
EDUCATION

- École Polytechnique Fédérale de Lausanne, Switzerland (EPFL)** Sept. 2009
Ph.D. in School of Computer and Communication Sciences
Advisors: Prof. Rüdiger Urbanke and Dr. Nicolas Macris
Thesis: *Statistical Physics Methods for Sparse Graph Codes*
- École Polytechnique Fédérale de Lausanne, Switzerland (EPFL)** June 2005
Masters in School of Computer and Communication Sciences
Advisor: Prof. Rüdiger Urbanke
GPA: 5.72/6.0
- Indian Institute of Technology, Bombay, India (IIT)** July 2003
Bachelor of Technology in Electrical Engineering
Advisor: Prof. Abhay Karandikar
GPA: 8.9/10.0

CURRENT POSITION

- Post-doctoral Research Associate** Jan 2011 to Present
Supervisor: Dr. Misha Chertkov
Theoretical Division and Center for Nonlinear Studies (CNLS),
Los Alamos National Laboratory, Bikini Atoll Road, MS 213, Los Alamos, NM, USA.

JOB DESCRIPTION

Perform basic research in information science and computation, coding theory and statistical physics using tools from probability, graph theory, convex optimization, analysis and algebra. Current research focus is on developing and analyzing efficient error-correction codes for various communication scenarios like mobile phones, internet and hard disk drives.

PAST POSITION

- Post-doctoral Research Associate** Dec 2009 to Jan 2011
Supervisor: Dr. Misha Chertkov
New Mexico Consortium, 4200 West Jemez Road, Suite 301, Los Alamos, NM, USA.

RESEARCH INTERESTS

Information and Coding Theory, Graphical Models and their Analysis, Statistical Physics of Computer and Communication Sciences, Convex optimization, Linear Programming Relaxations, Compressive Sensing, Smart Grids, Wireless Communications

GRADUATE COURSEWORK

Probability and Stochastic Models, Information Theory, Modern Coding Theory, Wireless Communications, Advanced Algorithms, Quantum Information Theory, Computer Networks, Probability and Measure Theory, Functional Analysis, Algebra for Communications.

JOURNAL PUBLICATIONS*

[J1] *Threshold Saturation via Spatial Coupling: Why Convolutional LDPC Ensembles Perform so well over the BEC.* Shrinivas Kudekar, Tom Richardson, Rüdiger Urbanke. Accepted to IEEE Transactions on Information Theory, 2010. (23)

[J2] *Decay of Correlations for Sparse Graph Error Correcting Codes.* Shrinivas Kudekar, Nicolas Macris. In SIAM Journal on Discrete Mathematics, 2010.

[J3] *Sharp Bounds for MAP Decoding of General Irregular Low-Density Parity-Check Codes.* Shrinivas Kudekar, Nicolas Macris. In IEEE Transactions on Information Theory, Volume 55, Issue 10, 2009. (11)

[J4] *Computing the Conditional Entropy Using the Interpolation Method.* Shrinivas Kudekar, Satish Babu Korada, Nicolas Macris. Submitted to IEEE Transactions on Information Theory.

[J5] *Achieving Capacity via Belief Propagation.* Shrinivas Kudekar, Tom Richardson, Rüdiger Urbanke. In preparation.

CONFERENCE PUBLICATIONS*

[C1] *Spatial Coupling for Nonnegative Compressive Sensing.* Shrinivas Kudekar, Kenta Kasai. In preparation.

[C2] *Threshold Saturation on Channels with Memory via Spatial Coupling.* Shrinivas Kudekar, Kenta Kasai. Submitted to IEEE International Symposium on Information Theory (ISIT), Saint-Petersburg, Russia, 2011.

[C3] *Spatially Coupled Codes over the Multiple Access Channel.* Shrinivas Kudekar, Kenta Kasai. Submitted to IEEE International Symposium on Information Theory (ISIT), Saint-Petersburg, Russia, 2011.

*The numbers in the bracket, at the end of selected publications, indicates overall number of citations.

- [C4] *Linear Programming based Detectors for Two-Dimensional Intersymbol Interference Channels*. Shrinivas Kudekar, Jason Johnson, Misha Chertkov. Submitted to IEEE International Symposium on Information Theory (ISIT), Saint-Petersburg, Russia, 2011.
- [C5] *Threshold Saturation via Spatial Coupling: Why Convolutional LDPC Ensembles Perform so well over the BEC*. Shrinivas Kudekar, Tom Richardson, Rüdiger Urbanke. In the proceedings of IEEE International Symposium on Information Theory (ISIT), Austin, USA 2010.
- [C6] *Threshold Saturation on BMS Channels via Spatial Coupling*. Shrinivas Kudekar, Cyril Measson, Tom Richardson, Rüdiger Urbanke. In the proceedings of IEEE 6th International Symposium on Turbo Codes and Iterative Information Processing, Brest, France, 2010. (9)
- [C7] *The Effect of Spatial Coupling on Compressive Sensing*. Shrinivas Kudekar and Henry Pfister. In Forty-Eight Annual Allerton Conference on Communication, Control and Computing, Illinois, USA, 2010.
- [C8] *Decay of Correlations in Low-Density Parity-Check Codes: Low Noise Regime*. Shrinivas Kudekar, Nicolas Macris. In the proceedings of IEEE International Symposium on Information Theory (ISIT), Seoul, 2009.
- [C9] *Lower Bounds on the Rate-Distortion Function of Individual Low-Density Generator-Matrix Codes*. Shrinivas Kudekar and Rüdiger Urbanke. In the proceedings of IEEE 5th International Symposium on Turbo Codes and Related Topics, Lausanne, Switzerland, 2008. (9)
- [C10] *Concentration of Magnetization for Linear Block Codes*. Shrinivas Kudekar, Satish Babu Korada, Nicolas Macris. In the proceedings of IEEE International Symposium on Information Theory (ISIT), Toronto, Canada, 2008.
- [C11] *Decay of Correlations: An Application to Low-Density Parity-Check Codes*. Shrinivas Kudekar and Nicolas Macris. In the proceedings of IEEE 5th International Symposium on Turbo Codes and Related Topics, Lausanne, Switzerland, 2008.
- [C12] *Proof of replica formulas in the high noise regime for communication using Low-Density Generator-Matrix Codes*. Shrinivas Kudekar and Nicolas Macris. In the proceedings of Information Theory Workshop (ITW), Porto, Portugal, 2007.
- [C13] *Exact solution for the Conditional Entropy of Poissonian Low-Density Parity-Check Codes over the Binary Erasure Channel*. Shrinivas Kudekar, Satish Babu Korada, Nicolas Macris. In the Proceedings of IEEE International Symposium on Information Theory (ISIT), Nice, France, 2007. (4)
- [C14] *Sharp Bounds for MAP Decoding of General Irregular Low-Density Parity-Check Codes*. Shrinivas Kudekar, Nicolas Macris. In the Proceedings of IEEE International Symposium on Information Theory (ISIT), Seattle, USA, 2006.
- [C15] *Learning TCP-Adaptive Congestion Detection for Heterogeneous Networks*. Shrinivas Kudekar, Ajay Kumar Singh, Abhishek Jain, Abhay Karandikar, and Sachin Katti. In

National Conference on Communications, India, 2004.

TECHNICAL REPORTS

[T1] *Survey Propagation Inspired Algorithms for Satisfiability*. Shrinivas Kudekar, Nicolas Macris and Rüdiger Urbanke. EPFL Technical Report: LTHC-REPORT-2008-002, 2008.

[T2] *Exact Free Energy of Dilute p -spin Model*. Shrinivas Kudekar, Nicolas Macris. EPFL Technical Report: LTHC-REPORT-2008-001, 2008.

INVITED TALKS

- Shrinivas Kudekar, *The Effect of Spatial Coupling on Compressive Sensing*, Forty-Eight Annual Allerton Conference on Communication, Control and Computing, Illinois, USA, 2010.

EXPERIENCE

Indian Institute of Technology, Bombay (B. Tech. Project) 2003
Networking: Design of a novel TCP congestion detection and recovery protocol (LTCP) when operating over heterogeneous networks, where there can be transient losses not due to congestion which make the action of TCP congestion control strategy redundant. *Relevant Publications:* [C15]

Indian Institute of Science, Bangalore (Summer Intern) 2002
Computer Vision: Developed a fully working pick and place robot arm system, capable of detecting (2D), picking and placing objects present in a workspace with a help of a single camera.

Coding Theory Workshop in Mathematisches Forschungsinstitut Oberwolfach (MFO), Germany, December 2nd to December 8th 2007. A week long interaction with leading coding theorists.

Information Theory and Applications Workshop in San Diego, USA, May 5 to May 9, 2009. A week long workshop on information and coding theory and its applications, with tutorials from eminent computer and communication scientists.

TEACHING EXPERIENCE

I was a teaching assistant for the following bachelor and masters courses. Principles of Digital Communications, Advanced Digital Communications, Information Theory and Coding, Introduction to Information Systems (basics of signal processing, source compression, cryptography, channel coding).

My duties involved helping prepare homeworks, assist and guide students and grading homeworks and exams.

HONORS

- Recipient of EPFL Fellowship from 2003 to 2009, Lausanne, Switzerland.
- Ranked 219th out of approximately 100,000 in the competitive Joint Entrance Examination (JEE) to the Indian Institutes of Technology (1999).
- Ranked 8th in the Regional Mathematical Olympiad, India (1998).
- Awarded the National Talent Scholarship. 750 students are awarded scholarships every year all over India (1996).

PROFESSIONAL ACTIVITIES

Member of IEEE. Reviewer for IEEE Transactions on Information Theory, IEEE International Symposium on Information Theory (ISIT), IEEE Journal on Selected Areas in Communications (JSAC), IEEE Communication letters.