

Resume for Sören Molander



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Goals:

I am interested in autonomous systems, signals and sensors, computer vision and systems that learn. I have 20 years of university and industry experience in the following areas:

Image & signal processing & analysis, stochastic processes & statistics, pattern recognition, computer vision (2D/3D), OO-programming, tracking & Kalman filters, knowledge-based systems & sensor fusion. Application areas include research in cooperating UAV:s, vision based collision avoidance, remote sensing, face tracking, bearings only tracking and data fusion, and atmosphere transmission modeling.

Tools I have used include programming languages like Matlab/Simulink, MODTRAN, NVTherm, Mathematica, matrixX/SystemBuild, C++/C/Pascal/Git/Linux and agile development methods.

I am fluent in English, and speak and write decent German and French.

I have a wide range of interests, but especially enjoy working in areas like robotics, sensors and systems, machine learning and artificial intelligence.

Lately I have helped my organisation with business ideas and product development. I have also become infatuated with LambertW-functions.

Specialties:

Applied mathematics and statistics, signal/image analysis, pattern recognition, tracking, sensor fusion, AI, programming, systems design, integration and

engineering.

Work Experience:

2016-06-01 – now: Panasonic AB, Langen Germany

Company profile: Electronics OEM and ADAS activities

Sensor fusion, occupancy grids, temporal and spatial trilateration, Extended Kalmanfilters.

2014-08 – 2016-03 Alten AB

Company profile: Consulting in IT, Embedded systems and mechanical engineering.

Consulting assignments:

. OCR investigation for Svenska Spel Stockholm (Python, theory)

. Volvo Trucks ATR, Lindholmen , Göteborg. Maintenance and documentation of a matlab track fusion platform.

In-house activities:

. Sponsoring Robocup Junior

. Initiated inhouse robotics after-work Linefollowing and machine learning (Raspberry Pi, Python, C++, openCV)

2011-05-1/10-31 Autoliv Electronics (consulting 50 %) Linköping, Sweden

Company profile: Manufacturer and developer of vision based systems for the Automotive industry

- Tools: matlab, C++
- Development of image analysis applications including lane departure and collision warning

2005-11- 23-2014-08 SAAB Aerosystems

Linköping, Sweden

Company profile: Manufacturer of civil and military aircraft and UAV:s

- Tools: C++, Matlab/Simulink,atmosphere simulation with MODTRAN, matrixX/SystemBuild, Maple, Mathematica
- International research project (ETAP) on cooperating UAV:s
- Gripen aircraft sensor design specification, sensor integration and requirement management
- Requirement specification, design and parts of the implementation of a collision avoidance system for UAV:s
- Design and implementation of Extended Kalman filters for bearings-only tracking
- Performance calculations for sensors
- Technical roadmaps for sensor development and integration
- R&D programs for UAV:S and decision support systems
- Participating in EU program for new UAV technology
- Three co-authored patents related to sensor fusion and tracking.
- Part-time consulting for Autoliv Electronics (Computer vision)

2001- 2005 *SmartEye AB* *Stockholm, Sweden*

Company profile: Real-time analysis of video sequences

Job profile: Developer and image analysis expert (4 yrs)

- Tools: C++ (Visual Studio/gnu) Emacs,CVS,Mathematica,Matlab
Platforms: Windows/Linux
- R&D project leader
- Automated anchor point detection
- Object and feature point tracking
- Chess-board calibration with bar-codes
- Blink-detection and eyelid modeling
- Feature detection with directional distributions
- Automated anchor point detection (an entire tracking system in C++)
- Design and implementation of image analysis framework in C++
- Technical audit of companies for risk capital investors
- Signal processing and filtering
- One European patent application

1999- 2001 *Carlstedt Research & Technology Stockholm, Sweden*

Company profile: Advanced consulting in computer technology

Job profile: Computer consultant (2 yrs)

- Tools: C++ (Visual Studio/gnu),C,Emacs,CVS,Mathematica
Platforms: Windows,Linux,Unix
- Adaptive normalization (for SmartEye AB)
- Tracking recovery (SmartEye AB)
- Brain atlas gui developer (Elekta AB)
- Database-java communication

1996- 1999 *SSC Satellitbild* *Kiruna, Sweden*

Company profile: Supplier of remotely sensed satellite data

Job profile: Developer and image analysis expert (3 yrs)

- Tools: C++ (Visual Studio/gnu),Pascal,C,Emacs,CVS,Mathematica,ARC/INFO, Erdas/Imagine,Unix-scripts.
Platforms: WindowsNT/95,Linux,Unix/Solaris
- Responsible for transfer of company software to Unix
- Implementation of map-projection utilities
- Scene/segmentation analysis using region growing and co-occurrence matrices
- Image restoration (e.g. adaptive bit correction and Wiener filtering)
- Responsible for installation and modification of radar processing (SAR) system
- Project leader for remote sensing projects (optical/SAR)
- Visualization of terrain data with VRML

- ArcInfo AML and UNIX script programming
- Lectures for UN-projects and supervision of students

1995- 1996 *INRIA, Sophia-Antipolis* *France*

Post-doctoral position (1 yr)

- Segmentation/watershedding algorithms (SUN/Solaris, C++, C,Lisp)
- Knowledge-based image understanding
- Various studies in artificial life, digital mapping and edge detection

1994- 1994 *ATÖ/KFA-Jülich* *Jülich, Germany*

Post-doctoral position (6 months)

- Simulation models of artificial neural networks
- Literature studies in neuroscience.

Education:

1988- 1994 *Chalmers Univ. of Technology, Göteborg, Sweden*

Doctor of Philosophy

- Ph..D. thesis on knowledge-based image understanding, with applications to medical imagery at the department of Applied Electronics (now “Signals and Systems”). The thesis work involved the design and implementation of a system for automated segmentation using scene models and processing models (scheduling). Most of the programming was done under VAX/VMS using Pascal, Fortran and VMS-scripts.
- Graduate studies in predicate logic, programming, signal/image processing, memory models, genetic algorithms, artificial neural networks and quantum mechanics
- Undergraduate level teaching in signal processing
- Arranged a seminar on artificial neural networks at the dept. of Mathematics

1986- 1988 *Onsala Space Observatory* *Onsala, Sweden*

Graduate studies

- Graduate work on VLBI observations and data analysis
- Graduate courses in radio astronomy and astrophysics

1982- 1986 *University of Uppsala* *Uppsala, Sweden*

Bachelor of Science

- B.Sc. in theoretical physics and astronomy
- Exchange student at the University of Sussex (6 months)
- Project work in theoretical physics (Kaluza-Klein theory)

Selected Publications:

- Molander S. & Broman H., Gustavsson T. (1991): "A controllable Medial Axis Transform", Proceedings of the society for automated image analysis (now SSBA), Linköping, 6-7 March, pp. 240-243.
- Molander S. & Broman H. (1993): "Knowledge-based segmentation and state-based control in image analysis: two examples from the biomedical domain", Signal Processing (Elsevier), special issue on intelligent systems for signal and image understanding, Vol. 32, Nos 1-2., May, pp. 201-215.
- Molander S. (1995): "Blob analysis of biomedical image sequences: a model-based and an inductive approach", proceedings of the summer school in Huddinge (ed. Stig Andersson) Analysis of Dynamical and Cognitive Systems, Aug. 9-14 1993, in Lecture Notes in Computer Science, Springer Verlag, Vol. 888., pp. 169-187.
- Molander S. (1994): "What is lacking in today's vision systems?", Proceedings of the Swedish Society for Automated Image Analysis (SSAB), Halmstad, March, 8-9, pp. 13-17.
- Alfredsson J., Lundqvist A., Molander S., Nordlund P-J (2010): "Decision Support for the Gripen NG Aircraft and Beyond". Proc. ICAS, 19-24 Sept., Nice

Grants :

Joint grants for a post-doc at INRIA

1995-1996

- Swedish Technical Research Council (TFR)
- Hellmuth Hertz Foundation
- Listed in the Marquis "who is who" data base

Skills :

Computer

- Programming/design UML/OMT
- C++/C/Pascal/Java/Mathematica
- Linux/Unix/Windows
- Emacs/CVS/Gnu/Visual Studio/.Net

Languages

- Swedish (native)
- English (fluent written/spoken)
- German (excellent written/spoken)
- French (decent written/spoken)

Other

- Mathematical/statistical modelling, numerical analysis and stochastic processes
- Signal/image processing and computer vision
- Pattern recognition and machine learning
- Geometry (Projective & Euclidian)
- Statistics

Miscellaneous:

10 Months of army service (1980-1981, radio telegraphy, green beret unit at K3, Skövde)

Frequent contributor to internal human resource magazines (Swedish and French)

Articles in Swedish computer related magazines

Review of a book in quantum mechanics in Sweden's largest daily newspaper (DN kultur 1988)

I maintain a command line image and signal processing toolbox in C++ for Windows/Linux (see below for URL).

Member of Licentiate thesis Committee at the Institute for Space Physics, Kiruna

Member of Licentiate thesis committee at the Center for Image Analysis, Uppsala

Personal:

I am self-motivated person eager to take on new challenges, and enjoy working in groups as well as doing problem solving on my own. I am a firm believer in the combination of theory and practice and enjoy working with all sides and aspects of a problem.

Apart from my professional interest in computer vision I am also interested in biology, complex systems and evolution. I am convinced that research in truly autonomous systems requires studying the interaction between systems and their environment and finding a good balance between pre-wiring (evolution/nature) and system adaption (learning/nurture).

I'm an amateur telemark (free heel) skier, and also enjoy skating, traveling, kayaking, mountain hiking, the local pub, and going to the movies. I'm an ardent reader and especially enjoy modern SF-literature, history and philosophy.

Private URL: (<http://hem.bredband.net/sormol>)

References:

Available Upon Request