John Benjamin Cassel

Current Direction

Discovery-driven domain design and software engineering
of engineering design, operational planning, and research support platforms
for agro-ecological engineering and multifunctional landscape design.

Work experience

◇ **Principal Software Engineer**, Indigo Agriculture, Charleston, MA (Summer 2022-Spring 2024) and

◇ **Staff Software Engineer**, Indigo Agriculture, Charlestown, MA (Spring 2022-Summer 2022)

- Completed domain and architectural designs for integrating agricultural data from disparate data sources into common representations serving cross-program needs.
- Designed and co-developed a sensor logistics system while maintaining the existing solution.
- Undertook active collaboration, design/code review, and issue triage to achieve correctness and quality goals.
- Co-led a company-scale initiative on reconciling data models through conclusion in regular standards activity.

◇ **Research Programmer**, Wolfram|Alpha LLC, Champaign, IL (Spring 2018-Spring 2022)

- Formulated and undertook a biology content gathering effort to help win a major partner.
- Led the biomolecular sequence vertical for the Wolfram Language.

◇ **Systems Engineer; Tech Lead**, Agrible, Champaign, IL (Summer 2015-Winter 2017)

- Co-created the main task processing system of the analysis backend.
- Codeveloped the primary representation and interface for farm activities.
- Served as the technical lead of the team providing cross-product superstructure.

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

- Created an engineering design framework supporting agent-based exploration.
- Assisted in the development of semantic import functionality.
- Supported Wolfram|Alpha database infrastructure.

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

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

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

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

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

- Devised a domain-specific knowledge resource editor with rich constraint checking.
- Invented a new probabilistic network technique for modeling intelligence scanning tasks.

◇ **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.

john.benjamin.cassel@gmail.com
http://johnbenjamincassel.github.io/
Champaign, IL 61820
United States of America

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

· Invented a visualization for the comparison of event sequences.

· Pursued 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 for error detection and recovery.

· Formulated a transparent method for annotating compiler-generated dependency/dominator graphs with runtime-collected information.

◇ **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.*

Skills

◇ **Processes and Domains** Experience with discovery-based design processes, domain-driven design, software engineering, geographic information systems, natural language processing, data processing pipelines, Agile practices, the data science process, testing strategy, and strategic foresight. Familiarity with agricultural operations, factory simulation, reliability and quality control, basic bioinformatics, and distributed/parallel computing.

◇ **Analytical Techniques** Stakeholder analysis, non-parametric Bayesian inference, decision-theoretic planning, simulation, optimization, knowledge representation and reasoning, machine learning emphasizing reinforcement learning, neural networks, system dynamics modeling, domain-specific languages, and data visualization.

◇ **Programming Languages** Professional experience in Python, Java, SQL, Common Lisp, and Wolfram Language (Mathematica). Projects and brief experience in many others, including Go, Erlang, C/C++, and Ruby.

◇ **Specialized Domain Toolkits** Work with Django, MySQL, PostgreSQL, Snowflake, AWS, Docker, Tableau, RubyOnRails, Wolfram SystemModeler, ArcMap, Tableau, FastAPI, and others.

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.*

◇ **2016** Cassel, J. Wolfram|Alpha: A Computational Knowledge "Search" Engine. In Lee, N. (editor) *Google It: Total Information Awareness*, pages 267-299. Springer, New York, NY.

◇ **2018** Cassel J.B., Cousineau S.V. Permaculture as a Systemic Design Practice. In: Jones P., Kijima K. (editors) *Systemic Design. Translational Systems Sciences, vol 8., pages 293-318. Springer, Tokyo.*

john.benjamin.cassel@gmail.com
http://johnbenjamincassel.github.io/
Champaign, IL 61820
United States of America