Claus Thrane

Résumé

Contact Information

Distributed and Embedded Systems unit.
Department of Computer Science.
Aalborg University, Selma Lagerlöfs Vej 300
9220, Aalborg Ø. Denmark.

Full name: Mr. Claus Rørbæk Thrane
Place of birth: Esbjerg, Denmark
Date of birth: January 17^{th} 1981
Children: None
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Profile

I am an Assistant Professor, with the Distributed and Embedded Systems (DES) unit in the department of Computer Science at Aalborg University. Moreover, I am a (junior) member of the Center for Embedded Software Systems (CISS), and the Danish VKR Center of Excellence MT-LAB.

Research Interests: Formal methods in software verification, more precisely; Semantics and theory of non-determinism and concurrency, for timing and resource constrained systems, with focus on verification of quantitative properties and robustness. My interests also extend to: Automata Theory, Static analysis, Complexity Theory and Game Theory.

Academic Qualifications

Aalborg University, Denmark

Ph.D. Computer Science. Nov. 2011.

M.Sc. Computer Science (Cum Laude). June 2008.

B.Sc. Computer Science. June 2006.

Esbjerg Handelsskole, Denmark

Higher Commercial Examination (hhx). June 2001.

Positions

2011 – current: Assistant Professor (Adjunkt) Dept. of Computer Science, Aalborg University.

2008 – 2011: Ph.D. Fellow, Dept. of Computer Science, Aalborg University.

2007 – 2008: Teaching Assistant, Dept. Computer Science Aalborg University.

2005 – 2007: Developer, Portal Gruppen Aalborg University.

2002 – 2011: Systems Administrator, Kon-Tec.

Visiting Positions

2012, Visiting Professor IRISA/Rennes, France. (funded/planned)

2010, Research visit LSV at ENS Cachan, France. (Feb – Aug.)

Honours and Awards

Best Paper Award, MEMICS 2009, Znojmo.

Best (CS) Paper Award, Annual IEEE Student Paper Conf., Aalborg 2008, (given by Google Aarhus).

MSc graduation with *Cum Laude* honors, currently the highest obtainable honor, at Danish universities. Translation: *Elitekandidat*.

PUBLICATIONS

Book Chapters

Marktoberdorf 2009 lecture notes, was published as book chapters, by IOS Press. In 2011, an updated version is to appear in the same series.

- U. Fahrenberg, K. G. Larsen, C. Thrane, "Verification, Performance Analysis and Controller Synthesis for Real-Time Systems", In *NATO Science for Peace and Security Series - D: Information and Communication Security*, Vol. 22, 2009 *Engineering Methods and Tools for Software Safety and Security*, Editor: Manfred Broy, Wassiou Sitou, Tony Hoare. IOS Press, ISBN: 978-1-58603-976-9.

- U. Fahrenberg, K. G. Larsen, C. Thrane, "Model-based Verification and Analysis for Real-Time Systems", In *NATO Science for Peace and Security Series - D: Information and Communication Security Engineering Methods and Tools for Software Safety and Security*, Vol. 30, 2011, Editor: Manfred Broy, Christian Leuxner, Tony Hoare. DOI:10.3233/978-1-60750-711-6-231

Refereed international journals

- C. Thrane, U. Fahrenberg and K. G. Larsen, "Quantitative Simulations of Weighted Transition Systems", *Journal of Logic and Algebraic Programming*, vol. 79(7), pp. 689–703, 2010.

- U. Fahrenberg, K. G. Larsen and C. Thrane "A Quantitative Characterization of Weighted Kripke Structures in Temporal Logic", *Computing and Informatics*, vol. 29, no. 6+ pp. 1311–1324, 2010.

- K. G. Larsen, U. Fahrenberg, C. Thrane, "Metrics for weighted transition systems: Axiomatization and complexity", Theoretical Computer Science, vol. 412, Issue 28, Festschrift in Honour of Jan Bergstra, pp 3358–3369, 20 June 2011.

Peer reviewed papers, in proceedings

- C. Thrane and U. Sørensen, "Slicing for Uppaal", *In Proc. of the Annual IEEE Student Paper Conference (AISPC'08)*, pp. 1-5, Aalborg, Feb. 2008.

- U. Fahrenberg, K. G. Larsen and C. Thrane. "Verification, Performance Analysis and Controller Synthesis for Real-Time Systems". In Proc. of *3rd International Conference on Fundamentals of Software Engineering, (FSEN'09).*, pp. 34–61, 2009.

- U. Fahrenberg, K. G. Larsen and C. Thrane "A Quantitative Characterization of Weighted Kripke Structures in Temporal Logic". In Proc. of *Annual Doctoral Workshop on Mathematical and Engineering Methods in Computer Science (MEMICS'09)*, Schloss Dagstuhl–Leibniz-Zentrum fuer Informatik, OpenAccess Series in Informatics, vol. 13, 2009.

- U. Fahrenberg, C. Thrane and K. G. Larsen "Distances for Weighted Transition Systems: Games and Properties", In Proc. of Proceedings Ninth Workshop on Quantitative Aspects of Programming Languages (QAPL'11), Electronic Notes in Theoretical Computer Science, vol 57. 134-147. 2011.

- P. Bouyer-Decitre, K. G. Larsen, N. Markey, O. Sankur, C. Thrane "Timed Automata Can Always Be Made Implementable". In Proc. of 22nd International Conference on Concurrency Theory (CONCUR'11) Aachen, Germany, September 6-9, 2011. LNCS vol. 6901 pp 76–91.

- S. S. Bauer, U. Fahrenberg, L. Juhl, K. G. Larsen, A. Legay, and C. Thrane "Quantitative Refinement Relations for Weighted Modal Transition Systems". in Proc. of the 36th International Symposium on Mathematical Foundations of Computer Science (MFCS'11) 2011. LNCS vol. 6907.

- U. Fahrenberg, A. Legay, and C. Thrane "The Quantitative Linear-Time-Branching-Time Spectrum". Accepted at IARCS Annual Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS) December 12 to 14, 2011 IIT Bombay, Mumbai, India.

Workshops

- P. Bouyer-Decitre, N. Markey, O. Sankur, C. Thrane "Making Timed Automata Robust", Abstract in Proc. DOTS 2010.
- U. Fahrenberg, C. Thrane and K. G. Larsen "Linear and branching distances for Weighted Automata, and a corresponding Logic", Abstract in Proc. WATA 2010.
- U. Fahrenberg, K. G. Larsen and C. Thrane "A Quantitative Characterization of Weighted Kripke Structures in Temporal Logic". Extended Abstract at QUANTLOG, Rhodes, Juli 2009.
- C. Thrane, U. Fahrenberg and K. G. Larsen "Quantitative Simulations of Weighted Transition Systems" Extended Abstract in proc. of the Nordic Workshop on Programming Theory (NWPT'08), Tallinn, Estonia, 19-21 November 2008.
- C. Thrane, U. Sørensen and K. G. Larsen "Slicing for Uppaal" Extended Abstract in proc. of the Nordic Workshop on Programming Theory (NWPT'08), Tallinn, Estonia, 19-21 November 2008.

Others

- S. S. Bauer, U. Fahrenberg, A. Legay, and C. Thrane "General Quantitative Specification Theories, with an Application to Robustness of Timed Systems" submitted.
- Kim G. Larsen, Radu Mardare, Claus Thrane "Approximated Metatheory for Markovian Logic", submitted.
- S. S. Bauer, K. G. Larsen, R. Mardare and C. Thrane "Modular Metrics for Markovian Systems". Draft

PhD Thesis

- Quantitative Models and Analysis for Reactive Systems, by Claus Thrane, 170 pages
  Department of Computer Science, Aalborg University 2011
  Supervisors: Kim G. Larsen & Uli Fahrenberg
  Committee: Hans Hüttel (AAU), Brian Nielsen (AAU), Manfred Droste (Leipzig University), and Mariëlle Stoelinga (University of Twente).

Master Thesis

- Slicing for Uppaal, by Claus Thrane and Uffe Sørensen, 98 pages
  Department of Computer Science, Aalborg University 2007
  Examiners: Kim G. Larsen (supervisor) and Jens Christian Godskesen. (Grade 13).

Technical Reports (Student work)

- On Weighted Labelled Transition Systems, Quantitative Relations and Logic.
  By C. Thrane
  Technical report 1213005970, Dept. Computer Science AAU, Pages 33, June 2008
- Syntactic, CTL preserving, reduction of Uppaal models - using slicing techniques.
  By C. Thrane and U. Sørensen
  Technical report, Dept. Computer Science AAU, Pages 73, December 2006
- A Logic for the MR Calculus,
  By M. Dahl, C. Thrane, U. Sørensen and M. Clemmensen
  Technical report, Dept. Computer Science AAU, Pages 22, June 2006
- Nomad - A Language/Compiler for distributed systems.
  By M. Dahl, C.Thrane, U. Sørensen, M. Clemmensen, A. Buch and T. L. Kjeldsen
  Technical report 1117451012, Dept. Computer Science AAU, Pages 108, May 2005

Invited talks

A Quantitative Characterization of Weighted Kripke Structures in Temporal Logic.
Workshop on Quantitative Logics (QUANTLOG) – July 11 2009, Rhodes, Greece.

Talks

Quantitative Models and Analysis for Reactive Systems, *PhD Defence* AAU, Aalborg	Nov. 18. 2011
Robustness of Timed Automata DTU, Copenhagen	Oct. 24. 2011
Timed Automata Can Always Be Made Implementable AAU, Aalborg	Aug. 22. 2011
Making Timed Automata Robust University Paris Diderot.	Sep. 3 2010
Weighted Bisimulation Games AAU, Aalborg.	May 12 2010
Quantitative Characterization of WKS in Logic + Thoughts on generalization. Dagstuhl.	Jan. 18 2010
Quantitative Characterization of WKS in Temporal Logic. MEMICS, Znojmo.	Nov. 13 2009
Metrics for Weighted Kripke Structures DTU, Copenhagen.	Sep. 14 2009
Metrics for Weighted Kripke Structures DTU, Copenhagen.	Aug. 17 2009
Metrics for Weighted Transition Systems Nijmegen, The Netherlands.	June 12 2009
Slicing for Uppaal IT University, Copenhagen, Denmark.	Mar. 12 2009
Quantitative Simulations of Weighted Transition Systems Tallinn, Estonia	Nov. 21 2008
Slicing for Uppaal Tallinn, Estonia	Nov. 21 2008

Scientific Services

Organization committee member, FORMATS 2011.

Sporadic reviewer for

- Nordic Journal of Computing.
- Semantics and Algebraic Specification (Peter D. Mosses festscrift).
- Conference proc. by year: ICALP(09), HSCC(10,11), ICTAC(09), PDM(09), SOFSEM(09,11), TACAS(09,11), LICS(10), CONCUR(10), ICFEM(10), FOCCACS(11), CAV(11), FSTTCS(11), FORMATS(11), DATE(12), LPAR(12).

External Collaboration

ENS Cachan, Laboratoire Spécification et Vérification
Feb – Aug, 2010: Visiting Researcher (Ph.D Stud.). Working with Patricia Bouyer-Decitre and Nicolas Markey.

Dept. of Control Engineering (AAU)
Since 2009: Collaboration with Rafael Wisniewski and Christoffer Slot on hybrid systems in context of the MT-Lab Center.

IRIA/INRIA Rennes
April 2011: Continuing ongoing collaboration with Axel Legay and Uli Fahrenberg.

Participation in Projects

Member of the Center for Embedded Software Systems – CISS	From 2008.
Member of VILLUM KANN RASMUSSEN Research Centre of Excellence – MT-LAB	From 2008.
Member of the European project FP7-ICT-STREP-214755 QUASIMODO	2008–2010.

Teaching

Aalborg University, Dept. of Computer Science

Supervision: (of 3 months projects)

2011, Aut.	Mikkel Madsen & Heidi Munksgaard (7th. semester computer science, AAUE).
2011, Aut.	2 groups of 4 students (5. semester computer science).
2009, Aut.	1 group of 7 students (1. semester computer science).
2009, Spr.	BSc. thesis project for 4 students (software engineering).

Lecturing:

2011, Aut.	Distributed Systems (5. semester)
2011, Aut.	Advanced Distributed Systems (7. semester)
2008, Aut.	Introduction to programming in Java (1. semester)

Teaching Assistant:

2010, Aut.	Computability and Complexity
2009, Aut.	Computability and Complexity
2009, Spr.	Principles of Concurrency and Operating Systems
2009, Spr.	Models and Tools for Parallelism
2008, Aut.	Distributed Systems
2008, Spr.	Models and Tools for Parallelism
2007, Spr.	Semantics and Verification

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Personal profile

I consider myself very passionate about my work as well as my personal interests, which often melt together thus taking up a lot of my time. Being a PhD student, time does not always permit for me to indulge in my private interests, which includes photography, scuba diving, sailing and all things nature. But I do try to take the time on occasion. University life, does however allow me to travel which I enjoy tremendously.

Life Projects

S/Y Dream **2001**

In 2001 I joined, the crew aboard the sailing yacht Dream, on a project to circumnavigate the globe. The project was 3 years total, and my time aboard was nearly 1 year, covering 181 degrees of the planet (Australia to the Caribbean via South Africa), and included almost 100 dives. It was wonderful experience, one which I hope to repeat later in life.

Volunteering

CompuClub, Esbjerg **1999 – 2006**

Organization staff and Board member of a regional computer interest group arranging 5 day – bi-annual meeting with an avg. of 300 participants (max 500–600 as I recall).

HJ-NET, Hjerting **1998 – 2001**

Organization staff and Chairman of local computer interest group with frequent meetings including 20–100 participants.

Assenbæk Mølle Spejdercenter **1998 – 2001**

Instructor / crew (Drejer) at the international scout (activity) center Assenbæk Mølle, having year round activities for scouts.

Hjerting Drenge, scout group **1987 – 2000**

Scout group with focus on sailing. In the years 1997-2000 I was an assistant instructor / co-instructor.