

CONTACT INFORMATION Duncan Hall, Room 2017A [gautamd@rice.edu](mailto:gautamd@rice.edu)  
 6100 Main Street, Houston, TX -77005 <http://gautamdasarathy.com>

RESEARCH INTERESTS Statistical signal processing, machine learning, and information theory

EDUCATION **University of Wisconsin**, Madison, WI, USA

- Doctor of Philosophy, Electrical Engineering Aug '14  
 Thesis: *Data Efficient and Robust Algorithms for Reconstructing Large Graphs*  
 Advisors: Robert Nowak, Ph.D. and Stark Draper, Ph.D.
- Master of Science, Electrical Engineering May '10  
 Advisors: Robert Nowak, Ph.D. and Stark Draper, Ph.D.

**VIT University**, Vellore, Tamil Nadu, India

- Bachelor of Technology, Electronics and Communication Engineering, May '08  
 (Graduated First Class with Distinction)

RESEARCH EXPERIENCE **Post-Doctoral Fellow** Aug '16 to Present  
 Electrical Engineering Department  
 Rice University

- **Manifold Structure of Deep Representations** - Building a theoretical understanding of the manifold representations of deep machine learning models.
- **New algorithms for Learning Hypergraphical Models** - Developing provably correct algorithms for model selection in hypergraphical models. In particular, the kinds of hypergraphs that are motivated by the study of the brain's modeling of the real world.

**Post-Doctoral Fellow** Aug '14 to Aug '16  
 Machine Learning Department  
 Carnegie Mellon University

- **Model Selection from Compressive and Adaptive Measurements** - Developing techniques for computationally efficient and statistically consistent model selection from compressive or adaptive measurements. In particular, (a) graphical model selection from adaptive measurements, (b) characterizing the tradeoffs between compression and sample complexity in covariance estimation from compressed samples, and (c) performing regression using compressed samples.
- **Multi-armed Bandits with Multiple Fidelities** - Extending the multi-armed bandit framework to incorporate rewards with multiple costs per arm.

**Graduate Research Assistant** May '09 to Aug '14  
 Department of Electrical Engineering  
 University of Wisconsin - Madison

- **Sketching Sparse Matrices** - Developed a framework for compressed acquisition of sparse matrices. This framework can be applied to estimating sparse covariance matrices from compressed realizations, and to recovering graphs from coarse level cut information or additive queries.
- **Active Learning on Graphs** - Characterized the fundamental limits of and developed optimal algorithms for the problem of label prediction on graphs. This has applications in mining data on social networks and in semi-supervised learning.
- **Phylogenetics** - Developed novel efficient techniques for learning the "tree of life" from multiple genes and characterized the fundamental data requirements of this problem.
- **Active Clustering and Complex Networks** - Created new and efficient algorithms

to perform hierarchical clustering robustly and efficiently. This has applications in network tomography and analyzing gene microarray data.

- **Information Theory and Storage Systems** - Investigated the information theoretic characterization of high dimensional storage systems, particularly, the tradeoff between the amount of data stored, the number of items indexed, and the error rate. Currently using these insights to investigate better algorithms for storage and retrieval from such databases.

#### **Research Intern**

May '10 - Sept. '10

Mitsubishi Electric Research Laboratories (MERL)  
Cambridge, MA

- Worked on developing algorithms for dynamic updates and rapid routing on large graphs

#### **Advanced Independent Study**

May '08 - July '09

Professor Barry Van Veen's Bio-Signal Processing Lab  
University of Wisconsin - Madison

- Studied the effect of basic signal processing on Granger Causality

#### **Project Assistant**

Oct. '08 to Feb. '09

Waisman Lab for Brain Imaging and Behavior  
University of Wisconsin - Madison

- Developed algorithms to tackle noise due to physiological changes in ECG data

#### JOURNAL PAPERS

1. **Dasarathy, G.**, Nowak, R., Roch, S., *Data Requirement for Phylogenetic Inference from Multiple Loci: A New Distance Method*. IEEE/ACM Transactions on Computational Biology and Bioinformatics, Vol 12, Issue 2, April '15
2. **Dasarathy, G.**, Shah, P., Bhaskar, B., Nowak, R., *Sketching Sparse Matrices, Covariances, and Graphs via Tensor Products*. IEEE Transactions of Information Theory, Vol 61, Issue 3, January '15
3. Eriksson, B., **Dasarathy, G.**, Barford, P., Nowak R., *Efficient Network Tomography for Internet Topology Discovery*. IEEE/ACM Transactions on Networking, Vol 20, Issue 3, June '12

#### CONFERENCE PAPERS

1. **Dasarathy, G.**, Shah, P., Baraniuk, R., *Sketched Covariance Testing: A Compression-Statistics Tradeoff*. IEEE International Symposium of Information Theory (ISIT), Aachen, Germany, Jun. '17
2. **Dasarathy, G.**, Rao, N., Baraniuk, R., *On Computational and Statistical Tradeoffs in Matrix Completion with Graph Information*. Signal Processing with Adaptive Sparse Representations (SPARS), Lisbon, Portugal, Jun. '17 (**Oral Presentation**)
3. Kandaswamy, K., **Dasarathy, G.**, Schneider, J., Póczos, B., *The Multi-Fidelity Multi-Armed Bandit*. Advances in Neural Information Processing Systems, Barcelona, Spain, Dec. '16
4. Kandaswamy, K., **Dasarathy, G.**, Oliva, J., Schneider, J., Póczos, B., *Gaussian Process Bandit Optimization with Multi-fidelity Evaluations*. Advances in Neural Information Processing Systems, Barcelona, Spain, Dec. '16
5. **Dasarathy, G.**, Singh, A., Balcan, M. F., Park, J. H., *Active Learning Algorithms for Graphical Model Selection*. International Conference on Artificial Intelligence and Statistics (AISTATS), Cadiz, Spain, May '16 (**Full Oral Presentation**)

6. **Dasarathy, G.**, Nowak, R., Zhu, X., *S<sup>2</sup>: An Efficient Graph Based Active Learning Algorithm with Application to Nonparametric Classification*. Conference on Learning Theory (COLT), Paris, France, July '15
7. **Dasarathy, G.**, Nowak, R., Roch, S., *New Sample Complexity Bounds for Phylogenetic Inference from Multiple Loci*. IEEE International Symposium on Information Theory (ISIT), Honolulu, HI, July '14
8. **Dasarathy, G.**, Draper, S., *Upper and Lower Bounds on the Reliability of Content Identification*. International Zurich Seminar on Communications (S. D. Invited), Feb. '14
9. **Dasarathy, G.**, Shah, P., Bhaskar, B., Nowak R., *Sketching Sparse Covariance Matrices and Graphs*. NIPS workshop on Randomized Methods in Machine Learning, Lake Tahoe, NV, Dec. '13
10. **Dasarathy, G.**, Shah, P., Bhaskar, B., Nowak R., *Covariance Sketching*. 50th Annual Allerton Conference, Allerton House, Urbana-Champaign, IL (R. N. Invited), Oct. '12
11. **Dasarathy, G.**, Draper, S., *On Reliability of Content Identification from Databases based on Noisy Queries*. IEEE International Symposium on Information Theory (ISIT), St. Petersburg, Russia, Aug. '11
12. **Dasarathy, G.**, Draper, S., *Reliability in Noisy Search*. UCSD Workshop on Information Theory and Applications, (S. D. Invited), Feb. '11
13. Eriksson, B., **Dasarathy, G.**, Barford, P., Nowak R., *Active Clustering: Robust and Efficient Hierarchical Clustering using Adaptively Selected Similarities*. Artificial Intelligence and Statistics (AISTATS), Ft Lauderdale, FL, April '11
14. Eriksson, B., **Dasarathy, G.**, Barford, P., Nowak R., *Toward the Practical Use of Network Tomography for Internet Topology Discovery*. IEEE International Conference on Computer Communications. San Diego, CA, Mar '10

#### MENTORING

##### **Jong Hyuk Park**

Fall '14 - Spring '15

Machine Learning Department  
Carnegie Mellon University

- Honors Undergraduate Research Thesis: Active Sampling for Estimating Gaussian Graphical Models
- Runner-up in Yahoo! Undergraduate Research Award in Meeting of the Minds (CMU undergraduate research symposium)
- Co-supervised by Aarti Singh, Ph.D.

##### **Amrit Prahraj**

Summer '11

Department of Electrical Engineering  
University of Wisconsin - Madison

- Khorana Scholar project: Efficient Structure Learning of Genetic Networks
- Co-supervised by Robert Nowak, Ph.D.

#### TEACHING

##### **Guest Lecturer**

Department of Electrical Engineering  
University of Wisconsin - Madison

- **ECE 901: Statistical Learning Theory**  
Instructor: Robert Nowak, Ph.D.  
Lecture on *Minimax Lower Bounds*

Spring '14

- **ECE 729: Information Theory** Spring '12  
Instructor: Stark Draper, Ph.D.  
Lecture on *Rate-Distortion Theory*

- Project Assistant/Grader** Fall '09  
Department of Electrical Engineering  
University of Wisconsin - Madison
- **ECE 735 - Signal Synthesis and Recovery Techniques**  
Instructor: John Gubner, Ph.D.

- Teaching Assistant** Spring '09  
Department of Electrical Engineering  
University of Wisconsin - Madison
- **ECE 379 - Introduction to Signals and Information Processing**  
Instructor: Robert Nowak, Ph.D.

- Teaching Assistant** Spring '09  
Department of Electrical Engineering  
University of Wisconsin - Madison
- **ECE 331 - Probability and Random Processes**  
Instructor: James Bucklew, Ph.D.

SELECTED  
INVITED TALKS  
AND AWARDS

- **Invited Talk** at the Information Theory and Applications (ITA) Workshop, La Jolla, CA. Feb '17
- **Invited Talk** at the ECE Seminar Series, Rice University, Houston, TX. May '16
- **Invited Talk** at TTI-Chicago, Chicago, IL. Apr. '16
- **NSF Travel Award** for attending SIAM Conference on Applied Algebraic Geometry, Daejon, South Korea. Aug. '15
- **Invited Talk** at the SIAM Conference on Applied Algebraic Geometry, Daejon, South Korea. Aug. '15
- **Invited Talk** at the Computer Science and Engineering Department Seminar, IIT Madras, Chennai, India. Feb. '15
- **Invited Talk** at the Electrical Engineering Department Seminar, IIT Bombay, Mumbai, India. Feb. '15
- **Invited Talk** at the Information Theory and Applications (ITA) Workshop as part of the "Graduation Day" for outstanding students and postdocs, La Jolla, CA. Feb. '15
- **Travel Award** for attending the International Symposium on Information Theory (ISIT) 2014, Honolulu, HI. Jun. '14
- **Merit Scholarship** for Best Academic Performance at VIT University, Vellore, India. Jul. '05
- **Merit Certificate** by Central Board of Secondary Education (CBSE), India being in the top 0.1% of the examinees in Physics in the All India Senior School Certificate Exam (AISSCE). Jul. '04

PROFESSIONAL  
ACTIVITIES AND  
SERVICE

- **Reviewer:** Annals of Statistics, Electronic Journal of Statistics, IEEE Transactions of Information Theory, Applied and Computational Harmonic Analysis, Distributed Computing, IEEE Journal of Selected Topics in Signal Processing, Artificial Intelligence and Statistics (AISTATS), IEEE International Symposium on Information Theory (ISIT), Neural Information Processing Systems (NIPS), International Conference of Machine Learning (ICML), International Joint Conference on Artificial Intelligence (IJCAI), The AAAI Conference on Artificial Intelligence (AAAI), Symposium on the Theory of Computing (STOC).

- **Technical Program Committee Member:** International Joint Conference on Artificial Intelligence (IJCAI) - ML Track, The AAAI Conference on Artificial Intelligence (AAAI), The International Conference on AI & Statistics (AISTATS).
- **Lead Organizer:** Statistical Machine Learning Reading Group (2014-15), Reading Group on Convex Optimization Methods (2012), Reading Group on Modern Methods in Information Processing (2012), Reading Group on Fundamentals of Information Theory (2011), UW Communications and Signal Processing (CommDSP) Seminar Series (2009).
- **Member:** CMU's BiasBusters Workshop (2015), UW Indian Graduate Student Association New Student Outreach (2010 - 2013), UW ECE Graduate Student Association (Inaugural) Board (2010).