Ankit Singh Rawat

Curriculum Vitae

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Education

2010–2015	**M.S./Ph.D. in Electrical & Computer Engineering**, *The University of Texas at Austin*, Austin, TX.
	Dissertation: New Coding Techniques for Distributed Storage Systems.
	Research Advisor: Prof. Sriram Vishwanath.
	Thesis Committee: Prof. Sriram Vishwanath, Prof. François Baccelli, Prof. Alexandros G. Dimakis, Prof. Arya Mazumdar, Prof. David Zuckerman.
2006–2010	**B.Tech. in Electrical Engineering**, *Indian Institute of Technology (IIT) Kanpur*, India.
	Second highest CGPA amongst graduating students in Electrical Engineering at IIT Kanpur.

Research Interests

Coding for Distributed Storage and Computation, Statistical Machine Learning, Information Theory, Security and Privacy, Neuro-inspired Computing.

Awards and Achievements

2010–2011	Recipient of **Microelectronics and Computer Development (MCD) Fellowship** at UT Austin.
2008–2009	Recipient of **Sri Singhasan Singh Scholarship** at IIT Kanpur.
2006–2008	Awarded **Academic Excellence Award** for the academic years 2006-2007 and 2007-2008 at IIT Kanpur.
2006–2010	Recipient of **Nita Goyal and Ashish Gupta Scholarship** at IIT Kanpur.
2006	Awarded **CBSE Merit Scholarship** for securing all India rank (AIR) **159** in All India Engineering Entrance Examination (AIEEE) 2006.

Research and Industrial Experience

September 2016 – present	**Postdoctoral Associate/Fellow**, *EECS, Massachusetts Institute of Technology*, Cambridge, MA. **Host:** Prof. Gregory W. Wornell
September 2017 – present	**Postdoctoral Research Associate**, *College of Inf. and CS, University of Massachusetts*, Amherst, MA. **Host:** Prof. Arya Mazumdar
September 2015 – August 2016	**Postdoctoral Fellow**, *CS Department, Carnegie Mellon University*, Pittsburgh, PA. **Host:** Prof. Venkatesan Guruswami
August 2010 – August 2015	**Graduate Research Assistant & MCD Fellow**, *The University of Texas at Austin*, Austin, TX. **Advisor:** Prof. Sriram Vishwanath
June 2013 – August 2013	**Summer Intern**, *Alcatel Lucent Bell Labs*, Murray Hill, NJ. **Mentor:** Dr. Emina Soljanin
June 2012 – August 2012	**Research Engineer (Intern)**, *DOCOMO Innovations, Inc.*, Palo Alto, CA. **Mentors:** Dr. Haralabos C. Papadopoulos & Dr. Ozgun Y. Bursalioglu
May 2009 – July 2009	**Summer Intern**, *CASE, Syracuse University*, Syracuse, NY. **Mentor:** Prof. Pramod K. Varshney

Priprints/ in preparation

[1] Hardik Jain, Ethan R Elenberg, **Ankit Singh Rawat**, and Sriram Vishwanath. Coded access architectures for dense memory systems. *under submission*, *Available* online.

[2] **Ankit Singh Rawat**, Itzhak Tamo, Venkatesan Guruswami, and Klim Efremenko. MDS code constructions with small sub-packetization and near-optimal repair bandwidth. *under submission*, *Available at*

arXiv:1709.08216.

[3] **Ankit Singh Rawat**, Onur Ozan Koyluoglu, and Sriram Vishwanath. Centralized repair of multiple node failures with applications to communication efficient secret sharing. *under submission*, *Available at* arXiv:1603.04822.

[4] Christos Thrampoulidis and **Ankit Singh Rawat**. The phaselift for non-quadratic Gaussian measurements. *in preparation*.

[5] Raj Kumar Maity, **Ankit Singh Rawat**, and Arya Mazumdar. Robust gradient descent via moment encoding with LDPC codes. *in preparation*.

Journal Publications

[1] **Ankit Singh Rawat**, Dimitris S. Papailiopoulos, Alexandros G. Dimakis, and Sriram Vishwanath. Locality and availability in distributed storage. *IEEE Transactions on Information Theory*, 62(8):4481–4493, August 2016. *Available at* IEEE Xplore.

[2] **Ankit Singh Rawat**, Zhao Song, Alexandros G. Dimakis, and Anna Gal. Batch codes through dense graphs without short cycles. *IEEE Transactions on Information Theory*, 62(4):1592–1604, April 2016. *Available at* IEEE Xplore.

[3] **Ankit Singh Rawat**, Arya Mazumdar, and Sriram Vishwanath. Cooperative local repair in distributed storage. *EURASIP Journal on Advances in Signal Processing*, 2015(1), December 2015. *Available at* Springer Link.

[4] Natalia Silberstein, **Ankit Singh Rawat**, and Sriram Vishwanath. Error-correcting regenerating and locally repairable codes via rank-metric codes. *IEEE Transactions on Information Theory*, 61(11):5765–5778, November 2015. *Available at* IEEE Xplore.

[5] Onur Ozan Koyluoglu, **Ankit Singh Rawat**, and Sriram Vishwanath. Secure cooperative regenerating codes for distributed storage systems. *IEEE Transactions on Information Theory*, 60(9):5228–5244, September 2014. *Available at* IEEE Xplore.

[6] **Ankit Singh Rawat**, Onur Ozan Koyluoglu, Natalia Silberstein, and Sriram Vishwanath. Optimal locally repairable and secure codes for distributed storage systems. *IEEE Transactions on Information Theory*, 60(1):212–236, January 2014. *Available at* IEEE Xplore.

[7] **Ankit Singh Rawat**, Priyank Anand, Hao Chen, and Pramod K. Varshney. Collaborative spectrum sensing in the presence of byzantine attacks in cognitive radio networks. *IEEE Transactions on Signal Processing*, 59(2):774–786, February 2011. *Available at* IEEE Xplore.

Refereed Conference Publications

[1] **Ankit Singh Rawat**, Itzhak Tamo, Venkatesan Guruswami, and Klim Efremenko. epsilon-MSR codes with small sub-packetization. In *Proceedings of IEEE International Symposium on Information Theory (ISIT)*, pages 2043–2047, June 2017. *Available at* IEEE Xplore.

[2] **Ankit Singh Rawat**. Secrecy capacity of minimum storage regenerating codes. In *Proceedings of IEEE International Symposium on Information Theory (ISIT)*, pages 1406–1410, June 2017. *Available at* IEEE Xplore.

[3] Arya Mazumdar and **Ankit Singh Rawat**. Associative memory using dictionary learning and expander decoding. In *Proceedings of the Thirty-First AAAI Conference on Artificial Intelligence (AAAI)*, pages 267–273, February 2017. *Available at* AAAI Proceedings.

[4] Venkatesan Guruswami and **Ankit Singh Rawat**. MDS code constructions with small sub-packetization and near-optimal repair bandwidth. In *Proceedings of the Twenty-Eighth Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 2109–2122, January 2017. *Available at* SIAM Proceedings.

[5] Arya Mazumdar, Yury Polyanskiy, **Ankit Singh Rawat**, and Hajir Roozbehani. Distance preserving maps and combinatorial joint source-channel coding for large alphabets. In *Proceedings of IEEE International Symposium on Information Theory (ISIT)*, pages 3067–3071, July 2016. *Available at* IEEE Xplore.

[6] **Ankit Singh Rawat**, Onur Ozan Koyluoglu, and Sriram Vishwanath. Centralized repair of multiple node failures. In *Proceedings of IEEE International Symposium on Information Theory (ISIT)*, pages 1003–1007, July 2016. *Available at* IEEE Xplore.

[7] Arya Mazumdar and **Ankit Singh Rawat**. Associative memory via a sparse recovery model. In *Proceedings of the 28th International Conference on Neural Information Processing Systems (NIPS)*, pages 2701–2709, 2015. *Available at* NIPS Proceedings.

[8] **Ankit Singh Rawat**, Zhao Song, Alexandros G. Dimakis, and Anna Gal. Batch codes through dense graphs without short cycles. In *Proceedings of IEEE International Symposium on Information Theory (ISIT)*, pages 1477–1481, June 2015. *Available at* IEEE Xplore.

[9] Arya Mazumdar and **Ankit Singh Rawat**. On adversarial joint source channel coding. In *Proceedings of IEEE International Symposium on Information Theory (ISIT)*, pages 271–275, June 2015. *Available at* IEEE Xplore.

[10] Casen Hunger, Mikhail Kazdagli, **Ankit Singh Rawat**, Alexandros G. Dimakis, Sriram Vishwanath, and Mohit Tiwari. Understanding contention-based channels and using them for defense. In *Proceedings of IEEE 21st International Symposium on High Performance Computer Architecture (HPCA)*, pages 639–650, February 2015. *Available at* IEEE Xplore.

[11] **Ankit Singh Rawat** and Emina Soljanin. Dynamic control of video quality for avs. In *Proceedings of IEEE International Symposium on Information Theory (ISIT)*, pages 821–825, June 2014. *Available at* IEEE Xplore.

[12] **Ankit Singh Rawat**, Dimitris S. Papailiopoulos, Alexandros G. Dimakis, and Sriram Vishwanath. Locality and availability in distributed storage. In *Proceedings of IEEE International Symposium on Information Theory (ISIT)*, pages 681–685, June 2014. *Available at* IEEE Xplore.

[13] Avhishek Chatterjee, **Ankit Singh Rawat**, Sriram Vishwanath, and Sujay Sanghavi. Learning the causal graph of markov time series. In *Proceedings of 51st Annual Allerton Conference on Communication, Control, and Computing (Allerton)*, pages 107–114, October 2013. *Available at* IEEE Xplore.

[14] **Ankit Singh Rawat**, Onur Ozan Koyluoglu, Natalia Silberstein, and Sriram Vishwanath. Secure locally repairable codes for distributed storage systems. In *Proceedings of IEEE International Symposium on Information Theory (ISIT)*, pages 2224–2228, July 2013. *Available at* IEEE Xplore.

[15] Onur Ozan Koyluoglu, **Ankit Singh Rawat**, and Sriram Vishwanath. The secrecy capacity of minimum bandwidth cooperative regenerating codes. In *Proceedings of IEEE International Symposium on Information Theory (ISIT)*, pages 1421–1425, July 2013. *Available at* IEEE Xplore.

[16] Natalia Silberstein, **Ankit Singh Rawat**, Onur Ozan Koyluoglu, and Sriram Vishwanath. Optimal locally repairable codes via rank-metric codes. In *Proceedings of IEEE International Symposium on Information Theory (ISIT)*, pages 1819–1823, July 2013. *Available at* IEEE Xplore.

[17] Govinda Kamath, Natalia Silberstein, N. Prakash, **Ankit Singh Rawat**, V. Lalitha, Onur Ozan Koyluoglu, P. Vijay Kumar, and Sriram Vishwanath. Explicit MBR all-symbol locality codes. In *Proceedings of IEEE International Symposium on Information Theory (ISIT)*, pages 504–508, July 2013. *Available at* IEEE Xplore.

[18] **Ankit Singh Rawat**, Ozgun Y. Bursalioglu, and Haralabos C. Papadopoulos. Scheduling algorithms for mu-mimo with partial current csit and full delayed csit. In *Proceedings of IEEE 77th Vehicular Technology Conference (VTC Spring)*, pages 1–7, June 2013. *Available at* IEEE Xplore.

[19] Natalia Silberstein, **Ankit Singh Rawat**, and Sriram Vishwanath. Error resilience in distributed storage via rank-metric codes. In *Proceedings of 50th Annual Allerton Conference on Communication, Control, and Computing (Allerton)*, pages 1150–1157, October 2012. *Available at* IEEE Xplore.

[20] **Ankit Singh Rawat** and Sriram Vishwanath. On locality in distributed storage systems. In *Proceedings of IEEE Information Theory Workshop (ITW)*, pages 497–501, September 2012. *Available at* IEEE Xplore.

[21] **Ankit Singh Rawat**, Sriram Vishwanath, Abhishek Bhowmick, and Emina Soljanin. Update efficient codes for distributed storage. In *Proceedings of IEEE International Symposium on Information Theory (ISIT)*, pages 1457–1461, July 2011. *Available at* IEEE Xplore.

[22] **Ankit Singh Rawat**, Priyank Anand, Hao Chen, and Pramod K. Varshney. Countering byzantine attacks in cognitive radio networks. In *Proceedings of IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pages 3098–3101, March 2010. *Available at* IEEE Xplore.

[23] Priyank Anand, **Ankit Singh Rawat**, Hao Chen, and Pramod K. Varshney. Collaborative spectrum sensing in the presence of byzantine attacks in cognitive radio networks. In *Proceedings of the Second International Conference on COMmunication Systems and NETworks (COMSNETS)*, pages 1–9, January 2010. *Available at* IEEE Xplore.

Invited Conference Publications

[1] Islam Samy, Onur Ozan Koyluoglu, and **Ankit Singh Rawat**. Efficient data access in hybrid cloud storage. In *Proceedings of the 55th Annual Allerton Conference on Communication, Control, and Computing (Allerton)*, October 2017. *Available* online.

[2] **Ankit Singh Rawat**, Onur Ozan Koyluoglu, and Sriram Vishwanath. Progress on high-rate MSR codes: Enabling arbitrary number of helper nodes. In *Proceedings of Information Theory and Applications Workshop (ITA)*, pages 1–6, January 2016. *Available at* IEEE Xplore.

[3] **Ankit Singh Rawat**, Natalia Silberstein, Onur Ozan Koyluoglu, and Sriram Vishwanath. Secure distributed storage systems: Local repair with minimum bandwidth regeneration. In *Proceedings of the 6th International Symposium on Communications, Control and Signal Processing (ISCCSP)*, pages 5–8, May 2014. *Available at* IEEE Xplore.

[4] **Ankit Singh Rawat**, Dimitris S. Papailiopoulos, Alexandros G. Dimakis, and Sriram Vishwanath. On codes with availability for distributed storage. In *Proceedings of the 6th International Symposium on Communications, Control and Signal Processing (ISCCSP)*, pages 15–18, May 2014. *Available at* IEEE Xplore.

[5] **Ankit Singh Rawat**, Arya Mazumdar, and Sriram Vishwanath. On cooperative local repair in distributed storage. In *Proceedings of the 48th Annual Conference on Information Sciences and Systems (CISS)*, pages 1–5, March 2014. *Available at* IEEE Xplore.

[6] **Ankit Singh Rawat**, Dimitris S. Papailiopoulos, and Alexandros G. Dimakis. Availability and locality in distributed storage. In *Proceedings of IEEE Global Conference on Signal and Information Processing (GlobalSIP)*, pages 923–928, December 2013. *Available at* IEEE Xplore.

[7] **Ankit Singh Rawat**, Natalia Silberstein, Onur Ozan Koyluoglu, and Sriram Vishwanath. Optimal locally repairable codes with local minimum storage regeneration via rank-metric codes. In *2013 Information Theory and Applications Workshop (ITA)*, pages 1–8, February 2013. *Available at* IEEE Xplore.

Invited Talks

October 2017	"Faster Data-Processing in Cloud-based Systems," *Signal and Information Processing Seminar Series, Rutgers University*, Piscataway, NJ.
October 2017	"Efficient Data Access in Hybrid Cloud Storage," *55th Annual Allerton Conf. on Communication, Control, and Computing (Allerton)*, Monticello, IL.
June 2017	"MDS Codes with Small Sub-packetization and Near-optimal Repair Bandwidth," *6th Biennial Canadian Discrete and Algorithmic Mathematics Conf. (CanaDAM)*, Toronto, Canada.
March 2017	"New Paradigms for Cloud Storage," *Department of Electrical Engineering, University of Notre Dame*, South Bend, IN.
March 2017	"New Paradigms for Cloud-based Systems," *Department of Electrical Engineering, Columbia University*, New York City, NY.
November 2016	"New Coding Techniques for Distributed Storage Systems," *Department of Electrical and Computer Engineering, Texas A&M University*, College Station, TX.
September 2016	"Neural Auto-associative Memory via Sparse Recovery," *LIDS & Stats Tea Talk, Massachusetts Institute of Technology*, Boston, MA.
April 2016	"New Coding Techniques for Distributed Storage Systems," *Signals, Information, and Algorithms Lab., EECS, Massachusetts Institute of Technology*, Boston, MA.
April 2016	"New Coding Techniques for Distributed Storage Systems," *Theory Seminar, College of Inf. and Computer Science, University of Massachusetts*, Amherst, MA.
February 2016	"New Coding Techniques for Distributed Storage Systems," *Graduation Day Talk, Information Theory and Applications Workshop (ITA)*, San Diego, CA.
October 2015	"Codes to Enable Parallel Reads in Distributed Storage Systems," *Theory Lunch Seminar, Computer Science Department, Carnegie Mellon University*, Pittsburgh, PA.

October 2015	"Dynamic Control of Video Quality in Adaptive Video Streaming," *BIRS Workshop on Mathematical Coding Theory for Streaming*, Banff, Canada.
December 2013	"Update and Repair Efficient Codes for Distributed Storage," *DIMACS Workshop on Algorithms for Green Data Storage*, Piscataway, NJ.
September 2013	"Optimal Locally Repairable Codes for Distributed Storage Systems," *Department of Electrical and Computer Engineering, University of Minnesota Twin Cities*, Minneapolis, MN.
August 2013	"Update and Repair Efficient Codes for Distributed Storage," *Mathematics Colloquium & Informal Seminar*, Bell Labs, NJ.

Teaching & Mentoring Experience

Spring 2015	**Teaching Assistant** for Information Theory (EE381K-7), UT Austin. **Instructor:** Prof. Alexandros G. Dimakis. ○ Delivered lectures on selected topics. Designed examination problems, graded homework assignments and examination papers, and conducted weekly office hours.
Spring 2015	**Teaching Assistant** for Modeling of Large Wireless Networks (EE381K-5), UT Austin. **Instructor:** Prof. François Baccelli. ○ Delivered lectures on selected topics. Graded homework assignments and examination papers, conducted weekly office hours, and advised students on their course projects.
Spring 2015 – Fall 2017	**Hardik Jain** & **Ethan R. Elenberg**, UT Austin. ○ Mentored Hardik and Ethan as a part of the project on designing coded memory system to avoid bank-conflicts in a multi-core setup. The project was funded by Futurewei Technologies, Inc.
Fall 2017	**Gary Lee**, MIT. ○ Mentoring Gary for an ongoing project on performing reliable sensing in the presence of faulty sensors. This project employs the coding theoretic ideas on robust polynomial interpolation in the domain of sensor array processing.
Fall 2017	**Raj Kumar Maity**, UMass Amherst. ○ Mentoring Raj for his work on performing coded computation to mitigate the effect of straggling servers in a distributed computing setup.

Professional Service

Technical Program Committee (TPC) Member:
○ IEEE International Symposium on Information Theory (ISIT), 2018.
○ International Workshop on Distributed Storage Systems and Coding for Big Data (BigData) 2017.
○ International Workshop on Distributed Storage Systems and Coding for Big Data (BigData) 2015.

Session Chair:
○ Information Theory and Applications Workshop (ITA) 2016.

Reviewer:
○ IEEE Transactions on Information Theory.
○ IEEE/ACM Transactions on Networking.
○ ACM Transactions on Storage.
○ IEEE Transactions on Signal Processing.
○ IEEE Transactions on Vehicular Technology.
○ IEEE Transactions on Communications.
○ IEEE Journal of Selected Topics in Signal Processing.
○ IEEE Transactions on Computers.
○ IEEE Communications Letters.
○ EURASIP Journal on Wireless Communications and Networking.
○ IEEE Transactions on Network Science and Engineering.
○ IEEE International Symposium on Information Theory (ISIT), 2011– 2017.
○ Conference on Neural Information Processing Systems (NIPS), 2016, 2017.
○ IEEE Symposium on Foundations of Computer Science (FOCS), 2017.

- IEEE International Conference on Computer Communications (INFOCOM), 2011, 2017, 2018.
- IEEE Information Theory Workshop (ITW), 2014, 2015, 2017.
- IEEE Vehicular Technology Conference (VTC), 2014.
- IEEE International Symposium on Personal, Indoor and Mobile Radio Comm. (PIMRC), 2013.
- IEEE Wireless Communications and Networking Conference (WCNC), 2013.
- IEEE International Conference on Communications (ICC), 2012.
- IEEE International Symposium on Information Theory and Its Applications (ISITA), 2012.
- IEEE International Conference on Cognitive Radio Oriented Wireless Networks (CROWNCOM), 2011.
- IEEE Global Communications Conference (GLOBECOM), 2011.
- IEEE Symposium on Computers and Communications started (ISCC), 2011.
- International Conference on Signal Processing and Communications (SPCOM), 2010.

References

Gregory W. Wornell
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