Archana Venkataraman

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Education

Massachusetts Institute of Technology, Cambridge, MA

Ph.D., Electrical Engineering — Sept 2007 – Aug 2012
Thesis Title: Generative Models of Brain Connectivity for Population Studies
Thesis Supervisor: Prof. Polina Golland
GPA: 5.0/5.0

M. Eng., Electrical Engineering — Sept 2006 – Sept 2007
Thesis Title: Signal Approximation using the Bilinear Transform
Thesis Supervisor: Prof. Alan V. Oppenheim
GPA: 5.0/5.0

S.B., Electrical Engineering — Sept 2003 – June 2006
Concentration: Communications, Controls and Signal Processing
GPA: 5.0/5.0

Research and Professional Experience

Yale Image Processing & Analysis Group, New Haven CT — Jan 2014 – Present
Faculty Supervisor: Prof. James S. Duncan
- *Characterizing Functional Networks in Autism*
- *Multi-modal EEG/fMRI Image Analysis*

MIT Medical Vision Group, Cambridge MA — Jan 2008 – Dec 2013
Faculty Supervisor: Prof. Polina Golland
- *Identifying Foci of a Neurological Disorder*
- *Generative Models for Combined Analysis of fMRI and DWI Data*
- *Robust Feature Selection in fMRI for Patient Classification*
- *Data-Driven Functional Connectivity Analysis*

MIT Digital Signal Processing Group, Cambridge MA — Jan 2006 – Sept 2007
Faculty Supervisor: Prof. Alan V. Oppenheim
- *Signal Approximation using the Bilinear Transform*

MIT Lincoln Laboratory, Lexington MA — June 2006 – Aug 2006
Advanced Sensor Techniques Group
Supervisor: Dr. Andrew McKellips
- *Adaptive IIR Nulling Solution for a Sparse Non-Commutative Environment*

MIT Microsystems Technology Laboratory, Cambridge MA — Sept 2004 – Jan 2006
Faculty Supervisor: Prof. Anantha P. Chandrakasan
- *A Low-Power Integrated Switched-Capacitor DC-DC Power Converter*
- *A Low-Power Sensing Front End (w/Naveen Verma)*

Xerox Corporation, Rochester NY — June 2004 – Aug 2004
XCEL Summer Internship Program
- *Developed software additions for an online hardware management tool*

MIT Nanostructures Laboratory, Cambridge MA — Sept 2003 – June 2004
Faculty Supervisor: Prof. Henry I. Smith
- *Fabrication of a 2D Photonic Crystal (w/Minghao Qi)*

Teaching Experience

Teaching Assistant, Information & Inference (6.437, MIT) Feb 2011 – May 2011

- *Graduate-level course satisfying TQE (technical qualifying evaluation) requirement*
- *TA Responsibilities: teaching weekly recitation, writing and grading exams, compiling and distributing HW assignments, office hours*

Instructor, Eta Kappu Nu (MIT) Jan 2006

- *Co-developed an introductory signals and systems course for underclassmen*
- *Taught four classes, each one lasting for three hours*

Journal Articles

A. Venkataraman, J. Wu, S. van Noordt, M.J. Larson, M. South, M.J. Crowley. *Medial Frontal Theta Oscillations Linked to Differential Feedback Processing in High-Functioning Autism.* In Preparation for Brain & Cognition, 2015.

A. Venkataraman, D. Yang, K.A. Pelphrey and J.S. Duncan. *Bayesian Community Detection in the Space of Group-Level Functional Differences.* Under Revision for IEEE Trans Medical Imaging, pp. 1-19, 2015.

A. Venkataraman, J.S. Duncan, D. Yang and K.A. Pelphrey. *An Unbiased Bayesian Approach to Functional Connectomics Implicates Social-Communication Networks in Autism.* NeuroImage Clin, 8:356-366, 2015.

A. Venkataraman, M. Kubicki and P. Golland. *From Brain Connectivity Models to Region Labels: Identifying Foci of a Neurological Disorder.* IEEE Transactions on Medical Imaging, 32(11):2078-2098, 2013.

A. Venkataraman, T.J. Whitford, C-F. Westin, P. Golland and M. Kubicki. *Whole Brain Resting State Functional Connectivity Abnormalities in Schizophrenia.* Schizophrenia Research, 139(1-3):7-12, 2012.

A. Venkataraman, Y. Rathi, M. Kubicki, C-F. Westin and P. Golland. *Joint Modeling of Anatomical and Functional Connectivity for Population Studies.* IEEE Trans on Medical Imaging, 31(2):164-182, 2012.

K.R.A. Van Dijk, T.Hedden, **A. Venkataraman**, K.C. Evans, S.W. Lazar and R.L. Buckner. *Intrinsic Functional Connectivity As a Tool For Human Connectomics: Theory, Properties, and Optimization.* Journal of Neurophysiology, 103(1):297-321, 2010.

Peer-Reviewed Conference Publications

A. Venkataraman, D. Yang, K.A. Pelphrey and J.S. Duncan. *Community Detection in the Space of Functional Abnormalities Reveals both Heightened and Reduced Brain Synchrony in Autism.* In Proc. Bayesian and Graphical Models for Biomedical Imaging, pp. 1-12, 2015.

A. Sweet*, **A. Venkataraman***, S.M. Stufflebeam, H. Liu, N. Tanaka and P. Golland. *Detecting Epileptic Regions Based on Global Brain Connectivity Patterns.* In Proc. MICCAI: International Conference on Medical Image Computing and Computer Assisted Intervention, LNCS 8149:98-105, 2013.

A. Venkataraman, M. Kubicki and P. Golland. *From Brain Connectivity Models to Identifying Foci of a Neurological Disorder.* In Proc. MICCAI: International Conference on Medical Image Computing and Computer Assisted Intervention, LNCS 7510:697-704, 2012.

A. Venkataraman, Y. Rathi, M. Kubicki, C-F. Westin and P. Golland. *Joint Generative Model for fMRI/DWI and its Application to Population Studies.* In Proc. MICCAI: International Conference on Medical Image Computing and Computer Assisted Intervention, LNCS 6361:191-199, 2010.

A. Venkataraman, M. Kubicki, C-F. Westin and P. Golland. *Robust Feature Selection in Resting-State fMRI Connectivity Based on Population Studies.* In Proc. MMBIA: IEEE Computer Society Workshop on Mathematical Methods in Biomedical Image Analysis: 63-70, 2010.

A. Venkataraman, K.R.A Van Dijk, R.L. Buckner and P. Golland. *Exploring Functional Connectivity in fMRI via Clustering.* In Proc. ICASSP: IEEE International Conference on Acoustics, Speech and Signal Processing, 441-444, 2009.

P. Golland, D. Lashkari and **A. Venkataraman**. *Spatial Patterns and Functional Profiles for Discovering Structure in fMRI Data*. Invited paper. In Proc. Asilomar Conference on Signals, Systems and Computers, 1402-1409, 2008.

A. Venkataraman and A.V. Oppenheim, *Signal Approximation using the Bilinear Transform*, In Proc. ICASSP: IEEE International Conference on Acoustics, Speech and Signal Processing, 3729-3732, 2008.

Conference Abstracts

A. Venkataraman, James S. Duncan, Daniel Y.-J. Yang and Kevin A. Pelphrey. *Abnormal Functional Communities in Autism*. Submitted to IMFAR: Intl Meeting For Autism Research, 2016.

G. Rosenblau, **A. Venkataraman**, B. Vander Wyk and Kevin A. Pelphrey. *Developmental Trajectories of Social and Nonsocial Cooperation*. Submitted to IMFAR: Intl Meeting For Autism Research, 2016.

A. Venkataraman, James S. Duncan, Daniel Y.-J. Yang and Kevin A. Pelphrey. *An Unbiased Bayesian Approach to Functional Connectomics Implicates Social-Communication Networks in Autism*. ISBI: International Symposium on Biomedical Imaging, 2015.

Sinan Zhao, **Archana Venkataraman**, Peipeng Liang and Gopikrishna Deshpande. *Investigating the Role of Brain Stem in Alzheimers Disease using Directional Brain Networks derived from Resting State fMRI*, 23^{rd} Annual Meeting of ISMRM, May 2015.

A. Venkataraman, M. Kubicki and P. Golland. *From Brain Connectivity Models to Identifying Foci of a Neurological Disorder*. 3^{rd} Biennial Conference on Resting State Brain Connectivity, Sept 2012.

A. Venkataraman, K.R.A Van Dijk, R.L. Buckner and P. Golland. *Exploring Functional Connectivity in fMRI via Clustering*, Annual Meeting of the Organization of Human Brain Mapping, June 2009.

Research Funding

R21 MH109880 PI: Venkataraman 04/01/16 – 03/31/18
Deciphering Autism Spectrum Disorder via Multimodal Image Fusion
Agency: National Institute of Mental Health
Total Funding Amount: $275,000 over 2 years
Under Review by CPDD Study Section

R01 HD083881 Joint PI: Sukhodolsky, Pelphrey 12/01/2015 – 11/30/2020
Neural Mechanisms of CBT for Anxiety in Autism
Agency: National Institute of Child Health and Human Development
Total Funding Amount: $2,033,960 over 5 years
Role: Co-Investigator (20% effort)
Awaiting Advisory Council Notification

K99 MH105590 (Mentored Award) PI: Venkataraman Release Date: 04/01/15
Deciphering Autism Spectrum Disorder via Multimodal Image Fusion
Agency: National Institute of Mental Health
Total Funding Amount: $983,200 over 5 years
Impact Score: 37 – Resubmitted as Independent R21

Awards and Honors

CHDI Grant, Network Models of Brain Connectivity for Huntington's Disease	2013 – 2014
MIT Lincoln Lab Campus Collaboration Award	2012 – 2014
Advanced Multimodal Neuroimaging Training Program (NIH)	2011 – 2012
National Defense Science and Engineering Graduate Fellowship (NDSEG)	2007 – 2010
MICCAI Student Travel Award ($500)	Sept 2010
Siebel Scholarship ($20,000)	2007 – 2008
MIT Provost Presidential Fellowship	2006 – 2007
Morris Joseph Levin Award, Best Thesis Presentation (M.Eng.)	May 2007

Asssociation of MIT Alumnae, Senior Academic Achievement Award ($500)	May 2006
Xerox Technical Minority Scholarship ($10,000)	Jan 2006
Maletta Foundation Scholarship, Rochester Engineering Society ($2500)	Jan 2005
Semiconductor Research Corporation Undergraduate Research Award ($18,000)	2004 – 2005
Xerox Technical Minority Scholarship ($2,500)	Dec 2004
National Merit Scholarship ($2,500)	Sept 2003

Technical Presentations

Invited Talks

- International Symposium on Biomedical Imaging, Brooklyn NY (April 2015)
  An Unbiased Bayesian Approach to Functional Connectomics Implicates Soc-Comm Networks in Autism
- Image Processing Conference at SPIE Medical Imaging, San Diego CA (Feb 2014)
  Johns Hopkins, MIT IMES, UT Austin, MIT Lincoln Laboratory (Jan-June 2013)
  Characterizing Abnormal Brain Networks
- Laboratory for Mathematical Imaging, Harvard & Rising Stars Workshop, MIT (Nov 2012)
  From Brain Connectivity Models to Identifying Foci of a Neurological Disorder
- MIT Lincoln Laboratory, Martinos Center for Biomedical Imaging, Yale University (Oct-June 2012)
  Generative Models of Brain Connectivity for Population Studies
- Neurospin, Paris, France (July 2011)
  Joint Modeling of Anatomical and Functional Connectivity for Population Studies

Conference and Workshop Oral Presentations

- Bayesian and grAphical Models for Biomedical Imaging (Oct 2015)
  Comm Detection in the Space of Functional Abnormalities Reveals Abnormal Brain Synchrony in Autism
- International Conference on Medical Image Computing and Computer Assisted Intervention (Sept 2013)
  Detecting Epileptic Regions Based on Global Brain Connectivity Patterns
- International Conference on Medical Image Computing and Computer Assisted Intervention (Oct 2012)
  From Brain Connectivity Models to Identifying Foci of a Neurological Disorder
- International Conference on Medical Image Computing and Computer Assisted Intervention (Sept 2010)
  Joint Generative Model for fMRI/DWI and it Application to Population Studies
- Masterworks Symposium, MIT (May 2007) **Won Best Thesis Presentation Award**
  M.Eng. Thesis Work: *Signal Approximation Using the Bilinear Transform*

Poster Presentations

- 3^{rd} Biennial Conference on Resting State Brain Connectivity (Sept 2012)
  From Brain Connectivity Models to Identifying Foci of a Neurological Disorder
- IEEE Computer Society Workshop on Mathematical Methods in Biomedical Image Analysis (June 2010)
  Robust Feature Selection in Resting-State fMRI Connectivity Based on Population Studies
- Annual Meeting of the Organization of Human Brain Mapping (June 2009)
  IEEE International Conference on Acoustics, Speech and Signal Processing (April 2009)
  Exploring Functional Connectivity in fMRI via Clustering
- IEEE International Conference on Acoustics, Speech and Signal Processing (April 2008)
  Signal Approximation Using the Bilinear Transform
- Interconnect Focus Center Design Review, Atlanta, GA (Nov 2005)
  An Integrated Low-Power Switched-Capacitor DC-DC Power Converter

Professional Activities

Editor for "Computational Diffusion MRI & Brain Connectivity" (Springer *Mathematics & Visualization*, 2013)

Organizer for "Mathematical Models for Brain Connectivity" (MICCAI Workshop, 2013)

Reviewer for the IEEE Transactions on Medical Imaging, NeuroImage, the International Conference on Medical Image Computing and Computer Assisted Intervention, the IEEE Conference on Computer Vision and Pattern Recognition, the European Conference on Computer Vision and Neuroinformatics

Siebel Scholar (2007 – Present)

IEEE Member (2006 – Present)

MICCAI Society Member (2008 – Present)
Tau Beta Pi, Engineering Honor Society (2006 – Present)
Eta Kappa Nu, EE Honor Society (2006 – Present)
National Society of Collegiate Scholars (2006 – Present)

Non-Professional Activities and Leadership Roles

Ashdown Residential Scholar Coordinator (MIT)	June 2009 – June 2010
President, Ashdown House Executive Committee (MIT)	June 2008 – June 2009
Living Things Officer, Ashdown House (MIT)	Jan 2006 – June 2008
Boston Open Committee, International Badminton Tournament (Cambridge, MA)	Sept 2004 – June 2008
Honor Society Chair Positions (MIT)	Feb 2006 – Apr 2007
Treasurer and Co-Captain, MIT Badminton Club	June 2005 – June 2006

References

Polina Golland
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Massachusetts Institute of Technology
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James Duncan
Professor of Biomedical & Electrical Engineering and Diagnostic Radiology
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Harris Professor in the Child Study Center & Professor of Psychology
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