CHANDAN SINGH

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**ACADEMICS**

Graduation Date

May 2017

* Enrolled at University of Virginia – School of Engineering: GPA 3.88
* Majors: CS (CS GPA: 3.94) & Math (Math GPA: 3.89)
* **Math**: Statistics, Applied Linear Models, Probability, Stochastic Processes, Linear Algebra, Chaos Theory I & II, Survey of Algebra, Multivariate Calculus, Discrete Mathematics, Differential Equations, Real Analysis, Calculus I & II
* **Science**: Advanced Machine Learning, Learning Theory, Machine Learning, Algorithms, Artificial Intelligence, Deep Learning in Computer Vision & Graphics, Neural Network Models, Neurobiology, Information Retrieval, Theory of Computation, Program & Data Representation, Computer Architecture, Software Dev. Methods, Advanced Software Dev. Methods, Operating Systems, Computer Science I, Digital Logic Design

**RESEARCH / WORK EXPERIENCE**

**AI research internship at Facebook (accepted offer)**

Summer 2017

**ML research assistant under Dr. Yanjun Qi at the University of Virginia**

Fall 2016 - Present

*Contributed to development of novel method of estimating multiple Sparse Gaussian models*

* + Developed learning for sparse Graphical models from samples across several tasks
  + Developed learning for shared and individual parts of multiple graphs explicitly
  + Developed methods for stabilizing the covariance matrix used in multitask learning

**ML research assistant under Dr. Srinivas Turaga at the Howard Hughes Medical Institute**

Summer 2015 -

Fall 2016

*Contributed to enhanced ML implementations for neural image segmentation*

* + Implemented and extended novel watershed algorithms for performance evaluation
  + Contributed to GPU CNN implementation using fork of Caffe with malis training objective
  + Setup distributed mllib implementation to run in parallel on compute cluster using Apache Spark
  + Wrote Scala code to alter parts of random forest model

**Computational neuroscience research assistant under Dr. William Levy at the University of Virginia**

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
  + Used NEURON simulation environment to simulate stochastic gating of sodium channels
  + Performed background research to determine parameters for simulation

**Scientific computing research intern at the Howard Hughes Medical Institute**

Summer 2014

*Modeled effects of back propagating action potentials on neuron spike shape*

* + Used Neurocube Matlab scripts to simulate extracellular recordings of a neuron
  + Used NEURON software package to simulate intracellular firing of a neuron
  + Used Matlab scripts to visualize data of action potential firing

**Android research intern at defense contractor Research Innovations Incorporated**

Fall 2013 - Spring 2014

*Developed Android app to increase data storage capacity of QR Codes*

Summer 2013

**Web development intern at defense contractor Research Innovations Incorporated**

*Worked on web application to simultaneously coordinate different tasks between multiple users*

**PAPERS / POSTERS**

**Submitted**

* Singh & Levy, 2016: “Complexity leads to simplicity: A consensus layer V pyramidal neuron can sustain interpulse-interval coding” - http://arxiv.org/abs/1609.08213

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* + Submitted to PLOS Computational Biology
* Morel, Singh, & Levy, 2016: “Linearized synaptic integration at no extra cost”
  + Submitted to The Journal of Computational Neuroscience

**Posters**

* Singh, Hewitt, & Turaga, 2015: “Optimizing random forest image segmentation for connectomics”
  + Presented at the Janelia Undergraduate Scholar Poster Session

**In Preparation**

* Qi Lab: “Multi-task learning of functional connectivity on the ABIDE dataset via SIMULE”
* Turaga Lab: “Convolutional neural networks for pixelwise connectome classification”
* Levy Lab: “Characterizing stochastic threshold: neural computation meets biophysical simulations”

**COMPUTER SKILLS**

* **Languages**
  + Java - Experienced: object-oriented programming, graphics, GUI design, Listeners, unit testing
  + Python - Experienced: ipython, image processing, numpy, h5py, pyspark, unit testing, data visualization
  + Matlab - Experienced: data analysis, matrix manipulation, neural network modeling, parallel processing
  + C/C++ - Proficient: memory management, calls from other languages using Cython, Bridj, JNA, MEX
  + R - Proficient: manipulating data, performing regression, data visualization, graphical model packages
  + Scala - Basic: mllib library, parallelization with Apache Spark
* **Machine Learning**
  + Scikit-learn, Torch, Caffe Convolutional Neural Networks, Random Forests for image segmentation
  + GGM R packages
  + Apache Spark with mllib framework
  + Implementing gradient boosting using MALIS training objective
* **Android**: Activity lifecycle, UI design, data processing, image processing, graphics, animation
* **Web**
  + Django, JS, HTML, CSS, XML, Node JS, jQuery, Angular JS
  + Wordpress, Weebly
  + Maps: Google Maps API, OpenLayers Map API, OWF Map API, KML
* **General**
  + OS: Windows, Mac, Ubuntu, Linux
  + Sorting/searching, Data structures, Big-O analysis, Data visualization
  + Wolfram Mathematica, Photoshop CS6, NEURON, IntelliJ IDEA, Eclipse, Latex, Emacs
  + Collaboration: Github, Slack, Git Stash, Jira, Confluence, Markdown

**OUTSIDE ACTIVITIES**

* Rodman Scholar, National Merit Finalist 2014 – Present
  + Raven honor society, Intermediate honors 2016
  + Recipient of Vidya Balvantrai Shelat Fund Award 2016
* Computer Team 2010 - Present
  + ICPC Regional Qualification 2014 - 2016
  + 1st Place Microsoft Code Competition 2016
* APDA Debate, PF Debate 2010 – Present
* Indian Student Association dance performances 2014 – Present
* Volunteering through Madison House, Chinmaya Mission 2010 – Present
  + Computer literacy program, Serving food at homeless shelters