

Personal information

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Current position

I am currently working as Professor at the Department of Computer Science and Electrical, and Space Engineering at Luleå University of Technology. Since February 2009 I am also the manager of research-level education at the department.

As of May 2010, I also hold a visiting researcher position at the University of Bergen and the Christian Michelsen Research Centre.

Academic degrees/appointments

- **January 2012:** Professor, Industrial Electronics, Luleå University of Technology, Sweden.
- **January 2006:** Associate Professor (docent) in Industrial Electronics, Luleå University of Technology, Sweden.
- **April 2002:** Doctor of Philosophy (Ph.D.) in Industrial Electronics. Luleå University of Technology, Sweden.
- **February 2000:** Licentiate in Industrial Electronics Luleå University of Technology, Sweden.
- **January 1998:** Master of Science in Computer Science and Engineering, with a major in Signal Processing. Luleå University of Technology, Sweden.

Grants, awards, and invitations

- 2011-2014 - *Hjalmar Lundbohm Research Centre*. 5.6 MSEK, for modeling and measurement of flow patterns inside weakly magnetic separators. Co-applicant with Prof. Bertil Pålsson, Luleå University of Technology.
- 2011-2013 - *ProcessIT Innovations / Tillväxtverket*. 3.7 MSEK for the “Pulp index” project, in collaboration with pulp and paper industries and their technology providers.
- 2009-2011 - *ProcessIT Innovations*. Funding for developing and participating in collaboration projects with regional process industry.
- June 2006 - *The Royal Skyttean Society Young Researcher Award (Kungl. Skytteanska Samfundet)* for the technical faculty at Luleå University of Technology
- Invited talk at *Institut für Mikro- und Sensorsysteme, Otto-von-Guericke-Universität Magdeburg*. Nov. 29, 2004.
- Research grant from the *Swedish Energy Agency* for developing an ultrasonic sensor for biogas energy content 2004–2005.
- Research grant from the technical faculty for ultrasonic characterization of ceramic bone cements.

- Scholarship for visiting *Laboratoire Ondes et Acoustique* in Paris, France during March–July 2001. Granted by *The Research Council of Norrbotten*.
- Invited speaker at *Automationsdag*, Stockholm, Sweden, February 6–7, 2002.
- Invited talk at *Laboratoire Ondes et Acoustique*, Paris. September 2002.
- Invited article, *Materials Science: Materials in Medicine*, 2002. See publication list below.

Entrepreneurial activities

Founder and owner of JEC Solutions (<http://jec-solutions.mine.nu>). Activities involve consulting and software development in the area of experimental design and measurement systems engineering.

Past job experience

- **Lecturer/senior lecturer** **April 2002 – January 2012**
Dept. of Computer Science, Electrical and Space Engineering, Luleå University of Technology.
- **Head of division** **July 2007 — Aug. 2011**
Div. of Systems and Interaction, Dept. of Computer Science, Electrical and Space Engineering, Luleå University of Technology.
- **Deputy head of department** **Feb. 2009 – Dec. 2010**
Dept. of Computer Science and Electrical Engineering, Luleå University of Technology.
- **Assistant manager, senior lecturer** **July 2005 – June 2007**
EISLAB, Dept. Computer Science and Electrical Engineering, Luleå University of Technology.
- **Ph.D. Student.** **January 1998 – April 2002**
Research and undergraduate teaching. See publication list below.
- **Teaching assistant** **November 1996 – December 1997**
The position involved designing and constructing software and lab material for the first undergraduate course in signal processing at Luleå Univ. of Technology. It also involved grading home exercises, exams, and lab work.
- **Consultant** **December 1995 – January 1996**
Design and implementation of a software package in experimental design for the department of Chemistry Tromsø University, Norway.

Military service

I did my military service at the communications corps S3, Boden, Sweden, as a cryptographer during 1992-1993.

Tutoring experiences

Current Ph.D. students

- January 2012–present: M.Sc. Anders Landström, Div. of Systems and Interaction, Luleå Univ. of Technology.
- November 2011–present: M.Sc. Kubilay Ovacikli, Rubico Consulting AB (Industrial Ph.D. student).
- October 2011–present: M.Sc. Jan Stener, Div. of Mineral Technology, Luleå Univ. of Technology. (Assistant supervisor)

- May 2011–present: M.Sc. Mikael Håkansson, Div. of Systems and Interaction, Luleå Univ. of Technology.
- February 2011–present: M.Sc. Frida Nellros, Div. of Systems and Interaction, Luleå Univ. of Technology.

Past Ph.D. & graduate students

- Dr. Jimmie Wiklander, EISLAB, Luleå Univ. of Technology. (Assistant supervisor). Graduated: December 19, 2011.
- Dr. Tobias Andersson, Div. of Systems and Interaction, Luleå Univ. of Technology. Graduated: December 2010.
- Dr. Fredrik Hägglund, EISLAB, Luleå Univ. of Technology. Graduated: September 2009.
- Dr. Jesper Martinsson, EISLAB, Luleå Univ. of Technology. Graduated: September 2008. Currently with LKAB R&D, Malmberget, Sweden. Received the *Award in Curt Boström's Honor* from *The Research Council of Norrbotten*, for best PhD thesis in 2008.
- Dr. Robert Schäfer, Institut für Mikro- und Sensorsysteme, Otto-von-Guericke-Universität Magdeburg (Assistant supervisor). Graduated: June 3, 2008 (summa cum laude).
- Lic. Eng. Marcus Junered, Luleå Univ. of Technology (Assistant supervisor), Graduated: June 2007.
- Dr. Pär-Erik Martinsson, EISLAB, Luleå Univ. of Technology. (Assistant supervisor), Graduated: 2003. Currently with ProcessIT Innovations, Luleå Univ. of Tech.

Grading committee duties (Ph.D. theses)

- Grading committee member, Robert Schäfer, Magdeburg University, Germany, 2008.
- Grading committee member, Jenny Wirandi, Lund University of Technology, Sweden.
- Grading committee member, Peter Holdfeldt, Chalmers, Sweden, June 2009.
- Grading committee member, Erik Vanhatalo, Luleå University of Technology, Sweden, December 2009.
- Grading committee member, Marcus Engholm, Uppsala University, Sweden, May 2010.
- Grading committee member (reserve), Malin Albing, Luleå University of Technology, Sweden, 2008.
- Grading committee member (reserve), Erik Olsson, Luleå University of Technology, Sweden, 2007.
- Grading committee member (reserve), Eva-Lena Johansson, Luleå University of Technology, Sweden, 2007.

Lecturing and teaching on Bachelor's and Master's level

As of today I have been the supervisor or supervisor of over 30 Master's theses. I have also been involved in teaching numerous courses. Below is a list of a few.

- **Signals and systems I** (1998–2000). Lecturing as well as grading of lab work and exercises. I also developed the computer simulation system and computer assignments for the course.
- **Digital transmission systems** (1999). Lectures and laboratory work.
- **Multidimensional signal processing**. Lectures and laboratory work (image coding).
- **Discrete-time signal processing** (1998). Lab work and homework assignments.

- **Undergraduate project in signal processing** (1999–2000). Responsible for planning the course as well as supervising individual projects.
- **Instrumentation and Experimental Methodology** (2000–2002). Lectures on experimental design, and supervision of project groups.
- **Measurement Technology and Signal Processing** (2002) Lectures on Signal Processing, Communications Systems for engineering students in Kalix.
- **Medical Signal Processing** (2004) Course planning, lectures and lab work.
- **Measurement and Instrumentation**. Examiner (2005–2009), Course development, lectures and lab work (2005–2007).
- **Introduction to Information Technology (introductory course)** Course development, examiner, lectures, lab work.
- **Industrial Image Analysis (2007–2010)**. Examiner. Course development
- **Signal Analysis (2009)**. Lectures and lab work.
- **Measurement Technology & Uncertainty Analysis**. Course development, examiner, lectures, and lab work. Fall 2009–
- **Radiography and Digital Image Processing**. Lectures and lab work (2010).

Other

- Program committee member, poster session, *ITF Automationsdag*, Stockholm, Sweden, February 5–6, 2009
- Session chair, International Congress on Ultrasonics (ICU2007), Vienna, Austria, April 9–12, 2007.
- Reviewer for *IEEE Trans. Ultrason., Ferroelec., and Freq. Contr.* 2005–present.
- Reviewer for *Elsevier Ultrasonics*. 2003 – present.
- Reviewer for *J. Biomed. Mater. Res.: Part B - Appl. Biomat.* 2005–present.
- Reviewer for *Measurement Science and Technology* 2004–present.
- Board member of Luleå Sportskyttklubb (Shooting Sports Club). 2004–present (currently president). President 2007–present.
- Board member of SJ Pistolklubb (Pistol Club), Luleå. 2005–present (currently vice president).
- Board member of the Shooting Sports Association of Norrbotten. 2011–present (currently chairman of the pistol section).
- Board member of Frispel (university music association), Luleå. 2006–2011 (president).
- Board member of the Fencing Association of Norrbotten, 1993–1995.
- Board member of Umeå Fencing Club, Umeå, Sweden, 1990–1991.

References

Available upon request.

Publications

Publication summary (Last update: November 3, 2011)

- 1 book (co-author)
- 1 book chapter (co-author)
- 23 peer-reviewed journal articles
- 42 conference papers
- ISI citation count: 74
- ISI H-index: 4
- SCOPUS citation count: 100
- SCOPUS: H-index: 5
- Google Scholar citation count (excl. books): 183
- Google Scholar H-index: 7

Books and book chapters

- [1] R. Carlson and J. E. Carlson, *Design and Optimization in Organic Synthesis: Second Enlarged and Revised Edition*. Amsterdam: Elsevier, 2nd ed., 2005.
- [2] R. Carlson and J. E. Carlson, *Comprehensive Chemometrics: Chemical and Biochemical Data Analysis*, vol. 1, ch. The Study of Experimental Factors, pp. 301–344. Amsterdam: Elsevier, 2009.

Theses and reports

- [1] J. Carlson, *Ultrasonic Characterization of Materials and Multiphase Flows*. PhD thesis, Luleå University of Technology, April 2002.
- [2] J. Carlson, “Multiphase flow measurements using ultrasound,” Licentiate thesis, Luleå University of Technology, February 2000.
- [3] J. Carlson and A. Grennberg, “A new algorithm for constructing optimal experimental designs,” Research report, Luleå University of Technology, November 1998. ISSN: 1402-1528.
- [4] J. Carlson, “Ultrasound measurements in moving multi-phase suspensions,” Master’s thesis, Luleå University of Technology, January 1998. ISSN: 1402-1617.

Peer-reviewed journal articles

- [1] R. Carlson, J. Carlson, and A. Grennberg, “A novel approach for screening discrete variations in organic synthesis,” *J. Chemometrics*, vol. 15, no. 5, pp. 455–474, 2001.
- [2] J. Carlson and P.-E. Martinsson, “A simple scattering model for measuring particle mass fractions in multiphase flows,” *Ultrasonics*, vol. 39, no. 8, pp. 585–590, 2002.
- [3] M. Nilsson, J. Carlson, E. Fernández, and J. A. Planell, “Monitoring the setting of calcium-based bone cements using pulse-echo ultrasound,” *J. Mater. Sci: Mater. in Med.*, vol. 13, no. 12, pp. 1135–1141, 2002.
- [4] J. Carlson, M. Nilsson, E. Fernández, and J. A. Planell, “An ultrasonic pulse-echo technique for monitoring the setting of CaSO₄-based bone cement,” *Biomaterials*, vol. 24, no. 1, pp. 71–77, 2003.
- [5] J. Carlson and R. K. Ing, “Ultrasonic speckle correlation imaging of 2D particle velocity profiles in multiphase flows,” *Flow Measurement and Instrumentation*, vol. 14, no. 4-5, pp. 193–200, 2003.

- [6] J. E. Carlson and P.-E. Martinsson, "Exploring interaction effects in two-component gas mixtures using orthogonal signal correction of ultrasound pulses," *J. Acoust. Soc. Am.*, vol. 117, no. 5, pp. 2961–2968, 2005.
- [7] R. Carlson and J. E. Carlson, "Canonical analysis of response surfaces. a valuable tool for process development," *Org. Proc. Res. Dev.*, vol. 9, no. 3, pp. 321–330, 2005.
- [8] R. Carlson and J. E. Carlson, "Principal properties and designs for discrete variations," *Org. Proc. Res. Dev.*, vol. 9, no. 5, pp. 680–689, 2005.
- [9] J. E. Carlson and R. Carlson, "Prediction of molar fractions in two-component gas mixtures using pulse-echo ultrasound and PLS regression," *IEEE Trans. Ultrason., Ferroelec., and Freq. Contr.*, vol. 53, no. 3, pp. 606–613, 2006.
- [10] J. Martinsson and J. E. Carlson, "Parametric estimation of ultrasonic phase velocity and attenuation in dispersive media," *Ultrasonics*, vol. 44, pp. e991–e994, Dec. 2006.
- [11] R. Schäfer, J. E. Carlson, and P. Hauptmann, "Ultrasonic concentration measurement of aqueous solutions using PLS regression," *Ultrasonics*, vol. 44, pp. e947–e950, Dec. 2006.
- [12] J. Martinsson, J. E. Carlson, and J. Niemi, "Model-based phase velocity and attenuation estimation in wideband ultrasonic measurement systems," *IEEE Trans. Ultrason., Ferroelec., and Freq. Contr.*, vol. 54, pp. 138–146, Jan. 2007.
- [13] J. E. Carlson and V.-M. Taavitsainen, "Ultrasonic measurement of the reaction kinetics of the setting of calcium sulfate cements using implicit calibration," *J. Chemom.*, vol. 22, no. 11-12, pp. 752–757, 2008.
- [14] J. Martinsson, F. Häggglund, and J. E. Carlson, "Complete post-separation of overlapping ultrasonic signals by combining hard and soft modeling," *Ultrasonics*, vol. 48, no. 5, pp. 427–443, 2008.
- [15] F. Häggglund, J. Martinsson, and J. E. Carlson, "Model-based estimation of thin multi-layered media using ultrasonic measurements," *IEEE Trans. Ultrason., Ferroelec., and Freq. Contr.*, vol. 56, no. 8, pp. 1689–1702, 2009.
- [16] R. Carlson, G. Simonsen, A. Descomps, and J. E. Carlson, "Orthogonal experiments in the development of organic synthetic processes," *Org. Proc. Res. Dev.*, vol. 13, no. 4, pp. 798–803, 2009.
- [17] G. Johansson, F. Häggglund, J. E. Carlson, and J. Johansson, "Picosecond level error detection using PCA in the hardware timing systems for the EISCAT-3D LAAR," *Radio Science Bulletin*, no. 333, pp. 45–50, 2010.
- [18] F. Häggglund, J. E. Carlson, and T. Andersson, "Ultrasonic classification of thin layers within multi-layered materials," *Meas. Sci. Tech.*, vol. 21, no. 1, p. 015701, 2010.
- [19] T. Andersson, M. J. Thurley, and J. E. Carlson, "A machine vision system for estimation of size distributions by weight of limestone particles during ship loading," *Minerals Engineering*, vol. 25, no. 1, pp. 38–46, 2012.
- [20] M. D. Vlad, L. González, S. Gómez, J. López, J. E. Carlson, and E. Fernández, "Ultrasound monitoring of the setting of calcium-based bone cements," *J. Mater. Sci: Mater. Med.*, 2012. Published online, April 8, 2012.
- [21] J. E. Carlson, J. R. Gasson, T. Barth, and I. Eide, "Extracting homologous series from mass spectrometry data by projection on predefined vectors," *Chemom. Intell. Lab. Syst.*, no. 114, pp. 36–43, 2012.

- [22] J. E. Carlson, A. Linge Tomren, K. Folegrø, and T. Barth, "Estimation of dielectric properties of crude oils based on IR spectroscopy," *Chemom. Intell. Lab. Syst.*, 2012. Submitted.
- [23] R. Carlson, G. Simonsen, A. Descomps, and J. E. Carlson, "Identification of important experimental variables in organic synthetic procedures by near-orthogonal experiments," *Org. Proc. Res. and Dev.*, 2012. Submitted.

Conference papers

- [1] R. Carlson and J. Carlson, "Strategy for screening variations in organic synthesis," in *Proc. of Chimométrie 97*, (Lyon, France), December 3–5 1997.
- [2] J. Carlson, A. Grennberg, and J. Delsing, "Multiphase flow characterized by scattering of ultrasound," in *Proc. of 9:th Int. Conf. on Flow Meas. FLOMEKO'98*, (Lund, Sweden), pp. 493–497, June 1998.
- [3] J. Carlson and A. Grennberg, "Ultrasonic measurement of particle mass fractions in multiphase flow," in *Proc. of IEEE Int. Ultrason. Symp.*, vol. 1, (Lake Tahoe, NV, USA), pp. 757–760, October 1999.
- [4] R. Carlson, J. Carlson, and A. Grennberg, "Novel and optimal strategy for screening discrete variations in organic synthesis," in *Proc. of 17th Process Dev. Symp.*, (Cambridgeshire, UK), June 13–15 1999. Invited for presentation.
- [5] J. Carlson, "Mass fraction measurements in multiphase flows using a clamp-on PVDF array," in *Proc. of IEEE Int. Ultrason. Symp.*, vol. 1, (San Juan, Puerto Rico), pp. 471–474, October 2000.
- [6] J. Carlson, "Joint measurement of particle distribution and particle mass fraction in multiphase flows using a clamp-on PVDF array," in *Proc. of Flow Measurement 2001*, (Peebles, Scotland, UK), 2001.
- [7] J. Carlson, G. Bouchet, and A. Maurel, "Simultaneous characterization of velocity and temperature profiles using time-reversal," in *Proc. 17:th Int. Congr. on Acoust. ICA2001*, (Rome, Italy), p. 4A.01, September 2001.
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- [10] J. Carlson, M. Nilsson, E. Fernández, and J. A. Planell, "Monitoring the setting of injectable calcium-based bone cements using pulse-echo ultrasound," in *Proc. of IEEE Int. Ultrason. Symp.*, (Munich, Germany), pp. 1261–1264, October 8–11 2002.
- [11] J. Carlson, F. Sjöberg, N. Quieffin, R. K. Ing, and S. Catheline, "Echo-cancellation in a single-transducer ultrasonic imaging system," in *Proc. of the 5:th Nordic Signal Processing Symposium, NORSIG-2002*, (Tromsø, Norway), October 4–7 2002.
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- [13] P.-E. Martinsson, J. E. Carlson, and R. Carlson, "Ultrasonic classification of gases using principal component analysis," in *Proc. of the 5th World Congress on Ultrasonics*, (Paris, France), pp. 1129–1132, WCU, September 7–10 2003.

- [14] J. E. Carlson, J. van Deventer, and M. Micella, "Accurate temperature estimation in ultrasonic pulse-echo systems," in *Proc. of the 5th World Congress on Ultrasonics*, (Paris, France), pp. 1565–1568, WCU, September 7–10 2003.
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- [20] M. Barracó, E. Fernández, R. Torres, J. López, R. Bosch, and J. Carlson, "Ultrasound monitoring of the setting of injectable bone cement biomaterials for spinal surgery applications," in *Proc. of the Second Annual European Rheology Conference*, (Grenoble, France), April 21–23 2005.
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- [25] F. Hägglund, J. Martinsson, J. E. Carlson, and C. Carlander, "Model-based characterization of thin layers using pulse-echo ultrasound," in *Proc. of International Congress on Ultrasonics*, (Vienna, Austria), p. Paper ID 1562, April 9–12 2007.
- [26] J. E. Carlson, J. Martinsson, and M. Lundberg Nordenvaad, "Measurement of methane content in upgraded biogas using pulse-echo ultrasound," in *Proc. of International Congress on Ultrasonics*, (Vienna, Austria), p. Paper ID 1366, April 9–12 2007.
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- [35] J. E. Carlson and F. Häggglund, "Characterization of thin layers in multi-layered structures: On the problem of finding starting values for numerical solutions to inverse problems," in *Proc. of IEEE Int. Ultrason. Symp.*, (Rome, Italy), pp. 1537–1540, September 20-23 2009.
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- [39] A. Renbi, J. E. Carlson, and J. Delsing, "Impact of pcb manufacturing process variations on trace impedance," in *International Symposium on Microelectronics*, no. 44, (Long Beach, CA), Oct. 9-13 2011.
- [40] A. L. Tomren, T. Barth, K. Folgerø, and J. E. Carlson, "Chemometric analysis of crude oil composition and fluid properties," in *Biennial conference of the European Association of Organic Geochemists (EAOG)*, no. 25, (Interlaken, Switzerland), Sept. 18-23 2011.
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Other (popular science or contributions to magazines and trade-shows)

- [1] J. E. Carlson, “Utveckling av analysmetoder för bio- och naturgas med hjälp av ultraljud,” *Nytt om Biogas*, no. 1, pp. 10–11, 2005.
- [2] J. Carlson and J. van Deventer, “IT som stöd för optimering och energimätning i fjärrvärme och gasnät,” in *Proc. of Energi, IT och Design*, (Eskilstuna, Sweden), January 18-19 2006.
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