MEHMET KEREM TURKCAN

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EDUCATION

- ◇ **Columbia University,** United States — January 2017 – May 2022 (Expected)
  - Ph.D. in Electrical Engineering, Systems Biology and Neuroengineering
  - Academic Advisor: Aurel Lazar
  - Cumulative GPA: 4.09
  - *Relevant Coursework*: Systems Biology: Design Principles for Biological Circuits, Sparse Representation and High-Dimensional Geometry, Introduction to Genomic Information Science and Technology, Foundations of Graphical Models, Autonomous Multi-Agent Systems
- ◇ **Cold Spring Harbor Laboratory,** United States — June 2019 – July 2019
  - *Drosophila* Neurobiology: Genes, Circuits & Behavior Laboratory/Lecture Course
  - Helmsley Fellowship Award
- ◇ **Columbia University,** United States — September 2015 – December 2016
  - M.Sc. in Computer Science, Machine Learning/Thesis Track
  - Cumulative GPA: 3.97
  - *Relevant Coursework*: Advanced Machine Learning, Bayesian Methods in Machine Learning, Neural Networks and Deep Learning, Introduction to Computational Learning Theory, Computer Graphics, Programming Languages and Translators, Analysis of Algorithms I
- ◇ **Istanbul Technical University,** Turkey — 2011 – 2015
  - B.Sc. in Electronics and Communication Engineering
  - Cumulative GPA: 3.75
  - High Honors List: Fall 2011, Spring 2012, Fall 2012, Spring 2013, Fall 2014, Spring 2014, Fall 2015
  - Presidential Merit Scholarship
  - *Relevant Coursework:* Image Processing, Wireless Communication Networks, Data Communications, Digital Signal Processing Design and Applications, Advanced Physics Project Laboratory
- ◇ **École Polytechnique Fédérale de Lausanne (EPFL),** Switzerland — 2013 – 2014 Fall Term
  - Erasmus Exchange for B.Sc. in Electronics and Communication Engineering
  - *Relevant Coursework:* Applied Machine Learning, Advanced Signal Processing, Information Theory and Coding
- ◇ **American Robert College High School,** Turkey — 2007-2011

TEACHING

- ◇ *Course Assistant,* Columbia University — Spring 2020
  - **ECBM E4070: Computing with Brain Circuits of Model Organisms**
- ◇ *Course Assistant,* Columbia University — Spring 2019
  - **EEBM E6095: Computing with Brain Circuits**
- ◇ *Teaching Assistant,* Columbia University — Spring 2018
  - **ECBM E6070: Fruit Fly Brain as a Neuroinformation Processor**
- ◇ *Teaching Assistant,* Columbia University — Fall 2017
  - **BMEB W4020: Computational Neuroscience: Circuits in the Brain**
- ◇ *Course Assistant,* Columbia University — Fall 2016
  - **ECBM E4040: Neural Networks and Deep Learning**

TALKS&LECTURES

- ◇ *FlyBrainLab: An Interactive Open Computing Platform,* PyData Global — November 2020
  - FlyBrainLab as a Platform for Centralizing Computational Research on Drosophila Neural Circuits
- ◇ *ECBM E4070: Computing with Brain Circuits of Model Organisms,* Columbia University — February 2020
  - Massively Parallel Circuit Emulation with FlyBrainLab and Modeling Synaptic Conductance Dynamics
- ◇ *BMEB W4020: Computational Neuroscience: Circuits in the Brain,* Columbia University — September 2019
  - Channel Conductances as Memristive Systems and Introduction to I/O Equivalence for Spiking Neuron Models

◇ *Fruit Fly Brain Hackathon 2019,* Columbia University March 2019
- Introduction to FlyBrainLab: An Interactive Computing Platform for the Fly Brain

◇ *Drosophila Neurobiology: Genes, Circuits&Behavior,* Cold Spring Harbor Laboratory July 2018
- Building the Functional Map of the Fruit Fly Brain

PUBLICATIONS

◇ Preprints

- **The Fruit Fly Brain Observatory: From Structure to Function**
  The next generation open-source platform to support open, collaborative Drosophila neuroscience research.
  Nikul H. Ukani, Chung-Heng Yeh, Adam Tomkins, Yiyin Zhou, Dorian Florescu, Carlos Luna Ortiz, Yu-Chi Huang, Cheng-Te Wang, Mehmet K. Turkcan, Tingkai Liu, Paul Richmond, Chung-Chuan Lo, Daniel Coca, Ann-Shyn Chiang, Aurel A. Lazar
- **Using an Ancillary Neural Network to Capture Weekends and Holidays in an Adjoint Neural Network Architecture for Intelligent Building Management**
  Capture uncertainty and inject extra information for forecasting for intelligent building management.
  Zhicheng Ding, Mehmet K. Turkcan, Albert Boulanger

◇ Accepted

- **Generating Executable Mushroom Body and Lateral Horn Circuits from the Hemibrain Dataset with FlyBrainLab**
  CNS*2020, 2020.
  Building executable neural circuits for neuropils associated with learned and innate memories using recently-released single-synapse-scale connectomics data.
  Aurel A. Lazar*, Mehmet K. Turkcan*, Yiyin Zhou* (*: Equal Contribution)
- **Comparing Drosophila Neural Circuit Models with FlyBrainLab**
  CNS*2020, 2020.
  Highlighting the use of FlyBrainLab for studying the central complex and the early olfactory system.
  Aurel A. Lazar*, Tingkai Liu*, Mehmet K. Turkcan*, Yiyin Zhou* (*: Equal Contribution)
- **Computational modeling of bilateral olfactory sensory processing in adult Drosophila**
  Janelia Navigational Algorithms and Neural Circuit Computations Directing Olfactory Search Across Species Conference, 2020.
  Theoretical algorithms for the representation of odorant sources in the olfactory system.
  Aurel A. Lazar*, Mehmet K. Turkcan* (*: Equal Contribution)
- **FlyBrainLab: An Interactive Computing Environment for the Fruit Fly Brain**
  2019 Society for Neuroscience Conference (SfN), 2019.
  An interactive computing platform for studying the function of circuits constructed from fly brain data.
  Mehmet K. Turkcan, Tingkai Liu, Chung-Heng Yeh, Yiyin Zhou, Aurel A. Lazar
- **Common SNP-based Haplotype Analysis of the 9p21.3 Gene Locus as Predictor of Coronary Artery Disease in Tanzanian Population**
  Cellular and Molecular Biology (Noisy-le-Grand, France), 2019.
  Studying the association of the 9p21.3 locus with Coronary Artery Disease in the Tanzanian population.
  Gokce Akan, Peter Kisenge, Tulizo Shemu Sanga, Erasto Mbugi, Ismael Adolf, Mehmet K. Turkcan, Mohammed Janabi, Fatmahan Atalar
- **Face-looking Image Recognition**
  2019 27th Signal Processing and Communications Applications Conference (SIU), 2019.
  A generalizable approach for cross-modal face matching via deep transfer learning.
  Mehmet K. Turkcan, Ege Çetin, Tayfun Akgül
- **Threatsim: Resolve Threats to Manufacturing Industries using Reinforcement Learning**
  Columbia University Data Science Day, 2017.
  Reinforcement learning to optimize planning of preventive maintenance and detect threats.
  Kartikeya Upasani, Mehmet K. Turkcan, Albert Boulanger
- **Generation of $1/f^{\alpha}$ Noise via Frequency Scaling**
  EMO Journal of Electrical, Electronics, Computers, Biomedical and Control Engineering, 4(8), 2014.
  A scale transform in frequency domain can be utilized to generate noise with differing $1/f$ statistics.
  Mehmet K. Turkcan, Tayfun Akgül

◇ In Preparation

- **FlyBrainLab: Building the Functional Map of Fruit Fly Brain**
  An interactive computing platform for studying the function of circuits constructed from fly brain data.
- **Real Time Power Allocation in Solar Microgrids via Deep Learning**
  Deep learning for addressing a non-differentiable customer satisfaction maximization task efficiently.

RESEARCH

◇ *Undergraduate Scholar* March – December 2014
Istanbul Technical University Signal Processing Laboratory Istanbul, Turkey

- Worked on a TUBITAK (The Scientific and Technological Research Council of Turkey) backed research project titled "Towards Automated Face Recognition: Sketch/Caricature-Photo Matching Using Caricature Making Techniques".
- Focused on the applications of machine learning and the design of potentially novel metric learning methods for face and sketch recognition problems.
- Designed, implemented and evaluated a new metric learning algorithm that achieved state of the art matching accuracy on metric learning problems for cross-modal face recognition.

◇ *Research Intern* Summer 2013
Istanbul Technical University Signal Processing Laboratory Istanbul, Turkey

- Implemented various state-of-the-art face detection and recognition algorithms.
- Considered the use of some unconventional integral transforms like the dual Mellin variable in relation to time and frequency for feature extraction.
- Investigated the use of such feature extraction methods for the analysis of sequential time series data, achieving improved performance on a number of market prediction problems compared to previous literature.

WORK EXPERIENCE

◇ *R&D Specialist* May – August 2015
ArtGe Technologies Istanbul, Turkey

- Worked on the design and implementation of scalable and efficient face recognition systems with an additional focus on the improvement of user experience.

◇ *Student Intern* Summer 2014
ArtGe Technologies Istanbul, Turkey

- Implemented machine learning algorithms to perform automatic agriculture related data extraction from images, as part of the TARBIL (Agricultural Monitoring and Information System) Project funded by the Turkish Ministry of Food, Agriculture and Livestock.
- Designed, implemented and benchmarked a novel regression approach for estimating crop heights from arbitrarily placed, low quality stereo camera installations.

TECHNICAL SKILLS

◇ **Programming Languages:** C/C++, MATLAB, Python, Typescript, Javascript, 8051 Assembly, GML, HTML, CSS
◇ **Deep Learning Libraries:** TensorFlow, PyTorch, Theano, OpenAI Gym, Keras
◇ **Operating Systems:** Linux, macOS, Windows
◇ **Design Software:** LaTeX, Photoshop, Illustrator, InDesign