Sachin Salim

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EDUCATION

University of Southern California, Los Angeles, CA
PhD - Electrical and Computer Engineering   *Aug 2024 – Present*
Advisor: Dr. Anand Joshi, Signal and Image Processing Institute

University of Michigan, Ann Arbor, MI
Masters - Data Science and Machine Learning, Electrical and Computer Engineering   *Dec 2023*
GPA: 4.00/4.00
Graduate Certificate in Computational Neuroscience

Indian Institute of Technology Kanpur, India   *May 2018*
Bachelor of Technology - Computer Science and Engineering

PUBLICATIONS & PRESENTATIONS

- Computational modeling of electrophysiology recordings can predict octopus arm movement, N. Gedela, **S. Salim**, R. Radawiec, J. Richie, C. Chestek, A. Draelos, G. Pelled, 2024 *(Accepted in Bioelectronic Medicine)*
- Real-time behavioral analysis on octopus arm using transfer learning and streaming dimension reduction (Oral Presentation), **Sachin Salim**, Neural Networks Journal Club, University of Michigan, October 2023
- Translating Cartoon to Natural Images using Stable Diffusion (Poster Presentation), **S. Salim,** S. Arvavasu, N. Mohamed, 2023

RESEARCH EXPERIENCE

Biomedical Imaging Group, University of Southern California   *Aug 2024 – Present*
Research Assistant | Mentor: Dr. Anand Joshi

- Developing a U-Net-based deep learning framework using quantile regression to synthesize missing MRI contrasts while estimating uncertainty, improving data completeness for neurological research.

Draelos Lab, University of Michigan   *May 2023 – July 2024*
Research Assistant | Mentor: Dr. Anne Draelos

- Led a project analysing octopus arm motion using deep learning (DeepLabCut) & unsupervised (ProSVD) methods
- Discovered significant statistical variations in kinematic features to stimulations across different arm locations

Cortical Neural Prosthetics Lab, University of Michigan   *Jan 2023 – Apr 2023*
Research Assistant | Mentors: Dr. Cynthia Chestek, Joseph Costello

- Developed a real-time finger kinematics prediction model using reinforcement learning tools (Gym, RLlib-Ray)
- Finetuned a feed-forward neural network that decodes the neural signals from motor cortex of non-human primates

Movement Control Lab, Indian Institute of Science, Bengaluru, India   *Oct 2020 - Dec 2020*
Research Intern | Mentors: Dr. Aditya Murthy, Dr. Varsha Vasudevan

- Investigated internal fast feedback controls in hand movements through statistical analyses on inter-trial variability

Computational Economics Lab, Indian Institute of Technology Kanpur, India *Jan 2018 - Apr 2018*
Undergraduate Researcher | Mentor: Dr. Swaprava Nath

- Quantified environmental improvement when passengers share ride and follow route using minimum spanning trees

TEACHING

Graduate Student Instructor, University of Michigan
- **EECS 504: Graduate Computer Vision**, Robotics, Dr. Jason Corso   *Aug 2023 – Dec 2023*
- **EECS 442: Computer Vision**, Computer Science & Engineering, Dr. David Fouhey   *Jan 2023 – Apr 2023*

PROFESSIONAL EXPERIENCE

Skellam AI, Bengaluru, India   *Aug 2021 - Aug 2022*
Applied Machine Learning Engineer
- Created a marketing automation tool featuring hyper-personalized recommendations using collaborative filtering
- Implemented activity tracking system for anonymous customers, boosting quarterly revenue by 130%

Adobe Inc., Noida / Bengaluru, India   *June 2018 - July 2021*
Software Development Engineer – 2
- Collaborated cross-functionally with managers, design team, and engineers to develop 'Adobe Captivate'
- Implemented a space-efficient solution using shape objects for incorporating text, reducing build size by 27%

Samsung R & D, Bengaluru, India   *May 2017 - July 2017*
Software Development Intern
- Implemented IoTivity on Samsung's 'ARTIK' Smart IoT platform, addressing dynamic connectivity needs

PROJECTS

Modeling APL-Mediated Local Inhibition in the Fruit Fly Mushroom Body   *Sep 2023 – Dec 2023*
- Demonstrated that local inhibition regulates sparsity of Kenyon Cell (KC) outputs comparably to global inhibition
- Substantiated through simulations that local-random PN-KC connectivity enhances odor recognition accuracy

Translating Cartoon to Natural Images using Stable Diffusion   *Oct 2023 – Dec 2023*
- Trained a latent diffusion model to unconditionally generate images of both domains
- Used a pre-trained image captioning model (BLIP) as a guidance to condition the diffusion generation

Brain Tumor Segmentation using an ensemble of 3D U-Nets   *Oct 2022 - Dec 2022*
- Implemented highly scalable 3D U-net, a deep CNN classifier, to segment tumor subregions
- Created an ensemble of models trained with different hyper-parameters achieving a high dice score of 80.5%

Parkinson's Disease Progression Prediction   *Feb 2023 - Apr 2023*
- Developed a machine learning regression model to identify biomarkers using protein and peptide data
- Submitted the model with 63.4% sMAPE score to AMP PD program's prestigious Kaggle coding competition

Seizure Detection and Closed-Loop Control   *Mar 2023 – Apr 2023*
- Developed control methods using Simulink and explored mathematical frameworks to understand seizure dynamics
- Detected seizure on EEG data via SVM-trained machine learning model with 96.9% accuracy

OUTREACH ACTIVITIES

Volunteer, **BrainsRule!** - Outreach project to get middle schoolers excited about brain   *Mar 2023*
- Demonstrated the motor control in arms by letting them send electrical signals from their arm to my arm

Member, **Neural Networks Journal Club**   *Jan 2023 – Present*
Member, **Translational Neural Engineering Journal Club**   *Jan 2023 – Present*

SKILLS

Languages: Python, C/C++, Java, JavaScript, MATLAB, SQL, Julia
Technologies: PyTorch, Neuron, COMSOL, Jupyter, AWS, Git/GitHub, Simulink, LaTeX

LEADERSHIP & EXTRA-CURRICULAR

Head of Events, Udghosh - IIT Kanpur inter-collegiate sports meet   *Jan 2017 – Oct 2017*
Member, Athletics: represented IIT Kanpur and won 10+ medals in national meets   *Sep 2014 – Mar 2018*

REFERENCES

Anand Joshi (University of Southern Californa)   ajoshi@usc.edu
Anne Draelos (University of Michigan)   adraelos@umich.edu
Cynthia Chestek (University of Michigan)   cchestek@umich.edu
Swaprava Nath (IIT Bombay/Kanpur)   swaprava@cse.iitb.ac.in
David Fouhey (NYU/University of Michigan)   david.fouhey@nyu.edu