Shreyasvi Natraj

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WORK EXPERIENCE

ETH Zürich
Scientific Assistant (Department of Biology) [15/06/2023 – Current]

- Carried out on primer design, PCR, cloning, expression and protein purification of wild-type, mono-SUMOylated and tetraSUMOylated EME1 protein variants using BL21 DE3 bacterial competent cells.
- Performed In-vitro ubiquitination assays to understand poly-SUMOylated EME1 MUS81 and TRIM25 interactions during rDNA damage repair.
- Carried out Differential Expression, Alternative Splicing, Gene Ontology, KEGG Pathway and Signaling Pathway Impact Analysis for ZNF451 isoform knockout transcriptomics data and Gene Ontology analysis for proteomics data.
- Developing Optical Flow based neural network for Mitochondrial shape change, mobility & Fission/Fission event detection using live-cell imaging data.

*(**Supervisors:** Tatijana Kleele, Andrea Pichler, Matthias Peter)*
Cloning-Expression-Protein Purification, Western Blotting, DESeq2, DEXSeq2, rMATS, gseGO, gseKEGG, SnapGene, napari, Zeiss Zen, Euler (ETH Zurich's HPC Cluster)

National Centre for Competence in Research Synapsy
Graduate Student Researcher/ Research Assistant [01/02/2019 – 31/01/2023]

- Carried out 3D localization and pose estimation using photogrammetry and point cloud analysis.
- Developed gaze, audio & video neural network classifiers for screening of autism spectrum disorder.
- Carried out analysis of deep learning tools with clinical scores for digital phenotyping of autism spectrum disorder.
- 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 analysis for schizophrenia patient's structural MRI data during a 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, baobab (UNIGE's HPC Cluster)

CERN
Technical Student [01/07/2021 – 30/06/2022]

- Used terraform & ansible for EOSC Testsuite for high energy physics, deep learning and high-performance computing workload benchmarking on several Cloud computing providers
- 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

CERN
Openlab Summer Student [04/06/2018 – 31/08/2018]

- 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

University of Geneva -Tsinghua University Initiative
Summer Student [03/07/2017 – 26/08/2017]

- 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 to create a text detection neural network-based portable low-cost scanner for automated digitalization of UNOG Archive Data. (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

MIT Media Lab (Graviky Labs & LVPEI MITRA)
Summer Research Intern [01/05/2016 – 30/08/2016]

- 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, ImageJ, 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.
- 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