

JOHN LICATO

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Assistant Professor ◊ Department of Computer Science and Engineering
University of South Florida

EMPLOYMENT

University of South Florida

August 2017 – Current

Assistant Professor, Computer Science and Engineering
Director, Advancing Machine and Human Reasoning (AMHR) Lab

Indiana University / Purdue University – Fort Wayne

August 2015 – July 2017

Assistant Professor, Computer Science
Director, Analogical Constructivism and Reasoning Lab

EDUCATION

Rensselaer Polytechnic Institute (RPI)

May 2015

PhD in Computer Science

University of South Alabama

May 2010

BS in Computer Science / Minor in Mathematics
Magna Cum Laude

BRIEF BIOGRAPHICAL SKETCH

I am an Assistant Professor of Computer Science at the University of South Florida (Tampa - Main Campus), having started in August of 2017. Prior to that, I was an Assistant Professor of Computer Science at Indiana University/Purdue University - Fort Wayne (2015-2017). I graduated in Spring of 2015 with a PhD in computer science from Rensselaer Polytechnic Institute, having studied under Professor Selmer Bringsjord.

I am the director of the Advancing Machine and Human Reasoning (AMHR) Lab, a cross-disciplinary lab that dedicated to answering the following guiding research questions:

- How can artificial intelligence make people better reasoners?
- How can we create better artificially intelligent reasoners?
- How can we advance our knowledge of logic and other cognitive-level reasoning processes in order to produce better conclusions, justifications, and arguments?

My lab is devoted to not only creating smarter AI, but ensuring that these advances help improve, rather than replace, human reasoners. For more information, see <https://sites.google.com/view/amhr>.

I'm also interested in human-level and logical reasoning; particularly, the kind of reasoning that we normally refer to as cognitive. This encompasses the following topics: Computational modeling of cognitive reasoning; cognitive science and robotics; computational cognitive architectures; automated theorem provers; artificially intelligent reasoners; analogical, deductive, and hypothetico-deductive reasoning; artificial reasoning with highly-expressive (e.g. second-order, modal, etc.) logics.

AWARDS AND SERVICE

AFOSR Young Investigator's Award: "Active Formalization in Artificial and Human Reasoners" (PI; funded amount: \$450,000) *January 2018 - December 2020*

Elected Membership and Promotions Coordinator of the International Association for Computing and Philosophy (IACAP) 2016-2017

AFOSR Young Investigator's Award: "Active Formalization via Analogico-Deductive Reasoning" (PI; funded amount: \$360,000) Summer 2016 - Spring 2019

AFOSR grant: "Great Computational Intelligence (GCI), Mature and Further Applied" (co-PI with RPI and UIUC; my component: \$172,612.35) Spring 2017 - Fall 2021

IPFW IRSC grant: "Transformational Robotics: An Interdisciplinary Engineering Collaboration" (co-PI; funded amount: \$15,000) Summer 2016

IPFW OSP grant: "Advancing Developmental AI with Late Piagetian Theory" (Awarded but had to withdraw afterwards; funded amount: \$8,000) Summer 2016

Science Central Portal to the Public Faculty Fellow (\$750 award) 2016

Sigma Xi Researcher of the Year - IPFW Chapter (\$750 award) 2015-2016

AFOSR grant: "Great Computational Intelligence in the Formal Sciences via Analogico-Deductive Reasoning" (co-PI with RPI and UIUC; my component: \$25,000) Fall 2015 - Summer 2016

School of Science Graduate Student Council Secretary Fall 2011 - Fall 2012

ACM (IPFW Chapter) Faculty Advisor Fall 2015 - Present

RPI Founder's Award of Excellence 2012

School of Science Graduate Student Council Secretary Fall 2011 - Fall 2012

School of Science Graduate Council Representative Fall 2011 - Spring 2013

ACM Student Chapter President Fall 2009 - Spring 2010

Upsilon Pi Epsilon (International Computing Honor Society) Inducted 2010

ACM Student Chapter Vice President Fall 2008 - Spring 2009

University of South Alabama President's Scholars List Fall 2009 BS in Computer Science

Outstanding Student Scholarship Spring 2009 South Alabama ACM Student Chapter

Best Paper, 7th International CCCT 2009 For "A Voice Operated Tour Planning System for Autonomous Mobile Robots"

Best Undergraduate Research, ACM Mid-Southeast Regional Conference Fall 2008 For "A Voice Operated Tour Planning System for Autonomous Mobile Robots"

National SMART Grant Fall 2008 - Spring 2009

SELECTED PUBLICATIONS

For additional publications, see my google scholar page.

2020

- BRINGSJORD, S., GOVINDARAJULU, N. S., LICATO, J., AND GIANCOLA, M. Learning ex nihilo. In *Proceedings of the 6th Global Conference on Artificial Intelligence (GCAI 2020)* (2020)
- COOPER, M., FIELDS, L., BADILLA, M., AND LICATO, J. Wg-a: A framework for exploring analogical generalization and argumentation. In *Proceedings of the 42nd Cognitive Science Society Conference (CogSci 2020)* (2020)

- LICATO, J., AND COOPER, M. Assessing Evidence Relevance By Disallowing Direct Assessment. In *Proceedings of the 12th Conference of the Ontario Society for the Study of Argumentation* (2020)
- LICATO, J. Commentary on Michael Yong-Set, “Getting Down in the MUDs: A Ludological Perspective on Arguers”. In *Proceedings of the 12th Conference of the Ontario Society for the Study of Argumentation* (2020)
- MALABY, E., DRAGUN, B., AND LICATO, J. Towards Concise, Machine-discovered Proofs of Gödel’s Two Incompleteness Theorems. In *Proceedings of The 33rd International Florida Artificial Intelligence Research Society Conference (FLAIRS-33)* (2020), E. Bell and R. Barták, Eds., AAAI Press
- MARJI, Z., NIGHOJKAR, A., AND LICATO, J. Probing the Natural Language Inference Task with Automated Reasoning Tools. In *Proceedings of The 33rd International Florida Artificial Intelligence Research Society Conference (FLAIRS-33)* (2020), E. Bell and R. Barták, Eds., AAAI Press

2019

- BOGER, M., LAVERGHETTA JR., A., FETISOV, N., AND LICATO, J. Generating near and far analogies for educational applications: Progress and challenges. In *Proceedings of the 2019 ICMLA Special Session on Machine Learning Applications in Education* (2019)
- CIAMPAGLIA, G. L., LICATO, J., AND ROSEN, P. Visualizing the evolution of online conversation using discussion mapper. In *Proceedings of the 2019 Spring Symposium on Towards AI for Collaborative Open Science (TACOS)* (2019)
- LICATO, J., AND COOPER, M. Evaluating relevance in analogical arguments through warrant-based reasoning. In *Proceedings of the European Conference on Argumentation (ECA 2019)* (2019)
- LICATO, J., MARJI, Z., AND ABRAHAM, S. Scenarios and recommendations for ethical interpretive ai. In *Proceedings of the AAAI 2019 Fall Symposium on Human-Centered AI* (Arlington, VA, 2019)
- QUANDT, R., AND LICATO, J. Problems of autonomous agents following informal, open-textured rules. In *Proceedings of the AAAI 2019 Spring Symposium on Shared Context* (2019)

2018

- LICATO, J., AND ZHANG, Z. Evaluating Representational Systems in Artificial Intelligence. *Artificial Intelligence Review* 52, 2 (2019), 1463 – 1493.
- LICATO, J., BOGER, M., AND ZHANG, Z. Developing a Dataset for Personal Attacks and Other Indicators of Biases. In *Proceedings of the AAAI 2018 Spring Symposium on “Beyond Machine Intelligence”* (2018).
- LICATO, J., AND MARJI, Z. Probing formal/informal misalignment with the loophole task. In *Proceedings of the 2018 International Conference on Robot Ethics and Standards (ICRES 2018)* (2018).

2017

- LEWIS, B., SMITH, I., FOWLER, M., AND LICATO, J. The Robot Mafia: A Test Environment for Deceptive Robots. In *Proceedings of the 28th Modern Artificial Intelligence and Cognitive Science (MAICS) Conference* (2017), J. Licato and A. Hayes, Eds.
- WYSS, M., THIEME, A., AND LICATO, J. Can AI Reason Over Representational Systems? In *Proceedings of the 28th Modern Artificial Intelligence and Cognitive Science (MAICS) Conference* (2017), J. Licato and A. Hayes, Eds.

- FOWLER, M., THIEME, A., AND LICATO, J. Robotic Misdirection, for Good Causes: Strategically Deceptive Reasoning in Artificial Generally Intelligent Agents. In *Proceedings of the 28th Modern Artificial Intelligence and Cognitive Science (MAICS) Conference (2017)*, J. Licato and A. Hayes, Eds.
- BRISKEY, B. A., ROMANELI, M. G., HALE, D., AND LICATO, J. Understanding the U-Shaped Curve: Central Claims and Applications for AI. In *Proceedings of the 28th Modern Artificial Intelligence and Cognitive Science (MAICS) Conference (2017)*, J. Licato and A. Hayes, Eds.
- LICATO, J. Two Paradoxes and Their Implications for AI-Assisted Analysis. In *Proceedings of the 2017 Conference of the International Association for Computing and Philosophy (IACAP 2017) (2017)*.

2016

- BRINGSJORD, S., LICATO, J., AND BRINGSJORD, A. The Contemporary Craft of Creating Characters Meets Today's Cognitive Architectures: A Case Study in Expressivity. In *Integrating Cognitive Architectures into Virtual Character Design*, J. Turner, M. Nixon, U. Bernardet, and S. DiPaola, Eds., Advances in Computational Intelligence and Robotics (ACIR). Information Science Reference / IGI Global, 2016.
- LICATO, J., AND FOWLER, M. Formalizing Confidence Propagation in Analogico-Inductive Reasoning. In *Proceedings of the 2016 Conference of the International Association for Computing and Philosophy (IACAP 2016) (2016)*.
- LICATO, J., AND FOWLER, M. Embracing Inference as Action: A Step Towards Human-Level Reasoning. In *Proceedings of the 2016 AGI Conference (2016)*.
- LICATO, J., AND BRINGSJORD, S. A Physically Realistic, General-Purpose Simulation Environment for Developmental AI Systems. In *Proceedings of the ECAI 2016 Workshop on Evaluating General-Purpose AI (EGPAI 2016) (2016)*.

2015

- ATKIN, K., LICATO, J., AND BRINGSJORD, S. Modeling Interoperability Between a Reflex and Reasoning System in a Physical Simulation Environment. In *Proceedings of the 2015 Spring Simulation Multi-Conference (2015)*.
- BELLO, P., LICATO, J., AND BRINGSJORD, S. Constraints on Freely Chosen Action for Moral Robots: Consciousness and Control. In *Proceedings of RO-MAN 2015 (2015)*.
- BRINGSJORD, S., LICATO, J., GOVINDARAJULU, N. S., GHOSH, R., AND SEN, A. Real Robots that Pass Human Tests of Self-Consciousness. In *Proceedings of RO-MAN 2015 (2015)*.
- BRINGSJORD, S., AND LICATO, J. By Disanalogy, Cyberwarfare is Utterly New. *Philosophy and Technology* 28, 3 (2015), 339–358.
- BRINGSJORD, S., GOVINDARAJULU, N. S., LICATO, J., SEN, A., JOHNSON, J., BRINGSJORD, A., AND TAYLOR, J. On Logicist Agent-Based Economics. In *Proceedings of Artificial Economics 2015 (AE 2015) (Porto, Portugal, 2015)*, University of Porto.
- LICATO, J. *Analogical Constructivism: The Emergence of Reasoning Through Analogy and Action Schemas*. PhD thesis, Rensselaer Polytechnic Institute, Troy, NY, May 2015.
- LICATO, J., MARTON, N., DONG, B., SUN, R., AND BRINGSJORD, S. Modeling the Creation and Development of Cause-Effect Pairs for Explanation Generation in a Cognitive Architecture. In *Proceedings of the 2015 International Workshop on Artificial Intelligence and Cognition (AIC 2015) (2015)*.

- LICATO, J. Formalizing Deceptive Reasoning in Breaking Bad : Default Reasoning in a Doxastic Logic. In *Proceedings from the 2nd AAAI Symposium on Deceptive and Counter-Deceptive Machines (DCDM 2015)* (2015), M. Clark, S. Bringsjord, and P. Bello, Eds.
- MARTON, N., LICATO, J., AND BRINGSJORD, S. Creating and Reasoning Over Scene Descriptions in a Physically Realistic Simulation. In *Proceedings of the 2015 Spring Simulation Multi-Conference* (2015).

2014

- ARISTA, D., LICATO, J., GOVINDARAJULU, N. S., BRINGSJORD, S., AND BELLO, P. Introducing the Doxastically Centered Approach to Formalizing Relevance Bonds in Conditionals. In *Proceedings of the 2014 Annual Meeting of the International Association for Computing and Philosophy* (Thessaloniki, Greece, 2014), V. Müller, Ed.
- BRINGSJORD, S., GOVINDARAJULU, N. S., ELLIS, S., MCCARTY, E., AND LICATO, J. Nuclear Deterrence and the Logic of Deliberative Mindreading. *Cognitive Systems Research* 28 (2014), 20–43.
- GOVINDARAJULU, N. S., LICATO, J., AND BRINGSJORD, S. Toward a Formalization of QA Problem Classes. In *Proceedings of the Seventh Conference on Artificial General Intelligence* (2014).
- HUMMEL, J. E., LICATO, J., AND BRINGSJORD, S. Analogy, Explanation, and Proof. *Frontiers in Human Neuroscience* 8, 867 (2014).
- LICATO, J., SUN, R., AND BRINGSJORD, S. Structural Representation and Reasoning in a Hybrid Cognitive Architecture. In *Proceedings of the 2014 International Joint Conference on Neural Networks (IJCNN)* (2014).
- LICATO, J., SUN, R., AND BRINGSJORD, S. Using a Hybrid Cognitive Architecture to Model Children’s Errors in an Analogy Task. In *Proceedings of CogSci 2014* (2014).
- LICATO, J., BRINGSJORD, S., ATKIN, K., BORKOWSKI, M., CUSICK, J., EASTLACK, K., MARTON, N., PANE-JOYCE, J., AND WHITEHEAD, S. ‘The Brilliant Boardroom’: Cognitive Computing with the DCEC* and ADR. In *Proceedings of the IBM Research Cognitive Systems Colloquium* (2014).
- LICATO, J., SUN, R., AND BRINGSJORD, S. Using Meta-Cognition for Regulating Explanatory Quality Through a Cognitive Architecture. In *Proceedings of the 2nd International Workshop on Artificial Intelligence and Cognition* (Turin, Italy, 2014).
- LICATO, J., BRINGSJORD, S., AND GOVINDARAJULU, N. S. How Models of Creativity and Analogy Need to Answer the Tailorability Concern. In *Computational Creativity Research: Towards Creative Machines*, T. R. Besold, K.-u. Kühnberger, M. Schorlemmer, and A. Smaill, Eds. Atlantis Press, 2014, ch. 5.

2013

- GOVINDARAJULU, N. S., LICATO, J., AND BRINGSJORD, S. Small Steps Toward Hypercomputation via Infinitary Machine Proof Verification and Proof Generation. In *Unconventional computation and natural computation - 12th international conference (UCNC 2013)* (2013), G. Mauri, A. Dennunzio, L. Manzoni, and A. E. Porreca, Eds., pp. 102–112.
- GOVINDARAJULU, N. S., BRINGSJORD, S., AND LICATO, J. On Deep Computational Formalization of Natural Language. In *Proceedings of the Sixth Conference on Artificial General Intelligence (AGI-13)* (Beijing, China, 2013).

- LICATO, J., GOVINDARAJULU, N. S., BRINGSJORD, S., POMERANZ, M., AND GITTELSON, L. Analogico-Deductive Generation of Gödel's First Incompleteness Theorem from the Liar Paradox. *Proceedings of the 23rd Annual International Joint Conference on Artificial Intelligence (IJCAI-13)* (2013).
- LICATO, J., BRINGSJORD, S., AND GOVINDARAJULU, N. S. How Models of Creativity and Analogy Need to Answer the Tailorability Concern. In *Proceedings of the IJCAI 2013 Workshop on Computational Creativity, Concept Invention, and General Intelligence* (Beijing, China, 2013), T. R. Besold, K.-u. Kühnberger, M. Schorlemmer, and A. Smaill, Eds.

2012 and Earlier

- BRINGSJORD, S., AND LICATO, J. Psychometric Artificial General Intelligence: The Piaget-MacGyver Room. In *Theoretical Foundations of Artificial General Intelligence*, P. Wang and B. Goertzel, Eds. Atlantis Press, 8, square des Bouleaux, 75019 Paris, France, 2012, pp. 25–48.
- LICATO, J., BRINGSJORD, S., AND HUMMEL, J. E. Exploring the Role of Analogico-Deductive Reasoning in the Balance-Beam Task. In *Rethinking Cognitive Development: Proceedings of the 42nd Annual Meeting of the Jean Piaget Society* (Toronto, Canada, 2012).
- SMITH III, C. V., AND LICATO, J. A Voice Operated Tour Planning System for Autonomous Mobile Robots. *Journal of Systemics, Cybernetics and Informatics* 8, 3 (2010), 72–79.