# Jonathan Y. Ito

***Curriculum Vitae***


**Contact**

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## Research Interests

Artificial Intelligence
Cognitive Science
Human-Computer Interaction
Affective Computing
Decision Theory & Game Theory
Human Judgment & Decision Making
Automated Decision Aids & Decision Support Systems

## Education

**University of Southern California**
Ph.D., Computer Science, March 2013

Thesis: *Context Dependent Utility: An Appraisal-Based Approach for Modeling Decisions, Context, and Framing*

Advisor: Professor Stacy Marsella

Committee: Professor Jonathan Gratch, Professor Milind Tambe, Professor Richard John

**University of Southern California**
M.S., Computer Science, May 2005

**University of California at Irvine**
B.S., Computer Science, September 2000

## Professional Experience

2013-Present **Google**, *Software Engineer*
Participated in the development, maintenance, and deployment of a machine learning infrastructure used to support the automated classification of web documents.

2013-2013 **Institute for Creative Technologies**, *Postdoctoral Research Associate*
Continued independent research on computationally modeling context, framing, and the human decision process. Conducted several human subject studies via Amazon Mechanical Turk exploring how the context of decision problems can affect the choices people make. Successfully presented and published these results in several conferences.

2005-2013 **Institute for Creative Technologies**, *Graduate Research Assistant*
Member of the social simulation lab and emotion group. Pursued independent research related to affective computing, self-deception, computational models of appraisals and emotion, and contextually-sensitive decision methods, under the mentorship of Professor Stacy Marsella.

2009-2011 **Reading to Kids**, *Cochair, Information Technology Committee*
Volunteer Cochair of the Information Technology Committee. Reading to Kids is a nonprofit organization dedicated to promoting reading among children by organizing monthly reading clubs consisting of approximately 500 volunteers and 2000 children across 7 schools in Los Angeles. Duties included maintenance of technology infrastructure and ongoing development of website. The Reading to Kids website is a dynamic database-driven web application responsible for recording volunteer attendance, school assignments, and other vital statistics related to managing the monthly reading clubs.

2003-2004 **KSVentures**, *Software Engineer*
Assisted in development of the *Halo* project. The goal of the project was to create a general reasoning and inference engine capable of answering domain-specific questions by utilizing ontologies, a database of common-sense knowledge, and information gleaned from scientific texts. Primarily contributed to the development of a domain-specific ontology and its associated logical inference rules.

2001-2003 **ISX**, *Software Engineer*
Developed agent-based technologies using ontologies, logical inference engines, and rule-based planning systems.

> **Situational Awareness Training:** Lead developer for a Java-based, distributed training tool used for evaluating and enhancing the situational awareness of US Army Sergeants, who typically command 8 to 13 soldiers in the field. Implemented the training tool as a collaborative simulation and successfully field-tested it at the Quantico Marine Corps base over an extremely

slow communications link.

**Effects Based Operations Planning System:** One of the primary developers for a graphical planning system based on an *effects-based* planning paradigm. This paradigm allows the user to focus on the desired effects of a plan rather than on a relatively constrained set of alternatives. Primary responsibilities included the development of a domain-specific planning ontology coupled with a logical inference engine which partially automated the creation of complex plans.

2000-2001 **Sapient**, *Consultant & Software Engineer*
Developed, deployed, and maintained web-based technologies in a multi-disciplinary team setting.

1999-2000 **Unisys**, *Student Intern*
Assisted in developing and migrating existing legacy mainframe operating system into a modern, Windows environment.

## Research Experience

Thesis Work **Computational Decision Model of Context and Framing**
Thesis focuses on developing a computational model of the human decision process which is sensitive to context and framing effects. The model integrates both Appraisal Theory and Decision-Theoretic models of risk-based decision making to account for context and framing effects in a general, highly flexible, and extensible manner. Designed, administered, and analyzed several empirical studies conducted via Amazon Mechanical Turk which support this framework.

**Self Deception as a Rational Strategy**
Developed and implemented a framework for updating agent-based beliefs which allows for self deception. The framework updates the probabilistic beliefs of an agent by maximizing the *beliefs* of the agent relative to its goals. Furthermore, identified several computational and game-theoretic scenarios in which self-deceptive behavior may be more adaptive than purely rational behavior. For instance, in game-theoretic scenarios similar to the classic *battle of the sexes*, adopting a self-deceptive strategy can outperform a purely rational one.

**Defining Measures of Message Consistency**
Addresses the problem of determining whether to believe and ultimately accept information received from other agents. Developed a mechanism which allows an agent to adopt a "what if" mentality

whereby the consistency of a proposed belief is evaluated according to whether it provides a better explanation for the history of observed actions in the world. Implemented this mechanism in PsychSim, a multi-agent social simulation tool which allows for extremely rich and detailed modeling of agents and their associated belief states.

## Grants and Awards

2010 **International Summer School in Affective Sciences**
Applied to and attended a multi-disciplinary seminar and workshop series for affective science hosted by the Swiss National Center of Competence in Research

2009 **NSF East Asian and Pacific Summer Institute Fellowship**
Awarded a summer grant for independent research abroad at the University of Melbourne in Australia in collaboration with Professor Liz Sonenberg. As Principal Investigator, gave invited talks at several different universities and conducted research into the potentially normative aspects of self-deception ultimately leading to the publication of a short paper.

## Security Clearance

US Top Secret Clearance, *expired 2005*

## Technical Skills

**Programming Languages**
Java, R, C, C++, Haskell, LISP, Scheme, Python, PHP, HTML, CSS, Javascript, AJAX, Ruby, Perl

**Experimental Tools**
Amazon Mechanical Turk, Qualtrics

**Productivity Tools**
LaTeX, Microsoft Office, gnuplot, Graphviz, MetaPost

**Operating Systems**
Unix/Linux, Microsoft Windows

## Publications

Journal Papers

Jonathan Ito, David Pynadath, and Stacy Marsella. Modeling self-deception within a decision-theoretic framework. *Autonomous Agents and Multi-Agent Systems*, 20(1):3–13, January 2010.

Conference Papers

Jonathan Ito and Stacy Marsella. Context dependent utility: modeling decision behavior across contexts. In *Proceedings of 35th Annual Conference of the Cognitive Science Society (to appear)*, 2013.

J. Ito and S. Marsella. Contextually-based utility: An appraisal-based approach at modeling framing and decisions. In *Twenty-Fifth AAAI Conference on Artificial Intelligence*, volume 2, pages 60–65, 2011.

Jonathan Y. Ito, David V. Pynadath, Liz Sonenberg, and Stacy C. Marsella. Wishful thinking in effective decision making (extended abstract). In *Proceedings of the 9th International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2010).*, 2010.

Jonathan Y. Ito, David V. Pynadath, and Stacy C. Marsella. Self-deceptive decision making: Normative and descriptive insights. In Carles Sierra, Cristiano Castelfranchi, Keith S. Decker, and Jaime Simão Sichman, editors, *Proceedings of the Conference on Autonomous Agents and Multiagent Systems AAMAS*, volume 2, pages 1113–1120. IFAAMAS, May 2009.

Jonathan Y. Ito, David V. Pynadath, and Stacy C. Marsella. Modeling self-deception within a decision-theoretic framework. In Helmut Prendinger, James C. Lester, and Mitsuru Ishizuka, editors, *Proceedings of the Conference of Intelligent Virtual Agents IVA*, volume 5208 of *Lecture Notes in Computer Science*, pages 322–333. Springer, September 2008.

Jonathan Y. Ito, David V. Pynadath, and Stacy C. Marsella. A decision-theoretic approach to evaluating posterior probabilities of mental models. In Christopher Geib and David Pynadath, editors, *Proceedings of the AAAI Workshop on Plan, Activity, and Intent Recognition (PAIR-07)*, volume WS-07-09 of *AAAI Technical Report*, pages 60–65. AAAI Press, July 2007.

J. Donnelly, G. Edwards, P. Haglich, J. Ito, K. Olin, and T. Padgett. Effects-based planning with strategy templates and semantic support. In *AeroSense 2003*, pages 27–35. International Society for Optics and Photonics, 2003.

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