Viveck R Cadambe

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Current Employment

Postdoctoral Fellow at Research Lab of Electronics (RLE), Department of Electrical Engineering and Computer Science, Massachusetts Institute of Technology (MIT), Cambridge, MA USA Joint position as a postdoctoral researcher at the Department of Electrical and Computer Engineering at Boston University.

Education

University of California, Irvine **September 2006 - September 2011**

- Ph.D in Electrical Engineering and Computer Science

Indian Institute of Technology, Madras, India **August 2001 - July 2006**

- M.Tech in Electrical Engineering
- B.Tech in Electrical Engineering

Research Interests

Wireless communications, information theory, communication networks, interference alignment, network coding, co-operative communications, data centers, distributed storage systems, signal processing.

Industry Experience

Microsoft Research, Redmond, WA, USA **June 2010 - Sep 2010**
Summer Intern.

Mindtree Consulting Ltd, Bangalore, India **May 2004 - July 2004**
Summer Intern.

Teaching Experience

University of California, Irvine **Jan 2011 - Mar 2011**
Teaching assistant for undergraduate course on Engineering Probability.

University of California, Irvine **Jan 2010 - Mar 2010**
Teaching assistant for undergraduate course on Signals and Systems.

IIT Madras **January 2006 - May 2006**
Teaching assistant for undergraduate course in Digital Signal Processing.

IIT Madras **August 2005 - November 2005**
Teaching assistant for undergraduate course on Principles Of Communications.

Awards and Honors

- 2011 CPCC Best Dissertation Award at the Department of Electrical Engineering and Computer Science, UCI
- **2009 Information Theory Society Best Paper Award** (Journal Paper 1.).
- 2008-09 UCI Electrical Engineering and Computer Science Best Paper Award (Journal Paper 1.).
- Awarded the Center for Pervasive Communication and Computing (CPCC) fellowship at UCI for the year 2007-08.

- Paper 15. among two papers nominated for the best paper award for the Communication Theory Symposium in IEEE ICC 2008.
- National Talent Search examination (NTSE) scholar (given to 750 students in India every year).
- Qualified for the Indian National Physics and Mathematics Olympiads in 2001.

Professional Activities

Student Member IEEE, Reviewer for IEEE Transactions on Communications, IEEE Transactions on Wireless Communications, IEEE Transactions on Information Theory, IEEE Journal on Selected Areas in Communications, IEEE Communication Letters, IEEE Globecom 2008, 2009, 2010 IEEE International Communications Conference (ICC) 2009, 2010, IEEE International Symposium on Information Theory (ISIT) 2009, 2010.

Coursework

Information Theory, Wireless Communications, Performance Analysis of Communication Networks, Machine Learning, Digital Communications, Random Processes, Digital Signal Processing, Digital Signal Compression, Fundamentals of Algorithms, Image Signal Processing, Advanced Linear Algebra, Group Theory, Applied Cryptography

Journal Publications

1. *Viveck R. Cadambe*, Syed A. Jafar, "Interference Alignment and the Degrees of Freedom of the K user Interference Channel", IEEE Transactions on Information Theory, Aug. 2008, Vol. 54, No. 8,pages 3425 - 3441.
   (2009 Information Theory Society Best Paper Award)
2. *Viveck R. Cadambe*, Syed A. Jafar, Shlomo Shamai, "Interference Alignment on the Deterministic Channel and Application to Fully Connected Gaussian Interference Networks", IEEE Transactions on Information Theory, Jan. 2009, Vol. 55, No. 1, pages 269 - 274.
3. *Viveck R. Cadambe*, Syed A. Jafar, "Degrees of Freedom of Wireless Networks with Relays, Feedback, Co-operation and Full Duplex Operation", IEEE Transactions on Information Theory, May 2009, Vol. 55, No. 5, pages 2334-2344.
4. *Viveck R. Cadambe*, Syed A. Jafar, "Parallel Gaussian Interference Networks are Not Always Separable", IEEE Transactions on Information Theory, Sep. 2009, Vol. 55, No. 9, pages 3983-3990.
5. *Viveck R. Cadambe*, Syed A. Jafar, "Interference Alignment and the Degrees of Freedom of Wireless X networks", IEEE Transactions on Information Theory, Sep. 2009, Vol. 55, no. 9, pages 3893-3908.
6. *Viveck R. Cadambe*, Syed A. Jafar, Chenwei Wang, "Interference Alignment with Asymmetric Complex Signaling - Settling the Host-Madsen-Nosratinia Conjecture", IEEE Transactions on Information Theory, Sep. 2010, Vol. 56, no. 9, pages 4552-4565.
7. Krishna S. Gomadam, *Viveck R. Cadambe*, Syed A Jafar, "A Distributed Numerical Approach to Interference Alignment and Applications to Wireless Interference Networks," IEEE Transactions on Information Theory, June 2011, Vol.57, No.6, pages 3309-3322.

Unrefereed Publications

8. *Viveck R. Cadambe*, Syed A. Jafar, " Reflections on Interference Alignment and the Degrees of Freedom of the K User Interference Channel" , IEEE Information Theory Society Newsletter, Vol. 59, No. 4, December 2009, Pages 5-9.

Preprints

9. Viveck R. Cadambe, Jianqiang Luo, Cheng Huang, Jin Li, "A Greedy Approach to Efficient Recovery of Single Node Failure in Coding Based Storage Systems", Submitted to IEEE INFOCOM 2012.
10. Dimitris S. Papailiopoulos, Alexandros G. Dimakis, *Viveck R. Cadambe*, "Repair Optimal Erasure Codes through Hadamard Designs", 2011, draft available on *http://arxiv.org*
11. *Viveck R. Cadambe*, Cheng Huang, Syed A. Jafar, Jin Li "Optimal Repair of MDS Codes in Distributed Storage via Subspace Interference Alignment", 2011, draft available on *http://arxiv.org*
12. *Viveck R. Cadambe*, Syed A. Jafar, Hamed Maleki "Distributed Data Storage with Minimum Storage Regenerating Codes - Exact and Functional Repair are Asymptotically Equally Efficient", draft available on *http://arxiv.org*.
13. *Viveck R. Cadambe*, Syed A. Jafar, "Interference Alignment and a Noisy Interference Regime for a Many-to-one Interference Networks", Submitted to IEEE Transactions on Information Theory, draft available on *http://arxiv.org*.
14. Chiachi Huang, *Viveck R. Cadambe*, Syed A Jafar, "On the Capacity and Generalized Degrees of Freedom of the X Channel", Submitted to IEEE Transactions on Information Theory, draft available on *http://arxiv.org*

Conference Publications

15. *Viveck R. Cadambe*, Syed A. Jafar, "Can 100 Speakers talk for 30 minutes in each room within one hour and with zero interference to each others audience", Proceedings of the 45th Allerton Conference, Sep. 2007.
16. *Viveck R. Cadambe*, Syed A. Jafar, "Degrees of Freedom of Wireless Networks - What a difference delay makes ?", Proceedings of Asilomar Conference on Signals and Systems, Oct. 2007. (**Invited Paper**).
17. *Viveck R. Cadambe*, Syed A. Jafar, "Interference Alignment on the Deterministic Channel and Application to Fully Connected AWGN Interference Networks", Information Theory Workshop, Porto, May 2008.
18. *Viveck R. Cadambe*, Syed A. Jafar, "Interference Alignment and Spatial Degrees of Freedom of the K user Interference channel", Proceedings of International Conference on Communications (ICC), May 2008.
19. *Viveck R. Cadambe*, Syed A. Jafar, "Duality and Stability Regions of Multi-Rate multiple access and Broadcast Networks", Proceedings of International Symposium of Information Theory, Jul. 2008.
20. *Viveck R. Cadambe*, Syed A. Jafar, "Degrees of Freedom of Wireless X networks", Proceedings of International Symposium of Information Theory, Jul. 2008.
21. *Viveck R. Cadambe*, Syed A. Jafar, "Can relays, feedback, co-operation and full-duplex operation increase the degrees of freedom of wireless networks", Proceedings of International Symposium of Information Theory, Jul. 2008.
22. *Viveck R. Cadambe*, Syed A. Jafar, "Multiple Access Outerbounds and the Inseparability of Parallel Gaussian Interference Channels", Proceedings of IEEE Globecom, Dec. 2008.
23. Krishna S. Gomadam, *Viveck R. Cadambe*, Syed A. Jafar, "Approaching the Capacity of Wireless Networks through Distributed Interference Alignment", Proceedings of IEEE Globecom, Dec. 2008.
24. Chiachi Huang, *Viveck R. Cadambe*, Syed A. Jafar, "Generalized Degrees of Freedom of the (Noisy) X Channel", Proceedings of 42nd Asilomar Conference on Signals, Systems and Computers, Oct. 2008 **(Invited Paper)**.

25. Chiachi Huang, *Viveck R. Cadambe*, Syed A. Jafar, "Interference Alignment and the Generalized Degrees of Freedom of the X Channel", Proceedings of IEEE International Symposium on Information Theory, Jul. 2009.
26. *Viveck R. Cadambe*, Syed A. Jafar, Sriram Vishwanath, "Capacity Region of a Class of Deterministic Z Channels", Proceedings of IEEE International Symposium on Information Theory, Jul. 2009.
27. *Viveck R. Cadambe*, Syed A. Jafar, Chenwei Wang "Interference Alignment with Asymmetric Complex Signaling", Proceedings of Allerton Conference on Communications, Control and Computing, Oct. 2009 **(Invited Paper)**.
28. *Viveck R. Cadambe*, Syed A. Jafar, "Interference Alignment via Random Coding and Capacity of a Class of Deterministic Interference Channels", Proceedings of Allerton Conference on Communications, Control and Computing, Oct. 2009.
29. *Viveck R. Cadambe*, Syed A. Jafar, "Unique Separability and Sum-Capacity of the MAC-Z-BC network", Proceedings of IEEE International Symposium On Information Theory, June. 2010.
30. *Viveck R. Cadambe*, Syed A. Jafar, Hamed Maleki "Minimum Bandwidth for Regeneration of Failed Nodes in Distributed Storage", Proceedings of IEEE Wireless Network Coding Workshop, June. 2010.
31. *Viveck R. Cadambe*, Syed A. Jafar, Hamed Maleki "Asymptotic Interference Alignment for Distributed Storage Applications", Proceedings of IEEE Asilomar Conference on Signals, Systems and Computers, Nov, 2010. **(Invited Paper)**
32. *Viveck R. Cadambe*, Cheng Huang, Jin Li "Permutation Codes: Optimal Codes for Repair of a Single Failed Node in MDS Code based Distributed Storage Systems.", Proceedings of IEEE International Symposium on Information Theory, July 2011.
33. *Viveck R. Cadambe*, Cheng Huang, Jin Li, Sanjeev Mehrotra, "Polynomial Length MDS Codes with Optimal Repair in Distributed Storage Systems", to be presented in the 45th Asilomar Conference on Signals, Systems, and Computing.

Invited Talks

1. "Interference Alignment: Principles and Applications", Indian Institute of Science, Bangalore, India, July 2009
2. "Interference Alignment: Principles and Applications", Indian Institute Technology, Madras, , India, July 2009
3. "Interference Alignment: Principles and Applications", University of Illinois, Chicago, IL, USA, August 2009
4. "Interference Alignment: Principles and Applications", University of Southern California, CA, USA, June 2010
5. "Network Interference Management via Interference Alignment", University of Southern California, USA, Mar 2011
6. "Network Interference Management via Interference Alignment", University of California San Diego, USA, Mar 2011
7. "Network Interference Management via Interference Alignment", California Institute of Technology, USA, May 2011
8. "Network Interference Management via Interference Alignment", Massachusets Institute of Technology, USA, May 2011
9. "Network Interference Management via Interference Alignment", Boston University, USA, May 2011

10. "Interference Management for Wireless Communications and Distributed Storage", Indian Institute of Science, Bangalore, July 2011
11. "Common Invariant Subspaces and Tensor Products of Interference Alignment in Wireless Communications and Distributed Storage," BIRS Workshop on Algebraic Structure in Network Information Theory, Banff, Canada, August 2011.

Patents

Patent application "STORAGE CODES FOR DATA RECOVERY" filed with joint inventors Dr. Cheng Huang and Dr. Jin Li at Microsoft Research, Redmond (Pending).