

## RAHUL RATAN

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**OBJECTIVE**      Seeking a full-time position related to electrical engineering which uses my knowledge and research in communication networks and digital switching.

### RESEARCH INTERESTS

- Design and performance analysis of interconnection networks
- Packet switching architectures and related routing/scheduling algorithms
- Quantum computing methods focusing on their application to novel switch design

<b>EDUCATIONAL BACKGROUND</b>	<p><b>Ph.D. Candidate, Electrical and Computer Engineering</b> <i>Advisor: Prof. A. Yavuz Oruç</i> University of Maryland, College Park</p> <p><b>M.S., Electrical and Computer Engineering</b> <i>Advisor: Prof. A. Yavuz Oruç</i> University of Maryland, College Park</p> <p><b>Bachelor of Technology, Electrical Engineering</b> Indian Institute of Technology (IIT), Kanpur, India</p>	<p>Jan 2003 – Present Expected: June 2007</p> <p>December 2002 GPA: 3.74/4.0</p> <p>May 2000 GPA: 9.0/10 .0</p>
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### WORK EXPERIENCE

#### Internship

May 1999 - Jul 1999    Technical Intern  
Optical Communication Systems Lab, Indian Institute of Technology, New Delhi, India  
Worked on characterization of point-to-point optical fiber links via simulation in Pascal. Identified critical performance parameters and feasible range of operation for various source, fiber and detector setups.

#### Research at University of Maryland, College Park

Graduate Research Assistant with Prof. A. Y. Oruç working on interconnection switching networks.

Jan 2003 - Present    **Quantum Packet Switching: *Doctoral research work***  
Designed a quantum multistage self-routing switching network to switch packets without blocking. This novel approach merges quantum computing with packet switching. This switch uses quantum gates and reduces blocking by using quantum superposition and quantum search algorithms.

Jan 2001 - Dec 2002    **Routing and Performance of Buffered Packet Concentrators: *Masters thesis***  
Developed a packet scheduling and routing algorithm for sparse crossbar concentrators. Also created a theoretical queuing model for performance evaluation of buffered concentrators. This model gave a limit on the best possible performance which was used to evaluate the performance of the scheduling algorithm.

**Linear System Representation of Network Switches**  
Developed a scheme to represent network switches using linear systems. This scheme represents switches as circuits and allows their evaluation using circuit theory.

#### Teaching at University of Maryland, College Park

Teaching Assistant/Grader under Prof. A. Y. Oruç for Digital Computer Design (ENEE 446) course.

**PUBLICATIONS**

1. M. K. Shukla, R. Ratan and A. Y. Oruç, "A Quantum Self-Routing Packet Switch". *Proceedings of the 38th Annual Conference on Information Sciences and Systems (CISS'04)*, March 2004.
2. M. K. Shukla, R. Ratan and A. Y. Oruç, "The Quantum Baseline Network". *Proceedings of the 39th Annual Conference on Information Sciences and Systems (CISS'05)*, March 2005.
3. R. Ratan, M. K. Shukla and A. Y. Oruç, "On Random Routing and its Application to Quantum Interconnection Networks". *Proceedings of the 40th Annual Conference on Information Sciences and Systems (CISS'06)*, 2006.
4. M. K. Shukla, R. Ratan and A. Y. Oruç, "Affine Image Warping On Programmable Graph Architecture Using Grid Space Algebra". *Proceedings of the 40th Annual Conference on Information Sciences and Systems (CISS'06)*, March 2006.

5. R. Ratan and A. Y. Oruç, "Routing on Input Queued Buffered Sparse-Crossbar Packet Concentrators". *Proceedings of the 37th Annual Conference on Information Sciences and Systems (CISS'03)*, March 2003.
6. R. Ratan and A. Y. Oruç, "Performance Evaluation of Input Queued Buffered Sparse-Crossbar Packet Concentrators". *Proceedings of the 37th Annual Conference on Information Sciences and Systems (CISS'03)*, March 2003.
7. R. Ratan and A. Y. Oruç, "Packet Loss in Bipartite Concentrators". *Proceedings of the 35th Annual Conference on Information Sciences and Systems (CISS'01)*, March 2001.
8. R. Ratan, "On Routing and Performance Evaluation of Buffered Sparse Crossbar Concentrators". Master's Thesis, University of Maryland, College Park, December 2002.

#### RELEVANT COURSEWORK

- Random Processes in Communications, Detection and Estimation Theory, Information Theory, High Speed Networking, Wireless Communication Theory, Optical Communication Systems, Advanced Computer Interconnection Networks, Digital/Multiuser Communication, Optical Networks, Computer Networks, Signal and System Theory, Control Systems.
- Computer Architecture, CAD of Digital Systems, Distributed Computer System Design, Digital Electronics and Microprocessor Technology, Digital Circuit Design, Semiconductor Devices.
- Mathematical Statistics, Scientific Computing, Stochastic Processes.

#### COMPUTER SKILLS

*Languages:* C, C++, Pascal, Basic, Assembly (8085/8086), HTML.  
*Operating Systems:* Windows, Unix (Solaris), Linux, Mac OS X.  
*Software:* Matlab, Mathematica, PSpice, LATEX.

#### HONORS/AWARDS

- 1996-2000      Scholarship by NTPC (National Thermal Power Corporation) for excellence in undergraduate studies.
- 1994-2000      National Talent Search Scholarship by the government of India.
- 1997
- Institute Merit Prize for academic excellence by Indian Institute of Technology, Kanpur, India.
  - Invitation from government of India to witness the republic day parade from the Prime Minister's box for outstanding academic achievement in high school at the national level.
- 1996
- National, state and school merit certificates by government of India, Delhi state government and Delhi Public School respectively for outstanding academic performance (top 0.1% nationally) in mathematics and physics.
  - Merit certificate for finishing among top 1% candidates in National Physics Olympiad, India.
- 1989-1996      Gold medal for outstanding academic achievement for eight consecutive years at Delhi Public School, Delhi.

#### ACTIVITIES

- 2000-Present      Reviewer for IEEE Transactions on Parallel and Distributed Systems (IEEE-TPDS) and IEEE International Conference on Parallel Processing, 2005 (IEEE-ICPP'05).  
 Student member IEEE, IEEE/ComSoc.

#### OTHERS

- 2005-Present      Member of United States Tennis Association (USTA).  
 2005                  Member of second place team (3.0 level) Men's USTA league: Prince George's county.  
 2001-Present      Member of skydiving club at University of Maryland.  
 1997-2000        Member of quiz club, Indian Institute of Technology (IIT), Kanpur.

#### REFERENCES

Available on request.