Shreyasvi Natraj

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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 during rDNA damage repair.

*(**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 GRADUATE STUDENT RESEARCHER/ 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-authorship) - 23/07/2021

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

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

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

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 Master of Science (Neuroscience), CGPA: 5.56/6 (08/09/2019 - 01/08/2022)

R.V. COLLEGE OF ENGINEERING Bachelor of Engineering (Biotechnology), CGPA: 8.55/10 (01/05/2015 - 30/05/2019)

VOLUNTEERING PROJECTS, SKILLSET & ACHIEVEMENTS

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 raspberry pi 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*)
• **SRISTI-UNICEF Summer School 2017:** Developed a low-cost toxic gas detector for the prevention of casualties of salt farmers due to poisonous gas leakages in Rann Of Kutch region in Gujarat.

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

Selected 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