Nima Mousavi

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EDUCATION

PhD, Electrical and Computer Engineering — University of California San Diego
Intelligent Systems, Robotics, and Control — 2015 - 2021 (Expected)
GPA: 3.87 / 4.0

MSc, Electrical and Computer Engineering — University of California San Diego
Intelligent Systems, Robotics, and Control — 2015 - 2019
GPA: 3.87 / 4.0

BSc, Electrical Engineering: Digital Systems — Sharif University of Technology, Iran
GPA: 3.94 / 4.0 — 2011 - 2015

SKILLS

- Solid research and implementation experience in inference models for variant calling using short-read sequencing data. Familiar with 10X Genomics single cell pipelines.
- Strong background in software development and object oriented C++ and Python. Familiar with Rust and C#.
- Experienced in High Performance Computing (HPC), Linux environment, and Git version control.
- Profound knowledge of algorithms and demonstrated proficiency in problem-solving by deriving creative and innovative solutions.
- Deep mathematical and probabilistic knowledge and experienced in theoretical problem analysis and statistical methods.
- Excellent teamwork and communication skills, shown as constructive cooperation with colleagues in interdisciplinary teams.

PUBLICATIONS

- **N. Mousavi**, R. Yanicki, S. Shleizer-Burko, M. Gymrek. "Profiling the genome-wide landscape of tandem repeat expansions", Nucleic Acids Research, 47.15 (2019): e90 https://doi.org/10.1093/nar/gkz501
- I. Mitra, **N. Mousavi**, N. Ma, M. Lamkin, R. Yanicky, S. Shleizer-Burko, M. Gymrek. "The contribution of de novo tandem repeat mutations to autism spectrum disorders", bioRxiv (2020) https://doi.org/10.1101/2020.03.04.974170
- **N. Mousavi**, J. Margoliash, N. Pusarla, S. Saini, R. Yanicky, M. Gymrek. "TRTools: a toolkit for genome-wide analysis of tandem repeats", Bioinformatics, btaa736 (2020) https://doi.org/10.1093/bioinformatics/btaa736
- S. Saini, I. Mitra, **N. Mousavi**, S. F. Fotsing, M. Gymrek. "A reference haplotype panel for genome-wide imputation of short tandem repeats", Nature communications 9.1 (2018): 4397 https://doi.org/10.1038/s41467-018-06694-0
- **N. Mousavi**, B. Aksanli, A. Akyurek, T. Rosing. "Accuracy-Resource Tradeoff for Edge Devices in Internet of Things", SmartEdge'17, in conjunction with IEEE PerCom'17. https://doi.org/10.1109/PERCOMW.2017.7917627

EXPERIENCE

Intern, 10X Genomics, Pleasanton, CA — Jun 2020 - Sep 2020

- Created multiple steps for the 10X Genomics single cell immune profiling pipeline using Rust and Python programming languages.

Bioinformatics Intern, Illumina, San Diego, CA Jun 2018 - Sep 2018

- Implemented algorithmic improvements to increase accuracy of somatic variant caller to meet pipeline requirements.
- Utilized object oriented design and GitHub code review to facilitate test-driven C# development.
- Performed rigorous benchmarking in High Performance Computing (HPC) environment.
- Worked in close collaboration and presented findings to technical and marketing teams.

Teaching Assistant, Sep 2014 - Jun 2018

Advanced Bioinformatics Lab (UCSD), *Digital Systems* (UCSD), *Computer Structures and μProcessors Lab* (Lead Assistant, Sharif), *Principles of Electrical Engineering* (Sharif)

- Held well-received discussion and lab sessions, designed and graded homework and tests, provided mentorship, and assisted course administration.

Volunteer Work, Iranian Student Association, UCSD, La Jolla, CA May 2016 - Apr 2018

Vice President (May 2017- Apr 2018), Financial Director (May 2016-May 2017)

- Collaborated with board members, university officials, and volunteers to hold events with upwards of 300 attendance from the community.

Physics Teacher, Multiple High Schools, Iran Summers 2012-14

National Physics Olympiad Preparation

- Taught advanced physics material to students with different backgrounds in group sessions.
- Encouraged students toward success by one-on-one counseling and motivational talks
- Assisted Olympiad competitors with one-on-one problem solving sessions and guidance talks.

RESEARCH AND PROJECTS

GangSTR: Genotyping STR Expansions, UCSD, La Jolla, CA 2017 - Present

- Created a novel software tool for genome-wide profiling and genotyping short tandem repeats from aligned short read sequencing data.
- Developed maximum likelihood model based on local realignment of paired-end reads and implemented with object oriented C++ after prototyping with Python.
- Performed simulation and experimental validation (capillary electrophoresis).
- Presented findings in major human genetics conferences (ASHG 2018, ISMB 2018).
- Abstract selected for **Reviewers' Choice award** at ASHG 2020 by scoring in the top 10% of all poster abstracts.

TRTools: a toolkit for genome-wide analysis of tandem repeats, UCSD 2019 - Present

- Created a software toolkit for analysis and post-processing of tandem repeat(TR) call sets.
- Developed the capacity to support different TR callers (ExpansionHunter, HipSTR, GangSTR, AdVNTR, and popSTR2) by implementing a TR harmonizer module that extract the relevant information from each method's call set.

De novo tandem repeat mutations and autism spectrum disorders, UCSD 2018 - 2020

- Incorporated additional features into GangSTR, including support for sex chromosomes and new output fields for de novo calling.
- Provided feedback on the pipeline which includes GangSTR and multiple methods from the TRTools toolkit.

Context Engine, University of California San Diego, La Jolla, CA May 2016 - Nov 2016

- Developed the object oriented design of a modular middleware for Internet of Things.
- Supervised development of machine learning code and performed system integration.
- Implemented embedded system interface with local sensors and actuators and cloud-based database.

- Showcased the capability of system using an end-to-end application alongside poster presentation.

Home Automation System, Sharif Univ of Tech, Tehran, Iran Sep 2014 - May 2015

- Integrated system components including MySQL database, network, HTTP server, and the main embedded Arduino controller, and demonstrated remote control capability for user.
- Designed an online UI (PHP) that allows interaction with house items using a visual control panel.

AURALUX Strategic Game, Sharif Univ of Tech, Tehran, Iran Feb 2014 - Apr 2014

- AURALUX is a map conquer strategic game in which each team has several units that are aimed to capture enemy buildings.
- Collaborated with two students to develop the game core using C++ object oriented programming. The final project exploited a character based console interface, and was ranked as one of the best projects within the Advanced Programming course.
- Developed or improved almost all IFPS programs used for financial reports.

PROGRAMMING LANGUAGES

- C/C++/C#
- Python
- MATLAB
- Rust
- Bash
- Spark

RELEVANT COURSEWORK

- Algorithm Design
- Object Oriented Programming
- Statistical Learning
- Machine Learning
- Personal Genomics and Bioinformatics
- Data Mining (Spark)