Michael Teti | Curriculum Vitae

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Education

Doctor of Philosophy in Complex Systems and Brain Sciences **Present**
Florida Atlantic University
Boca Raton, FL

Bachelor of Science in Biology **2016**
Florida Atlantic University
Boca Raton, FL

Research Positions

Summer Research Fellow **2021**
Center for Nonlinear Studies, *Los Alamos National Lab*
Accepted Proposal: "Learning from Limited Data with a Biologically Plausible Model of Mouse Visual Cortex Constrained by Neuronal Recordings"

Graduate Research Intern **2019–Present**
Advanced Research in Cyber Systems, *Los Alamos National Lab*
Developed and studied deepfake defenses for both audio and time series data.

Visiting Student **2018–2019**
Max Planck Florida Institute for Neuroscience
Worked on an interdisciplinary team to develop state-of-the-art computer vision algorithms to automate the collection and analysis of large-scale neural recordings.

Projects

Sparse and Predictive Coding Models of Mouse V1 Optical Recordings **2020–Present**
FAU Machine Perception and Cognitive Robotics Laboratory *Dissertation Topic*
Developing and investigating sparse predictive coding models to explain mouse V1 simple cell responses to natural videos. Click here for the project repository.

Synthesizing Neutron Pulse Trains via Deep Generative Models **2020**
Los Alamos National Laboratory
Implemented various generative deep learning models – including Neural Hawkes Process, Wasserstein GANs, and Variational Autoencoders – and investigated each one's ability to simulate neutron pulse trains obtained with a neutron coincidence detector.

MATE: Marine Autonomous Trash Eater **2019**
FAU Machine Perception and Cognitive Robotics Laboratory

Creation of a mobile aquatic vessel capable of identifying and collecting plastic waste in aquatic environments. Mentored two students in the M.S. in Mechanical Engineering program and worked with them to integrate computer vision and autonomous navigation technology into the vessel. Click here for the project repository.

Adversarial Audio Detection With Sparse Autoencoders **2019**
Los Alamos National Laboratory
Investigated latent representations of sparse autoencoders given adversarial speech signals for deepfake detection in the 2019 Cyber Toaster Summer Program.

Auto-focus for 2-Photon Imaging of Dendritic Spines **2018–2019**
Max Planck Florida Institute for Neuroscience
Worked on a team of scientists and students toward the creation of a Deep RL algorithm for drift correction in 2-photon imaging experiments. Also mentored two students from FAU high school as part of the first Max Planck Neural Data Science class.

Investigation of Behaviorally-Cloned DNNs in an Autonomous Steering Task **2016–2018**
Machine Perception and Cognitive Robotics Laboratory
Developed a platform to train DNNs to autonomously control a sub-scale RC vehicle. Investigated the generalization ability of the trained DNNs under various modifications to the physical environment. Click here for the repository.

References

Teti, M., Hahn, W.E., Martin, S., Teti, C., and Barenholtz, E. "A Controlled Investigation of Behaviorally-Cloned Deep Neural Network Behaviors in an Autonomous Steering Task." *Robotics and Autonomous Systems*, 142:103780, 2021. (Undergraduate Thesis)

Teti, M., Meyer, E., and Kenyon, G. "Can Lateral Inhibition for Sparse Coding Help Explain V1 Neuronal Responses To Natural Stimuli?." 2020 IEEE Southwest Symposium on Image Analysis and Interpretation (SSIAI). IEEE, 2020.

Presentations

Teti, M. "Adversarial Attacks on Biologically Plausible Action Recognition Networks". Presented at the Los Alamos National Lab Center for Nonlinear Studies Post-Doc Seminar Series, October, 2021.

Teti, M. "Synthesizing Neutron Pulse Trains." Presented at the Los Alamos National Lab Student Symposium, August 2020.

Teti, M., Meyer, E., and Kenyon, G. "Can Sparse Coding Help Account for Non-Classical Receptive Field Effects in V1 Simple Cells?" Poster presented at From Neuroscience to Artificially Intelligent Systems meeting at Cold Spring Harbor Laboratory, November 2020.

Teti, M. "Detecting Adversarial Speech." Talk given at Los Alamos Center for Nonlinear Studies, July 2019.

Teti, M., Barenholtz, E., and Hahn, W. "Half the Measurements, Twice the Speed: Accelerating Deep Reinforcement Learning With Compressed Sensing." Talk given at the 7th annual Neuro-Inspired Computational Elements Workshop in Albany, NY, March 2019.

Teti, M., Barenholtz, E., and Hahn, W. "Comparing Deep Learning Architectures in a Self-Driving Vehicle." Poster presented at GTC 2018 in San Jose, California, March 2018.

Teti, M., Hahn, W., and Barenholtz, E. "Compressed Sensing With Dynamical Neural Networks." Poster presented at the Florida Atlantic University 8th Annual Graduate and Professional Research Day, March 2017.

Awarded Grants

NSF/U.S. Department of Energy **2021**
Sparse Coding and Predictive Processing to Model Mouse V1 Simple Cells *$1.35M*
PI: Garrett Kenyon and Yijing Watkins

The Everglades Foundation **2016**
Deep Learning Automatic Image Classification and Quantification of Bird Species *$10,000*
PI: Elan Barenholtz

FAU Office of Undergraduate Research and Inquiry **2015**
Q-learning in Bebop Drone *$2,000*
PI: Elan Barenholtz and William Hahn

Awards

Provost Fellowship **2018**
Identified as an outstanding student in the FAU College of Science

FAU Graduate Research Day Peer Review Award **2017**
For poster titled "Compressed Sensing With Dynamical Neural Networks"

Technical Skills

0–1 years: AllenSDK, Nengo

1–3 years: R, PetaVision Neural Simulation Toolbox, Keras

3+ years: TensorFlow, PyTorch, Matlab, Docker, Python

Relevant Coursework

- Artificial Intelligence
- Nonlinear Dynamical Systems
- Information Theory
- Analysis of Algorithms
- Computational Foundations of AI
- Intro to Neural Networks
- Machine Perception and Cognitive Robotics
- Digital Image Analysis
- Intro to Data Science
- Computational Neuroscience
- Developmental Neurobiology
- Cognitive Neuroscience
- Neuroscience I and II
- Genetics
- Biochemistry I and II
- Methods in Complex Systems
- Microbiology
- Comparative Animal Physiology

Teaching

Instructor **2020–2021**
Intermediate Statistics Lab

Instructor and TA **2018–2019**
Introduction to Deep Learning