

## Dr. Prasad Krishnan

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**Name:** Prasad Krishnan

**Born:** 1985.

**Citizenship:** Indian.

**Gender:** Male

**PhD:** ECE Department, Indian Institute of Science Bangalore.

**Research interests:** Interested in the wide area of Coding Theory and Practice, both classical and modern coding techniques, especially Convolutional Codes, Network Coding, Network-Error Correction, Index Coding, Space-Time Coding and Quantum Coding. Other areas on interest include Digital Communications, Wireless Communications and Information Theory.

**Ph.D topic of research:**

### **On Network Coding and Network Error Correction**

Network coding is a field of information theory and coding theory and is a method of attaining maximum information flow in a network. The following are the chief contributions of my work (with Prof. B. Sundar Rajan).

- Introduced convolutional codes in the context of network-error correction for coherent network coding. The proposed scheme offers advantages over the known block network-error correction codes in terms of field size and decoding technique.
- Discussed error correction for unit-delay networks for the first time, using convolutional codes.
- Presented a memory reduction technique for enabling single-generation network coding in networks with delay and also discussed the advantages of doing so for network-error correction.
- Introduced and optimised a technique for block network-error correction in networks without delays.
- Demonstrated the theoretical and practical differences between network coding for networks with delays and for networks without delays.
- Studied the theoretical foundations of network error correction using matroids and provided constructions for networks with scalar linear network error correction.
- Demonstrated a new and interesting technique to transmit information through network coded networks with delay.

**B.E thesis topic:** **Micromobility protocols:**

- Compared two micro-mobility protocols for cellular networks, Cellular-IP and Hand-off Aware Wireless Access Internet Infrastructure (HAWAII) using simulations (Network Simulator-2) and proposed a new integrated scheme that combined the advantages of the two.

### Published Journals:

1. “*Network-Error Correcting Codes using Small Fields*”, K. Prasad and B. Sundar Rajan, IEEE Transactions on Communications, Vol. 62, No. 2, Feb. 2014, pp. 423-433,  
Available at <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=arnumber=6712187>.
2. “*A Matroidal Framework for Network-Error Correcting Codes*”, K. Prasad and B. Sundar Rajan, IEEE Transactions on Information Theory, Vol. 61, Issue 2, Feb. 2015, pp. 836-872,  
Available at <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=arnumber=6967856>.
3. “*Precoding techniques for Network Alignment using Transform Approach for Acyclic Networks with Delay*”, Teja Bavirisetti, Abhinav Ganesan, K. Prasad, and B. Sundar Rajan, IEEE Transactions on Information Theory, Vol. 60, Issue 10, Oct. 2014, pp. 6276 - 6302,  
Available at <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6869027>.

### Conference publications:

1. “*Convolutional Codes for Network-Error Correction*”, K. Prasad and B. Sundar Rajan, Appeared in the proceedings of GLOBECOM 2009, Honolulu, Hawaii, USA, Nov. 30 - Dec. 4,  
Available at <http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=05425892>.
2. “*Convolutional Network-Error Correcting Codes for Unit-Delay Networks*”, K. Prasad and B. Sundar Rajan, Appeared in the proceedings of ICC 2010, held at Cape Town, South Africa, May 23-27,  
Available at <http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=05502115>.
3. “*Single Generation Network Coding for Networks with Delay*”, K. Prasad and B. Sundar Rajan, Appeared in the proceedings of ICC 2010, held at Cape Town, South Africa, May 23-27,  
Available at <http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=05502118>.
4. “*On Network-Error Correcting Convolutional Codes under the BSC Edge Error Model*”, K. Prasad and B. Sundar Rajan, Appeared in the proceedings of ISIT 2010, held at Austin, Texas, June 13-18, pp. 2418-2422.  
Available at <http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=05513774>.
5. “*Network-Error Correcting Codes using Small Fields*”, K. Prasad and B. Sundar Rajan, Appeared in the proceedings of ISIT 2011, held at St. Petersburg, Russia, July 31 - Aug. 5.  
Available at <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6033888>.
6. “*A Generalized Network Alignment for Three-Source Three-Destination Multiple Unicast Networks with Delays*”, Abhinav Ganesan, Teja Damodaram Bavirisetti, Krishnan Prasad and B. Sundar Rajan, Proceedings of IEEE Information Theory Workshop, held at Paraty, Brazil, October 16-20, 2011.  
Available at <http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=06089521>.
7. “*On network coding for acyclic networks with delays*”, Krishnan Prasad and B. Sundar Rajan, Proceedings of IEEE Information Theory Workshop, Paraty, Brazil, October 16-20, 2011.  
Available at <http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=06089517>.

8. “A Matroidal Framework for Network-Error Correcting Codes”, Krishnan Prasad, and B. Sundar Rajan, Proceedings of ISIT 2012, to be held at MIT, Cambridge, USA.  
Available at <http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=06283512>.
9. “A Transform Approach to Linear Network Coding for Acyclic Networks with Delay”, Teja Damodaram Bavirisetti, Abhinav Ganesan, Krishnan Prasad, and B. Sundar Rajan, Proceedings of ISIT 2012, to be held at MIT, Cambridge, USA, July 1-6.  
Available at <http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=06283629>.
10. “A Construction of Matroidal Error Correcting Networks”, K. Prasad and B. Sundar Rajan, Proceedings of ISITA 2012, Honolulu, Hawaii, USA, October 28-31, 2012.  
Available at <http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=06400963>.

**Academic qualifications:**

Board/University	Year	Specialization	% of marks/Grade
Matriculation	2001	-	87.27%
Tamil Nadu State Board	2003	Maths, Physics, Chemistry, Comp. Science	96.41%
B.E, College of Engg, Anna University	2007	Electronics and Communication	8.52/10
Ph.D	2014	Telecommunications	7.3/8

**Other academic details:**

- Ranked 226 in GATE 2007 (Graduate Aptitude Test in Engineering) amongst 36,000+ candidates.
- Ranked 11 in the Tamil Nadu Professional Courses Entrance Exam (2003) amongst 100,000+ candidates.
- Awarded the Sarukkai Jagannathan award (in IISc) for conference travel.
- Awarded student travel grant by organizers of IEEE International Conference on Communications, 2010.

**Academic activities**

- Helped organise Signal Processing and Communications conference 2010 (SP-COM) held at IISc Bangalore.
- Attended Microsoft Research Summer School 2009 on Networking held at IISc Bangalore.
- Attended Joint Telematics Group (JTG) Summer Schools in 2010 and in 2011 held at IISc Bangalore and IIT Bombay respectively.
- Attended SPCOM (2010 and 2012) held at IISc Bangalore.

**Courses taken in IISc:**

- **Mathematics**  
Linear algebra  
Algebra
- **Communication systems**  
Digital Communication  
Error Control Codes  
Space-time signal processing and coding  
Advanced Coding theory (Network coding)

Advanced Coding theory - Quantum Error Correction (audit)  
Wireless communication (audit)

**Other B.E  
projects:**

- Adaptive noise cancellation in ECG
- Temperature monitoring system
- Decibel meter
- Predator-prey system

**Non-academic  
activities**

- Member of Vivekananda Study Circle, IISc. Helped organise several events at IISc in that regard.