

Arthur Richard Wandzel

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Summary:

An experienced technical leader / entrepreneur with over 8+ years of AI/ML experience in top-tier research institutions and startups. My research in academia has yielded a number of accomplishments (papers, patents, fellowships) with direct translation into industry by founding ambitious, team-oriented, AI companies. Recently, I've been seeking out projects with a stronger emphasis on social impact, working as a venture lead with Engie Impact and Standard Chartered Bank derisking sustainability business opportunities in the intersection of sustainable finance, scope 3 decarbonization, and clean energy: arthurwandzel.org

Key Words: entrepreneurship, sustainability, mentorship, high-impact-initiatives, humanity-centered-product-design, artificial intelligence, machine learning, data science, IOT, deep learning, collaborative robotics, cloud engineering, object-based reasoning and perception, probabilistic modeling, statistics / mathematical theory.

Education:

- *Brown University, Providence, RI* *Sept. 2016-May 2018*
M.S. in Computer Science (Cumulative GPA: 3.75/4.0)
- *University of Michigan, Ann Arbor, MI* *Sept. 2010-May 2015*
B.S. in Biopsychology, Cognition, and Neuroscience (Cumulative GPA: 3.69/4.0)
Dual-Minors: Computer Science and Philosophy (Mind and Meaning)

Work Experience:

- Founder of Delta Capture *Dec. 2022-Present*
- Entrepreneur in Residence at Engie Impact (Sustainability). *Mar. 2022-Dec. 2022*
- Cofounder & Head of AI of JAMM Technologies. *Nov. 2020-Feb. 2022*
- Entrepreneur in Residence at Entrepreneur First (SG08 cohort). *Aug. 2020-Nov. 2020*
- Machine Learning Engineer at Omdena *Mar. 2020-June 2020*
- Researcher at the Adaptive Computing Lab at the National University of Singapore. *Aug. 2019-Aug. 2020*
- Researcher at the Human to Robots Lab at Brown University. *Aug. 2018-Aug. 2019*
- Researcher at the SOAR: Cognitive Architecture Lab at the University of Michigan. *Aug. 2015-Aug. 2016*

Work Projects:

- *Founder of Delta Capture (global)* *Dec. 2022-Present*

Early stage venture exploring value-added solutions in sustainability x agriculture.

With special attention to improving data collection on farming practices -- to mitigate the impact of deforestation and carbon emissions (Scope 3).

- *Cofounder & Head of AI of JAMM Technologies (Singapore)* *Nov. 2020-Dec. 2021*

JAMM is a VC-backed AI-powered insurtech company based in Singapore. We raised \$600k+ and assembled a world-class team of 9 to build a platform for smart driving—the safer you drive the more you're rewarded. Product was live on the road with over 100+ drivers in Singapore and the United Kingdom.

Developed the core technical IP, our product roadmap, budget, and timeline, and communicating key results to key shareholders (investors, customers, business leaders, researchers). The technology was based on a dashcamera leveraging computer vision algorithms for driver behavior understanding which included a fully automated cloud video streaming pipeline and AI/ML algorithms (design, implementation, and deployment).

AI for Social Good:

Mar. 2020-Jun 2020

Omdena: COVID-19 Understanding Policy Effects on the Economically Marginalized

Working as an ML Engineer in part-time collaboration with a world-class team of 50 AI experts to enable governments to design data-driven health and economic policies for Coronavirus that are sensitive to vulnerable populations. This is part of an 8 week AI for Social Good challenge hosted by Omdena

Technical Skills:

- **Computational Theory:** PAC-learning, Rademacher complexity, VC-dimensions, MDPs/POMDPs, martingales
- **Models:** Graph Neural Networks, LSTMs, CNNs, probabilistic models (Bayesian), kalman-filters, random forest classifiers (boosting/bagging), SVMs, kernel-methods, reinforcement learning algorithms, policy gradients, value function approximation, monte carlo simulations, MCST, Bayesian optimization (research & design & implementation).
- **ML/AI Frameworks:** pytorch, tensorflow
- **Data Analysis:** regression, classification, ANOVA/T-tests, clustering, PCA, k-fold validation (analyzed large real-world datasets, tested hypothesis, developed machine learning models with regularization, benchmarking, as well as knowledge & practice of an array of methods & theory)
- **Cloud System Design:** GCP, Azure, AWS, distributed computing, parallelization, kubernetes, virtual machines, cron scheduling, error reporting & logging, microservice design, client libraries (built a fully automated video streaming pipeline in production)
- **DevOps/MLOps:** docker, terraform, github, staging and production environments, CI/CD, regression testing, experiment tracking & dataset versioning (weights & biases).
- **Backend Engineering/Web API/Security:** API gateway, Redoc, REST commands, OAuth, API key management (deployed web API (OpenAPI 2.0 standards))
- **Databases:** SQL, NoSQL (Neo4j, Big Table), query engines OLAP (Big Query), SLA, eventual consistency, sharding, horizontal and vertical scaling, distributed computing.
- **Agile Development:** scrum master, sprint & epic planning, road map design, project requirement documents (project owner / manager for a number of external and internal projects with consultants or in-house team.
- **IOT/Edge Computing/Networking/Hardware:** TCP, UDP, algorithm benchmarking, transmission rates & volumes, codecs (H264, H265, AV1), transcoding, GPU/TPUs architectures, parallelization, MQTT, HTTP/HTTPS.
- **Coding Languages:** Java, C, C++, Python, Bash, R, Lisp

Awards:

- *National University of Singapore Research Fellowship* *Aug. 2019*
A grant to fund my year-long research under the project
“Integrated Planning and Learning for Robust Decision Making Under Uncertainty.”
- *Andrew W. Mellon Foundation Future of Work Seed Grant* *Mar. 2019*
A grant to start a podcast under Brown University’s Human Centered Robotics Initiative called “*Working Robots.*” This aims to host an open discussion between a layperson and a robotics / artificial intelligence expert on the subject of technology, job-loss, and automation in the changing US economy.

Patents:

- Wandzel, A. & Tellex, S. “Systems and Methods for Operating Robots Using Object-Oriented Partially Observable Markov Decision Processes,” #405505-561P01US *Oct. 2019*

Publications:

- Wandzel, A., Seungchan, K., Tellex, T., and Oh, Y. *2019*
OO-POMCP: Robust Multi-Object Planning for Object-Oriented POMDPs,
Preprint.
- Wandzel, A., Oh, Y., Fishman, M., Kumar, N., Wong L.S. L., Tellex, T. *2019*
Multi-Object Search using Object-Oriented POMDPs.
International Conference on Robotics and Automation (ICRA). Montreal, Canada.
- Jones, S. J., Wandzel, A. R., Laird, J. E. *2016*
Efficient Computation of Spreading Activation Using Lazy Evaluation.
Proceedings of the 14th International Conference on Cognitive Modeling (ICCM). University Park, Pennsylvania.

Research Projects:

- Perception for Planning: Integrating Attention into Planning for Deep Robot Navigation among Crowds* *Aug. 2019-Aug. 2020*
Research Advisor: Professor David Hsu
Department of Computer Science at the National University of Singapore
 Investigating how attending to decision-relevant exo-vehicles may improve planning performance for goal-directed navigation for autonomous vehicles based on predictions from graph neural networks (GNNs).
Keywords: planning and learning, graph neural networks (GNNs), autonomous vehicles (AVs)
- OO-POMCP: Robust Multi-Object Planning for Object-Oriented POMDPs* *Nov. 2018-Aug. 2020*
Research Advisor: Professor Stefanie Tellex
Department of Computer Science at Brown University
 Investigating the efficiency of planning by comparing factored models via applying Rademacher complexity bounds on the number of samples to evaluate q-values for online sample-based POMDP planners.
Keywords: reinforcement learning, computational learning theory, Rademacher Complexity, POMDPs
- Multi-Object Search using Object-Oriented POMDPs* *Jan. 2017-Sept. 2018*
Research Advisor: Professor Stefanie Tellex
Department of Computer Science at Brown University
 Designed an object-oriented POMDP algorithm for tractably planning under uncertainty for a novel multi-object search task. The main contribution is to express uncertainty in terms of independent object-specific distributions where each distribution can be modified via a grounded language command (e.g. “Find the mugs in the kitchen”).
Keywords: reinforcement learning, POMDPs, object-based reasoning, collaborative robotics, planning
- Implementing Scalable Context-Sensitive Retrieval* *May 2015-Sept. 2016*
Research Advisor: John E. Laird
Department of Computer Science at the University of Michigan
 Developed a scalable algorithm for retrieving context-relevant information from a semantic network via spreading activation. This offers a cognitive agent an ability to probabilistically reason over its current knowledge.
Keywords: semantic network, ontology, probabilistic reasoning, artificial intelligence
- Autonomous Retrieval Cues* *May 2014-Dec. 2015*
Research Advisor: John E. Laird
Department of Computer Science at the University of Michigan
 Leveraged task structure in order autonomously store, maintain, and retrieve information so as to reduce the procedural working memory of a cognitive agent.
Keywords: autonomous agent, information retrieval, optimization, cognitive modeling

Teaching Experience:

- Primary Instructor* *Fall 2015*
Freshman Honors Seminar: Perspectives of Consciousness (Course ID#: Honors135)
 Designed and instructed a course-listed honors freshman seminar of 15 students that surveyed different approaches for studying consciousness in various fields such as Philosophy, Anthropology, Neuroscience, Cognitive Science, and Computer Science.

Organizations:

- Editor-in-Chief of Undergraduate Research Journal* *Aug. 2012 –Aug. 2013*
 Lead the organization the University of Michigan Undergraduate Research Journal (UMURJ) in publishing an annual student journal by managing a team of editors, fund raising for costs (\$5,150 total), and designing / editing the journal.

Workshop Participation:

- *Nengo Summer School for Large-Scale Brain Modeling* June 2016
The Centre for Theoretical Neuroscience at the University of Waterloo
- *The Soar Cognitive Architecture Workshop* June 2015
Computer Science Department at the University of Michigan
- *Psychology and the Other* October 2013
Psychology Department at Lesley University
Presented poster: *An Existential Crisis—the Absentminded Man: A Survey of Existential Therapy within Modern Psychology*

Course Highlights:

Brown University, Providence, RI

Computer Science

CSCI 1550: Probabilistic Methods in Computer Science	Spring 2018
CSCI 2951: Learning and Sequential Decision Making	Fall 2017
CSCI 1420: Machine Learning	Spring 2017
CSCI 2951: Collaborative Robotics	Spring 2017

Applied Mathematics

APMA 1655: Statistical Inference I	Fall 2016
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Cognitive, Linguistics, and Psychological Studies

CLPS 1520: Computational Vision	Fall 2016
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University of Michigan, Ann Arbor, MI

Computer Science

EECS492: Intro to Artificial Intelligence	Spring 2015
EECS 281: Data Structures & Algorithms	Fall 2014
EECS499: Independent Study— Cognitive Inspired Information Retrieval Techniques	Fall 2014
EECS594: Intro to Adaptive Systems	Spring 2014
EECS280: Programming and Data Structures	Spring 2014
EECS203: Discrete Mathematics	Spring 2014
EECS183: Elementary Programming	Fall 2013

Statistics

STATS401: Applied Statistical Inference II	Spring 2013
STATS251: Intro. to Statistics and Data Analysis	Winter 2012

Philosophy

PHIL399: Independent Study— Gödel's Incompleteness Proofs in Mathematical Logic	Spring 2015
PHIL202: Intro to Symbolic Logic	Fall 2014
PHIL340: Minds & Machines	Spring 2014
PHIL383: Knowledge & Reality	Fall 2013

Biopsychology, Cognition, and Neuroscience (BCN)

PSYCH341: Advanced Lab in Cognitive Psychology	Spring 2015
PSYCH303: Research Methods in Psychology	Fall 2015
PSYCH499: Decision Processes	Fall 2013
PSYCH47: How the Mind Works: Intro to Modern Cognitive Science	Spring 2013
PSYCH434: Biopsychology of Learning and Memory	Spring 2013

