Abdullah Yonar

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EDUCATION

HARVARD UNIVERSITY | Ph.D. in Applied Mathematics
Expected Sep 2020 | Cambridge, MA ·

BOGAZICI UNIVERSITY | BS in Physics
Conc. in Computational Physics | June 2014 | Istanbul, Turkey
Dean's Honor List

RESEARCH EXPERIENCE

HARVARD UNIVERSITY | Research Assistant
Aug 2014 – Present | Cambridge, MA
> Working with **Prof. Sharad Ramanathan**.
> Developed compressed sensing based method to identify key neurons in biological and artificial neural network that control distinct behaviors.
> Studying the time scale dynamics of long-lived neural states and behavioral states.
> Experience with: Compressed sensing, Neural Networks, Computational modelling, Deep Learning, Recurrent Neural Networks, Building optical setups, Calcium imaging, Optogenetic manipulations.

MIT | Undergraduate Research Assistant
Mar 2013 – Aug 2013 | Cambridge, MA
> Worked with Prof. Jeff Gore on two projects.
> Predicting nonlinear multispecies ecosystem dynamics from pair interactions of bacteria species.
> Modelling invasion dynamics of co-existing yeast and bacteria culture.

UNIVERSITY OF CALIFORNIA, BERKELEY | Summer Research Assistant
June 2012 – Aug 2012 | Berkeley, CA
> Worked with Prof. Ahmet Yildiz.
> Modelling stepping mechanism of motor protein dynein using Single Molecule Fluorescence Imaging technique. Specifically interested in ATP-dependent and independent Rate Constants of Dynein Stepping.
> TIRF microscopy, Single molecule biophysics

BOGAZICI UNIVERSITY | Undergraduate Research Assistant
Feb 2012 – Jan 2013 | Cambridge, MA
> Worked with Prof. Erkcan Ozcan on Radiation Protection and Shielding Simulation with FLUKA (Monte Carlo Simulation Package) to construct a new Cyclotron at Bogazici University.

UNIVERSITY OF MAINZ | Summer Research Assistant
July 2011 – Oct 2012 | Mainz, Germany
> Worked with Prof. Volker Buescher on Data analysis to reproduce the t-channel Single Top-Quark with cross section in pp collisions at $\sqrt{s} = 7TeV$ collected with the Atlas detector at CERN.

PUBLICATIONS

(*:equal contribution, †:corresponding author)

- Jeff B. Lee*, **Abdullah Yonar***†, Tim Hallacy, Ching-Han Shen, Josselin Milloz, Jagan Srinivasan, Askin Kocabas, Sharad Ramanathan†. A compressed sensing framework for efficient dissection of neural circuits. **Nature Methods**, 16, 126-133 (2019).

- **Abdullah Yonar**†, Tim Hallacy, Sharad Ramanathan†. A mechanism for the time scale of the state changes in long-lived neural states. *in prep.*

TEACHING

HARVARD UNIVERSITY | Teaching Fellow
Cambridge, MA

- **Applied Physics 286**: Inference, Information Theory, Learning and Statistical Mechanics. (Fall 2019)

- **Applied Math 215**: Advanced Mathematical Techniques for Modern Biology. (Spring 2019)

  - Gave guest lecture on variational inference and variational autoncoders and dimensionality reduction methods.

- **SPU25**: Energy: Perspectives, Problems, and Prospects. (Spring 2016)

- **Instructor**, Machine Learning Winter School, Seoul High School. Seoul, Korea (Dec 2018)

PRESENTATIONS

Talks

- BAWM, MIT, Cambridge, MA, "A Compressed Sensing Framework for Efficient Dissection of Neural Circuits." (2018)

- Young Scientists Symposium, LMU, Munich, Germany, "Identifying essential neurons in neural networks that control distinct behavior." (2017)

- Bauer Seminar Series, Harvard, Cambridge, MA, "Slow modulating interneurons control exploratory vs exploitative states." (2016)

Posters

- **A. Yonar**. "Compressed sensing based framework for dissecting artificial and biological neural networks". Neural Information Processing Systems (NeurIPS) 2019, LMRL Workshop, Vancouver, Canada (2019)

- T. Hallacy, **A. Yonar**, J.B. Lee, S. Ramanathan. "Identifying neural circuit that controls innate immune system in C. elegans". Biophyscis Retreat, Harvard Medical School, Boston, MA (2018)

- **A. Yonar**, J.B. Lee, T. Hallacy, S. Ramanathan. "Using compressed sensing framework for dissecting neural circuit controlling speed of locomotion in C. elegans". MCB Department Retreat, Woods Hole, MA (2017)

PROJECTS
work in progress

- Compressed sensing approach to identify key nodes in recurrent neural networks.
- Dissecting pathogen avoidance behavior for immune and nervous system interaction.
- Training RL agent to control biological neural networks with Chenguang Li.
- Ensemble of Networks for optimal network compression: Training ensemble of networks near the vicinity of global minimum to find optimal network size.
- Predicting future states from behavioral videos with contrastive learning to learn behavioral structures.

AWARDS & HONORS

- Harvard School of Engineering and Applied Sciences Fellowship (2014-2015)
- TUBITAK (The Scientific and Technological Council of Turkey) Scholarship (2009 - 2014)
- Bogazici University Scholarship (2009 - 2014)
- Dean's Honor list, Bogazici University (2014)
- Finalist at National Physcis Olympiad (2008)
- Ranked in top 0.01% among 1.8 million participants in National University Exam (2009)

EXPERIENCE

Pytorch • Keras • TensorFlow