John Benjamin Cassel

Current Direction

Improving the governance of infrastructure and stewardship of natural resources by developing information systems and design activities for discovering relationships, understanding stakeholders, and determining impacts.

Work experience

◇ **Systems Engineer**, Agrible, Champaign, IL (Summer 2015-Current)

- Domain modeling, data analysis, and optimization for better decision making in farm systems leading to more sustainable and profitable outcomes.

◇ **Research Programmer**, Wolfram Research, Champaign, IL (Spring 2014-Summer 2015)

- Created an engineering design framework supporting agent-based exploration.
- Assisted in the development of user-visible Mathematica functionality.
- Supported Wolfram|Alpha database applications.

◇ **Software Engineer**, Wolfram|Alpha LLC, Champaign, IL (Fall 2009-Winter 2013)

- Enhanced an internal object-relational toolkit with inheritance and better geotemporal support.
- Advised multiple object-relational schema designs.
- Developed and maintained W|A database release infrastructure.

◇ **Big Data Analyst**, Cdling, Toronto, ON (Fall 2011-Spring 2012)

- Applied prediction market analysis to early stage start-ups.

◇ **Member of the Technical Staff**, Wolfram Research, Champaign, IL (Summer 2008-Fall 2009)

- Designed machine learning tools for anticipating user behavior.
- Wrote a novel version control system for data.
- Engineered a database deployment system.

◇ **Research Engineer**, Riverglass Incorporated, Champaign, IL (Fall 2005 – Summer 2008)

- Designed and constructed a planning language and evaluator for federated query.
- Developed a publish and subscribe system for streaming geographic data.
- Invented a new probabilistic network technique for modeling intelligence scanning tasks.
- Devised a domain-specific knowledge resource editor with rich constraint checking.

◇ **Research Consultant**, Riverglass Incorporated (Spring 2005 – Fall 2005)

- Constructed a knowledge-base with probabilistic inference rules.
- Built a planning system for evaluating the importance of analytics tasks.
- Engineered a fine-grained security system for knowledge resources.

◇ **Research Assistant**, Automated Learning Group, NCSA (2004)

- Invented a visualization for the comparison of event sequences.
- Discovered new algorithms for learning and planning over streams of event sequences.

◇ **Research Assistant**, Depend Research Group, CRHC (Summer 2003 – Fall 2003)

- Engineered an environment for mining patterns of faults to aid in error detection and recovery.
- Formulated a transparent method for annotating compiler-generated dependency/dominator graphs with runtime-collected information.

◇ **Teaching Assistant**, Department of Computer Science, (Spring 2003)

◇ **Research Programmer**, Department of Physics, (Summer 2002 – Winter 2002)

- Designed, implemented, optimized, and assessed an iteratively scanning muon tracking algorithm for the RTES subsystem of the BTeV particle detector.

◇ **Research Programmer**, Department of Aviation, (Spring 2001 – Summer 2001)

- Modeled the behavior of the crew of a Navy destroyer in the context of training simulations and onboard electronic assistant as used by the chief damage control officer.

Education

◇ **OCAD University**, Toronto, ON, Canada
M.Des. in Strategic Foresight and Innovation, May 2011
Major Project: *Addressing Risk Governance Deficits through Scenario Modeling Practices.*
Advisers: Peter Jones with Walter Derzko
Committee review: John's work as demonstrated in the MRP can be recognized as an important contribution to systemic foresight theory and practice. ...It has a serious moral thrust in its ability to deal effectively with problems of significant scale and complexity. Because of this temper, this methodology can ...facilitate breakthroughs of understanding, consensus for action, and the coordination of social power.

◇ **University of Illinois**, Champaign-Urbana, IL
B.Sc. in Computer Science with Honors, May 2002.
Application Sequence: *Manufacturing Engineering.*

Publications

◇ **2014** Cassel, J. Probabilistic Programming with Stochastic Memoization: Implementing non-parametric bayesian inference. *Mathematica Journal*, 16:1.

◇ **2014** Cassel, J. Non-parametric stakeholder discovery: A process for mitigating risk governance deficits through open-ended protocols. In Hsu, W. H., editor, *Emerging Methods in Predictive Analytics: Risk Management and Decision-Making*, pages 97-126. IGI Global, Hershey, PA.

◇ **2014** Cassel, J. The Methodological Unboundedness of Limited Discovery Processes. *FORMacademisk, 7:4.*

Skills and Interests

◇ **Analytical Techniques** Stakeholder analysis, non-parametric Bayesian inference, decision-theoretic planning, online simulation, recurrent neural networks, and domain-specific languages.

◇ **Programming Languages**

- **Professional experience in** Java (including Eclipse, ANTLR, ANTLRWorks, and Spring), Python, Common Lisp (including KnowledgeWorks), MySQL, and Mathematica.
- **Projects using** SQL, Modelica, Go, HTML, Ruby, C++, Visual Basic, C, GAP, MIPS assembler, Matlab, Processing, Scheme, Erlang, and Maude.
- **Brief familiarity with** Perl, Javascript, Prolog, X86 assembler, and many others.

◇ **Specialized Domain Toolkits** Development within Wolfram SystemModeler, ArcMap (including ArcObjects), D2K, Django, and RubyOnRails.

◇ **Operating Systems and Hardware Platforms** Windows, Mac, Linux, Solaris, Lynx (hard real-time OS), Texas Instruments DSPs, BasicStamp.

◇ **Information systems** Experience with geodatabases, text-processing pipelines, the data-mining process, and test-driven development. Familiarity with factory simulation, reliability and quality control, and computer numerical control of machine tools.