Chandan Singh

cs3hq@virginia.edu | csinva | 571-315-5748 | chandan-singh

EDUCATION

PHD | Statistical Learning
UC Berkeley | Begins Fall 2017

- Minor 1: ML Theory
- Minor 2: Comp. Neuroscience
- Advised by Bin Yu & Jack Gallant

BS | Computer Science & Math
University of Virginia | May 2017

- Conc. in Probability/Statistics
- Graduated with high distinction

RESEARCH INTERESTS

Neural Decoding
fMRI • Vision
Connectomics
Structural • Functional
Network Learning Models
Sparse coding • Synaptogenesis
Theoretical Neuroscience
Interpulse interval coding • AP velocity

COURSEWORK

COMPUTATION
Learning Theory
Machine Learning
Structure Learning
Algorithms
Artificial Intelligence
Deep Learning in Vision & Graphics
Neural Network Models
Neurobiology
Information Retrieval
Theory of Computation
Program & Data Representation
Software Dev. I & II
Computer Architecture & OS

MATHEMATICS
Statistics
Probability
Linear Algebra
Real Analysis
Linear Models
Stochastic Processes
Chaos Theory I & II
Multivariate Calculus
Discrete Mathematics
Differential Equations
Abstract Algebra

EXPERIENCE

BERKELEY B. YU RESEARCH LAB | AI Researcher
Fall 2017 - Spring 2021

- Applying statistical learning techniques to model neural data

FACEBOOK | Computer Vision Intern
Summer 2017

- Worked on deep learning for semantic segmentation of satellite imagery
- Developed autoencoders for unsupervised layer-wise pretraining
- Implemented CRFs for segmentation post-processing

UVA Y. QI RESEARCH LAB | ML Researcher
Fall 2016 – Spring 2017

- Contributed to development of novel weighted-ℓ_1, multi-task Gaussian graphical models
- Developed learning for sparse graphical models across several tasks
- Applied novel graphical models to functional brain connectivity

HHMI S.TURAGA RESEARCH LAB | ML Researcher
Summer 2015, Winter 2015, Summer 2016

- Implemented and extended novel watershed algorithms for neural image segmentation performance evaluation
- Contributed to GPU CNN implementation using fork of Caffe with malis training objective
- Set up distributed mllib implementation to run in parallel on compute cluster using Apache Spark

UVA W.LEVY RESEARCH LAB | Computational Neuroscience Researcher
Jan 2015 - Fall 2016

- Simulated stochastic neurons to determine mutual information, variability, energy efficiency, and threshold
- Visualized and analyzed data in Matlab, Python, calculated mutual information in Mathematica
- Simulated stochastic gating of sodium channels via NEURON software
- Performed background research to determine parameters for simulation

HHMI SCIENTIFIC COMPUTING | Research Intern
Summer 2014

- Simulated extracellular neural recordings via Neurocube Matlab scripts
- Simulated intracellular neural firing via NEURON software package
- Visualized action potential firing in Matlab

RESEARCH INNOVATIONS INC. | Web Dev / Android Research Intern
Summer 2013 - Spring 2014

- Developed web application to simultaneously coordinate different tasks between multiple users
- Developed Android app to increase data storage capacity of QR Codes

SKILLS

LANGUAGES

Experienced
Java • Python • Matlab • LaTeX
Proficient
C • C++ • R • Android • Mathematica
Familiar
Scala • Javascript • Django

MACHINE LEARNING

Frameworks
Scikit-learn • Keras • MIlib
Algorithms
CNNs • Graphical Models • RFs
Problems
Image Segmentation • Functional Connectivity

GENERAL

Software
Photoshop • NEURON
OS
Linux • Mac • Windows
IDEs
IntelliJ • PyCharm • Eclipse • Vim
Collaboration
Slack • Github • Markdown
Languages
English • Spanish • Hindi

ANDROID

Activity Lifecycle • UI Design • Graphics

WEB

Basic Languages • Django • Mapping APIs

PAPERS / POSTERS

Published/Accepted

- Singh & Levy, 2017: "A consensus layer V pyramidal neuron can sustain interpulse-interval coding" *PLOS One.*

Under Review

- Singh, Wang, & Qi, 2017: "A weighted-ℓ_1, multi-task graphical model with applications to heterogeneous brain connectivity" *Neural Information Processing Systems*
- Funke, Tschopp, Grisaitis, Singh, Saalfeld, & Turaga, 2017: "A Deep Structured Learning Approach Towards Automating Connectome Reconstruction from 3D Electron Micrographs" *Neural Information Processing Systems*
- Morel, Singh, & Levy, 2017: "Linearized synaptic integration at no extra cost" *Journal of Computational Neuroscience*

Posters / Talks

- Singh, 2017: "A novel machine-learning algorithm for uncovering brain connections underlying autism" *University of Virginia Undergraduate Research & Design Symposium, Winner in Design Category*
- Singh, 2017: "Uncovering brain connections underlying autism via graphical models" *Tom Tom Founder's Machine Learning Conference*
- Singh, 2017: "Complexity leads to simplicity: Investigating neural linearization via biophysical simulations" *University of Virginia Undergraduate Research & Design Symposium, Semifinalist in Research Category (1 of 6 undergraduates)*
- Singh, Hewitt, & Turaga, 2015: "Optimizing random forest image segmentation for connectomics" *Janelia Undergraduate Scholar Poster Session*

In Preparation

- Levy lab: "Neural computation at the thermal limit"
- Levy lab: "Action potential velocity optimization via biophysical simulation"

AWARDS

UVA Rader Research Award	2017
Rodman Scholar	2014-2017
Raven Honor Society	2016-2017
Vidya Balvantrai Shelat Fund Award	2016
ICPC Regional Qualification	2014, 2015, 2016
1st Place Microsoft Code Competition	2016
3rd Place Google Games UVA	2017
2nd Place APT Puzzle Competition	2017
Intermediate Honors	2016
Dean's List	2014-2017

OUTSIDE ACTIVITIES

APDA, PF Debate	2010-2017
Indian Student Association	2014-2017
Madison House Volunteering (Computer Literacy)	2014-2017
IM Basketball, Soccer	2015-2017
Chinmaya Mission Volunteering	2010-2014