

Jennifer Williams

Curriculum Vitae

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Publications

- Conference Proceedings **Same cause; different effects in the brain.**
M. Toneva*, **J. Williams***, A. Bollu, C. Dann, L. Wehbe.
Causal Learning and Reasoning, CLeaR 2022
- Preprints **Behavior measures are predicted by how information is encoded in an individual's brain.**
J. Williams, L. Wehbe.
arXiv 2021 (arXiv:2112.06048)
- Journal Papers **Discriminative subtyping of lung cancers from histopathology images via contextual deep Learning.**
B.J. Lengerich, M. Al-Sheivat, A. Alavi, **J. Williams**, S. Labbaki, E.P. Xing.
medRxiv 2020 (DOI: 10.1101/2020.06.25.20140053)
- Journal Papers **LSD1 dual function in mediating epigenetic corruption of the vitamin D signaling in prostate cancer.**
S. Battaglia, E. Karasik, B. Gillard, **J. Williams**, T. Winchester, M.T. Moser, D.J. Smiraglia, B.A. Foster.
Clinical Epigenetics 2017 (DOI: 10.1186/s13148-017-0382-y)

Education

- Expected 2022 **PhD in Computational Biology**, Carnegie Mellon University (CMU).
Advisor: Dr. Leila Wehbe, Machine Learning Department
Topic: Machine Learning Method Development to Model Individual Differences in the Brain in the Presence and Absence of Disease
- 2013-2016 **Cancer and Systems Biology EU-USA Atlantis Dual Degree Program.**
 - **Master of Science in Natural Science**, Roswell Park, University at Buffalo.
Advisor: Dr. Barbara Foster
Topic: Computational and Experimental Interrogation of Vitamin D's Role in Prostate Cancer
 - **Master of Science in Integrated Systems Biology**, University of Luxembourg.
 - **Courses Towards MSc**, University of Amsterdam and VU University Amsterdam.
- 2013 **Bachelor of Science in Biology**, Canisius College. Magna Cum Laude.

Relevant PhD Coursework and Computing Skills

- Languages Python, R, MATLAB, Java, \LaTeX
- Libraries Scikit-learn, Pandas, NumPy, Pycortex
- Courses Cognitive Neuroscience, Machine Learning, ABCDE of Statistical Methods in Machine Learning, Intermediate Statistics, Probabilistic Graphical Models, Computational Medicine

Fellowships

- 2020-2021 Digital Health Fellowship - Center for Machine Learning and Health (CMLH)
 - Full tuition and stipend for 12 months and \$3,000 for research-related expenses
- 2017-2019 NIH T32 Training Grant - National Institute of Biomedical Imaging and Bioengineering
 - Full tuition and stipend for 2 years and \$6,000 for research-related expenses

- 2013-2015 CanSys MS Scholarship - Atlantis EU-USA Training Program
 - Stipend for 12 months
- 2012-2013 Canisius Earning Excellence Program (CEEP) Research Grant

Current Research Projects

Graduate Research Assistant - CMU

Predicting Behavior From How Information is Encoded in an Individual's Brain.

- Creating a framework to identify individual differences in how information is encoded in the brain, and testing if these differences predict behavior measures. Utilizing functional connectivity methods and encoding/decoding models with visual and language semantic features to analyze neuroimaging data.

Creating Interpretable Integrated Analysis of Imaging and Genomic Data.

- Collaborating with a cross-functional team to develop a deep learning framework to incorporate complex covariate data (e.g. histology images) into an interpretable graphical model framework.

Discovering How Individual Differences in a Stroke Impact Vision Recovery.

- Extending causal mediation methods to model how fMRI activity and a stroke lesion impact a participant's visual field recovery.

Identifying Individual Brain Differences in Healthy and Depressed Participants.

- Developing algorithms to model individual differences in time series fMRI or EEG data elicited by naturalistic stimuli (audio and videos) that are clinically relevant.

Conference Posters and Oral Presentations

- 2022 **Behavior Measures are Predicted by How Information is Encoded in an Individual's Brain.** Computational and Systems Neuroscience (COSYNE), poster
- 2021 **Behavior Measures are Predicted by How Information is Encoded in an Individual's Brain.** Neuromatch Conference 4 (NMC4), poster
- 2021 **Leveraging Brain Encoding Models to Predict Individual Differences in Behavior.** Society for Neuroscience (SFN), poster
- 2019 **All Terrain Graph-Learner-CPC: Causal Model Discovery for Missing Not at Random Data.** Intelligent Systems for Molecular Biology/European Conference on Computational Biology (ISMB/ECCB), poster
- 2018 **Contextual Explanation Networks Enable Integrated Analysis of Imaging and Genomic Data.** ISMB, poster
- 2018 **Learning Causal Models from Missing Not at Random Data in Clinical Datasets.** NIH Training Grantees Meeting of the National Institute of Biomedical Imaging and Bioengineering, poster
- 2013 **Preliminary Results on the Prevalence of Physiology Students' Homeostatic Misconceptions.** Experimental Biology (EB) poster
- 2012 **Mentoring: A Collaboration Between Higher Education and Urban After School Outreach Programs.** Science Teachers Association of New York State Conference (STANYS), oral presentation

Awards

- 2021 Top Reviewer Machine Learning for Health (ML4H) Conference
 - Top 10 reviewer out of several hundred

- 2019 Attended 2019 Machine Learning Summer School (MLSS) Moscow to collaborate and learn state of the art techniques to advance machine learning research
- 2019 Carnegie Mellon University Graduate Student Assembly/Provost Conference Award
- 2019 International Conference on Machine Learning (ICML) Travel Award
- 2018 CMU-Pitt Computational Biology (CPCB) PhD Program Student Service Award
- 2013 Canisius College Biology Department Excellence in Science Education Award
- 2012 Beta Beta Beta (Biological Honor Society - National Inductee)

Selected Previous Research Experiences

Graduate Research Assistant - CMU

Extending Causal Model Discovery for Missing Not at Random Data (MNAR).

- Proposed, developed and implemented a causal learning algorithm to learn a causal graph when data is MNAR.

Graduate Research Assistant - Roswell Park

Interrogated Vitamin D's Role in Prostate Cancer.

- Profiled the vitamin D receptor and lysine-specific demethylase 1 (LSD1) interactomes using Prostate Cancer clinical samples and data I collected from cell lines and mice.
- Thesis published by ProQuest, "Inhibiting LSD1 restores vitamin D responsiveness in castration resistant prostate cancer", 2016.

Relevant Service and Leadership

- 2021-present **BrAIIn Seminar Co-organizer.**
Co-organized a weekly seminar at the intersection of neuroscience and AI research
- 2021-present **CPCB Steering Committee Student Representative.**
Collaborated with senior leadership in the CPCB PhD program to decide strategic priorities
- 2018-present **Peer Reviewer.**
ML4H Conference 2021
New In ML @NeurIPS Workshop 2020-2021
Nature Scientific Reports
ECCB 2018
- 2016-present **TechNights Volunteer.**
Created and led workshop on image processing for middle school girls
Assisted teaching other STEM topics through interactive workshops
- 2020 **Graduate Application Support Program Mentor.**
Provided feedback to potential CMU PhD program applicants
- 2017-2020 **CPCB Graduate Student Assembly.**
President (2019-2020)
Vice President (2018-2019)
Senator (2017-2018)
- 2017-2019 **TECBio REU (Training and Experimentation In Computational Biology Research Experiences for Undergraduates).**
Co-led a journal club for undergraduate researchers (2019)
Ethics mentor for undergraduate researchers (2018)
Moderated a journal club for undergraduate researchers (2017 - 2018)
- 2019 **Convestro Pittsburgh Regional Science & Engineering Fair Judge.**
Leader of a 5 judge team in Medicine, Health, and Microbiology category
- 2018-2019 **Admissions Committee Member CPCB PhD program.**
Reviewed PhD program applications and assisted making admissions decisions
- 2018 **Intel International Science and Engineering Fair (ISEF) Grand Award Judge.**

Teaching and Mentoring

- 2019-2020 **Mentored Undergraduate Student.**
William Yang - CMU Computer Science
- 2017-2018 **Teaching Assistant**, *Carnegie Mellon University*.
Course: Lab Methods for Computational Biologists.
Planned and taught module on computational sequence analysis