

John Benjamin CasseL

- Current Direction** Discovery-driven domain design and software development of systems engineering, operational planning, and experimental design platforms to support agroecological engineering and multifunctional landscape design.
- Work experience**
- ◇ **Principal Software Engineer**, Indigo Agriculture, Charleston, MA (Summer-2022-Present)
 - Navigating sensemaking and discovery activities that solve integration questions.
 - Developing processes and software architectural concepts to allow new initiatives to thrive.
 - Coleading a company-scale initiative on reconciling data models across digital products.
 - ◇ **Staff Software Engineer**, Indigo Agriculture, Charlestown, MA (Spring 2022-Summer 2022)
 - Sensemaking and software system design to expand data models and architecture.
 - ◇ **Research Programmer**, Wolfram|Alpha LLC, Champaign, IL (Spring 2018-Spring 2022)
 - Formulated and undertook biology content gathering to address partner needs.
 - Developed biomolecular sequence functionality for the Wolfram Language.
 - ◇ **Systems Engineer; Tech lead**, Agribile, 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.
 - ◇ **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 geotemporal 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.
 - ◇ **Research Assistant**, Automated Learning Group, NCSA (2004)

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- 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.
 - ◇ **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.
 - ◇ **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*.
- Skills
- ◇ **Programming Languages** Professional experience in Java, Python, SQL, Common Lisp, and Wolfram Language (Mathematica). Projects and brief experience in many others.
 - ◇ **Specialized Domain Toolkits** Development within Django/PostgreSQL, AWS, Docker, Wolfram SystemModeler, ArcMap (including ArcObjects), D2K, RubyOnRails, and others.
 - ◇ **Processes and Domains** Experience with discovery-based design processes, geographic information systems, text-processing pipelines, agile software engineering, the data science process, test-driven development, and strategic foresight. Familiarity with agricultural operations, factory simulation, reliability and quality control, and basic bioinformatics.
 - ◇ **Analytical Techniques** Stakeholder analysis, non-parametric Bayesian inference, decision-theoretic planning, simulation, optimization, knowledge representation and reasoning, reinforcement learning, recurrent neural networks, and domain-specific languages.

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