ANGELA **TAM**

DATA SCIENTIST

angela.tam@mail.mcgill.ca angela-tam.github.io angela-tam-phd angela-tam

About

A data scientist with expertise in developing prognostic neuroimaging biomarkers for neurodegenerative diseases and a passion for practicing open science.

Experience

Senior Scientist

Perceiv AI

2020 – Present Montreal, Canada

- Led precision medicine research that aimed to predict individuals at high-risk of disease progression with machine learning algorithms
- Published research in peer-reviewed scientific journals and presented talks and posters at conferences
- Developed software-as-a-service products for clinical decision support and clinical trial patient selection
- Coded pipelines that aggregated, cleaned, and harmonized large-scale datasets obtained from research consortia and clinical trials containing medical imaging, genetic, and clinical information
- Designed brain imaging processing pipelines and quality control procedures that can be implemented at scale
- Containerized software for deployment on cloud computing services
- Drafted applications for medical device approval from federal health agencies (e.g. US FDA)
- https://perceiv.ai/

Postdoctoral Research Fellow

National University of Singapore

2018 – 2020 Singapore

- Advisor: B. T. Thomas Yeo
- Processed medical images and tabular data (e.g. demographics, questionnaires) from a large multi-centre dataset in a developmental population (n = 11,000) for scientific research
- Used neuroimaging features derived from functional magnetic resonance imaging to predict cognition, personality traits, and mental health symptoms with machine learning techniques (e.g. kernel ridge regression)
- Provided mentorship to PhD students

Graduate Student Researcher

Centre de recherche de l'Institut universitaire de gériatrie de Montréal

2013 – 2018 Montreal, Canada

- Trained machine learning models (e.g. support vector machine, logistic regression, random forest) on brain MRI scans to predict Alzheimer's disease dementia
- Contributed to the development of an open source neuroimaging pipeline: NeuroImaging Analysis Kit

Education

Ph.D. in Neuroscience

McGill University

2013 – 2018 Montreal, Canada

- Advisors: Pierre Bellec & John Breitner
- Thesis: Predicting Alzheimer's dementia from heterogeneous patterns of neurodegeneration and functional connectivity
- Keywords: neuroimaging, brain networks, machine learning, prediction, biomarker development, neurodegenerative disease

M.Sc. in Neuroscience

Queen's University

2011 – 2013 Kingston, Canada

- Advisor: Angeles Garcia
- Thesis: Neuroimaging attentional control in the Stroop task
- Keywords: cognition, neuroimaging, aging

B.Sc. in Psychology

University of Ottawa

2007 – 2011 Ottawa, Canada

- Magna Cum Laude
- Advisor: Patrick Davidson
- Thesis: The effects of aging and sleep quality on location and distance-based processes in memory for when something happened

Skills

git/GitHub Python Jupyter R MATLAB Octave Bash AWS HTML LaTeX Docker Unix/Linux

big data neuroimaging MRI fMRI scientific software development scientific research scientific writing data visualization data wrangling data mining machine learning

Languages

English
French
Cantonese

Selected Oral Presentations and Panels

Use of Foresight AD to reduce screen failure rates due to biomarker cut-offs in early Alzheimer's disease trials
Alzheimer's and Parkinson's Diseases Conference (AD/PD) 2024 — Lisbon, Portugal

Foresight AD: A multimodal prognostic tool to forecast cognitive and functional decline in early Alzheimer's disease
World Congress of Neurology 2023 — Montreal, Canada

Toward #DementiaZero: Colliding technologies, predictive neuroscience, and precision aging
Inventures 2023 — Calgary, Canada

Prediction of cognitive decline for enrichment of Alzheimer's disease clinical trials with machine learning
Alzheimer's Association International Conference (AAIC) 2022 — San Diego, USA

A machine learning tool to enrich Alzheimer's disease clinical trials in presymptomatic cohorts
Clinical Trials in Alzheimer's Disease (CTAD) 2021 — Boston, USA

Selected Peer-Reviewed Publications

1. *Chen, J., ***Tam, A.**, Kebets, V., Orban, C., Ooi, L. Q. R., Marek, S., *et al.* Shared and unique brain network features predict cognition, personality and mental health in childhood in the ABCD study. *Nature Communications* **13.** doi:10.1038/s41467-022-29766-8 (2022).
2. Li, J., Bzdok, D., Chen, J., **Tam, A.**, Ooi, L. Q. R., Holmes, A. J., *et al.* Cross-ethnicity/race generalization failure of behavioral prediction from resting-state functional connectivity. *Science Advances* **8,** eabj1812. doi:10.1126/sciadv.abj1812 (2022).
3. Marek, S., Tervo-Clemmens, B., Calabro, F. J. & others including **Tam, A.**, Reproducible brain-wide association studies require thousands of individuals. *Nature* **603,** 654–660. doi:10.1038/s41586-022-04492-9 (2022).
4. Ooi, L. Q. R., Chen, J., Zhang, S., Kong, R., **Tam, A.**, Li, J., *et al.* Comparison of individualized behavioral predictions across anatomical, diffusion and functional connectivity MRI. *NeuroImage* **263,** 119636. doi:10.1016/j.neuroimage.2022.119636 (2022).
5. **Tam, A.**, Laurent, C., Gauthier, S. & Dansereau, C. Prediction of Cognitive Decline for Enrichment of Alzheimer's Disease Clinical Trials. *The Journal of Prevention of Alzheimer's Disease,* 1–10. doi:10.14283/jpad.2022.49 (2022).
6. Urchs, S. G., **Tam, A.**, Orban, P., Moreau, C., Benhajali, Y., Nguyen, H. D., Evans, A. C. & Bellec, P. Functional connectivity subtypes associate robustly with ASD diagnosis. *Elife* **11,** e56257. doi:10.7554/eLife.56257 (2022).
7. **Tam, A.**, Dansereau, C., Iturria-Medina, Y., Urchs, S., Orban, P., Sharmarke, H., *et al.* A highly predictive signature of cognition and brain atrophy for progression to Alzheimer's dementia. *GigaScience* **8.** doi:10.1093/gigascience/giz055 (2019).
8. Vogel, J. W., Vachon-Presseau, E., Pichet Binette, A., **Tam, A.**, Orban, P., Joie, R. L., *et al.* Brain properties predict proximity to symptom onset in sporadic Alzheimer's disease. *Brain* **141,** 1871–1883. doi:10.1093/brain/awy093 (2018).
9. Badhwar, A., **Tam, A.**, Dansereau, C., Orban, P., Hoffstaedter, F. & Bellec, P. Resting-state network dysfunction in Alzheimer's disease: A systematic review and meta-analysis. *Alzheimer's & Dementia: Diagnosis, Assessment & Disease Monitoring* **8,** 73–85. doi:10.1016/j.dadm.2017.03.007 (2017).
10. **Tam, A.**, Dansereau, C., Badhwar, A., Orban, P., Belleville, S., Chertkow, H., *et al.* A dataset of multiresolution functional brain parcellations in an elderly population with no or mild cognitive impairment. *Data in Brief* **9,** 1122–1129. doi:10.1016/j.dib.2016.11.036 (2016).
11. Orban, P., Madjar, C., Savard, M., Dansereau, C., **Tam, A.**, Das, S., *et al.* Test-retest resting-state fMRI in healthy elderly persons with a family history of Alzheimer's disease. *Scientific Data* **2,** 1–11. doi:10.1038/sdata.2015.43 (2015).
12. **Tam, A.**, Dansereau, C., Badhwar, A., Orban, P., Belleville, S., Chertkow, H., *et al.* Common Effects of Amnestic Mild Cognitive Impairment on Resting-State Connectivity Across Four Independent Studies. *Frontiers in Aging Neuroscience* **7,** 2214–2266. doi:10.3389/fnagi.2015.00242 (2015).
13. **Tam, A.**, Luedke, A. C., Walsh, J. J., Fernandez-Ruiz, J. & Garcia, A. Effects of reaction time variability and age on brain activity during Stroop task performance. *Brain Imaging and Behavior* **9,** 609–618. doi:10.1007/s11682-014-9323-y (2015).
14. *Ruthirakuhan, M., *Luedke, A. C., ***Tam, A.**, Goel, A., Kurji, A. & Garcia, A. Use of physical and intellectual activities and socialization in the management of cognitive decline of aging and in dementia: A review. *Journal of Aging Research* **2012.** doi:10.1155/2012/384875 (2012).

* Authors contributed equally.