# SCOTT LANGEVIN

Research Scientist

## RESEARCH INTERESTS

My research interests are in artificial intelligence, specifically probabilistic reasoning and multiagent systems. I am also interested in expert systems, machine learning, software engineering and service oriented computing.

## EDUCATION

**Doctor of Philosophy, Computer Science** 2006-2010
University of South Carolina, Columbia South Carolina
Department of Computer Science and Engineering

- Advisor: Marco Valtorta
- Dissertation: Knowledge Representation, Communication, and Update in Probability-Based Multiagent Systems
- GPA: 3.94 / 4.0

**Master of Engineering, Computer Science** 2006-2008
University of South Carolina, Columbia South Carolina
Department of Computer Science and Engineering

- Specialization: Artificial Intelligence and Distributed Computing
- GPA: 3.95 / 4.0

**Bachelor of Science, Computer Science** 1995-2001
University of Victoria, Victoria British Columbia
Department of Computer Science and Engineering

- Specialization: Software Engineering

## RESEARCH EXPERIENCE

**DOVETAIL**
**IARPA KNOWLEDGE DISCOVERY AND DISSEMINATION (KDD)**
Toronto, Ontario
**Machine Learning Researcher** 2011-Present

- Performed research on large scale complex event processing and event clustering in support of event similarity search.

**WATCH OFFICER INFORMATION NETWORK DISPLAY SYSTEM**
**DARPA RESILIENT COMMAND AND CONTROL (RC2)**
Toronto, Ontario
**Adaptive Systems Researcher** 2011-Present

- Preformed research on adaptive user interfaces in support of command and control of large heterogenious command and control systems.

**SENIORSMART CENTER FOR ECONOMIC EXCELLENCE**
Columbia, South Carolina
**Research Assistant** 2008-2010

The SeniorSMART center is focused on the research and development of technologies to address the needs of an aging population. I was involved with researching and developing prototype technologies for a home environment that can detect when an occupant has fallen and in need of assistance. An additional focus of the project dealt with monitoring occupants' movements (sit-to-stand, gait, sleeping patterns, and motion behavior) with the goal of detection of deviations in behavior that may indicate onset of an illness.

- **SMARTHOME Project (funded by Palmetto Health)**
  - **Co-PIs: Michael N. Huhns and Victor Hirth**
  - Researched existing state of art of automated human fall detection.
  - Constructed a pattern recognition system using vibration data from simulations for fall detection.
  - Prototyped several different fall detection systems and evaluated their performance.
  - Prototyped a piezo electric pressure sensor for sit-to-stand test measurements.
  - Provided technical recommendations for the project.

**FRAUNHOFER INSTITUTE FOR EXPERIMENTAL SOFTWARE ENGINEERING**
Kaiserslautern, Germany
**Visiting Researcher** June 2008

As a visiting researcher to the Fraunhofer Institute of Experimental Software Engineering I was provided an opportunity to see how Fraunhofer researchers approach problems of elderly care using technology. During the course of the stay, I worked in Fraunhofer's high tech Assisted Living Laboratory with researchers exploring sensor technology and artificial intelligence techniques to identify and track behaviors of elderly for the purpose of early diagnosis of changing health conditions.

- Explored practical applications of technology to monitor the health of the elderly in a home setting.
- Worked with Fraunhofer researchers on an EMFIT pressure mat system for measuring physical motor capabilities of older adults by measuring their capacity to stand up from a chair, with the intent of uncovering diagnostic patterns that can indicate oncoming disabilities.
- Worked with software architects to learn the design, configuration and installation of a service oriented platform for sensor networks.

**CENTER FOR INFORMATION TECHNOLOGY**
Columbia, South Carolina
**Research Assistant** 2006-2009

The Center for Information Technology focusses on agent-based systems and decision support research. During this time, I was involved in the research and development of several government and privately funded research projects.

- **Scalability of Service-Oriented Applications (funded by U.S. Navy OPNAV)**
  - **PI: Michael N. Huhns**
  - Developed a decision support system to aid a decision-maker in determining the feasibility and appropriate software architecture for a planned application.
  - Assisted with the construction of a simulation of SOA performance under varying loads.
- **Combining Facts and Expert Opinion in Analytical Models via Logical and Probabilistic Reasoning (funded by DTO)**
  - **Co-PIs: Marco Valtorta, Michael N. Huhns and John Byrnes**
  - Lead the software development of BALER (Bayesian and Logical Engine for Reasoning).
  - Created BRUSE, a Bayesian reasoning engine that supports soft evidence.
  - Responsible for integration using web services with other CASE research groups.
  - Assisted with the creation of a natural deduction proof to Bayesian network converter.
- **ACTAR Project (funded by USC CIT)**
  - **PI: Michael N. Huhns**
  - Developed a mobile handheld system that provides tactical and cultural advice to warfighters.
  - Developed a recommender engine for the system to provide situation assessments and recommended actions.

## PROFESSIONAL EXPERIENCE

**OCULUS INFO, INC.**
Toronto, Ontario
**Research Scientist** 2011-Present

I am currently a researcher scientist, involved with artificial intelligence research and development. Focusing on machine learning solutions for adaptive systems, probabilistic modeling, mixed initiative AI and detecting complex temporal patterns in rich datasets.

**IMPACT TECHNOLOGIES GROUP, INC.**
Charlotte, North Carolina
**Software Engineer** 2004-2005

While working at Impact Technologies I was an important member of the user interface team. My role was to research and incorporate latest technologies into Impacts financial planning suite PlanLab.

- Developed several ASP.NET software frameworks to ease development and maintenance.
- Involved in re-architecting PlanLab into an extensible modular system.
- Developed a web-based dynamic data acquisition system designed to be a drop-in replacement for Microsoft InfoPath.

**WENCO SYSTEMS LTD.**
Victoria, British Columbia
**Systems Consultant** 2001-2004

This position required me to work closely with project managers and IT departments to provide custom contract management software (PACT) to Wenco's clients. My responsibilities included creating database models, user interfaces, business logic and interfacing into existing third-party database applications. Specific clients and duties included:

- **Syncrude Canada Ltd., Fort McMurray Alberta**
  - Design and architected next version of PACT as a web application using ASP.NET.
  - Replaced existing work request and release systems and fully integrated with PACT.
  - Designed a distributed object oriented framework for ease of system development by junior developers.
  - Developed technical specifications and requirements.
- **OA Solutions, Victoria, BC**
  - Architected system design for the Health Cross Jurisdictional Database System (this system aids federal and provincial governments to project and track actual costs in the Health sector).
  - Responsible for development of core system.
  - Instructed several training sessions on ASP.NET for OA Solutions development team.
  - Provided development support to OA Solutions senior and junior developers.
- **Centre for Education Information Standards and Services (CEISS),Victoria,BC**
  - Assisted development of the Student Outcomes Reporting System (SORS).
  - Developed web pages in ASP utilizing JavaScript for client side functionality.
  - Developed business objects in VB to aid in generating Excel reports.
- **Suncor Energy Inc. (Oil Sands), Fort McMurray, AB**
  - Re-Architected the Web Based Amendments and Releases workflow system.
  - Developed DB conversion routines for old WBAR data.
  - System interfacing with financial systems (ORACLE).
- **BC Buildings Corp. (BCBC), Victoria, BC**
  - Developed a web based vendor performance entry system.
  - Developed Oracle procedures to email BCBC personnel to fill out a vendor performance when a contract end date has been reached.

**ORBITAL TECHNOLOGIES INC.**
Vancouver, British Columbia
**Software Developer** 2000 (Workterm)

- Developed educational children's software for TLC using a variety of software tools, such as VC++, CodeWarrior, and ToolBook.

- Creating a tool for educators to install and control online curriculum for students.
- Ported several Broderbund software titles for use with the educational tool. This often required reverse engineering binary file formats and learning new development tools.

**WENCO SYSTEMS LTD.**
Victoria, British Columbia
**Software Developer** 1999 (Workterm)
- Implemented several database driven web applications for Wenco Systems, such as an online bug tracking system and time management system.

**ISM-BC TELECOM SOLUTIONS**
Burnaby, British Columbia
**Network Administrator** 1998 (Workterm)
- Responsible for Windows administration. Primary task was the configuration of two new DNS servers, and reorganizing the network topology. The main goal of this task was to increase network security.

## TEACHING EXPERIENCE

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**
University of South Carolina, Columbia South Carolina

- **Instructor - Introduction to Information Technology (CSCE 101) — Fall 2006**
  - Instructed freshmen on various entry level topics in information technology.
- **Laboratory Instructor - Web Programming (CSCE 102) — Spring 2006**
  - Instruction of XHTML, CSS and Javascript tutorials to freshmen.

## INVITED LECTURES

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**
University of South Carolina, Columbia South Carolina

- **Guest Lecture - Algorithmic Design I (CSCE 145) — Fall 2009**
  - Instructed students on software development using Eclipse and Java.
- **Guest Lecture - Service Oriented Computing (CSCE 526) — Spring 2009**
  - Instructed students on the use of Eclipse and AXIS2 for web service development.

## HONORS AND AWARDS

**AAMAS Student Scholarship** 2010
Accepted for AAMAS Doctoral Consortium (one of 12 students worldwide)

**Member of Upsilon Pi Epsilon** 2008
International Honor Society for the Computing and Information Disciplines

**Member of Eta Kappa Nu** 2007
International Honor Society for Electrical and Computer Engineering

## PUBLICATIONS

"Agent-Encapsulated Bayesian Networks and the Rumor Problem" (with Marco Valtorta, and Mark Bloemeke), In *Proceedings of the Ninth International Conference on Autonomous Agents and Multiagent Systems*, 2010.

"Data Characterization and Classification of Acceleration and Acoustic Emission Data for Human Fall Detection" (with J. Caicedo, P. Shin, V. Hirth, D. Krotish and D. Mitchell), In preparation for *Modical Engineering & Physics*.

"Knowledge Representation, Communication, and Update in Probability-Based Multiagent Systems", In *Proceedings of the Ninth International Conference on Autonomous Agents and Multiagent Systems Doctoral Consortium*, 2010.

"Agent-Encapsulated Bayesian Networks and the Rumor Problem" (with Marco Valtorta, and Mark Bloemeke), Technical Report CSCE TR-2010-001. Technical report, Department of Computer Science and Engineering, University of South Carolina, February 2010.

"Performance Evaluation of Algorithms for Soft Evidential Update in Bayesian Networks: First Results" (with Marco Valtorta), In *Proceedings of the Second International Conference on Scalable Uncertainty Management*, 2008.

"Cultural Tactical Advisor for Warfighters" (with Michael N. Huhns, José M. Vidal, Alicia Ruvinsky and Benito Mendoza), In *Proceedings of 25th Army Science Conference*, 2006.

## PROFESSIONAL AFFILIATIONS/MEMBERSHIPS

- IEEE Computer Society
- Association for Computing Machinery (ACM)
- Association for the Advancement of Artificial Intelligence (AAAI)
- Multiagent Reading Group, University of South Carolina
- Bayesian Network Reading Group, University of South Carolina

## PROFESSIONAL ACTIVITIES

### PROGRAM COMMITTEE MEMBER

- IEEE International Conference on Service-Oriented Computing and Applications (SOCA'10), Perth, Australia, December 2010
- International Workshop on Situation Recognition and Medical Data Analysis in Pervasive Health Environments (PervaSense'10), Munich, Germany, March 2010
- IEEE International Conference on Service-Oriented Computing and Applications (SOCA'09), Taipei, Taiwan, December 2009
- International Workshop on Situation Recognition and Medical Data Analysis in Pervasive Health Environments (PervaSense'09), London, UK, April 2009

### ACADEMIC REVIEWER

- International Conference on Industrial, Engineering, & Other Applications of Applied Intelligent Systems (IEA-AEISOCA 2010), Perth, Australia, December 2010