Max Springer

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Department of Mathematics
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Research Interests

Algorithmic Game Theory, Auction and Mechanism Design,
Fair Allocation, Combinatorics, Machine Learning

Education

University of Maryland — College Park, MD
PhD in Applied Mathematics — August 2020 – Present
MS in Applied Mathematics — Awarded in May 2022
Advisor: Professor MohammadTaghi Hajiaghayi

Cornell University — Ithaca, NY
BA in Mathematics, concentration in Biology — August 2015 – May 2019
Minors in Biological Sciences & Cognitive Science

Accepted Publications

Analysis of a Learning Based Algorithm for Budget Pacing
MohammadTaghi Hajiaghayi and Max Springer* (arXiv)
22nd *International Conference on Autonomous Agents and Multiagent Systems*

Optimal Sparse Recovery Using Decision Stumps
Kiarash Banihashem, MohammadTaghi Hajiaghayi and Max Springer*
37th *AAAI Conference on Artificial Intelligence - February 2023*

Online Algorithms for the Santa Claus Problem
MohammadTaghi Hajiaghayi, MohammadReza Khani, Debmalya Panigrahi and Max Springer*
36th *Conference on Neural Information Processing Systems - December 2022*

A Machine Learning Approach for Predicting Impaired Consciousness in Absence Epilepsy
Max Springer, Aya Khalaf, ... and Hal Blumenfeld
Annals of Clinical and Translational Neurology (ACTN) - July 2022

The Pulse: Transient fMRI Signal Increases in Subcortical Arousal Systems During Transitions in Attention
Rong Li, Jun Hwan Ryu, Peter Vincent, Max Springer, ... and Hal Blumenfeld
NeuroImage - May 2021

Submitted Papers

Almost Envy-Free Allocations of Indivisible Goods or Chores with Entitlements
MohammadTaghi Hajiaghayi, Max Springer and Hadi Yami*
32nd *International Joint Conference on Artificial Intelligence*

Almost Tight Guarantees for Online Nash Social Welfare Maximization
K. Banihashem, M.T. Hajiaghayi, E. Moreno, S. Shin and M. Springer*
32^{nd} *International Joint Conference on Artificial Intelligence*

A Nash Equilibrium Approach to Missing Data Imputation
Kiarash Banihashem, MohammadTaghi Hajiaghayi and Max Springer *
40^{th} *International Conference on Machine Learning*

Improved Oracle Based Algorithms for Adversarial Contextual Bandits
Kiarash Banihashem, MohammadTaghi Hajiaghayi, Suho Shin, and Max Springer*
The 26th International Conference on Artificial Intelligence and Statistics

In Preparation

Validation of a New Model for Estimating Insulin Sensitivity and Beta-Cell Function from Oral Glucose Tolerance Tests
Stephanie Cheung, Max Springer, Joon Ha and Arthur Sherman

Presentations

EEG and Machine Learning in Prediction of Impaired Responses to Visual Stimuli During Interictal Epileptiform Discharges
75th American Epilepsy Society Meeting - December 2021

Analysis of a Learning Based Algorithm for Budget Pacing
Facebook Operations Research Workshop - October 2021

A Machine Learning Approach for Classification of Spike-Wave Discharges in Absence Epilepsy
74th American Epilepsy Society Meeting - December 2020

Driving Safety in Patients with Generalized SWD but no Clinical Seizures: Evaluation with a Realistic Driving Simulator
73rd American Epilepsy Society Meeting - December 2019

Honors and Awards

Nokia Bell Lab's Outstanding Innovation Award — Summer 2022

Recipient of Aziz / Osborn Gold Medal in Teaching Excellence — 2021 - 2022

Recipient of NSF Graduate Research Fellowship (NSF GRFP) — March 2022

Recipient of University of Maryland Dean's Fellowship — August 2020

* authors appear in alphabetical order

Research Experience

Hajiaghayi Research Group December 2020 – Present
University of Maryland (College Park), Department of Computer Science
Advisor: Professor MohammadTaghi Hajiaghayi
Research focuses on fair division problems and approximate algorithms.

AI Research Lab May 2022 – August 2022
Nokia Bell Labs
Advisor: Dr. Matthew Andrews
Research focuses on computer vision for automation of industrial monitoring.

Laboratory of Biological Modeling May 2021 – August 2021
National Institutes of Diabetes and Digestive Kidney Diseases (NIDDK)
Advisor: Dr. Arthur Sherman
Research focuses on analysis of dynamical systems model of Type 2 Diabetes.

Blumenfeld Lab May 2019 – August 2020
Yale University School of Medicine, Department of Neurology
Advisor: Dr. Hal Blumenfeld
Formulated machine learning classification algorithm for epileptiform discharges from large-scale set of scalp EEG data.

Strogatz Research Group January 2019 – May 2019
Cornell University, Department of Mathematics
Advisor: Professor Steven Strogatz
Research focused on evolutionary game theory and dynamic modeling of bacterial resistance.

Integrative Cancer Dynamics Unit May 2018 – December 2018
National Cancer Institute, National Institutes of Health
Advisor: Dr. Orit Lavi
Worked on dynamical systems model of cell cycle and tumorgenesis.

Computational Physiology Laboratory January 2017 – January 2018
Cornell University, Department of Neurobiology and Behavior
Advisor: Professor Christiane Linster
Investigated the physiological effects and behavioral role of serotonin within the rodent olfactory bulb.

Teaching experience

Lecturer and Head Teaching Assistant (UMD) Fall 2022
DATA/MSML 602: Principles of Data Science
Presented lectures on various topics concerning Python implementation of data science principles. Devised course assignments and exams.

Graduate Teaching Assistant (UMD) Fall 2021

MATH 140: Calculus I

Held twice weekly recitations for topics covered in lecture. Course topics: Limits continuity, derivatives and applications of the derivative, integration, etc…

Average student rating: 5/5.

Graduate Teaching Assistant (UMD) Spring 2021

MATH 141: Calculus II

Held twice weekly recitations for topics covered in lecture. Course topics: techniques of integration, differential functions, sequences & series, etc…

Average student rating: 4.5/5.

Graduate Teaching Assistant (UMD) Fall 2020

MATH 135: Mathematics for Life Sciences

Held twice weekly recitations for topics covered in lecture. Course topics: descriptive statistics, probability, discrete time modeling.

Average student rating: 5/5.

Services

External Reviewer

Conferences: ESA ’21, ITCS ’22, AAAI ’22, AISTATS ’22, ICML ’22, NIPS ’22

Skills

Programming

Proficient in: MATLAB, Python, Java, R.

Languages: English (native), German (advanced), Italian (limited)