

CURRICULUM VITAE – GUNNAR BOLMSJÖ

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Personal details

Name: Gunnar Bolmsjö

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Swedish citizenship, Married, three daughters

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Present Appointment

Professor, PhD (Robotics) at Lund University, Dept. of Design Sciences, Division of Machine Design.

Director of studies, Industrial Design, Lund University.

Education

1986 PhD (Tekn Dr), Lund University, Dept of Production and Materials Engineering

1981 MSc, Mechanical Engineering, Lund University

Work Experience

2005-present Professor (Robotics) at the Department of Design Sciences, Division of Machine Design, Lund University

1987-2004 Professor (Robotics) at the Department of Mechanical Engineering, Lund University

1986-1987 Research associate at the Department of Production and Materials Engineering, Lund University

1980-1986 Assistant, PhD student, at the Department of Production and Materials Engineering, Lund University

Additional Information

Languages: Swedish as a mother tongue, fluent in oral and written English

Military Service: 15 months in the Swedish Navy as a radio operator working with crypto, Morse and voice communication. Operating in the Baltic Sea.

Birth: 25th of June, 1955

Teaching

Courses have been held in robotics mainly within the mechanical engineering program, 4th year since beginning of the 1980's. In addition, a large number of Master Thesis students have been supervised and examined during this period. During the last years, new course have been developed and the courses in robotics now includes the following: Applied Robotics, Service Robotics, Robot technology Project, Digital Factory (all 7.5 ECTS credits) and a Master Thesis project of 30 ECTS credits.

PhD supervision and examination

The PhD examination in Sweden has an intermediate examination called *Teknisk Licentiat*, Technical Licentiate degree. The following Technical Licentiate students have been supervised and examined (Tech Lic Degree):

1. Mikael Ericsson. *Simulation of Robotic TIG-Welding*. Licentiate in Engineering Thesis. Lund University, Lund, Sweden, Division of Robotics, Department of Mechanical Engineering, 2003. coden:LUTMDN/(TMMV-5170)/1-96/(2003). ISBN 91-628-5702-9.
2. Jonas Assarsson. *Simulation and Analysis of Parallel Kinematic Machines*. Licentiate in Engineering Thesis. Lund University, Lund, Sweden, Division of Robotics, Department of Mechanical Engineering, 2001. coden:LUTMDN/(TMMV-1047)/1-74/(2001).
3. Arne Ingemansson. *Reduction of Disturbances in Manufacturing Systems Based on Discrete-Event Simulation*. Licentiate in Engineering Thesis. Lund University, Lund, Sweden, Division of Robotics, Department of Mechanical Engineering, 2001. coden:LUTMDN/(TMMV-1050)/1-78/(2001).
4. Lars Holst. *Integrating Discrete-Event Simulation into the Manufacturing System Development Process*. Licentiate in Engineering Thesis. Lund University, Sweden, Department of Mechanical Engineering, 2001. ISBN 91-631-1404-6.
5. Lars Randell. *A Methodology to Reduce Time Consumption in Discrete-Event Simulation Projects*. Licentiate in Engineering Thesis. Division of Robotics, Department of Mechanical Engineering, Lund University, Lund, Sweden, 2000. CODEN:LUTMDN/(TMMV-1042)/1-77/2000.
6. Krister Brink. *Event Based Control of Industrial Robot Systems*. Licentiate in Engineering Thesis. Department of Production and Materials Engineering, Lund University, Lund, Sweden, 1996. CODEN:LUTMDN/(TMMV-1026)/1-139/(1996).
7. Magnus Olsson. *On Off-line Programming and Simulation of Robotic Systems*. Licentiate in Engineering Thesis. Department of Production and Materials Engineering, Lund University, Lund, Sweden, 1996. CODEN:LUTMDN/(TMMV-1028)/1-131/(1996).
8. Lars-Ola Larsson. *The Modelling of Geometrical Parameters in Robotic GMA Welding*. Licentiate in Engineering Thesis. Department of Production and Materials Engineering, Lund University, Lund, Sweden, 1995. CODEN LUTMDN/(TMMV-1020)/1-70(1995).
9. Per Hedenborn. *Robotics in Automated Inspection and Quality Control*. Licentiate in Engineering Thesis. Department of Production and Materials Engineering, Lund University, Lund, Sweden, 1992. CODEN: LUTMDN/(TMMV-1014)1-105/(1992).
10. Hamid Nasri. *A Process Model for Robotic Grinding*. Licentiate in Engineering Thesis. Department of Production and Materials Engineering, Lund University, Lund, Sweden, 1992.

11. Björn Ågren. *On the Monitoring and Analysis of GMA Welding*. Licentiate in Engineering Thesis. Department of Production and Materials Engineering, Lund University, Lund, Sweden, 1991. CODEN: LUTMDN/(TMMV-1012)/1-63/(1991).
12. Per Dahlén. *Personnel Costs - Quantification, Analysis, Action (Personalmerkostnader - Kvantifiering, Kalkyl Åtgärd)*. Licentiate in Engineering Thesis. Department of Production and Materials Engineering, Lund University, Lund, Sweden, 1991.

The following PhD students have been supervised and examined (PhD degree):

1. Lars Cederqvist. *Friction Stir Welding of Copper Canisters Using Power and Temperature Control*. PhD Thesis. Lund University. 2011. ISBN: 978-91-7473-136-1.
2. Mikael Eriksson. *Simulation of Robot Paths and Heat Effects in Welding*. PhD Thesis. Lund University. 2006. ISBN: 978-91-628-6869-7.
3. Lars Holst. *On Discrete-Event Simulation, Operations Analysis, and Manufacturing System Development*. PhD Thesis. Department of Mechanical Engineering, Lund University. 2005. CODEN:LUTMDN/(TMMV-1059)/1-240/(2004).
4. Per Cederberg. *On Sensor-Controlled Robotized One-off Manufacturing*. PhD Thesis. Department of Mechanical Engineering, Lund University. 2004. CODEN:LUTMDN/(TMMV-1058)/1-78/(2004), 91-628-6289-8.
5. Arne Ingemansson. *On Reduction of Production Disturbances in Manufacturing Systems Based on Discrete-Event Simulation*. PhD Thesis. Department of Mechanical Engineering, Lund University. 2004. CODEN:LUTMDN/(TMMV-1057)/1-178/(2004), ISBN 91-628-6149-2
6. Mikael Fridenfalk. *Development of Intelligent Robot Systems Based on Sensors Control*, PhD Thesis, ISBN 91-628-5550-6, Faculty of Engineering, Lund University, 2003.
7. Lars Randell. *On Discrete-Event Simulation and Integration in the Manufacturing System Development Process*. PhD Thesis. Division of Robotics, Department of Mechanical Engineering, Lund University. 2002. CODEN: LUTMDN/(TMMV-1054)/1-165/2002, ISBN 91-628-5319-8.
8. Magnus Olsson. *Simulation and execution of autonomous robot systems*. PhD Thesis. Division of Robotics, Department of Mechanical Engineering, Lund University, Sweden. 2002. CODEN: LUTMDN/(TMMV-1051)/1-100/2002, ISBN 91-628-5120-9.
9. Hamid Nasri. *Modeling and Requirements of the Automated Deburring Process*. PhD Thesis. Division of Robotics, Department of Mechanical Engineering, Lund University, Lund, Sweden. 1999. CODEN:LUTMDN/(TMMV-1041)/1-246/(1999).
10. Stefan Adolfsson. *Automatic Quality Monitoring in GMA Welding using Signal Processing Methods for Robotic Arc Welding*. PhD Thesis. Department of Production and Materials Engineering, Lund University, Lund, Sweden. 1998. CODEN LUTMDN/(TMMV-1038)/1-269/(1998).
11. Björn Ågren. *Sensor Integration for Robotic Arc Welding*. PhD Thesis. Department of Production and Materials Engineering, Lund University, Lund, Sweden. 1995. CODEN LUTMDN/(TMMV-1023)/1-151/(1995).
12. Per Dahlén. *Labor Stability in the Justification of Advanced Manufacturing Systems*. PhD Thesis. Department of Production and Materials Engineering, Lund University, Lund, Sweden. 1995. CODEN LUTMDN/(TMMV-1022)/1-136/(1995).

13. Max Xie. *Quality Assurance and Control for Robotic GMA Welding*. PhD Thesis. Department of Production and Materials Engineering, Lund University, Lund, Sweden. 1992. CODEN LUTMDN/(TMMV-1013)/1-171/(1992).

I am currently the main supervisor of one PhD student (Jeroen De Backer).

Services related to my work

The services described in this section are limited to ongoing or most recent services.

External since 2003

1. Expert reviewer for EU 2011, ICT 2011, call 7 (cognitive robotics).
2. Expert reviewer for EU 2010, ICT 2010, call 6 (cognitive robotics).
3. Assessment for position as professor in adaptive manufacturing systems at the Royal Institute of Technology (KTH), Sweden, 2010.
4. Assessment for position as professor in welding technology at University West, Sweden, 2009.
5. Assessment for position as associate professor in welding technology at University West, Sweden, 2009.
6. Assessment for position as associate professor in mechanical engineering at University of Växjö (Now Linnaeus University), 2009.
7. Assessment for position as associate professor in automation technology, Skövde University, 2009.
8. Expert reviewer for EU 2009, ICT 2009-4 and ICT FoF.
9. Chairman of the grading committee for PhD candidate Adrian Murgau, Chalmers, Göteborg. Dissertation on June 11, 2009.
10. External examiner for PhD candidate Fredrik Sikström, University West, Trollhättan and Chalmers, Göteborg. Licentiate seminar on October 3, 2008.
11. Chairman of the grading committee for PhD candidate Avenir Kobetski, Chalmers, Göteborg. Dissertation on September 12, 2008.
12. Chairman of the grading committee for PhD candidate Olof Nyqvist, Royal Institute of Technology (KTH), Stockholm. Dissertation on June 5, 2008.
13. Assessment for position as Professor at Reading University, UK 2008
14. Member of the board of the NordPLM'09 Conference, Göteborg (January 2009)
15. Member of the scientific board of FAIM Conference, Skövde (July 2008)
16. Opponent / external examiner for Licentiate Thesis, PhD candidate Mikael Hedelind, Mälardalen University, March 28, 2008.
17. Chairman of the grading committee for PhD candidate Torbjörn Ilar, Luleå University. Dissertation on March 13, 2008.
18. Assessment for position as Professor, NTNU, Norway, 2007
19. Chairman of the grading committee for PhD candidate Mikael Soron, University of Örebro. Dissertation on December 3, 2007
20. Chairman of the grading committee for PhD candidate Sabina Fjällström, Chalmers, Göteborg. Dissertation on November 9, 2007.
21. External examiner for PhD candidate Morten Kristiansen, Aalborg University, Denmark. Dissertation on June 26, 2007.
22. Chairman of the grading committee for PhD candidate Peter Nordell, Chalmers, Göteborg. Dissertation on February 2, 2007.

23. External examiner for PhD candidate S.P. Kumaresh Babu, National Institute of Technology, Tiruchirappalli, India. Awarded degree, 2006.
24. External examiner (opponent) at Dissertation at KTH, Stockholm, for Candidate Daniel Tesfamariam Semere. Supervisor: Bengt Lindberg. December 22, 2005.
25. External examiner (grading/evaluation committee) at Chalmers, Göteborg for Candidate Björn Åstrand. September 8, 2005. Dissertation at University of Halmstad.
26. External examiner (opponent) at Chalmers, Göteborg, for candidate Ulf Eriksson. Supervisor: Anders Kinnander. March 4, 2005
27. External examiner at Dissertation at Norges Tekniske og Naturvetenskaplige Høgskola (NTNU) (at Narvik), for candidate Björn Solvang. Supervisor: Professor Terje Lien. June 12, 2003.
28. External examiner at Dissertation at de Montfort University, Leicester, UK, for PhD candidate Mr Hok Chuen Ng. Supervisor: Professor Philip Moore. June 13, 2003.

Research

Research areas in robotics are based on three applied areas; (1) industrial robotics, (2) manufacturing system, and (3) service robotics. Within these areas a fundamental technology is simulations that, together with modeling and optimization define our working method in most of our research. Simulation relates to time continuous simulation in robotics and discrete event simulation of manufacturing systems. Modeling is used for many purposes including systems, robots, application processes, etc. Finally, optimization relates to how to solve a task in an efficient way applying simulation and modeling. The publications provide information about specific work in these areas.

Grants

Major grants during the last years are as follows:

1. Samverkande strukturer för flexibel tillverkning, VINNOVA hypotesprövning, contract no 2010-01942. 2010-12-01 – 2011-10-01.
2. Acroboter, EU funded STREP project, contract No 045530. 2007-2010.
3. SMERobot, EU funded IP project, contract no 011838. 2005-2009.
4. L-FAM. National project funded by Vinnova, MERA program. Project no P28065-1. 2005-2008.

Publications

The publications listed below are those published during the last 5-10 years.

Journals

1. Ákos Végvári, Mattias Magnusson, Lars Wallman, Simon Ekström, Gunnar Bolmsjö, Johan Nilsson, Tasso Miliotis, Jörgen Östling, Sven Kjellström, Jan Ottervald, Bo Franzén, Hans Hultberg, György Marko-Varga and Thomas Laurell, "Implementation of a protein profiling platform developed as an academic-pharmaceutical industry collaborative effort", *J. of Electrophoresis*, **29**:2696-2705, 2008.
2. Ulf Lorentzon, Gunnar Bolmsjö, Mike Doyle and David Carus, "MAGIC-HAND: A bottle and jar opening machine for people with severe disabilities", *J. of Gerontechnology*, **6**(2): 79-88, 2007.

3. Tomas Andersson, Mattias Johansson, Gunnar Bolmsjö, and Peter James, "Automating MALDI Sample Plate Loading", *J. of Proteome Research*, (technical note), **6**(2):894-896, 2007. Also visible on the 2006 archive page.
4. Carlos Balaguer, Antonio Gimenez, Alberto Jardón Huete, Angelo M. Sabatini, Mike Topping and Gunnar Bolmsjö, "The MATS Robot" *IEEE Robotics & Automation Magazine*, **13**(1):51-58), 2006.
5. Lars Wallman, Simon Ekström, Mattias Magnusson, Gunnar Bolmsjö, Magnus Olsson, Johan Nilsson, György Marko-Varga and Thomas Laurell, "Robotic implementation of a microchip-based protein clean-up and enrichment system for MALDI-TOF MS readout", *J. of Meas. Sci. Technol*, **17**:3147-3153, 2006.
6. Arne Ingemansson, Torbjörn Ylipää and Gunnar Bolmsjö, "Reducing bottle-necks in a manufacturing system with automatic data collection and discrete-event simulation", *Journal of Manufacturing Technology Management*, **16**(8):615-628, 2005.
7. Anders Blomdell, Gunnar Bolmsjö, Torgny Brogårdh, Per Cederberg, Mats Isaksson, Rolf Johansson, Mathias Haage, Klas Nilsson, Magnus Olsson, Tomas Olsson, Anders Robertsson, and Jianjun Wang, "Extending an Industrial Controller - Implementation and Applications of a fast open sensor interface", *IEEE Robotics & Automation Magazine*, **12**(3):85-94, 2005.
8. Gunnar Bolmsjö and Magnus Olsson, "Sensors in robotic arc welding to support small series production", *Industrial Robot*, **32**(4):341-345, 2005.
9. Per Cederberg, Magnus Olsson and Gunnar Bolmsjö, "A semiautomatic task-oriented programming system for sensor-controlled robotised small-batch and one-off manufacturing", *Robotica*, **23**(6):743-754, 2005.
10. Arne Ingemansson and Gunnar Bolmsjö, "Improved efficiency with production disturbance reduction in manufacturing systems based on discrete-event simulation", *Journal of Manufacturing Technology Management*, **15**(4):267-279, 2004.
11. Rolf Johansson, Anders Robertsson, Klas Nilsson, Torgny Brogårdh, Per Cederberg, Magnus Olsson, Tomas Olsson, and Gunnar Bolmsjö, "Sensor interaction in task-level programming and industrial robotic task execution control", *Industrial Robot*, **31**(3):284-296, 2004
12. Mikael Fridenfalk and Gunnar Bolmsjö, "Design and validation of a universal 6D seam tracking system in robotic welding using arc sensing", *Advanced Robotics*, **18**(1):1-14, 2004.
13. Lars Holst, Lars Randell and Gunnar Bolmsjö, "Integrated development of manufacturing systems using simulation – proposing the fundamentals for a joint research project", *CIRP Journal of Manufacturing Systems*, **31**(4):287-293, 2003.
14. Mikael Fridenfalk and Gunnar Bolmsjö, "Design and validation of a universal 6D seam tracking system in robotic welding based on laser scanning", *Industrial Robot*, **30**(5), 2003.
15. Per Cederberg, Magnus Olsson and Gunnar Bolmsjö, "Virtual Triangulation Sensor Development", Behavior Simulation and CAR Integration Applied to Robotic Arc-Welding", *Journal of Intelligent and Robotic Systems*, **35**:365-379, 2002.
16. Gunnar Bolmsjö, Magnus Olsson and Per Cederberg, "Robotic Arc Welding - Trends and Developments for Higher Autonomy", *Industrial Robot*, **29**(2):98-104, 2002.
17. Mikael Fridenfalk and Gunnar Bolmsjö, "Design and validation of a sensor guided robot control system for welding in shipbuilding", *Int. J. for the Joining of Materials*, **14**(3/4):44-55, 2002.

18. Mikael Ericsson, Gunnar Bolmsjö and Per Nylén. "Three-Dimensional Simulation of Robot Path and Heat Transfer of a TIG-Welded Part with Complex Geometry", SME Technical Paper AD02-292, Society of Manufacturing Engineers, Dearborn, MI, USA, 2002.

Conferences

1. Gunnar Bolmsjö, Mathias Haage, Svend Sohald, Magnus Kjaerbo and Magnus K Gustafsson, "Service oriented architecture for automatic planning and programming of industrial robots". In *Proceedings of the Conference on Flexible Automation and Intelligent Manufacturing FAIM 2010 Conference*, CA, USA, July 12-14, 2010.
2. Lars Cederqvist, Rolf Johansson, Anders Robertsson and Gunnar Bolmsjö, "Faster temperature response and repeatable power input to aid automatic control of friction stir welded copper canisters". In *Proceedings of Friction Stir Welding and Processing V*, San Francisco, USA, pp 39-43, , 2009.
3. Gabor Stepan, Andras Toth, Laszlo L. Kovacs, Gunnar Bolmsjö, Giorgos Nikoleris, Dragoljub Surdilovic, Andreas Conrad, Antonios Gasteratos, Nikolaos Kyriakoulis, Dimitrios Chrysostomou, Rigas Kouskouridas, Joseph Canou, Tom Smith, William Harwin, Rui Loureiro, Rafa Lopez and Miguel Moreno, "ACROBOTER: a Ceiling Based Crawling, Hoisting and Swinging Service Robot Platform", *23rd BCS Conference on Human-Computer Interaction, September 1-5, 2009, Cambridge, UK*.
4. Lars Cederqvist, Gunnar Bolmsjö, Carl D Sorensen, "Adaptive control of novel welding process to seal canisters containing Sweden's nuclear waste using PID algorithms". In *Proceedings of the 18th International Conference on Flexible Automation and Intelligent Manufacturing FAIM 2008 Conference*, Skövde, Sweden, June 30 – July 2008.
5. Gunnar Bolmsjö, "Increased flexibility using sensors to support one-off production in robotic arc welding", In *Proceedings of the JOM-12 Conference*, March 20-23, 2005, Helsingor, Denmark.
6. Gunnar Bolmsjö, Ulf Lorentzon, Mikael Vatau, Mike Doyle, David Carus and Mike Topping, "Development and integration of package opening devices with a flexible robot in a SMART home environment", In *Proceedings of the 7th Conference AAATE*, Dublin August 31st-Sept 3, 2003.
7. Gunnar Bolmsjö and Mikael Fridenfalk. "Sensor guided robot welding in ship building", In *Proceeding of the JOM-11 Conference*, Joining of Materials, Helsingor, Denmark, 2003.
8. Arne Ingemansson, Gunnar Bolmsjö and Ulrika Harlin, "A survey of the use of the discrete-event simulation in manufacturing industry", In *Proceedings of the 10th Int. Manufacturing Conf. in China (IMCC2002)*, Xiamen, China, October 2002.
9. Per Cederberg, Magnus Olsson and Gunnar Bolmsjö, "Remote control of a standard ABB robot system in real time using the Robot Application Protocol (RAP)", In *Proceedings of the International Symposium on Robotics, ISR2002*, Stockholm, October, 2002, paper No. 113.
10. Magnus Olsson, Per Cederberg and Gunnar Bolmsjö, "Integration of Simulation and Execution in Industrial Robot Systems" , In *Proceedings of the International Symposium on Robotics, ISR2002*. Stockholm, 2002, paper No. 112.
11. Gunnar Bolmsjö, Magnus Olsson and Ulf Lorentzon, "Development of a general purpose robot arm for use by disabled and elderly at home", In *Proceedings of the International Symposium on Robotics, ISR2002*. Stockholm, 2002, paper No. 111.

12. Gunnar Bolmsjö, "Education in Automation of Welding at Lund University", In *Proceedings of the Third International Conference on Education in Welding (JOM)*, Helsingør, Denmark, October 2002.
13. Mikael Fridenfalk and Gunnar Bolmsjö, "Design and validation of a sensor guided control system for robot welding in shipbuilding", In *Proceedings of the 11th International Conference on Computer Applications in Shipbuilding, ICCAS 2002*, Malmö, Sweden, September 2002.
14. Ulf Lorentzon and Gunnar Bolmsjö, "A Methodology Using Computer tools in the Product Development Process", In *Proceedings of 8th Mechatronics Forum International Conference, Mechatronics 2002*, Twente, The Netherlands, June 2002.

Books and book chapters

1. Mikael Fridenfalk and Gunnar Bolmsjö, "*Design and Validation of a Universal 6D Seam Tracking System in Robotic Welding Based on Laser Scanning*", Chapter 3 in "*Industrial Robotics - Programming, Simulation and Applications*", pro literatur Verlag, Kin-Huat Low (Editor), 2007. ISBN 3-86611-286-6.
2. Gunnar Bolmsjö, *Industriell Robotteknik*, Studentlitteratur, 2006 (in Swedish).
3. J. Norberto Pires, Altino Loureiro and Gunnar Bolmsjö, *Welding Robots: Technology, System Issues and Application*, Springer, ISBN-13: 978-1852339531, 2005.

Other publications

1. Gunnar Bolmsjö, "Robotanvändning förenklas i Lund", *Fogningsteknik*, (1):20-21, 2007. (edited by Torbjörn Hallgren), in Swedish.
2. Gunnar Bolmsjö. "Increased flexibility using sensors to support one-off production in robotic arc welding" *Danish Welding Magazine*, 2006.
3. "Europeisk teknik för mindre företag", Alexandra Wattvil (Editor), *Verkstäderna*, (12):24-25, 2006. (Article describing the SMERobot project and activities at LTH).
4. Gunnar Bolmsjö, "Industrirobotar – utveckling och användning utifrån ett danskt perspektiv", *Danish Welding Journal*, 2005. In Swedish.