

Curriculum Vitae

Name:	Christian Ridderström	
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E-mail:	christian.ridderstrom@home.se	
Year of birth:	1973	
Civil status:	single	

Personal goal

Interesting and rewarding work, that deals with complex technical systems, especially mechatronic and/or real-time systems. [In the best of all worlds: building space ships...]

Education

- 2003-05-12 Doctor of Engineering**, Royal Institute of Technology (KTH), Sweden
Degree from the Dept. of Machine Design, Mechatronics Lab, in a doctoral program affiliated with the Centre for Autonomous Systems (CAS). Title of thesis [3]:
“Legged locomotion: Balance, control and tools — from equation to action”.
- 1997-05-01 Master of Science**, Engineering Physics (appl. mathematics), KTH
Scholarship granted by CAS for M.Sc. project. Title of thesis [14]:
“Corridor Navigation by Visual Servoing”.

Research

- 1997–2003 Mechatronics Lab**, Centre for Autonomous Systems, KTH
Worked on developing a complex robot platform for locomotion in rough terrain (a four-legged walking robot), especially system structure and computer architecture.
Combined and further developed tools for analytic modeling of rigid body models with simulation and control design software.
Developed and implemented control methods for statically balanced walking and dynamically balanced trotting, as well as an active force-based balance controller.
Analyzed stability of statically balanced stances when compliance is considered.
Gained experience in efficiently dealing with complexity (and in connection, system design), and developing required tools and methods.

1996–1997 Computational Vision and Active Perception Lab, CAS, KTH

Developed and implemented a controller for steering a wheeled robot along a corridor based on visual cues (vertical lines).

Work experience

1990–2002 MHU Robotics AB, Sweden (corresponds to \approx 4 years full time)

Concurrent with studies in high school and university. Until 1996, I independently developed a new generation of the company's operating system (PC80) for their industrial robots. It has been in production and industrial use since then. Primarily I worked with software development, but also some hardware design (a portable terminal and interface electronics).

From 1996, the work focused on creating a new hardware platform (PPC104) with a reduced number of components, and the corresponding changes in software. This work has given me practical experience and skills in designing software systems, but also in design of (digital) electronics.

1994–1995 Military service, LV3/Norrtälje, Sweden (12 months)

“Stridsledare” (approx. *battle commander*) in charge of a 10-man group with a Robot 70-system (laser-guided antiaircraft missiles) mounted on a tank.

Publications

List of publications attached at the end. You may download the publications from <http://www.md.kth.se/~chr/publications>. Some of them require a username (**cv**) and a password (**cv**) because of copyright restrictions.

Selected presentations

- “Dynamical modeling of walking robots”, CAS, KTH 1998
- “Behaviour-based control and making M3L walk”, Mechatronics Lab, KTH 1998
- “Model-based control of walking systems”, Industrial Workshop, Mechatronics Lab, KTH 1998
- “Walking controller ideas”, Leg Lab, MIT, Boston, USA 1998
- “Balance and stability — what are we t(w)alking about”, CAS, KTH 1999
- “Computer architecture of WARP1”, FZI, Karlsruhe, Germany 1999
- “Combining control design tools for large systems”, guest lecture in *Advanced Course in Mechatronics*, Dept. of Machine Design, KTH 2000
- “Stability of statically balanced stances on compliant surfaces”, CAS, KTH 2002
- “Combining control design tools for large systems”, Engineering Institute, KTH 2003
- “Overview of WARP1, control design tools and stability results”, for the CAS Scientific Advisory Board, KTH 2003

Miscellaneous

- Reviewer for the *International Journal of Robotic Research*.
- Co-editor of the proceedings from the 5th *Int. Symposium on Intelligent and Robotic Systems*, 1997.
- Organized and gave half-day seminar on the use of advanced control design tools at the Dept. of Machine Design and CAS, KTH.

Computer skills

<i>OS</i>	Expert user of Unix (Solaris and Linux), advanced user of Windows and moderately skilled administrator (Linux).
<i>Languages</i>	Extensive experience with C, C++ and assembler (primarily x86). Also experience with languages such as Scheme, Forth, Modula, Pascal, BASIC etc.
<i>Tools</i>	Extensive experience using and programming Maple, MATLAB and toolboxes such as Simulink, Stateflow, Real-Time Workshop and xPC Target (“rapid prototyping” of control systems).

Language skills

<i>Swedish</i>	native language
<i>English</i>	fluent
<i>German</i>	working knowledge

Personal interests

Main hobbies are riflery, windsurfing and RC aeroplanes.

1997-2003 Chairman of TVÖR riflery (still active instructor/leader in an affiliated youth club).

List of publications

- [1] Christian Ridderström and Johan Ingvast. Warp1: Towards walking in rough terrain — smooth foot placement. In *Int. Conf. on Climbing and Walking Robots*, Catania, Italy, September 2003. accepted.
- [2] Johan Ingvast, Christian Ridderström, Freyr Hardarson, and Jan Wikander. Warp1: Towards walking in rough terrain — control of walking. In *Int. Conf. on Climbing and Walking Robots*, Catania, Italy, September 2003. accepted.
- [3] Christian Ridderström. *Legged locomotion: Balance, control and tools — from equation to action*. PhD thesis, The Royal Inst. of Technology, 100 44 Stockholm, Sweden, May 2003. See <http://www.md.kth.se/~cas/publications>.

- [4] Christian Ridderström. Stability of statically balanced, radially symmetric stances for legged robots on compliant surfaces. In *Int. Conf. on Climbing and Walking Robots*, Paris, France, September 2002.
- [5] J. Ingvast, C. Ridderström, F. Hardarson, and J. Wikander. Improving a trotting robot's gait by adapting foot trajectory offsets. In *Int. Conf. on Climbing and Walking Robots*, pages 711–718, Karlsruhe, Germany, September 2001.
- [6] J. Ingvast, C. Ridderström, and J. Wikander. The four legged robot system WARP1 and its capabilities. In *Second Swedish Workshop on Autonomous Systems*, Stockholm, Sweden, October 2002. See <http://www.md.kth.se/~cas/publications>.
- [7] Christian Ridderström. Stability of statically balanced stances for legged robots with compliance. In *Int. Conf. on Robotics and Automation*, Washington DC, USA, 2002.
- [8] Christian Ridderström and Johan Ingvast. Combining control design tools — from modeling to implementation. In *Int. Conf. on Robotics and Automation*, pages 1327–1333, 2001.
- [9] Christian Ridderström and Johan Ingvast. Quadruped posture control based on simple force distribution — a notion and a trial. In *Int. Conf. on Intelligent Robots and Systems*, pages 2326–2331, 2001.
- [10] C. Ridderström, J. Ingvast, F. Hardarson, M. Gudmundsson, M. Hellgren, J. Wikander, T. Wadden, and H. Rehbinder. The basic design of the quadruped robot Warp1. In *Int. Conf. on Climbing and Walking Robots*, Madrid, Spain, October 2000.
- [11] Christian Ridderström. Legged locomotion control — a literature survey. Technical Report TRITA-MMK 1999:27, Dept. of Machine Design, Royal Institute of Technology, S-100 44 Stockholm, Sweden, November 1999. ISSN 1400-1179.
- [12] Henrik Rehbinder and Christian Ridderström. Attitude estimation for walking robots. In *Int. Conf. on Climbing and Walking Robots*, September 1999.
- [13] Freyr Hardarson, Bengt Eriksson, Christian Ridderström, Tom Wadden, and Jan Wikander. Experiments with impedance control of a single compliant leg. In *Int. Conf. on Climbing and Walking Robots*, September 1999.
- [14] Christian Ridderström. Corridor navigation by visual servoing. Master's thesis, The Royal Inst. of Technology, 100 44 Stockholm, Sweden, March 1997.