

Curriculum Vitae for Noah Torp-Smith

July, 2005

Personal Data / Contact Info

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Education

Current

Working on Ph. D. project at the IT University of Copenhagen. Details:

Project Title: Reasoning about Resources
Supervisor: Lars Birkedal, IT University of Copenhagen
Enrollment: Aug. 1st, 2001
Submission of Thesis: July 31st, 2005

During my Ph. D., I have taken courses at graduate level in the following areas:

Reasoning about Low-level Programs;
Formal Semantics of Programming Languages;
Calculi, Logics, and Semantics for Mobile and Distributed Systems;
Domain Theory and Higher-order λ -calculi;
Topos Theory.

Degrees Completed

- Summer 2003 Master of IT from IT University of Copenhagen. Thesis title: “Proving Correctness of a Garbage Collector via Local Reasoning”. Advisor: Associate Professor Lars Birkedal.
- Summer 2000 Bachelor of Science in Computer Science and Mathematics from University of Copenhagen. Bachelor’s project on Gödel’s Incompleteness Theorem.
- Summer 1996 “Studentereksamen” High School at Vordingborg Gymnasium. (Mathematical exam).

Main Research Interests

My research is primarily focussed on *separation logic*, which is a logic that was discovered independently by Peter O’Hearn and John Reynolds. It is well suited to reason about programs that manipulate shared mutable data structures. In my master’s thesis, I used separation logic to formally specify and prove correct a copying garbage collector. I have also worked on combining separation logic and refinement, and on applying separation logic to higher order programming languages. Currently, I am working on using a higher order version of the logic of Bunched Implications in separation logic to give reasoning principles for abstract data types involving complex pointer manipulations. All of this work will be available in my dissertation.

Employment Record

- Fall 2005 Internship at Microsoft Research, Cambridge. I’ll work with Nick Benton in the “Programming Principles and Tools” group.
- 2001 - 2005 Ph. D. Scholarship at the IT University of Copenhagen.
- 2000 - 2001 Teaching Assistant on the first-year course “Mathematics and Computations” at DIKU.
- 1999 - 2001 Programming job at SUPER VISION Strategi og Data. Most of the work performed at KgF (Kommunernes gensidige Forsikringselskab). Developing and supporting the AMARANT financial accounting system.
- 1997 - 1999 Working as a consultant at FOA (Forbundet af Offentligt Ansatte), supporting their “Remote Teaching” project.
- 1992 - 1997 Employed at Q8 Service gas stations.

Publications

Publications under different categories are listed in reverse chronological order. All papers are available from my web page:

<http://www.itu.dk/people/noah/>

Refereed Journal Papers

- L. Birkedal, N. Torp-Smith, and J. C. Reynolds Local Reasoning about a Copying Garbage Collector ACM TOPLAS, June 2005. Accepted modulo revisions.

Refereed Conference Papers

- L. Birkedal, N. Torp-Smith, and H. Yang. Semantics of separation-logic typing and higher-order frame rules. In *Proc. of the 20th IEEE Symposium on Logic in Computer Science (LICS'05)*, pages 260 - 269, Chicago, IL, USA, June 2005.
- B. Biering, L. Birkedal, and N. Torp-Smith. BI hyperdoctrines and higher-order separation logic. In *Proceedings of the European Symposium on Programming (ESOP'05)*, Edinburgh, Scotland, April 2005. Springer.
- I. Mijajlovic, N. Torp-Smith, and P. W. O'Hearn. Refinement and separation contexts. In K. Lodoya and M. Mahajan, editors, *FSTTCS 2004: Foundations of Software Technology and Theoretical Computer Science*, volume 3328 of *LNCS*, pages 421 – 433, Chennai, India, December 2004. Springer Verlag, Berlin.
- L. Birkedal, N. Torp-Smith, and J. Reynolds. Local reasoning about a copying garbage collector. In *Proc. of the 31st ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL'04)*, pages 220 – 231, Venice, Italy, January 2004.

Technical Reports, etc.

- L. Birkedal, N. Torp-Smith, and J. C. Reynolds Correctness of a Garbage Collector via Local Reasoning. Technical report TR-2003-30, IT University of Copenhagen. July 2003. (revised version of Master's thesis)
- B. Biering, L. Birkedal, and N. Torp-Smith. BI hyperdoctrines, Higher-order Separation Logic and Abstraction. Technical Report ITU-TR-2005-69, IT University of Copenhagen. Copenhagen, Denmark, July, 2005.
- B. Biering, L. Birkedal, and N. Torp-Smith. An Introduction to Higher-order Separation Logic. Short paper presented at the Twentieth Annual IEEE Symposium on Logic in Computer Science. Chicago, IL, USA. June, 2005.
- N. Torp-Smith Towards the Theory of Equilogical Spaces. Graduate Project, DIKU, University of Copenhagen. July 2001.

Research Talks

I have presented my work at the following fora:

- Spatial Logics Workshop, Nottingham, 25th March 2003. In connection with the First APPSEM II workshop in Nottingham, 26th to 28th March 2003.

- 1st MM-NET Workshop on Analytical Techniques for Memory Management. University of Kent at Canterbury, 15th May 2003.
- The 31st ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages. January 14-16, 2004.
- Guest lecture on a minicourse by John Reynolds on Separation Logic at BRICS, Aarhus. December 2003.
- Workshop for Logics for Dynamic Data. Chennai, India. December 2004.
- The 20th Annual IEEE Symposium on Logic in Computer Science. June 25-29, 2005. Both a conference talk, and a presentation at the short presentation session.

Refereeing

I have contributed to academia by refereeing for the following fora.

- The ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages, 2004.
- Theoretical Computer Science, 2004.

Teaching Experience

In connection with the Danish Ph. D. program, one has to deliver a certain amount of teaching. Thus, I have taught courses and supervised student's projects at the IT University of Copenhagen, as specified in this list:

Web Programming, Spring 2002 — I have prepared and given two lectures in the spring semester of 2002.

Student's Projects, Spring 2002 — I supervised 17 student's projects jointly with Thomas Hildebradt in the spring semester of 2002.

Student's Projects, Fall 2002 — I supervised 12 student's projects jointly with Rasmus Mgelberg in the fall semester of 2002.

Student's Projects, Fall 2003 — I supervised 10 student's projects jointly with Rasmus Mgelberg in the fall semester of 2003.

IPBR, 2004 I lectured in the course "Introduktion til Programmering – Begreber og Redskaber" jointly with Jens Chr. Godskesen and Nina Bohr. I gave 7 out of 12 lectures in this course.

Students' Projects, Spring 2004 I taught 19 students' projects in the four week projects period after the Spring semester in 2004, in collaboration with Jens Chr. Godskesen.

Stay at Foreign University

I spent five months (February - June) in 2003 at Queen Mary University of London, working with Professor Peter W. O'Hearn and his research group on issues related to separation logic. This later resulted in a conference paper with O'Hearn and Mijajlovic.

Other Merits

- Member of the Ph. D. study board at IT University of Copenhagen in the period 2002 - 2005. Vice president medio 2004 - June 2005. Elected position.
- Board member of "Ejerforeningen Marstalsgade 16 - 18", the "apartment owner's association" in the building where I live. Chairman of the Board from March 2000 to April 2005. Elected position.
- Board member of *Kantineforeningen*, the student-driven cafeteria at DIKU.
- Arranging *Rustur*, the freshman enrollment course, at DIKU. Co-edited the handbook for the new students in 2000.