Chris Hinrichs

Contact Information

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Research Interests

Statistical Machine Learning; NeuroImaging; Functional Brain Imaging and Connectivity Discovery; Permutation Testing and Multiple Comparisons Analysis; Multi-Modality Image Analysis; Kernel Methods; Alzheimer's Disease

Education

University of Wisconsin – Madison, Madison, Wisconsin USA

Ph.D., Computer Sciences, completed December 12, 2012

- Advisor: Vikas Singh, Ph.D.
- Thesis: "Multi-Modality Inference Methods for Neuroimaging with Applications to Alzheimer's Disease Research"

University of Chicago, Chicago, Illinois USA

M.S., Computer Science Professional Program, August, 2006

University of Illinois at Chicago, Chicago, Illinois USA

B.S., Computer Science, May, 2004

Academic Experience

University of Wisconsin – Madison, Madison, Wisconsin USA

Postdoctoral Fellow **January, 2013 - present**
Conducted research; presented research in seminars; authored numerous publications; and consulted on cross-disciplinary projects.

Graduate Research Assistant **August, 2006 - December 2012**
Conducted research; presented research in seminars; authored numerous publications; attended graduate courses; and consulted on cross-disciplinary projects.

- Computation and Informatics in Biology and Medicine (CIBM)
  Pre-doctoral trainee **July 2009 – June 2012**
- Research Assistant **May 2008 – June 2009; July – December 2012**

Teaching assistant **August, 2006 - May, 2008**
Conducted programming lab sessions and discussions during office hours; graded works; designed and implemented student assignments; produced and distributed solutions to assignments.

- CS 302: Introduction to programming, Fall 2006, Spring 2007
- CS 525: Linear Optimization, Fall 2007
- CS 640: Special topics: Medical Image Analysis, Spring 2008
- CS 769: Adv. Natural Language Processing, Spring 2008

Publications

W. Kim, V. Singh, M. K. Chung, **C. Hinrichs**, D. Pachauri, O. C. Okonkwo, S. C. Johnson, For the Alzheimer's Disease Neuroimaging Initiative
Multi-resolutional Shape Features via Non-Euclidean Wavelets: Applications to Statistical Analysis of Cortical Thickness
NeuroImage (in press)

V. 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 (in press)

C. Hinrichs*, V. Ithapu*, Q. Sun, S. C. Johnson, V. Singh
*contributed equally
Speeding up permutation testing in Neuroimaging
Neural Information Processing Systems (NIPS), 2013.
[selected for oral spotlight, 5% acceptance]

C. Hinrichs, V. Singh, J. Peng, S. C. Johnson
Q-MKL: Matrix-induced Regularization in Multi-Kernel Learning with Applications to Neuroimaging.
Neural Information Processing Systems (NIPS), 2012.
[25.2% acceptance]

C. Hinrichs, V. Singh, N. M. Dowling, S. C. Johnson.
MKL-based sample enrichment and customized outcomes enable smaller AD clinical trials
Workshop on Machine Learning and Interpretation in NeuroImaging (MLINI) NIPS 2011 workshop.
[selected for oral presentation, 12.5% acceptance]

D. Pachauri, **C. Hinrichs**, M. K. Chung, S. C. Johnson, and V. Singh.
Topology based Kernels with Application to Inference Problems in Alzheimer's disease.
IEEE Transactions on Medical Imaging Issue PP(99), 29 April 2011.

C. Hinrichs, V. Singh, G. Xu, and S. C. Johnson.
Predictive Markers for AD in a Multi-Modality Framework: An Analysis of MCI Progression in the ADNI Population.
NeuroImage, 55(2):574–589, 2011.

K. Motwani, N. Adluru, **C. Hinrichs**, A. L. Alexander, and V. Singh.
Epitome driven 3-D Diffusion Tensor image segmentation: on extracting specific structures.
Neural Information Processing Systems (NIPS), 2010.
[selected for oral spotlight, 5.9% acceptance]

L. Mukherjee, V. Singh, J. Peng, and **C. Hinrichs**.
Learning Kernels for variants of Normalized Cuts: Convex Relaxations and Applications.
IEEE conf. on Computer Vision and Pattern Recognition (CVPR), 2010.
[26.8% acceptance]

C. Hinrichs, V. Singh, G. Xu, and S. C. Johnson.
MKL for Robust Multi-modality AD Classification.
Medical Image Computing and Computer-Assisted Intervention (MICCAI), 786–794, 2009.
[32% acceptance]

C. Hinrichs, V. Singh, L. Mukherjee, G. Xu, M. K. Chung, and S. C. Johnson.
Spatially augmented LPBoosting for AD classification with evaluations on the ADNI dataset.
NeuroImage,48(1):138–149, 2009.

Invited Talks

- **Seminar**: Speeding Up Permutation Testing in Neuroimaging
  Systems Information Learning Optimization (SILO) Seminar.
  Madison, WI. October 13, 2013

- **Seminar**: *How Machine Learning Methods Can Reshape Neuroimaging-Based Clinical Trials*
  Computation and Informatics in Biology and Medicine (CIBM) Seminar.
  Madison, WI. November 13, 2012
- **Oral presentation**: *MKL-based sample enrichment and customized outcomes enable smaller AD clinical trials*
  Workshop on Machine Learning and Interpretation in NeuroImaging (MLINI) at NIPS 2011
  Sierra Nevada, Spain. December 16–17, 2011
- **Invited talk**: *A novel clinical trial methodology for neuroimaging data*
  Workshop on Mathematical Methods in Medical Image Analysis.
  Seoul National University, Seoul, S. Korea. September 26–27, 2011
- **Guest lecture**: *Multi-Kernel Learning and applications to the Alzheimers Disease Neuroimaging Initiative (ADNI) dataset*
  Statistical Methods in NeuroImage Analysis. (course)
  Seoul National University, Seoul, S. Korea. September 16, 2011
- **Plenary talk**: *Learning disease patterns from medical images: Applications to Alzheimers Disease research*
  NLM Informatics Training Conference.
  Bethesda, MD. June 28–30, 2011
- **Seminar**: *Learning to recognize disease patterns in medical imaging: Applications to Alzheimer's Disease research*
  Computation and Informatics in Biology and Medicine (CIBM) Seminar.
  Madison, WI. October 26, 2010
- **Seminar**: *Alzheimers disease classification of MR images using spatially augmented LP-Boosting*
  Brainfood Seminar
  Madison, WI. February 17, 2009

Professional Experience

Journal Reviewer

- NeuroImage
- IEEE Transactions on Biomedical Engineering
- International Journal of Biomedical Data Mining
- PLoS-ONE
- IEEE Transactions on Multimedia
- Psychiatry Research: Neuroimaging

Conference Reviewer

- IEEE conf. on Computer Vision and Pattern Recognition (CVPR) 2009–2014
- International Conference on Computer Vision (ICCV) 2013
- Neural Information Processing Systems (NIPS) 2013

Computer Skills

- Statistical and Optimization Packages: Matlab; CPLEX; CVX; SVM_Light; LibSVM; Shogun; GNU Scientific Library (GSL)
- Other libraries: Visualization ToolKit (VTK)
- Languages: Matlab; C/C++; Perl; Python; basic Unix shell scripting
- Applications: LaTeX; spreadsheet, and presentation software
- Algorithms: Linear and Non-linear systems and solvers; Kernel Methods;
- Operating Systems: GNU/Linux; Windows.