

# Vamsi K Ithapu

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Madison, WI 53706-1510 USA <http://pages.cs.wisc.edu/~vamsi/>
- EDUCATION **University of Wisconsin-Madison**, Madison, Wisconsin, USA  
Doctor of Philosophy (Ph.D) Candidate, Computer Sciences Jan 2013 - present  
*Minors*: Electrical and Computer Engineering, Statistics  
Grade Point Average: 3.56/4  
*Thesis*: Learning and Inference Algorithms for Neuroimaging-based Clinical Trials  
*Advisor*: Vikas Singh
- Indian Institute of Technology**, Guwahati, India  
Bachelor of Technology, Electronics and Communication Engineering Aug 2006 - May 2010  
Grade Point Average: 8.52/10  
*Thesis*: Investigation of diversity in Multiple Input Multiple Output (MIMO) SAR imaging systems  
*Advisor*: Amit Kumar Mishra
- WORK EXPERIENCE
- *Research Assistant* Jul 2013 - present
  - *Project Assistant* Jan 2012 - Jun 2013  
Wisconsin Alzheimer's Disease Research Center, University of Wisconsin-Madison, Madison USA
  - *Teaching Assistant* Aug 2011 - Dec 2011  
Course: Introduction to Computer Engineering  
Electrical and Computer Engineering, University of Wisconsin-Madison, Madison USA
  - *Research Engineer* Aug 2010 - Jun 2011  
Acoustic Research Laboratory, National University of Singapore, Singapore
  - *Research Intern* May 2009 - Jul 2009  
Dept. of Medical Informatics, RWTH Aachen University, Aachen, Germany
- RESEARCH INTERESTS
- Machine Learning  
Matrix Factorization, Multi-scale methods, Revealing structure in Unsupervised data  
Theory and Design of Deep Networks, Regularizing Neural Networks
  - Nonparametric Statistics  
Computationally Efficient Testing
  - Applications  
Learning Models in Biomedical studies, Interpretable Non-linear Models in Medicine
- PUBLICATIONS *Conferences*
1. H. Hao, Y. Zhang, **V. K. Ithapu**, V. Singh, G. Wahba, S. C. Johnson, When can Multi-site Datasets be Pooled for Regression: Hypothesis Tests,  $\ell_2$ -consistency and Neuroscience Applications, In: Submitted
  2. **V. K. Ithapu**, R. Kondor, S. C. Johnson, V. Singh, The Incremental Multiresolution Matrix Factorization Algorithm, Computer Vision and Pattern Recognition (CVPR), 2017

3. **V. K. Ithapu**, S. Ravi, V. Singh, On the interplay of network structure and gradient convergence in deep learning, 54th Allerton Conference on Communication, Control and Computing, 2016
4. H. Hao, **V. K. Ithapu**, S. Ravi, V. Singh, G. Wahba, S. C. Johnson, Hypothesis Testing in Unsupervised Domain Adaptation with Applications in Alzheimer's Disease, Neural Information Processing Systems (NIPS), 2016
5. S. Ravi, **V. K. Ithapu**, S. C. Johnson, V. Singh, Experimental Design on a Budget for Sparse Linear Models and Applications, International Conference on Machine Learning (ICML), 2016
6. L. Mukherjee, S. Ravi, **V. K. Ithapu**, T. Holmes, V. Singh, An NMF perspective on Binary Hashing, International Conference on Computer Vision (ICCV), 2015
7. S. J. Hwang, M. Collins, S. Ravi, **V. K. Ithapu**, N. Adluru, S. C. Johnson, V. Singh, A Projection free method for Generalized Eigenvalue Problem with a nonsmooth Regularizer, International Conference on Computer Vision (ICCV), 2015
8. **V. K. Ithapu**, S. Ravi, V. Singh, Convergence of gradient based pre-training in Denoising autoencoders, arxiv:1502.03537
9. **V. K. Ithapu**, V. Singh, O. Okonkwo, S. C. Johnson, Randomized denoising autoencoders for smaller and efficient imaging based AD clinical trials, Medical Image Computing and Computer Assisted Intervention (MICCAI), 2014
10. C. Hinrichs\*, **V. K. Ithapu\***, Q. Sun, S. C. Johnson, V. Singh, Speeding up Permutation Testing in Neuroimaging, Advances in Neural Information Processing Systems (NIPS), 2013  
\* : Hinrichs and Ithapu contributed equally    **[Oral Spotlight]**
11. J. Xu, **V. K. Ithapu**, L. Mukherjee, J. Rehg, V. Singh, GOSUS: Grassmannian Online Subspace Updates with Structured-sparsity, International Conference on Computer Vision (ICCV), 2013
12. **V. K. Ithapu**, A. Fritsche, A. Oppelt, M. Westhofen, T. M. Deserno, Fundus image registration for vestibularis research, Proceedings of SPIE Medical Imaging, 2010
13. **V. K. Ithapu**, A. K. Mishra, R. K. Panigrahi, Diversity employment into target plus clutter SAR imaging using MIMO conguration, Indian Antenna Week, 2010
14. **V. K. Ithapu**, A. K. Mishra, Hybrid diversity strategy using MIMO radar for target tracking, IEEE Applied Electromagnetics Conference (AEMC), 2009

#### *Journals*

15. F. Gutierrez-Barragan, **V. K. Ithapu**, C. Hinrichs, C. Maumet, S. C. Johnson, T. E. Nichols, V. Singh, Accelerating Permutation Testing in Voxel-wise Analysis through Subspace Tracking: A new plugin for SnPM, In: Submitted (arXiv:1703.01506)
16. **V. K. Ithapu**, S. Ravi, V. Singh, On architectural choices in deep learning: From network structure to gradient convergence and parameter estimation, In: Submitted (arXiv:1702.08670)
17. N. N. Kumar, M. Gautam, J. J. Lochhead, D. J. Wolack, **V. K. Ithapu**, V. Singh, R. G. Thorne, Relative vascular permeability and vascularity across different regions of the rat nasal mucosa: implications for nasal physiology and drug delivery, *Nature Scientific Reports*, 2016
18. **V. K. Ithapu**, V. Singh, O. C. Okonkwo, R. J. Chappell, N. M. Dowling, S. C. Johnson, Imaging based enrichment criteria using deep learning algorithms for efficient clinical trials in MCI, Alzheimer's and Dementia, 2015
19. **V. K. Ithapu**, V. Singh, C. Lindner, B. Austin, C. Hinrichs, C. Carlsson, B. Bendlin, S. C. Johnson, Extracting and summarizing white matter hyperintensities using supervised segmentation methods in Alzheimer's disease risk and aging studies, Human Brain Mapping, 2013

20. **V. K. Ithapu**, A. K. Mishra, Cooperative Multi-Monostatic SAR: A New SAR Configuration for Improved Resolution, IEEE Antennas and Wireless Propagation Letters, 2010

*Abstracts*

21. **V. K. Ithapu**, L. Clark, V. Singh, R. Kosciak, S. C. Johnson, Deductive Mode Finding: Tracing Back Cognitive Decline in Biomarker Positive Middle-Aged Adults, Alzheimer’s Association International Conference (AAIC), 2017
22. H. Zhou, **V. K. Ithapu**, S. Ravi, V. Singh, S. C. Johnson, G. Wahba, R. L. Kosciak, S. Asthana, C. M. Carlsson, K. Blennow, H. Zetterberg, Statistical Algorithms for Harmonizing Biomarker Distributions Across Different Cohorts, Sites and Assays: Applications to CSF Measurements, Alzheimer’s Association International Conference (AAIC), 2017
23. S. Ravi, **V. K. Ithapu**, V. Singh, R. Kosciak, S. C. Johnson, Machine Learning Algorithms for Experiment Design in High Dimensional Longitudinal Cohort Studies: Implications for Clinical Trials, Alzheimer’s Association International Conference (AAIC), 2017
24. H. Zhou, S. Ravi, **V. K. Ithapu**, S. C. Johnson, G. Wahba, V. Singh, Hypothesis Testing in Unsupervised Domain Adaptation with Applications in Neuroscience, Center for Predictive Computational Phenotyping (CPCP) Retreat, 2016
25. T. Vo, **V. K. Ithapu**, V. Singh, M. Newton, Graph partitioning: mixtures for modeling and clustering graph-associated data, Center for Predictive Computational Phenotyping (CPCP) Retreat, 2016
26. **V. K. Ithapu**, V. Singh, O. Okonkwo, S. C. Johnson, A predictive multi-modal imaging marker for designing efficient and robust AD clinical trials, Clinical Trials on Alzheimer’s Disease (CTAD), 2014
27. **V. K. Ithapu**, V. Singh, O. Okonkwo, R. J. Chappell, S. C. Johnson, A predictive multimodal imaging marker for efficient sample enrichment in AD clinical trials, Alzheimer’s Association International Conference (AAIC), 2014
28. **V. K. Ithapu**, V. Singh, B. Austin, C. Hinrichs, C. Carlsson, B. Bendlin, S. C. Johnson, Extracting white matter hyperintensities in Alzheimer’s disease risk and aging studies using supervised segmentation methods, Alzheimer’s Association International Conference (AAIC), 2013

BOOK  
CHAPTERS

1. **V. K. Ithapu**, V. Singh, S. C. Johnson, Randomized deep learning methods for clinical trial enrichment and design in Alzheimer’s disease, Deep Learning for Medical Image Analysis (1st Edition) ISBN: 9780128104088; Chapter 15

SELECTED  
TALKS

1. Machine Learning methods for enriching clinical trials in Preclinical Alzheimer’s Disease, Mayo Symposium on the BRAIN Initiative, 2017
2. On the interplay of network structure and gradient convergence in deep learning, Allerton Conference on Communications, Control and Computing (ALLERTON), 2016
3. A predictive multi-modal imaging marker for designing efficient and robust AD clinical trials, Clinical Trials on Alzheimer’s Disease (CTAD), 2014
4. Speeding up Permutation Testing in Neuroimaging, Advances in Neural Information Processing Systems (NIPS), 2013

PATENTS

1. **V. K. Ithapu**, V. Singh, S. C. Johnson, O. C. Okonkwo, Medical Imaging System Providing Disease Prognosis, US Patent 20160073969, 2016

2. **V. K. Ithapu**, A. K. Mishra, Cooperative Multi-Monostatic Synthetic Aperture Radar, Patent Number: 499/kol/2010

AWARDS	MICCAI Student Travel Award	Jun 2014
	NIPS Student Travel Award	Oct 2013
	Machine Learning Summer School (MLSS) Travel Scholarship	Jul 2012
	DAAD - Working Internships in Science and Engineering (WISE) Scholarship	Feb 2009
	Selected among top 1% in Joint Entrance Examination (JEE)	May 2005
	Rudra Memorial Award - Topper in Higher Secondary	May 2003
	Selected for National Maths Olympiad (top 5%)	Nov 2002

TOOLBOXES AND GUIs	1. Incremental Multiresolution Matrix Factorization <a href="http://pages.cs.wisc.edu/~vamsi/projects/incmmf.html">http://pages.cs.wisc.edu/~vamsi/projects/incmmf.html</a>	Apr 2017
	2. Design Choice in Deep Learning (R Shiny) <a href="http://pages.cs.wisc.edu/~vamsi/DLDesignChoices">http://pages.cs.wisc.edu/~vamsi/DLDesignChoices</a>	Feb 2017
	3. Rapid Permutation Testing in Neuroimaging (MATLAB) <a href="http://felipegb94.github.io/RapidPT/">http://felipegb94.github.io/RapidPT/</a> (a patch for SnPM) Earlier Version – <a href="https://www.nitrc.org/projects/efficient_pt/">https://www.nitrc.org/projects/efficient_pt/</a>	Oct 2016 Jan 2014
	4. Randomized Denoising Autoencoders for Neuroimaging (MATLAB) <a href="https://www.nitrc.org/projects/rdacodes/">https://www.nitrc.org/projects/rdacodes/</a>	Mar 2015
	5. Wisconsin White Matter Hyperintensities Segmentation Toolbox (MATLAB) <a href="https://www.nitrc.org/projects/w2mhs/">https://www.nitrc.org/projects/w2mhs/</a> (> 1500 downloads on NITRC and SourceForge)	May 2013

REVIEWER SERVICES	International Conference on Machine Learning (ICML), <i>Ad-Hoc</i>	2016
	Medical Image Computing and Computer Assisted Intervention (MICCAI)	2016
	Computer Vision and Pattern Recognition (CVPR), <i>Ad-Hoc</i>	2016
	Transactions on Medical Imaging (IEEE TMI)	2016
	International Conference on Computer Vision (ICCV), <i>Ad-Hoc</i>	2016
	Journal of Magnetic Resonance Imaging (Wiley)	2015
	Proc. of Neural Information Processing Systems (NIPS)	2015
Neuroimage (Elsevier)	2014	

STUDENT MENTORING	Nikhil Kannan (B.S CS/Math)	Spring 2017 - present
	Prithvi Chowhan (B.S CS/Math)	Spring 2017 - present
	Felipe Gutierrez-Barragan (B.S CS)	Summer 2015 - Fall 2016
	Zeyuan Hu (B.S CS/Math)	Fall 2013 - Spring 2014
	Christopher Lindner (B.S CS)	Spring 2013 - Summer 2014

COMPUTER SKILLS	Languages : Matlab, Python, R, Mathematica, Informatica, Octave
	Softwares : AFNI, SPM, SnPM, VBM8, FSL, IPE, HTML, IC Station, AnSoft, LTSpice, SolidEdge v9, L <sup>A</sup> T <sub>E</sub> X, VisualDSP++

REFERENCES	Vikas Singh	<a href="mailto:vsingh@biostat.wisc.edu">vsingh@biostat.wisc.edu</a>
	Sterling C. Johnson	<a href="mailto:scj@medicine.wisc.edu">scj@medicine.wisc.edu</a>
	Risi Kondor	<a href="mailto:risi@cs.uchicago.edu">risi@cs.uchicago.edu</a>