Niki Tavakoli

Ph.D. Student in Biomedical Engineering

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EDUCATION

Ph.D. - University of Southern California 2021 - 2026 (Expected)

M.S. - University of Southern California 2019 - 2021

B.A. - University of California, Los Angeles 2014 - 2018

RESEARCH INTERESTS

I am a Biomedical Engineering graduate student at the University of Southern California. My passion lies in the subfield of Mathematical Oncology and the creation of models that simulate complex cancer processes, tumor progression, and allow for optimized patient treatments. My project uses metabolic flux analysis to gain insight into tumor-stromal metabolic crosstalk in colorectal cancer and targeted therapies.

RESEARCH EXPERIENCE

PhD Student *05/2021 - Present*

University of Southern California

- Computational Systems Biology Laboratory, Dept. of Biomedical Engineering
- Project: Multiscale systems biology modeling to exploit tumor-stromal metabolic crosstalk in colorectal cancer
- Collaboration with Shannon Mumenthaler (USC), Nicholas Graham (USC) and Paul Macklin (IU) through NIH U01

Graduate Student Researcher *06/2019-08/2019*

Keck School of Medicine of USC

- Dept. of Molecular Microbiology & Immunology
- Data collection and database creation.

TEACHING EXPERIENCE

Teaching Assistant *08/2020 - 05/2021*

USC Dept. of Biomedical Engineering

- BME 513 (Signals & Systems Analysis), BME 415/416L (Regulation of Medical Products)
- Assisted students at weekly office hours.
- Graded problem sets and exams.

PROFESSIONAL EXPERIENCE

Data Science Intern *11/2019 - 05/2020*

Leaf Ground Ltd.

- Worked under VP of Software Engineering.
- Developed SEO prediction models for company brands.
- Created COVID-19 data visualizations for company websites.

Biofeedback Technician *06/2017 - 06/2018*

Peak Brain Institute Los Angeles

- Worked under Dr. Andrew Hill, PhD
- Helped administer client electroencephalograms and clean EEG data.
- Set up and ran patient biofeedback sessions using EEGer and Bioexplorer softwares.

Clinical Intern *06/2016 - 11/2017*

UCLA Ronald Reagan Medical Center

- Assisted doctors and nurses with patient rounds and care.
- Worked in ICU, ER, Oncology and Medical Telemetry units.

HONORS, AWARDS & FELLOWSHIPS

Fellowships and Scholarships

- *PhysiCell Honorarium*, awarded to selectively funded students for annual hackathon, 06/21
- *USC Annenberg Fellowship Top-off*, top-off monetary award given to selected USC graduate school fellows, 02/21
- *USC Graduate School Fellowship*, 02/21
- *UCLA Regents Scholarship*, awarded to the top 1.5% of UCLA students on the basis of academic and extracurricular excellence, 09/16

Selected Honors

- *MS Award for Academic Excellence & Service*, given to one selected MS student in Biomedical Engineering, 05/21
- *UCLA Care Extender Intern Award*, awarded for completing over 250 hours of exceptional volunteering work, 10/17

COMPUTATIONAL SKILLS

Languages: Python (Pandas/NumPy, SciKit-Learn), Matlab, C, bash
Visualization: Matplotlib, Seaborn, Plotly, GraphPad Prism
Other Technologies: Git, LaTeX, HTML/CSS
Operating System: macOS
Experience with:

- Metabolic Flux Analysis (openCOBRA)
- Machine Learning Algorithms: Linear Regression, Logistic Regression, SVMs, Random Forests
- Slurm batch scheduling system

RELEVANT COURSEWORK

Graduate Coursework: Systems Biology, Signals and Systems Analysis, Biomedical Imaging Informatics, Advanced Biomedical Systems, Scientific Computing and Visualization, Data Science at Scale, Database Systems

Undergraduate Coursework: General & Organic Chemistry, Cell & Molecular Biology, Genetics/Evolution/Ecology, Biochemistry, Multi-Variable Calculus, Calculus-Based Physics, Linear Algebra & Differential Equations, Statistics, Research Methods

PROJECTS

PhysiCell Microenvironment Cell Simulator *July 2021*

Worked in a 6 person team of engineers to develop an agent-based model extension of the PhysiCell software by using C++ to implement cell fibers in the extracellular matrix.

Distributed Memory K-Clique Enumeration *December 2020*

Helped create a parallel algorithm for k-clique enumeration that can scale clique enumeration/counting

on large-scale clusters using both shared and distributed memory parallelism in high performance computing.

Prediction Model for Search Engine Optimization *December 2019*
Utilized the Google BigQuery API in Python to reduce over 10 million rows of data from MongoDB those those with the highest calculated potential to improve SEO of company's websites on Google. Trained data using a prediction model that ultimately resulted in quick and efficient content improvements.

OUTREACH & MEMBERSHIP

Campus Outreach:

Student Instructor *09/2019 - Present*
USC Viterbi K-12 STEM Center

- LAUSD *Mission Science* Instructor: held after-school sessions with elementary/middle school students on various topics in Science and Engineering.
- *STEM Perspectives* Instructor: lead students in teams to teach skills in scientific research, presentations, and writing.
- *Discover Engineering* Summer Programs TA: taught Physics, Mathematics and Engineering lessons in addition to various engineering software demos to high-school seniors.
- *Data Assistant*: organizing and cleaning STEM center data.

Member, Mentor *08/2020 - Present*
USC Women in Science & Engineering

- Graduate student mentor for STEM undergraduates considering applying to graduate school.
- Member and participant in various workshops aimed at forging a close community of female scientists and engineers at USC.

Professional Society Memberships:

Society of Mathematical Biology

- Elected member of Publications Committee.

Biomedical Engineering Society

- Volunteered under Director of Academic Affairs to help organize participation for the annual 2021 BMES conference.