

JAMES R SOLBERG

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OBJECTIVE

Seeking full-time employment as an Electrical/Mechanical/Systems Engineer in areas such as controls, sensing, or electromechanical systems (available early 2008).

EDUCATION

Doctorate of Philosophy

Northwestern University - Dept. of Mechanical Engineering (Anticipated Completion: Dec 2007 or June 2008)

- **Specialization:** sensing, controls, robotics, mechatronics, systems engineering, sensor fusion, sensor design, target localization, information filtering, signal processing, complex systems, sensing/motion co-optimization, and mechanical design
- **Working Dissertation Title:** "Sensor-Based Control in Electrosensory Systems"
- **Lab:** Laboratory for Intelligent Mechanical Systems (research advisors: Kevin Lynch & Malcolm MacIver)
- **GPA:** 4.0 / 4.0
- **Selected Courses:** Computer Control in Manufacturing ◊ Neural Control of Movement ◊ Advanced Mechatronics ◊ Sensorimotor Control ◊ Biomedical Robotics ◊ Flexible Automation ◊ Optimal Control ◊ Geometry in Robotics ◊ Optimization ◊ Motion Planning and Control Under Uncertainty ◊ Nonlinear Dynamics

Master of Science (Computer Systems Engineering)

Sydney University (Australia) - School of Electrical and Information Engineering (December 2000)

- **Specialization:** feedback control, electromechanical systems, embedded microprocessors, sensors, biomedical engineering, low-level programming (i.e., assembly language), and real-time control
- **Thesis Title:** "Closed-Loop Control of Functional Electrical Stimulation for Human Gait: Introduction, Feedback Sensors, and Foreseeable Difficulties"
- **Selected Courses:** Computers in Real Time Control and Instrumentation ◊ Microprocessors in Engineered Products ◊ Networked Systems ◊ Biomedical Engineering Systems

Master of Science (Mechanical Engineering)

University of Illinois (Urbana-Champaign) - Dept. of Mechanical Engineering (December 1999)

- **Specialization:** controller design, sensing, computer control of mechanical systems, signal filtering, DSP programming, control theory, analog electronics, and thermodynamics
- **Thesis Title:** "Regulation of the Liquid-Mass-Fraction of the Refrigerant Exiting an Evaporator"
- **Lab:** Air Conditioning and Refrigeration Center (research advisor: Norm Miller)
- **GPA:** 3.8 / 4.0
- **Selected Courses:** Computer Control of Mechanical Engineering Systems ◊ Industrial Control Systems ◊ Genetic Algorithms in Search, Optimization, and Machine Learning ◊ Mechatronics ◊ Control System Theory and Design ◊ Computer Architecture ◊ Biomedical Instrumentation

Bachelor of Science (Mechanical Engineering)

University of Illinois (Urbana-Champaign) - Dept. of Mechanical Engineering (December 1997)

- **Senior Project:** "Motor Grader Engine Air Intake System Design"
- **GPA:** 3.7 / 4.0

AREAS OF EXPERTISE

- | | | | |
|------------|---|--------------------|-----------------------|
| • CONTROLS | • INFORMATION & SIGNAL FILTERING | • MECHATRONICS | • SYSTEMS ENGINEERING |
| • SENSING | • BIO-INSPIRED SENSING & CONTROL TECHNIQUES | • EMBEDDED SYSTEMS | • SENSOR DEVELOPMENT |
| • ROBOTICS | • ELECTROMECHANICAL SYSTEMS | • SENSOR FUSION | • COMPUTER SIMULATION |
| • MATLAB | • BAYESIAN (e.g., KALMAN) FILTERING | • ELECTRONICS | • REAL-TIME CONTROL |

PROFESSIONAL EXPERIENCE

Graduate Research Assistant

Northwestern University (September 2003 - present)

- Developed controller and data processing software for a biologically-inspired active sensing system.
- Designed and built a feedback-controlled robot capable of locating and tracking underwater objects using a novel sensing system.
- Managed small research team consisting of both students and professors.

Research Engineer

Northwestern University Fienberg School of Medicine (March 2001 - August 2003)

- Designed, fabricated, and maintained the mechanical, electrical, and computer systems of the laboratory facilities.
- Made significant contributions to many collaborative research projects throughout the department.
- Instructed students on engineering concepts related to their research and courses.

Controls and Instrumentation Engineer

Faculty of Health Sciences at Sydney University (*June 2000 - December 2000*)

- Participated in research team to develop a biomedical system that could enable paraplegic patients to walk.
- Duties included developing controller and signal processing algorithms, implementing and maintaining software and hardware, updating colleagues on my progress, and publishing results.

Tutor/Instructor/Counselor

Wesley College at Sydney University (*February 2000 - November 2000*)

- Provided individual tutoring and supplementary lectures to undergraduate students in disciplines of mathematics, physics, and mechanical, electrical, and computer engineering.
- Counseled and mentored undergraduate students needing guidance.

Graduate Research Assistant

University of Illinois (Urbana-Champaign) (*January 1998 - January 2000*)

- Conducted research in the area of feedback control of mobile air conditioning systems.
- Invented and calibrated a groundbreaking sensor that permits air conditioners to operate more effectively.
- Other duties included managing project, coordinating with corporate sponsors to fulfill their needs, publishing results, and presenting quarterly deliverables to corporate sponsors.

Software Development Engineer

Wolfram Research (Champaign, IL) (*Summer 1997*)

- Debugged large sections of the existing software.
- Developed and implemented original software package which is used to graphically model various engineering systems.

Research Assistant

Wolfram Research (Champaign, IL) & University of Illinois (UIUC) (*Summer 1996*)

- Created and validated algorithms for the inverse kinematics of a robotic manipulator.
- Coordinated with other team members to insure continuity of research; presented and published conclusions.

PRIMARY-AUTHOR WRITTEN WORK

- Solberg, J.R. & P.M. Ferreira. **Inverse Kinematics of Robotics and Its Applications of Symbolic Computing.** *Wolfram Research Inc.* Technical Report. 1996: Champaign, IL.
- Solberg, J.R. & N.R. Miller. **Regulation of the Liquid-Mass-Fraction of the Refrigerant Exiting an Evaporator.** *The Air Conditioning and Refrigeration Center* Technical Report TR-159. 2000: Urbana, IL.
- Solberg, J.R., N.R. Miller, & P.S. Hrnjak. **A Sensor for Estimating the Liquid Mass Fraction of the Refrigerant Exiting an Evaporator.** *Society of Automotive Engineers 2000 World Congress.* 2000: Detroit, MI.
- Solberg, J.R. & R.M. Smith. **Closed-Loop Control of Functional Electrical Stimulation for Human Biped Locomotion in Paraplegic Patients.** *Faculty of Health Sciences* Technical Report. 2001: Sydney, Australia.
- Solberg, J.R. **Sensor-Based Control in Weakly Electric Fish with Applications to Robotics.** *The Laboratory for Intelligent Mechanical Systems* Technical Report. 2005: Evanston, IL.
- Solberg, J.R., K.M. Lynch, & M.A. MacIver. **Robotic Electrolocation: Active Underwater Object Localization with Electric Fields.** *IEEE International Conference on Robotics and Automation.* 2007: Rome, Italy.
- Solberg, J.R., K.M. Lynch, & M.A. MacIver. **Active Electrolocation for Underwater Target Localization.** currently submitted to *The International Journal of Robotics Research.*

A FEW OTHER PROJECTS (RESEARCH, CLASS, AND PROFESSIONAL)

- Primordial Turtles: The Emergence of Adaptation and Optimization in an Ecosystem (an interactive computer simulation)
- The Autostalker (an autonomous robot capable of following a human evader)
- The Weight 2K Precision Electronic Scale (operated with an embedded microprocessor)
- Conductive Polymer Sensor In-Shoe Discrete Plantar Pressure Measurement System
- Fist of Fury: Virtual Reality Glove and Robotic Hand
- Optimization of a Mesoscopic Peristaltic Compressor Channel Using a Genetic Algorithm

HONORS & AFFILIATIONS

HONORS

Varsity Letter: University of Illinois (Track & Field)

Tau Beta Pi: Engineering Honor Society

Golden Key: International Honor Society

All-Big Ten Academic: Big Ten Conference (Scholar-Athlete Award)

PROFESSIONAL AFFILIATIONS

American Society of Mechanical Engineers

Institute of Electrical and Electronics Engineers

⇒ [More details on my background and interests are available at http://solbergweb.com/james/engineer/](http://solbergweb.com/james/engineer/) ⇐