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VIREN JAIN, PhD  
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## Education

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- 2009 MASSACHUSETTS INSTITUTE OF TECHNOLOGY  
*Ph.D. in Computation, December 2009*  
“Machine Learning of Image Analysis with Convolutional Networks and Topological Constraints”  
Committee: Sebastian Seung (Advisor), Edward Adelson, Yann LeCun (NYU), Tomaso Poggio  
Minor field: Artificial Intelligence
- 2004 UNIVERSITY OF PENNSYLVANIA  
*B.A.S. in Computer Science, B.A. in Cognitive Science*

## Positions

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- 2016- Google  
Staff Research Scientist
- 2014-2016 Google  
Senior Research Scientist
- 2011-2014 Howard Hughes Medical Institute (HHMI) Janelia Farm Research Campus.  
Fellow and Laboratory Head
- 2004-10 MIT  
Research Assistant, Seung Laboratory.
- 2003 Johns Hopkins University  
Undergraduate Research Fellow, Center for Language and Speech Processing
- 2001-4 University of Pennsylvania  
Undergraduate Research Assistant, Institute for Research in Cognitive Science
- 2001 Trintech Group  
Engineering summer internship.
- 2000 Telcordia Technologies  
Engineering summer internship.

## Publications

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- 2016 Januszewski, M., Maitin-Shepard, J.B., Li, P., Kornfeld, J., Denk, W., **Jain, V.** *Flood-Filling Networks*. arXiv, 2016.
- 2016 Maitin-Shepard, J.B., **Jain, V.**, Januszewski, M., Li, P., Abbeel, P. *Combinatorial Energy Learning for Image Segmentation*. Advances in Neural Information Processing Systems (NIPS) 30, 2016.
- 2013 Huang, G.B. and **Jain, V.** *Deep and Wide Multiscale Recursive Networks for Robust Image Labeling*. International Conference on Learning Representations (ICLR) 2014.
- 2013 Bogovic, J., Huang, G.B., and **Jain, V.** *Learned versus Hand-Designed Feature Representations for 3d Agglomeration*. International Conference on Learning Representations (ICLR) 2014.

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- 2013 Helmstaedter, M.N., Briggman, K., Turaga, S., **Jain, V.**, Seung, H.S, and Denk W. *Connectomic reconstruction of the inner plexiform layer in the mouse retina*. Nature.
- 2011 **Jain, V.**, Turaga, S., Briggman, K., Helmstaedter, M.N., Denk, W., and Seung, H.S. *Learning to Agglomerate Superpixel Hierarchies*. Advances in Neural Information Processing Systems (NIPS) 24, 2011.
- 2010 **Jain, V.**, Seung, H.S., and Turaga, S.C. *Machines that learn to segment images: a crucial technology for connectomics*. Current Opinion in Neurobiology, 2010.
- 2010 **Jain, V.**, Bollman, B., Richardson, M., Berger, D.R., Helmstaedter, M.N., Briggman, K.L., Denk, W., Bowden, J.B., Mendenhall, J.M., Abraham, W.C., Harris, K.M., Kasthuri, N., Hayworth, K.J., Schalek, R., Tapia, J.C., Lichtman, J.W., and Seung, H.S. *Boundary Learning by Optimization with Topological Constraints*. Proceedings of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR), 2010.
- 2010 Turaga, S.C., Murray, J.F., **Jain, V.**, Roth, F., Helmstaedter, M., Briggman, K., Denk, W. and Seung, H.S. *Convolutional networks can learn to generate affinity graphs for image segmentation*. Neural Computation, 2010.
- 2008 **Jain, V.** and Seung, H.S., *Natural Image Denoising with Convolutional Networks*. Advances in Neural Information Processing Systems (NIPS) 21, 2008.
- 2007 **Jain, V.**, Murray, J.F., Roth, F., Turaga, S., Zhigulin, V., Briggman, K., Helmstaedter, Denk, W. and Seung, H.S. *Supervised Learning of Image Restoration with Convolutional Networks*. Proceedings of the IEEE International Conference on Computer Vision (ICCV), 2007.
- 2005 **Jain, V.**, Zhigulin, V. and Seung, H.S., *Representing Part-Whole Relationships in Recurrent Neural Networks*. Advances in Neural Information Processing Systems (NIPS) 18, 2005.
- 2004 **Jain, V.** and Saul, L.K. *Exploratory analysis and visualization of speech and music by locally linear embedding*. Proceedings of the International Conference on Speech, Acoustics and Signal Processing (ICASSP), 2004.
- 2004 Och, F., Gildea, D., Khudanpur, S., Sarkar, A., Yamada, K., Fraser, A., Kumar, S., Shen, L., Smith, D., Eng, K., **Jain, V.**, Zhen, J. and Radev, D. *A Smorgasbord of Features for Statistical Machine Translation*. Proceedings of the Human Language Technology and 5th Meeting of the NAACL (HLT-NAACL), 2004.

## Presentations

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- 2017 Invited Participant: Advancing Neuroscience with the National Labs. Chicago.
- 2017 *Generative Adversarial Networks for Interpolation and Alignment*. Invited Talk: HHMI/MPI Connectomics Meeting. Berlin.
- 2017 *Large-scale Automated EM Reconstruction*. Invited Talk: HHMI Frontiers in Imaging Science. Ashburn, VA.
- 2017 Invited Participant: Chan-Zuckerberg Workshop on Computational Tools for Microscopy. San Francisco.
- 2016 *Neural Architectures for Large-scale 3D Reconstruction*. Invited Talk: CVPR 2016 workshop "Perceptual Organization in Computer Vision". Las Vegas.
- 2015 *Big Data in Action*. Invited Plenary Talk: International Society for Magnetic Resonance in Medicine (ISMRM 2015). Toronto.

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- 2013 *Mapping Neural Circuits with EM Reconstruction*. Google. Mountain View, CA.
- 2012 *Mapping Neural Circuits with EM Reconstruction*. Geometric Computing Laboratory, Stanford University. Palo Alto, CA.
- 2012 *Mapping Neural Circuits with EM Reconstruction*. Center for Imaging Science, Johns Hopkins University. Baltimore, MD.
- 2011 *Mapping Neural Circuits with EM Reconstruction*. Dept of Computer Science & Engineering, Washington University in St Louis. St. Louis, MO.
- 2011 *Computationally Guided Proofreading for EM Reconstruction*. Howard Hughes Medical Institute/Max Planck Society High-Resolution Circuit Reconstruction Conference, September 2011. Ashburn, VA.
- 2009 *Boundary learning by optimization with topological constraints*. Brainstorm Consortium Meeting, November 2009. Harvard University, Cambridge, MA.
- 2009 *Segmentation for connectomics*. Harvard (MCB 206)/MIT (9.691) Connectomics course, November 2009. Harvard University, Cambridge, MA.
- 2009 *Segmentation of neuronal ultrastructure using machine learning*. Howard Hughes Medical Institute/Max Planck Society High-Resolution Circuit Reconstruction Conference, September 2009. Berlin, Germany.
- 2009 *Boundary detection and image segmentation using convolutional networks*. Fourth International Workshop for Microscopic Image Analysis With Applications in Biology, September 2009. National Institutes of Health, Bethesda, MD.
- 2008 *Progress and prospects for high-throughput reconstruction of neural circuitry*. Workshop on Cortical Microcircuits and their Computational Functions, December 2008. Neural Information Processing Systems Conference, Whistler, Canada.

## Teaching Experience

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- Teaching Assistant for MIT 9.641 “Neural Networks” taught by Prof. Sebastian Seung. (2006, 2009)

## Honors and Awards

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- 2005 Singleton Presidential Fellowship, MIT.
- 2004 National Science Foundation Post-CLSP Workshop Undergraduate Research Grant.

## Organization and Reviewing

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- Area Chair for *Advances in Neural Information Processing Systems 31 (NIPS 2017)*.
- Co-organizer (with Sridhar Turaga):  
*NIPS 2016 Workshop “Connectomics II: Opportunities and Challenges for Machine Learning”*
- Co-organizer (with Mitya Chklovskii, Winfried Denk, and Moritz Helmstaedter):  
*2014 HHMI/Max Planck “Dense Circuit Reconstruction Conference”*

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- Co-organizer (with Moritz Helmstaedter):  
*NIPS 2012 Workshop: "Connectomics: Opportunities and Challenges for Machine Learning"*
  - Reviewer for *Journal of Machine Learning Research*
  - Reviewer for *IEEE Transactions on Pattern Analysis and Machine Intelligence*
  - Reviewer for *The IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2010, 2011, 2012, 2013)*.
  - Reviewer for *Advances in Neural Information Processing Systems 25 (NIPS 2011, NIPS 2012)*.
  - Reviewer for *International Conference on Computer Vision (ICCV 2011)*.
  - Reviewer for *The 11th European Conference on Computer Vision (ECCV 2010)*.
  - Reviewer for *The 26th International Conference on Machine Learning (ICML 2009)*.

### Research Support

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| 2011- | Howard Hughes Medical Institute<br>Support for equipment and personnel in the Jain laboratory at Janelia Farm Research Campus.                           |
| 2004  | National Science Foundation Undergraduate Research Grant.<br>(PI: Aravind Joshi) \$10,000 for independent research project at ISI in Marina del Ray, CA. |