Shreyasvi Natraj

Email address: shreyasvi.natraj@unige.ch | **Website:** nshreyasvi.github.io

WORK EXPERIENCE

15/06/2023 – CURRENT
ETH ZÜRICH - SCIENTIFIC ASSISTANT

- Developing optical-based neural networks for Mitochondrial mobility quantification & Fission/Fission event detection in neuronal cells using iSIM based live-cell imaging data.
- Carrying out Differential Expression, Differential Splicing, Gene Ontology, KEGG Pathway and Signaling Pathway Impact Analysis for ZNF451 isoform knockout transcriptomics data and Gene Ontology analysis for proteomics data.
- Carried out cloning, expression and protein purification of wild-type, mono-SUMOylated and tetraSUMOylated EME1 protein variants using BL21 DE3 bacterial competent cells and performed In-vitro ubiquitination assays to understand poly-SUMOylated EME1 MUS81 and TRIM25 interactions.

(Supervisors: Tatjana Kleele, Andrea Pichler, Matthias Peter)
Cloning-Expression-Protein Purification, Western Blotting, DESeq2/DEXSeq2, rMATS, gseGO/gseKEGG, SnapGene, FIJI

01/02/2019 – 31/01/2023
NATIONAL CENTRE FOR COMPETENCE IN RESEARCH SYNAPSY - RESEARCH ASSISTANT

- Developed gaze, audio & video neural network classifiers for screening of autism spectrum disorder.
- Analyzed deep learning tools relation with clinical scores for digital phenotyping of autism spectrum disorder.
- Worked on optogenetics, EEG signal and behavioral pattern analysis for Shank3 knockout mice interactions.
- Contributing to writing several research articles and research grants (Swiss National Foundation Sinergia grant).
- Worked on developing PACS platform using XNAT and DCM4CHEE and carried out structural MRI data analysis during summer internship at FCBG (Campus Biotech) under Dr. Michael Dayan

(Supervisors: Marie Schaer, Thomas Maillart)
Slurm, Seaborn, PyTorch, Scipy, Keras/TensorFlow, OpenCV, Pandas, R-Caret, Streamlit, freesurfer, MRI/fMRI & EEG Analysis

01/07/2021 – 30/06/2022
CERN - TECHNICAL STUDENT

- Benchmarked high-energy physics and HPC workloads over EOSC Testsuite.
- Developed a Openshift based web interface/dashboard for results visualization and analysis.
- Conducted FAIR testing and developed several kubernetes-based tools for the Archiver project.
- TestSuite awarded best demo at EGI Conference 2021, Archiver Awarded by the Digital Preservation Coalition.

(Supervisors: Joao Fernandes, Bob Jones)
Terraform, Ansible, kubernetes, docker, slurm, GCP, Azure, AWS, IBM Cloud, Tensorflow/Keras, PyTorch

04/06/2018 – 31/08/2018
CERN - OPENLAB SUMMER STUDENT

- Developed automated damage analysis extraction tool for stereo image pair & shuttle radar topography-based digital elevation models and structure point data for Aleppo, Syria & Herat, Afghanistan.
- Developed mechanical turk web instances for refugee camp polygon data generation. (Talk)
- Implemented event tracker for social media-based disaster data collection tool called E2MC
- Carried out ionized gas simulations using Garfield++ to determine ionization/excitation rates, gain curves and penning effect transfer probabilities.(Github Repo)

(Supervisors: Lars Bromley, Francois Grey, Sofia Vallecorsa)
Pandas, OpenCV, AWS M-Turk, GCP, HTML, CSS, JS, QGIS, Pybossa, DBSCAN, KNN, Garfield++, Root

03/07/2017 – 26/08/2017
UNIVERSITY OF GENEVA - TSINGHUA UNIVERSITY INITIATIVE - SUMMER STUDENT

- Implemented multiple CNN models for object detection and trash classification in an automated trash sorting system.
- Successfully generated annotated dataset from crude data using crowdsourced Zooniverse campaign
- Launched Alcrowd challenge and developed low-cost scanner for digitalization of UNOG Archives. (Press Release)
- Contributed to making SPI for FPGA-RPi communication (cosmic pi).

(Supervisor: Francois Grey, Colin Wells)
OpenCV, TensorFlow, GCP, Microsoft Azure Services, Xilinx Vivado/VHDL, Raspberry Pi, Lattice ICE40HX8

01/05/2016 – 30/08/2016

MIT MEDIA LAB (GRAVIKY LABS & LVPEI MITRA) - SUMMER RESEARCH INTERN

- Developed an electrostatic system for a device called Kaalink to convert PM2.5 into Air-Ink
- The project was showcased in a documentary at the Cannes Film Festival.
- Worked on developing BullsEye, a smartphone attachment to determine corneal topography during an MIT Media Lab summer internship at LVPEI. *(Awarded Certificate of team excellence)*

(Supervisors: Anirudh Sharma, Nikhil Kaushik)

Solidworks (3D Modeling & Simulation), Manufacturing/assembly, Dry Lab Skills, Ansys, slicer, C++

PUBLICATIONS

- **Using 2D Video-based Pose Estimation for Automated Prediction of Autism Spectrum Disorders in Preschoolers**
  S. Natraj*, N. Kojovic*, S.P. Mohanty, T. Maillart & M. Schaer, Scientific Reports 11 (* first co-author), 23/07/2021 (article)

- **COVID-19 Activity Risk Calculator as a Gamified Public Health Intervention Tool**
  S. Natraj, M. Bhide, N. Yap, M. Liu, A. Seth, C. Glorioso, Scientific Reports 13 - 11/08/2022, (article)

- **Video-Audio Neural Network Ensemble For Comprehensive Screening Of Autism Spectrum Disorder in Young Children**
  S. Natraj, N. Kojovic, T. Maillart & M. Schaer, PLoS One (Under Review) - 05/06/2023 (preprint)

- **Gesture imitation performance and visual exploration in young children with autism spectrum disorder**
  K. Latrèche, N. Kojovic, I. Pittet, S. Natraj, M. Franchini, I. M. Smith, M. Schaer, BMC journal of neurodevelopmental disorders (Under Review) - 03/04/2023 (preprint)

- **Rapid identification of autism diagnosis from short video segments: which are the most relevant features?**
  N. Kojovic, F. Journal, S. Natraj, N. Thillainathan, K. Latrèche, S. Solazzo, M. Godel, F. Robain, M. Giraud, I. Pittet, L. Ilen, J. Husman, C. Feller, M. Schneider and M. Schaer, (In preparation) - 15/03/2024

EDUCATION AND TRAINING

- **University of Geneva:** 08/09/2019 - 01/08/2022 - Master of Science (Neuroscience), **CGPA:** 5.56/6
- **R.V. College of Engineering:** 01/05/2015 - 30/05/2019 - Bachelor of Engineering (Biotechnology), **CGPA:** 8.55/10

SELECTED PROJECTS

- **NeuralWorks**: Co-founder of NeuralWorks, working on developing hardware agnostic Neurofeedback and Brain-computer interface platform.
- **Abbie (AR/VR Sensor Based roBot for Intuitive Exploration):** Used Google project tango's area learning and RaspberryPi to build an autonomous pod-like vehicle. *(KPIT Sparkle 2017 National top 15 finalist)*.
- **Casie (Context Acquired detail Sensing in Indoor/outdoor Environment):** Developed a deep-learning model to ensure efficient understanding of online lectures using video recordings of students. (EMEA region top 10 projects)
- **Drosophila Flight Pattern Tracking:** Used Lime software-defined radio (SDR) in order to track drosophila and their interaction/behavior through flight patterns (Remote Internship under NCBS, Bangalore-India).
- **SRISTI-UNICEF Summer School 2017:** Developed a low-cost toxic gas detector for the prevention of gas poisoning among salt farmers due to poisonous gas leakages in Rann Of Kutch region in Gujarat.
- **UV Hyperspectral Imaging of Teeth:** Developed a low-cost UV Hyperspectral Imaging camera using modified CMOS and filter lens for identification of fluoride content in teeth. (Remote Internship under Carnegie Mellon University)

SKILLSET

Languages & Softwares: Python, R, C++, freesurfer, SnapGene, Zeiss Zen, FIJI, Solidworks
Other Skills: Wet Lab Skills, Microcontroller/ARM architecture based sensing and signal processing

ACHIEVEMENTS

- Startup NeuralWorks awarded Talentkick 2022 and Blaze Accelerator 2022 grants,
- Indian Defence Research & Development Organisation Dare to Dream 4 competition National First Prize Winner,
- Selected among top 10 startups for Venturelab's AIT 2020 Program,
- Microsoft Imagine Cup 2020 EMEA Top 10 Finalists,
- HackZurich 2020 and 2023 Sponsor Challenge Winner and PennApps 2023 Best Use of Statistics Hack Winner,
- SRISTI UNICEF 2015 Award Winner,
- Awarded Best Outgoing Student at R.V. College of Engineering, Class of 2019
- National Entrepreneurship Challenge 2015/16 Winner