Curriculum Vitae

August 8th 2006

1   Personal information

Name: <u>Sven</u> Erik Karlsson
Phone: +46-70-6794449
E-mail: Sven.Karlsson@sven.karlsson.name, svenka@ics.forth.gr
Date of birth: December 3rd 1973
Place of birth: Linköping, Sweden
Gender: Male
Nationality: Swedish
Civil state: Not married, living with my girlfriend
Current position: Researcher, Institute of Computer Science (ICS), Foundation for Research and Technology-Hellas (FORTH)
Personal notes: I live on Crete, Greece, with my girlfriend since thirteen years, Madelen. In my spare time I enjoy listening to music, attending music concerts, reading books, and watching movies and tv-shows, mostly science fiction. When I find the time, I go to the gym. I also spend quite some time designing hardware and software. One long running project involves designing an Atari ST/TT micro computer clone utilizing binary translation and implementing an operating system for said system. I consider myself to be thorough, responsible, and interested. I'm a member of the ACM.
Website: http://www.sven.karlsson.name/ (Currently under construction.)
Language skills: Swedish and English (fluently), understands German

2   Education record

2.1   Swedish "Studentexamen", 1992

Natural science curriculum, Platenskolan, Motala.
This degree is a Swedish degree necessary for attending university studies.

2.2   Master of Science in Engineering Physics, 1997

Lund University, Sweden
Thesis Title: *CELP based speech compression – a VLSI implementation*
Thesis advisors: Pietro Andreani, Johan Peterson and Jörgen Olsson
The thesis is co-authored with Stefan Lundberg. The thesis was runner up for the Axis Award 1998 for the best M.Sc. thesis project of the year.

2.3 Licentiate in Engineering, 2000

Department of Information Technology, Lund University, Sweden

Thesis Title: *Performance Aspects of Software Based Shared Memory in Multicomputers*

Thesis advisors: Professors Lars Philipson and Mats Brorsson

Thesis area: computer architecture and distributed systems

The Licentiate in Engineering degree is a Swedish degree halfway between M.Sc. and Ph.D.

2.4 Doctor of Philosophy, 2004

Department of Microelectronics and Information Technology, the Royal Institute of Technology, KTH, Sweden

Thesis Title: *Shared Memory and OpenMP on Clusters*

Thesis area: computer architecture and distributed systems

Thesis advisor: Mats Brorsson

3 Teaching experience

I have extensive teaching experience covering over 12 years experience teaching university courses at all levels and in two countries. I also have experience from teaching activities outside the university such as tutorals at conferences and companies, courses given to high school students and acrticles in computer magazines. My teaching experience is summarized in my pedagogical qualification portfolio.

4 Research experience

I have been a Ph.D. student at Lund University, Sweden from 1997 to 2000 and at the Royal Institute of Technology, KTH, Sweden from 2000 to September 2004. I have been part of Prof. Mats Brorsson's group and have been working within the computer architecture field. More specifically I have been working on software distributed shared memory systems, compilers, network protocols, distributed computing systems and network interconnects. I have also been working, with the other students in Prof. Brorsson's group, on simulation methodology and simulation environments. In addition, I have a keen interest in operating system design and have done some work in this area. Furthermore, I have been a very active part in discussions within the group on micro-architectural issues and I have a background as ASIC designer working with micro-architecture design and implementation. I also have a strong background in hardware realization including hardware design and prototyping. I received my Ph.D. in 2004.

In July 2005, I joined ICS-FORTH, Crete, Greece as a post-doc researcher under the supervision of Prof. Angelos Bilas. I am working on network communication protocols for clusters and programming models for multi-core architectures and clusters.

More precisely, I am leading the development of a state-of-the art cluster communication library, Hermes, that utilizes off-the-shelf Gigabit and 10 gigabit Ethernet hardware to achieve

communication data rates and latencies comparable to custom hardware. In this project, we are working on several different topics. We are, for example, improving flow control algorithms by modelling the interconnecting Ethernet switches. Furthermore, we study the use of multiple parallel Ethernet links to attain higher data rates and possibly lower latencies. We also have experimented with primitives that allow packets to be delivered out-of-order to reduce latencies.

In addition to the work on Hermes, I have been working on scalable programming models that would not only work efficiently on present and future multi-core architectures such as chip multiprocessors but also scale to larger systems utilizing multiple multi-core chips each containing a set of processors. The programming models studied are also applicable to clusters. This effort is not finished and I am currently investigating the application of concepts such as the ACID properties, taken from the database field, in general purpose programming models.

Below is an itemized list of other research related experience. All research related publications are in the publication list.

4.1 International research projects

- Have worked within, and partly planned the work in, Intone an international project financed by the European Commission under contract number IST-1999-20252. The project ran for three years. I collaborated closely with project partners and was the single representative for the Royal Institute of Technology, KTH at several project meetings. I have also been actively involved in the coordination of the work, within the project, performed at the Royal Institute of Technology, KTH. The group at KTH consisted of five persons. Prof. Brorsson can be contacted for reference.

- Working within the SARC project, an international project financed by the European Commission and involving most high profile computer architecture researchers in Europe.

4.2 Research grants

- Have not received grants as main applicant. I have, however, been involved in several grant applications and have been co-applicant to one grant application to the Swedish Agency for Innovation Systems. I am the main applicant on two grant application to the Swedish Research Council and have previously filed two proposals to the Swedish Research Council. I have also written parts of two grant applications for the European Union IST call 5. Further information available on request.

4.3 Student supervision

- Have supervised several project workers from 2000 to 2003. These project workers have taken part in research projects and have performed implementation tasks. Prof. Mats Brorsson can be contacted for further reference. Additional reference persons available on request.

- Have supervised 9 master students. These are listed in my pedagogical qualification portfolio. Two of the projects have received the Axis Award for the best M.Sc. thesis project. They are:

    1 Peter Gustavsson and Fredrik Wendel, *Parallel Processing in an Embedded Environment*, December 1998, Recipient of the Axis Award 1999 for the best M.Sc. thesis project of the year.

2   Fredrik Bjorne and Mats Fridén, *A Software Implementation of The Baseband In Bluetooth*, September 1999, Recipient of the Axis Award 2000 for the best M.Sc. thesis project of the year.

The subjects of the master projects include computer architecture, VLSI design, simulation technology, celluar networks and network planning, operating systems and computer security.

Current master students include Stavros Passas and George Kotsis at ICS-FORTH, Crete, Greece. These two students work on cluster communication and programming infrastructures.

4.4   International collaboration and visits

- Collaborated with post-doc Dr. Sung-Woo Lee from Department of Computer Engineering at KyungPook National University, South Korea. 2001-2002.
- Visited CEBPA at UPC in Barcelona, Spain, February 2003.
- Have collaborated with ARM Ltd. in Cambridge, UK and have visited ARM Ltd. in April and May 2004. I was working under a contract with them and adapted a few research software packages that I have developed and that ARM has licensed.
- Have visited ICS at FORTH, Crete, Greece, in April 2005.
- Part of the HiPEAC European network of excellence.
- Currently collaborating with researchers at the the Royal Institute of Technology, KTH, Sweden, and a research group at the University of Massachusetts Amherst, USA, aiming at finishing a joint research grant application.
- Joined ICS at FORTH, Crete, Greece, in July 2005 as a post-doc researcher.

4.5   Other research experience

- Member of the program committee for the IEEE International Conference on Parallel and Distributed Systems (2006).
- Referee for various journals, conferences and workshops. Including but not limited to: Europar (2006), ACM International Conference on Supercomputing (2006), IEEE International Conference on Cluster Computing (2006), IEEE International Conference on Distributed Computing Systems (2006), Design, Automation and Test in Europe (2006), IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS-2006), International Symposium on Computer Architecture (2004), IEEE Transactions on Computers (2004), International Conference on Parallel Processing, Journal on Cluster Computing (2001), European Workshop on OpenMP, Workshop on Communication Architecture for Clusters. I generally receive 1 or 2 assignments for journal paper reviews and roughly 10-20 conference paper review assignments per year.
- Have held several tutorials at major conferences and workshops. See the publication list for a list of major tutorials.
- Have presented all accepted papers in the publication list as long presentations (20-30 minutes). I have also held several invited talks.
- Was in charge of the proceedings of the 2004 instalment of the EWOMP workshop and have been involved in the local arrangements for said workshop.
- Have reviewed the OpenMP specification version 2.5.

4.6 Technology transfer activities

- I have licensed the OdinMP compiler and the Balder software to ARM Ltd and have also worked with them to port and optimize the software for their ARM processors. This was done during 2003 and 2004.
- I have also worked closely with the industrial partners in the INTONE project (IST-1999-20252) helping them to use OpenMP in production environments.
- I have advised several master projects in cooperation with various companies.
- I have co-developed one training course on TCP/IP stacks for use within a company. The course was then given by me to different companies over 4 years. Several companies encouraged their employees to attend the course.

5 Employment record

5.1 Business Security AB, Lund, Sweden, 1996-1997: ASIC designer

- Designed and implemented application specific integrated circuits for encryption of computer communication and telecommunication.
- Designed and implemented a custom instruction set architecture, ISA, for embedded devices. The ISA was my own design and was implemented as a micro-controller core.
- Designed and implemented a compilation system for said instruction set architecture.

Left the position voluntarily to pursue Ph. D. studies.

5.2 Lund University, Lund, Sweden, 1997 - 2000: Ph. D. student

- Research on parallel computers and compilers for parallel computers.
- Teaching undergraduate and graduate courses in computer engineering, computer architecture, parallel computer systems, VLSI design, network programming, and embedded systems programming.

Advisors: Professor Mats Brorsson and Professor Lars Philipsson

5.3 Royal Institute of Technology, KTH, Stockholm, Sweden, 2000 - September 2004: Ph. D. student

- Research on parallel computers and compilers for parallel computers
- Teaching undergraduate courses in computer and telecommunication networks, parallel computer systems, and network programming.

Advisor: Professor Mats Brorsson

5.4 ICS-FORTH, Crete, Greece, July 2005 - Present: Post-doc researcher

- Research on network communication protocols for clusters and programming models for multi-core architectures and clusters.
- Teaching undergraduate course in computer architecture.

Supervisor: Professor Angelos Bilas

6　Other activities

Listed below is a set of other important activities. Further information and details are available on request.

- Led, with Daniel Elvin, from 1999 to 2000 a project that installed a local area network in a residential area in Lund, Sweden. Through this network over 250 apartments were connected to the Internet. Daniel and I acted as the apartment owners' representatives and prepared contracts, supervised the installation, and post installation, we administrated the network. The project was very successful, attracted media attention, and has generated several spin-off projects in other residential areas. Daniel can be contacted for further reference.

- Have extensive experience in designing digital hardware. Some of my designs include: a PCI controller implemented in CPLDs for a Motorola 68030 based microcomputer, several embedded controller cards including designs with Motorola Coldfire and Motorola Power PC micro-controllers, and microprocessors, and CPLDs, and FPGAs from Lattice, Altera and Xilinx. Some of these designs have been available commercially. I also have some experience with analog designs including radio designs.

- Have advised several award winning M.Sc. projects, see my portfolio of pedagogical qualifications.

- Have developed a port, to the SimpleScalar micro-architecture simulator, of a recent version of the GCC compiler and the GNU Banalities suites. One of my master students has extended SimpleScalar so as to support the Linux kernel. I helped out porting the Linux kernel to SimpleScalar. In addition, I have also experience from helping colleagues with extensions to, and revisions of, SimpleScalar and also the Simics full system simulator.

- Have led and run several larger software projects such as one version of the operating system for the Atari ST/TT range of microcomputers, music sequencer software for said range of microcomputers, and a development system, including assemblers and debuggers, for the Atari Jaguar game console system.

- Have designed and implemented a custom real-time operating system under a contract from Ericsson AB, Sweden. The operating system was used in a project led by professor Lars Philipsson. Further details available on request.

- Have designed and competed with several advanced graphics applications, i.e., so called demos, for the Atari ST including 3D engines and advanced music engines.

- Was part of the team that developed the official computer game for the 1998 run of the Lund Carnival, a carnival organized by the student union in Lund. The carnival attracts tens of thousands of visitors every fourth year. Further details available on request.

- Have designed a fairly strong Othello playing program which is likely to be among the ten strongest Othello playing programs in the world. Have won local competitions with the program.

- Have participated in several collaborative software and hardware design projects. Some of these have been open source projects.

- Have won prices and grants in competitions for young inventors, and in competitions for pre-university research projects.

- Have participated several times in the national trials for the International Chemistry Olympiad and the International Olympiad in Informatics reaching national levels and final trials. Have received grants for my participation in the International Chemistry Olympiad.

- Was part of the staff of Radio AF between 1992 and 1993. Radio AF is the student radio station in Lund.
- Have had several duties within the student union at the Lund Institute of Technology. I have been a member of the "Studierådet" which is a group within the student union that performs course evaluations and audits the education at the Lund Institute of Technology.
- Have been a student representative member on the board of the department of Applied Electronics, Lund University, Sweden.
- Have been a student representative member on the board of LDC, the Computer Centre in Lund, Lund University, Sweden.

6.1 Design and computer skills

Below is a brief list of my engineering skills and related skills.

Design skills: Have extensive software and digital hardware design experience. Some experience of analog and radio design. Have designed full custom ASICs.

Computer skills: *Fluent*, i.e., would be able to program large programs without reference literature: C, C++, Motorola 68000 assembly language.

Fluent to a lesser degree: ABEL, ARM assembly language, various BASIC variants, HTML, Java, MIPS assembly language, Pascal, Power and PPC assembly language, Simula, Sparc assembly language, VHDL, Verilog, x86 assembly language, Z80 Assembly language.

Knowledge, i.e., written a few programs, including but not limited to Miranda, ML, PHP, and Smalltalk.

Have administrated Linux, OpenBSD, Solaris, Windows NT, Windows 2000, and Windows XP systems.

Regularly uses productivity tools such as Microsoft Office and Adobe FrameMaker.

Regularly uses CAD tools for PCB design. Have designed multilayer PCBs with BGAs and other very dense components. Have designed PCBs for high speed digital electronics as well as analogue hardware such as video, radio, and audio equipment.

Have designed large ASICs using VHDL, Verilog, Cadence, and Mentor Graphics tools. Familiar with several different synthesis tools, standard cell libraries and processes.

Have designed CPLDs and FPGAs using various tools

Have designed systems with PCI and AGP busses, as well as various microprocessor busses, USB, IDE, SCSI interfaces as well as other I/O interfaces. I feel confident designing advanced digital hardware and have experience of designing systems with most of the modern architecture features**.**

7 Patents, membership in professional organization, distinctions

I have no patents filed or accepted. Four of the Master students I have advised have received awards for their Master theses, see section 4.3. Apart from that, I have not received any research related awards, see however section 6 for other distinctions. I am not a member of any research council or related organization. I am, however, a member of the ACM and SIGARCH.

8   References

References, recommendation letters, official documents, publications, software, and theses are available on request.