



education

phd | computer science

uc berkeley | fall 2017-present

- major: learning
- minor 1: statistics
- minor 2: comp. neuroscience
- advised by bin yu & jack gallant

bs | computer science & math

university of virginia | spring 2017

- conc. in statistics
- graduated with high distinction

research interests

computational neuroscience
interpretability
computer vision

coursework

computation

computer vision
machine learning
structure learning
algorithms
artificial intelligence
deep learning seminar
learning theory
deep learning in graphics
theory of computation
data structures
software dev. I & II

neuro

neurobiology
neural network models
visual neuroscience
cognitive science seminar

mathematics

statistical models
optimization
probability, statistics
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 - present

- developed machine learning techniques to model high-dimensional neural data
- investigated methods to interpret deep learning methods
- examined brain-inspired models for computer vision

facebook | computer vision intern

summer 2017

- improved deep learning models for semantic segmentation of satellite imagery
- investigated autoencoders for unsupervised layer-wise pretraining
- implemented crfs for segmentation post-processing

uva y. qi research lab | ml researcher

fall 2016 - spring 2017

- developed novel weighted- ℓ_1 , multi-task gaussian graphical model
- analyzed large-scale functional brain connectivity with graphical models

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 development of novel 3d unet cnn architecture with malis training objective
- distributed mllib random forest over compute cluster with apache spark

uva w. levy research lab | comp. neuroscience researcher

fall 2014 - fall 2016

- simulated biophysically detailed neurons to understand the computations of real neurons
- simulated stochastic gating of sodium channels to analyze noise, variability, and mutual information
- analyzed energy efficiency of neurons, particularly with regard to interpulse interval coding
- performed calculations for top-down and bottom-up partitioning of the brain's energy budget

hhmi scientific computing | research intern

summer 2014

- examined effects of back-propagating action potentials by simulating intracellular neural firing with detailed biophysical models
- simulated extracellular recording from neurons and measured noise
- made detailed visualizations of action potential firing

research innovations inc. | web dev / android intern

summer 2013 - spring 2014

- developed web application to simultaneously coordinate different tasks
- developed android app to increase data storage capacity of qr codes

skills

languages

experienced

python • java • matlab • \LaTeX

proficient

r • c++ • c • android • mathematica

familiar

scala • javascript • django

machine learning

frameworks

tensorflow • scikit-learn • keras •

mllib • caffe

algorithms

cnns • graphical models • rfs

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

papers / posters





published/accepted

- morel, singh, & levy, 2018: "linearized synaptic integration at no extra cost" *journal of computational neuroscience* 
- singh, wang, & qi, 2017: "a weighted- ℓ_1 , multi-task graphical model with applications to heterogeneous brain connectivity" *nips 2017 workshop on advances in modeling and learning interactions from complex data* 
- singh & levy, 2017: "a consensus layer V pyramidal neuron can sustain interpulse-interval coding" *plos one.* 

under review

- funke, tschopp, grisaitis, sheridan, singh, saalfeld, & turaga, 2017: "a deep structured learning approach towards automating connectome reconstruction from 3d electron micrographs" *tpami* 
- levy lab: "neural computation at the thermal limit" 

posters / talks

- singh, 2017: "a novel machine-learning algorithm for uncovering brain connections underlying autism" *uva 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" *uva 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* 

awards

uva rader research award	2017
raven honor society	2016-2017
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

funding awards

graduate student researcher appointment	2018
eecs departmental fellowship	2017
vidya balvantrai shelat fund award	2016
rodman scholar	2014-2017

outside activities

im basketball, soccer	2015-2018
apda, pf debate	2010-2017
indian student association	2014-2017
madison house volunteering (computer literacy)	2014-2017
chinmaya mission volunteering	2010-2014

