

James Oswald

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Research Interests

Artificial Intelligence Logic-Based AI, Automated Reasoning, Cognitive Architectures
Machine Learning Generative Models, Reinforcement Learning
Logic Many-Dimensional Modal Logics, Description Logics, Fuzzy Logics

Selected Skills

Programming Languages C++, Python, Java, C, Javascript
ML Technologies Tensorflow, PyTorch, scikit-learn
Proof Assistants and Provers Coq, Lean3, Vampire
Other Numpy, Matplotlib, MPI, OpenMP, CUDA, OpenGL

Education

Rensselaer Polytechnic Institute

Troy, NY

PHD IN COMPUTER SCIENCE (PURSUING)

Aug. 2021 - PRESENT

- Concentration in Artificial Intelligence
- Breadth in Theory of Computation and Systems/Software
- Advised by Prof. Selmer Bringsjord
- Graduate Researcher in the Rensselaer Artificial Intelligence and Reasoning (RAIR) Lab
- 4.0 GPA

The State University of New York at Albany (SUNY Albany)

Albany, NY

B.S. IN COMPUTER SCIENCE AND MATHEMATICS

Aug. 2018 - May. 2021

- Double Major in Computer Science and Mathematics
- Undergraduate Researcher in the Data Mining and Management (DMM) Lab
- Graduated *summa cum laude* (3.89 GPA)

Research Employment

IBM

Yorktown Heights, NY

AIRC SUMMER EXTERN (INCOMING)

May. 2023 - August. 2023

- Will be working with the AI Planning Group

Rensselaer AI and Reasoning Laboratory

Troy, NY

GRADUATE RESEARCH ASSISTANT

May. 2022 - September. 2022

- Funded by ONR Grant #N00014-22-1-2201 "Meta-Cognitively Perceptive Artificial Teammates" with Advisor/PI: Selmer Bringsjord (RPI).
- Integration of **automated reasoners** with the ARCADIA Cognitive Architecture
- Development of reasoning demos with robots and **Minigrid OpenAI Gym environment**

The Research Foundation for SUNY

Albany, NY

RESEARCH AIDE

Jan. 2021 - Aug. 2021, Jan. 2022

- Funded By NSF Grant #2025793: "Generative Machine Learning for Nanomaterial Design" with advisors/PIs: Petko Bogdanov (SUNY Albany), Stacy Copp (UC Irvine)
- Developed novel attribute-regularized variational autoencoder (ARVAE) models for intelligent design of Ag-DNA nanoparticles
- Implemented **generative AI** models in **Tensorflow** and **Pytorch** using custom LSTMs
- Designed robust visualization tools using **WebGL** and **Matplot Lib**

Teaching Experience

RPI Graduate Teaching Assistant

Aug 2021 - Present

- Data Structures (Spring 2023)
- Computer Science I (Fall 2022)
- Data Structures (Spring 2022)
- Programming Languages (Fall 2021)

Professional Service / Reviewing

PC Member AGI (2023)

Subreviewer IJCAI (2021), DSAA (2021)

Publications

Key:

Forthcoming - accepted for publication but not published yet.

Under review - submitted but not yet accepted for publication.

CONFERENCE PAPERS

1. Michael Giancola, **James Oswald**. "Non-Profit-Driven Development Paths for Equitable AI/AGI", International Conference Series on Robot Ethics and Standards, 2023 (Forthcoming)
2. Selmer Bringsjord, **James Oswald**, Michael Giancola. "The M Cognitive Meta-Architecture as Touchstone for Standard Modeling of AGI-Level Minds", Artificial General Intelligence, 2023 (Forthcoming)
3. Selmer Bringsjord, Naveen Sundar Govindarajulu, John Slowik, **James Oswald**, Michael Giancola, John Angel, Shreya Banerjee, & Aiden Flaherty. "PERI.2 Goes to PreSchool and Beyond, in Search of AGI", Artificial General Intelligence, 2022
4. **James Oswald**. "Market Prediction as a Task for AGI Agents", Artificial General Intelligence, 2022
5. Fariha Moomtaheen, Matthew Killeen, **James Oswald**, Anna González-Rosell, Peter Mastracco, Alexander Gorovits, Stacy M Copp, Petko Bogdanov. "DNA-Stabilized Silver Nanocluster Design via Regularized Variational Autoencoders", Proceedings of the 28th ACM SIGKDD Conference on Knowledge Discovery and Data Mining, 2022

JOURNAL ARTICLES

1. Selmer Bringsjord, Michael Giancola, Naveen Sundar Govindarajulu, **James Oswald**, John Slowik, Paul Bello, Micah Clark. "Argument-Based Inductive Logics, With Coverage of Compromised Perception" (Under Review)

BOOK CHAPTERS

1. Selmer Bringsjord, Naveen Sundar Govindarajulu, **James Oswald**. "Universal Cognitive Intelligence, from Cognitive Consciousness, and Lambda". Computational Approaches to Conscious Artificial Intelligence, 2023 (Forthcoming)

Awards

RPI Departmental Letter of Recognition from Boleslaw K. Szymanski	Jan 2023
For the project <i>An Analysis of Motifs in Multilayer Brain Networks Across Sex and Age</i>	
SUNY Albany Presidential Award for Undergraduate Research	Jun. 2021
SUNY Albany Dean's List	Spring. 2019 - Spring. 2021
SUNY Albany Presidential Scholarship	Aug. 2018 - May. 2021

Professional Memberships & Societies

RPI Computer Science Honors Society - Upsilon Pi Epsilon	Nov. 2022 - Present
• Full Member (Nov. 2022 - Present)	
NY Capital Region Logic Reading Group	May 2022 - Present
• Co-Founder and Organizer	
SUNY Albany KDD Cup (Machine Learning Competition) Team	May 2021
• Team Captain (Apr. May 2021)	
Institute of Electrical and Electronics Engineers (IEEE)	Jan. 2019 - Present
• Graduate Student Member (Jan. 2022 - Present)	
• Undergraduate Student Member (Jan. 2019 - Jan. 2022)	
SUNY Albany Presidential Honors Society	Jan 2019 - May 2021
• Full Member (Jan 2019 - May 2021)	
SUNY Albany IEEE Student Chapter	Oct. 2018 - Present
• Alumni Mentor (Jun. 2021 - Present)	
• Chair (May. 2020 - Jun. 2021)	
• Junior Chair (Feb. 2020 - May. 2020)	
• Member (Oct.2018 - Feb. 2020)	