# PRAVEEN KUMAR GOPALA

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**Objective** . . . . . . . . . . . . . . .. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

To obtain a full-time systems engineering position with a primary focus on wireless communications and signal processing.

**Education** . . . . . . . . . . . . . . . . . . . . . . . . . . .. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

- **Ph.D. in Electrical Engineering** (September 2007)
  The Ohio State University, Columbus, Ohio
  Advisor: Prof. Hesham El Gamal
  Thesis: *Feedback in Wireless Networks: Cross-layer Design, Secrecy and Reliability*
  GPA: 3.98/4

- **M.S. in Electrical Engineering** (June 2004)
  The Ohio State University, Columbus, Ohio
  Advisor: Prof. Hesham El Gamal
  GPA: 3.97/4

- **B.E. in Electronics and Communication** (May 2002)
  Anna University, Chennai, India
  Thesis: *Resource Allocation Strategies for Next Generation Wireless Networks*
  GPA: 9.3/10 (Ranked 1st in the University)

**Professional Experience** . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

- **Senior Systems Engineer** (July 2007 – Present)
  NextWave Broadband, San Diego, CA

  - Built a complete stand-alone WiMAX simulator that incorporates the MAC/PHY features in the WiMAX IEEE 802.16e standard (using the C++ based NS-2 simulation package).
  - Analyzed the role of rate adaptation in throughput performance using the WiMAX simulator.
  - Characterized the delay and overhead performance of different bandwidth request mechanisms using the WiMAX simulator.
  - Designed the dynamic service flow management framework at the NextWave Base Transceiver Station (BTS) and Subscriber Station (SS) based on WiMAX MAC layer specifications.
  - Designed the MS state management framework (including Idle mode and Sleep mode operation) at the NextWave BTS and SS based on WiMAX MAC layer specifications.
  - Analyzed and documented the impact of audio/video encoding, IP encapsulation, ESG streaming, and conditional access systems on the performance of the MXtv (Mobile TV over WiMAX) project.

- **Summer Intern** (June 2005 – September 2005)
  GE Global Research Center, Niskayuna, NY

  - Analyzed the effects of antenna blockage on the performance of the NORM (NACK-Oriented Reliable Multicast) protocol for reliable satellite multicast applications.
  - Proposed modifications to the NORM protocol (aggressive handling of CLR blockage & receiver partitioning based on blockage correlation) to improve the throughput performance under blockage. This work was published as a paper in IEEE CAMAD 2006.
  - Incorporated most of the proposed modifications into the NORM source code (using C++).
  - Quantified the gains obtained by running simulations on a satellite multicast test bed.

- **Graduate Research Associate**                                    (September 2003 – August 2007)
  The Ohio State University, Columbus, OH

    - Cross-layer design of efficient low-complexity schedulers for SISO and MISO cellular multicast.
    - Characterization of throughput-delay-complexity tradeoffs in wireless multicast channels.
    - Practical medium-block length rate-less coding schemes for wireless multicast applications.
    - Characterization of the achievable error exponents of ARQ channels with practical delay deadline constraints.
    - Design of efficient hybrid-ARQ schemes (incremental redundancy transmission) that harness the ARQ diversity in fading MIMO random access channels.
    - Cooperative source-channel coding schemes (Virtual-MIMO) for the transmission of spatially correlated information in wireless sensor networks.
    - Design of efficient schemes that exploit multi-path fading in wireless channels to facilitate secure communication.

- **University Fellow**                                              (August 2002 – August 2003)
  The Ohio State University, Columbus, OH

    - Cooperative transmission schemes for dense wireless sensor networks.
    - Characterization of capacity and number of simultaneously observable modes for dense multimodal wireless sensor networks.

- **Research Associate**                                             (January 2001 – June 2002)
  AU-KBC Research Center, Anna University, Chennai, India

    - Performance evaluation of Dynamic channel allocation (DCA) and Dynamic packet assignment (DPA) schemes in cellular systems.
    - Scheduling and admission control policies enabling the provision of QoS guarantees to multimedia traffic in wireless systems.

**Journal Publications** . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

- A. D. Murugan, P. K. Gopala and H. El Gamal, "Correlated Sources over Wireless Channels: Cooperative Source-Channel Coding", *IEEE Journal on Selected Areas in Communications*, Vol. 22, No. 6, pp. 988 – 998, Aug. 2004.

- P. K. Gopala, Y. H. Nam and H. El Gamal, "On the Error Exponents of ARQ Channels with Deadlines", *IEEE Transactions on Information Theory*, Vol. 53, No. 11, pp. 4265 – 4273, Nov. 2007.

- P. K. Gopala, L. Lai and H. El Gamal, "On the Secrecy Capacity of Fading Channels", To appear in *IEEE Transactions on Information Theory*, 2008.

- P. K. Gopala and H. El Gamal, "Scheduling for Cellular Multicast: A Cross-layer Perspective", *Submitted to the IEEE Transactions on Mobile Computing*, 2008.

- Y. H. Nam, P. K. Gopala and H. El Gamal, "ARQ Diversity in Fading Random Access Channels", *In Submission*.

**Conference Publications** . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

- P. K. Gopala, L. Lai and H. El Gamal, "On the Secrecy Capacity of Fading Channels", *Proceedings of ISIT 2007*, June 2007 **(Finalist for Best Paper Award)**.

- L. Lai, P. K. Gopala and H. El Gamal, "Secure communications over wireless channels", *Proceedings of the Information Theory & Applications (ITA) Workshop*, UCSD, Jan. 2007 **(Invited)**.

- Y. H. Nam, P. K. Gopala and H. El Gamal, "Resolving Collisions via Incremental Redundancy: The ARQ Diversity", *Proceedings of IEEE INFOCOM 2007*, May 2007.

- S. F. Bush, P. K. Gopala and O. Imer, "Enhancing Reliable Multicast Transport to Mitigate the Impact of Blockage", *Proceedings of IEEE CAMAD 2006*, Jun. 2006.

- P. K. Gopala and H. El Gamal, "On the Throughput-Delay Tradeoff in Cellular Multicast", *Proceedings of the Symposium on Information Theory in WirelessCom 2005*, Jun. 2005.

- P. K. Gopala and H. El Gamal, "Opportunistic Multicasting", *Proceedings of the Asilomar Conf. on Signals, Systems and Computers*, Nov. 2004 **(Invited)**.

- P. K. Gopala and H. El Gamal, "On the Scaling Laws of Multi-modal Wireless Sensor Networks", *Proceedings of IEEE INFOCOM'04*, Mar. 2004.

- P. K. Gopala and H. El Gamal, "On the Scaling Laws of Dense Wireless Sensor Networks", *Proceedings of ACM Sensys 2003*, UCLA, Nov. 2003 **(Invited)**.

- N. R. Karthikeyan, Mani Sridhar, G. Praveen Kumar, K. Ramakrishnan, R. Jayaparvathy and S. Srikanth, "Priority Oriented Scheduling in cellular systems with dynamic packet assignment", *Proceedings of the 9th National Conf. on Communications*, IIT Madras, Aug. 2002.


**Honors** . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

- Finalist for Best Student Paper Award at the International Symposium on Information Theory (ISIT), Nice, France, Jun. 2007 (Ranked among the best 8 papers out of a total of 193 submissions).
- University Fellowship, The Ohio State University (2002 – 2003).
- University Gold Medal, Anna University, India (2002).
- Ramanujan Award for excellence in Mathematics, Anna University (2002).


**Relevant Graduate Courses** . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

Random variables and processes, Digital Communications, Wireless Communications, Detection and Estimation theory, Adaptive Filtering, Coding theory, Information theory, Queuing theory, Numerical Optimization, Control Systems, Linear Algebra, Real analysis.


**Programming Experience** . . . . . . . . .. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

C/C++, NS-2, Tcl, Matlab, Simulink (Windows and Unix/Linux platforms).


**Professional Services** . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

Reviewer for: IEEE Trans. on Information Theory, IEEE Journal on Selected Areas in Communications, IEEE Trans. on Communications, IEEE Trans. on Wireless Communications, IEEE Trans. on Mobile Computing, IEEE Trans. on Vehicular Technology, IEEE Communications Letters, IEEE Communications Magazine, IEEE Global Telecommunications Conference (GLOBECOM), IEEE Conference on Computer Communications (INFOCOM), IEEE Wireless Communications and Networking Conference (WCNC).


**References** . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

Available on request.