Kishore Padmaraju

Dept. of Electrical Engineering
1300 Seeley W. Mudd
New York, NY, 10027

Office: 212-854-5348
Email: kp2362@columbia.edu
Website: www.ee.columbia.edu/~kishore
Citizenship: United States of America

EDUCATION

Columbia University, NY
Ph.D. Candidate in Electrical Engineering — Expected Completion 2014
Dissertation Title: *Control Systems for Silicon Photonic Microring Devices*

Columbia University, NY
M.S. Electrical Engineering — May 2011

University of Rochester, NY
B.S. Electrical and Computer Engineering *with Highest Distinction* — May 2009
B.S. Physics *with High Distinction* — May 2009

OBJECTIVE

Job opportunities in research & development environments that will provide the opportunity to both utilize and expand upon my academic preparation in engineering.

RESEARCH INTERESTS

Nanophotonics, optical interconnects, embedded optical systems, optical modulation techniques, advanced modulation formats, digital-signal processing, coherent optical processing, optical networking, optoelectronics.

RELEVANT SKILLS

Computer Languages: C/C++, Java, VHDL(FPGA Design), Assembly, HTML, LaTeX

Scientific Applications: MATLAB, LabVIEW, VPI

Optical Communications: Extensive experience with standard optical/electrical telecommunication test & measurement equipment including: lasers, modulators, filters, amplifiers, interferometers, receivers, free-space optics, and system performance assessments of optical & electrical channels; as well as experience in interfacing with nanophotonic devices.

GRADUATE RESEARCH EXPERIENCE

Lightwave Research Laboratory, Columbia University, NY — **Fall 2009 – present**
Currently working as a graduate research assistant (GRA) under the supervision of Professor Keren Bergman on research topics that lie at the intersection of optical communications and nanophotonics.

University of Campinas, Brazil — **January 2012**
Selected to participate in the National Nanotechnology Infrastructure Network (NNIN) international winter school program on "Silicon and III-V Nanophotonics." A rigorous two-week program that included seminars from leading U.S. faculty in the field of nanophotonics.

Jülich Research Center, Germany — **Summer 2009**
Worked with Dr. Jürgen Moers on a nanofabrication process to be used in the fabrication of next-generation transistors. This project was supported through a NNIN scholarship.

ACADEMIC AWARDS

- **SPIE John Kiel Scholarship** [*annually awarded to a student who shows the potential for long-term contribution to the field of optics and optical engineering*] (2013)
- **IBM/SRC Ph.D. Fellowship** [*full tuition & stipend award for up to 5 years*] (2012–)
- **Faculty Award** [*annually awarded to the department's most promising graduate*] (2009) – Department of Electrical & Computer Engineering, University of Rochester
- **RES Scholarship Award** (2009) – Rochester, NY IEEE Section

MANAGEMENT AND COLLABORATION EXPERIENCE

- **Preparation of grant proposals for government agencies (NSF, NSA, DARPA)**: Establishing scope of research objectives, setting timeline and milestones, risk assessment, coordination of experiments.
- **OSA/SPIE Student Conference (2012):** Co-led the organization of a 3-day student conference that was attended by over 100 international graduate students, had a budget of $25K, and prominent invited speakers; jointly held between Columbia University & the City College of New York.

- **Charles & Janet Forbes Entrepreneurial Competition (2009):** Placed 3rd in a business competition, rendering us recipients of a cash prize. The competition was composed of engineering students who had recently finished a senior design project as part of their engineering curriculum. Judging was based on business plans and a business presentation.
- **RIT Senior Design Competition (2009):** Received a "most marketable" award, rendering us recipients of a cash prize. The event was an international competition for senior design projects of undergraduate engineering students. Our project was an energy meter that could easily track and save the energy consumption of various household appliances.

ACADEMIC SERVICE

- **Reviewer for the following journals:** Photonics Technology Letters, Optics Letters, Optics Express, Journal of Lightwave Technology
- **Founder & President** of Optics Society of America (OSA), Columbia University Student Chapter
- **Founder & President** of SPIE, Columbia University Student Chapter
- **Vice President** of Tau Beta Pi (Engineering Honor Society), University of Rochester Student Chapter
- **Treasurer** of IEEE, University of Rochester Student Chapter
- **Teaching Assistant:** Nonlinear Optics, Electronic Circuits, Digital Communications, Thermodynamics

RELATED COURSEWORK

Optics, Photonic Integrated Circuits, Nonlinear Optics, Quantum Optics, Quantum Mechanics, Communication Theory, Digital Communications, Computer Networks, Stochastic Processes, Optical Fiber Communication Systems, Wave Transmission, Embedded FPGA Design.

REFERENCES

Prof. Keren Bergman (*bergman@ee.columbia.edu*)
Dept. of Electrical Engineering, Columbia University

Prof. Andrew P. Knights (*aknight@mcmaster.ca*)
Dept. of Engineering Physics, McMaster University

Prof. Tony Heinz (*tony.heinz@columbia.edu*)
Dept. of Electrical Engineering, Columbia University

Prof. Richard M. Osgood Jr. (*osgood@columbia.edu*)
Dept. of Electrical Engineering, Columbia University

Prof. Chee Wei Wong (*cww2104@columbia.edu*)
Dept. of Electrical Engineering, Columbia University

PATENT APPLICATIONS

- **K. Padmaraju**, K. Bergman, "*Method of using dithering for wavelength locking and stabilizing a microring resonator,*" (patent pending).
- **K. Padmaraju**, K. Bergman, "*Method of using Wavelength-Locking to Achieve Direct Electrical Read-Out of Microring Sensors,*" Application # 61/838,107 (patent pending).
- Knights, D. Logan, **K. Padmaraju**, K. Bergman, "*Integrated Thermal Stabilization of a Microring Modulator,*" (patent pending).

PUBLICATIONS

> 30 co-authored journal & conference publications

Journal Publications

- **K. Padmaraju**, D. F. Logan, T. Shiraishi, J. J. Ackert, A. P. Knights, K. Bergman. "Wavelength Locking and Thermally Stabilizing Microring Resonators using Dithering Signals." **Journal of Lightwave Technology**, (*accepted*).
- **K. Padmaraju**, K. Bergman. "Resolving the thermal challenges for silicon microring resonator devices." **Nanophotonics**, 2 (4), 2013.
- **K. Padmaraju**, D. F. Logan, X. Zhu, J. J. Ackert, A. P. Knights, K. Bergman. "Integrated thermal stabilization of a microring modulator." **Optics Express**, 21 (12), 2013.

- R. R. Grote, **K. Padmaraju**, B. Souhan, J. B. Driscoll, K. Bergman, R. M. Osgood. "10 Gb/s Error-Free Operation of All-Silicon Ion-Implanted-Waveguide Photodetectors at 1.55 μm." **IEEE Photonics Technology Letters**, 25 (1), 2013.
- **K. Padmaraju**, J. Chan, L. Chen, M. Lipson, K. Bergman. "Thermal stabilization of a microring modulator using feedback control." **Optics Express**, 20 (27), 2012.
- L. Xu, Q. Li, N. Ophir, **K. Padmaraju**, L. W. Luo, L. Chen, M. Lipson, K. Bergman. "Colorless Optical Network Unit Based on Silicon Photonic Components for WDM PON." **IEEE Photonics Technology Letters**, 24 (16), 2012.
- **K. Padmaraju**, N. Ophir, Q. Xu, B. Schmidt, J. Shakya, S. Manipatruni, M. Lipson, K. Bergman. "Error-free transmission of microring-modulated BPSK." **Optics Express**, 20 (8), 2012.
- N. Ophir, R. K. W. Lau, M. Menard, X. Zhu, **K. Padmaraju**, Y. Okawachi, R. Salem, M. Lipson, A. L. Gaeta, K. Bergman "Wavelength Conversion and unicast of 10-Gb/s data spanning up to 700 nm using a silicon nanowaveguide." **Optics Express**, 20 (6), 2012.
- N. Ophir, R. K. W. Lau, M. Menard, R. Salem, **K. Padmaraju**, Y. Okawachi, M. Lipson, A. L. Gaeta, K. Bergman. "First Demonstration of a 10-Gb/s RZ End-to-End Four-Wave-Mixing Based Link at 1884 nm Using Silicon Nanowaveguides." **IEEE Photonics Technology Letters**, 24 (4), 2012.
- L. Xu, **K. Padmaraju**, L. Chen, M. Lipson, K. Bergman. "10-Gb/s Access Network Architecture Based on Micro-Ring Modulators With Colorless ONU and Mitigated Rayleigh Backscattering." **IEEE Photonics Technology Letters**, 23 (13), 2011.
- A. Biberman, H. L. R. Lira, **K. Padmaraju**, N. Ophir, J. Chan, M. Lipson, K. Bergman. "Broadband Silicon Photonic Electro-Optic Switch for Photonic Interconnection Networks." **IEEE Photonic Technology Letters**, 23 (8), 2011.
- N. Ophir, J. Chan, **K. Padmaraju**, A. Biberman, A. C. Foster, M. A. Foster, M. Lipson, A. L. Gaeta, K. Bergman. "Continuous Wavelength Conversion of 40-Gb/s Data Over 100 nm Using a Dispersion-Engineered Silicon Waveguide." **IEEE Photonics Technology Letters**, 23 (2), 2011.

Conference Publications

- **K. Padmaraju**, D. F. Logan, X. Zhu, J. J. Ackert, A. P. Knights, K. Bergman. "Wavelength Locking of Microring Resonators and Modulators using a Dithering Signal." **European Conference on Optical Communications** (ECOC), London, England, 2013.
- **K. Padmaraju**, D. F. Logan, J. J. Ackert, A. P. Knights, K. Bergman. "Initialization and Stabilization of Microring Resonators for Next-Generation Silicon Photonic Interconnects" **[Best in Session Award] SRC TechCon**, Austin, 2013.
- **K. Padmaraju**, D. F. Logan, X. Zhu, J. J. Ackert, A. P. Knights, K. Bergman. "Simplified Platform for Microring-Sensing using Wavelength Locking **[post-deadline paper]**." **Conference on Lasers and Electro-Optics** (CLEO), San Jose, 2013.
- **K. Padmaraju**, D. F. Logan, J. J. Ackert, A. P. Knights, K. Bergman. "Microring Resonance Stabilization using Thermal Dithering." **IEEE Optical Interconnects Conference**, Santa Fe, 2013.
- **K. Padmaraju**, D. F. Logan, X. Zhu, J. J. Ackert, A. P. Knights, K. Bergman. "Integrated Thermal Stabilization of a Microring Modulator." **Optical Fiber Communication Conference** (OFC), Anaheim, 2013.
- X. Zhu, **K. Padmaraju**, L. Chen, D. F. Logan, J. J. Ackert, A. P. Knights, M. Lipson, K. Bergman. "Pattern-Dependent Performance of Microring Modulators." **Optical Fiber Communication Conference,** Anaheim, 2013.
- D. Brunina, X. Zhu, **K. Padmaraju**, L. Chen, M. Lipson, K. Bergman. "10-Gb/s WDM Optically-Connected Memory System using Silicon Microring Modulators." **European Conference on Optical Communications** (ECOC), Amsterdam, Netherlands, 2012.
- Q. Li, N. Ophir, L. Xu, **K. Padmaraju**, M. Lipson, K. Bergman. "Experimental Characterization of the Optical-Power Upper Bound in a Silicon Microring Modulator." **IEEE Optical Interconnects Conference**, Albuquerque, 2012.

- R. R. Grote, **K. Padmaraju**, J. B. Driscoll, B. Souhan, K. Bergman, R. M. Osgood. "10 Gb/s Error-Free Operation of an All-Silicon C-band Waveguide Photodiode." **Conference on Lasers and Electro-Optics** (CLEO), San Jose, 2012.
- N. Ophir, **K. Padmaraju**, M. Menard, R. K. W. Lau, Y. Okawachi, M. Lipson, A. L. Gaeta, K. Bergman. "A Broadband 1850-nm 40-Gb/s Receiver Based on Four-Wave Mixing in Silicon Waveguides." **Conference on Lasers and Electro-Optics** (CLEO), San Jose, 2012.
- N. Ophir, R. K. W. Lau, M. Menard, X. Zhu, **K. Padmaraju**, Y. Okawachi, R. Salem, M. Lipson, A. L. Gaeta, K. Bergman "Wavelength Conversion and unicast of 10-Gb/s data spanning up to 700 nm using a silicon nanowaveguide." **Optics Express**, 20 (6), 2012.
- **K. Padmaraju**, J. Chan, L. Chen, M. Lipson, K. Bergman. "Dynamic Stabilization of a Microring Modulator Under Thermal Perturbation." **Optical Fiber Communication Conference** (OFC), Los Angeles, 2012.
- **K. Padmaraju**, N. Ophir, Q. Xu, B. Schmidt, J. Shakya, S. Manipatruni, M. Lipson, K. Bergman. "Error-Free Transmission of DPSK at 5 Gb/s Using a Silicon Microring Modulator **[Finalist, Best Student Paper]**." **European Conference on Optical Communications** (ECOC), Geneva, Switzerland, 2011.
- **K. Padmaraju**, N. Ophir, S. Manipatruni, C. B. Poitras, M. Lipson, K. Bergman. "DPSK Modulation Using a Microring Modulator." **Conference on Lasers and Electro-Optics** (CLEO), Baltimore, 2010.
- N. Ophir, **K. Padmaraju**, M. Menard, R. K. W. Lau, M. Lipson, A. L. Gaeta, K. Bergman. "Continuously Tunable Wavelength Conversion of Data with Record Probe-Idler Separations in a Silicon Nanowire." **Conference on Lasers and Electro-Optics** (CLEO), Baltimore, 2010.
- N. Ophir, **K. Padmaraju**, A. Biberman, L. Chen, K. Preston, M. Lipson, K. Bergman. "First Demonstration of Error-Free Operation of a Full Silicon On-Chip Photonic Link." **Optical Fiber Communication Conference** (OFC), Los Angeles, 2011.
- L. Xu, **K. Padmaraju**, L. Chen, M. Lipson, K. Bergman. "First Demonstration of Symmetric 10-Gb/s Access Networks Architecture based on Silicon Microring Single Sideband Modulation for Efficient Upstream Signal Re-modulation." **Optical Fiber Communication Conference** (OFC), Los Angeles, 2011.
- **K. Padmaraju,** N. Ophir, A. Biberman, L. Chen, E. Swan, J. Chan, M. Lipson, K. Bergman. "Intermodulation Crosstalk from Silicon Microring Modulators in Wavelength-Parallel Photonic Networks-on-Chip." **IEEE Photonics Society Conference**, Denver, 2010.
- N. Ophir, A. Biberman, J.S. Levy, **K. Padmaraju**, K. J. Luke, M. Lipson, K. Bergman. "Demonstration of 1.28-Tb/s Transmission in Next-Generation Nanowires for Photonic Networks-on-Chip." **IEEE Photonics Society Conference**, Denver, 2010.
- J.C. Gerharz, **K. Padmaraju**, J. Moers, D. Grützmacher. "Etching Titanium Nitride gate stacked on high-k dielectric." **Micro and Nano Engineering** (MNE), Genoa, Italy, 2010.
- A. Biberman, H. L. R. Lira, **K. Padmaraju**, N. Ophir, M. Lipson, K. Bergman. "Broadband CMOS-Compatible Silicon Photonic Electro-Optic Switch **[post-deadline paper]**." **Conference on Lasers and Electro-Optics** (CLEO), San Jose, 2010.