

RAJEEV KUMAR DOKANIA

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Education

- MS-PhD in ECE department, Cornell University, Fall 2005-Present, CGPA: 4.129/4
- B.Tech (H) in Electrical Engineering from IIT Kharagpur, India with Department Rank one in 2003, CGPA: 9.37/10

Job- Experience

- **Graduate Research Assistant:** From August 2005 to Present, **Cornell university, USA**
-Working on realizing low power circuits and systems for Wireless and Optical Communication as part of my MS-PhD degree. For the low power wireless system, I am working on UWB Impulse Radio design. The work in this area involves novel firefly-based synchronization scheme and design of pulse-shaping and detection circuit. The work also involves networking protocols and synchronization detection and maintenance algorithm. I am also working on time domain characteristics of UWB antennas. On the optical interconnect, I worked on interconnect modeling, multi-core architectural advantage assessment, coherency protocol for optical interconnect architecture, high speed electrical circuit designs (e.g. Clock and Data Recovery circuits, modulator driver, amplifiers), as well as integration challenges with the silicon photonic devices. I also looked into process and thermal tuning of the silicon-ring modulators.
- **Graduate Intern:** From July 2006 to January 2007, **Intel, Santa Clara, USA**
-Worked as a graduate intern in Photonics technology lab lead by Mario Paniccia (**Intel Fellow**) on testing of high speed optical module to facilitate optical egress for debug applications. Looked into Intel's proprietary parallel high-speed interfaces ("quickpath" or "CSI" at the system platform level) and associated difficulties and opportunities in optical domain.
- **Component Design Engineer:** From June 2003 to August 2005, **Intel, Bangalore, India**
-Worked, on DFX of two different network-router projects and one multi-core server processor. The work involved concept, design and architecture of different DFX features such as in-die variation, benchmarking, BIST designs for small array memories, high speed SERDES (XAUI, GAUI etc.), PLLs and bulk memories, scan tests, IO-tests, leakage, structural and functional test structure insertion, test structure designs for reliability (Burn-In) tests, thermal management, pin-maps, jtag, pattern generation, testing and debug with support for cycle-determinism. I also worked on yield analysis and design for regaining manufacturing yields.
- **Undergraduate intern:** From May 2002 to July 2002, **Yamacraw, Georgia Tech, USA**
-Worked on the low-dropout regulators under the guidance of Dr. Rincon-Mora. Worked out a method for canceling load regulation from a typical 2.5% to a mere 0.2% without compromising system stability or other performance parameters.

Teaching

- TA for ECE453- Analog Circuit design course in fall 2007 at Cornell.
- Mentor for Sahil Arora, MEng. ECE Student at Cornell.
- Mentor for Scott McClure, REU student at Cornell NanoFabrication.
- guide to a no. of students towards their IIT-JEE preparation in Math & Science.

Awards

- “**Intel Foundation PhD-fellowship**” for 2007-2008 and 2008-2009.
- “**Best Project Award**” in RF-circuit design course at Cornell, 2007.
- A “**MICRO Top-Picks**” Paper, based on **industrial relevance** in **IEEE MICRO**, 2007.
- **SRA** (Spontaneous Recognition Award) and other appreciations at **Intel, 2004-2005**.
- B.Tech (H) in Electrical Engineering (EE) from IIT Kharagpur, India with Department **Rank as One**, getting the **Institute Silver Medal**, 2003.
- Given the **Best-outgoing student award** in EE in IIT Kharagpur, 2003.
- The final year project was adjudged the **Best project** & was awarded, 2003.
- Scored **10/10 in one of the semester**, on an **absolute grading** system in IIT, 2003.
- Multiple **Merit scholarships** towards tuition fee waiver at IIT 1999-2003
- Selected in “**All India Talent Search**” by Sahara Group India, 1996.

Academic Projects

- Ultra low power impulse radio design.
- Design of complete RF Receiver chain including LNA , MIXER, VCO at 1.8GHz.
- Design of a 10-Gbps CDR for dense-optical interconnects.
- Thermal and process tuning of ring-resonators based optical modulators.
- Study about leveraging optics in future bus-based CMPs.
- Design of various modes of voltage & current Reference circuits.
- Design of an integrated optical directional Coupler
- Design of bang-bang controlled dc-dc buck converter integrated with LDO.
- Design of mixed-mode, current mode & voltage mode band-gap reference circuits.
Design of booth multiplier, FSM applications for generation of PWM signal, lift controller design, vending machine controller design.
- Cancellation of load-regulation in low drop-out regulators.
- Design of a PID controller to control the speed of an inductance motor.
- Design of a circuit-breaker circuitry, based on MOSFET behavior.
- Design of a Thyristor based circuitry to control the power-factor of the supply line.

Publications

- A. Apsel, R. Dokania and X. Wang, "**Ultra-Low Power Radios for Ad-Hoc Networks**", *IEEE International Symposium on Circuits and Systems*, 24-27 May 2009, Taipei, Taiwan. [CNF]
- X. Wang, R. Dokania and A. Apsel, "**Implementation of a Global Clocking Scheme for ULP Radio Networks**", *IEEE International Symposium on Circuits and Systems*, 24-27 May 2009, Taipei, Taiwan. [CNF]
- R.K. Dokania and A.B. Apsel, "**Analysis of Challenges for On-Chip Optical Interconnects**", *ACM Proceedings of Great Lakes Symposium on VLSI*, May 10-12 , 2009,

Boston [CNF]

- Manipatruni, S., Dokania, R., Schmidt, B., Droz, N., Poitras, C., Apsel, A. and Lipson, M. "**Wide Temperature Range Operation of Micron-scale Silicon Electro-optic Modulators**", *Optics Letters*, Vol, 33, No. 19, Sept. 2008. [JNL]
- S. Manipatruni, R.K. Dokania, B. Schmidt, J. Shakya, A.B. Apsel and M. Lipson " **Wide Temperature Range Operation of Resonant Silicon Electro-Optic Modulators** " *Integrated Photonics and Nanophotonics Research and Applications(IPNRA)*, 13-16th July, 2008, Boston. [CNF]
- R.K. Dokania, "**On-Chip Optical Interconnects: Architecture, Circuit, & Device Challenges and Directions** " - M.S. Thesis under the guidance of Dr. Alyssa Apsel, 2008, Cornell University, USA. [TH]
- N. Kirman, M. Kirman, R.K. Dokania, J.F. Martinez, A.B. Apsel, M.A. Watkins and D.H. Albonesi "**On-chip optical technology in future bus-based chip multicore designs**" *IEEE Micro*, Special Issue on the **Top Picks** from Microarchitecture Conferences, Vol. 27, No. 1, January/February 2007 [JNL]
- N. Kirman, M. Kirman, R.K. Dokania, J.F. Martinez, A.B. Apsel, M.A. Watkins and D.H. Albonesi "**Leveraging Optical Technology in Future Bus-Based Chip Multiprocessors**" *Proceedings of Intl' symposium on microarchitecture (MICRO '06)* , *IEEE CS press*. 11-13 December 2006, pages: 492-503.(**Nominated for best paper**) [CNF]
- R.K. Dokania and G.A. Rincon-Mora, "**Cancellation of load regulation in low drop-out regulators**" *Electronic Letters, IEE*, Volume 38, Issue 22, October 2002, pages: 1300-1302. [JNL]
- R.K. Dokania, S.K. Baranwal and A. Patra, "**Peak current detector based control of DC-DC buck converter for portable application**" *proceedings of IEEE INDICON 2004*, 22-24 December 2004, pages: 594-596. [CNF]
- R.K. Dokania, "**Design of bang-bang controlled dc-dc buck converter integrated with LDO**" - Thesis on Final year project work for B.Tech (H), May, 2003, IIT KGP. [TH]

Patents

- R.K. Dokania, X. Y. Wang and A. B. Apsel , "**Method and Apparatus for localized synchronization detection & retention and Transceiver design for PCO based UWB Impulse Radio and network**", filed October 2008.
- S. Manipatruni, R.K. Dokania, A. B. Apsel and M. Lipson, "**Method and Apparatus for Wide Temperature Range Operation of Resonant Silicon Electro-optic Modulators**", filed August 2008.

Seminar

- Various Talks on Impulse Radio design and synchronization as part of Graduate Research, USA.
- “DFX: A Journey to the Other side of IC Design”, Tutorial, at Cornell Electron Device Society, Ithaca, USA
- Talk on Optical egress and optical probes for silicon debug at Intel, Santa clara, USA
- Presentation on a waveguide coupler Fabricated at Cornell’s Nanofabrication facility at Cornell University, USA.
- Presentation on LDO circuit topology to cancel load-regulation problem at Georgia Institute of Technology, USA.
- Presentation on band-gap reference circuits (voltage mode, current mode & mixed mode at Cornell University, USA.
- Presentation on different Regulator circuitries at IIT Kharagpur, India
- Presentation on DC-DC Buck converter design at IIT Kharagpur, India
- Presentation on advantages & challenges on Single-mode fibers at IIT Kharagpur, India
- Short talk on path delay equalization scheme at IIT Kharagpur, India
- Seminar talk on various kind of circuit breakers at IIT Kharagpur, India.
- Seminar talk on Power-circle diagrams & their utilities at IIT Kharagpur, India
- Talk on memory repair and various DFT-strategies at various point of time in Intel Corporation, Bangalore.

Tools/CAD

- **Analog Design**
 - Cadence schematic composer, analog environment and Virtuoso layout editor, HSPICE, ADS, HFSS, Calibre, Diva, Assura etc.
- **Digital Design**
 - Synopsys tools, ncsim, signalscan, simvision, modelsim, Astro, CSIM, encounter
- **Optical Module Design**
 - Rsoft, L-Edit
- **DFT**
 - Logic Vision tools, fastscan, & also about some-internal tools within Intel
- **Scripting/programming**
 - Perl, C, basic, Tcl, Matlab
- **Others**
 - Clearcase, Various O/s including linux, various utility tools including MS visio, Matlab

Professional Activities

- Reviewer for JSSC, TCAS and ISCAS.
- Co-President and Treasurer of Cornell Electron Device Society.

References

(on Request)