

Mahdi Jafari Siavoshani

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Research Interests

I am interested in various fundamental problems that arise in communication systems and in particular communication networks. My research interests mainly focus on understanding the fundamental limits of such networks (systems) as well as the design of new techniques and algorithms that are suitable for practical implementation. I am also interested in the connection of communication and computer sciences. More specifically my research interests include:

Theory and algorithms for network information flow, network coding, network algorithms, connection of communication and computer sciences, information and coding theory, wireless communication networks, sensor networks, and signal processing.

Academic Appointments

- 2014–present **Assistant Professor**, *Department of Computer Engineering, Sharif University of Technology, Tehran, Iran.*
- 2012–2013 **Postdoctoral Fellow**, *Institute of Network Coding, The Chinese University of Hong Kong, Hong Kong.*

Education

- 2007–2012 **Ph.D. in Computer and Communication Sciences**, *Ecole Polytechnique Fédérale de Lausanne, Switzerland.*
Dissertation Title: Network Coding: Theoretical Designs Directed to Applications.
Supervisor: Prof. Christina Fragouli.
- 2005–2007 **M.Sc. in Computer and Communication Sciences**, *Ecole Polytechnique Fédérale de Lausanne, Switzerland.*
Dissertation Title: On Randomized Network Coding Properties and their Applications.
Supervisor: Prof. Christina Fragouli.
- 2000–2004 **B.Sc. in Communication Systems**, *Sharif University of Technology, Tehran, Iran.*
Dissertation Title: Application of Radio over Fiber in Cellular Communication.
Supervisor: Prof. Jawad A. Salehi.
- 2003–2005 **B.Sc. in Physics**, *Sharif University of Technology, Tehran, Iran.*

Honors, Awards and Distinctions

- 2007–2012 EPFL Scholarship for Ph.D. program in Communication and Computer Sciences at Ecole Polytechnique Fédérale de Lausanne, Switzerland.
- 2005–2007 Excellency Scholarship for M.Sc. program in Communication Systems at Ecole Polytechnique Fédérale de Lausanne, Switzerland.
- Aug, 2002 Ranked first in Robocup Rescue League, Fukuoka, Japan.
- Sep, 1999 Gold Medal in the 12th National Physics Olympiad, Tehran, Iran.

Publications

Working Papers

- M. Jafari Siavoshani, S. Yang, and R. W. Yeung, “**Non-coherent network coding: An arbitrarily varying channel approach**”.
- M. Jafari Siavoshani, S. Mishra, C. Fragouli, and S. N. Diggavi, “**Group secret key agreement over state-dependent wireless broadcast channels**”.
- I. Safaka, M. Jafari Siavoshani, U. Pulleti, E. Atsan, C. Fragouli, K. Argyraki, S. Diggavi, “**Exchanging secrets without using cryptography**,” *CoRR*, <http://arxiv.org/abs/1105.4991>.

Journal Papers

- M. Jafari Siavoshani, C. Fragouli, and S. Diggavi, “**Subspace properties of network coding and their applications**,” *IEEE Transactions on Information Theory*, vol. 58, no. 5, pp. 2599–2619, May 2012.
- M. Jafari Siavoshani, S. Mohajer, C. Fragouli, and S. Diggavi, “**On the capacity of non-coherent network coding**,” *IEEE Transactions on Information Theory*, vol. 57, no. 2, pp. 1046–1066, Feb. 2011.
- L. Keller, M. Jafari Siavoshani, K. Argyraki, C. Fragouli, and S. Diggavi, “**Joint identity-message coding**,” *IEEE Journal on Selected Areas in Communications (JSAC)*, vol. 28, no. 7, Sep. 2010.

Conference Proceedings

- C. L. Chan, M. Jafari Siavoshani, S. Jaggi, N. Kashyap, and P. O. Vontobel, “**Generalized belief propagation for estimating the partition function of the 2D Ising model**,” to appear in *IEEE International Symposium on Information Theory (ISIT)*, 2015, Hong Kong.
- J. B. Ebrahimi and M. Jafari Siavoshani, “**On linear index coding from graph homomorphism perspective**,” *Information Theory and Applications*, 2015, USA (invited paper).
- J. B. Ebrahimi and M. Jafari Siavoshani, “**Linear index coding via graph homomorphism**,” *IEEE International Conference on Control, Decision and Information Technologies (CoDIT'14)*, Nov. 2014, France.
- J. B. Ebrahimi and M. Jafari Siavoshani, “**On index coding and graph homomorphism**,” *IEEE Information Theory Workshop (ITW)*, Nov. 2014, Australia.
- F. Haddadpour, M. Jafari Siavoshani, M. Bakshi, and S. Jaggi, “**On AVCs with quadratic constraints**,” *IEEE International Symposium on Information Theory (ISIT)*, Jul. 2013, Turkey.
- M. Jafari Siavoshani and C. Fragouli, “**Multi-terminal secrecy in linear non-coherent packetized networks**,” *Network Coding Workshop (NETCOD)*, Jun. 2012, USA.
- M. Jafari Siavoshani, S. Yang, and R. W. Yeung, “**Non-coherent network coding: an arbitrarily varying channel approach**,” *IEEE International Symposium on Information Theory (ISIT)*, Jul., 2012, USA.
- M. Jafari Siavoshani, S. Mishra, C. Fragouli, and S. N. Diggavi, “**Group secret key agreement over state-dependent wireless broadcast channels**,” *IEEE International Symposium on Information Theory (ISIT)*, Aug. 2011, Russia.
- M. Jafari Siavoshani, C. Fragouli, S. Diggavi, U. Pulleti, and K. Argyraki, “**Group secret key generation over broadcast erasure channels**,” *Asilomar Conference on Signals, Systems, and Computers*, Nov. 2010, USA.

- S. Mohajer, M. Jafari Siavoshani, S. N. Diggavi, and C. Fragouli, “**On the capacity of multisource non-coherent network coding,**” *Information Theory Workshop (ITW)*, Jun. 2009.
- M. Jafari Siavoshani, C. Fragouli, and S. Diggavi, “**Code construction for multiple sources network coding,**” *MobiHoc-S3’09*, May 2009.
- M. Jafari Siavoshani, L. Keller, C. Fragouli, and K. Argyraki, “**Compressed network coding vectors,**” *IEEE International Symposium on Information Theory (ISIT)*, Jun. 2009.
- M. Jafari Siavoshani, S. Mohajer, C. Fragouli, and S. Diggavi, “**On the capacity of non-coherent network coding,**” *IEEE International Symposium on Information Theory (ISIT)*, Jun. 2009.
- L. Keller, M. Jafari Siavoshani, K. Argyraki, C. Fragouli, and S. Diggavi, “**Identity aware sensor networks,**” *IEEE INFOCOM*, Apr. 2009.
- M. Jafari Siavoshani, C. Fragouli, and S. Diggavi, “**Noncoherent multisource network coding,**” *IEEE International Symposium on Information Theory (ISIT)*, Jul. 2008.
- M. Jafari Siavoshani, C. Fragouli, and S. Diggavi, “**On locating byzantine attackers,**” *Network Coding Workshop (NETCOD)*, Jan. 2008.
- M. Jafari Siavoshani, C. Fragouli, and S. Diggavi, “**Subspace properties of randomized network coding,**” *IEEE Information Theory Workshop (ITW)*, Jul. 2007 (invited paper).
- M. Jafari Siavoshani, C. Fragouli, S. Diggavi, and C. Gkantsidis, “**Bottleneck discovery and overlay management in network coded peer-to-peer systems,**” *SIGCOMM Workshop on Internet Network Management*, Aug. 2007.

Teaching Experience

- **Engineering Probability and Statistics (BSc)**,
Sharif University of Technology,
Spring 2016, Spring 2015; Fall 2014; Spring 2014.
- **Signals and Systems (BSc)**,
Sharif University of Technology,
Fall 2014.
- **Computer Networks (BSc)**,
Sharif University of Technology,
Spring 2016, Fall 2015.
- **Stochastic Processes (MSc/PhD)**,
Sharif University of Technology,
Fall 2015.
- **Information and Coding Theory (MSc/PhD)**,
Sharif University of Technology,
Fall 2014.
- **Network Coding (MSc/PhD)**,
Sharif University of Technology,
Spring 2015.

Selected Talks

From Belief Propagation to Generalise Belief Propagation

Dec. 2015 School of Mathematics, Institute for Research in Fundamental Sciences (IPM), Iran.

- Sep. 2015 Institute of Network Coding (INC), Hong Kong.
[Group secret key agreement over state-dependent wireless broadcast channels](#)
- Aug. 2014 Institute of Network Coding (INC), Hong Kong.
[Non-coherent network coding: an arbitrarily varying channel approach](#)
- Jul. 2012 International Symposium on Information Theory (ISIT), MIT.
[Multi-terminal secrecy in linear non-coherent packetized networks](#)
- Jun. 2012 Network Coding Workshop (NETCOD), MIT.
[On the capacity of non-coherent network coding](#)
- Jul. 2011 Institute of Network Coding (INC), Hong Kong.
- Jun. 2009 International Symposium on Information Theory (ISIT), Seoul.
- Jul. 2008 International Symposium on Information Theory (ISIT), Toronto.
[Code construction for multiple sources network coding](#)
- May 2009 MobiHoc-S3'09, New Orleans.
[On locating byzantine attackers](#)
- Jan. 2008 Network Coding Workshop (NETCOD), Hong Kong.
[Subspace properties of randomized network coding](#)
- Jul. 2007 Ecole Polytechnique Fédérale de Lausanne, Lausanne.