AALBORG UNIVERSITET

Fakultetskontoret for
ENGINEERING, SUND og TECH

Dokument dato: 12. december 2017

Dokumentansvarlig: Mark Gammeljord

Akademisk Råd indkaldes hermed til møde nr. 20177 onsdag den 20. december 2017 kl. 12.30-16.00 Mødelokale *A Novi, Alfred Nobelsvej 21*

Indkaldte:
Mads Græsbøll Christensen, Henrik Pedersen, Petar Popovski, Knud Erik Skouby, Thomas Bak, Arne Remmen, Henrik Lund, Claus Lassen, Bent Thomsen, Ivan Aaen, Stefania Serafin, Morten Meyer Rasmussen, Lukas Bjørn Leer Bysted, Kristoffer Holger Weithøft Lindstrøm, Torben Larsen, Kirsten Nielsen, Lise Kirt Nordensgaard

Afbud: Thomas Bak, Claus Lassen, Lise Nordensgaard

Referent: Mark Gammeljord

	Dagsordenpunkter
1.	**Godkendelse** A. Godkendelse af dagsorden for AR ekstra møde 201217 B. Godkendelse af referat af AR møde 20176 **Orientering:** C. Referat fra ph.d.-udvalgsmøde 5-2017 den 24. oktober 2017. **Bilag 20177-1c**
2.	**Tildeling af ph.d.-grad til positivt bedømte ph.d.-afhandlinger fra:** A. Asger Heidemann Andersen, Institut for Elektroniske Systemer. Afhandlingens titel: ”Speech Intelligibility Prediction for Hearing Aid Systems”. B. Bijay Neupane, Institut for Datalogi. Afhandlingens titel: ”Predictive Data Analytics for Energy Demand Flexibility”. C. Chres Wiant Sørensen, Institut for Elektroniske Systemer. Afhandlingens titel: ”On Tunable Sparse Network Coding in Commercial Devices for Networks and Filesystems”. D. Christina Dahl Madsen, Institut for Planlægning. Afhandlingens titel: ”The logic of the project – a paradox in public administration”. E. Dilshod Ibragimov, Institut for Datalogi. Afhandlingens titel: ”Optimizing Analytical Queries over Semantic Web Sources”. F. Emmanouil Valsomatzis, Institut for Datalogi. Afhandlingens titel: “Aggretatioon Techniques for energy flexibility” G. Lotte Raun, Institut for Arkitektur og Medieteknologi. Afhandlingens titel: “Designing

	for service change. A study on how designers address implementation of service changes during service design projects for hospitals" H. Nicolai Bæk Thomsen, Institut for Elektroniske Systemer. Afhandlingens titel: "Speech processing for social robots to improve interaction with humans" I. Niels Werner Adelman-Larsen, Institut for Elektroniske Systemer. Afhandlingens titel: "Reverberation times suitable for venues that present pop and rock music" J. Ramin Irani, Institut for Arkitektur og Medieteknologi. Afhandlingens titel: "Computer vision-based methods for detection and measurement of psychophysiological indicators" **Bilag 20177-2**
3.	**Indstillinger vedr. sammensætning af sagkyndigt udvalg vedr. professorstillingen i:** A. "Human Geography" ved Institut for Planlægning (stilling 60230) **Bilag 20177-3**
4.	**Indstilling vedr. sammensætning af sagkyndige udvalg vedr. adjunktstillingerne i:** A. "Geoinformatics" ved Institut for Planlægning (stilling 201737) B. "Energy Planning and Energy Systems Modelling" ved Institut for Planlægning (stilling 201738) C. "Energy Planning and Geographical Information Systems" ved Institut for Planlægning (stilling 201739) **Bilag 20177-4**
5.	**Indstillinger vedr. sammensætning af sagkyndigt udvalg vedr. postdocstillingen i:** A. "Aerial connectivity over cellular networks" ved Institut for Elektroniske Systemer (stilling P21748) B. "Control Theory" ved Institut for Elektroniske Systemer (stilling P21752) C. "Sensor Technology for Creative Robotics in Architecthure" ved Institut for Arkitektur og Medieteknologi (stilling P21755) **Bilag 20177-5**
6.	**Fremme af god videnskabelig praksis** Som følge af den nye organisering af Aalborg Universitets Praksisudvalg (AAU Praksisudvalg eller PU AAU) pr. 1. juli 2017, blev ansvaret for fremme af god videnskabelig praksis placeret hos de Akademisk Råd (AR). Akademisk råd bedes derfor drøfte og beslutte en proces for, hvordan rådet får udarbejdet nye retningslinjer for fremme god videnskabelig praksis. Kristian Østergaard Sørensen og Helen Kjerstein Kristensen fra Ph.d.-kontoret deltager under punktet. **Bilag 20177-6a** **Bilag 20177-6b** **Bilag 20177-6c** **Bilag 20177-6d**
7.	**Æresdoktor 2018 for TECH** Akademisk Råd bedes drøfte og godkende indstillingen fra bedømmelsesudvalget **Bilag 20177-7a** **Bilag 20177-7b**
8.	**Godkendelse af mødekalender 2018** AR bedes godkende mødekalenderen for 2018

	Bilag 20177-8a **Bilag 20177-8b**
9.	**Rammer for Akademisk Råds virke** AR bedes drøfte hvilke rammer der er nødvendige for at rådet kan udøve sit virke og efterkomme de krav som er beskrevet til Akademisk råd i universitetsloven
10.	**Meddelelser fra dekanen og/eller formanden**
11.	**Eventuelt**

Til orientering

OBS! Vedr. bedømmelsesudvalg: I de tilfælde hvor ansøgningsfristen ligger efter Akademisk Råds møde kontrolleres der efterfølgende for inhabilitet og sammensætning af udvalget (kvindelig bedømmer). Hvis der konstateres uregelmæssigheder, vil dekanen/formanden godkende nyt/nye medlemmer.

AALBORG UNIVERSITET

Fakultetskontoret for
ENGINEERING, SUND og TECH

Dokument dato: 6.december 2017

Dokumentansvarlig: Mark Gammeljord

Akademisk Råd indkaldes hermed til møde nr. 20176 onsdag den 6. december 2017 kl. 12.30-14.30 NOVI, Niels Jernes Vej 10, mødelokale 5

Tilstedeværende

Mads Græsbøll Christensen, Thomas Bak, Arne Remmen (Skype), Claus Lassen, Ivan Aaen, Lukas Bjørn Leer Bysted, Kristoffer Holger Weithøft Lindstrøm, Torben Larsen, Kirsten Nielsen, Lise Kirt Nordensholt

Afbud: Henrik Pedersen, Bent Thomsen, Petar Popovski, Henrik Lund, Knud Erik Skouby, Morten Meyer Rasmussen, Stefania Serafin, Morten Meyer Rasmussen

Referent: Mark Gammeljord

	Dagsordenpunkter
1.	**Godkendelse** A. Godkendelse af dagsorden for AR møde 20176 B. Godkendelse af referat af AR møde 20175 **Orientering** **Bilag 20176-1**
	Dagsorden blev ændret, da der ikke var tilstrækkeligt fremmødte medlemmer til, at AR var beslutningsdygtige. Punkt 6 blev fastholdt. AR drøfter punktet, hvorefter høringssvar udsendes til skriftelig høring blandt AR medlemmerne. De resterende punkter på dagsorden udskydes til AR møde d. 20. december.
2.	**Tildeling af ph.d.-grad til positivt bedømte ph.d.-afhandlinger fra:** A. Asger Heidemann Andersen, Institut for Elektroniske Systemer. Afhandlingens titel: ”Speech Intelligibility Prediction for Hearing Aid Systems”. B. Bijay Neupane, Institut for Datalogi. Afhandlingens titel: ”Predictive Data Analytics for Energy Demand Flexibility”. C. Chres Wiant Sørensen, Institut for Elektroniske Systemer. Afhandlingens titel: ”On Tunable Sparse Network Coding in Commercial Devices for Networks and Filesystems”. D. Christina Dahl Madsen, Institut for Planlægning. Afhandlingens titel: ”The logic of the project – a paradox in public administration”. E. Dilshod Ibragimov, Institut for Datalogi. Afhandlingens titel: ”Optimizing Analytical Queries over Semantic Web Sources”.

	Bilag 20176-2
	Punktet blev udsat til AR møde d. 20. december
3.	**Indstillinger vedr. sammensætning af sagkyndigt udvalg vedr. professorstillingen i:** A. "Human Geography" ved Institut for Planlægning (stilling 60230) **Bilag 20176-3**
	Punktet blev udsat til AR møde d. 20. december
4.	**Indstilling vedr. sammensætning af sagkyndige udvalg vedr. adjunktstillingerne i:** A. "Geoinformatics" ved Institut for Planlægning (stilling 201737) B. "Energy Planning and Energy Systems Modelling" ved Institut for Planlægning (stilling 201738) C. "Energy Planning and Geographical Information Systems" ved Institut for Planlægning (stilling 201739) **Bilag 20175-4**
	Punktet blev udsat til AR møde d. 20. december
5.	**Indstillinger vedr. sammensætning af sagkyndigt udvalg vedr. postdocstillingen i:** A. "Aerial connectivity over cellular networks" ved Institut for Elektroniske Systemer (stilling P21748) B. "Control Theory" ved Institut for Elektroniske Systemer (stilling P21752) **Bilag 20176-5**
	Punktet blev udsat til AR møde d. 20. december
6.	**Høring af rektors forslag til budgetprincipper for budget 2019** Kristian Vagn Nielsen fra fakultetskontorets Økonomi Service præsenterer på mødet forslaget om ændring af universitetets budgetprincipper fra og med budget 2019. Akademisk bedes drøfte rektors forslag til ændring af budgetprincipper fra og med budget 2019, samt udarbejde et høringssvar hertil. **Bilag 20176-6a** **Bilag 20176-6b** **Bilag 20176-6c** **Bilag 20176-6d**
	Præsentation af rektors forslag til budgetprincipper fra og med budget 2019 ved Kristian Vagn Nielsen. Udkast til høringsvar udarbejdes, hvorefter det sendes rundt til kommentering blandt rådets medlemmer. Herefter fremsendes det til rektor.
7.	**Fremme af god videnskabelig praksis** Som følge af den nye organisering af Aalborg Universitets Praksisudvalg (AAU Praksisudvalg eller PU AAU) pr. 1. juli 2017, blev ansvaret for fremme af god videnskabelig praksis placeret hos de Akademisk Råd (AR). Akademisk råd bedes derfor drøfte og beslutte en proces for, hvordan rådet får udarbejdet nye retningslinjer for fremme god videnskabelig praksis. Kristian Østergaard Sørensen og Helen Kjerstein Kristensen fra Ph.d.-kontoret deltager under punktet. **Bilag 20176-7a** **Bilag 20176-7b** **Bilag 20176-7c** **Bilag 20176-7d**
	Punktet blev udsat til AR møde d. 20. december
8.	***Æresdoktor 2018 for TECH*** Akademisk Råd bedes drøfte og godkende indstillingen fra bedømmelsesudvalget

	Bilag 20176-8a **Bilag 20176-8b**
	Punktet blev udsat til AR møde d. 20. december
9.	**Godkendelse af mødekalender 2018** AR bedes godkende mødekalenderen for 2018 **Bilag 20176-9a** **Bilag 20176-9b**
	Punktet blev udsat til AR møde d. 20. december
10.	**Meddelelser fra dekanen og/eller formanden**
	Punktet blev udsat til AR møde d. 20. december
11.	**Eventuelt**

Til orientering

- Fortegnelse over sager godkendt af dekanen siden sidst

OBS! Vedr. bedømmelsesudvalg: I de tilfælde hvor ansøgningsfristen ligger efter Akademisk Råds møde kontrolleres der efterfølgende for inhabilitet og sammensætning af udvalget (kvindelig bedømmer). Hvis der konstateres uregelmæssigheder, vil dekanen/formanden godkende nyt/nye medlemmer.

AALBORG UNIVERSITET

The Technical Doctoral School of It and Design
Niels Jernes Vej 10
9220 Aalborg Ø

Sagsbehandler:
Helen Kjerstein Kristensen
Telefon: 99 40 73 73
Email: hek@adm.aau.dk

Til stede:
Christian S. Jensen
Lars Bo Henriksen
Rafael Wisniewski
Mads Græsbøl Christensen
Michael Kvist Svangren
Anne Juhler Hansen
Charlotte Holmberg
Helen Kjerstein Kristensen (ref.)

Afbud:
Peter Axel Nielsen

Dato: 06-11-2017
Sagsnr.: 2017-561-00004

Ph.d.-udvalgsmøde 5-2017 tirsdag den 24. oktober 2017 kl. 8.30, Niels Jernes Vej 10, lokale 5

1. Godkendelse af dagsorden
Dagsordenen blev godkendt med følgende ændring: Punkt 3: Kriterier for godkendelse af bedømmelsesudvalg tages før punkt 2: Nedsættelse af bedømmelsesudvalg.

2. Kriterier for godkendelse af bedømmelsesudvalg
Kravet til at være medlem af et bedømmelsesudvalg er, at man skal være anerkendt forsker. En anerkendt forsker er en person, der i en årrække på videnskabeligt niveau aktivt har beskæftiget sig med forskning, og som er på mindst lektor- eller professorniveau. Der var enighed at tilføje til tjeklisten, at beskrivelsen af hvorfor der ikke er inhabilitet skal være grundig og indholdsmæssig samt indeholde en liste over de fælles publikationer, der er. Det er ikke tilstrækkeligt bare at skrive, at publikationssammenfaldet er ubetydeligt. Herved håber ph.d.-udvalget, at der kan reduceres i sagsbehandlingstiden. Ændringsforslaget rundsendes til ph.d.-udvalget til godkendelse pr. mail.

3. Nedsættelse af bedømmelsesudvalg

a) Vedr. cand.polyt. Abdul Rauf Khans' ph.d.-afhandling:"Statistical Data Mining and Machine Learning an Application in Manufacturing Industry", Institut for Elektroniske Systemer.
Ph.d.-udvalget kan ikke godkende den ene eksterne bedømmer. Begrundelsen er, at ph.d.-udvalget lægger vægt på, at medlemmerne skal have erfaring med forskeruddannelse.

b) Vedr. cand.polyt. Jesper Viese Knudsens ph.d.-afhandling: "Modeling, Control, and Optimization for Diesel Generators", Institut for Elektroniske Systemer.
Ph.d.-udvalget godkendte bedømmelsesudvalget. Ph.d.-udvalget henstiller til, at instituttet i højere grad drager omsorg for, at der ikke er publikationssammenfald mellem hovedvejleder og bedømmerne.

c) Vedr. cand.polyt. Alex Oliveras Martinez' ph.d.-afhandling: "Characterization and Modelling of Massive MIMO Channels", Institut for Elektroniske Systemer.
Ph.d.-udvalget godkendte bedømmelsesudvalget.

d) Vedr. cand.polyt. Lars Grundahls ph.d.-afhandling: "District Heating and a Danish Heat Atlas", Institut for Planlægning.

Ph.d.-udvalget godkendte bedømmelsesudvalget.

4. Meddelelser

CSJ er blevet bedt om at levere fokuspunkter på ph.d.-området til budgettet. Der er meldt fire punkter ind: 1. Prioriteret rekruttering af ph.d.-studerende vs. post docs. 2: Fokus på forbedret rekruttering af ph.d.-studerende. 3: Karrierevejledning for ph.d.-studerende. 4: Employability for ph.d.-studerende. Der vil også være mere fokus på ErhvervsPhD og Erhvervs postdoc.

Epinion har nu leveret sidste udkast til karriereundersøgelsen, og den forventes at være klar inden for kort tid. Den vedlægges til næste møde i ph.d.-udvalget.

5. Monitorering af ph.d.-kurser

CSJ: Programmet Computer Science rettes til. Den sidste del af navnet ”and Engineering” er fjernet. Sekretariatet bedes sikre, at excel-arket afspejler dette.

6. Regler for fordeling af ECTS fra kurser

CSJ: Vi har regler for, hvilke kurser man skal have. Man skal have cirka 30 ECTS. Vi deler kurserne op i projektspecifikke og generelle kurser. CSJ henstiller til, at vi fremadrettet anvender denne terminologi og ikke siger programspecifikke. Man skal have 10 ECTS projektspecifikke og 10 ECTS generelle. Resten kan man selv placere. Der kan anvendes maksimalt 6 ECTS til konferencer/studiekredse. Det vil blive nævnt i nyhedsbrevet.

7. Rekrutteringsoplæg

CHO kan være med til at kvalificere rekrutteringsprocessen ved at lave PI-tests på ansøgere til ph.d.-stillinger. Testen kan hjælpe med til at forme interviewet, fordi det kan vise, hvor man skal spørge ind. Det skal ses som et supplement til den faglige vurdering. CSJ: Det er et godt tilbud. Det er ikke nødvendigvis vejledernes spidskompetence at vurdere de menneskelige kvaliteter, da de er fokuserede på fagligheden og de videnskabelige kvalifikationer. PI-testen kan vise, hvor ansøgerens styrker og svagheder er og dermed være med til at styre interviewet. CHO deltager gerne i selve samtalen. CHO vil gerne udarbejde en spørgeguide. Det vil blive nævnt i nyhedsbrevet.

8. Mødedatoer for 2018

Sekretariatet finder mulige datoer via sammenhold af kalendere. Endvidere forsøges at finde ny dato for december-mødet.

9. Eventuelt

CSJ: Vi har lige fastlagt forslag til budget for ph.d.-skolen. I år var første år med TECH-budget.

AALBORG UNIVERSITET
Institut for Elektroniske Systemer
Fredrik Bajers Vej 7B
9220 Aalborg Ø
www.es.aau.dk

Dato: 24. november 2017

Til Forskerskolen
Att.: Lisbeth Diinhoff
N.J. 10

Vedrørende tildeling af ph.d.-grad til Asger Heidemann Andersen

Institut for Elektroniske Systemer indstiller at bedømmelsesudvalgets indstilling følges således at Asger Heidemann Andersen tildeles ph.d.-graden for sin ph.d.-afhandling "Speech Intelligibility Prediction for Hearing Aid Systems". Forsvaret fandt sted d. 22.11.2017.

Professor Zheng-Hua Tan været hovedvejleder for Asger Heidemann Andersen.

Med venlig hilsen

Børge Lindberg

Institutleder

Institutleder Børge Lindberg, tlf. +45 9940 8638, E-mail bli@es aau.dk
Institutsekretær Kirsten Jensen, tlf. +45 9940 8650, E-mail kri@es.aau dk

AALBORG UNIVERSITY
DENMARK

Assessment of the PhD thesis entitled:

Speech Intelligibility Prediction for Hearing Aid Systems

Submitted by Asger Heidemann Andersen, M.Sc. in Wireless Communication

The assessment committee consists of the following members as decided by the Dean of the Technical Faculty of IT and Design on 3 August, 2017:

- Member 1: Dr. rer, nat.Thomas Brand, Department of Medical Physics and Acoustics, Oldenburg University, Germany. E-mail: Thomas.brand@uni-oldenburg.de
- Member 2: Reader Mike Brookes, Electrical and Electronic Engineering, Imperial College London, United Kingdom. E-mail: mike.brookes@imperial.ac.uk.
- Member 3 (chairman): Associate Professor Flemming Christensen, Department of Electronic Systems, Aalborg University. E-mail: fc@es.aau.dk.

Supervisor for the thesis has been Professor, Zheng-Hua Tan, Aalborg University.

Co-supervisors for the thesis have been Professor, Jesper Jensen, Aalborg University & Oticon A/S and Tekn. Dr. Jan Mark de Haan, Oticon A/S.

Description of the thesis

The thesis is based on a collection of 3 journal and 5 conference papers and contains an introduction to the topic including summary of the findings. The introduction contains 5 chapters (1 The Challenges of Speech Communication, 2 Speech Intelligibility Prediction, 3 Applications to Hearing Aid Systems, 4 Summary of Contributions, 5 Directions of Future Research) and it is accompanied by a list of references (155). The thesis has a length of 258 pages of which the introduction takes 46 pages and the papers 183.

The papers are:

- Paper A: A Binaural Short Time Objective Intelligibility Measure for Noisy and Enhanced Speech, Asger Heidemann Andersen, Jan Mark de Haan, Zheng-Hua Tan, Jesper Jensen, INTERSPEECH, pp. 2563–2567, Dresden, Germany, 2015, (Status: Printed).
- Paper B: A Method for Predicting the Intelligibility of Noisy and Non-Linearly Enhanced Binaural Speech, Asger Heidemann Andersen, Jan Mark de Haan, Zheng-Hua Tan, Jesper Jensen, 41st IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), Shanghai, China, pp. 4995-4999, 2016, (Status: Printed).
- Paper C: Speech Intelligibility Prediction as a Classification Problem, Asger Heidemann Andersen, Esther Schoenmaker, Steven van de Par, 26th IEEE International Workshop on Machine Learning for Signal Processing (MLSP), pp. 1-6, Salerno, Italy, 2016, (Status: Printed).
- Paper D: Predicting the Intelligibility of Noisy and Non-Linearly Processed Binaural Speech, Asger Heidemann Andersen, Jan Mark de Haan, Zheng-Hua Tan, Jesper Jensen, IEEE/ACM Transactions on Audio, Speech, and Language Processing, Vol. 24, No. 11, pp. 1908–1920, 2016, (Status: Printed).
- Paper E: A Non-Intrusive Short-Time Objective Intelligibility Measure, Asger Heidemann Andersen, Jan Mark de Haan, Zheng-Hua Tan, Jesper Jensen, 42st IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), New Orleans, United States, pp. 5085-5089, 2017, (Status: Printed).
- Paper F: On the use of Band Importance Weighting in the Short-Time Objective Intelligibility Measure, Asger Heidemann Andersen, Jan Mark de Haan, Zheng-Hua Tan, Jesper Jensen, INTERSPEECH, pp. 2963–2967, Stockholm, Sweden, 2017, (Status: Printed).

- Paper G: Refinement and Validation of the Binaural Short Time Objective Intelligibility Measure for Spatially Diverse Conditions, Asger Heidemann Andersen, Jan Mark de Haan, Zheng-Hua Tan, Jesper Jensen, Speech Communication, (Status: Submitted).
- Paper H: Non-Intrusive Speech Intelligibility Prediction using Convolutional Neural Networks, Asger Heidemann Andersen, Jan Mark de Haan, Zheng-Hua Tan, Jesper Jensen, IEEE/ACM Transactions on Audio, Speech, and Language Processing, (Status: Submitted).

Assessment of the thesis

Part 1: Extended summary

The extended summary is very well written and easy to read. It gives a clear formulation of the goals of the research and motivates their importance.

Section 1 gives a general high-level description of the process of speech communication including hearing, speech production, speech processing, binaural processing, assessment of intelligibility, and different factors influencing speech intelligibility. It explains the reasons why the thesis concentrates on using intelligibility as a performance measure and goes on to discuss the properties of the communications chain that affect the intelligibility of speech.

Section 2 gives an introduction to speech intelligibility prediction (SIP). It presents a taxonomy of intelligibility prediction algorithms in which they are classified according to their required input signals and to whether they attempt to predict monaural or binaural intelligibility. It appears that not all existing algorithms fit perfectly into the taxonomy, but it is very helpful for the organisation of this thesis, as all papers are clearly dedicated to this taxonomy as explained in section 4. Section 2 goes on to review the important intelligibility prediction algorithms that have been previously described in the literature. The review is well presented; it clearly identifies the differences between algorithms and explains the principles that underlie each one. The review could have been strengthened by the inclusion of quantitative comparisons of algorithm performance in addition to the qualitative comparisons that it currently presents.

Section 3 describes how intelligibility prediction algorithms can help in the development and, potentially, the operation of hearing aids. It presents a classification of SIP in the development of hearing aids as well as in future hearing aid processing. This is essential for defining the rationale of this thesis and for motivating the two main focusses: binaural SIP and non-intrusive SIP.

Section 4 presents an overview and short summary of the papers. It summarizes the contributions of the thesis, explains how each of the presented papers fits into the taxonomy presented in Sec. 2 and provides a brief overview of the contribution from each paper.

Section 5 briefly suggests some directions for future work including deep learning neural networks that will certainly offer new possibilities that go beyond the scope of the thesis.

The use of references is extensive. A bibliography of 155 references is included.

The contributions of the work presented in this thesis lie in two main areas.

1. It introduces a novel algorithm for binaural SIP. Although other researchers have previously proposed algorithms for this task, this is the first algorithm that is able to give reliable results even when the speech has been processed by an enhancement algorithm as is typical in a hearing aid. In the course of

several papers [A, B, D, G], the proposed algorithm has been refined and improved in order to enlarge the range of circumstances under which it performs reliably.

2. The second main area of contributions is in the development of a SIP algorithm that is non-intrusive, i.e. one that does not require knowledge of the undistorted speech signal. The thesis present two alternative approaches to this problem. Although both extract similar features from the degraded speech signal, one uses signal processing techniques to estimate the unknown clean speech signal while the other uses a neural network to estimate the intelligibility of the degraded speech directly.

Part 2: Papers

In general, all papers appear very well written with a common clear and systematic approach to research communication.

Paper A:

This paper presents the BSTOI metric, which combines the equalization-cancellation (EC) model with the short time objective intelligibility measure (STOI). Similar combinations of the EC model exist with other measures, for instance with the speech intelligibility index (SII). However, as this model requires the clean speech signal and the degraded binaural signal as inputs, it has the advantage – over previous binaural intelligibility metrics – that it can be applied not only to linearly processed speech (as other models), but also to non-linearly processed signals. Experimental results show that it is able to predict the binaural advantage as a function of interferer azimuth in experiments that use a speech target and speech-shaped noise interferer. The derivation of the model is very systematic and the evaluation convincing.

Paper B:

This paper is a predecessor of paper D. Details are discussed there.

Paper C:

This paper investigates how individual stimuli - nonsense syllables (logatomes) - can be predicted in a binaural setting by means of STOI-like features extracted from noisy speech. Different methods of feature extraction are compared and analysed with Fisher linear discriminant analysis. It shows that, with this rather straightforward classifier, the performance of the classifier is substantially better than chance but that it normally over-predicts the intelligibility. Interestingly all three types of feature extraction lead to similar results and feature dimensionality seems to play a major role. This paper contains many interesting new ideas which should be further investigated in future studies.

Paper D:

This paper presents the deterministic binaural STOI (DBSTOI) metric, which replaces Monte Carlo elements of the BSTOI presented in paper A by the deterministic calculation of an expected value. This removes the stochastic uncertainty in the measure and reduces its computational complexity by almost a factor of 20. The paper includes similar evaluation results as in paper A, which show that the performance is very similar to that of BSTOI. For computational tractability reasons, a number of simplifications were made to the STOI measure, but although the paper states that these have no apparent effect on performance, no systematic evaluations are performed to validate this explicitly.

An important feature of the DBSTOI measure is the simple frame-based voice activity detector (VAD) which is essential also in the following papers. The analytical derivations are elegant and include the state-of-the art knowledge on this field. The evaluation of the model is convincing. It is shown that the DBSTOI is applicable to different situations including non-linear processed signals.

Paper E:

Most speech intelligibility metrics require knowledge of the clean speech signal. This paper presents a non-intrusive metric (NI-STOI) that uses only the mixed noisy speech. The metric uses principal component analysis to estimate the modulation domain characteristics of the clean speech and then uses a STOI-like measure to estimate the intelligibility. This has several advantages for many applications. The calculation of the NI-STOI still uses the correlation in the modulation domain of a clean speech estimate with the mixed signal. Interestingly, the estimate of the clean signal is based on the mixture itself. This is achieved using a sparse-principal-component-analysis of the speech estimate, which does only represent those signal components that have been trained as speech-like. This training appears to be superior to the heuristic assumptions used in the non-intrusive SRMR model, which has many conceptual similarities. Interestingly, only the lowest modulation frequency channel is required for NI-STOI analysis. This even increases the similarity to the SRMS model. It is not easy to see why the training of the NI-STOI is introducing such a large advantage.

It would have been nice to compare the performance with other published non-intrusive metrics that are designed for intelligibility estimations, but the evaluation of the model with human data is convincing and it is not surprising that the model fails when the competing signal contains a single speech source, because so far the model applies no stream segregation.

Paper F:

The original STOI measure was constructed with strong focus on simplicity and included no band importance weighting (BIF). This paper investigates whether the performance of STOI could be improved by applying non-uniform weights as is done in most other speech intelligibility prediction algorithms. Although it does not quite have the best overall performance, the paper concludes that, surprisingly, the uniform weights of the existing algorithm are the best choice. The statistical analyses using Kendall's tau is very elegant here, because it excludes the effect of the reference intelligibility function that interacts with the BIF. Even though this study produced a negative result, it is important that this work was done as we now know that BIFs do not significantly improve STOI. However, it would have improved the paper if the values used in the evaluated non-uniform weight functions were shown.

Paper G:

This paper investigates a bias observed in DBSTOI (paper D) that arises in poor SNR conditions when diffuse noise is present. The origin of the bias is identified and a modified metric, MBSTOI, is proposed in which it is largely eliminated. Experimental results confirm that the modified metric performs almost as well as DBSTOI in other circumstances. The MBSTOI is evaluated using critical data for additive noise, but not for distorted signals. However, arguments are presented why the derivation of MBSTOI is expected to hold also for non-linearly processed signals. This is convincing but clearly further work is required regarding this question.

Paper H:

Like paper E, this paper presents a non-intrusive speech intelligibility metric that uses STOI-like features. The method applies a convolutional neural network and a relatively small data basis which the author justifies with the fact that SIP is a simple problem compared to automatic speech recognition (ASR) and that therefore smaller neural networks and smaller data bases (compared to ASR) can be used. The algorithm is tested on a range of datasets and found to give intelligibility predictions that are as good as or better than those of STOI and ESTOI despite having no access to the clean speech signal. The results of this approach are very promising even though further situations have to be evaluated in future work. A very useful result of this approach is that the convolution kernels that are generated during training can be visualized. This offers different directions of further research which are promising.

Oral presentation and discussion
Date and place of the oral defence: 22 November 2017, Aalborg, Denmark.

Asger gave a 45 minutes presentation of his work keeping within the allowed time. The presentation was well structured and supported by good illustrations explaining both technical matters as well as the overall structure of the PhD study. After the presentation the committee raised a number of general and specific questions, which were discussed during a period of 1 hour and 40 minutes. Asger engaged in the scientific discussion with very elaborate and well structured answers on the topics brought to question. He demonstrated a wide knowledge within the area, both on the general overview and on very specific questions.

Conclusions

Overall, the work presented in this thesis has made a substantial and very significant contribution to the field of speech intelligibility prediction (SIP) with the two main focusses: Binaural SIP and non-intrusive SIP. As the resulting SIP tools can be applied to non-linearly processed signals, this work enables the use of SIP in the development of hearing aid speech enhancement algorithms in a way that was not previously practicable. The amount of work presented is clearly very large compared to the average PhD thesis.

The thesis is very well written and easy to read. It has two main parts, the introduction and the papers. Both parts demonstrate the clear conception and elaborated realisation of this thesis. The author demonstrates a deep knowledge of the state-of-the-art of current research and successfully contributes to the field by consequent work and many new ideas. This progress was achieved by precise analysis and further development of existing methods like the STOI measure and the EC model as well as evaluating ideas regarding the use of for instance neural networks.

At the defence, the candidate gave a very well structured presentation and engaged with confidence, scientific maturity and a general high level in the scientific discussion.

The committee unanimously recommends that Asger Heidemann Andersen is awarded the PhD degree.

22 November 2017

Thomas Brand

Mike Brookes

Flemming Christensen

AALBORG UNIVERSITET

Cassiopeia

Det Teknisk Naturvidenskabelige Fakultet
Forskerskolen
Njv 10

Att.: Bettina Wedde

8 november 2017

Institut for Datalogi
Selma Lagerlöfs Vej 300
9220 Aalborg
Tlf. 9635 8080
Fax 9635 9798
i16@cs aau dk
www cs aau dk

Institutleder
Kristian G. Olesen
Tlf. 9635 9852

Sagsbehandler
Helle Schroll
Tlf. 9635 8852

Ph.d.- forsvar Bijay Neupane

Vedlagt fremsendes underskrevet indstilling for Bijay Neupane, som forsvarede sin ph.d. afhandling den 3. november 2017 på SL 300.

Best regards,

Helle Schroll

AALBORG UNIVERSITY
DENMARK

Assessment of the PhD thesis entitled:

Predictive Data Analytics for Energy Demand Flexibility

Submitted by Bijay Neupane, M.Sc. in August 2017.

The assessment committee consists of the following members as decided by the Dean of the Technical Faculty of IT and Design on 10 August 2017:

- Member 1: Professor Toon Calders, University of Antwerp/ULB Bruxelles, Belgium. E-mail: toon.calders@ulb.ac.be
- Member 2: Dr. Mathieu Sinn, IBM Research Ireland, Ireland. E-mail: MATHSINN@ie.ibm.com
- Member 3 (chairman): Associate Professor Bin Yang, Aalborg University, Denmark. E-mail: byang@cs.aau.dk

Supervisor for the thesis has been Professor Torben Bach Pedersen Aalborg University, Denmark.

Co-supervisor for the thesis has been Prof. DR.-ING. Wolfgang Lehner, TU Dresden, Germany.

Description of the thesis

The thesis is based on a collection of 6 papers, which consists of 143 pages in total. The detailed information of the 6 papers is listed as follows.

- Paper [1]: Bijay Neupane, Torben Bach Pedersen, and Bo Thiesson, "Evaluating the Value of Flexibility in Energy Regulation Markets". In Proceedings of the 2015 ACM Sixth International Conference on Future Energy Systems (e-Energy '15), Bangalore, India, pages 131-140, 2015. Published.
- Paper [2]: Bijay Neupane, Torben Bach Pedersen, and Bo Thiesson, "Towards flexibility detection in device-level energy consumption" In Proceedings of the Second ECML/PKDD Workshop, DARE'14, pages 1-16, 2014. Published.
- Paper [3]: Bijay Neupane, Laurynas Šikšnys, and Torben Bach Pedersen, "Device level Demand Forecasting for Flexibility Markets," Submitted for journal publication, Submitted in August 2017.
- Paper [4]: Bijay Neupane, Laurynas Šikšnys, and Torben Bach Pedersen, "Generation and Evaluation of Flex-Offers from Flexible Devices," In Proceedings of the ACM Eighth International Conference on Future Energy Systems (e-Energy '17), Hong Kong, pages 131-140, 2017. Published.
- Paper [5]: Davide Frazzetto, Bijay Neupane, Thomas Dyhre Nielsen, and Torben Bach Pedersen, "User-comfort Oriented Prediction and Scheduling of Flex-Offers from Flexible Units," In preparation.
- Paper [6]: Bijay Neupane, Laurynas Šikšnys, and Torben Bach Pedersen, "DeMand: A Tool for Evaluating and Comparing Device-Level Demand and Supply Forecast Models". In proceeding of the Workshops of the EDBT/ICDT 2016 Joint Conference, EnDM 2016, Bordeaux, France, pages 1-6, 2016. Published.

Assessment of the thesis

Mini review for Paper [1]: Evaluating the Value of Flexibility in Energy Regulation Markets

This paper tackles a challenging research question: what is the utility of energy flexibility offers in the Nordic spot and regulation markets? Higher flexibility leads to a better balance between demand and supply and as such helps to avoid up/down regulation. One of the key steps in answering that question is designing a model for up/down regulation prices as a function of the spot market price and the up/down

regulation volume. The authors consider three different models which are validated and compared against each other. Controlled experiments using real-world data combined with the simulated effect of moving an assumed flexible offer show that significant gains could be achieved when part of the offer is made flexible.

The description and formulation of market objectives of utilizing flexibility is very clear. The experimental analysis in Section 6 is conducted systematically and discussed carefully. The main takeaway messages from this chapter are solidly grounded. A few concerns / unclear points:

- It would have been good to include the actual performance of the final model (in terms of MSE or other metrics). Otherwise, this leaves the question how reliable the estimated price is. As this price is a key element in the measurement of the benefits of the method, the conclusions are not fully supported by the experiments. Perhaps include a graphical comparison of model output / market actuals for the testing period (Jan-Feb 2014).
- What exactly is 'n' (in the notation of Section 5), i.e., into how many individual flex-offers is the total capacity of 1, 10, ..., 250MWh divided?
- It would have made sense to introduce randomness to the greedy algorithm (solving equation (7)), run it repeatedly, and report the maximum benefit over all runs. This would have helped to avoid some of the artefacts in Figure 5 (a) (e.g., non-monotonic relations between capacity and savings), which seem to be due to the exact order in which the greedy algorithm evaluates flex-offers.
- It would have been good to run the experiments over different testing periods, as the provided test period (Jan-Feb 2014) is rather short and might exhibit a seasonal bias.
- The paper doesn't discuss the potential side effect that the costs of up/down regulation services might actually increase as a consequence of demand response, as up/down regulation becomes less lucrative and fewer market players might be offering those services.
- The references in this paper are mostly related to technical aspects of demand side management; it would have been interesting to compare the findings with results from the econometric literature, i.e. are the 49% reduction in regulation costs and 29.4% reduction in regulation volume coherent with findings by other authors.
- The estimation method seems to assume that demand and supply of energy is perfectly known at the time the flex-offers are planned. Given the nature of some of the energy sources such as wind energy this is a highly unrealistic assumption. Isn't it the case that the Balance Responsible Party actively tried to avoid any up- or down-regulation by setting the spot-price to the level that results in balance? I.e., where demand and supply curves meet? In this respect the up- or down-regulation are at least partially due to unpredictable fluctuations in supply. At least some discussion on this aspect would have been expected. A more realistic setting would hence be how to decide best, on the spot, if a flexible demand is moved to the current time, or away from it to optimize the balance in the view of an only partially known future.

Overall, the paper shows that in a very controlled setting, a flexible demand can lead to huge gains. In addition, the paper also makes a scientific contribution, and the link to the overall outline of the thesis is clear.

Mini review for Paper [2]: Towards flexibility detection in device-level energy consumption

The paper investigates properties of device-level energy, with the goal showing that there are regularities in device usage patterns. The importance of detecting such regularities is that they can be used as a first step towards automatic recognition of device flexibility and hence automating making flex-offers.

The starting point is a systematic list of patterns/correlations that might be present in or among particular devices. The authors carefully explain the dataset that is being used in the analysis. In particular, the dataset consists of energy consumption profiles for six different houses, each containing profiles for 16 to 24 individual devices. The workflow of pre-processing the data is arguably one of the biggest challenges working with such high-dimensional and low-level information. The proposed pre-processing approaches for anomaly removals, state segmentation, and filling gaps are explained in sufficient detail.

Finally, the paper uses descriptive and graphical statistics to extract patterns and correlations in device usage. The analysis is carried out systematically and discussed carefully. The analysis shows clear week versus weekend trends, and strong regularities in the times certain devices such as for instance dishwashers are operated. Moreover, there are strong correlations between different devices which is clearly very important when making flexible offers; for instance, strongly correlated devices could be packaged in one offer.

The methodology appears to be solid, although one has to keep in mind that they are evaluated on a relatively small dataset (devices from only six households), hence it is difficult to say how well they would generalize. The small size of the dataset and its quality issues make it difficult to come to conclusive answers for some of the hypotheses, which the author acknowledges. In contrast to the first sentence in Chapter 5.4 of the PhD thesis (which builds on this paper), it is hard to see that this work answered (or attempted to answer) the question whether the flexibilities that users have in their daily routines "are [...] enough".

To conclude, there is sufficient scientific value in this work and it is well-aligned with the goal of the thesis.

Mini review for Paper [3]: Device level Demand Forecasting for Flexibility Markets

This paper is yet unpublished and as such the review is based on Chapter 6 of the thesis. This paper studies forecasting models for energy demand at the device level, and analyses the utility of such forecasts for trading flexibility in energy markets. Strictly speaking, such forecasting models are developed only for washer/dryer devices, which perhaps should be made clear earlier on.

The modelling approaches are carefully explained: pattern sequence matching and logistic regression with importance weights and/or L1 regularization. However, little information is provided for the techniques used; it is especially not clear why exactly these three classifiers were chosen, and other, more state-of-the-art classifiers such as Random forests or Support Vector Machines have been omitted. Furthermore, clearly

the independent variables are correlated which is known to be a problem for logistic regression. In addition, there appear to be some inconsistencies in the formal write-up of Algorithm 1 and 2:

- Algorithm 1:
  - the implementation of p(h) in the case where M is empty (line 8/10) appears to be different from what is described in the text ("we calculate the probability over the complete dataset")
  - note that d-1 will be in M, leading to a problem in line 13 (since a_d is not available)
- Algorithm 2: M could still be empty after the while loop (line 2-5).

It is unclear how to derive the loss in equation (4). Shouldn't this be a \leq instead of =?

This paper contains very little concrete information regarding the dataset characteristics. The experimental analysis (Section VI) doesn't mention the training/validation/test data split, which is an important detail for a machine learning model evaluation. What is the exact approach to "tune the model correctly so that it self-selects the most relevant [features]" (Section VI A)? It is not fully convincing that, based on looking at two devices on a relatively small dataset, one can conclude "that the proposed device-level forecast model is generalizable"; perhaps a more careful wording would have been advisable. In Section VI B, what exactly is the test period over which the savings in energy costs could be achieved?

Many of the settings in the experiments are insufficiently explained: (1) For the group level it is not explained how the groups are formed in the experimental section. The reader has to assume it is as given in the example when groups are introduced. (2) Similarly, the procedure to select the optimal lambda ("The best regularization parameter for the classifiers is estimated via cross-validation over each λ value.") What does this mean? Was cross-validation run for each value of lambda, and the best selected, or was the selection of the best lambda itself cross-validated? (as should have been done)

There is a section on demand forecast (instead of activation forecast) but experiments are absent. A reason for the absent experiments should be provided. Furthermore, to measure the performance of demand prediction it is proposed to bin the demands and predict the bin instead as a classification problem. It is unclear why this transformation is useful. This is clearly a regression problem of which performance could be measured with RMSE for instance.

The performance of the classifiers at the hourly level is poor. Statements like "the model achieves a precision of 1, i.e., 0 unexpected demands, for some threshold values" are deceptive given that this precision is reached for a very low recall value. At the daily level performances are more acceptable but it is questionable if predictions at this granularity are useful for the prediction task.

The overall goal in the chapter is very interesting and valuable. This paper is a scientific investigation of a challenging research question; it follows a methodological approach and obtains valid results on the given data set. The overall conclusion seems to be sufficiently supported: it is possible to some extent to predict whether or not a device will be used and at what time, based on historical information of the device's usage.

Mini review for Paper [4]: Generation and Evaluation of Flex-Offers from Flexible Devices

This paper corresponds to chapter 7 in the thesis and is by far the strongest of the thesis. This paper presents an essential piece of work on predictive analytics tools for extracting energy flexibility offers from device-level information. For three types of devices: wet devices, electronic vehicles, and heat pumps, it is studied how flex-offers can be generated based on historical information about the device's usage.

Algorithm 1-3 and Figures 3, 4-6 of paper [4] are a very clear, concise summary of the general workflow and specializations for particular devices. The presented methodology involves the combination of a large number of individual techniques and results, which is done excellently. The modular structure, formal descriptions in pseudo-code and graphical illustrations help the reader to understand the complex workflow at various levels of detail. The statistical and financial evaluations are described and carried out very carefully. Figure 14 needs a few improvements (the labels on the x-/y-axis appear to be wrong; the legend covers large parts of the graphs). It is a bit of overstatement to say that the proposed approach "can extract [device-level] flexibility with up to 98% accuracy" (Abstract), as this is only the case for particular types of devices with low amount of flexibility anyway.

As in the other chapters, for the flex offers that are generated, an evaluation procedure is developed that takes into account the economic reality of today's energy market. The experiments are well-designed and their results are clearly explained. From the experiments it is clear that the goal of the chapter, namely automatically generating profitable flex offers for the three aforementioned types of devices is reached by the methods exposed in the chapter. It would have been good to be clearer about the exact testing periods, particularly as some experiments (Figure 9-10) compare flexible demand over different seasons.

Overall this paper appears to be a solid and significant piece of work. The analysis of the results and the conclusion are of high scientific quality and the chapter is very well-written.

Mini review for Paper [6]: DeMand: A Tool for Evaluating and Comparing Device-Level Demand and Supply Forecast Models

This paper describes the architecture, implementation and interfaces of the "DeMand" system, which underlies a lot of the experimentation from the previous papers. Exemplarily, the deployment and evaluation of a device-level forecasting model is demonstrated. The paper is well written and organized. The paper describes the system with a use-case walking the reader through the different steps in the tool.

In terms of research originality and significance, this paper does not introduce any new scientific contributions but is of great importance for the dissemination of the work. It reads more like a technical report or demo paper, rather than solving a specific research challenge. In particular, the paper lacks an evaluation of the effectiveness of the DeMand system for model design and evaluation (e.g. by user

testing). It remains unclear who the users of this system would be, and how effective and efficient they would find this tool for accomplishing their goals. However, by making a tool available to other researchers the impact of the research increases and makes it more easily accessible. As such the tool in itself is a worthwhile contribution.

Overall comments for the whole thesis:

Overall, the PhD thesis is very well structured. The thesis studies an interesting research problem: how can data analysis and predictive analytics techniques be used to assist and support the system of flex offers in today's dynamical energy market. It is clear, in every chapter, how the individual pieces of work contribute towards the overall investigation. The writing is good, despite a relatively large number of minor grammatical mistakes (mostly singular/plural endings, present tense form in 3rd person singular versus other forms; "there" vs "their", "where" vs "were" etc), which could be easily fixed. The quality of the illustrations and graphs is excellent, and almost all figures and captions are self-explanatory. Experiments are carefully explained and evaluated. Real-world data sets are used in order to support the conclusions reached in the thesis.

The strength of this thesis lies in the breadth of its examination, which can be seen from the various techniques that had to be applied and combined in order to derive its main technical results: econometrics, data management, statistics, machine learning, pattern recognition, optimization as well as a thorough understanding of energy markets and flexibility concepts. The synthesis provided in this thesis is a significant scientific accomplishment and advancement of the state-of-the-art. The breadth of this thesis occasionally comes with a lack of depth; for example, it remains unclear how well the statistical forecasting methodology would generalize to other device-level data sets. Also, the state-of-the-art review could be more comprehensive; it often focuses on the application side, but doesn't go into much depth on the methodology. But this is probably unavoidable in a thesis which covers such a broad variety of topics.

The other main strength of the thesis is the multi-disciplinary nature in the sense that economical aspects are blended with more technical aspects. A prime example of this synergy is the evaluation of the predictive methods that were used not only in terms of precision and recall, but also in function of economic value. We are curious about whether the results are good enough to generate profit?

Oral presentation and discussion

The defense took place on 3rd November 2017, Aalborg, Denmark. It started at 13.00 and finished at 15.15. Bijay Neupane gave a presentation on "Predictive Data Analytics for Energy Demand Flexibility." The presentation was clear and gave a good overview of his work. The candidate gave a clear presentation of the results, with good use of examples and illustrations. The presentation covered all the main technical and scientific challenges presented in the thesis. The committee was very satisfied with the presentation.

The presentation was followed by questions from examiners. The candidate provided good answers to most of the questions from the committee, demonstrating his knowledge of the details involved. The committee was satisfied with the answers to the questions.

Conclusions

The papers included in the thesis are of good quality overall. Four papers have been published in high quality, peer-reviewed conferences and workshops, and one paper received the best paper award in the ACM e-Energy Conference 2017. Two other papers are under submission.

All papers fit well into the general context of the thesis outlined in the extended summary. The methods presented in the thesis clearly help advance the use of predictive analytics for detecting, extracting, and exploiting energy flexibility.

The candidate has clearly fulfilled the requirements for the degree of Ph.D. The committee unanimously recommends that Bijay Neupane is awarded the PhD degree.

Toon Calders	Mathieu Sinn	Bin Yang
3rd November 2017	3rd November 2017	3rd November 2017

AALBORG UNIVERSITET

Institut for Elektroniske Systemer
Fredrik Bajers Vej 7B
9220 Aalborg Ø
www.es.aau.dk

Dato: 7. november 2017

Til Forskerskolen
Att.: Lisbeth Diinhoff
N.J. 10

Vedrørende tildeling af ph.d.-grad til Chres Wiant Sørensen

Institut for Elektroniske Systemer indstiller at bedømmelsesudvalgets indstilling følges således at Chres Wiant Sørensen tildeles ph.d.-graden for sin ph.d.-afhandling "On Tunable Sparse Network Coding in Commercial Devices for Networks and Filesystems". Forsvaret fandt sted d. 3. november 2017.

Lektor Daniel E. Lucani været hovedvejleder for Chres Wiant Sørensen.

Med venlig hilsen

Børge Lindberg

Børge Lindberg

Institutleder

Institutleder Børge Lindberg, tlf. +45 9940 8638, E-mail bli@es.aau.dk
Institutsekretær Kirsten Jensen, tlf. +45 9940 8650, E-mail krj@es.aau.dk

AALBORG UNIVERSITY
DENMARK

The Technical Doctoral School
of IT and Design
Niels Jernes Vej 10
P.O. Box 159
9220 Aalborg East
Denmark

Date: 03-11-2017

Final Assessment of a PhD Thesis

Date: 3rd November, 2017.

Final assessment of the PhD thesis entitled

On Tunable Sparse Network Coding in Commercial Devices for Networks and File-systems

submitted by Chres Wiant Sørensen

The assessment committee consists of the following members as decided by the Dean of the Technical Faculty of IT and Design.

Professor Sergio Palazzo
University of Catania
Italy
sergio.palazzo@dieei.unict.it

Associate Professor Dejan Vukobratovic
University of Novi Sad
Serbia
dejanv@uns.ac.rs

Professor (MSO) Jan Østergaard
Aalborg University
Denmark
jo@es.aau.dk

Supervisor for the thesis has been Associate Professor Daniel E. Lucani, Aalborg University.

Co-supervisors for the thesis have been Prof. Muriel Medard, MIT, USA and Prof. Frank H.P. Fitzek, Technische Universitat Dresden, Germany.

Short resume of the thesis

The thesis takes the form of a collection of four research papers and an additional four regular chapters. The four regular chapters are: Introduction, Thesis Outline, Thesis Contribution, and Conclusion.

The four research papers are:

Paper A: Chres W. Sørensen, Arash S. Badr, Juan A. Cabrera, Daniel E. Lucani, Janus Heide, Frank H. P. Fitzek, "A practical view on tunable sparse network coding," *European Wireless (EW)*, 2015. □

Paper B: Chres W. Sørensen, Achuthan Paramanathan, Juan A. Cabrera, Morten V. Pedersen, Daniel E. Lucani, Frank H. P. Fitzek, "Leaner and meaner: Network coding in SIMD enabled commercial devices," *IEEE Wireless Communications and Networking Conference (WCNC)*, 2016.

Paper C: Chres W. Sørensen, Daniel E. Lucani, Frank H. P. Fitzek, Muriel Mé- dard, "On-the-fly overlapping of sparse generations: A tunable sparse network coding perspective," *IEEE Vehicular Technology Conference (VTC)*, 2014. □

Paper D: Chres W. Sørensen, Daniel E. Lucani, Muriel Médard, "On network coded filesystem Shim: Over-the-top multipath multi-source made easy," *IEEE International Conference on Communications (ICC)*, Accepted, 2017. □

Assessment of the thesis

Chres Wiant Sørensen's thesis is structured in two main parts, the first outlining motivations, research activities, and major results, the second collecting four selected papers, all of which being presented in prestigious conferences. More specifically, in the first part the candidate describes the activities carried out in the last three years in the field of tunable sparse network coding, with the aim of investigating and evaluating the performance of this approach as compared to other techniques like Random Linear Network Coding and Overlapping Generations, and the impact of its usage in a variety of devices ranging from embedded devices to smartphones and computers. As a valuable aspect, the overall work of the candidate is based on a comprehensive methodology that encompasses mathematical analysis of sufficient depth, remarkably competent design and implementation in practical settings, and thorough measurement campaigns.

Out of the papers included in the thesis, the first outlines the main features of Tunable Sparse Network Coding (TSNC) and investigates the complexity and delay of a real-life implementation of TNSC in the Kodo C+11 network coding library. In particular, this implementation allowed the authors to run a set of measurements and characterize the performance of TSNC as compared to Random Linear Network Coding and Sparse Random Linear Network Coding. One of the most insightful results was showing that the complexity-delay trade-off can be significantly improved by the use of a limited number of feedback packets per generation.

The second paper enhances the results of the previous one, by providing a comparison of measurements obtained upon eight different commercial devices, and focusing on optimization of network coding schemes for Single Instruction Multiple Data (SIMD) available in the latest generation of Intel and Advanced RISC Machines (ARM) processors. The measurement campaign carried out showed that reducing the code density can also reduce the energy footprint since sparser codes are processed faster, and the use of hardware optimization already provided in today's

Intel and ARM processors can deliver order of magnitude processing speed-up and energy-per-bit reduction as well.

The third paper focuses on a TSNC-inspired approach to Overlapping Generations, which can potentially be useful in multicast and multi-source applications, that is, transmitting to multiple receivers and receiving from multiple sources. Specifically, the paper advocates that exploiting sparse coding instead of RLNC, and leveraging occasional feedback are beneficial to realize "on-the-fly" overlapping generations, so providing a low-complexity and low-overhead solution. The measurements obtained showed that the proposed approach can provide close-to-optimal delay performance, while reducing the processing effort by orders of magnitude in real systems.

Finally, the fourth paper introduces a novel solution to implement network coding in a protocol stack, encompassing a "network-coded filesystem shim" (NCFSS) which is aimed to expand regular and even proprietary protocols with benefits from coding. The idea is supported by a proof-of-concept implementation in C++ using the FUSE library. The results obtained through the experimental set-up showed not only that coded filesystems can be deployed to support other high-level protocols (e.g., HTTP, SSH), but also that in the proposed solution file access and download time experienced by multiple sources are faster than in traditional approaches.

Oral presentation and discussion

3rd of November, 2017: Aalborg University.

The presentation by the PhD student was very clear, fluent, and visually appealing. The candidate provided a good overview as well as an adequate level of detail about his thesis work. During the discussion, the PhD student received questions both within the topic of his thesis as well as questions related to prior related work within the fields of network coding and communications. The candidate answered with confidence the questions directly related to the thesis, and he demonstrated good capabilities in handling complex questions outside the specific topics of the thesis. In general, the candidate demonstrated his ability to conduct a scientific discussion and to illustrate the main findings of his work.

Conclusions

The work reported in the thesis shows that the candidate has a good capacity to carry out research activities thoroughly and autonomously, and definitely owns the scientific level that is requested to pursue the PhD degree.

The particular strength of the work carried out in this thesis is in the capability of the candidate to bring novel network coding concepts from research to development phase and to test the working prototypes in near-real world environment. It is worth noting that the primary contribution of the thesis is not in theoretical advances of network coding but in efficient implementations and development aspect of network coding technology.

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The committee members agree that the quality of the oral presentation and the response to questions in terms of clarity and accuracy is adequate.

The assessment committee unanimously recommends that Chres Wiant Sørensen is awarded the PhD degree.

Professor Sergio Palazzo

Associate Professor Dejan Vukobratovic

Professor (MSO) Jan Østergaard

AALBORG UNIVERSITET

Institut for Planlægning
Rendsburggade 14
9000 Aalborg

Telefon: 9940 8809
Email: mars@plan.aau.dk

Dato: 17-11-2017

The Technical Doctoral School of It and Design
Niels Jernes Vej 10

Vedr. "Projektets logik – den offentlige sektors paradox", af Christina Dahl Madsen, Institut for Planlægning

Hermed fremsendes bedømmelsesudvalgets Final Assessment vedr. ovennævnte ph.d. afhandling.

Instituttet anbefaler, at bedømmelsesudvalgets indstilling følges, og at Christina Dahl Madsen tildeles ph.d. graden.

Med venlig hilsen

Marianne Sørensen

AALBORG UNIVERSITY
DENMARK

Final assessment of the PhD thesis entitled:

"Projektets logik – den offentlige sektors paradox" (Submitted in Danish)

"The logic of the project – a paradox in public administration"

Submitted by Christina Dahl Madsen, MA in Learning and Change Processes

The assessment committee consists of the following members as decided by the Dean of the Technical Faculty of IT and Design by 09.08.2017:

- Professor Lutz Mez, Freie Universität Berlin, lutz.mez@fu-berlin.de
- Associate Professor Jan Jaap Rothuizen, VIA University College, jjr@via.dk
- Associate Professor Jette Egelund Holgaard (chairman): Aalborg University, jeh@plan.aau.dk

Supervisor for the thesis has been Professor Lars Bo Henriksen, Aalborg University.

Description of the thesis
The thesis is presented as a monograph including 248 pages, plus appendixes (including confidential material). The monograph includes 7 chapters.

Chapter 1 presents the motivation, the theoretical starting point, the problem formulation and the structure of the thesis. A critical sociological perspective motivates the core dilemma addressed in the thesis stating that public administration is being confronted with demands of increasing efficiency and documentation on the one hand, and demands for increasing quality, creativity and innovation on the other. Projects, partnerships, co-construction and cross-organizational networks are presented as some of the organization trends, which are in play to bridge this gap.

This leads to the research question (Christensen, 2017, 30):

> "How is the project concept applied as a form of organising and collaborating in the public administration in Denmark, and how do cross-organisational networks and partnerships in projects constitute a complex challenge as well as a potential arena for possibilities for the future public administration, as a collective learning organisation"

The "Volunteer Project" initiated in 2011 by the management of Aalborg Youth School is then presented as a possibility to study the complexity of cross-organizational projects.

Chapter 2 presents the methodological framework for the study. The chapter starts with an introduction to action research as the outset, and institutional ethnography is proposed as complementary analytical strategy (p. 48, introduced in chapter 1). The chapter quite early introduces the approach of Czarniawskas anthropological field studies as being of high influence for this study. It is argued that action research is an appropriate approach in order to provide rich explanations of the processes in a cross-organizational project, by observing and being in interaction and dialogue with the field. Furthermore, the material is supplemented with expert insights from a study abroad. The data-collection includes a combination of 20 semi-structured interviews and observations/recordings of inventions made in the field (p. 55). As for the data processing, the inspiration from institutional ethnography raises attention to the importance of language, language games and

storylines. Last but not least, the challenges of action research are discussed, and CM presents a model in order to outline and distinguish the different positions she, as an action researcher, is engaged in (p. 67).

Chapter 3-5 follows the same structure, starting off by providing a critical sociological perspective, which is then used as a frame of reference in the interpretation of the empirical findings which is structured according to Røvik's three phases of:

- Context and motivation (kontekst og motivation) – where the idea of the volunteer project meets the logic, history and practice of the organization (Chapter 3).
- Phase of integration (indføringsfase) – where the project over time is integrated in the social practice (Chapter 4)
- Phase of translation (oversættelsesfase) – where the actors acknowledge and adopt concepts and approaches used in the project as meaningful to the local community context as well as to the core output of the organization (Chapter 5).

Chapter 3 presents the story of how the Volunteer project in the organization Aalborg Youth School is initiated. The analysis shows that the project was well aligned with the logic and history of the organization as well as management visions. On the other hand, the project divides the rest of the organization in two. Some seem to be demotivated by, or motivated to work against, the project as it is seen as a symptom of management lacking understanding of local needs. Others actually find that the project relates to current practices, e.g. by linking to the volunteer concept, to project work practices, or to personal relations.

Chapter 4 focuses on the matter of integration exemplified by one of the pilot projects in the Volunteer project called "Create yourself" ("Skab dig"). The analysis of this project outlines language games between a manager being impatient and protective of his dream and people having the insight to point to the challenges of implementation. But it also tells a story about a project, which is successful in delivering results and gathering a group of people who are engaged in the project – sometimes however of reasons not that related to the project. It also shows how people might relate very well to the cross-organizational dimension – and then based on their engagement with the cross-organizational project redraw to create their own project.

Chapter 5 focuses on the translation phase of a project called "The college project" ("Seminarie projektet"). The story unfolded presents a situation where a key partner in the project is not able to translate the project in a meaningful way to the local context, and a manager who is not willing to accept that translation processes is needed and has to be supported. Room for ownership and engagement from some of the participants "to make things work" actually brings the project back on track, but one (however serious) disruption is all it takes for the project to vanish. Another key partner is however capable of making this translating process, and familiarity with Problem Based Learning is used as a potential explanation. Together with the outcome of chapter 4, this forms the base for adding to theoretical framework by introducing the term: translations conditions.

In Chapter 6, the learning from the above stories are gathered and creates a knowledge base for developing a model of "Conditions for the learning community" The model has three dimensions stressing:

1) Story and Management (Story og Styring) to stress the importance of contextual factors around what ever the organization want to have initiated, implemented, developed or changed, but also the work needed to align the cross-organizational project objectives with the core output of the organization and ending the story in a "proper" way.
2) Time and Patience (Tid og Tålmodighed) to encounter the difference between the logic embedded in the discipline society compared to the project society. Conditions and premises are different, and it is argued that the project needs to be able to move agile, flexible and crosscutting in the organization, which contradicts the call for fast implementation and standardization. Madsen stresses that time and patience will provide room to actual identify real (reelle og faktuelle) needs that the project is to address.

3) Reflective relations (Reflekterende relationer) are stressed due to the situation of sometimes decoupled or fragmented organizations, where members exist as organizations in the organization. Madsen calls for a reflection on the structure for knowledge exchange and learning with the purpose of getting the projects into the storyline of the organization.

Chapter 6 ends with a reflection on the concept of volunteers and questions whether what was found overseas and inspired the "Volunteer Project", could in fact have been found in the history of the Youth School as a continuation of the organizational storyline.

Chapter 7 concludes the thesis in relation to the overall research question.

Assessment of the thesis

The thesis is well written and is based on a solid empirical foundation. The storyline presented shows considerable insights of being "in the field" and abilities to carefully navigate in the continual dataflow this provides. The richness of the empirical material makes it possible to describe every day challenges in a cross-organizational project. This endeavor to make rich data based on field studies includes a time-consuming data-collection and –processing and this comprehensive work is acknowledged by the assessment committee. Furthermore, the thesis also shows the ability of the researcher to reflect on and exemplify the challenge of being in a position as a trusted newly hired employee and a critical researcher.

The thesis however also has some weaknesses, and it can be argued that this is mostly due to a too ambitious research design. The research question encounters both challenges and potentials in the context of a project society, whereas the theoretical framework is not providing this balance. This means that when occasionally the empirical material shows potentials (and not challenges), there is no resonance in the theoretical framework as it is presented. In these cases, discrepancy with the critical sociological perspective might be noticed, or other theoretical areas are visited rather sporadic, like in the case of communities of practice (CoP) and Problem Based Learning (PBL). The methodological design also stands out as too ambitious in the attempt to combine different approaches in an action research setting. Based on different theoretical approaches to action research, the methodological design calls for different positions as explained (p. 67-68): the co-constructive position, the sensing position and the meta-reflective position. However, in reading the thesis, it seems that the co-constructive position is not used for systematic analysis. The complexity of the field and the complexity of the methodological design could have justified a more systematic and concluding reflection on the strengths and weaknesses of this design. Finally, it can be argued whether the theoretical voices of critical sociology have been given too much voice, and even sometimes, indications of a deductive approach are present, making the alignment with the social constructivist perspective questionable.

However, looking at the findings, the arguments put forward from a critical sociological perspective about the current change to the project society are supplemented by concrete storylines of everyday dilemmas. The resonance these storylines provided is the first step to reflect on how everyday actions and agency, translations and translation conditions, can impact organizational and even societal change. Thereby, not only the actions taken during the study but also the following meta-analysis can have implication on actual practice. In this way, the intention rooted in the action research project has served its purpose. Furthermore, Madsen succeeds in making a synthesis of the identified challenges and presents a model, which can serve as a framework for discussing, how key challenges can be overcome in other contextual settings.

Oral presentation and discussion
At the defense, Madsen presented an overview of the thesis content in a living and including way. In the academic discussion Madsen showed considerable strengths in exemplifying theoretical constructs by use of empirical material. The assessment committee would however have liked more conceptual precision related to theories and methods. Overall, Madsen answered satisfactory to most of the questions raised by the assessment committee.

Conclusions

The thesis is well written and is based on a solid empirical foundation. The storylines report everyday practice in a way, which can inspire reflections on organizational change in the public administration. Madsen furthermore succeeds in making a synthesis of the identified challenges and presents a model, which can serve as a conceptual framework for implementation of educational projects and for inquiries of organizational structures and dynamics.

At the defense, Madsen presented an overview of the thesis content in a living and including way, and in the following academic discussions Madsen answered satisfactory to most of the questions raised by the assessment committee.

The committee therefore unanimously recommends that Christina Dahl Madsen is awarded the PhD degree.

10.11.2017

Lutz Mez

Jan Jaap Rothuizen

Jette Egelund Holgaard

AALBORG UNIVERSITET

Cassiopeia

Det Teknisk Naturvidenskabelige Fakultet
Forskerskolen
Njv 10

Att.: Bettina Wedde

8 november 2017

Institut for Datalogi
Selma Lagerlöfs Vej 300
9220 Aalborg
Tlf. 9635 8080
Fax 9635 9798
i16@cs.aau.dk
www.cs.aau.dk

Institutleder
Kristian G. Olesen
Tlf. 9635 9852

Sagsbehandler
Helle Schroll
Tlf. 9635 8852

Ph.d.- forsvar Dilshod Ibragimov,

Vedlagt fremsendes underskrevet indstilling for Erasmus Mundus ph.d. studerende Dilshod Ibragimov, som forsvarede sin ph.d. afhandling den 15. november 2017 på ULB, Bruxelles.

Best regards

Helle Schroll

AALBORG UNIVERSITY
DENMARK

Assessment of the PhD thesis entitled:

Optimizing Analytical Queries over Semantic Web Sources

Submitted by Dilshod Ibragimov

The assessment committee consists of the following members as decided by the Dean of the Technical Faculty of IT and Design on 2017-08-09:

- Professor Maria-Esther Vidal Universidad Simón Bolívar, Venezuela, mvidal@usb.ve
- Professor Ladjel Bellatreche National Engineering School for Mechanics and Aerotechnics (ENSMA), France, bellatreche@ensma.fr
- Associate Professor, Kristian Torp (chairman),Aalborg University, Denmark, torp@cs.aau.dk

Supervisor for the thesis has been.

- Professor Esteban Zimányi Université Libre de Bruxelles, Belgium
- Professor Torben Bach Pedersen Aalborg University, Denmark

Co-supervisor for the thesis has been.

- Associate Prof. Katja Hose Aalborg University, Denmark

Description of the thesis
The thesis is based on a collection of papers and is 121 pages + xii. The thesis is based on the following papers where coauthor statements have been submitted.

- Dilshod Ibragimov, Katja Hose, Torben Bach Pedersen, and Esteban Zimányi. Towards Exploratory OLAP Over Linked Open Data - A Case Study. In International Workshops on Enabling Real-Time Business Intelligence (BIRTE), Riva del Garda, Italy, 2013, and Hangzhou, China, 2014, Revised Selected Papers, pages 114–132.
- Dilshod Ibragimov, Katja Hose, Torben Bach Pedersen, and Esteban Zimányi. Processing Aggregate Queries in a Federation of SPARQL Endpoints. In 12th European Semantic Web Conference, (ESWC 2015), Portoroz, Slovenia, pages 269–285, 2015.
- Dilshod Ibragimov, Katja Hose, Torben Bach Pedersen, and Esteban Zimányi. Efficient Support of Analytical SPARQL Queries in Federated Systems. In preparation for a conference submission.
- Dilshod Ibragimov, Katja Hose, Torben Bach Pedersen, and Esteban Zimányi. Optimizing Aggregate SPARQL Queries Using Materialized RDF Views. In 15th International Semantic Web Conference, (ISWC 2016) Kobe, Japan, pages 341–359(1), 2016

Assessment of the thesis

Overview

The thesis makes advances in the area of Data Management in Web-based infrastructures by tackling the problem of analytical processing over RDF data accessible using SPARQL endpoints. RDF data sources can be large and composed of incomplete data; furthermore, these sources may also include implicit facts, which required the execution of reasoning processes to make explicit entailed facts. All these characteristics of RDF data negatively impact on the time complexity of query processing tasks, and make traditional query processing approaches unsuitable in presence of complex queries and large RDF data sources.

The manuscript is organized into six chapters that clearly present the foundations and motivation of the problem of query processing over Web data published as Linked Data, as well as limitations of existing approaches, the proposed query processing strategies, formal and empirical evaluation of the proposed techniques, and lessons learned and future work. The list of references includes relevant and recent articles from top ranked international conferences and journals in the areas of Databases and Semantic Web on the topics of Data Management, Linked Data, and Web query processing.

Chapter 1

This chapter positions the studied problem and its contexts, identifies its difficulties and exposes the main contributions and the structure of the different chapters. The query processing problem tackled in this thesis is clearly motivated in the context of Web data published as Linked Data. Advantages and limitations of existing approaches, as well as the problem statement and scope of the dissertation are stated in this chapter. Finally, the research questions that guide this thesis, contributions, referred publications, and main results are precisely described

Chapter 2

This work is motivated by two points: (i) in the last decades, semantic data sources have emerged and become operational databases, since the major database editors provide semantic supports in their products. This is mainly due to the spectacular development of ontologies and knowledge bases such as Yago, DBpedia, Freebase, etc., in several domains like E-commerce, Engineering, Medicine, etc. (ii) the maturity of the data warehousing technology and its surrounding tools. This technology succeeds in the closed-world, where data loaded in the warehouse are issued from internal sources with traditional structures. The Web phenomenon contributes in breaking the closed-world assumption. As a consequence, the traditional tools of data warehouses have to be leveraged to deal with RDF data. The candidate proposes then two main research contributions in this chapter: (i) the definition of multidimensional schema of an OLAP cube exclusivity in RDF. This schema is able to define a remote data source for querying during the OLAP analysis phase. (ii) the proposition of a computer aided process for discovering previously unknown data sources and building a multidimensional schema of the cube. These two contributions are illustrated based on a motivating example related to linked movie database (Linkded MDB) Website, which offers information about movies. The movie data can be queried using a SPARQL endpoint. The candidate presents a partial logical schema of LinkdedMDB and gives examples of SPARQL queries executed on the top of this schema. A conceptual schema of the data cube is also given. The candidate uses QB4OLAP and VoID to describe the multidimensional schema. To query this schema, SPARQL queries are needed to remote data endpoints for data retrieval. I would like to mention that the main hypothesis of this work is the assumption that the multidimensional schema of the OLAP cube and data sources are known in advance. An interesting discussion of data source discovery approaches is given, where three main categories are highlighted: (1) querying knowledge bases, (2) querying data management platforms, and (3) querying semantic Web search engines. A conceptual framework is presented, supported by a system consisting of four main modules: (1) semantic query processor, (2) distributed query processor, (3) global conceptual schema and (4) source/discovery/schema builder. The candidate reviews some existing studies based on three directions: semantic Web warehousing, source discovery and distributed Sparql query processing. This part of this chapter remains too verbose and the presence of a comparison using some relevant criteria would facilitate the understanding of these studies. I would like to mention that there exist several research efforts on Semantic web warehouses; and each one dealt with a particular phase(s) of the life cycle of the warehouse construction: (i) requirement elicitation, (ii) conceptual modeling, (iii) ETL, (iv) Logical modelling, (v) physical modeling and (vi) exploitation. The presentation of the studies of semantic web warehouses could be driven by the different phases of the life cycle to make it more clear and comprehensive.

Chapter 3

The problem of federated processing of aggregate queries over SPARQL endpoints is tackled in this chapter. Query processing against federations of SPARQL endpoints requires the achievement of several issues. First, queries need to be decomposed into subqueries that can be executed over the available relevant sources; next, optimization methods need to be executed in order to identify query execution plans that collect relevant data efficiently; finally, physical operators that allow for the efficient execution of these plans need to be selected and executed. The author addresses all these challenges and proposes federated query processing methods that rely on a cost model and novel physical operators to efficiently execute aggregate queries against SPARQL endpoints. Three physical operators are defined: MedJoin, SemiJoin, and PartialAgg; these operators allow for reducing the size of intermediate results, speeding up query execution. The query optimizer relies on a Cost-based Optimizer for Distributed Aggregate Queries (CoDA) to identify query plans that can be efficiently evaluated by the selected SPARQL endpoints. CoDA takes into account not only the cost of executing the queries over the selected sources, but also the cost of transferring data and aggregating the results; considering all these parameters allows CoDA to precisely estimate the cost of executing a query. Furthermore, data collected from the endpoints is merged by the federated engine using the MedJoin operator; this operator enables the federated query engine to evaluate very selective subqueries, reducing thus the workload of the SPARQL endpoints and the size of the intermediate results. The proposed federated query processing methods are evaluated over SSB, a very well-known benchmark proposed by the Database community; datasets of different sizes are evaluated in the study, as well as 13 queries of different complexity. The Virtuoso engine is considered as the baseline of the experiment; different versions of the proposed engine where CoDA is not considered, are also included in the study. The experimental results suggest that the proposed federated cost-based query engine is able to efficiently execute aggregated SPARQL queries, and overcome the baseline engines and the other proposed methods.

Chapter 4

This paper proposes OLAP-style AnalytIcs in a FederaTion of SPARQL Endpoints (LITE). This is because usually users are looking for combining partial data extracted from various endpoints. This requirement is illustrated by two examples showing the necessity of managing the problem of data source heterogeneity and the absence of hierarchies in these sources matching with the user hierarchies. Three main contributions of this paper are: (1) the proposition of a native RDF/SPARQL -based approach for efficient support of analytical queries over federations of Sparql endpoints; (2) the proposition of an extended vocabulary for specifying the mapping between multidimensional global schema located at the mediator side and local schemes of sources; (3) and rewriting algorithm of sparql queries that takes into account hierarchical information encoded in RDF schema. LITE models source and target schemas as RDF schema graphs that highlight the structures of the data available for the analysis. Several experiments are conducted showing the efficiency of analytical queries in a federated set up, by considering the Star Schema Benchmark. This motivation of using such benchmark is the absence of standard SPARQL benchmarks applicable to the studied problem.

Chapter 5

The problem of SPARQL query answering based on RDF views is tackled in this chapter. Considering RDF views during planning and execution of queries is an important problem, which has been extensibly studied by the database community because enables query engines to execute queries over materialized views. Although there are efficient approaches from the database community, the problem of query answering using RDF views imposes new challenges to enforce efficient and effective query executions. The author focuses on analytics SPARQL queries and presents MARVEL a query engine able to execute SPARQL queries against a set of RDF views. The novelty of MARVEL is that materialized views are seen as named graphs described as SPARQL queries; materialized views are physically executed and the results are stored in a triple store. MARVEL implements an algorithm for selecting the views required to answer a query as well as for rewriting the query based on these views. MARVEL is empirically evaluated using RDF collections from three state-of-the-art benchmarks: BSBM, LUMB, and SSB; the impact of using materialized views is evaluated in the study. Empirical

results provide evidence that MARVEL query processing techniques are able to speed up execution time in queries and RDF views with different characteristics. More importantly, the reported results allow for understanding the impact on query processing of precomputing intermediate query results in materialized views.

Chapter 6

The last chapter concludes the manuscript summarizing the main contributions and discussing the strong points and the limitations. As highlighted by the author, SPARQL analytical query processing can be performed over Linked Data efficiently. Several perspective issues are also given, which shows the quality and difficulty of the subject studied.

Oral presentation and discussion

The presentation of the thesis and subsequent oral defense took place at Libre de Bruxelles, Belgium, Wednesday November 15, 2017. The title of the oral presentation was "Optimizing Analytical Queries over Semantic Web Sources" and Associate Professor Kristian Torp served as moderator of the event that started at 14.10 and ended at 16.25.

The candidate gave a clear presentation of the results, with good use of examples and illustrations within the area of aggregated SPARQL queries over federations of linked datasets. The presentation captured the interest of the audience, and covered all the main technical and scientific challenges presented in the thesis. The committee was highly satisfied with the presentation.

In the discussion following the presentation, the candidate provided good answers to all of the three rounds of questions from the committee. The answers were clear and covered many technical aspects in the areas of query processing and optimization. The candidate was able to provide explanations of advanced topics even beyond the scope of the thesis. The committee was highly satisfied with the discussion.

Conclusions

Overall the manuscript is well-written and clearly motivates and presents the tackled problems, as well as the proposed formalisms, strategies, and algorithms. The manuscript also states the main characteristics of the proposed approaches; and with empirical evaluations, the behavior of the proposed techniques are validated and compared with existing approaches in terms of efficiency and effectiveness. Thus, this work is not only novel, but also puts scientific and technical contributions in perspective, and provides evidence of the contributions that are made to the state-of-the-art.

Dilshod Ibragimov has demonstrated his versatility by addressing a complex research problem related to the exploitation of Semantic Data Warehouse in a Federated Set up. We would like to highlight the quality of the work performed. This thesis represents a large body of work tacking a set of complex problems such as data integration, execution queries over mediator, mathematical cost model development, query rewriting, materialized views selection, etc. All these problems consider the specificities of Web data (open world assumption, incompleteness of data and the need to support derived information). We would like to mention the efforts deployed by the candidate in terms of experimentations. The publications that the thesis is based on are of good quality: The ISWC and ESWC are both ranked A by CORE 2017 and BIRTE Workshop.

In conclusion, Dilshod Ibragimov significantly contributes to state-of-the-art within semantic data warehouse exploitation and optimization. Further, the thesis meets the conditions of novelty, soundness, and innovativeness required in a doctoral dissertation. The committee unanimously recommends that Dilshod Ibragimov be awarded the Ph.D. degree in computer science.

Professor Maria-Esther Vidal | Professor Ladjel Bellatreche | Assoc. Professor Kristian Torp

AALBORG UNIVERSITET

Cassiopeia

Det Teknisk Naturvidenskabelige Fakultet
Forskerskolen
Njv 10

Att.: Bettina Wedde

5.12.17

Institut for Datalogi
Selma Lagerlöfs Vej 300
9220 Aalborg
Tlf. 9635 8080
Fax 9635 9798
i16@cs.aau.dk
www.cs.aau.dk

Institutleder
Kristian G. Olesen
Tlf. 9635 9852

Sagsbehandler
Helle Schroll
Tlf. 9635 8852

Ph.d.- forsvar Emmanouil Valsomatzis,

Vedlagt fremsendes underskrevet indstilling for Erasmus Mundus ph.d. studerende Emmanouil Valsomatzis, som forsvarede sin ph.d. afhandling den 4. december 2017 på Institut for Datalogi.

Best regards,

Helle Schroll

Assessment of a PhD thesis

Assessment of the PhD thesis entitled

Aggregation Techniques for Energy Flexibility

Submitted by **Emmanouil Valsomatzis**, M.Sc. to the Technical Faculty of IT and Design at Aalborg University (AAU) and the Polytechnic University of Catalonia (UPC)

The assessment committee consists of the following members as decided by the Dean of the Technical Faculty of IT and Design:

- Senior Scientist **Henrik W. Bindner**,
  Center for Electrical Power and Energy, Technical University of Denmark
  E-mail: hwbi@elektro.dtu.dk
- Associate Professor **Lukasz Golab**,
  Department of Management Sciences, Universty of Waterloo, Ontario, Canada
  E-mail: lgolab@uwaterloo.ca
- Associate Professor **Simonas Šaltenis** (chairman),
  Department of Computer Science, Aalborg University, Denmark.
  E-mail: simas@cs.aau.dk

Supervisor for the thesis has been
Professor **Torben Bach Pedersen**,
Department of Computer Science, Aalborg University, Denmark.

UPC Supervisor for the thesis has been
Associate Professor **Alberto Abello**,
Polytechnic University of Catalonia (UPC), Spain.

AAU Co-supervisor for the thesis has been
Associate Professor **Katja Hose**,
Department of Computer Science, Aalborg University, Denmark.

1 Description of the Thesis

The Ph.D. thesis consists of an introduction, a collection of five papers, a summary section, a bibliography, and an appendix. The introduction offers an overview of the contributions made by the papers and the summary section summarizes the results of the thesis and offers future research directions. The thesis is 151+xvi pages.

Here are the five papers constituting the main body of the thesis, appearing in chapters 2 to 6:

> Chapter 2: Emmanouil Valsomatzis, Katja Hose, Torben Bach Pedersen, Laurynas Šikšnys, "Measuring and Comparing Energy Flexibilities," In *Proceedings of the Workshops of the EDBT/ICDT 2015 Joint Conference (EDBT/ICDT), Belgium, Brussels*, vol. 1330, pp. 78 85, 2015.
>
> Chapter 3: Laurynas Šikšnys, Emmanouil Valsomatzis, Katja Hose, Torben Bach Pedersen, "Aggregating and Disaggregating Flexibility Objects," *IEEE Transactions on Knowledge and Data Engineering (TKDE)*, 27(11), pp. 2893–2906, 2015.
>
> Chapter 4: Emmanouil Valsomatzis, Katja Hose, Torben Bach Pedersen, "Balancing energy flexibilities through aggregation," In *Proceedings of the Second International Workshop on Data Analytics for Renewable for Renewable Energy Integration (DARE)*, Nancy, France, pp. 17–37, 2014.
>
> Chapter 5: Emmanouil Valsomatzis, Torben Bach Pedersen, Alberto Abelló, Katja Hose, "Aggregating energy flexibilities under constraints," In *Proceedings of the 7th IEEE International Conference on Smart Grid Communications (SmartGridComm)*, Sydney, Australia, pp. 484–490, 2016.
>
> Chapter 6: Emmanouil Valsomatzis, Alberto Abelló, Torben Bach Pedersen, "Trading Aggregated Flex-Offers via Flexible Orders," *DBTR series*, http://dbtr.cs.aau.dk/DBPublications/, DBTR-38.pdf, Aalborg University, Technical Report, 2017.

2 Assessment of the Thesis

In the following we give brief reviews of all the papers contained in the thesis. For each paper we highlight the main contributions and strengths as well as any weaknesses and open questions. We conclude by summarizing the strong points and the weak points of the thesis.

2.1 Chapter 2

The central concept of this chapter, as well as all other chapters of the thesis, is the so called *flex-offer*. A flex-offer contains two pieces of information: a range of start times (earliest and latest start time) and an energy profile (minimum and maximum number of energy units required per unit of time or slice, e.g., per hour).

The contribution of this chapter is a set of definitions of flexibility of a flex-offer. The chapter motivates the need for this by flex-offer aggregation: when aggregating individual flex-offers, it is useful to measure the loss of flexibility, and it is useful to quantify the flexibility of the resulting aggregated offers.

The chapter proposes eight flexibility measures: 1) time (basically the width of the start time range); 2) energy (the difference between max and min total energy required/produced); 3) product (a product of the first two measures); 4) vector (the length of the vector consisting of the first two measures); 5) time series (difference between the earliest possible instantiation of the flex offer using the minimum possible energy per slice, and the latest possible instantiation using the maximum possible energy per slice); 6) assignments (number of valid assignments or instantiations of the flex offer); 7) absolute area based (area under the union of the plots of all possible assignments, when plotted in an energy-time space); and 8) relative area based (as previous, but normalized).

The chapter then discusses the pros and cons of each measure, showing that some measures are obviously inadequate.

On the positive side, the chapter provides a comprehensive set of flexibility definitions. The chapter illustrates some of the difficulties of handling flexibility in a systematic way. On the negative side, there is no discussion of which measures are used in real energy markets, which could have been the most interesting part as the measures themselves seem pretty straightforward. In addition, the introduced measures are not used in the rest of the thesis.

2.2 Chapter 3

This is the main chapter of the thesis. It introduces the main concepts for the aggregation algorithms that are being further developed in the following chapters. The problem is to aggregate (and then disaggregate) a set of individual flex-offers into larger flex-offers that can be traded on the energy market. The goal is to have a small number of aggregated flex-offers that retain flexibility and at the same time are balanced (similar energy usage/production throughout the lifetime of the offer).

The proposed technique first groups similar individual flex-offers (similar in having similar earliest/latest start times and flexibilities). Next, a bin packing phase breaks up some groups if they are too big. Finally, the chapter proposes five techniques to ensure balance, ranging from exhaustive search over all possible starting positions to heuristic techniques that may break up some groups even further.

On the positive side, the chapter includes a lot of algorithmic details, and, to the best of the committee's knowledge, solves a novel problem. The chapter is well written and explains in a systematic way the issues involved, the suggested solutions, and quantified results of the various alternatives including some parameter variations to illustrate trade-offs between efficiency in time and flexibility. The results are based on simulations of a portfolio of flex-offers.

On the negative side, the chapter could contribute a clearer problem statement and hardness analysis. How hard is the version of the problem without balancing, just with group constraints? Then, what happens to hardness when you add a constraint about retained flexibility (for different flexibility definitions)? And then what happens when you add balance constraints?

2.3 Chapter 4

This is a short chapter that experimentally evaluates two greedy heuristics from prior work whose goal is to align a set of flex-offers in a way that maximizes balance. The heuristics are simple greedy and exhaustive greedy from chapter 3 of this thesis. The chapter is fairly well written and is again using quantitative measures to compare the different algorithms based on a

simulated portfolio of flex-offers. As the chapter does not have any new technical contributions, only an experimental evaluation, perhaps it would have been better to combine this chapter with the previous one.

2.4 Chapter 5

This chapter again addresses the problem of flex-offer aggregation to reduce the number of objects to be scheduled while retaining as much flexibility as possible. The difference from prior work is that it additionally considers local grid constraints in the form of limited power transfer capacity (to avoid overloading the transformers). The paper proposes two greedy heuristics and evaluates them on realistic scenarios.

While this chapter sounds a bit incremental, it does add an important and practical constraint to the flex-offer aggregation problem.

2.5 Chapter 6

This chapter illustrates how the flex-offers can be shaped to comply with the flexible order that is part of the Elspot market. The flexible order shape is a constant power consumption for a defined duration with a flexible start time, i.e., a shape that is well suited for flex-offers. In particular, time flexibility must be between 1 and 23 hours, the minimum contract size is 100kW, hourly values must be multiples of 100kW. As for the previous chapters, a set of algorithms are developed to aggregate the flex-offers into the desired shape. A fleet of EVs is modelled using the flex-offers and their energy requirement is aggregated. The total cost of energy is compared to a situation where energy is acquired when the EVs are plugged in. The chapter proposes three heuristics to solve this problem and experimentally evaluates them. Additionally, an interesting aspect of the chapter is a financial evaluation: it compares the cost of buying electricity outright versus using flexible orders.

2.6 Summary of Contributions and Strong Points

The thesis is treating a very timely topic of how to integrate flexibility of Distributed Energy Resources (DERs) into a market-based electricity system. A so-called flex-offer is used to describe the flexibility of the DERs in time and energy. Since flex offers from individual prosumers are usually far too small to be traded on an energy market, the main part of the thesis is concerned with how the flex-offers of the individual DERs can be aggregated to form large enough entities to allow them to participate in markets and how they can be disaggregated to schedule the participating units at activation time.

The contribution of this thesis is a suite of aggregation (and disaggregation) techniques for flex-offers that satisfy various criteria such as balance (where the total energy required or produced per unit of time is smoothed out over the lifetime of the offer), maximum capacity constraints (e.g., to make sure transformers are not overloaded) and other market-specific constraints (time and volume granularity, minimum flexibility, etc.). The thesis also includes a chapter about various definitions of flexibility that might make sense in the context of flex offers.

The thesis presents solid scientific contributions in a challenging area. The research problems are well identified. To the best of the committee's knowledge, the contributions of the thesis are original. The thesis both extends the flex-offer concept to provide aggregated flexibility and

it is an implementable way of aggregating DER flexibility for trading which is not common in literature where typically the flexibility is not traded but "just" used as a resource for operation of the power system. The idea of having a simple and tradable way of including flexibility into the operation of the power system could be one of the key elements for deployment of future real world solutions. This may result in decreased electricity consumption, decreased carbon footprint, and lower cost to maintain the grid.

Overall, the thesis documents that Emmanouil Valsomatzis has a very good understanding for developing efficient algorithms and relevant IT infrastructure for supporting the analysis of the flex-offers and their aggregation/disaggregation. The flex offer aggregation problems studied in this thesis are intractable to solve exactly: there are far too many potential solutions to examine them all. As a result, the heuristic algorithms used in the thesis are appropriate. Systematic and quantitative methods are used for evaluation of performance. The tested hypotheses involve runtime and solution quality. The thesis uses a mixture of real and synthetic datasets to verify that the proposed techniques can find a solution in reasonable time and that the solution meets the required criteria.

The thesis contains numerous examples and illustrations which facilitate understanding of the presented concepts.

The candidate has a good set of publications at the international level, including one journal paper in a top journal. This demonstrates that the candidate is able to do high-quality, independent research.

2.7 Summary of Weaknesses and Open Questions

Among the challenges considered in the thesis, there are interesting open issues that the committee recommends to address in future work.

While focusing on valuable computer science contributions, the thesis lacks a link to the physical system and derived from that it lacks a discussion of the appropriateness of flex-offers in general and specifically in terms of apparent accuracy of the results in relation to the origin of the flex-offers. EVs are mainly being used as example DER since they are in this context relatively simple. The stochasticity of the source is not treated – the flex-offers are treated deterministically. There is also apparent in Chapter 6 that the lead time for trading is not included. The presented work is suffering from only solving part of the loop and therefore is not considering issues that in real implementations will play a significant role.

It is acknowledged that the work done as part of the PhD project is large and that there would have to be limitations to scope, but the thesis would have been better if the requirements and context were articulated more explicitly. The thesis would have also been improved if the summary and conclusion had been better worked through to extract the contributions and to conclude more precisely, i.e., the thesis could have better demonstrated "the prominent role of flexibility." It has provided a set of aggregation algorithms based on flex-offers and it assumes that the flexibility both at the time of offering it and at the time of execution is the same and can be described by the same flex-offer. Further, there seems to be an implicit assumption in the thesis that the time dimension and the volume/amount dimension are independent (and independently flexible). Is this realistic?

In summary, the thesis could have benefited from considerations on physical implementation and of comparison with alternative approaches. The trading is not actually implemented and considerations on how risk associated with the flex-offers should be handled are not treated. It

is assumed that the flex-offers are directly used for producing flexible orders.

Some parts of the thesis could have been better written. Chapter 1 could have been improved with a list of terms or a list of abbreviations used in the thesis. The summary part is using terms that have not been defined at the time of reading and the conclusion may be over-generalizing the results and not really concluding on the best solution.

3 Oral Presentation and Discussion

Date and place of the oral defense: *December 4, 2017, Aalborg University.*

The title of the oral presentation was *Aggregation Techniques for Energy Flexibility*, and Associate Professor Hua Lu served as moderator of the event, which started at 13:00 and ended at 15:35.

The candidate gave a very convincing presentation of his thesis. The candidate presented a comprehensive overview of the main contributions documented in the thesis. The presentation was well prepared, pedagogical, made good use of illustrations, and captured the essence of the thesis. The candidate demonstrated that he mastered the subject of his thesis and showed evidence that he is capable of carrying out novel research.

During the subsequent discussion, the candidate demonstrated his extensive knowledge of the field and convincingly answered technical questions regarding his research.

4 Conclusions

Motivated by the wide-spread introduction of renewable energy sources and new energy hungry devices such as heat-pumps and electric vehicles, the thesis address a timely topic of how to integrate flexibility of distributed energy resources into a market-based electricity system. The main contribution of the thesis is a suite of aggregation and disaggregation techniques for so-called flex-offers which describe the flexibility of energy resources.

The committee finds that the thesis represents a significant body of research that is well within what can be expected from a Ph.D. thesis. The thesis is based on a solid understanding of related work. It makes appropriate use of the relevant apparatus of computer science. The thesis succeeds in presenting novel results that further state-of-the-art in the relevant scientific area. The oral presentation and the subsequent discussion was well received by the committee.

The members of the assessment committee unanimously recommend that Emmanouil Valsomatzis be awarded the Ph.D. degree.

Aalborg, December 4, 2017

Henrik W. Bindner | Lukasz Golab | Simonas Šaltenis

AALBORG UNIVERSITY
DENMARK

Department of Architecture, Design and Media Technology
Rendsburggade 14
9000 Aalborg
Denmark

Contact person:
Lisbeth Dam
Phone: +45 9940 3603
E-mail: ldam@create.aau.dk

Date: 27-11-2017

Det Tekniske Fakultet for IT og Design
Niels Jernes Vej 10
Att.: Helene Ulrich Pedersen

Lotte Raun – Designing for Service Change

Hermed fremsendes bedømmelsesudvalgets indstilling vedr. Lotte Rauns ph.d. afhandling, som hun forsvarede den 24. november 2017. Af indstillingen fremgår, at bedømmelsesudvalget anbefaler, at Lotte Raun bliver tildelt ph.d.-graden.

Instituttet indstiller hermed tildeling af ph.d.-graden til Lotte Raun.

Med venlig hilsen

Lisbeth Dam

Bilag

AALBORG UNIVERSITY
DENMARK

Assessment of the PhD thesis entitled:

Designing for Service Change. A study on how designers address implementation of service changes during service design projects for hospitals.

Submitted by Lotte Raun, M.Sc. in 2010

The assessment committee consists of the following members as decided by the Dean of the Technical Faculty of IT and Design on June 6, 2017

Professor Henry Larsen, University of Southern Denmark hlarsen@sam.sdu.dk

Professor Satu Miettinen, University of Lapland satu.miettinen@ulapland.fi

Professor (chairman) Ellen Christiansen Aalborg University ech@hum.a.au.dk

PhD supervisor for the thesis has been professor Nicola Morelli, Aalborg University

Co-supervisor for the thesis has been associate professor Søren Bolvig Poulsen, Aalborg University

Description of the thesis

The thesis is a monograph, 280 pages + appendix submitted on dvd and comprising A: project reports A,B,C,D and B interview guides. Chapter 1 of the monograph provides an introduction, which presents research questions, overview and a list of three publications, a book chapter and two conference papers all of which have contributed content without being included in the thesis. Chapter 2 presents the research design and epistemological considerations, the cases, and the methods of inquiry. Lone Raun presents a conceptual model describing how implementation is addressed, which has been refined and evaluated throughout her case research. Chapter 3 describes the field of service design with emphasis on service design as a practice. After also having introduced theory of organizational change, gaps in current knowledge about implementation practice in service design are pointed out. Chapter 4 goes deeper into the foundation for the conceptual model, before chapter 5 describes and analyses the four cases researched. In chapter 6 lessons learnt across cases are presented, and this presentation leads in chapter 7 to a discussion of implementation strategies, before conclusion and perspectives are presented in chapter 8. No chapter 9. Chapter 10 holds bibliography and list of figures.

Assessment of the thesis

The main message of this PhD thesis is already to be found in the title "designing for service change" from which the reader can infer that service design implies change, which is what has motivated Lotte Raun's research, since she finds that the implication of service design should comprise a focus on the realization of the design ideas. She found, however, when she began her research, that what she calls "implementation" is underresearched within the field of service design. From a clear positioning of the relevance of her work Lotte Raun gives then an account of how she has been pursuing her research epistemologically as well in

practical inquiry. A rich casematerial is included, the analysis of which is presented in a clear and structured way.

The research question presented p. 18 is formulated as "*How do designers address the implementation of proposed service changes during service design projects for hospitals*?", and detailed into RQ1: "*Which theoretical starting point is appropriate for investigating the way designers address the implementation of proposed service changes in service design projects for hospitals?*" and RQ2: "*What characterizes the way designers address the implementation of proposed service changes in service design projects for hospitals?*" Lotte Raun breaks new ground in the research field of service design by taking up this issue, and the questions are well formulated and helpful for generating new knowledge, since how service designers handle the issue of implementation is highly relevant.

In chapter 8 Lotte Raun responds to the research questions. Based on the presented research she concludes that designers address implementation during the entire project period by considering if the proposed changes are feasible to implement, and if the right people are committed and capable of making the implementation happen. The appropriateness of the conceptual model which Lotte Raun has developed in the beginning of her project and tested as tool of explanation throughout her analyses of the case studies, seems to answer the RQ1 about theoretical starting point. Regarding RQ2 the characteristics of designers' approach to implementation in hospitals she has found that designers follow content-related implementation strategies characterized by identifying space for change, proposing concrete changes to the present situation, and making internal stakeholders evaluate the feasibility of proposed change. Regarding the issue of whom to address, designers seek to involve the right people from the start of the project, promote implementation commitment, and ensure an appropriate handing over of the project to the organization.

As already mentioned regarding state of the art of knowledge about implementation within the discipline of service design Lotte Raun breaks new ground, which she argue well by going through the relevant literature. The lack of knowledge of this issue is subject to her criticisme, but at the same time a motivating factor for her reseach. She builds her critique by referencing literature in organizational theory, and by drawing this literature into her analysis and proposals for improvement. In chapter three Lotte Raun presents the theoretical foundation for her research in service design, and gives a state of the art description of what is and what is not implying change in a system and in actors' patterns of action. The chapter ends with an account of the hospital context for service design. The conceptual model of implemention conditions and strategies is presented in chapter four together with its theoretical foundation. Chapter five presents one by one the analysed cases with the conceptual model as structuring backbone. In chapter six the reader gets a comparative description of similarities and differences between the five cases, again having the conceptual model as point of departure. Chapter seven is a brief discussion leading up to chapter eights answers of the research questions.

Regarding the chosen methodology: The overall epistemological approach in Lotte Raun's research is accounted for in chapter two, where abductive reflection in introduced as the foundation and design research and research through design is portrayed. Empirically five cases are analysed, one of which Lotte Raun has been deeply involved in, and four others about which she has been interviewing both designers and internally responsible. This material is presented in an appropriately reflected way. She considers biases, and position the case material as means to the overall end of understanding conditions for service designers' implementation practice. A critical point is that the heavy structuring somehow does not allow the reader to follow how the analysis has been actually processed: what did people say, what were the stumblingstones and difficulties, both those they mentioned and those she maybe missed in interviews, but could find reflected in the outcome and in the reports? A narrative account would have given the reader a richer picture of problems and bottlecks in the service design practice.

This should not, however, overshadow that the thesis provides insights into this practice as well as tools for conceptualising, and further down the road improving this practice. In chapter one Lotte Raun accounts for the papers and other contributions, which she has already dissiminated, and the feedback of which forms part of the ground for the present monograph.

The conclusion is clear, well supported, and link research problems and conclusion clearly. The references are sufficient, relevant and properly selected. The thesis is well written, although with a tendency to overcodify and overstructure, which makes the reader miss a narrative to bind the threads more freely together.

The committee has the following issues to be discussed in the oral defense:

The thesis provides both scientific and practical professional contributions to the field of service design. However, the presented results also invites reflection regarding the depth of the findings, especially with regard to methods and process of committing and identifying relevant staff and stakeholders in the service design and/or implementation processes. Further thesis could define better what charachteristics make the service design process feasible.

In the conceptual model, Raun splits the organisational themes into either being structural or relational. This is followed up systematically in the reflection on the four cases, but for the reader what is placed in each of the two boxes does not not seem to follow a consistent pattern. This invites to a conversation about about how to make sense of the organisational themes theoretically and practically from the experience with the cases, and in which way such a categorisation in hindsight is seen as helpful and/ or the opposite.

The key concept "implementation", although still a practical reality in change of practices in hospitals, is in design challenged by more agil approaches including that of co-design, and an issue inviting deeper discussion regarding for whom, when, and how much co-creation and co-design is relevant in the present change context in service design.

Conclusion

At the oral defence November 24, 2017, at Aalborg University, Lotte Raun was challenged by the committee with respect to her research through design as a research methodology, the concept of implementation, and her conceptualization of designer identity. She defended her position with regard to these issues, and based on the thesis, as well as the oral presentation, and the following discussion the committee unanimously recommends that Lotte Raun is awarded the PhD degree.

Aalborg University, November24, 2017

Professor Henry Larsen

Professor Satu Miettinen

Professor (chairman) Ellen Christiansen

AALBORG UNIVERSITET

Institut for Elektroniske Systemer
Fredrik Bajers Vej 7B
9220 Aalborg Ø
www.es.aau.dk

Dato: 28. november 2017

Til Forskerskolen
Att.: Lisbeth Diinhoff
N.J. 10

Vedrørende tildeling af ph.d.-grad til Nicolai Bæk Thomsen

Institut for Elektroniske Systemer indstiller at bedømmelsesudvalgets indstilling følges således at Nicolai Bæk Thomsen tildeles ph.d.-graden for sin ph.d.-afhandling "Speech Processing for Social Robots to Improve Interaction with Humans". Forsvaret fandt sted d. 24.11.2017.

Professor Zheng-Hua Tan har været hovedvejleder for Nicolai Bæk Thomsen.

Med venlig hilsen

Børge Lindberg

Institutleder

Institutleder Børge Lindberg, tlf. +45 9940 8638, E-mail bli@es.aau.dk
Institutsekretær Kirsten Jensen, tlf. +45 9940 8650, E-mail krj@es.aau.dk

AALBORG UNIVERSITY
DENMARK

Assessment of the PhD thesis entitled:

Speech Processing for Social Robots to Improve Interaction With Humans

Submitted by Nicolai Bæk Thomsen, M.Sc. in E.E.

The assessment committee consists of the following members as decided by the Dean of the Technical Faculty of IT and Design on August 15, 2017:

- Professor Reinhold Häb-Umbach Communications Engineering, Paderborn University Germany E-mail: haeb@nt.upb.de
- Professor Jan Larsen, Department of Applied Mathematics and Computer Science Technical University of Denmark E-mail: janla@dtu.dk
- Associate Professor Lars Bo Larsen (chairman), Department of Electronic Systems, Aalborg University E-mail: lbl@es.aau.dk

Supervisor for the thesis has been Professor, Zheng-Hua Tan, Department of Electronic Systems, Aalborg University.

Co-supervisors for the thesis has been: Professor Søren Holdt Jensen and Associate Professor Børge Lindberg Department of Electronic Systems, Aalborg University.

Description of the thesis

The thesis consists of an introduction (part I) and 9 papers (part II), which cover 5 peer-reviewed conference papers, 1 peer-reviewed journal journal publication, and 2 submitted peer-reviewed journal publications. The paper are:

Paper A: "A heuristic approach for a social robot to navigate to a person based on audio and range information". In proceedings of RSJ International Conference on Intelligent Robots and Systems (IROS), 2015 IEEE, pp. 5884-5890.

Paper B: "Where are you? A method for robot navigation to a person based on speech and range information" by Nicolai Bæk Thomsen, Zheng-Hua Tan, Børge Lindberg, Søren Holdt Jensen. **Submitted to** Springer Journal of intelligent & robotic systems, 2017.

Paper C: Improving robustness against environmental sounds for directing attention of social robots" by Nicolai Bæk Thomsen, Zheng-Hua Tan, Børge Lindberg, Søren Holdt Jensen. Published in "Multimodal Analyses enabling Artificial Agents in Human-Machine Interaction", United States: Springer Publishing Company, 2015. pp. 25-34. Post-workshop proceedings of the Second Workshop on Multimodal Analyses Enabling Artificial Agents in Human Interaction, MA3HMI 2014.

Paper D: "Learning direction of attention for a social robot in noisy environments" by Nicolai Bæk Thomsen, Zheng-Hua Tan, Børge Lindberg, Søren Holdt Jensen In: The 3rd AAU Workshop on Robotics, Aalborg Universitetsforlag, 2015. Pp. 8-14.

Paper E: "Signal-to-interference ratio driven positioning strategy for a social robot in spoken interactions" by Nicolai Bæk Thomsen, Zheng-Hua Tan, Børge Lindberg, Søren Holdt Jensen. **Submitted to** Elsevier Speech Communication, 2017.

Paper F: "Speaker-dependent dictionary-based speech enhancement for text-dependent speaker verification" by Nicolai Bæk Thomsen, Dennis Alexander Lehmann Thomsen, Zheng-Hua Tan, Børge Lindberg, Søren Holdt Jensen, in Proceedings of Interspeech 2016. ISCA 9, 2016, pp.1839-1843.

Paper G: "Improving the convergence of CO-training for audio-visual person identification" by Nicolai Bæk Thomsen, Xiaodong Duan, Zheng-Hua Tan, Børge Lindberg, Søren Holdt Jensen, in First International Workshop on Sensing, Processing and Learning for Intelligent Machines (SPLINE) 2016. United States: IEEE.

Paper H: "Designing and implementing an interactive social robot from off-the-shelf components", by Nicolai Bæk Thomsen, Zheng-Hua Tan, Xiaodong Duan, in "Recent Advances in Mechanism Design for Robotics." Germany: Springer, 2015, pp. 113-122. Proceedings of the 3rd IFToMM Symposium on Mechanism Design for Robotics, held in Aalborg, Denmark, 2-4 June, 2015.

Paper I: "iSocioBot - a multimodal interactive social robot" by Zheng-Hua Tan, Nicolai Bæk Thomsen, Xiaodong Duan, Evgenios Vlachos, Sven Ewan Shepstone, Jesper Lisby Højvang, Morten H. Rasmussen Accepted for publication in International Journal of Social Robotics, 2017.

Assessment of the thesis

The title of the thesis "Speech processing for social robots to improve interaction with humans" covers the addressed themes well, as it is concerned with different speech processing aspects of human-to-robot communication. This include research on 1) how to navigate to a human if the human is not in the line-of-sight, 2) how to determine which sound source the robot should direct its attention to, and 3) how to approach the human. Further there are contributions on speaker identification/verification in noisy environments. While the focus is clearly on speech/audio processing, some of the papers include a vision component as well.

For Part I, Introduction

The thesis introduction is quite brief and comprises 25 pages, followed by a reference list. It presents the main focus area of the thesis and the three research hypotheses. This is followed by sections discussing speech processing and social robots and non-field-of-view speaker localization, which is the first focus area of the thesis. Person identification and verification is addressed in the subsequent sections, and the introduction ends by a listing of the papers comprising Part II of the dissertation as well as an overall conclusion.

Three research hypotheses are stated without any introduction on the second page of the thesis as:

1. That extraction of certain audio features can enable a robot to locate an audio source with no a priori knowledge about the physical environment.
2. That the influence of interfering acoustic sources can be minimized by letting the robot move to a position that minimizes the SIR (signal-to-interference ratio).
3. That a robot from audio can direct its attention towards a dominant speaker among multiple potential speakers and also ignore non-human sources by using feedback from face detection.

By starting with a presentation of the research hypotheses without any prior introduction or discussion, the candidate prevents himself from any deeper discussion and arguments for the relevance of the research questions. This leaves the reader speculating as to why these were chosen. Unfortunately, the hypotheses are never revisited or discussed in the remainder of the thesis, as would be expected, for example in the conclusion. So, while certainly treating the research questions implicitly in-depth in the papers and thereby testing the hypotheses, no clear answer to the research questions are in fact provided or discussed in the summary. The assessment committee regards this a weakness of the thesis.

The committee furthermore notes:

- The introduction contains sections discussing the state-of-the-art within the addressed fields and how it relates to the work carried out. A reference list with 86 entries supports this. Regarding the underlying audio/speech signal processing methods and algorithms, the author gives a good overview of the most important techniques, however, without going into any detail. This is, probably, what one should expect in an extended summary. The description of the achievements is balanced and does not overestimate own contributions.
- The methodology is a mixed theoretical and experimental approach. The committee regards it as a strength that extensive implementations and experiments were carried out to support and inform the theoretical work. The summary, however, does not provide great details.
- The thesis' contributions are not explicitly described nor discussed extensively in the summary. Instead the candidate has chosen to provide a short summary of the individual papers. This discussion is introduced by a scenario overview, where each paper is placed in a figure (fig. 5, p. 19) that explains how they are related. This gives a nice, albeit very short, overview of the linkage. In addition to this, papers H and I are mentioned to address the overall construction of the iSocioBot, which seems a reasonable way to introduce them. The committee would have preferred a more explicit discussion of the thesis' contributions.

For Part II, Papers

Paper A

The proposed method is quite heuristic with several parameter values, whose settings generally require prior knowledge. A problem is, that the robot has to stop to be able to listen. When moving, the robot's ego noise of servos etc. is so high that an acoustic source localization is not possible. There are, however, publications which tackle this important issue (e.g., Microphone Array Signal Processing for Robot Audition, by H. Löllmann et al., HSCMA 2016). Signal power is proposed as a feature. But signal power is a difficult feature because it depends on the speaker's volume, and the propagation characteristics. Furthermore, keeping the signal power constant is counter-intutive to the user, as s/he will probably raise his/her voice if the robot is distant and lower it as it comes nearer. The committee wonders how relevant this feature is compared to the the direct-to-reverberant ratio. The optimality of equal weighting of the two features equally in Eq. (A.4) has not been discussed.

Paper B

Paper B presents a speed-up of the algorithm used in Paper A by introducing "visibility gaps": the robot moves as far as it can before calling the human again, instead of calling the human at regular intervals. The method is rather heuristic but seems to work. The paper leads to significant reduction of number of times the human is called. However, the overall time required to find the human is still rather large.

Paper C

There seems to be an error in Fig. C.2: the text on the arrows leaving the question "speech" should be swapped: If the question is answered by "no", one should return to "wait for audio", not if it is answered by "yes". Further, there is a clash of notation for the variable "T": it is used for denoting a threshold (eq. C.2) and an interval (first line on page 90). In the experiments, there were no overlapping sounds, which is quite unrealistic. Interfering sounds that passed the VAD threshold were distinguished from human speech by their relatively short duration. This certainly holds for many sounds, but not for all. Furthermore, the duration T_A, below which a sound is classified as non-speech, is set a priori. In the Figures C.4 - C.6 one can see a delay between the speech onset and the speech detection by the robot, which is in the order of a few seconds. This should be discussed.

Paper D:

The paper is concerned with the important problem of how to direct a robot's attention to a speaker in the presence of other, possibly also speech-like, noise. The problem is solved using a Bayesian Hypothesis Testing approach and employing acoustic and visual modalities. A sequential hypothesis testing scenario is employed, whereby a face detection in the direction of the most prominent sound source increases the probability of classifying the sound as speech directed towards the robot.

Sound source localization is based on the well-known SRP-PHAT method. Speech, as opposed to other noise sources, is detected with a harmonicity measure, while the result of the face detection serves as a measure to control the update of the probability of the detected sound being human speech directed towards the robot.

Two update rules are proposed. The first rule implicitly assumes that face detection is always correct, while rule 2 incorporates the uncertainty of face detection and, further, the fact, that the environment may change and thus probabilities estimated in the past may become invalid.

While the whole methodology is grounded in a solid statistical framework, the parameters of the model are chosen a priori based on what worked well for the considered scenario. Of course, an estimation of the parameters from training data covering a wide range of scenarios would be more appealing. However, this is probably impossible due to the lack of training data.

In the experiments, rule 2, which accounts for uncertainty in face estimation, turns out to deliver, not surprisingly, better results. However, due to the static scenario considered, the advantage of deemphasizing outdated information could not be well demonstrated.

Overall the paper is well written. The theory is sound, and the experimental verification is convincing, however, somewhat limited. Due to the many heuristic parameters, it is unclear how well the system would perform in different scenarios (different noises, different SNRs, different geometric configurations etc.). Further, there are some

limitations w.r.t. the algorithms used (e.g., only the loudest sound source is evaluated for speech presence), which are, however, properly mentioned in the conclusion.

Paper E

The goal in this paper is to find a position for the robot where the signal-to-interference ratio is maximized, which additionally has to adhere to social constraints. In Eq. (E.2) the power value is denoted by σ where σ^2 would be the preferred standard. The quantity in Eq. (E.8), which the author calls "correlation coefficient", is usually called magnitude coherence in the signal processing literature. Eq. (E.10) assumes that the TDOA estimate is normally distributed around the true value. This is convenient for the subsequent processing, but actually a rather poor approximation: reflections or non-line-of-sight are the major causes of errors, which are not well modeled by a normally distributed error although reference [23] seem to suggest this. The assumption that the signal power decreases as the square of the distance isotropically in all directions is a very coarse assumption. But these assumptions seem to work!

Paper F

This paper focuses on speaker verification and speech enhancement using non-negative sparse matrix factorization (non-negative sparse coding) from speaker-dependent utterances.

The contribution in this paper is rather marginal despite the fact that the paper claims to propose a new approach based on dictionary-based noise reduction. The enhancement algorithm (nonnegative matrix factorization with a sparseness constraint) is well known and even more advanced version of such algorithm using e.g. power factor of two in the spectrogram representation has not been considered (factor close to 2/3 due to Stevens power law has shown to be useful). Only the application to speaker verification seems to be new. But this has no impact on the speaker enhancement algorithm design. The algorithm is compared to other classical speech enhancement algorithms such as Wiener filtering.

Paper G

A relatively little modification to the CO-training algorithm is introduced, which leads to considerably faster convergence. The final performance, however, is not improved.

Paper H

The paper presents the technical and electronic design of the iSocioBot but does not contain any new contributions in relation to the main hypotheses of the thesis.

Paper I

Paper I is a later and extended version of Paper H and includes the second version of iSociobot and in particular additional system-level human-interaction evaluation.

The paper starts with a discussion of requirements for social robots (SC). A number of claims are made on p.190, but no references are provided to back these requirements up. For example, it is concluded that a height of 1.2 m is too

low for comfortable interaction with a standing (adult?) human. However, neither empirical nor literature evidence are provided to support this claim. A short overview of existing SCs are provided and it is concluded that none fits the requirements. The following section describes the iSocioBot implementation in terms of appearance and hardware and software. Apart from the Styrofoam body, all electronics and mechanics are readily available standard components. All software modules are built upon the open source Linux/ROS platforms and all developed software is made freely available. This is highly commendable. Thus, it seems to be possible to completely replicate the iSociobot.

Sections 3 (Person Tracking), 4 (Person Identification), 5 (Speech recognition), 6 (Speech synthesis), and 7 (Visual Feedback) all quite briefly outline the involved methods, but largely without references. It is necessary to consult papers A-G to obtain an in-depth understanding of the technologies. This is to be expected in an overall description, but e.g. Section 6 only describes the text-to-speech system as "propriety" and does not provide any further information at all, except that a female voice is used. Section 8 describes the interaction management, and e.g. mentions that the "ALICE" chatbot is utilized. It is not clear whether it is the general A.L.I.C.E framework which is used or "the" ALICE chatbot. The authors provide no examples of e.g. discourse management, evaluation results or a reference.

The most in-depth section is 9 (Evaluation). A thorough description of the evaluation scenario is given, together with a statistical analysis of the GodSpeed questionnaire for social robot evaluation. The chosen evaluation scenario (with dyads, one interactor, one observer) is described in some detail, but it is not clear why this was deemed superior to e.g. letting a project team member take the observers' role. That would have doubled the interacting respondents' numbers from 16 to 32. ANOVA analyses are performed on the questionnaire responses, and the most interesting findings are discussed.

Overall the paper succeeds in presenting the iSociobots' construction and modules and a system-level evaluation. It is clearly written and well structured. The sections describing the software modules are by nature quite brief. Unfortunately, the lack of references in these sections would force a reader to quite extensive researching to fully benefit from the paper. In particular sections 7 and 8 suffers from this with almost no evidence or references. A system level evaluation is performed and the results are presented. This is fitting for a paper describing a full robotic system. The paper provides useful insights in the current version as well as suggestions for future improvements

Concerning Papers H,I, it is evident from the co-author statements that the candidate has been instrumental in the implementation of the iSocioBot software and platform, in addition to the algorithms presented in papers A-G.

Conclusions of the assessment

As is evident from the presentation and discussion above, the thesis presents a solid scientific and engineering contribution to the field of speech communication with social robots. The contributions and results are presented in the nine published and submitted papers (three of these journal papers – two still in submission). The committee compliments the candidate on the implementation and experimental work, which is known to be inherently difficult and time-consuming.

However, the thesis also has some weaknesses. The introduction is very brief and the candidate does not provide arguments for the selection or relevance of the research hypotheses, nor does he include an explicit discussion of the fulfilment of these. Likewise, the thesis' contributions are not presented or discussed in the light of the research questions, rather an abstract of each published paper is included instead.

In the oral defense Nicolai Bæk Thomsen gave a presentation outlining the main part his work. He presented and unfolded the hypotheses driving the research and the obtained results in a clearly understandable manner. In the questioning session, he answered all questions from the assessment committee and engaged in discussions in a lively manner. He showed awareness of the limitations and assumptions of his work. He suggested how to proceed, e.g. to follow a learning-based approach to overcome some of the limitations of the heuristic assumptions that many experiments are currently dependent upon.

Taken together, Nicolai Bæk Thomsen showed the level of scientific and engineering maturity to be expected to deserve the ph.d. degree.

In conclusion, the committee recommends Nicolai Bæk Thomsen be awarded the ph.d. degree.

Friday, November 24th, 2017.

Lars Bo Larsen

Reinhold Häb-Umbach

Jan Larsen

AALBORG UNIVERSITET

Institut for Elektroniske Systemer
Fredrik Bajers Vej 7B
9220 Aalborg Ø
www.es.aau.dk

Dato: 28. november 2017

Til Forskerskolen
Att.: Lisbeth Diinhoff
N.J. 10

Vedrørende tildeling af ph.d.-grad til Niels Werner Adelman-Larsen

Institut for Elektroniske Systemer indstiller at bedømmelsesudvalgets indstilling følges således at Niels Werner Adelman-Larsen tildeles ph.d.-graden for sin ph.d.-afhandling "REVERBERATION TIMES SUITABLE FOR VENUES THAT PRESENT POP AND ROCK MUSIC". Forsvaret fandt sted d. 12.10.2017.

Professor Dorte Hammershøi været hovedvejleder for Niels Werner Adelman-Larsen.

Med venlig hilsen

Børge Lindberg

Børge Lindberg

Institutleder

Institutleder Børge Lindberg, tlf. +45 9940 8638, E-mail bli@es.aau.dk
Institutsekretær Kirsten Jensen, tlf. +45 9940 8650, E-mail kri@es.aau.dk

AALBORG UNIVERSITY
DENMARK

Assessment of the PhD thesis entitled:

REVERBERATION TIMES SUITABLE FOR VENUES THAT PRESENT POP AND ROCK MUSIC

Submitted by Niels Werner Adelman-Larsen, M.Sc. in Acoustics

The assessment committee consists of the following members as decided by the Dean of the Faculty of Engineering and Science by 8 February 2016:

- Member 1: Professor Peter Svensson, Department of Electronics and Telecommunications,,Norwegian University of Science and Technology, O.S. Bragstads Plass 2, 7491 Trondheim, Norway, E-mail: peter.svensson@iet.ntnu.no.
- Member 2: Associate Professor Tapio Lokki, Department of Computer Science, Aalto University, Otakaari 5, FI-02150 Espoo, Finland, E-mail: tapio.lokki@aalto.fi.
- Member 3 (chairman): Associate Professor Flemming Christensen, Department of Electronic Systems, Aalborg University, Fredrik Bajers Vej 7B, DK-9220 Aalborg East, Denmark, E-mail: fc@es.aau.dk.

Supervisor for the thesis has been Professor Dorte Hammershøi, Department of Electronic Systems, Aalborg University, Fredrik Bajers Vej 7B, DK-9220 Aalborg East, Denmark.

Description of the thesis

The thesis is based on a collection of papers one of which is a published book. The main thesis including 2 journal and 3 conference papers has a length of 116 pages. The book, which is supplied at the side due to publishing rights, has 470 pages. The main body of the thesis (the extended summary) includes two short summaries in English and Danish (3 and 2 pages, respectively), Acknowledgements (1 page), Introduction (7 pages), Project Objectives (11 pages), presentation of the 6 contributions (18 pages), Summary of findings (3 pages), Conclusion (2 pages) and Bibliography (7 pages).

- Paper 1: "Suitable reverberation times for halls for rock and pop music", Niels Werner Adelman-Larsen, Eric R. Thompson & Anders C. Gade. Journal of Acoustical Society of America 127 (1), January 2010. Status: Printed.
- Paper 2: "Investigation on acceptable reverberation time at various frequency bands in halls that present reinforced music", Niels W. Adelman-Larsen, Cheol-Ho Jeong & Bård Støfringsdal. Applied Acoustics, 2017. Status: Submitted.
- Paper 3: "ABSORPTION COEFFICIENTS OF STANDING AUDIENCES IN HALLS", Niels Werner Adelman-Larsen & Cheol-Ho Jeong. The Sixteenth International Congress on sound and Vibration, Kraków, July 2009. Status: Printed.
- Paper 4: "A survey of reverberation times in 50 European venues presenting pop & rock concerts", Niels W. Adelman-Larsen & Jens Jørgen Dammerud. Forum Acusticum 2011 – Aalborg – Denmark. Status: Printed.
- Book: "Rock and Pop Venues, Acoustic and Architectural Design", Niels Werner Adelman-Larsen. Springer Verlag, 2014. ISBN 978-3-642-45235-2. Status: Printed.
- Paper 5: "POSSIBLE ACOUSTIC DESIGN GOALS IN VERY LARGE VENUES HOSTING LIVE MUSIC CONCERTS", NW Adelman-Larsen. Proceedings of the Institute of Acoustics, Vol. 37. Pt.3 2015. Status: Printed.

Assessment of the thesis

Paper 1

The paper is solid scientific work with new relevant results linking objective room acoustical parameters with subjective impressions of concert halls used for amplified (rock and pop) music using sufficient references. It would have been nice to see more of a discussion on problems with the rating methodologies (bias effects of open judgements based on memories; effects of turning these specific scales into numerical values, etc.), but the approach is quite accepted in the room acoustics field. The paper includes interesting data on absorption of standing people - but one aspect is not commented: if we had absorption data for seated persons at 2.7 persons/m^2, maybe the absorption coefficients of seated and standing people would be almost the same? In particular if the measurement uncertainties were taken into account. There is no discussion on reasons for the higher absorption at 63 Hz. What are the measurement uncertainties? The analysis of correlation between objective measurements and subjective ratings might be further qualified by including information from relevant references on correlation between the different objective parameters.

Paper 2

Paper 2 is investigating the hypotheses that reverberation times at mid-high frequencies might preferably be higher than previous target functions – especially found in recommendations for classical halls – have suggested. This might lead to more flat responses in the halls at an occupied state partly because of the directivity of PA loudspeakers and the fact that they are pointing into the audience. The paper presents reverberation times of two smaller Danish venues with comparable volumes and varying reverberation times in the questioned frequency range. A questionnaire survey is performed among musicians and sound engineers knowing the halls, and subjective ratings of the halls are collected. Appropriate statistical tools are used to find significant differences in the ratings.

The data material is rather limited, so a generalization might be somewhat limited, however the conclusions appear reasonable: That mid-high frequencies reverberation for the empty hall can be allowed – or even preferred – higher than at the low frequencies, and that there might be a higher tolerance for long reverberation time in the 63 Hz band compared to 125 Hz.

Paper 3

Paper 3 presents novel idea to measure absorption of the standing audience. However, there is a huge variance in a small number of not-so-well-documented measurements. The paper is, e.g., lacking information on the loudspeaker configurations in the different halls, which might qualify the discussion of e.g. microphone positions (heights) further. Regarding the measurement system, it remains unclear why the impulse response alignment plays a role.

Regarding the huge variance on the results, it is hard to see how an average of all these measurements (with varying equipment) would be the correct absorption of standing audience. These values should not be used until more data is collected, and/or the reasons for the variance or uncertainties are discussed.

Paper 4

A very large measurement campaign of 55 large European halls is demonstrated. This is a big engineering task, and could have been a very solid scientific addition to paper 1 if it was made with the same systematic approach. But it is hard to find the point the paper tries to make.

There are a number of unsubstantiated claims especially when it comes to subjective statements on the perceived quality of the halls. Why are "three Danish halls with good reputation" used as reference, and not the best (5/10) halls from paper 1?

There is a lack of discussion or simulation of the direct-to-reverberant ratio in small vs. large (enormous) halls. Maybe the importance of the reverberation is so much smaller in the huge rooms that there is no systematic influence of the reverberation time on the perceived quality?

All results are averages of mid frequency octave bands (RT[125-2k]), but the motivation says that low frequencies and high frequencies are important separately. They should have been presented separately. In addition, there would have been much more information in the measured data than only RT and derivatives of that

Book

The book presents an overview of the very extensive measurement campaign of the 55 halls with higher detail than paper 4, and as such chapter 7 and the appendices are very relevant for the thesis.

The remaining parts of the book contain mainly normal textbook information. There are almost no references in the book, and they are not living up to normal scientific publishing standards.

Paper 5

Paper 5 represents the data of the 20 largest of the 55 halls. The paper is speculative and quite unsystematic without a clear scope, and appears to be relying more on the authors "convictions" and beliefs than solid scientific arguments. It is, however, interesting to see the comparison with other recommendations. Surprisingly, in Fig. 2, the T30 is apparently the average, which includes 63 Hz again as opposed to paper 4.

The following statement seems strange: "The T30 versus frequency band of hall number 5 is shown in figure 3. The higher value at 63 Hz is left out of the debate except it should be mentioned that due to the ears' higher threshold to sound at these very low frequencies the sound decay (reverberation) becomes inaudible sooner. This is the reason for the higher tolerance in this frequency band shown in figure 1." Why leave the 63 Hz out of the debate? Also, wasn't the reason for the higher value at 63 Hz the observation that, de facto, the best halls have higher values? Finally, the auditory threshold curves describe the level, not the decay that is audible.

At the end, the paper presents some interesting data from measurements in a very large hall with and without audience. This information might be used in connection with the absorption data of the previous papers. Information on the measurements setup is however lacking, and the data is not used further.

Extended summary

The extended summary contains 5 parts: 1) A general introduction to the topic including state of the art, 2) project objectives 3) Presentation of the studies 4) summary of findings and 5) Conclusion.

The summary is well supported by 91 references cited throughout the text. Some of the references, however, lack information like e.g. ISBN numbers for books, page and volume numbers, and a few are only citing personal communication.

The introduction includes considerations on the use of objective and subjective room acoustical parameters, and lays out the state of the art in room acoustical design parameters. Most of these parameters have been earlier developed in the framework of classical concert hall acoustics. A shorter section reviews the few relevant studies for rooms with amplified music.

The project objectives sets the frame of the work which is primarily:"...to create new knowledge in the field of auditorium acoustics with the view of providing suggestions and insight for acoustical consultants to use when projecting halls that present pop/rock music." It includes choice of research methods, like laboratory vs. real life experiments and musicians vs. audience as test subject, and arguments for the importance of the

reverberation time as a key measure. Some other measures related to the reverberation process are also considered, such as the critical distance, which seems to be of great importance for rooms with amplified music. The chapter contains many considerations on different aspects of amplified music in concert halls e.g. frequency content of the music, the way of playing, the mixing process etc. However, a more consistent use of subchapter headlines would have eased the reading.

The presentation of the studies contains a section for each paper (and book), but extends beyond the content of the papers, and argues many of the choices tying the individual investigations together.

In general, the quality of dissemination and language is decent with some minor typos appearing – especially to the end of the summary.

Many of the concerns mentioned in the paper reviews above are addressed in the summary, and the reasons behind the scientific choices are argued.

Oral presentation and discussion
Date and place of the oral defence: 12 October 2017, Aalborg, Denmark.

Niels gave a 54 minutes presentation of his work keeping within the specified time constrains. The structure of the presentation was clear and well organized focusing on the general framework, the methods used and results and conclusion, supported by good illustrations. After the presentation the committee raised a number of comments and specific and general questions, which were discussed during a period of 1 hour and 45 minutes. Niels engaged in a good scientific discussion with elaborate answers on the topics brought to question. He demonstrated a wide knowledge within the area, although not as strong in room acoustical theory and in the low level technical details of measurement systems.

Conclusions

Paper 1 and 2 presents systematic scientific studies of good quality. The following conference papers present follow-up studies, in which the relevance for the scientific community is mainly in the collected data, which hopefully would encourage other researchers to continue the work started in this thesis. The extended summary contains explanations for choices and scientific as well as technical considerations beyond the content of the papers.

The thesis presents some good scientific and engineering contributions, and it is the first one to gather a solid amount of data from pop & rock venues that can serve as reference data, and guidelines for engineers and designers.

At the defence, the candidate gave a well-structured presentation and engaged with a good level in the scientific discussion.

The committee unanimously recommends that Niels Werner Adelman-Larsen is awarded the PhD degree.

12 October 2017

Peter Svensson

Tapio Lokki

Flemming Christensen

AALBORG UNIVERSITY
DENMARK

Department of Architecture, Design and Media Technology
Rendsburggade 14
9000 Aalborg
Denmark

Contact person:
Lisbeth Dam
Phone: +45 9940 3603
E-mail: ldam@create.aau.dk

Date: 27-11-2017

Det Tekniske Fakultet for IT og Design
Niels Jernes Vej 10
Att.: Bettina Wedde

Ramin Irani – Computer Vision-Based Methods for Detection and Measurement of Psychophysiological Indicators

Hermed fremsendes bedømmelsesudvalgets indstilling vedr. Ramin Iranis ph.d. afhandling, som han forsvarede onsdag den 24. november 2017. Af indstillingen fremgår, at bedømmelsesudvalget anbefaler, at Ramin Irani bliver tildelt ph.d.-graden.

Instituttet indstiller hermed tildeling af ph.d.-graden til Ramin Irani.

Med venlig hilsen

Lisbeth Dam

Bilag

AALBORG UNIVERSITY
DENMARK

Final Assessment of the PhD thesis entitled:

"Computer Vision-Based Methods for Detection and Measurement of Psychophysiological Indicators"

Submitted by Ramin Irani, M.Sc. in Electrical Engineering

The assessment committee consists of the following members as decided by the Dean of the Technical Faculty of IT and Design by August 25, 2017:

- **Member 1:** Senior Specialist Peter Ahrendt, Teknologisk Institut, Denmark, peta@teknologisk.dk
- **Member 2:** Assistant Professor Paulo Luís Serras Lobato Correia, Instituto de Telecomunicações, Instituto Superior Técnico, Lisboa, Porugal, plc@lx.it.pt
- **Member 3 (chairman):** Associate Professor Lazaros Nalpantidis, Aalborg University, Denmark, lanalpa@m-tech.aau.dk

Supervisor for the thesis has been Prof. Thomas B. Moeslund, Aalborg University, Denmark.
Co-supervisor for the thesis has been Associate Prof. Kamal Nasrollahi, Aalborg University, Denmark.

Description of the thesis

The thesis consists of four parts. The first part contains a general introduction to the research area, describes the research objectives, and summarizes the research results obtained. The following three parts represent the three research themes addressed in this thesis. Each of these three parts consists of a number of technical contributions, either journal articles, conference/workshop papers, or technical reports where the candidate had the major or significant contribution, as attested by the attached co-author statements. In total 11 such contributions are included in this thesis. All articles and papers, apart from the technical report, are published. The details of these contributions, as well as their exact distribution in the three last parts of this thesis, are as follows:

PART II: Estimation of physiological indicators

1. Ramin Irani, Kamal Nasrollahi, Thomas B. Moeslund, "Improved Pulse Detection from Head Motions using DCT." in 9th International Conference on Computer Vision Theory and Applications (VISAPP), 2014, pp. 118-124.
2. M. A. Haque, R. Irani, K. Nasrollahi, and T. B. Moeslund, "Heartbeat Rate Measurement from Facial Video," IEEE Intell. Syst., Dec. 2015.
3. R. Irani, K. Nasrollahi, and T. B. Moeslund, "Contactless Measurement of Muscles Fatigue by Tracking Facial Feature Points in A Video," in IEEE International Conference on Image Processing (ICIP), 2014, pp. 1– 5.
4. M. A. Haque, R. Irani, K. Nasrollahi, and T. B. Moeslund, "Facial Video based Detection of Physical Fatigue for Maximal Muscle Activity," IET Comput. Vis., 2016.
5. K. Nasrollahi, M. A. Haque, R. Irani, and T. B. Moeslund, "Contact-Free Heartbeat Signal for Human Identification and Forensics (submitted),"in Biometrics in Forensic Sciences, 2016, pp. 1– 14.

PART III: Estimation of psychological indicators

6. Ramin Irani, Kamal Nasrollahi, Thomas B. Moeslund, "Pain recognition using spatiotemporal oriented energy of facial muscles." IEEE Conference on Computer Vision and Pattern Recognition Workshop (CVPRW), 2015, pp. 80-87.
7. Ramin Irani, Kamal Nasrollahi, Marc O. Simon, Ciprian A. Corneanu, Sergio Escalera, Chris Bahnsen, Dennis H. Lundtoft, Thomas B. Moeslund, Tanja L. Pedersen, Maria-Louise Klitgaard, Laura Petrini, "Spatiotemporal analysis of RGB-D-T facial images for multimodal pain level recognition." IEEE Conference on Computer Vision and Pattern Recognition Workshop (CVPRW), 2015, pp. 88-95.
8. R. Irani, D. Simonsen, O. K. Andersen, K. Nasrollahi, and T. B. Moeslund, "Application of Automatic Energy-based Pain Recognition in Functional Electrical Stimulation," International J. Integr. Care, vol. 15, no. 7, pp. 1–2, Oct. 2015.

9. Ramin Irani, Kamal Nasrollahi, Thomas B. Moeslund, "Design of 4D Spatiotemporal Oriented Energy Filter for Kinect-based Pain Recognition (Technical Report).
10. Simonsen, D., Irani, R., Nasrollahi, K., Hansen, J., Spaich, E., Moeslund, T., Andersen, O.S., "Validation and test of a closed-loop tele-rehabilitation system based on functional electrical stimulation and computer vision for analyzing facial expressions in stroke patients." In: Jensen, W., Andersen, O.K.S., Akay, M. (eds.) Replace, Repair, Restore, Relieve Bridging Clinical and Engineering Solutions in Neurorehabilitation SE - 103, Biosystems & Biorobotics, vol. 7, pp. 741–750.

PART VI: Estimation of psychophysiological indicators

11. Ramin Irani, Kamal Nasrollahi, Abhinav Dhall, Thomas B. Moeslund, and Tom Gedeon, "Thermal Super-Pixels for Bimodal Stress Recognition," sixth International Conference on Image Processing Theory, 2016, pp. 1–14.

The thesis addresses the problem of facial video analysis for contact-free estimation of psychophysiological indicators, such as the estimation of the heartbeat, the detection of muscular fatigue, and the identification of pain and stress.
The thesis contributions include:

- The proposal of an improved method for contactless heartbeat estimation from the analysis of facial video.
- The proposal of a novel method for physical fatigue detection, by analyzing shaking induced by fatigue, which can be detected in facial video.
- A proposal for monitoring patients and identifying the level of pain and stress undergone by the patient.
- A close-loop validation of a tele-rehabilitation system for stroke patients, again based on the analysis of facial videos.

Assessment of the thesis

The thesis investigates well-motivated topics and is organized in a logical manner. The progression of the work, as evidenced by the included papers, is satisfactory and shows the ability of the candidate to analyze the state of the art and perform research that goes beyond it. The thesis could have benefitted from a concluding chapter discussing the major achievements and identifying open issues and promising ways to address them. Additionally, as some thesis chapters are papers published 3 years ago, one would expect in such a concluding chapter to find some discussion about the evolution of the relevant techniques and approaches to address the same problems since the publication date.
As the thesis is based on a collection of eleven papers, the assessment committee selected and reviewed five of the academically most significant papers. Their mini reviews follow.

Mini Reviews

A. Ramin Irani, Kamal Nasrollahi, Thomas B. Moeslund, "Improved Pulse Detection from Head Motions using DCT." in 9th International Conference on Computer Vision Theory and Applications (VISAPP), 2014, pp. 118-124.

This paper describes a system able to estimate the heartbeat from facial videos, by detecting and analyzing subtle facial motions that are caused by the circulation of blood. The proposed system is based on the "Eulerian video magnification" concept and more specifically it extends the proposal by Balakrishnan et al. entitled "Detecting Pulse from Head Motions in Video". The proposed system starts with face detection, after which a set of feature points are identified, in the nose and forehead regions, using Shi's "good features to track" algorithm. Feature points are tracked and the vertical components of the trajectories are kept and filtered with a moving average filter to reduce the effect of involuntary head motions. Also, a band-pass filtering is applied to remove undesired frequency components. PCA is then applied to the computed trajectories, followed by DCT, to identify the components with highest signal power and estimate the signal periodicity. The proposed system's operation is more robust to face movements and in the presence of different facial expressions.

The main contribution of this paper is that the proposed system improves the system of Balakrishnan et al. by replacing the FFT with DCT, for computing the fundamental frequency of the detected signal, and additionally applies a moving average filter to better cope with involuntary facial motion.

The paper shows the candidate's ability to understand the problem and to propose relevant improvements that result in better performance and increased robustness. Some discussion about the influence of covariates such as the presence of makeup, mustaches, glasses, etc. would have been helpful. Also, the motivation to replace the FFT with the DCT could be discussed in more depth, as well as the procedure to compute the periodicity of the signal. Finally results from more than eight people would make this paper stronger.

B. M. A. Haque, R. Irani, K. Nasrollahi, and T. B. Moeslund, "Heartbeat Rate Measurement from Facial Video," IEEE Intell. Syst., Dec. 2015.

This paper continues the research presented in included paper [1] (cf. mini review A) and presents a system for measuring heartbeat rate from facial videos. This work combines the use of GFT (Good feature to Track) and SDM (Supervised Descent Method) for facial feature point tracking. The performance of the proposed system is evaluated on the publicly available MAHNOB-HCI database and an own dataset. The presented experimental results show improved performance of the proposed system compared to other relevant approaches.

The main contribution of the paper is that it allows videos captured under more natural and realistic environments than before to be used for heartbeat rate measurements. Thus, it allows for facial expression changes and voluntary head motions, as well as more natural lighting conditions. The combined use of GFT and SDM methods helps towards that direction. Finally, the introduction of Face Quality Assessment (FQA) method prohibits low quality frames from contributing, thus improving the overall performance of the system.

The paper shows a clear improvement over the work documented in the previous included paper [1]. As a result, the ability of the candidate to realise limitations and come up with suggestions about their improvements is visible. A more in-depth discussion about the rationale behind the design choices of this system would be advisable. Furthermore, the conclusion section could have been more extended, discussing the outcomes and lessons learned from this work.

C. R. Irani, K. Nasrollahi, and T. B. Moeslund, "Contactless Measurement of Muscles Fatigue by Tracking Facial Feature Points in A Video," in IEEE International Conference on Image Processing (ICIP), 2014, pp. 1– 5.

This paper describes a system for the measurement of muscle fatigue in a contactless way, by analyzing facial videos and tracking the motion of selected feature points. It extends the work for computation of heartbeat from small facial motions caused by blood circulation, to muscle fatigue measurement by exploring the fact that, due to fatigue, muscles start shaking, and although shaking of the face might not always be detected by the naked eye, the induced motion can be measured by the proposed algorithm. The proposed system performs face detection, extracts feature points and tracks them. Trajectories are filtered with a moving average filter. The vibration signal is extracted and used for calculating the amount of released energy. When fatigue appears also the computed energy is observed to increase.

The main contribution of this paper is the mapping from the trajectories to an estimate of the released energy, which is used to compute fatigue. The proposed system for measuring facial muscle shaking measurement to estimate muscular fatigue is innovative.

Unlike alternative technologies, such as electromyography, the proposed method does not require the application of electrodes on the user's body. Most of the considered modules were already used for heartbeat estimation, but this work shows the candidate's ability to modify an existing solution for a different application, while introducing the additional modules required for the new application. The discussion of how to select algorithm parameters could be more complete. Some more details and explanations could have been provided about why 35 points are tracked in this case, while for heartbeat 150 points were used, why is the signal

filtered in the 3-5 Hz band, and how was equation 5 (detection of fatigue) derived. Last, the creation of fatigue ground truth data could have been further discussed in the paper.

D. Ramin Irani, Kamal Nasrollahi, Thomas B. Moeslund, "Pain recognition using spatiotemporal oriented energy of facial muscles." IEEE Conference on Computer Vision and Pattern Recognition Workshop (CVPRW), 2015, pp. 80-87.

In this paper, the authors propose a system for pain level estimation by using the automatic visual motion estimation of facial muscles. In particular, they propose using spatiotemporal oriented energy filtering. The application of such separable steerable filters appears to be a novelty in the context of automatic visual pain assessment. Given a sequence of head images with facial landmark positions, the proposed system performs face detection, alignment and filtering to produce an "energy" map estimate. Afterwards, the "energy" in three regions of the face are summarized into directional histograms and further into a scalar pain intensity index for each frame of the video. The system is evaluated on a public pain expression dataset.

The main contribution of this paper is the novel application of Spatiotemporal Oriented Energy filtering in the context of pain assessment from visual analysis.

A fair amount of references to related work in the area of visual pain assessment are provided. The paper proposes a technically plausible solution model with some investigation of the dataset. The authors compare with one recent method and evaluate on a public dataset to facilitate knowledge sharing in the community. On the other hand, considerations/motivation regarding technical and algorithmic choices are sometimes lacking, for example arguments for the use of spatiotemporal oriented energy filtering rather than some other method would be appreciated. Some more in-depth qualitative discussion of results would be also helpful.

E. Ramin Irani, Kamal Nasrollahi, Abhinav Dhall, Thomas B. Moeslund, and Tom Gedeon, "Thermal Super-Pixels for Bimodal Stress Recognition," sixth International Conference on Image Processing Theory, 2016, pp. 1–14.

In this paper, the authors propose a system for recognition of psychological stress using the combination of colour (RGB) camera and thermographic camera. The authors introduce the application of superpixels for feature extraction in thermal images in the context of stress recognition which is a novelty in this particular context. The proposed system performs face detection, face quality assessment, feature extraction and classification on individual RGB and thermal images in parallel, and followed by a mean and median filtering of the temporal sequence of classifier outputs. In the end, combination of the two modalities into a single stress/no-stress indicator for each individual frame is performed. The proposed system is evaluated on a public psychological stress database of concurrent RGB and thermal video recordings. The system is found to perform better than a relevant existing system.

The main contribution of this paper is the novel usage of superpixels in combination with thermal images for the recognition of stress.

The evaluation on a publicly available dataset by the Australian National University (ANU) is nice. The investigation of related literature and the reproduction of results of N. Sharma et al. is a strong point of this paper. The research findings of this contribution are nicely presented with a focus on its novelty. Some more explanations and investigations in the context of the choice of feature vector from superpixels would be helpful for the reader. Finally, the discussion of results could be more elaborate.

AALBORG UNIVERSITY
DENMARK

Oral presentation and discussion
Date and place of the oral defense: 24 November 2017, Aalborg, Denmark

At the public defense, the candidate gave an overview presentation of the main findings in his thesis. In the following discussion, he was well able to explain and defend his thesis. He answered questions both about technical details and the broader methodological context of his work. The candidate's presentation enlightened aspects of his work that were not as clear in the submitted thesis.

Conclusions
The committee concludes that with his PhD thesis and the presentation at the public defense, Ramin Irani has fulfilled the requirements for the PhD degree. The committee unanimously recommends that Ramin Irani is awarded the PhD degree.

Date: 24/11-17
Signature:

Peter Ahrendt

Date: 24/11/2017
Signature:

Paulo Luís Serras Lobato Correia

Date: 24/11/2017
Signature:

Lazaros Nalpantidis

Fortegnelse over bedømmelsesudvalg til
stilling Professor in Human Geography (60230) ved PLAN

Navn: Professor Henning Sten Hansen
Arbejdssted: PLAN, AAU
E-mail: hsh@plan.aau.dk

Navn: Professor Gunnel Forsberg
Arbejdssted: Stockholms Universitet
E-mail: gunnel.forsberg@humangeo.su.se

Navn: Professor Lars Winther
Arbejdssted: KU
E-mail: lw@ign.ku.dk

Akademisk Råd har taget stilling til, at medlemmer af bedømmelsesudvalget er sagkyndige inden for stillingsområdet på et niveau, der mindst svarer til det, der forudsættes for stillingen, dog ikke under lektorniveau.

Professor in Human Geography (60230)

Position No.
60230

At the Technical Faculty of IT and Design, Department of Planning, Aalborg a position as Professor in Human Geography is open for appointment from 1.8.2018 or soon hereafter.

The Department of Planning conducts research and teaching on development and planning in a broad sense, including social science aspects as well as more technical aspects of development, and with a focus on environmental, international as well as administrative dimensions. The Department offers bachelor and master's programmes in geography, planning and surveying.

Job description

The position requires research qualifications at Doctor level within the field of human geography.

The Department of Planning wishes to strengthen its research portfolio and develop its bachelor and master's programmes within the field of human geography. As Professor you are expected to provide leadership in both research and teaching.

The Department wishes to appoint a researcher with a strong academic and professional international network within the field of geography and an ability to attract research funding and manage larger research projects. As Professor you are expected to develop a strong research profile within human geography. Research areas may include the areas of urban geography, social and political geography or cultural geography.

As Professor you are expected to play a leading role in teaching and the development of curriculums for the B.Sc. and M.Sc. programmes in Geography. However, you may also be involved in teaching at other study programmes at the University.

As Professor, the main responsibility will be to build up a research agenda within the field of human geography in an interdisciplinary department. Furthermore, the responsibilities will be to

- Build up a research environment in human geography at the Department of Planning
- Attract external funding to establish a research agenda with international impact and visibility
- Provide leadership for the bachelor and master's programme in Geography at the Department of Planning
- Actively engage with internal and external research environments and beyond in order to strengthen Aalborg University's position within the field of human geography

You may obtain further professional information from Associate Professor Kristian Olesen, +45 93562364, kristian@plan.aau.dk.

Qualification requirements:
The successful applicant can demonstrate a documented high level of original scientific production at an international level, including proven further development of the research area in question. An assessment of the candidate's undertaking of research management and/or other possible management functions will also be taken into account. In addition the applicant is expected to have the qualifications required for undertaking teaching responsibilities. Special contributions to and development of educational and teaching related areas will be considered in the overall assessment.

The application must contain the following:

- A motivated text wherein the reasons for applying, qualifications in relation to the position, and intentions and visions for the position are stated.
- A current curriculum vitae.
- Copies of relevant diplomas (Master of Science and PhD). On request you could be asked for an official English translation.
- Scientific qualifications. A complete list of publications must be attached with an indication of the works the applicant wishes to be considered. You may attach up to 10 publications.
- Teaching qualifications described in the teaching portfolio. If this is not enclosed the applicant must include an explanation for its absence.

- Dissemination qualifications, including participation on committees or boards, participation in organisations and the like.
- Additional qualifications in relation to the position.
- References/recommendations.
- Personal data.

The applications are only to be submitted online by using the "Apply online" button below.

An assessment committee will assess all candidates.

For further information concerning the application procedure please contact Nickie Kate Hermansen by mail nkh@adm.aau.dk or phone (+45) 9940 7902.

Information regarding guidelines, ministerial circular in force, teaching portfolio and procedures can be seen here.

Workplace
Aalborg

Agreement
Appointment and salary acc. to the agreement between the Ministry of Finance and the Danish Confederation of professional Associations (AC) on Academics in the State. Employment as Professor is in accordance with a classified position on scale 37. In addition, a pensionable increment will be given.

Deadline
15/01/2018

Apply online

Aalborg University (AAU) conducts teaching and research to the highest level in the fields of humanities, engineering, and natural, health, and social sciences.

top

Curriculum vitae:

Name:	Gunnel Forsberg
Date of birth:	January 3, 1950,Bollnäs, Sweden
Address:	Islandsgatan 10, 753 08 Uppsala
Nationality:	Swedish

Academic career:

1975	Bachelors of Science, Uppsala Universitet
1989	PhD in Human Geography, Uppsala University *(*Dissertation title: *Industrial change and Gender Structure. Case Studies on four Local Labour Markets)*
1995	Associate Professor at the Faculty of Social Science, Uppsala University.

Academic positions:

1976-1979	Research assistant, Swedish University of Agricultural Sciences (SLU), Uppsala
1980-1981	Research assistant at the Swedish Centre for Working Life, Stockholm
1981-1985	Teaching assistant at dep. of Human Geography, Uppsala University
1922-1985	Research assistant at the Swedish Centre for Working Life, Stockholm (50%)
1985-1990	Research assistant at the Swedish Centre for Working Life, Stockholm (100%)
1990-1991	Researcher at Dep. of Human Geography, Uppsala University
1991-1998	Senior lecturer, Dep. of Human Geography, Uppsala University
1998-2017	Full Professor, Dep. of Human Geography, Stockholm University 100% (during 1999-2005: 50%)
1999-2005	Visiting Professor at Centre for Gender studies, Karlstad University 50%
2009 – 2010	Professor II In feminist Human Geography, Högskolen i Finnmark, Alta, Norway 20% ,.
2017	Senior professor, Dep. of Human Geography, Stockholm University 100%

Publications

Parental leave:

1979 – 1980
1986 – 1987

University assignments (selected)

2011-	Deputy Dean of the Faculty of Social Science, Stockholm University.
1998-	Chair of the Committee of Swedish University School of Planning, Stockholm University.
2011-	Chair of the board for Appointing Professors, Faculty of Social Scences, Stockholm University.
1998-	Representative of Carl Mannerfeldts scholarship fund, Stockholm University.
2007- 2011	Head of Department at Department of Human Geography, Stockholm University.
1999- 2005	Director at the Centre for Gender Studies, Karlstad University.
2003- 2005	Chair of the board for Associate professors, Karlstad University.

Project leadership (selected)

1994-1997	Project leader for "The countryside of Mälar region in Transition", Uppsala University, Funded by Riksbankens Jubileumsfond 1.300.000.
1994 - 1997	Project leader for "Gender and Regional Variations", funded by Forskningsrådsnämnden. Dnr 962012 A 18-5/479, 1.231.000.
1998 - 1999	Regioner för kvinnor och män. Om vardagens villkor i välfärden. Uppsala University, 200.000.
1997 - 2000	Project leader for Strategier för planering i dynamiska landsbygder. Forskningsrådsnämnden drn 690.0084/98, 500.000.
1999 - 2005	Programme leader for "Gender Relations on the Move" Karlstad University, , funded by samhällsvetenskapliga fakulteten, Karlstad universitet and Länsstyrelsen i Värmland. 2.000.000.
2001 – 2004	Den ekonomiska geografin ur ett köns/genusperspektiv. Funded by FAS, drn 2001-0051. 1.375.000:-
2002 - 2006	Project leader for "Changes and Development in the Region of Inner Scandinavia", Karlstads University, funded by EU:s INTERREG III. Drn IS 3041-119-02. 3.000.000.
2002 - 2005	Project leader for "Innovative Entrepreneurs in the Caring Sector. Innovation Systems in a Gender Perspective" funded by VINNOVA and Sveriges Kommuner och Landsting. Drn 2002-02926. 1.2000.000.
2004 - 2008	Project leader for icke-heterosexuellas villkor I arbetslivet "Homosexuals at work", Karlstads Universitet, funded by FAS. C2003/165, 2.800.000.
2006 - 2010	Project leader for "Innovationssystem och homosociala strukturer", (Innovation systems and Homo-social structures) in collaboration with prof. Gerd Lindgren, Karlstad University, funded by VINNOVA dnr 2005-00729. 3.500.000.
2007 - 2011	Project leader for "Gender and Rural Life—Creating Gendered Ruralities", funded by Vetenskapsrådet, Dr 421-2006-2290. 1.800.000.

2008 - 2013 Project leader for "When the world goes rural", funded by FORMAS. Dnr 251-2007-2019, 5 265 000.

External assignments (selected)

1994-1998 Member of the expert panel at RALF (Swedish board for Labor research.
2005-2010 Member of the Board of Swedish Secretariat for Gender Research, Gothenburg University.
2002-2006 Member of the expert panel at FORMAS (, (2004-2006 chair of the Committee)
2000 – 2005 Member of the Scientific Board of Swedish National Rural Development Agency, Östersund.
2001 -2012 Member of the Scientific Board of the Office of Regional Planning and Urban Transportation, Stockholm County.
2001 -2013 Member of the editorial board of the journal PLAN.
2006 -2012 Member of the Scientific Board for the Swedish Association of Local Authorities and Regions.
1990-2010 Expert (consultant) at the IM-Group in Uppsala.
2008 Chair of the board for Preparing Committee for the European fund for "Urban-Net".
2006-2012 Member of expert panel for Humanities and Social Sciences, Vetenskapsrådet.
2014 Member of the board for formulating the 10-year Program for Demokratisk og effektiv styring, planlegging og forvaltning (DEMOS), Norska Forskningsrådet.
2015- Member of Det konglige Norske Videnskabers Selskabs Akademi.
2015 Chair of the Swedish Higher Education Authority's pilot assessment of doctoral education at Linköping university.

Publications (selected)

Monographs and Readers

Forsberg, G & Lindgren, G (red), 2010, *Nätverk och Skuggstrukturer i regionalpolitiken.* Karlstad University Press. Karlstad.

Berger, S. Forsberg, G & Ørbeck, M. (red), 2007, *Inre Skandinavien – en gränsregion under omvandling.* Karlstad: Karlstad University Press

Forsberg, G, Grimsrud, G.; Jakobsen, L.; Jansdotter, M. & Vangsgraven Stubberud, K., 2006, *Gränsfall. Platsens betydelse för omställning och utveckling i en gränsregion.* Nordregio, Stockholm.

Forsberg, G., (red), 2005, *Planeringens utmaningar och tillämpningar.* Uppsala Publishing House, Uppsala.

Forsberg, G & Grenholm C. (red) 2005, *... och likväl rör det sig. Genusrelationer i förändring.* Karlstad university Press.

Berger, S., Forsberg, G. & Ørbeck, M. (red) 2004, *Atlas över Inre Skandinavien – Befolkning, näringsliv och livsmiljö,* Karlstad University Studies, 2004:66, Karlstad.

Forsberg, G 2003, *Genusforskning inom kulturgeografi - en rumslig utmaning.* Högskoleverket, Stockholm.

Forsberg, G, Jakobsen, L & Smirthwaite, G., 2003, *Homosexuella i arbetslivet* – Arbetsrapport, Karlstad: Genusvetenskap, Karlstads universitet.

Forsberg, G., Grenholm, C & Jakobsen, L. 2002, (red.) *Rum – upplevelsevärd – samhälle. Rapport från forskarkursen "I genderiserade rum"*. Karlstad University Studies 2002:20, Karlstad.

Genusrelationer i rörelse: Ett forskningsprogram, 2001, Forskargruppen för genusvetenskapliga studier, Jämställdhetscentrum, Karlstads universitet.

Amcoff, J., Forsberg, G.& Stenbacka, S., 1995, *Inflyttning och nybyggnation i Mälardalens landsbygd*, Delrapport inom projektet Mälardalens landsbygd i förändring. Arbetsrapport nr 155, Kulturgeografiska inst. Uppsala Universitet.

Forsberg, G. (red) 1994, *Befolkningsomflyttningar på landsbygden. Kunskapsöversikt och statistisk analys.* Delrapport inom projektet Mälardalens landsbygd i förändring Arbetsrapport nr 55, Kulturgeografiska inst. Uppsala Universitet.

Forsberg, G. & Carlbrand, E., 1993, *Mälarbygden - en kreativ region? En studie av Mälardalens landsbygd i förändring.* Forskningsrapporter från Kulturgeografiska institutionen, Uppsala universitet, nr 107.

Forsberg, G., 1989, Industriomvandling och könsstruktur. Fallstudier på fyra lokala arbetsmarknader. *Geografiska regionstudier Nr 20.* Kulturgeografiska institutionen vid Uppsala Universitet. (Avhandling)

Scientific articles in Journals and Readers

Stenbacka, S; Grubbström, A & Forsberg, G., 2017, Gendered youth strategies for inclusion in a changing society: breaking or reproducing the local gender contract? Area. Doi: 10.1111/area.12392

Forsberg, G & Stenbacka, 2017, Creating and Challenging gendered spatialities: How space affects gender contracts. *Geografiska Annaler Series B, Human Geography*, doi.org/10.1080/04353684.2017.1303269

Forsberg, G & Stenbacka, 2017, How to improve regional and local planning by applying a gender-sensitive analysis: examples from Sweden. *Regional Studies.* doi.org/10.1080/00343404.2017.1296942.

Lagerqvist, M. & Forsberg, G. 2017, Resmönster, resvanor och reseupplevelser bland ungdomar i Stockholm län. I: Wimark, T. (red) *Metoder och verktyg för sociala nyttoberäkningar i kollektivtrafiken.* Kulturgeografiskt seminarium 2017:1. Kulturgeografiska institutionen. Stockholm: Stockholms universitet., 87-113.

Forsberg, G. & Stenbacka, S., 2016, New Ruralities: The influence of International Migration on Swedish Rural Areas. In:Kobayashi, K; Westlund, H.; Matshushima, H. & Ohno. S. (eds) *Social Capital and Development Trends in Rural Areas. Vol II.* Marginal Areas Research Group. Kyoto University, 35-46.

Forsberg, G & Lindgren, G, 2015, Regional Policy, Social Networks and Informal Structures. *European Urban and Regional Studies* (vol 22(4) 368-382)

Forsberg, G & Stenbacka, S. 2013, Mapping Gendered Ruralities, *European Countryside*, DOI: 10.24.2478/euco-2013-0001.

Forsberg, G & Stenbacka S 2013, Rumsliga genusanalyser med aktören i fokus, I Förte, A; Kranvik, B; Gunnerud Berg, N & Dale, B. (eds) *Å Finne sted. Metodologiske perspektiver i stedsanalyser*, Trondheim: Akademika forlag, 123-142.

Forsberg, G; Hedberg, C. & Najib, A, 2012, When the World Goes Rural : Transnational Potentials of International Migration in Rural Swedish Labour Markets, In: Hedberg, C.;

Carmo, R. M. D. (eds) *Translocal Ruralism : Mobility and Connectivity in European Rural Spaces*, Springer, 125-142.

Forsberg, G; Lindgren, G & Pettersson, K, 2012, Economic Geography in Regional Planning – Homosocial Stories or Allowing Spaces? I: Andersson, S; Berglund, K; Gunnarsson, E & Sundin E (eds) *Promoting Innovation. Policies, Practices and Procedures.* Vinnova Report VR 2012:08. Stockholm: Vinnova.

Forsberg, G; Gunnarsson, E & Borgström, M, 2012, The Quist question revisited I: Bergman, A & Huzell, H 2012. *Segregationens seghet och dess föränderliga former,* 2012:25. Karlstad: Karlstad University Press.

Forsberg, G., 2012, Interaktion och intervention - Akademins möjligheter och begränsningar för jämställdhet och regional utveckling. *Arbetsmarknad & Arbetsliv* vol 18:2, 59-72

Forsberg, G., 2011, Å velge bosted i Lofoten: En diskursanalyse av folkelige fortellinger om bostedsvalg og hverdagsliv. *Norsk Geografisk Tidsskrift,* vovl 65:2. 118-120

Forsberg, G., 2010, Nyurbanism i Sverige? Behovet av geografisk kontextualisering. *Geografiska Notiser*, nr 2, s 79-85.

Forsberg, G., 2010, Gender, Geography and Spatial Practice In: Hermelin, Brita & Jansson, Ulf (eds) Placing Geography, Sweden Through Time and Space. *Ymer,* Svenska Sällskapet för Antropologi och Geografi. S 209-222.

Forsberg, G., 2010, En motsträvig kulturgeografs karriärväg, I: Niskanen, Kirsti & Florin, Christina (red) *Föregångarna. Kvinnliga professorer om liv, makt och vetenskap.* Stockholm, SNS förlag, s 85-112.

Forsberg, G & Berger S 2009, Globalised Economy in Värmland, *Journal of Nordregio*, nr 3, s 22-23.

Forsberg, G. 2008, EUs strukturpolitik - en genusögd betraktelse. I: *Ska hela Sverige leva?* Stockholm, Formas, s 369-380.

Forsberg, G., 2008, På gränsen till genusbrott. I: Berger, S. (red.) *Regional utveckling – om produktion, livskvalitet och inflytande.* Karlstad: Karlstad University Press.

Forsberg, G., Jakobsen, Liselotte; Jansdotter, Maria, 2007, Lokalt formade livsformer, handlingspraktiker och världsbilder. I: Berger, S. Forsberg, G & Ørbeck, M. (red) (2007) *Inre Skandinavien – en gränsregion under omvandling.* Karlstad: Karlstad University Press

Forsberg, G, 2006, "....så och på jorden" – materiella tolkningar av rurala genus-konstruktioner. I: Buick, K. et.al. (red) *Rumlig praksis.* Roskilde Universitetsforlag, Roskilde.

Forsberg, G, 2006, Genusanalys – en utmaning för framsynt stostdsplanering. I: Gunnarsson, E; Neergaard, A. & Nilsson, A. (red). *Kors och tvärs: Intersektionalitet och makt i storstadens arbetsliv*. Normal Förlag, Stockholm.

Forsberg, G, 2005, Den genderiserade staden, I: Friberg, T. et.al. (red) *Speglingar av rum. Om könskodade platser och sammanhang.* Brutus Östlings Bokförlag Symposion, Stockholm/Stehag.

Forsberg, Gunnel, 2005, Structural funds and Gender Mainstreaming: counting heads or Changing Structures? In: Schmied; Doris: *Winning and Loosing. The Geography of Europe's Rural Areas. Perspectives on Rural Policy and Planning,* Aldershot: Ashgate Publishing, s 203-215

Forsberg, Gunnel & Grenholm, Cristina, 'Tolkning och reflektion. Att rita kartor över nedärvda könsrelationer'. I: Forsberg, Gunnel & Grenholm, Cristina, (red) "... *och likväl rör det sig." Genusrelationer i förändring.* Karlstad: Karlstad University Press. s.11-23.

Forsberg, Gunnel & Grenholm, Cristina, 'Att sätta genusrelationer i rörelse". I: Forsberg, Gunnel & Grenholm, Cristina, (red) "... *och likväl rör det sig." Genusrelationer i förändring.* Karlstad: Karlstad University Press. s. 221-228.

Forsberg, Gunnel, 'Horisontella mål blir moln vid horisonten. Om jämställdhetsintegrering i regionalpolitiken. I: Forsberg, Gunnel & Grenholm, Cristina, (red) "... *och likväl rör det sig." Genusrelationer i förändring.* Karlstad: Karlstad University Press. s. 171-187.

Forsberg, G., 2005, "Rumsliga obalanser i befolkningens sammansättning och bosättning," I: Forsberg, G., (red) 2005, *Planeringens utmaningar och tillämpningar.* Uppsala Publishing House, Uppsala, s. 22-33.

Forsberg, G., 2005, "Landsbygder i omvandling" I: Forsberg, G., (red) 2005, *Planeringens utmaningar och tillämpningar.* Uppsala Publishing House, Uppsala, s. 203-214.

Forsberg, G, 2005, "Den regionala utvecklingspolitiken efter 1995". I: Forsberg, G., (red) 2005, *Planeringens utmaningar och tillämpningar.* Uppsala Publishing House, Uppsala. s. 284-302.

Forsberg, G., 2005, "Visionen om en jämställd planering – och försöken att förverkliga den." I: Forsberg, G., (red) 2005, *Planeringens utmaningar och tillämpningar.* Uppsala Publishing House, Uppsala, s. 203-214.

Forsberg, G, 2005, Horisontella mål blir moln vid horisonten: Om jämställdhetsintegrering i regionalpolitiken, I: Forsberg, G & Grenholm (red) 2005, ... *och likväl rör det sig. Genusrelationer i förändring.* Karlstad University Press.

Forsberg, G, 2005, Den genderiserade staden I: Friberg, Tora, Listerborn, Carina, Andersson, Birgitta & Scholten, Christina (red) *Speglingar av rum. Om könskodade platser och sammanhang.* Stehag: Brutus Östlunds Förlag/Symposion.

Forsberg, G., 2004, Gender Mainstream and Regional Development, *Journal of Nordregio,* Nr 2 vol 4, s14-15.

Forsberg, G. & Gunnerud Berg, N. 2003, 'Rural geography and feminist geography - discourses on rurality and gender in Britain and Scandinavia' I: Simonsen, K. & Öhman, J. (red) *Voices from the North.* Aldershot: Ashgate Publishing Ltd

Forsberg, G., 2003, *Genusforskning inom kulturgeografi – en rumslig utmaning.* Stockholm: Högskoleverket, Göteborg: Nationella sekretariatet för genusforskning.

Forsberg, G., 2002, 'En feministisk exkursion i ett vetenskapligt landskap' I: Schough, K. (red) *Svensk kulturgeografi och feminism – rötter och rörelser i en rumslig disciplin.* Karlstad University Studies 2002:3, s 41- 52.

Forsberg, G., 2002, "Guide till kulturgeografisk förståelse av kön och genus" I: Forsberg, G., Grenholm, C & Jakobsen, L. (red) *Rum – upplevelsevärd – samhälle. Rapport från forskarkursen "I genderiserade rum".* Karlstad University Studies, 2002:20: 13-22.

Forsberg, G. & Grenholm, C., 2000, *Ängla-gård(ar) i feministisk analys* I: Forsberg, G., Grenholm, C & Jakobsen, L. (red) *Rum – upplevelsevärd – samhälle. Rapport från forskarkursen "I genderiserade rum".* Karlstad University Studies, 2002:20: 97-111.

Forsberg, G., 2001, Kartan som redskap i genusforskningen – exemplet föräldraförsäkring och lokala traditioner I: *Plats, Landskap, Karta – en vänatlas till Ulf Sporrong,* Kulturgeografiska institutionen, Stockholms universitet.

Forsberg, G., 2001, Rural and gender studies: A conceptual comparison, *Norsk Geografisk Tidskrift* (Norwegian Journal of Geography) Special issue. Jones, Michael (ed) Contemporary debates in the discipline of Geography Space and place, Landscape and environment. Vol 55, No 3, 2001, 152-160

Forsberg, G., 2001, The difference that space makes. A way to describe the construction of regional gender contracts. *Norsk Geografisk Tidskrift* (Norwegian Journal of Geography) Special issue. Jones, Michael (ed) Contemporary debates in the discipline of Geography Space and place, Landscape and environment. Vol 55, No 3, 2001, 161-165.

Forsberg, G., Amcoff, J. & Stenbacka, S., 2001, Dynamisk landsbygd kräver ny planering. *Miljöforskning*, Nr 1-01. Sid 47-49.

Forsberg, G., 2000, Samhällets genusansikte. I: Berger, S. (red) *Det nya samhällets geografi.* Uppsala Publishing House.

Forsberg, G. & Grenholm, C., 2000, *Ängla-gård(ar) i feministisk analys* Paper till 20:e Nordiska symposiet för kritisk samhällsgeografi, Hammarö, Karlstad 2000-09-28 - 2000-10-01. 'Rum & förkropppsligade geografiska kunskaper'.

Forsberg, G, 2000, Förkroppsligade drömmar I: *På resande fot. 23 forskare skriver om turism och upplevelser.* ETOUR, Stockholm: Sellin & Partner Bok och idé AB.

Forsberg, G, Gonäs, L & Perrons, D., 2000, Paid work: participation, inclusion and liberation. I: Duncan, S. & Pfau-Effinger, B. *Gender, Economy and Culture in the European Union.* London: Routledge. Sid 27-48.

Forsberg, G., 2000, "Hennes engagemang var hennes storhet" I: Aldskogius, H (red) *Gerd Enequist. Professor i kulturgeografi 1949-1968.* Kulturgeografiska institutionen Rapport nr 110. Uppsala universitet

Forsberg, G., 1998, Regional variations in the gender contract: gendered relations in labour markets, local politics and everyday life in Swedish regions. *Innovation, No 11:2, p 191-209*

Forsberg, G., 1998, The differentiation of the countrysides, I Andersson, L., & Blom, T (eds) *Sustainability and Development. On the future of Small Society in a Dynamic Economy.* Regional Science Research Unit. University of Karlstad.

Forsberg, G., 1998, Framtidens arbetsmarknad och kvinnorna - vilka lärdomar kan vi dra av tidigare strukturomvandlingar? I: Furåker, B. & Blomsterberg M. (red*): Kan arbetslinjen överleva på morgondagens arbetsmarknad?* Rapport från en forskningskonferens i Göteborg 25-26 september 1997. Rådet för arbetslivsforskning, Stockholm.

Forsberg, G, 1997, Jordbruk som tjänsteproduktion - en ekologisk välfärdssektor, *Kvinnovetenskaplig Tidskrift*, nr 1, sid 30 - 38

Forsberg, G, 1997, Är landsbygden en kvinnofälla? Sid 17-40, *Working Paper* No. 5a, Institutet för regionalforskning, Östersund.

Forsberg, G, 1997, Rulltrapperegioner och social infrastruktur. I: Sundin, E. (red) *Om makt och kön - i spåren av offentliga organisationers omvandling.* Rapport till Utredningen om fördelning av ekonomisk makt och ekonomiska resurser mellan kvinnor och män, Stockholm, SOU 1997:83. Sid 31-68.

Forsberg, G, 1997, Att förstå den nya landsbygdens mosaik.I: Westlund, H., (red) *Lokal utveckling för regional omvandling.* Institutet för regionalforskning. Rapport 100, 1997.

Forsberg, G., 1997, Reproduktionen av den patriarkala bruksandan. I: Bergdahl, E., Isacson, M. & Mellander, B., *Bruksandan - hinder eller möjlighet?* Ekomuseum Bergslagen, 1997.

Forsberg, G., 1996, Rum med utsikter- modulationer på ett grundtema, *Kvinnovetenskaplig Tidskrift*, nr 2, sid 15-23

Forsberg, G., 1996, Landsbygdens nykolonisation, I: Månsson, H., *Periferin i Centrum*, Glesbygdsverket. Sid 31 – 46

Forsberg, G., 1996, Kvinnospår i Geografin, *Nordisk Samhällsgeografisk Tidskrift* nr 21, sid 2-21.

Berger, S. & Forsberg, G., 1995, Välfärd - en social infrastruktur. I: *Ditt Värmland. Om välfärd och levnadsförhållanden.* Länsstyrelsen i Värmlands län.

Forsberg, G., 1995, Kvinnor och regional rättvisa. *Nordisk Samhällsgeografisk Tidskrift,* nr 20, sid 88-100.

Forsberg, G., 1994, Occupational sex segregation in a 'women-friendly' society - the case of Sweden. *Environment and Planning A , vol 26, pp 1235-1256.*

Forsberg, G., 1992, Kvinnor och män i arbetslivet, I: Acker m . *Kvinnors och mäns liv och arbete*. SNS Förlag, Stockholm.

Forsberg . G., 1991, *Kvinnors framtida arbetsliv.* I: Produktion och familj - vägval inför 2000-talet. FRN-Framtidsstudier, Stockolm.

Forsberg, G., 1991, Samhällsgeografi och könsstrukturella analyser, I: Berger, S. (red), *Samhällets geografi*, Nordisk Samhällgeografisk Tidskrift, Uppsala.

Forsberg, G., 1990, On feminism and geography in Sweden. *Nordisk Samhällsgeografisk Tidskrift* nr 1-2.

Conference papers (selection of)

Forsberg, G 2017, *Barriers and opportunities in Academy. A reflection from the distaff side.* Paper presented in session Women in geography: is there a glass ceiling? at the 7th Nordic Geographers Meeting, Stockholm June 18-26, 2017

Forsberg, G. 2016, *Which Crises?* Paper presented at the conference Nordic Ruralities: Crisis and Recilience, May 22-24. University of Akureyri, Island

Forsberg, G., 2016, *Research on Migration.* Paper presented at workshop Essential scientific challenges for the humanities and social sciences: The case of migration flow and other issues May 15-18. UNICAMP, Campinas, Sao Paolo, Brazil.

Forsberg, G,; Webster, N., 2015, *Food for Integration – tied to locality,* Paper presented at the Nordic Geographers Meeting, *Geographical Imagination: Interpretations of Nature, Art and Politics* Tallinn, Estonia.

Forsberg, G; Stenbacka, S, 2015, *New ruralities: The influence on Swedish rural areas by international migration.* Paper presented at The 12th Workshop on Social Capital and Development Trends in the Japanese and Swedish Countryside, Hida Earth Wisdom Center, Takayama, JAPAN.

Forsberg, G; Webster, N, 2014 *Translocal practices and culinary reformation.* Paper presented at the Nordic Conference for Rural Research, Trondheim, Norway.

Forsberg, G; Stenbacka, S, 2014 *"Going gender": Mobility Practices in a Transnational World.* Paper presented at the Session Gender and Geography: Bodies, Borders and Mobilites. IGU Conference, Krakow.

Forsberg, G; Stenbacka, S, 2014 *"Going gender": mobility practices in a transnational world.* Paper presented at the Fourth International Workshop on Rural Change – Mobilities and Flexibilities, Trondheim, Norway.

Forsberg, G; Stenbacka, S, 2013, *Going gender and making space – about mobile but "placed" gender identities.* Paper presented at the NGM Conference Responsible Geographies, Reykjavik, Iceland.

Forsberg, G. 2012 *Transnationalism på den svenska landsbygden.* Paper presented at Regionforskarkonferens Karlstad.

Forsberg, G; Stenbacka, S; Lundmark, M., 2012, *Landsbygden, vems problem? Föreställningar om landsbygden - mer myter än faktiska fakta.* Paper presenterad at the second Nordic Ruralities Conference, Juensuu, Finland.

Forsberg, G.; Gunnarsson, E.; Borgström, M., 2013 *Kvinnor i strukturomvandligen (The Qvist-project) 1986 - ?.* Paper presenterad vid FALK-konferens: Makt, Myter och Motstridigheter – Utmaningar i dagens arbetsliv. Karlstad, Sweden.

Forsberg, G; Stenbacka, S, 2011, *A Geographical Twist of Doing Gender-theory.* Paper presented at the Nordic Geographers Meeting: Geographical Knowledge, Nature and Practice. Roskilde

Forsberg, G, 2010, *Regional policy and homosocial structures,* paper presented at VIII Triple Helix conference, Madrid, Spain.

Forsberg, G., *Vart är vi på väg? Om regional tillväxtpolitik.* Paper presenterad vid Nationell jämställdhetskonferens för Universitet och Högskolor. Karlstad, Sweden.

Forsberg, G., 2010, *Regional policy and homosocial structures.* Paper presented at ERSA conference Sustainable regional growth and development in the creative economy, Jönköping, Sweden.

Forsberg, G; Stenbacka, S, 2009, *When the World goes Rural – Are International Migration Flows changing the Swedish Countryside?* Paper presented at the Association of American Geographers Conference, *LAS VEGAS, USA.*

Forsberg, G., 2008, *The construction of gendered spaces.* Keynote address at the Nordic Conference on Gender, Intersectionality and Regional Development, Umeå, Sweden.

Forsberg, G & Jakobsen, L. 2008, *Aspects of contemporary understanding of non-heteronormativity in spatial and labour analysis.* Paper presenterad at "Changing Gender Relations: Nordic Feminism and Gender Research October 6, 2008" Karlstad University.

Forsberg, G, Stenbacka, S. & Råbock, I. 2008, *Mapping Gendered Ruralities.* Paper presented at "Changing Gender Relations: Nordic Feminism and Gender Research October 6, 2008" Karlstad University.

Forsberg, G. & Berger, S., 2007 *Globalised Economy at the Frontier,* Paper presented at the Regional Studies International Conference: Regions in Focus? Lisbon 2th-5th April 2007,

Forsberg, G. & Stenbacka., S., 2007, *Gendered discourses of rural space and practices,* Conference by Association of American Geographers, San Francisco,

Forsberg, G. & Stenbacka., S., 2007, *New Gendered Ruralities –: Contested place-specific gender contracts in Sweden,* Nordisk geografkonferens i Bergen, 14-17 juni 2007.

Forsberg, G, 2005, *The gendering of urban space,* Paper to The Inaugural Nordic Geographers Meeting, session: Gendered Spaces I: Public Spaces – to live and work in, May 10 – 14, Lund

Forsberg, G. 2003, *'Samhällsplaneringens genusdiskurser'* Paper presenterat vid konferensen "Kontexter som utmanar" Karlstad universitet, Institutionen för samhällsvetenskap, Avd. för genusvetenskap.

Berger, S. & Forsberg, G., 2001, *Evaluating the Structural Funds of the European Union* Paper presented at the International Conference "Evaluation, Good Governance and Development" in Colombo, Sri Lanka, 22 nd-24th June 2001, organized by SLEvA, The Sri Lanka Evaluation Association.

Forsberg, G & Berger, S., 1993, *Infrastruktur ett begrepp med många bottnar.* Kulturgeografiska institutionens minisymposium, Älvkarleö 1993-12-16--17.

Articles in Popular Scientific Magazines

Forsberg, G., 2014, Jämställdhet och jämlikhet, Tidskriften *PLAN* nr 4, 18-25.

Forsberg, G, Lundmark, M & Stenbacka, S 2012, *Demografiska myter. Föreställningar om landsbygden – mer myter än faktiska fakta.* Stockholm: Öhrlings PricewaterhouseCoopers AB.

Forsberg, G., 2011, Uthålligt vardagsliv. I: *Urbaniserad värld. Nya steg mot hållbara städer.* Antologi från Global Utmaning.

Forsberg, G., 2008, Hjälper miljonerna till kvinnors företagande? *Genusperspektiv,* nr 2, s 7.

Forsberg, G., 2007, Längtan efter den dag då klyvningsdiskursen är upphävd, *Genus,* nr 3, s. 36.

Forsberg, G. & Gunnerud Berg, N., 2005 Hverdagslivets infrastruktur – svensk och norsk utforming. (norska) *Plan* nr 3-4/2005, s 12-14.

Berger, S. & Forsberg, G., 2005, "Gränsen – resurs eller barriär?", (svenska) PLAN, Nr 2, s 16-19.

Forsberg, G. 2004, Genusperspektiv på turism och resande, *Nättidningen Alba,* nr 3

Forsberg, G. 2003, Vill du rösta bort dina arbetskamrater? *Arbetarskydd*, nr 7

Forsberg, G. 2003, Bögskämt på jobbet – är det något att bråka om? *Arbetarskydd* nr 14,

Forsberg, Gunnel & Hermelin, Brita: en gränslös platsplanering – en utmaning för samhällsplanerarutbildningen vid Stockholms universitet. Tidskriften *PLAN,* nr 3: 44-45

Forsberg, G. 2002, "Förena staden och landsbygden. *Framtider.* 2/2002. Tema: Stad och land – konkurrens som framtidsvision. 6-11.

Forsberg, G. 2002, Tjejen från callcentret blir aldrig staty. *Arbetarskydd,* nr 8, sid 17.

Forsberg, G, 2001, "Det geografiskt upplösta rummet", *Arbetarskydd*, nr 8,

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Forsberg, G, 2000, "Fler kvinnor på jobbet", *Arbetarskydd*, nr 14,

Forsberg, G., 1999, Se upp för Gnosjöandan, tjejer! *Arbetarskydd,* nr 6/7, sid 27

Forsberg, G., 1999, Jämställdheten och tillväxten, *Jämsmed, Om kvinnor och män i Jämtlands län,* Länsstyrelsen i Jämtlands län, Nr 2, sid 24.

Forsberg, G, 1998, "Vi älskar att tycka synd om landsbygden" *Arbetarskydd*, nr 5,

Forsberg, G, 1997, "Dimridåer om akademiska tjänster" *Arbetarskydd*, nr 10,

Forsberg, G, 1997, "Lös förankning - utväg eller tvångströja?" *Arbetarskydd*, nr 15,

Forsberg, G., 1996, Att vädra lantluft. *Byggforskning* , nr 5 sid 14 – 16

Reviews

Forsberg, G., Solstad, KJ, 2014, Pedagogisk entreprenørskap som virkemiddel for lokal og regional utvikling : eksempler fra skoler og mindre kystsamfunn i Finnmark, Norsk Geografisk Tidsskrift, nr 3, 201-203. (recension)

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Other Publications

Framflyttade positioner eller spel för galleriet – jämställdheten i strukturfondsarbetet, 2010 I: Hur jobbar vi med jämställdhet, integration, hållbar utveckling och innovation? Lärande utvärdering i regionalfondsprojekt. Stockholm: Tillväxtverket.

Strategier för jämställdhet – lokala genuskontrakt i Uppsala län, 2007, Uppsala: Resurs Uppland

Resurscentra för kvinnor - en kraft för hållbar regional utveckling? 2004, Stockholm: Nutek

Mål 5b Skärgården. Slututvärdering, 2001, IM-gruppen i Uppsala AB. Rapport 2001:3. Östersund: Glesbygdsverket

Mål 5b Västra Sverige. Slututvärdering, 2001, IM-gruppen i Uppsala AB. Rapport 2001:2.b Östersund: Glesbygdsverket

Sundgren Grinups, B. & Forsberg, G. 2001, *Jämställdhet,* http://www.ne.se/jsp/search/article.jsp?i_art_id=488430 Nationalencyklopedin 2001-08-10

Forsberg, G., 1999, *Könskvotering i regionalpolitiken – förslag till framtida åtgärder.* IM-Gruppen i Uppsala, Rapport 1999:1

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Forsberg, G., 1991, *Ett livsviktigt projekt.*! Framtid i Sörmland, LO-sektionen i Sörmland och A-forum Uppsala universitet, Eskilstuna.

Checka Listan!, 1990, Referensgruppen för jämställhet i kommunal planering, Uppsala kommun.

Forsberg, G. & Berger, S., 1989, *Om kvinnors förvärvshinder, frånvaro och närvaro*. IM-Gruppen, Uppsala.

Curriculum vitae

Professor Lars Winther
Institut for Geovidenskab og Naturforvaltning
Københavns Universitet

Profil:
Lars har været professor I kulturgeografi på Institut for Geovidenskab og Naturforvaltning på Københavns Universitet siden 2015. Lars har i mange år forsket i store byer og regional udvikling. Lars er leder af forskningsgruppen Transformation of cities and landscapes – geoinformatics, som primært beskæftiger sig med analyse af urbanisering og erhvervsmæssige forandringer i bynære områder. Lars har en kandidatgrad i kulturgeografi og en ph.d. i økononisk geografi, begge fra Københavns Universitet.

Publikationsliste (internationale peer-review artikler/bogkapitler 2010-2017)

- **Employment growth and regional development : industrial change and contextual differences between Denmark and Sweden.** / Eriksson, Rikard; Hansen, Høgni Kalsø; Winther, Lars. I: European Planning Studies, Vol. 25, Nr. 10, 2017, s. 1756-1778.
- **Employment growth, human capital and educational levels : uneven urban and regional development in Denmark 2002–2012.** / Hansen, Høgni Kalsø; Winther, Lars. I: Danish Journal of Geography, Vol. 115, Nr. 2, 2015, s. 105-118.
- **Manufacturing in the knowledge economy : innovation in low-tech industries.** / Hansen, Teis; Winther, Lars. Handbook of Manufacturing Industries in the World Economy. red. / John Bryson; Jennifer Clark; Vida Vanchan. Edward Elgar Publishing, Incorporated, 2015. s. 439-450 (Research Handbooks in Business and Management).
- **Knowledge Production, Urban Locations and the Importance of Local Networks.** / Skytt-Larsen, Christine Benna; Winther, Lars. I: European Planning Studies, Vol. 23, Nr. 9, 2015, s. 1895-1917.
- **Editorial – transformation of cities.** / Winther, Lars. I: Geografisk tidsskrift / Danish journal of geography, Vol. 115, Nr. 2, 03.07.2015, s. 67-72.
- **Regional development and the impact of the public sector in Denmark : employment growth and human capital.** / Hansen, Høgni Kalsø; Winther, Lars. I: Geografisk Tidsskrift/Danisk Journal of Geography, Vol. 114, Nr. 2, 2014, s. 156-168.
- **Competitive low-tech manufacturing and challenges for regional policy in the European context : lessons from the Danish experience.** / Hansen, Teis; Winther, Lars. I: Cambridge Journal of Regions, Economy and Society, Vol. 7, Nr. 3, 2014, s. 449-470.
- **Human capital in low-tech manufacturing : The geography of the knowledge economy in Denmark.** / Hansen, Teis; Winther, Lars; Hansen, Ronnie Fibæk. I: European Planning Studies, Vol. 22, Nr. 8, 2014, s. 1693-1710.
- **Emerging talents? International students before and after their career start in Denmark.** / Mosneaga, Ana; Winther, Lars. I: Population Space and Place, Vol. 19, Nr. 2, 2013, s. 181-195.
- **On the road to nowhere: a comment on amenities and urban regional development.** / Hansen, Høgni Kalsø; Winther, Lars. Cultural Political Economy of Small Cities. red. / Anne Lorentzen; Bas van Heur. London : Routledge, 2012. s. 31-43 (Regions and Cities).
- **The urban turn : cities, talent and knowledge in Denmark.** / Hansen, Høgni Kalsø; Winther, Lars. Aarhus Universitetsforlag, 2012. 148 s.
- **Book review : "Key concepts in economic geography"; Yuko Aoyama, James T. Murphy and Susan Hanson.** / Winther, Lars. I: Regional Studies, Vol. 46, Nr. 1, 2012, s. 150-151.
- **Innovation, regional development and relations between high- and low-tech industries.** / Hansen, Teis; Winther, Lars. I: European Urban and Regional Studies, Vol. 18, Nr. 3, 2011, s. 321-339.
- **Trust and local knowledge production: Interorganisational collaborations in the Sønderborg region, Denmark.** / Skytt, Christine Benna; Winther, Lars. I: Geografisk Tidsskrift, Vol. 111, Nr. 1, 2011, s. 27-41.
- **Crisis in the Resurgent City? The Rise of Copenhagen.** / Andersen, Hans Thor; Winther, Lars. I: International Journal of Urban and Regional Research, Vol. 34, Nr. 3, 2010, s. 693-700.
- **The spatial division of talent in city regions : location dynamics of business services in Copenhagen.** / Kalso Hansen, Høgni; Winther, Lars. I: Tijdschrift voor Economische en Sociale Geografie, Vol. 101, Nr. 1, 2010, s. 55-72.

Fortegnelse over bedømmelsesudvalg til
stilling 201737 Assistant Professor in Geoinformatics (201737) ved PLAN

Navn: Associate Professor Carsten Kessler
Arbejdssted: AAU, PLAN

Navn: Assiate Professor Martin Rudbeck Jepsen
Arbejdssted: KU

Navn: professor Hardy Pundt
Arbejdssted: Harz University of Applied Sciences

Akademisk Råd har taget stilling til, at medlemmer af bedømmelsesudvalget er sagkyndige inden for stillingsområdet på et niveau, der mindst svarer til det, der forudsættes for stillingen, dog ikke under lektorniveau.

Assistant Professor in Geoinformatics (201737)

Position No.
201737

At the Technical Faculty of IT and Design, Department of Planning, Copenhagen campus, a position as Assistant Professor in Geoinformatics is open for appointment from 1 February 2018 or soon hereafter.

The initial appointment for this position will be for 3 years, with possibility of extension.

The field of the Department for Planning includes development and planning in a broad sense, and thereby it ranges from the social science aspects of development like environmental management, physical planning, sector planning, land management, to technical subjects such as surveying and geoinformatics. See more at www.plan.aau.dk.

Job description

The position is allocated to the Geoinformatics research group, which covers a broad range of topics including spatial data infrastructure, geospatial analysis and modelling, earth observation, and geospatial enabled technologies broadly. The research is often associated with other topics at the Department of Planning such as climate change, migration, and spatial planning.

This specific position will be placed in an internally funded interdisciplinary 3-year project on Global flows of refugees and their impact on North European welfare states. The project is conducted in collaboration with the Department of Political Science, Department of Culture and Global Studies, and the Department of Learning and Philosophy. You may obtain further professional information from Head of Section, Professor Henning Sten Hansen, e-mail: hsh@plan.aau.dk / phone: +45 2815 6464 or Associate professor Carsten Kessler, e-mail: kessler@plan.aau.dk / phone.: +45 2090 7226.

Qualification requirements for the position:

The appointment presupposes that the applicant can demonstrate original scientific production at an international level. The successful candidate will develop demographic and migration simulation models in collaboration with rest of the Geoinformatics group. Applicants should therefore have strong programming skills and ideally have experience in large-scale geosimulation, processing of geospatial big data, or related topics. Knowledge about climate change will be considered an advantage.

Appointment as an Assistant Professor presupposes scientific qualifications at PhD-level or similar scientific qualifications. The research potential of each applicant will be emphasized in the overall assessment.

Appointment as an Assistant Professor cannot exceed a period of four years in total in a temporary position (appointment at Assistant Professor level cannot exceed a period of eight years in total in Denmark).

Information regarding guidelines, ministerial circular in force, teaching portfolio and procedures can be seen here.

The application must contain the following:

- A statement outlining your reasons for applying, and intentions and visions with, the position.
- Your curriculum vitae, including personal data, educational background, scientific qualifications, dissemination skills, participation in committees and boards, and additional qualifications relevant for the position.
- Copies of relevant diplomas (Master of Science and PhD). On request, you could be asked for an official English translation.
- A complete list of publications.
- Publications you wish to be considered by the assessment committee. You may attach up to 5 publications when applying for an associate professor position.
- References/recommendations

An assessment committee will assess all candidates.

The applications are only to be submitted online by using the "Apply onlin" button below.

Workplace
Copenhagen

Agreement
Employment is in accordance with the Ministerial Order on the Appointment of Academic Staff at Universities (the Appointment Order) and the Ministry of Finance's current Job Structure for Academic Staff at Universities. Employment and salary are in accordance with the collective agreement for state-employed academics.

Deadline
05/12/2017

Apply online

Aalborg University (AAU) conducts teaching and research to the highest level in the fields of humanities, engineering, and natural, health, and social sciences.

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Prof. Dr. Hardy Pundt

Curriculum vitae

1964	born in Hage/Ostfriesland, Germany
1970 - 1974	Primary School of Juist and Norden
1974 - 1977	Secondary school Johannes-Althusius Gymnasium, Emden
1977 - 1983	Secondary school Ulrichsgymnasium, Norden (May 1983: university entrance diploma)
1983	Six months military service at the "10th Airforce Regiment 2" in Budel Leegerplaats (The Netherlands) and at the "23. Flugabwehrraketen-Bataillon", Wiesmoor (Germany)
1983 - 1984	Ten months civil service in an institution to support handicapped people in Norden
1984 - 1990	Studies in geography, geology, botany, and ethnology at the University of Muenster
1990	Master of Science (Geography, focus on Computer-based hydrological modelling and GIS)
1987 - 1988	Students worker in the team for computer-cartography at the Historic Seminar of the University of Münster
1988 - 1990	Students worker in the „GIS-Group", Institute for Geography
1990 - 1993	Scientific employee at the Institute for Geography, University of Münster
1992	Additional business as teacher for programming at Siemens/Nixdorf
1993 - 1995	Project leader in the research project „LIFE" (Limnological Expert System), Institute for Geoinformatics, University of Münster
1995 - 1997	Project leader in the EU-project „CADCOS" (Computer-Aided Data Collection System) at the Chamber for Agriculture Westfalen-Lippe
1994 - 1996	Free lancer of the con terra – applied spatial information technologies, Münster
1994	Scientific consultant at the West Galloway Fisheries Trust Ltd., Newton Stewart, Scotland (6 months)
1995	Defence of the PhD thesis, at the Faculty for Mathematics and Natural Sciences, University of Münster

1996 - 2002	Scientific assistant at the Institute for Geoinformatics Münster (under Prof. Dr. W. Kuhn)
1994 - 2002	Member of the leading committee of the Institute for Geoinformatics
1997	Researcher/teacher at the Centro de Ecologia der Univ. Federal do Rio Grande do Sul in Porto Alegre, Brasilien (DAAD, 1 month)
2001	Researcher at the University of Utah (USA), Salt Lake City (1 month)
since 04/2002	Professor for Geoinformatics at Harz University of Applied Sciences in Wernigerode, Germany
since 2002	Member in several programme committees and reviewer for different scientifc journals in the field of Geoinformatics and Environmental Modelling
2003	Habilitation, venia legendii in Geoinformatics of the University of Münster, Germany
since 2008	Member of the Council of the Dept. of Automation and Computer Science
2006 - 2015	Coordinator of the curriculum "Computer Science"
2009 - 2017	Member of the Council of the Association of Geographic Information Laboratories Europe (AGILE), 2011 - 2017 Treasurer of AGILE
06/2012	*Best Research in Progress Award* at the European, Mediterranean & Middle Eastern Conference on Information Systems, Munich, 7th – 8th of June, 2012 (together with Andrea Heilmann and Jane Brennan (UTS Sydney))
08/2012	Researcher at the University of Technology Sydney/Australia (UTS) within the framework of a common project funded by the German Academic Exchange Service (DAAD) (1 month)
2012/2013	Coordination of two AGILE PhD schools, each with around 20 selected PhD students from various European Countries, Kenia, and Japan
2014 - 2016	Election into the Senate of the University of Applied Sciences Harz
2017	*Outstanding Paper Award* at the International Conference on Information Systems, Budapest/Hungary, 2017.
since 1992	Around 100 scientific publications in English and German language

Associate Professor Martin Rudbeck Jepsen

Address: Skipper Clements Alle 1, 1., 2300 Copenhagen, Denmark. Phone:+45 51940748
mrj@geo.ku.dk Google scholar: https://scholar.google.com/citations?user=3I5UVA0AAAAJ&hl=en

EMPLOYMENT

2013 – Present	Associate Professor, University of Copenhagen
2011 - 2013	Assistant Professor, University of Copenhagen
2010 - 2011	High School teacher, Birkerød Gymnasium
2008 - 2010	Post-doctoral reseearcher, Århus University
2006 - 2008	Data modeler and analyst, Statens Serum Institut (Danish Center for Disease Control)
2005 - 2006	Academic staff, Danish Ministry of Environment

EDUCATION

2015	Supervision of doctoral students, University of Copenhagen
2015	Responsible Conduct of Research, University of Copenhagen
2010	University Didactics, Århus University
2002 - 2006	PhD, University of Copenhagen
1998 - 2001	Cand. Scient, University of Copenhagen
1995 - 1998	B.Sc., University of Copenhagen

PERIOD OF LEAVE

2011	Paternity leave, 9 weeks

SCIENTIFIC RESEARCH AREAS

My overarching research focus is on the interplay between society and ecosystems, particularly when expressed as land use changes and climate change causes, mitigation, and adaptations. I have conducted research on land use systems since my master thesis, and have focused on local decision making and local environmental impacts, especially on carbon stocks and sequestrations in biomass. In contrast to the local scale studies, I have been lead on a project tracking and analyzing drivers of land management across the entire Europe for the past 200 years.

RESEARCH GRANTS

2017 – 2018	Erhvervsstyrelsen/Landdistriktspuljen – "hvad skaber rurale sucesser?" (appr. 500.000 DKK)
2015 – 2016	EU JPI "CLIMA" - "Processing chains for EO based land-use classifications" (appr. 500.000 DKK)
2011 – 2015	EU FP7 "VOLANTE" - "Understanding long-term drivers of land-use change" (appr. 2.000.000 DKK)
2006 – 2008	EU network of Excellence "MedVetNet" – WP scientific leader on spatial analysis and public health

Supervised 5 PhD-students (2 ongoing), appr. 25 master students.

SCIENTIFIC LEADERSHIP

2015-2018	PI on task 4 "Mapping Land Use", EU JPI project "CLIMA"
2011-2015	PI on task 4.3 "Long-term drivers of land use change" in EU FP7 research project "Visions of land use change in Europe (VOLANTE))

OTHER SCIENTIFIC MERITS

2017	reviewer for the Swiss National Science Foundation
2012	reviewer for the Portuguese Foundation for Science and Technology

Reviewer for a.o. Global Environmental Change, Regional Environmental Change, Int. J. of Appl. Earth Observation and Geoinformation, Land Use Policy, Ambio, Landscape Ecology.
VIP representative in the departamental board for teaching
Editorial board member on *Remote Sensing in Earth System Science* and *geoforum.dk*

SUPERVISION

Supervised 5 PhD-students (2 ongoing), appr. 25 master students.

Fortegnelse over bedømmelsesudvalg til
stilling 201738 Assistant Professor in Energy Planning and Energy System Modelling (201738)
ved PLAN

Navn: Professor mso Poul Østergaard
Arbejdssted: PLAN, AAU
E-mail: poul@plan.aau.dk

Navn: Professor Frits Møller Andersen
Arbejdssted: DTU
E-mail: fman@dtu.dk

Navn: Professor Louise Ödlund
Arbejdssted: Linköping Universitet
E-mail: louise.odlund@liu.se

Akademisk Råd har taget stilling til, at medlemmer af bedømmelsesudvalget er sagkyndige inden for stillingsområdet på et niveau, der mindst svarer til det, der forudsættes for stillingen, dog ikke under lektorniveau.

Assistant Professor in Energy Planning and Energy System Modelling (201738)

Position No.
201738

At Technical Faculty of IT and Design, Department of Planning, Aalborg a position as Assistant Professor in Energy Planning open for appointment from 1 April 2018 or soon hereafter. The position is available for a period of 3 years.

The Department of Development and Planning conducts research and teaching on development and planning in a broad sense, including social science aspects as well as more technical aspects of development, and with a focus on environmental, international as well as administrative dimensions.

Job description
Research areas will be within energy planning with a focus on smart energy systems, feasibility studies and public regulation. Special attention is given to the development and programming of the advanced energy system analysis tool, EnergyPLAN. It is expected that the position will contribute to the further development and use of such and similar tools in the research group.

Teaching will primarily be in Sustainable Energy Planning and Management at the bachelor as well as at the master level, but also in other study programmes at the University. You may obtain further professional information from Professor Poul Alberg Østergaard, Department of Planning, e-mail: Poul@plan.aau.dk or Henrik Lund, Department of Planning, e-mail: lund@plan.aau.dk tel.: +45 9940 8309.

Qualification requirements:

Appointment as an Assistant Professor presupposes scientific qualifications at PhD-level or similar scientific qualifications. The research potential of each applicant will be emphasized in the overall assessment. Appointment as an Assistant Professor cannot exceed a period of four years in total at Aalborg University in a temporary position (appointment at Assistant Professor level cannot exceed a period of eight years in total in Denmark). The application must contain the following:

- A statement outlining your reasons for applying, and intentions and visions with, the position.
- Your curriculum vitae, including personal data, educational background, scientific qualifications, dissemination skills, participation in committees and boards, and additional qualifications relevant for the position.
- Copies of relevant diplomas (Master of Science and PhD). On request you could be asked for an official English translation.
- A complete list of publications.
- Publications you wish to be considered by the assessment committee. You may attach up to 5 publications.
- A specification of your teaching qualifications relative to the teaching portfolio. If this is not enclosed you must include an explanation for its absence.
- References/recommendations.

An assessment committee will assess all candidates. The applications are only to be submitted online by using the "Apply online" button below.

For further information concerning the application procedure please contact Nickie Hermansen by mail nkh@adm.aau.dk or phone (+45) 9940 7902

Information regarding guidelines, ministerial circular in force, teaching portfolio and procedures can be seen here.

Workplace
Aalborg

Agreement
Employment is in accordance with the Ministerial Order on the Appointment of Academic Staff at Universities (the Appointment Order) and the Ministry of Finance's

current Job Structure for Academic Staff at Universities. Employment and salary are in accordance with the collective agreement for state-employed academics.

Deadline
05/12/2017

Apply online

Aalborg University (AAU) conducts teaching and research to the highest level in the fields of humanities, engineering, and natural, health, and social sciences.

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CURRICULUM VITAE (Short Version) 2017

Louise Ödlund (former Trygg)

Professor, Docent
Department of Management and Engineering
Linköping University (www.liu.se)

Louise Ödlund (former Trygg), Professor
Born: 7st September 1966, Citizen: Swedish

Present affiliation
- Professor in Energy Systems, Linköping University.
- Professor in Energy Technology, University of Gävle.

University education
2011 Docent in Energy Systems, Department of Mechanical Engineering, Linköping University
2006 PhD in Energy Systems, Department of Mechanical Engineering, Linköping University. "Swedish industrial and energy supply measures in a European system perspective", Supervisor Professor Björn Karlsson.
1982 MSc in Mechanical Engineering, Linköping University

Employment
2015- Guest Professor in Energy Technology, University of Gävle, Sweden
2014-2015 Professor in Energy Technology, University of Dalarna, Sweden
2013- Professor in Energy Systems, Linköping University, Sweden
2006-2013 Research Assistant, Linköping University, Sweden
2001-2006 PhD-student, Linköping University, Sweden
1997-2001 Business area manager, E.ON, Sweden
1992-1997 Research engineer, E.ON, Sweden

Short Resume

Louise Ödlund (former Trygg) is Professor in Energy System at Linköping University and Guest Professor in Energy Technology, University of Gävle. Louise completed in 1991 her M.Sc. in Mechanical Engineering at the University of Linköping. During the studies Louise was active in the student union and a member of the national board for post-secondary study assistance. Parallel to her engineering education she undertook extensive studies in mathematic.

In the years of 1991—92 Louise was employed as a teacher at the University of Linköping and at National Institute for Distance Education in Norrköping in the subject mathematics and physics. Through that period she was also involved in designing a multimedia program. During 1992-2001 Louise worked at E.ON, Norrköping. In 1997 she became Business Area Manager for new business development. She was then, among

other things, responsible for introducing district cooling in the municipality of Norrköping which included planning, designing, extension and management of the district cooling system. She was also part of the company's executive board and the MD group.

In 2001 Louise started her PhD studies at the division of Energy Systems at the University of Linköping. Her research area concerns regional and municipal energy systems with a special focus on district heating. By using optimization models she has studied how the combined energy system of energy user and energy supplier can shift in the direction of resource effectiveness and sustainability. Louise has also analyzed a great number of small- and middle sized industries in different Swedish municipalities and found measures that strongly can reduced the industries' use of energy.

Louise has several years of experience of University teaching. She has developed several university courses and co-developed the international master's program Energy and Environmental Engineering as well as the national master's program Energy, Environmental and Management. She has been Director of Studies at the division of Energy System at Linköping University for seven years and has taken extensive courses in leadership and is also a member of several boards at the University as well as within national and international authorities. Louise is part of the research school Reesbe (resource-effeicnt energy system in the built environment) interdisciplinary national research programme Energy Systems and is leading the research group for regional and municipal energy systems within the programme. She is responsible for the department's national Energy System conference that is held every second year and was also head secretary for the international conference of World Renewable Energy Conference that was held at the University of Linköping in 2011.

Louise has written several journal publications, conferences publications and reports. She has studied leadership and is supervisor for several PhD-students. Louise is involved in many research projects, both within the division as well as in co-operation with other universities. Louise is also a frequently engaged invited speaker for conferences and events.

Exampel of Publications Louise Ödlund (former Trygg)

Trygg L, Björk C, Karlsson P, Rönnelid M, Danica Djuric Ilic1 Heat collaboration for increased resource efficiency - a case study of a regional district heating system and a mine, , 5th International Symposium on District Heating and Cooling in Seoul, Korea, 2016

Nordenstam L., Bennerstam M, Trygg L, CONSIDERING INVESTMENT RESOURCES WHEN ASSESSING POTENTIAL C02 REDUCTIONS OF CHP - A CASE STUDY, 5th International Symposium on District Heating and Cooling in Seoul, Korea., 2016

Trygg L, District heating - a key element in a fully balanced renewable energy system, 2nd International Conference on Smart Energy Systems and 4th Generation District Heating 26-29 September 2016 · Aalborg

Rosén T, Trygg L, Active management of heat customers towards lower district heat return water temperature, 2nd International Conference on Smart Energy Systems and 4th Generation District Heating 26-29 September 2016 · Aalborg

Blomqvist S, Trygg L, A system perspective on altered district heating demand in multifamily buildings, 2nd International Conference on Smart Energy Systems and 4th Generation District Heating 26-29 September 2016 · Aalborg

Gustafsson G, Karlsson B, Trygg L, Rönnelid M, "CO2 emission evaluation of energy conserving measures in buildings connected to a district heating system - case study of a multi-dwelling building in Sweden", Energy 2016

Lidberg T, Olofsson T, Trygg L "System impact of energy efficient building refurbishment within a district heated region" Energy 2016

Borén S, Nurhadi L, Ny H, Karl-Henrik R, Broman G, Trygg L "A strategic approach to sustainable transport system development - Part 2: the case of a vision for electric vehicle systems in Southeast Sweden" Journal of Cleaner Production 2016

Trygg L, "Increased diffusion of renewable energy technologies – barriers and driving forces" AAG Annual Meeting, 2014

Djuric Ilic D, Dotzauer E, Trygg L, Broman G "Integration of biofuel production into district heating - part I: an evaluation of biofuel production costs using four types of biofuel production plants as case studies" Journal of Cleaner Production 2014

Djuric Ilic D, Dotzauer E, Trygg L, Broman G "Integration of biofuel production into district heating -part II: an evaluation of the district heating production costs using Stockholm as a case study" Journal of Cleaner Production 2014

Djuric Ilic D, Dotzauer E, Trygg L, Broman G "Introduction of large-scale biofuel production in a district heating system: an opportunity for reduction of global greenhouse gas emissions" Journal of Cleaner Production 2014

Djuric Ilic D, Trygg L "Economic and environmental benefits of converting industrial processes to district heating" Energy 2014

Broman G , Franca C-L, Trygg L, "Sustainable cities in a backcasting perspective", District heating association, Fjärrsyn 2013:20

Fuller R, Trygg L, "Six Million in Melbourne or a Network of Sustainable Midi-Cities? – a Thought Experiment." State of Australian Cities Conference 2013

Trygg L, " Improved energy efficiency - industrial SME and energy suppliers in a combined system" ECEE conference 2013

Thollander P, Rohdin P, Mashfegh B, Karlsson M, Söderström M, Trygg L Energy in Swedish industry 2020 – current status, policy instruments, and policy implications Journal of Cleaner Production 2013

Trygg L, Broman G, Franca C-L, "*District Heating and CHP – a Vital Role for the Development Towards a Sustainable Society?*", Urban Sustainability, Cultural Sustainability, Green Development and Clean Cars (USCUDAR 12), Spain, 2012

Djuric Ilica D, Dotzauer E, Trygg L, Broman G "Introduction of large-scale biofuel production in a district heating system – an opportunity for reduction of global greenhouse gas emissions" Journal of Cleaner Production, 2012

Franca C-L, Broman G, Robèrt K-H, Trygg L "Sustainability Self-Assessment Support: From Overall Strategy to Business Models Design Templates", Sustainable Innovation 17th International Conference, Germany, 2012

Djuric Ilica D, Dotzauer E, Trygg L, Broman G, Amiri S "Integration of a large-scale biofuel production with district heating production – an economic evaluation" Journal of Cleaner Production, under review, 2012

Thollander P, Rohdin P, Moshfegh M, Karlsson M, Söderström M, Trygg L " Energy in Swedish industry 2020 – current status, policy instruments, and policy implications", Journal of Cleaner Production, 2013

Fahlén E, Trygg L, Ahlgren E, "Assessment of absorption cooling as a district heating system strategy – A case study", Energy Conversion and Management, 2012

Djuric Ilic D, Dotzauer E, Trygg L, "District heating and ethanol production through polygeneration in Stockholm ", Applied Energy, 2012

Fahlén E, Trygg L, Ahlgren E "Potential CO2 reduction by increased integration of absorption cooling in a Swedish district energy system" 4th International Conference on Efficiency, Cost, Optimizations, Simulation and Environmental Impact of Energy 2011, Serbia, 2011

Djuric Ilic D , Trygg L, "Introduction of Absorption Cooling Process in CHP Systems – An opportunity for Reduction of Global CO2 Emissions" 4th International Conference on Efficiency, Cost, Optimizations, Simulation and Environmental Impact of Energy 2011, Serbia, 2011

Trygg L, Thollander P, Broman G, "Evaluation of industrial energy audit in SME", Proceedings of the 2010 International Energy Program Evaluation Conference, France, 2010

Difs K, Wetterlund E, Trygg L, Söderström M," Biomass gasification opportunities in a district heating system", Biomass and Bioenergy, 2010

Difs K, Nilsson M, Trygg L, Nordenstam L," Energy conservation measures in buildings – a local energy system perspective", Energy, 2010

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Amiri S, Trygg L, Moshfegh B, "Assessment of the natural gas potential for heat and power generation in the County of Östergötland in Sweden", Energy Policy, 2009

Gode J, Byman K, Persson A, Trygg L, " *Miljövärdering av el ur systemperspektiv. En vägledning för hållbar utveckling.*", B1882 IVL, 2009

Difs K, Trygg L, "Pricing district heating by marginal cost", Energy Policy, 2009

Difs K, Danestig M, Trygg L, "Increased use of district heating in industrial processes - impacts on heat load duration", Applied Energy, 2009

Trygg L, Difs K, Moshfegh B, "Absorption Cooling in CHP systems - old technique with new opportunities", Proceedings of the 10th World Renewable Energy Congress, Scotland, 2008

Difs K, Trygg L, "Increased industrial district heating use in a CHP system – economic consequences and impact on global CO2 emissions", Proceeding of the 5th European Conference on Economics and Management of Energy in Industry, Portugal, 2009

Trygg L, Difs K, Wetterlund E, Thollander P, Svensson I-L, Optimala Fjärrvärmesystem i symbios med industri och näringsliv, Fjärrsynrapport 2009:13, Svensk Fjärrvärme, 2009

Henning H, Trygg L, "Reduction of electricity use in Swedish industry and its impact on national power supply and European CO2 emissions", Energy Policy, 2008

Trygg L, Amiri S, "European perspective on absorption cooling in a combined heat and power system - a case study of energy utility and industries in Sweden", Applied Energy, 2007

Trygg L, "Swedish industrial and energy supply measures in a European system perspective", Dissertation No. 1049, Division of Energy Systems, Department of Mechanical Engineering, Linköping University, Sweden, 2006

Trygg L, Gebremedhin A, Karlsson B G, "Resource effective systems through changes in energy supply and industrial use: the Volvo - Skövde case", Applied Energy, 2006

Henning H, Trygg L, Gebremedhin A, " Enhanced biofuel utilisation in Swedish industries, buildings and district heating" Proceeding of the World Bioenergy 2006, Conference and exhibition on Biomass for Energy, Sweden, 2006

Trygg L, Karlsson B G, "Industrial DSM in a European electricity market - a case study of 11 industries in Sweden", Energy Policy, 2005

Henning D, Trygg L, Glad W, Gustafsson S-I, "Socio-technical analyses of energy supply and use in three Swedish municipalities striving toward sustainability", Proceeding of the 1st VHU Conference on Science for Sustainable Development, Ed. B Frostell, Sweden, 2005

Trygg L, "Generalized method for analysing industrial DSM towards sustainability in a deregulated European electricity market - method verification by applying it in 22 Swedish industries", Proceeding of the 2nd International Conference on Critical Infrastructures, Ed. J-C Sabonnadiere, France, 2004

C.V. Frits Møller Andersen

Education:
1980 M.Econ. from the University of Aarhus

Employment:
2013-present: Professor MSO, DTU Management Engineering
1997-2013: Head of Research Program Energy Systems Analysis, DTU Management Engineering
1992-1997: Senior scientist, Department of Policy Analysis the National Environmental Research Institute
1980-1992: Scientist/senior scientist, Energy Systems Analysis, Risø National Laboratory

Experience:
For 30 years I have worked with energy-, environmental- and macro-economic- modelling using statistical analyses and econometrics. In addition I have been head of the Energy Systems Analysis program for 15 years. I have developed a number of models within different areas of research. In macro-economics, as part of an EU-project I have developed the Danish Hermes model, and as project director for an EU-Pre-Accession project for the Lithuanian Ministry of Economy I have initiated and contributed to the developed of the first macro-econometric model of the Lithuanian economy "Litmod". Within energy- and environmental modelling I have lead the development of "EMMA" (Environmental satellite models for ADAM), developed the Frida-model used by the Danish EPA for projections of the generation of waste in DK, and developed a number of other satellite models to Adam and EMMA. EMMA is used by the Danish Energy Authority for energy demand forecasts and by Energinet.dk for annual forecasts of the demand for electricity. In addition to modelling experience I have contributed to a number of other projects and analyses e.g. the EU-Respond project and analyses of demand flexibility and the integration of VE in the energy system. Recently I have been head of the ENSYMORA-project funded by Innovation Fund Denmark. In this project I analysed hourly electricity consumption and developed models forecasting hourly consumption profiles at the national level and for local areas.
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Andersen, F.M., Skovgaard, M., Larsen, H.V. Municipal Waste: Generation, Management and Greenhouse Gas Emissions. *In: Waste and Environmental Policy / Editor: Mazzanti, Massimiliano ; Montini, Anna : Routledge,* (2009)

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Andersen, F.M., Larsen, H.V.; Skovgaard, M.; Moll, S.; Isoard, S., A European model for waste and material flows. *Resour. Conserv. Recycl.* (2007) **49** , 421-435

Jensen, T.S., Jensen, J.D.; Hasler, B.; Illerup, J.B.; Andersen, F.M., Environmental sub models for a macroeconomic model: Agricultural contribution to climate change and acidification in Denmark *J. Environ. Manag.* (2007) **82** , 133-143

Andersen, F.M., Jensen, S.G.; Larsen, H.V.; Meibom, P.; Ravn, H.; Skytte, K.; Togeby, M., Analyses of demand response in Denmark. Risø-R-1565(EN) (2006) 100 p.

Andersen, F.M., Celov, D.; Grinderslev, D.; Kazlauskas, A., A macro-econometric model of Lithuania LITMOD. *Econ. Modell.* (2005) **22** , 707-719

Andersen, F.M., Karlsson, K.B.; Grinderslev, D.; Werner, M.; Jensen, T.S., Miljømodeller til ADAM. *Nationaløkonomisk Tidsskr.* (2005) **143** , 26-42

Andersen, F.M.; Grinderslev, D.; Werner, M., Environmental satellite models for a macroeconomic model. *Environ. Resource Econ.* (2003) **24** , 197-212

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Andersen, F.M., The HERMES-Model for Denmark. 1989. 157 p. (Risø-M; No. 2800).

Fortegnelse over bedømmelsesudvalg til
stilling 201739 Assistant Professor in Energy Planning and Geographical Information Systems (201739) ved PLAN

Navn: Professor mso Poul Alberg Østergaard
Arbejdssted: PLAN, AAU

Navn: Professor mso Frits Møller Andersen
Arbejdssted: DTU

Navn: Professor Louise Ödlund
Arbejdssted: Linköping Universitet.

Akademisk Råd har taget stilling til, at medlemmer af bedømmelsesudvalget er sagkyndige inden for stillingsområdet på et niveau, der mindst svarer til det, der forudsættes for stillingen, dog ikke under lektorniveau.

Assistant Professor in Energy Planning and Geographical Information Systems (201739)

Position No.
201739

At Technical Faculty of IT and Design, Department of Planning, Copenhagen a position as Assistant Professor in Energy Planning open for appointment from 1 March 2018 or soon hereafter. The position is available for a period of 3 years.

The Department of Development and Planning conducts research and teaching on development and planning in a broad sense, including social science aspects as well as more technical aspects of development, and with a focus on environmental, international as well as administrative dimensions.

Job description
Research areas will be within energy planning with a focus on smart energy systems, feasibility studies and public regulation. Special attention is given to the use of Geographical Information Systems (GIS) and energy system analysis of large-scale integration of renewable energy and heating technologies. It is expected that the position will contribute to the further development and use of GIS in the research group.

Teaching will primarily be in Sustainable Cities and Sustainable Energy Planning and Management at the bachelor as well as at the master level, but also in other study programmes at the University. You may obtain further professional information from Professor Brian Vad Mathiesen, Department of Planning, e-mail: bvm@plan.aau.dk tel.: +45 9940 7218 or Henrik Lund, Department of Planning, e-mail: lund@plan.aau.dk tel.: +45 9940 8309.

Qualification requirements:

Appointment as an Assistant Professor presupposes scientific qualifications at PhD-level or similar scientific qualifications. The research potential of each applicant will be emphasized in the overall assessment. Appointment as an Assistant Professor cannot exceed a period of four years in total at Aalborg University in a temporary position (appointment at Assistant Professor level cannot exceed a period of eight years in total in Denmark). The application must contain the following:

- A statement outlining your reasons for applying, and intentions and visions with, the position.
- Your curriculum vitae, including personal data, educational background, scientific qualifications, dissemination skills, participation in committees and boards, and additional qualifications relevant for the position.
- Copies of relevant diplomas (Master of Science and PhD). On request you could be asked for an official English translation.
- A complete list of publications.
- Publications you wish to be considered by the assessment committee. You may attach up to 5 publications.
- A specification of your teaching qualifications relative to the teaching portfolio. If this is not enclosed you must include an explanation for its absence.
- References/recommendations.

An assessment committee will assess all candidates. The applications are only to be submitted online by using the "Apply online" button below.

For further information concerning the application procedure please contact Nickie Hermansen by mail nkh@adm.aau.dk or phone (+45) 9940 7902

Information regarding guidelines, ministerial circular in force, teaching portfolio and procedures can be seen here.

Workplace
Copenhagen

Agreement

Employment is in accordance with the Ministerial Order on the Appointment of Academic Staff at Universities (the Appointment Order) and the Ministry of Finance's current Job Structure for Academic Staff at Universities. Employment and salary are in accordance with the collective agreement for state-employed academics.

Deadline
05/12/2017

Apply online

Aalborg University (AAU) conducts teaching and research to the highest level in the fields of humanities, engineering, and natural, health, and social sciences.

top

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Louise Ödlund (former Trygg)

Professor, Docent
Department of Management and Engineering
Linköping University (www.liu.se)

Louise Ödlund (former Trygg), Professor
Born: 7st September 1966, Citizen: Swedish

Present affiliation
- Professor in Energy Systems, Linköping University.
- Professor in Energy Technology, University of Gävle.

University education
2011 Docent in Energy Systems, Department of Mechanical Engineering, Linköping University
2006 PhD in Energy Systems, Department of Mechanical Engineering, Linköping University. "Swedish industrial and energy supply measures in a European system perspective", Supervisor Professor Björn Karlsson.
1982 MSc in Mechanical Engineering, Linköping University

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2015- Guest Professor in Energy Technology, University of Gävle, Sweden
2014-2015 Professor in Energy Technology, University of Dalarna, Sweden
2013- Professor in Energy Systems, Linköping University, Sweden
2006-2013 Research Assistant, Linköping University, Sweden
2001-2006 PhD-student, Linköping University, Sweden
1997-2001 Business area manager, E.ON, Sweden
1992-1997 Research engineer, E.ON, Sweden

Short Resume

Louise Ödlund (former Trygg) is Professor in Energy System at Linköping University and Guest Professor in Energy Technology, University of Gävle. Louise completed in 1991 her M.Sc. in Mechanical Engineering at the University of Linköping. During the studies Louise was active in the student union and a member of the national board for post-secondary study assistance. Parallel to her engineering education she undertook extensive studies in mathematic.

In the years of 1991—92 Louise was employed as a teacher at the University of Linköping and at National Institute for Distance Education in Norrköping in the subject mathematics and physics. Through that period she was also involved in designing a multimedia program. During 1992-2001 Louise worked at E.ON, Norrköping. In 1997 she became Business Area Manager for new business development. She was then, among

other things, responsible for introducing district cooling in the municipality of Norrköping which included planning, designing, extension and management of the district cooling system. She was also part of the company's executive board and the MD group.

In 2001 Louise started her PhD studies at the division of Energy Systems at the University of Linköping. Her research area concerns regional and municipal energy systems with a special focus on district heating. By using optimization models she has studied how the combined energy system of energy user and energy supplier can shift in the direction of resource effectiveness and sustainability. Louise has also analyzed a great number of small- and middle sized industries in different Swedish municipalities and found measures that strongly can reduced the industries' use of energy.

Louise has several years of experience of University teaching. She has developed several university courses and co-developed the international master's program Energy and Environmental Engineering as well as the national master's program Energy, Environmental and Management. She has been Director of Studies at the division of Energy System at Linköping University for seven years and has taken extensive courses in leadership and is also a member of several boards at the University as well as within national and international authorities. Louise is part of the research school Reesbe (resource-effeicnt energy system in the built environment) interdisciplinary national research programme Energy Systems and is leading the research group for regional and municipal energy systems within the programme. She is responsible for the department's national Energy System conference that is held every second year and was also head secretary for the international conference of World Renewable Energy Conference that was held at the University of Linköping in 2011.

Louise has written several journal publications, conferences publications and reports. She has studied leadership and is supervisor for several PhD-students. Louise is involved in many research projects, both within the division as well as in co-operation with other universities. Louise is also a frequently engaged invited speaker for conferences and events.

Exampel of Publications Louise Ödlund (former Trygg)

Trygg L, Björk C, Karlsson P, Rönnelid M, Danica Djuric Ilic1 Heat collaboration for increased resource efficiency - a case study of a regional district heating system and a mine, , 5th International Symposium on District Heating and Cooling in Seoul, Korea, 2016

Nordenstam L., Bennerstam M, Trygg L, CONSIDERING INVESTMENT RESOURCES WHEN ASSESSING POTENTIAL C02 REDUCTIONS OF CHP - A CASE STUDY, 5th International Symposium on District Heating and Cooling in Seoul, Korea., 2016

Trygg L, District heating - a key element in a fully balanced renewable energy system, 2nd International Conference on Smart Energy Systems and 4th Generation District Heating 26-29 September 2016 · Aalborg

Rosén T, Trygg L, Active management of heat customers towards lower district heat return water temperature, 2nd International Conference on Smart Energy Systems and 4th Generation District Heating 26-29 September 2016 · Aalborg

Blomqvist S, Trygg L, A system perspective on altered district heating demand in multifamily buildings, 2nd International Conference on Smart Energy Systems and 4th Generation District Heating 26-29 September 2016 · Aalborg

Gustafsson G, Karlsson B, Trygg L, Rönnelid M, "CO2 emission evaluation of energy conserving measures in buildings connected to a district heating system - case study of a multi-dwelling building in Sweden", Energy 2016

Lidberg T, Olofsson T, Trygg L "System impact of energy efficient building refurbishment within a district heated region" Energy 2016

Borén S, Nurhadi L, Ny H, Karl-Henrik R, Broman G, Trygg L "A strategic approach to sustainable transport system development - Part 2: the case of a vision for electric vehicle systems in Southeast Sweden" Journal of Cleaner Production 2016

Trygg L, "Increased diffusion of renewable energy technologies – barriers and driving forces" AAG Annual Meeting, 2014

Djuric Ilic D, Dotzauer E, Trygg L, Broman G "Integration of biofuel production into district heating - part I: an evaluation of biofuel production costs using four types of biofuel production plants as case studies" Journal of Cleaner Production 2014

Djuric Ilic D, Dotzauer E, Trygg L, Broman G "Integration of biofuel production into district heating -part II: an evaluation of the district heating production costs using Stockholm as a case study" Journal of Cleaner Production 2014

Djuric Ilic D, Dotzauer E, Trygg L, Broman G "Introduction of large-scale biofuel production in a district heating system: an opportunity for reduction of global greenhouse gas emissions" Journal of Cleaner Production 2014

Djuric Ilic D, Trygg L "Economic and environmental benefits of converting industrial processes to district heating" Energy 2014

Broman G , Franca C-L, Trygg L, "Sustainable cities in a backcasting perspective", District heating association, Fjärrsyn 2013:20

Fuller R, Trygg L, "Six Million in Melbourne or a Network of Sustainable Midi-Cities? – a Thought Experiment." State of Australian Cities Conference 2013

Trygg L, " Improved energy efficiency - industrial SME and energy suppliers in a combined system" ECEE conference 2013

Thollander P, Rohdin P, Mashfegh B, Karlsson M, Söderström M, Trygg L Energy in Swedish industry 2020 – current status, policy instruments, and policy implications Journal of Cleaner Production 2013

Trygg L, Broman G, Franca C-L, *"District Heating and CHP – a Vital Role for the Development Towards a Sustainable Society?",* Urban Sustainability, Cultural Sustainability, Green Development and Clean Cars (USCUDAR 12), Spain, 2012

Djuric Ilica D, Dotzauer E, Trygg L, Broman G "Introduction of large-scale biofuel production in a district heating system – an opportunity for reduction of global greenhouse gas emissions" Journal of Cleaner Production, 2012

Franca C-L, Broman G, Robèrt K-H, Trygg L "Sustainability Self-Assessment Support: From Overall Strategy to Business Models Design Templates", Sustainable Innovation 17th International Conference, Germany, 2012

Djuric Ilica D, Dotzauer E, Trygg L, Broman G, Amiri S "Integration of a large-scale biofuel production with district heating production – an economic evaluation" Journal of Cleaner Production, under review, 2012

Thollander P, Rohdin P, Moshfegh M, Karlsson M, Söderström M, Trygg L " Energy in Swedish industry 2020 – current status, policy instruments, and policy implications", Journal of Cleaner Production, 2013

Fahlén E, Trygg L, Ahlgren E, "Assessment of absorption cooling as a district heating system strategy – A case study", Energy Conversion and Management, 2012

Djuric Ilic D, Dotzauer E, Trygg L, "District heating and ethanol production through polygeneration in Stockholm ", Applied Energy, 2012

Fahlén E, Trygg L, Ahlgren E "Potential CO2 reduction by increased integration of absorption cooling in a Swedish district energy system" 4th International Conference on Efficiency, Cost, Optimizations, Simulation and Environmental Impact of Energy 2011, Serbia, 2011

Djuric Ilic D , Trygg L, "Introduction of Absorption Cooling Process in CHP Systems – An opportunity for Reduction of Global CO2 Emissions" 4th International Conference on Efficiency, Cost, Optimizations, Simulation and Environmental Impact of Energy 2011, Serbia, 2011

Trygg L, Thollander P, Broman G, "Evaluation of industrial energy audit in SME", Proceedings of the 2010 International Energy Program Evaluation Conference, France, 2010

Difs K, Wetterlund E, Trygg L, Söderström M," Biomass gasification opportunities in a district heating system", Biomass and Bioenergy, 2010

Difs K, Nilsson M, Trygg L, Nordenstam L," Energy conservation measures in buildings – a local energy system perspective", Energy, 2010

Thollander P, Svensson I.L, Trygg L, "Analyzing variables for district heating collaborations between energy utilities and industries", Energy, 2010

Amiri S, Trygg L, Moshfegh B, "Assessment of the natural gas potential for heat and power generation in the County of Östergötland in Sweden", Energy Policy, 2009

Gode J, Byman K, Persson A, Trygg L, " *Miljövärdering av el ur systemperspektiv. En vägledning för hållbar utveckling.*", B1882 IVL, 2009

Difs K, Trygg L, "Pricing district heating by marginal cost", Energy Policy, 2009

Difs K, Danestig M, Trygg L, "Increased use of district heating in industrial processes - impacts on heat load duration", Applied Energy, 2009

Trygg L, Difs K, Moshfegh B, "Absorption Cooling in CHP systems - old technique with new opportunities", Proceedings of the 10th World Renewable Energy Congress, Scotland, 2008

Difs K, Trygg L, "Increased industrial district heating use in a CHP system – economic consequences and impact on global CO2 emissions", Proceeding of the 5th European Conference on Economics and Management of Energy in Industry, Portugal, 2009

Trygg L, Difs K, Wetterlund E, Thollander P, Svensson I-L, Optimala Fjärrvärmesystem i symbios med industri och näringsliv, Fjärrsynrapport 2009:13, Svensk Fjärrvärme, 2009

Henning H, Trygg L, "Reduction of electricity use in Swedish industry and its impact on national power supply and European CO2 emissions", Energy Policy, 2008

Trygg L, Amiri S, "European perspective on absorption cooling in a combined heat and power system - a case study of energy utility and industries in Sweden", Applied Energy, 2007

Trygg L, "Swedish industrial and energy supply measures in a European system perspective", Dissertation No. 1049, Division of Energy Systems, Department of Mechanical Engineering, Linköping University, Sweden, 2006

Trygg L, Gebremedhin A, Karlsson B G, "Resource effective systems through changes in energy supply and industrial use: the Volvo - Skövde case", Applied Energy, 2006

Henning H, Trygg L, Gebremedhin A, " Enhanced biofuel utilisation in Swedish industries, buildings and district heating" Proceeding of the World Bioenergy 2006, Conference and exhibition on Biomass for Energy, Sweden, 2006

Trygg L, Karlsson B G, "Industrial DSM in a European electricity market - a case study of 11 industries in Sweden", Energy Policy, 2005

Henning D, Trygg L, Glad W, Gustafsson S-I, "Socio-technical analyses of energy supply and use in three Swedish municipalities striving toward sustainability", Proceeding of the 1st VHU Conference on Science for Sustainable Development, Ed. B Frostell, Sweden, 2005

Trygg L, "Generalized method for analysing industrial DSM towards sustainability in a deregulated European electricity market - method verification by applying it in 22 Swedish industries", Proceeding of the 2nd International Conference on Critical Infrastructures, Ed. J-C Sabonnadiere, France, 2004

Fortegnelse over bedømmelsesudvalg til stilling P21748 Postdoc in aerial connectivity over cellular networks ved Department of Electronic Systems

Navn: Professor Preben Mogensen
Arbejdssted: Department of Electronic Systems, AAU
E-mail: pm@es.aau.dk

Navn: Associate Professor Troels B. Sørensen
Arbejdssted: Department of Electronic Systems, AAU
E-mail: tbs@es.aau.dk

Akademisk Råd har taget stilling til, at medlemmer af bedømmelsesudvalget er sagkyndige inden for stillingsområdet på et niveau, der mindst svarer til det, der forudsættes for stillingen, dog ikke under lektorniveau.

Postdoc in aerial connectivity over cellular networks

13-11-2017
Godkendt d.
Henrik Pedersen
dekan

Position No.
P21748

At the Technical Faculty of IT and Design, Department of Electronic Systems, a position as Postdoc in aerial radio connectivity over cellular networks is open for appointment from 1. January 2018, or as soon as possible thereafter. The fully funded position is available for a period of three years.

The Department of Electronic Systems is one of the largest departments at Aalborg University with a total of more than 250 employees. The department is internationally recognized in particular for its contributions within Information and Communication Technology (ICT). The research and teaching of the Department of Electronic Systems focus on electronic engineering and the activity areas are organized in the sections: Antennas, Propagation and Millimetre-wave Systems (APMS), Antennas, Propagation and Radio Networking section (APMS), Connectivity (CNT), Automation Control section (Control), Signal and Information Processing section (SIP), Wireless Communication Networks section (WCN) and Communication, Media and Information technologies (CMI). The department focuses on maintaining a close interplay with the university's surroundings - locally, nationally and internationally – as well as producing unique basic research and educating talented and creative engineers. The department collaborates with leading ICT researchers all over the world.

Job description

The main tasks of the successful postdoc candidate will be related to experimental research, testing and standardization of new radio functionalities for improved support of aerial connectivity over cellular networks. One obvious use case is connectivity of drones for beyond visual Line of Sight, requiring a highly reliable radio link. A severe aspect of aerial radio connectivity over cellular is the dramatic increase in inter cell interference from elevating the mobile device to more than 100 meters above ground level.
A key research area for the postdoc candidate will hence be on interference mitigation techniques.

- Multi-antenna and advanced transceiver at the terminal (aerial vehicle) side
- Antenna technologies and advanced transceiver technologies at the network side (including multi node technologies)
- Radio Resource Management including power-control, inter cell interference coordination, Aerial Vehicle detection etc.
- New mobility aspects of Aerial connectivity by cellular
- Techniques to ensure very high connectivity reliability

The expected qualifications for the postdoc candidate include:

- Good knowledge in radio propagation, 3G/4G cellular networks, Radio Resource Management
- Good knowledge on MIMO antenna systems and advanced transceiver technologies
- Matlab experience (being able to run and develop)
- Can work independently and as part of a team, creating results with use of Matlab based simulator.
- Running measurements/experiments with drones as part of a team.

The candidate will be involved in working with Nokia Bell Labs, several major European operators, the European DroC2om project and 3GPP UAV activities.

The successful candidate holds a PhD within a field related to wireless communications. Furthermore, he/she should be able to demonstrate enough research experience within the aforementioned topics. An excellent research track record is expected.

The project will take place at the Wireless Communications Networks section (WCN), Department of Electronic Systems, Aalborg University. The WCN section conducts research in areas such as radio access technologies, systems, network planning, resilience and quality of service, etc.

You may obtain further information from Professor Preben E. Mogensen (phone: +45 9940 8818, email: pm@es.aau.dk), Department of Electronic Systems.

Qualification requirements:
Appointment as Postdoc presupposes scientific qualifications at PhD-level or similar scientific qualifications. The research potential of each applicant will be emphasized in the overall assessment. Appointment as a Postdoc cannot exceed a period of four years in total at Aalborg University.

The application must contain the following:

- A motivated text wherein the reasons for applying, qualifications in relation to the position, and intentions and visions for the position are stated.
- A current curriculum vitae.
- Copies of relevant diplomas (Master of Science and PhD). On request you could be asked for an official English translation.
- Scientific qualifications. A complete list of publications must be attached with an indication of the works the applicant wishes to be considered. You may attach up to 5 publications.
- Dissemination qualifications, including participation on committees or boards, participation in organisations and the like.
- Additional qualifications in relation to the position. References/recommendations.
- Personal data.

The applications are only to be submitted online by using the "Apply online" button below.

An assessment committee will assess all candidates.

For further information concerning the application procedure please contact Anne Christoffersen by mail ach@adm.aau.dk or phone (+45) 9940 9680.

Information regarding guidelines, ministerial circular in force and procedures can be seen here.

Workplace
Aalborg

Agreement
Employment is in accordance with the Ministerial Order on the Appointment of Academic Staff at Universities (the Appointment Order) and the Ministry of Finance's current Job Structure for Academic Staff at Universities. Employment and salary are in accordance with the collective agreement for state-employed academics.

Deadline
05/12/2017

Apply online

Aalborg University (AAU) conducts teaching and research to the highest level in the fields of humanities, engineering, and natural, health, and social sciences.

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Fortegnelse over bedømmelsesudvalg til
stilling P21752 Postdoc in Control Theory ved Institut for Elektroniske Systemer

Navn: Professor Rafal Wisniewski
Arbejdssted:
E-mail: raf@es.aau.dk

Navn: Lektor John-Josef Leth
Arbejdssted:
E-mail: jjl@es.aau.dk

Akademisk Råd har taget stilling til, at medlemmer af bedømmelsesudvalget er sagkyndige inden for stillingsområdet på et niveau, der mindst svarer til det, der forudsættes for stillingen, dog ikke under lektorniveau.

28.11.17

Postdoc in Control Theory

Godkendt d. _____
Henrik Pedersen
dekan

Position No.
P21752

At the Technical Faculty of IT and Design, Department of Electronic Systems, a position as Postdoc in Control Theory is open for appointment from January 15 or soon thereafter and it is available for a period of 2 years.
The Department of Electronic Systems is one of the largest departments at Aalborg University with a total of more than 250 employees. The department is internationally recognized in particular for its contributions within Information and Communication Technology (ICT). The research and teaching of the Department of Electronic Systems focus on electronic engineering and the activity areas are organized in the sections: Antennas, Propagation and Millimetre-wave Systems section (APMS), Automation Control section (Control), Connectivity section (CNT), Signal and Information Processing section (SIP), Wireless Communication Networks section (WCN) and Communication, Media and Information technologies (CMI).
The department focuses on maintaining a close interplay with the university's surroundings - locally, nationally and internationally – as well as producing unique basic research and educating talented and creative engineers. The department collaborates with leading ICT researchers all over the world.

Job description

The candidate will be a team member of the CPS group comprising two full professors, 3 Associate Professors, 2 Postdocs, 2 PhD students, and 2 industrial PhD students. The background in the Group stretches from mathematics to engineering. Specifically, it covers dynamical systems, topology and algebraic geometry within mathematics, control theory, stochastic systems, and robotics within engineering.

The research will be carried out in control theory. Specifically, the research area comprises of advancing the Lyapunov density theory and devising conditions for stability which are numerically sound and hence can be checked by an algorithm. The aim of the work is to obtain non-conservative conditions for almost sure stability, and to develop optimization method leaning on polynomial certificates of positivity approximating the exact Lyapunov density. The security of computation will be in the focus. This will be the second focus of the post-doc project, i.e., methods for a secure optimization platform where optimization is performed on the cipher-text and the result is the cipher-text version of the optimal solution. At the stage of implementation of the optimal solution, the agents which are responsible of implementing the solution will subsequently be able to only decipher information relevant to their own operation.

You may obtain further professional information from professor Rafael Wisniewski by mail **raf@es.aau.dk** or phone (+45) 9940 8762.

Qualification requirements:
Appointment as Postdoc presupposes scientific qualifications at PhD-level or similar scientific qualifications. The research potential of each applicant will be emphasized in the overall assessment. Appointment as a Postdoc cannot exceed a period of four years in total at Aalborg University.

The application must contain the following:

- A motivated text wherein the reasons for applying, qualifications in relation to the position, and intentions and visions for the position are stated.
- A current curriculum vitae.
- Copies of relevant diplomas (Master of Science and PhD). On request you could be asked for an official English translation.
- Scientific qualifications. A complete list of publications must be attached with an indication of the works the applicant wishes to be considered. You may attach up to 5 publications.
- Dissemination qualifications, including participation on committees or boards, participation in organisations and the like.
- Additional qualifications in relation to the position. References/recommendations.
- Personal data.

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Information regarding guidelines, ministerial circular in force and procedures can be seen here.

Workplace
Aalborg

Agreement
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Deadline
07/12/2017

Apply online

Aalborg University (AAU) conducts teaching and research to the highest level in the fields of humanities, engineering, and natural, health, and social sciences.

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Fortegnelse over bedømmelsesudvalg til stilling P21755 Postdoc in Sensor Technology for Creative Robotics in Architecthure ved Department of Architecture Design and Media Technology

Navn: Professor Thomas B. Moeslund
Arbejdssted: Department of Architecture Design and Media Technology
E-mail: tbm@create.aau.dk

Navn: Associate Professor Kamal Nashrollahi
Arbejdssted: Department of Architecture Design and Media Technology
E-mail: kn@create.aau.dk

Akademisk Råd har taget stilling til, at medlemmer af bedømmelsesudvalget er sagkyndige inden for stillingsområdet på et niveau, der mindst svarer til det, der forudsættes for stillingen, dog ikke under lektorniveau.

Postdoc in Sensor Technology for Creative Robotics in Architecthure

Position No.
P21755

At the Technical Faculty of IT and Design, Department of Architecture, Design, and Media Technolgy a position as Postdoc in Sensor Technology for Creative Robotics in Architecthure is open for appointment from February 1, 2018 or soon hereafter and for a period of two years.

The Department of Architecture, Design, and Media Technology has as its goal the development of an innovative cluster of engineering-based environments for education and research which integrate creativity, engineering and technology within the disciplines of architecture, urban design, industrial design, digital design and interactive media. The department is a leading research and educational environment in Denmark that addresses the challenge of the interplay between creativity and technology, and develops new areas in research and education directed towards the end-user.

Job description
Aalborg University (AAU) is a leading University in Denmark within Architecture & Design as well as within Robotics. This post doc position is for two years and aims at bridging the gap between these traditionally isolated fields and contribute to research within Creative Robotics. Concretely, the focus will be on researching how sensor technologies, adaptive control and collaborative robotics can take part in the development of creative robotics for architectural applications. The studies are focused on architectural full scale prototypes interfacing between sensor data, parametric design models, robot actuation, information analysis and projection for design decision interfacing.

The ideal candidate therefore has strong competences within; sensor technology for adaptive robotics, computer vision and human-robot-collaboration including visual feedback e.g. VR, AR, projection. Moreover, interests in architecture design processes, material properties sensing and architectural physical prototypes are considered very positive.

The post doc will work closely together with the local Architecture group, Interaction group and Computer Vision group, meaning that the candidate should be interested in cross-disciplinary work.

Limited teaching within the area can be expected, but also in other study programmes at the University.

You may obtain further professional information from Professor Thomas B. Moeslund, tel.: +45 9940 8787, mail tbm@create.aau.dk

Qualification requirements:
Appointment as Postdoc presupposes scientific qualifications at PhD-level or similar scientific qualifications. The research potential of each applicant will be emphasized in the overall assessment. Appointment as a Postdoc cannot exceed a period of four years in total at Aalborg University.

The application must contain the following:

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- A current curriculum vitae.
- Copies of relevant diplomas (Master of Science and PhD). On request you could be asked for an official English translation.
- Scientific qualifications. A complete list of publications must be attached with an indication of the works the applicant wishes to be considered. You may attach up to 5 publications.
- Dissemination qualifications, including participation on committees or boards, participation in organisations and the like.
- Additional qualifications in relation to the position. References/recommendations.

- Personal data.

The applications are only to be submitted online by using the "Apply online" button below.

An assessment committee will assess all candidates.

For further information concerning the application procedure please contact Anne Christoffersen by mail ach@adm.aau.dk or phone (+45) 9940 9680.

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Workplace
Aalborg

Agreement
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Deadline
11/01/2018

Apply online

Aalborg University (AAU) conducts teaching and research to the highest level in the fields of humanities, engineering, and natural, health, and social sciences.

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Mødeforum og dato:	akademisk råd TECH 6. december 2017

AALBORG UNIVERSITET

Fakultetskontoret for ENGINEERING, SUND og TECH

Dokument dato: 28-11-17

Dokumentansvarlig: MFG

Sagsnr.:

Sagsfremstilling til møder

Overskrift og varighed:	Fremme af god videnskabelig praksis 45. min.
Sagsbehandler:	Mark Gammeljord Sekunderet af: Prodekan Torben Larsen (medlem af det tidligere TEKNAT praksisudvalg) Helen Kjerstein Kristensen, Ph.d. kontoret (sagsbehandler for det tidligere TEKNAT praksisudvalg) Kristian Østergaard Sørensen, Ph.d kontoret (sagsbehandler for det tidligere TEKNAT praksisudvalg)
Sagsfremstilling:	**BAGGRUND:** Som følge af den nye organisering af Aalborg Universitets Praksisudvalg (AAU Praksisudvalg eller PU AAU) pr. 1. juli 2017, blev ansvaret for fremme af god videnskabelig praksis placeret hos de Akademiske Råd (AR). Dette er indskrevet i den nye vedtægt (§ 21 stk. 2 pkt. 8): *..at akademisk råd fremover fastsætter retningslinjer til fremme af god videnskabelig praksis, mens rektor nedsætter et praksisudvalg og fastsætter retningslinjer for behandling af sager om brud på god videnskabelig praksis.* På den baggrund skal AR TECH fastlægge retningslinjer for fremme af god videnskabelig praksis. De hidtil gældende retningslinjer er vedlagt som BILAG 4. **OPLÆG TIL DRØFTELSE:** For at kunne arbejde med fremme af god videnskabelig praksis er man nødt til at kende noget til det, man prøver at undgå (brud på god videnskabelig praksis) Derfor vil der på mødet den 6. december være et oplæg, der adresserer: • **3 anonymiserede eksempler** på sager, der har været behandlet i TETECH/ENG's praksisudvalg. SE BILAG 1, 2 og 3. • **Overblik over sager** på ENG/TECH siden sommeren 2016 (hvor nyt plagieringsscanningssystem – Ithenticate – blev taget i brug) • **Erfaringer fra praksisudvalgets arbejde** – set fra medlemmets stol

	• **Obligatorisk screening og forebyggelse** i dag – Ithenticate og ph.d. kurser Oplægget vil være fakta og erfaringsbaseret, og derfor være tilbageskuende i sin tilgang. Der vil kun i mindre omfang blive brugt tid på at kommentere på det nye setup omkring AAU Praksisudvalg, da denne organisering tidligere har været behandlet på AR. For gældende regler og procedurer pr. 1. juli 2017 henvises til: Regler for Praksisudvalg Procedurer for behandling af sager i AAU Praksisudvalg
Indstilling:	Det indstilles at AR, at rådet på baggrund af oplægget om det hidtidige arbejde med god videnskabelig praksis, **drøfter og beslutter en proces for, hvordan AR TECH får udarbejdet nye retningslinjer for fremme af god videnskabelig praksis.**
Bilag:	BILAG 1: Medforfatterskab AR061217 BILAG 2: PHD reference AR 061217 BILAG 3: Afvist PHD AR 061217 BILAG 4: Tidligere retningslinjer for god videnskabelig praksis TEKNAT
Beslutning:	

BILAG 1

XXX

AALBORG UNIVERSITET

Fakultetskontoret for
ENGINEERING, SUND og TECH

Dokument dato: 30. juni 2017

Dokumentansvarlig: RPO

Draft ruling in relation to breach of good scientific practice

Dear XXX,

As previously noted, the Committee on Good Scientific Practice for the Technical Faculty of IT and Design addressed a complaint received from XXX.

This letter with the opinion of the Committee is a draft of the actual decision. You thus have the opportunity to comment on the opinion of the Committee before the final decision. Please send any comments by august 1. Should you not have any further comments, please make this known as soon as possible.

Please send your comments, or a statement that you do not have any comments, to Rikke Poulsen, Dean's Secretariat, rpo@adm.aau.dk.

After august 1, the Committee will make a final decision that will then be sent to the dean who will decide on a possible sanction.

The complaint

On January 29, XXX filed a complaint that you violated the rules on good scientific practice in relation to the article "XXX" by:

- Designating yourself as first author.
- Publishing the article without approval from XXX on the final version. (See the Danish Code of Conduct for Research Integrity (2014), 4.1, i., c)
- Denying XXX the opportunity to take part in the structuring or the revision of the article with timely notice. (See the Danish Code of Conduct for Research Integrity (2014), 4.1, iii.)

Opinion of the Committee

The Committee on Good Scientific Practice has reviewed the material submitted and finds that XXX, according to your remarks in an email of January 23, 2014 that he would be first author, had a legitimate expectation that any material published with content from his Master's thesis would designate him as first author.

The Committee does not find that publishing articles, etc., without prior agreement on author sequence to be in accordance with good scientific practice.

In the opinion of the Committee, the existing disagreement concerning author sequence further means that XXX cannot be seen as accepting the article.

Based on the material submitted, the Committee also finds that complaint items two and three derive from a forced process that could be avoided and for which XXX must bear responsibility.

On behalf of the Committee on Good Scientific Practice and the Technical Faculty of IT and Design,

Rikke Poulsen

BILAG 2

AALBORG UNIVERSITET

Faculty of Engineering and Science
Niels Jernes Vej 10
9220 Aalborg East

Committee on Good Scientific Practice
Chairman:
Lars Døvling Andersen

Secretariat:
Jacob Glensvang
Phone: 9940 3444
Email: jag@adm.aau.dk

Dato: 22-11-2016
Sagsnr.: 2016-503-00006

Re: Ruling re. suspected violation of good scientific practice in the PhD dissertation

On June 24, 2016, the Faculty of Engineering and Science received a report of plagiarism in the PhD dissertation the dissertation for which you were awarded the PhD degree on by the Academic Council at the Faculty of Engineering and Science.

Based on the material received, the dean of the Faculty of Engineering and Science, Eskild Holm Nielsen, referred the case for review by the faculty's Committee on Good Scientific Practice.

The case has been considered by the faculty's Committee on Good Scientific Practice and you were given the opportunity to submit your remarks to the matter. The Committee has now reached its ruling based on the material in the case including your remarks.

Ruling

The Committee on Good Scientific Practice finds that you have acted in breach of the *Rules Regarding Disciplinary Measures for Students at Aalborg University* which at the time of your submission of the PhD thesis were the rules applying to PhD students. You have done so by not using proper citation when using other author's material in a number of incidents. At the same time the Committee acknowledges that the incidents seem to stem from an unsuitable work process on your part. Furthermore, the Committee has noted that you state that the originality of the work can be attributed to you. The Committee has found no reason to dispute this claim.

Summary of the case evaluated by the Committee on Good Scientific Practice

The dissertation submitted consists of a conference article, five journal articles and a synopsis of these six articles. In connection with the committee's review of the above-mentioned case, a preliminary report had been prepared on the extent of convergence with other sources.

The report indicated that there were 26 instances of full or partial convergence with other published sources. In all instances these were accessible sources authored by one or more authors, not including the author of the PhD dissertation. All sources, with the exception of one (Source 9), were published prior to 2012 when the dissertation was submitted.

In all of the instances, the fully or partially copied passages do not include source referencing. In the vast majority of these, the original sources appear in the PhD dissertation's reference list, but nowhere is it indicated that the dissertation to a large extent is based on fully or partially copied material.

The dissertation submitted is based on one published conference article and five published journal articles. There is significant overlap between these publications and the dissertation's synopsis. The committee particularly notes, however, that for all six of the publications concerned overlap was detected with several of the above-mentioned 26 sources. For some of the publications, a smaller portion of the text converges with other sources. In some instances, a larger portion of the article converges substantially with previously published sources.

The convergence between the dissertation's synopsis and the six articles on the one hand and the 26 previously published works detected on the other hand is found continually through all seven parts of the dissertation. Thus, the issue is not solely partial copying without source reference in the description of the background for the work, but also in the results section, discussion and conclusion.

Your remarks to the case

You have submitted a rebuttal letter (55 pages), coding material, a paper and the final assessment of your PhD thesis. In your rebuttal letter you state that you did not intend to pass of other people's works as your own. You state that it is partly the result of not using three years of notes properly, cf. "*The final report was also written under pressure and with notes taken in 3 years. I should have been more organized taking notes and reduce the material to submit to the PhD thesis*" (Rebuttal letter p. 5). Furthermore you state that it is also partly because you were inexperienced in the beginning of the PhD study thus making most of the errors in this period cf. "*I must admit that paper 1 has more irregularities compared to other papers. This reflects the inexperience at the beginning of my project*" (Rebuttal letter p. 48). From your remarks it is also clear that you do admit to having made mistakes and errors in terms of not citing other people's works properly. However, at the same time you state that the originality of the work can be entirely accredited to you cf. "*...the framework, models, designs and experiments to generate the results are entirely original, and this is of course the foundation of my dissertation*" (Rebuttal letter p. 2).

Regulatory basis

At the time the PhD dissertation was submitted to the Faculty of Engineering and Science, PhD students were subject to the "Rules Regarding Disciplinary Measures for Students at Aalborg University" of February 2009. As stated in § 3, (2):

(2) Plagiarism includes such cases, cf., however, subsections 3 and 4, where a written examination assignment in full or in part appears to have been produced by the examinee(s) even though the assignment

1. *includes identical or almost identical reproduction of the wording or works of other authors, and the extracts are not marked by quotation marks, italics, indentation or other clear indication, including that of the source,*
2. *includes long passages with a wording which is so close to that of another work or other*
3. *production etc. that comparison suggests that those passages could not have been written without the use of the other work,*
4. *includes the use of another author's wording or ideas without crediting this author in a*
5. *suitable way, or*
6. *reuses text and/or central ideas from the examinee's own previously assessed or published works without complying with the rules laid down in no. 1) and 3).*

Grounds for the ruling

The Committee on Good Scientific Practice finds that the following are documented in the analysis of your PhD thesis:

- To a significant extent, the dissertation makes use of a large number of passages that are fully or partially reproduced directly from a larger number of previously published sources without indicating a quotation or paraphrasing. The committee notes, among other things, the substantial extent of full or partial copying.
- There is extensive use of work by other authors without indication of a quotation.
- The above practice is not solely used in the synopsis but also in the previously published articles by the author (and coauthors) that the dissertation is based on.

From your remarks it is made clear that in many of the relevant passages you agree that you have acted in an inappropriate manner with regards to the use of other people's works. At the same time you state that this was not in any way your intention but rather a result of inexpedient use of three years notes and not being familiar with the correct form of citing in scientific work at the beginning of your PhD study. Finally you also state that the originality of the work can be attributed solely to you.

The Committee on Good Scientific Practice concurs that the originality of the work can be attributed to you and that as such the results of the PhD dissertation can be attributed to you. This, however, does not excuse that in several instances you have copied directly from other sources without proper referencing the original source by applying quotation marks, cursive, insertion or any other indication with source reference.

Based on the existing material, the Committee on Good Scientific Practice at the Faculty of Engineering and Science at Aalborg University thus finds that the preparation of the dissertation submitted does not comply with good scientific practice.

Hearing

This ruling was sent to you in a draft version on October 5, 2016. On October 19, 2016 you submitted your remarks to the draft ruling. The Committee on Good Scientific Practice does not find that your remarks are grounds for a changed ruling. However, it is noted that source 9 is in fact published before your thesis and this has been altered in this ruling.

This ruling will be forwarded to the PhD Study Director at the Doctoral School of Engineering and Science and the Dean of the Faculty of Engineering and Science who will decide on possible sanctions.

Yours sincerely,

Lars Døvling Andersen

Chairman, The Committee on Good Scientific Practice at the Faculty of Engineering & Science

BILAG 3

AALBORG UNIVERSITY
DENMARK

The Doctoral School of Engineering and Science
Niels Jernes Vej 10
9220 Aalborg
Denmark

Contact Person:
Kristian Østergaard Sørensen
Phone: +45 9940 3512
E-mail: krs@adm.aau.dk

Dear

According to letter of August 29, 2016 you were informed of the suspicion of a possible breach of good scientific practice in relation to your PhD thesis. You were given until September 12, 2016 to submit your comments regarding the matter. Your comments were received on August 31, 2016.

Decision
Based on the result of the plagiarism analysis and the comments submitted by you the PhD Study Director has made a decision in the matter.

You are hereby *warned* against committing any future violations to the rules of good scientific conduct at the Faculty of Engineering and Science. Furthermore your PhD thesis in its present form cannot be accepted for defense and you are therefore given the opportunity to submit a revised thesis which abides by the rules of good scientific conduct no later than 1 December 2016. The PhD Study Director advises that you consult your supervisor when revising the thesis.

Grounds for decision

The Faculty of Engineering and Science's Guidelines for Promoting Good Scientific Practice and Reviewing Cases of Scientific Dishonesty states the following:

The following situations are examples of violations of good scientific practice:
- *The publication of another person's work as one's own (plagiarism) by direct copying, paraphrasing or using another person's original ideas without giving appropriate credit.*
- *Submission of insufficient information relevant for assessment of the work, including the foundation for the data, the data and methods used, or the author's scientific qualifications.*
- *In an assessment situation, a) use of a person's own previously assessed or published works without referencing (in the same way as for other people's work), b) use of a person's own works authored jointly with others without also submitting coauthor statements, or c) disregard of the rules that apply to assessment, including the use of unauthorized aids.*

As is shown by the plagiarism analysis, parts of your papers seem to have been copied directly into the thesis without referencing the source. Although it is of course accepted to include material from your papers in the 'Kappa' this must be done in such a way that it is made clear to all, including members of the assessment committee, which parts of the PhD thesis are based directly on the papers. I.e. when you copy directly from the papers into the 'Kappa' you must make a proper reference to the original source by applying quotation marks, cursive, insertion or any other indication with source reference. This must be done in the same way as when citing other people's work.

AALBORG UNIVERSITY
DENMARK

In your thesis you have placed a note under different sections stating the following "For further information, please refer to Paper XX: "title of paper". This approach is however not sufficient in relation to applying proper references.

You may refer the above decision to the Danish Agency for Higher Education, if the appeal is based on legal issues. The appeal must be submitted to the Faculty within two weeks from the day you have been informed of the decision. If the decision is maintained, the Faculty shall issue a statement upon which you shall be granted the opportunity to comment. The Faculty shall then submit the appeal to the Agency, enclosing the statement and any comments made by you.

Best

Kristian Østergaard Sørensen

AALBORG UNIVERSITET

Det Teknisk-Naturvidenskabelige Fakultet
Niels Jernes Vej 10
9220 Aalborg

Jacob Glensvang
Telefon: 9940 3444
Email: jag@adm.aau.dk

Dato: 25. nov. 2015
Sagsnr.: [Sagsnr.]

Tidligere retningslinjer for fremme af god videnskabelig praksis

GÆLDENDE INDTIL 30. JUNI 2017.

1. Fremme af god videnskabelig praksis

Følgende indsatser har til formål at fremme god videnskabelig praksis og forebygge, at der sker brud på god videnskabelig praksis på baggrund af manglende viden om gældende regler og procedurer:

1. Udarbejdelse og vedligeholdelse af informationsmateriale
2. Obligatoriske kurser for ph.d.-studerende
3. Digital plagiatscreening
4. Fakultetets indsats
5. Behandling af emnet god videnskabelig praksis på møder i akademisk råd

2.1. Udarbejdelse og vedligeholdelse af informationsmateriale

Ved Det Teknisk-Naturvidenskabelige Fakultet udarbejdes og vedligeholdes informationsmateriale om god videnskabelig praksis herunder regler og procedure for området. Informationsmaterialet er tilgængeligt via Det Teknisk-Naturvidenskabelige Fakultets hjemmeside.

2.*2. Obligatoriske forløb vedrørende videnskabelig metodik*

Alle ph.d. studerende skal gennemføre et obligatorisk kursus i videnskabelig metodik og god videnskabelig praksis inden for teknisk-naturvidenskabelig forskning. Kurset udbydes af Den Teknisk-Naturvidenskabelige Ph.d.-skole.

2.3. Digital plagiatscreening

Det Teknisk-Naturvidenskabelige Fakultet benytter sig af digital plagiatscreening i forbindelse med indlevering af ph.d.- og doktorafhandlinger. Formålet med screeningen er en grundlæggende teknisk afdækning af, hvorvidt der er sammenfald i indholdet af et videnskabeligt arbejde og egne eller andres allerede publicerede tekster.

2.4. Fakultetets indsats

Fakultetet har løbende til opgave at informere alle medarbejdere om fakultetets holdning til god videnskabelig praksis.

2.5. Behandling af emnet god videnskabelig praksis på møder i akademisk råd

God videnskabelig praksis bliver som emne behandlet på møder i akademisk råd med det formål løbende at udvikle tiltag, der kan medvirke til fremme af god videnskabelig praksis. Emnet behandles mindst én gang årligt.

Anledning / mødeforum og dato:	Akademisk Råd TECH 6. december 2017

AALBORG UNIVERSITET

Fakultetskontoret for ENGINEERING, SUND og TECH

Dokument dato: 23. november 2017
Dokumentansvarlig: Eva Hansen
Senest revideret:
Senest revideret af:
Sagsnr.:

Sagsfremstilling

Overskrift og varighed:	Æresdoktor 2018 for TECH
Sagsbehandler:	Eva Hansen
Sagsfremstilling:	I forbindelse med AAUs Årsfest er det en tradition, at fakulteterne indstiller et antal højt estimerede personer til modtagelse af æresdoktorgraden. TECH har indstillet en kandidat: Professor Thomas Parisini, Imperial College, UK Der er nedsat et bedømmelsesudvalg, som er foreslået af Børge Lindberg (ES) og efterfølgende godkendt af dekan Henrik Pedersen: <u>Bedømmelsesudvalg</u>: Thomas Bak, formand Rafael Wisniewski Torben Larsen Bedømmelsesudvalget har udarbejdet dets indstilling om hvorvidt de finder vedkommende på et niveau, som afstedkommer tildeling af æresdoktorgraden. Ifølge proceduren skal Akademisk Råd godkende indstillingerne fra bedømmelsesudvalget. Den endelige godkendelse foretages af rektor med frist den 18/12- 2017.
Indstilling:	Det indstilles, at Akademisk Råd godkender indstillingerne fra bedømmelsesudvalgene.
Bilag:	Bilag 1: Bedømmelse Thomas Parisini Bilag 2: Publikationsliste - Scopus

To whom it may concern

EVALUATION OF THOMAS PARISINI AS HONORIS DOCTOR CAUSA

Thomas Parisini (TP) – born 1963 - has since 2010 been Chair in Industrial Control at Imperial College London and is Director of Research at the Department of Electrical and Electronic Engineering. TP is also Deputy Director of KIOS Research and Innovation Center of Excellence at University of Cyprus and Danieli Endowed Chair of Automation Engineering at University of Trieste. TP is the author of 85 peer reviewed journal publications, 9 book chapters, 37 invited contributions, and 157 peer reviewed conference publications. TP's H-index (Google Scholar) is 35, and he has 5,296 citations.

TP is one of the most influential researchers in the field of automatic control, which concerns system principles that make it possible to effectively understand and design physical systems and allow operation without continuous direct human intervention. His research interests include neural-network approximations for optimal control, fault diagnosis for nonlinear and distributed systems, fault-tolerant control of large-scale systems, estimation and adaptive suppression of periodical disturbances in control systems, and nonlinear networked model predictive control systems. Among several awards, he is a co-recipient of the 2014 Outstanding Paper Award of the IFAC Journal of Process Control, of the 2004 Outstanding Paper Award of the IEEE Transactions on Neural Networks, and a recipient of the 2007 IEEE Distinguished Member Award.

The scientific contributions include robust fault diagnosis methodology for detecting, isolating and accommodating faults in large-scale and nonlinear dynamic systems. Correct and timely fault detection is of major importance in the field of system engineering, and constitutes a primary problem in a broad spectrum of applications. TP has also pioneered the use of neural networks for solving fault-diagnosis problems and more generally the use of neural network approximations for optimal control and decision.

TP is recognized world-wide by the research community for his commitment to academic societies such as IEEE Control Systems Society and IFAC (International Federation of Automatic Control) and as editor for some of the most prestigious journals in the field. TP is currently Vice-President for Publications Activities of the IEEE Control Systems Society and Editor for Control Applications of the most prestigious journal in the area, Automatica. He served as Editor in Chief of the IEEE Transactions on Control Systems Technology and was previously Associate Editor of Automatica, the IEEE Transactions on Automatic Control and IEEE Trans. On Neural Networks. TP is a fellow of the IEEE and IFAC and a Distinguished Lecturer of the IEEE.

Among other activities, he was the Program Chair of the 2008 IEEE CDC (most prestigious conference in automatic control) and a General Co-Chair of the 2013 IEEE CDC. He was the ECC Editorial Board Chair at the ECC conference in Aalborg, 2016 and he is General Co-Chair of the CCTA conference 2018 in Copenhagen.

In conclusion, we find that Professor Thomas Parisini is a truly outstanding researcher, who will be a highly worthy recipients of the degree *Honoris doctor causa* at Aalborg University.

Monday, 20 November 2017

Thomas Bak
Professor AAU

Rafael Wisniewski
Professor AAU

Torben Larsen
Vice-dean, Professor AAU

Publications - SCOPUS

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Mødeforum og dato:	Akademisk råd TECH 6. december 2017

AALBORG UNIVERSITET

Fakultetskontoret for ENGINEERING, SUND og TECH

Dokument dato: 28-11-17

Dokumentansvarlig: MFG

Sagsnr.:

Sagsfremstilling til møder

Overskrift og varighed:	Godkendelse af mødekalender for akademisk råd 2018
Sagsbehandler:	Mark Gammeljord
Sagsfremstilling:	Akademisk råd bedes godkende mødekalenderen for 2018. af bilag 1 og bilag 2 fremgår mødekalenderen for akademisk råd 2018 samt procesplan for skriftlige hørringer 2018.
Indstilling:	Det indstilles, at akademisk råd godkender mødekalenderen for 2018 samt procesplanen for skriftlige hørringer 2018
Bilag:	Bilag 1: mødekalender akademisk råd 2018 Bilag 2: procesplan for skriftlige hørringer 2018
Beslutning:	

Akademisk Råd TECH møder 2018

Februar	Marts	April	Maj	Juni	Juli
To 1	To 1	Sø 1 Påskedag	Ti 1	Fr 1	Sø 1
Fr 2	Fr 2 ○	Ma 2 2. påskedag 14	On 2 Dagsorden udsendes	Lø 2	Ma 2 Høring udsendes
Lø 3	Lø 3	Ti 3	To 3	Sø 3	Ti 3
Sø 4	Sø 4	On 4	Fr 4	Ma 4 23	On 4 Høringsfrist
Ma 5 Høring udsendes	Ma 5 10	To 5	Lø 5	Ti 5	To 5
Ti 6	Ti 6	Fr 6	Sø 6	On 6 ◑	Fr 6 ◑
On 7 ◑ Høringsfrist	On 7	Lø 7	Ma 7 19	To 7	Lø 7
To 8	To 8	Sø 8	Ti 8 ◑	Fr 8	Sø 8
Fr 9	Fr 9 ◑	Ma 9 Høring udsendes	On 9 AR møde TECH	Lø 9	Ma 9 28
Lø 10	Lø 10	Ti 10	To 10 Kr. himmelfartsdag	Sø 10	Ti 10
Sø 11	Sø 11	On 11 Høringsfrist	Fr 11	Ma 11 24	On 11
Ma 12 7	Ma 12 Dagsorden udsendes 11	To 12	Lø 12	Ti 12	To 12
Ti 13	Ti 13	Fr 13	Sø 13	On 13 Dagsorden udsendes	Fr 13 ●
On 14	On 14	Lø 14	Ma 14 20	To 14	Lø 14
To 15 ●	To 15	Sø 15	Ti 15 ●	Fr 15	Sø 15
Fr 16	Fr 16	Ma 16 ● 16	On 16	Lø 16	Ma 16 29
Lø 17	Lø 17 ●	Ti 17	To 17	Sø 17	Ti 17
Sø 18	Sø 18	On 18	Fr 18	Ma 18 25	On 18
Ma 19 8	Ma 19 AR med rektor 12	To 19	Lø 19	Ti 19	To 19 ◐
Ti 20	Ti 20	Fr 20	Sø 20 Pinsedag	On 20 ◐ AR møde TECH	Fr 20
On 21	On 21	Lø 21	Ma 21 2. pinsedag 21	To 21	Lø 21
To 22	To 22	Sø 22	Ti 22 ◐	Fr 22	Sø 22
Fr 23 ◐	Fr 23	Ma 23 17	On 23	Lø 23	Ma 23 30
Lø 24	Lø 24 ◐	Ti 24	To 24	Sø 24	Ti 24
Sø 25	Sø 25 Palmesøndag	On 25	Fr 25	Ma 25 26	On 25
Ma 26 9	Ma 26 13	To 26	Lø 26	Ti 26	To 26
Ti 27	Ti 27	Fr 27 Bededag	Sø 27	On 27	Fr 27 ○
On 28	On 28	Lø 28	Ma 28 Høring udsendes 22	To 28 ○	Lø 28
	To 29 Skærtorsdag	Sø 29	Ti 29 ○	Fr 29	Sø 29
	Fr 30 Langfredag	Ma 30 ◇ 18	On 30 Høringsfrist	Lø 30	Ma 30 31
	Lø 31 ○		To 31		Ti 31
20 arbejdsdage ekskl. 4 lørdage	20 arbejdsdage ekskl. 5 lørdage	19 arbejdsdage ekskl. 4 lørdage	21 arbejdsdage ekskl. 4 lørdage	21 arbejdsdage ekskl. 5 lørdage	22 arbejdsdage ekskl. 4 lørdage

Akademisk Råd TECH møder

18/19

August		September		Oktober		November		December		Januar	
On 1		Lø 1		Ma 1	40	To 1		Lø 1		Ti 1	Nytårsdag
To 2		Sø 2		Ti 2 ◑		Fr 2		Sø 2		On 2	Dagsorden udsendes
Fr 3		Ma 3 ◑	36	On 3	Dagsorden udsendes	Lø 3		Ma 3	49	To 3	
Lø 4 ◑		Ti 4		To 4		Sø 4		Ti 4		Fr 4	
Sø 5		On 5	AR møde TECH	Fr 5		Ma 5	Høring udsendes	On 5		Lø 5	
Ma 6	32	To 6		Lø 6		Ti 6		To 6	Dagsorden udsendes	Sø 6	
Ti 7		Fr 7		Sø 7		On 7 ●	Høringsfrist	Fr 7 ●		Ma 7	2
On 8	Høring udsendes	Lø 8		Ma 8	41	To 8		Lø 8		Ti 8	
To 9		Sø 9		Ti 9 ●		Fr 9		Sø 9		On 9	AR møde TECH
Fr 10		Ma 10	37	On 10	AR møde TECH	Lø 10		Ma 10	50	To 10	
Lø 11 ●		Ti 11		To 11		Sø 11		Ti 11		Fr 11	
Sø 12		On 12		Fr 12		Ma 12	46	On 12		Lø 12	
Ma 13	33	To 13		Lø 13		Ti 13		To 13	AR X-møde TECH	Sø 13	
Ti 14		Fr 14		Sø 14		On 14		Fr 14		Ma 14 ◐	3
On 15	Høringsfrist	Lø 15		Ma 15	42	To 15 ◐		Lø 15 ◐		Ti 15	
To 16		Sø 16		Ti 16 ◐		Fr 16		Sø 16		On 16	
Fr 17		Ma 17 ◐	38	On 17		Lø 17		Ma 17	51	To 17	
Lø 18 ◐		Ti 18		To 18		Sø 18		Ti 18		Fr 18	
Sø 19		On 19		Fr 19		Ma 19	47	On 19		Lø 19	
Ma 20	34	To 20		Lø 20		Ti 20		To 20		Sø 20	
Ti 21		Fr 21		Sø 21		On 21	Dagsorden udsendes	Fr 21		Ma 21 ○	4
On 22		Lø 22		Ma 22	43	To 22		Lø 22 ○		Ti 22	
To 23		Sø 23		Ti 23		Fr 23 ○		Sø 23		On 23	
Fr 24		Ma 24	Høring udsendes	On 24 ◌		Lø 24		Ma 24	52	To 24	
Lø 25		Ti 25 ○		To 25		Sø 25		Ti 25	Juledag	Fr 25	
Sø 26		On 26	Høringsfrist	Fr 26		Ma 26	48	On 26	2. juledag	Lø 26	
Ma 27	35	To 27		Lø 27		Ti 27		To 27		Sø 27	
Ti 28		Fr 28		Sø 28		On 28	AR møde TECH	Fr 28		Ma 28	5
On 29	Dagsorden udsendes	Lø 29		Ma 29	44	To 29		Lø 29 ◑		Ti 29	
To 30		Sø 30		Ti 30		Fr 30 ◑		Sø 30		On 30	
Fr 31				On 31 ◑				Ma 31	1	To 31	
23 arbejdsdage ekskl. 4 lørdage		20 arbejdsdage ekskl. 5 lørdage		23 arbejdsdage ekskl. 4 lørdage		22 arbejdsdage ekskl. 4 lørdage		19 arbejdsdage ekskl. 5 lørdage		22 arbejdsdage ekskl. 4 lørdage	

AALBORG UNIVERSITET

Det Tekniske Fakultet for IT og Design
Niels Jernes Vej 10
9220 Aalborg

Dato: 13-12-2017

Procesplan for skriftlig høring i Akademisk Råd, TECH

Nedsættelse af bedømmelsesudvalg ved skriftlig høring sker med jævne mellemrum mellem de ordinære møder i Akademisk Råd. Den anden onsdag i august måned er der sommerprocedure, hvor der også medtages godkendelse af Ph.d. grader.

Plan for skriftlig høring ved Akademisk Råd TECH 2018

Punkter sendes i høring	**Frist for tilbagemelding fra AR**
Mandag 5. februar	Onsdag 7. februar
Mandag 9. april	Onsdag 11. april
Mandag 28. maj	Onsdag 30. maj
Mandag 2. juli	Onsdag 4. juli
Sommerprocedure Onsdag 8. august	Onsdag 15. august
Mandag 24. september	Onsdag 26. september
Mandag 5. november	Onsdag 7. november

Skriftlige høringer vedr. indstillinger om sammensætning af bedømmelsesudvalg til videnskabelige stillinger vil blive udsendt via Akademisk Råd Intranet med en svarfrist på 3 dage. Ved sommerproceduren i august er der en svarfrist på 7 dage. Der gøres opmærksom på udsendelsen via en mail til Akademisk Råds medlemmer. Såfremt medlemmerne godkender udvalgene bedes dette sendes eksplicit retur i mail til sekretæren. Såfremt et medlem ikke kan godkende bedømmelsesudvalget svares alle rådets medlemmer pr mail.
Dokumentationen som ligger til grund for nedsættelse af bedømmelsesudvalg vil være en oversigt over bedømmelsesudvalgets medlemmer med angivelse af, hvem der er formand samt CV'er for de eksterne bedømmere og stillingsopslaget.

Tilbagemelding fra akademisk råds medlemmer
Der skal aktivt meldes tilbage fra akademisk råds medlemmer pr. mail.

Ingen indsigelser
Såfremt der ikke er indsigelser sendes der udelukkende svar/tilkendegivelse til sekretæren for Akademisk Råd.

Indsigelser
Såfremt der er bemærkninger og/eller indsigelser sendes der svar/tilkendegivelse til alle på akademisk råds mailliste.

Alle bemærkninger/kommentarer der måtte indkomme under en skriftlig høring, vil blive forelagt og drøftet med dekanen/formanden. Hvorefter dekanen/formanden afgør om sammensætningen af bedømmelsesudvalg og/eller tildeling af ph.d.-graden skal drøftes på næstekommende Akademisk Råds møde.
Et medlem kan ligeledes begære en sag behandlet på det førstkommende møde i Akademisk Råd. Ved tvivlsspørgsmål vil sagen altid blive behandlet på det førstkommende møde.

Inhabilitet
Såfremt et medlem erklærer sig inhabil i relation til behandling af en konkret sag informeres sekretæren herom. Sekretæren informerer de øvrige af rådets medlemmer med information om, at den efterfølgende korrespondance ikke sendes til pågældende medlem.

Vedkommende er ikke stemmeberettiget i den aktuelle sag. Medlemmet skal selv oplyse ved tilbagemeldingen, at sag nr. XXX ikke er behandlet grundet inhabilitet.

Evaluering
Proces for skriftlig høring evalueres løbende på Akademisk Råd møderne, så medlemmerne er i dialog om processen for nedsættelse af bedømmelsesudvalg.

Drøftelsen skal tages op ved marts møderne, så nye medlemmer, der indtræder i Akademisk Råd den 1. februar introduceres til procesplanen.