James Oswald

✉ oswalj@rpi.edu | ⌂ https://jamesoswald.dev | James-Oswald | 🎓 Google Scholar

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 EXTERN — *May. 2023 - August. 2023*

- Working under Kavitha Sriniva and the IBM AI Planning Group in the AI Automation and Scaling department.
- Enabling **Large Language Models** to be used as **PDDL** planning domain generators.

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 Gonzàlez-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)

Workshop

1. **James Oswald**, Brandon Rozek. "Parallel Verification of Natural Deduction Proof Graphs" Logical Frameworks and Meta-Languages: Theory and Practice (LMFTP). 2023 (Forthcoming)

Awards

RPI Departmental Letter of Recognition from Boleslaw K. Szymanski   Jan 2023
For the project *An Analysis of Motifs in
Multilayer Brain Networks Across Sex and Age*

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)