Kristina Lundqvist

Massachusetts Institute of Technology
Department of Aeronautics and Astronautics
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EDUCATION

Ph.D.   Computer Systems, Uppsala University, Sweden, 2000
        Dissertation: "Distributed Computing and Safety Critical Systems in Ada"
        Dissertation Advisor: Lars Asplund

Lic.   Computer Systems, Uppsala University, Sweden, 1997
        Thesis: "Distribution of Ada by Means of Software and Hardware"

M.Sc.   Computer Science, Uppsala University, Sweden, 1991
        Thesis: "CAD-mognad i Sverige, bland byggprojektörer och fastighetsförvaltare"

FIELDS OF SPECIALIZATION

Primary: Design and Verification of Distributed Real-Time Embedded Systems
Secondary: HW/SW Co-design, Software Processes, CS/SWE Education for non-CS
             Engineering Majors

ACADEMIC EMPLOYMENT

Assistant Professor	2004	-
Charles Stark Draper Assistant Professor, Dept. of Aero/Astro, MIT	2002	2004
Lecturer, Dept. of Aero/Astro, MIT	2001	2002
Post doctoral research fellow, Dept. of Aero/Astro, MIT	2000	2001

PROFESSIONAL ACTIVITIES

Director: Embedded Systems Laboratory, MIT

Panels: Invited by Swedish National Agency for Higher Education (Högskoleverket) to participate in the *National Evaluation of Graduate Engineering Education (Utvärdering av utbildningar till civilingenjör vid svenska universitet och högskolor)*

Reviewer: Digital Avionics Systems Conference
            Euromicro Conference on Real-Time Systems
            Euromicro Journal of Systems Architecture
            International Conference on Reliable Software Technologies
            Journal of Aerospace Computing, Information, and Communication

Track chair: Digital Avionics Systems Conference – Software Engineering

Session chair: Digital Avionics Systems Conference
               International Conference on Reliable Software Technologies

Member: ACM, AIAA, IEEE

PUBLICATIONS

Papers in Refereed Journals
1. K. Lundqvist and G. Wall, "A Rendezvous with Linda", ACM SIGAda Letters, Volume XVII Issue 3, May 1997

2. L. Asplund, K. Lundqvist, "Safety Critical Systems Based on Formal Models", ACM SIGAda Letters, Volume XX Issue 4, Dec 2000

3. K. Lundqvist and L. Asplund, "A Ravenscar-Compliant Run-Time Kernel for Safety-Critical Systems", Real-Time Systems – The International Journal of Time-Critical Computing Systems, 24, pp. 29-54, Kluwer Academic Publishers, Feb 2003

4. G. Naeser, K. Lundqvist, L. Asplund, "Temporal Skeletons for Verifying Time", ACM SIGAda Letters, Volume XXV Issue 4, Nov 2005

Proceedings of Refereed Conferences
1. G. Wall, L. Asplund, L. Björnfot, and K. Lundqvist, "Performance Expectations on Ada Programs", In Proc. Ada-Europe'93, LNCS 688, pp. 249-263, Springer-Verlag, 1993

2. L. Björnfot, L. Asplund, K. Lundqvist, and G. Wall, "Distributed Run-Time System, a Protocol for Ada", In Proc. Ada-Europe'93, LNCS 688, pp. 227-239, Springer-Verlag, 1993

3. L. Björnfot, K. Lundqvist, G. Wall, and L. Asplund, "Distribution of Tasks Within a Centrally Scheduled Local Area Network", In Proc. Ada-Europe'94, LNCS 887, pp. 421-432, Springer-Verlag, 1994

4. L. Björnfot, K. Lundqvist, G. Wall, and L. Asplund, "Termination of Ada Tasks in Hardware", In Proc. TRI-Ada'95, pp. 474-486, ISBN 0-89791-705-7, Nov 1995

5. A. Berglund, M. Daniels, K. Lundqvist, and E. Westlund, "Encouraging Active Participation in Programming Classes", In selected papers from the 7th national conference on college teaching and learning, pp. 25-39, Florida Community College at Jacksonville, 1996

6. K. Lundqvist and G. Wall, "Using Object Oriented Methods in Ada 95 to Implement Linda", In Proc. Ada-Europe'96, LNCS 1088, pp. 211-222, Springer-Verlag, 1996

7. G. Wall and K. Lundqvist, "Shared Packages Through Linda", In Proc. Ada-Europe'96, LNCS 1088, pp. 223-234, Springer-Verlag, 1996

8. K. Lundqvist and G. Wall, "A Rendezvous with Linda", In Proc. Washington Ada Symposium 96, pp. 85-94, ACM SIGAda, 1996

9. K. Lundqvist, L. Asplund, and S. Michell, "A Formal Model of the Ada Ravenscar Tasking Profile; Protected Objects", In Proc. Reliable Software Technologies, Ada-Europe'99, Springer-Verlag, LNCS 1622, Santander, Spain, June 1999

10. K. Lundqvist and L. Asplund, "A Formal Model of the Ada Ravenscar Tasking Profile; Delay Until", In Proc. ACM SIGAda Annual International Conference'99, pp. 15-21, Redondo Beach, USA, October 1999

11. K. Lundqvist and L. Asplund, "A Formal Model of a Run-Time Kernel for Ravenscar", In Proc. The 6th International Conference on Real-Time Computing Systems and Applications – RTCSA'99, IEEE, Hong-Kong, December 1999

12. L. Asplund and K. Lundqvist, "Safety Critical Systems Based on Formal Models", In Proc. SIGAda'2000, Laurel, MD, USA, November 2000

13. K. Weiss, N. Leveson, K. Lundqvist, N. Farid, and M. Stringfellow, "An Analysis of Causation in Aerospace Accidents", Space 2001, Albuquerque, New Mexico, August 2001

14. I. Navarro, K. Lundqvist, and N. Leveson, "An Intent Specification Model for a Robotic Software Control System", In Proc. 20th DASC, IEEE, Daytona Beach, FL, October 2001

15. M. K. Zimmerman, K. Lundqvist, N. Leveson, "Investigating the Readability of Formal Requirements Specification Languages", In Proc. 24th International Conference on Software Engineering (ICSE02), ACM Press, pp. 33-43, Orlando, FL, May 2002

16. J. Srinivasan, K. Lundqvist, "Real-Time Architecture Analysis: A COTS Perspective", In Proc. 21st DASC, IEEE, Irvine, CA, October 2002

17. J. Srinivasan, K. Lundqvist, "Identifying Rate Mismatch through Architecture Transformation", In Proc. 22nd DASC, IEEE, Indianapolis, IL, October 2003

18. C. Nehme, K. Lundqvist, "A Tool for Translating VHDL to Finite State Machines", In Proc. 22nd DASC, IEEE, Indianapolis, IL, October 2003

19. A. Silbovitz, K. Lundqvist, "A Hardware Implementation of a Ravenscar-Compliant Run-Time Kernel", In Proc. 22nd DASC, IEEE, Indianapolis, IL, October 2003

20. L. Asplund, K. Lundqvist, "The Gurkh Project: A Framework for Verification and Execution of Mission Critical Applications", In Proc. 22nd DASC, Indianapolis, IL, IEEE, October 2003

21. K. Lundqvist, J. Srinivasan, S. Gorelov, "Non-Intrusive System-Level Fault Tolerance", 10th International Conference on Reliable Software technologies, York, LNCS3555, June 2005

22. G. Naeser, K. Lundqvist, " Component-based Approaches to Run-Time Kernel Specification and Verification", 17th Euromicro Conference on Real-Time Systems (ECRTS05), IEEE, Palma de Mallorca, Spain, July 2005

23. K Lundqvist, J. Srinivasan, "A First Course in Software Engineering for Aerospace Engineers", 19th Conference on Software Engineering Education and Training (CSEE&T2006), IEEE, April 2006 (**to appear**)

24. Y. Boussemart, M. Ouimet, S. Gorelov, K. Lundqvist, "Non-Intrusive System-Level Fault Tolerance for an Electronic Throttle Controller", International Conference on Systems (ICONS06), IEEE, April 2006 (**to appear**)

25. G. Naeser, K. Lundqvist, J. Furunäs, "Evaluation of Delay Queues for a Ravenscar Hardware Kernel", Workshop on Unique Chips and Systems (UCAS-2), IEEE, March 2006 (**to appear**)

26. Y. Boussemart, K. Lundqvist, "The Gurkh Framework: an Industrial Case Study and Certification Issues for Safety-Critical Software", 3rd International ICSE Workshop on Software Engineering for Automotive Systems (SEAS'06), May 2006 (**submitted**)

27. K. Lundqvist, J. Srinivasan, "Aerospace Software Engineering – Systems thinking Foundations", Third International Workshop on Software Engineering Educations, May 2006 (**submitted**)

28. M. Ouimet, K. Lundqvist, "Using Abstract State Machines to Design and Analyze Real-Time Systems", ECRTS06, IEEE, July 2006 (**submitted**)

29. Y. Boussemart, K. Lundqvist, "Model-Level WCET Estimation Using the Linearly-Priced Times-Automata Formalism", 6th Intl Workshop on Worst-Case Execution Time (WCET) Analysis, ECRTS, IEEE, July 2006 (**to be submitted**)

Other Publications

1. K. Lundqvist, "CAD-mognad i Sverige, bland byggprojektörer och fastighetsförvaltare", M.Sc. Thesis, Uppsala University, August 1991

2. K. Lundqvist, "Distribution of Ada by Means of Software and Hardware", Licentiate Thesis, DoCS 97/84, ISSN 0283-0574, April 1997

3. L. Asplund, B. Johnson, K. Lundqvist, and A. Burns "Session Summary: The Ravenscar Profile and Implementation Issues", The 9th International Real-time Ada Workshop, ACM Press, Ada LETTERS, vol XIX, Number 2, June 1999

4. S. Michell and K. Lundqvist, "Position Paper: Extendable, Dispatchable Task Communication Mechanisms", ACM Press, Ada Letters, Volume XIX Issue 2, June 1999

5. K. Lundqvist, "Distributed Computing and Safety Critical Systems in Ada", PhD thesis, Uppsala University, Department of Computer Systems, DoCS 00/114, ISSN 0283-0574, April 2000

Internal Memoranda and Progress Reports

1. L. Björnfot and K. Lundqvist, "Distributed Real-Time Systems: Hardware", appeared in "Distributed Real-Time Systems: A Survey", editor H. Hansson, pp. 109-128, DoCS Technical report 94/48, May 1994

2. K. Lundqvist and L. Asplund, "A Formal Model of a Ravenscar-Compliant Run-Time Kernel and Application Code", Technical Report IT 2, Information Technology, Uppsala University, May 1999

3. K. Lundqvist, J. Srinivasan, "An Introduction to fGurkh", ESL Working Paper, April, 2004

4. J. Srinivasan, K. Lundqvist, "Why is Aerospace Software Development and Sustainment Hard?", LAI/ESL Working Paper, April, 2005

In Progress

- M. Ouimet, K. Lundqvist, J. Srinivasan, "Specification Based Testing: State of the Art and Future Directions", ACM Computing Surveys

- M. Ouimet, B. O'Connell, E. Erickson, K. Lundqvist, "Formal Methods in Practice: A study of Approaches, Tools and Practices", IEEE Transactions on Software Engineering.

- K. Lundqvist, G. Naeser, "The Gurkh Framework: Combining Formal Methods and Codesign", Kluwer Academic Publishers, Real-time Systems Journal

- K. Lundqvist, J. Srinivasan, Y. Boussemart, "Applying Aerospace Paradigms to the Automotive Industry: A Software Certification Perspective", TBD

TEACHING EXPERIENCE

MIT
2004 - 2006	Spearheaded the effort to include Computers and Programming into the core curriculum of Unified Engineering.
	Teaching C&P Segment of Unified Engineering
2005	Co-designed and taught Real-Time Systems and Software
2003	Redesigned and Taught 16.070, the precursor to C&P in Unified Engineering
2002	Co-taught and Coordinated Aerospace Software Engineering

Uppsala University[1]
1991 – 1999	Served as Course coordinator for 5 different courses
	Served as Primary lecturer for 7 different courses
	Served as Tutor for 7 different courses
	Served as Teaching assistant (TA) for 15 different courses

[1] The number of students attending these courses has varied between 40 and 80 students.
(See appendix for details.)

PRESENTATIONS / INVITED LECTURES

"Software safety Approach at MIT", The Workshop on Critical Software, NASDA, Japan, March 2002

 "Perspectives on MIT – Embedded Systems Research", Uppsala University, December 2004

"Why is Aerospace Software Development and Sustainment Hard?", ILP – MIT Information technology Conference, April 2005

"The Gurkh Project Rethinking Hardware Software Codesign", Lund University, October 2005

"Real-Time Systems", Ideon Science Park, Lund, Sweden, October 2005

"Software Safety", Lund University, October 2005

"Using Agile Approaches in Mission Critical Software Development is it Feasible?", Software days, Lund University, October 2005

"Development and Sustainment of Aerospace Software", Xerox Innovation Group, Xerox Corporation, Webster, NY, March 2006

AWARDS

MIT Alumni Fund for improvement of 16.2 teaching through the use of Lego Mindstorms ($25.000)

Scholarship from *The Swedish Foundation for International Cooperation in Research and Higher Education*, for a post-doctoral stay (430.000 SEK)

First prize, for the best Swedish Master of Science or Licentiate thesis concerning Ada

APPENDIX: Teaching Experience

MIT (2002 to Current)

Subject	Title	Years Taught	Roles	Course type
16.35	Aerospace Software Engineering	ST02	Co-Taught	UG
		FT02	Taught, Redesigned	
16.070	Introduction to Computers and Programming	ST03	Taught, Redesigned	UG
16.010 16.020	Introduction to Computers and Programming	FT03	Taught Designed	UG
		FT04	Taught	
		FT05	Coordinated	
16.35	Real-Time Systems and Software	ST05	Taught	UG[2]
16.030 16.040	Introduction to Computers and Programming	ST04	Taught Designed	UG
		ST05	Taught	
		ST06	Taught	

[2] Graduate Credits with end-of-term project

Uppsala University (1991 to 1999)

Title	Years Taught	Roles	Course type[3]
Computer Architecture	1991	TA	DVL, MNL, TF
	1992	Lecturer	MNL
		TA	TF
	1993	Lecturer, TA	DVL
	1995	Tutor, TA	MNP
		Course coordinator, lecturer	CSE
	1998	Tutor	TFP
		Tutor, TA	MNP
		TA	Cont
Introductory week	1992		DVL
	1993		DVL
Digital Technology and Computer architecture	1994	Course coordinator, lecturer	DVP
	1995	Course coordinator, lecturer	DVP
Information Technology	1996	Tutor, TA	CSE
	1997	Course coordinator, lecturer, TA	CSE
Internet and Local Area Networks	1997	Course coordinator, lecturer, TA	CSE

[3]
DVP/DVL	4 year Computer Science Program
ITP	4.5 year Information Technology Program
MNP/MNL	4 year Mathematics- and Natural Science Program
TFP/TF	4.5 year Engineering Physics Program
CSE	Computer Science/Engineering students
Cont	Continuing education