

Miloš A. Popović – CV

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FIELD OF INTEREST

First principles theory, design, and invention of on-chip device technology based on light-matter interaction on the micro and nano scale, including photonics, phononics and electronics, in the classical and quantum regimes. Design of integrated systems-on-chip that enable new modes of communication, computation, signal processing, and sensing through immersive interdisciplinary collaboration with microfabrication, circuits, systems and architecture experts. Topics: silicon photonics/nanophotonics; CMOS photonics-electronics integration and energy efficient, scalable photonic systems-on-chip; nanoscale confined elastic wave devices and NEMS; novel laser source concepts, photonic and phononic circuit based mode locking and optical frequency combs, and on-chip optical clock technology; RF photonics; quantum and nonlinear integrated photonics; nano-optomechanics and acousto-optics, optical forces, smart self-adaptive photonic systems; photonic device and circuit theory.

EDUCATION

Massachusetts Institute of Technology (Feb 2002–Sep 2007) **Cambridge, MA**
Ph.D. in Electrical Engineering Advisors: H.A. Haus (2002-3); E.P. Ippen, F.X. Kärtner (2003-7)
Thesis: "Theory & design of high-index-contrast microphotonic circuits" Minor: Applied Math

Master of Science in Electrical Engineering (Feb 2000–Feb 2002) GPA: 5.0/5.0
Thesis: "Air trenches for dense silica integrated optics" Advisor: H.A. Haus

Queen's University (Sep 1995–Apr 1999) **Kingston, Ontario, Canada**
Bachelor of Science in Electrical Engineering (graduated ranked 1st of 106)
Thesis: "Microwave power transmission for terrestrial applications" Advisor: A.P. Freundorfer

EMPLOYMENT

Assistant Professor (Innovation Career Development Professorship) **Boston University**
Department of Electrical and Computer Engineering July 2016-present

Co-Founder and Technical Principal **Ayar Labs, Inc.**
Start-up company commercializing photonics technology for data centers and computing 2015-present

Assistant Professor **University of Colorado, Boulder**
Department of Electrical, Computer and Energy Engineering Jan 2010–June 2016
(Parental leave Spring 2011 and Fall 2014. Reappointed Spring 2015. Review for Tenure in AY 2017-2018.)

Visiting Assistant Professor **University of Colorado, Boulder**
Department of Electrical, Computer and Energy Engineering Jul 2009–Dec 2009

Postdoctoral Associate **Research Laboratory of Electronics, MIT (Cambridge, MA)**
Supervisors: Profs. Erich P. Ippen and Franz X. Kärtner Sep 2007–Dec 2009
(special permission to be principal investigator on own projects granted by VP Research, C. Canizares)

Graduate Research Assistant **Research Laboratory of Electronics, MIT (Cambridge, MA)**
Supervisors: Profs. H.A. Haus (2000–03); E.P. Ippen and F.X. Kärtner (2003–07) Feb 2000–Sep 2007

Co-Project Leader, Electrical Team Manager **Queen's Univ. Solar Vehicle Team (Canada)**
Team advisor: Prof. Stephen J. Harrison (Queen's Univ., Kingston, Canada) Sep 1995–Dec 1999

PUBLICATIONS SUMMARY

18 U.S. patents, 166 papers [47 journal (5 invited), 119 conference (43 invited)], 2 book chapters [these publications, with full PDFs for recent papers, are accessible on my [group publications page](#)]
H-index: 33 (as of 2017)

AWARDS & HONORS

- **Innovation Career Development Professorship**, Boston University, ~\$60k over 3 yrs, (2017-2019)
- Fellow, **The Lucile & David Packard Foundation**, \$875,000 over 5 years (2012-2017):
 One of 16 awarded across all fields of science & engineering, by committee of top US academics
- Donnelly/GE Faculty Fellow, U. Colorado Boulder, ~\$60,000 over 6 years (2010-2016)
- Dean's Faculty Fellow, University of Colorado Boulder (2012)
- **MIT Presidential Fellow** (2000)
- National Science and Engineering Research Council of Canada Graduate Fellow (2000-2001)
- **University Medal in Electrical Engineering** (1999 top-ranked graduate)
- Team 2nd place, 1999 World Solar Challenge – 2000-mile solar car race across Australian desert.
- Queen's University Chancellor's Scholar (1995-1999 full scholarship, one of 6 awarded)
- 1st Prize – North America-wide Motorola University Electronics Design Contest (1998, with K. Koo, \$55,000 prize) for project: "Smart cruise control and telemetry system for a solar vehicle"

Student-led papers and awards (advisor or research supervisor role):

- Mark Wade (grad student), the **Outstanding Dissertation Award** from the College of Engineering & Applied Science (May 2016).
- Mark Wade (grad student), jointly with Chen Sun and Alex Wright-Gladstein (OptiBit Inc., now Ayar Labs, Inc.), Grand Prize (1st Place), **MIT Clean Energy Prize** sponsored by the Dept. of Energy, \$275,000 (2015) <http://www.betaboston.com/news/2015/05/12/optibits-energy-efficient-computer-chip-wins-mits-clean-energy-prize/>
- Mark Wade (grad student), **paper ranked #1 of 119 submissions** in its subcommittee at OFC 2014, upgrade to invited paper selected over nomination for best student paper (2014)
 "Energy-efficient active photonics in a zero-change, state-of-the-art CMOS process"
- **Best paper** (1st place), Jelena Notaros (undergrad), IEEE Region 5 Conference paper competition (2014)
 "Complex Wavevector Bloch Solver for Nanophotonic Device Applications"
- Chris Poulton (undergrad) selected to be **plenary speaker** at the National Collegiate Research Conference (NCRC) for his work on photonic crystals in zero-change CMOS in our lab, Harvard University (Jan 2014)
- **Best paper**, Chris Poulton (undergrad), Discovery Learning Apprenticeship (DLA) student conference(2013)
 "Photonic crystal cavities in zero-change advanced CMOS"
- **Best paper**, Miljan Dasic (undergrad), IEEE 5th Student Projects Conference (IEEEESTEC), Nis, Serbia (2012)
 "Design of Photonic Microring-Resonator Based Wavelength Selective 1xN Power Splitters"

RESEARCH MILESTONES

2017	First spectrally isolated entangled photon source monolithically integrated on chip
2015	First microprocessor with photonic I/O
2015	Photon pair source in CMOS microelectronics chip
2007, 2014	Ultraefficient array nano-antenna grating couplers
2014	Demonstrated 1dB loss photonic crystal add-drop filters
2014	Demonstrated ultra-low-energy (20fJ/bit) monolithic photonic transmitter
2014	First photonic transmitters and receivers fabricated on die with a state-of-the-art microprocessor
2014	Record thermal tuning efficiency microcavities (2uW/GHz)
2014	Record-low-loss waveguide crossings based on "low-loss unidirectional Bloch waves"
2007-2014	Proposed & brought into use in photonics concepts of imaginary (radiative) coupling , and loop-coupling
2014	Proposed/demonstrated mode-coupling based dispersion control for four-wave mixing and combs
2014	Proposed "dark state" laser as new tunable laser cavity geometry (besides Littrow, Littman...)
2013	Demonstrated first depletion modulator in polycrystalline silicon, and the first in bulk CMOS
2012	Demonstrated first active photonics-electronics platform in microelectronics SOI CMOS (45nm)
2010	Proposed dynamics compensated modulators , the first approach to distortion-free modulation that steps around the fundamental sensitivity(energy)-bandwidth tradeoff in resonant modulators [C53]

2008 Demonstrated first **photronics-electronics integration in microelectronics bulk CMOS** (28nm node)
 2007 Proposed microphotonic circuits that **circumvent the Kramers-Kronig relationship** between magnitude and phase response, enabling dispersionless coupled-cavity filters and delay lines
 2007 Demonstrated first **telecom-grade silicon photonic channel add-drop filters**
 2007 Dark state **sub-linewidth trapping in optomechanics**
 2007 Proposed **dual-ring optomechanical resonator** (widely used today in optomechanics research), and the general concept of **(self-)adaptive integrated photonics based on light forces**.
 2004 **First high-performance microring filters in a high index contrast platform**

GRANTS (\$4.2M total awarded to date)

Boston University (~\$300k total awarded to date)

Awarded:

Role: **Co-PI**
 Project: "Reclaiming Dark Silicon via 2.5D Integrated Systems with Silicon Photonic Networks"
 Funding: \$38k over 3 years (NSF CCF/SHF)
 Collaborators: Prof. A. Coskun (BU)
 Period of Performance: June 1, 2017-May 31, 2020

Collaborative project to generate educational content toward an EdX course in integrated photonics.

Role: **Co-Principal Investigator (on three-institution team, PI of BU part)**
 Project: "Memory System with Monolithic CMOS Photonic Networks for High-performance, Energy-efficient Embedded Manycore Machines"
 Funding: \$91k task add/transfer at BU (to previous \$1.16M effort at CU Boulder); DARPA POEM Program.
 Collaborators: Prof. V. Stojanovic (Berkeley), Prof. R. Ram (MIT), Prof. K. Asanovic (Berkeley); prime is MIT.
 Period of Performance: Sep 1, 2016-May 31, 2017

Program to design novel nanophotonic device technology that is compatible with current state-of-the-art CMOS process flows (used for microprocessors, DRAM, and mixed-signal ICs) to enable photonics in state of the art microelectronics, and to arrive at communication networks with unprecedented levels of energy efficiency (energy per bit of information) by leveraging photonic communication and electronic processing on chip. This effort is a follow-on of a seedling, below.

Role: **Co-PI (PI for Boston University part)**
 Project: "**AIM Academy Photonic Integrated Circuit Design and Test Education Curricula**"
 Funding: \$65k for 1 year, AIM Photonics Academy
 Collaborators: Prof. S. Preble (Rochester Institute of Technology)
 Period of Performance: Jan 1, 2016-Dec 31, 2016

Collaborative project to generate educational content toward an EdX course in integrated photonics.

Role: **Co-PI (PI for Boston University part)**
 Project: "**OP: Collaborative Research: Coherent Integrated Si-Photonic Links**"
 Funding: \$144k (\$345k total) over 3 years, NSF CCSS program
 Collaborators: Prof. V. Stojanovic (UC Berkeley)
 Period of Performance: Sep 1, 2016-Aug 31, 2019

Collaborative project to demonstrate new device and circuit concepts for coherent communication transceivers.

University of Colorado Boulder (\$3.2M total awarded to date)

Awarded:

Role: **Co-PI/Core Team Member (Principal Investigator for CU Boulder part)**

Leading Colorado effort, with full support of university, Colorado governor's office and state office of economic development (OEDIT), Colorado Photonics Industry Association (CPIA), and local industry partners.

Project: Integrated Photonics-Institutes for Manufacturing Innovation (IP-IMI)
Funding: \$0 received, \$2M budgeted (institute funding changed to competitive model, submitting to institute calls as member in future)
(total institute funding is \$510M over 5 years)

Part of a team that will bring together industry and academia to form a vertically integrated photonics manufacturing and rapid prototyping ecosystem, built around a domestic silicon photonics foundry. The IP-IMI is a DoD initiative to strengthen US domestic manufacturing in photonics, and provide technology, infrastructure and workforce training. It was announced by President Obama in Oct 2014:

Announcement: <http://www.whitehouse.gov/the-press-office/2014/10/03/fact-sheet-president-obama-announces-new-manufacturing-innovation-instit>

Role: **Principal Investigator**
Project: "Photonics based microwave radiometer (2)"
Funding (not yet awarded): \$60k; Ball Aerospace & Technologies Corp. IR&D
Period of Performance: Feb 15-Dec 31, 2016

Program to demonstrate basic suitability of a silicon photonics based microwave passive radiometer.

Role: **Principal Investigator**
Project: "Photonics based microwave radiometer"
Funding: \$87k over 6 months (July-Dec 2015); Ball Aerospace & Technologies Corp. IR&D

Seedling program to demonstrate basic suitability of a silicon photonics based microwave passive radiometer.

Role: **Principal Investigator**
Project: "Dark state hybrid lasers"
Funding: \$25k (6 month seedling) from HP Labs (PoP Dec 2014-May 2015)

Program to demonstrate new kind of laser cavity.

Role: **Principal Investigator**
Project: "Advanced Classical and Quantum Light Sources On-Chip Based on Photonic Molecule Circuits"
Funding: \$610k over 3-year effort; Office of Naval Research Award N000141410259, Stephen Pappert PM, PNT portfolio (Apr 2014-Mar 2017)

Program to demonstrate classical and quantum light sources based on parametric gain and coupled-microcavity systems on chip. Goals are to design structures that use mode, Q and coupling engineering to enable optimally efficient nonlinear processes, and by design enable light sources with (dynamically) controllable/tunable wavelength, controllable entanglement properties (joint spectral distribution), high efficiency and dynamic reconfigurability.

Role: **Co-Principal Investigator (subcontract from SLC company, SBIR)**
PI: Benjamin Moss (MIT and Silicon Light Circuits)
Project: Design Automation Software for Integrated Nanophotonics
Funding (company declined the grant, hence we had to decline an awarded grant): \$26k (of total \$150k), OSD/Air Force SBIR Call OSD13-C05 (Mar-Aug 2014)

Program to develop photonics design and layout infrastructure integrable with industry standard circuit design tools.

Role: **Principal Investigator**
Project: "Light Forces Based, Classical and Quantum Photonics On-Chip"
Funding: \$875k over 5-year effort; The David & Lucile Packard Foundation (2012-2017)
PoP: October 2012 – September 2017

Program to demonstrate photonic device technology where nanometer-scale optical confinement in silicon nanowires on-chip give rise to unique physics based on appreciable light forces and tailorable nonlinearity. Goals are to enable ultra-low-energy, "smart", self-adaptive circuits, and technology for communication and computation using quantum mechanics.

Role: **Co-Principal Investigator (on three-institution team); Lead PI of CU Boulder team**
Project: "Memory System with Monolithic CMOS Photonic Networks for High-performance, Energy-efficient Embedded Manycore Machines"

Funding: \$1.16M (total team \$15M=\$7M universities, \$8M industry) over total 3.5-year effort, 2 phases; DARPA POEM Program (Oct 2010-Mar 2011 seedling; Sep 2011-May 2015 program), DARPA ARO Grant No. W911NF-10-1-04128; no cost extension to May 2016 taken.

Collaborators: Prof. V. Stojanovic (Berkeley), Prof. R. Ram (MIT), Prof. K. Asanovic (Berkeley)

Program to design novel nanophotonic device technology that is compatible with current state-of-the-art CMOS process flows (used for microprocessors, DRAM, and mixed-signal ICs) to enable photonics in state of the art microelectronics, and to arrive at communication networks with unprecedented levels of energy efficiency (energy per bit of information) by leveraging photonic communication and electronic processing on chip. This effort is a follow-on of a seedling, below.

Role: **Principal Investigator**

Project: "Molding Optical Field Patterns for Highly Efficient Design of Strong-Confinement Photonic Devices"

Funding: \$360k; NSF (June 2011-May 2014)

Investigating devices based on a new type of Bloch wave, and developing efficient modulators, thermo-optically tunable devices, and optomechanical structures based on these concepts.

Massachusetts Institute of Technology (\$735k total awarded)

Awarded:

Role: **Principal Investigator**

Project: "Opto-Nanomechanical Self-Adaptive Photonic Devices Based on Light Forces"

Funding: \$125k, Advanced Concepts Committee, MIT Lincoln Lab (10/2008-12/2009)

Collaborators: Peter T. Rakich (Sandia National Lab), David O. Caplan (MIT Lincoln Lab)

Independently proposed and secured funding for a 1-year seedling effort to demonstrate self-adaptive photonic devices, based on light forces in nanophotonic structures and interplay of the motion caused by their action, and the effect of this motion back on the optical properties.

Role: **Principal Investigator** (subcontract from MIT Lincoln Lab, Lead PI D. Caplan)

Project: "Compact Power-efficient High-performance WDM Transmitters"

Funding: \$120k, Advanced Concepts Committee, MIT Lincoln Lab (3/2009-12/2009)

Provided integrated-photonics-based device concepts and designs for low size, weight and power chip-scale transmitters.

Role: **Co-Principal Investigator** (jointly with Prof. Rajeev Ram)

Project: "Hitless High-speed Switches for Integrated Photonic Networks"

Funding: \$490k, DARPA Seedling on "Low Loss Bulk CMOS Waveguides" (Oct 2008-Aug 2009)

Proposed core device concept and led (as PI) a 7-faculty research proposal on "hitless" nanophotonic high-speed switches for on-chip multicore processor photonic interconnects with large aggregate bandwidth (Tb/s). Successfully obtained DARPA funded seedling effort.

Other activity: Contributed to projects on telecom nanophotonic devices; intrachip photonic interconnects (V. Stojanovic, PI; 2007-); electronic-photonic integrated circuits (F. Kaertner, PI; 2004-) through work on slow light, dispersionless filters, energy-efficient modulators. Worked with T. Barwicz, IBM T.J. Watson Research Center (2006-) on a nanophotonics-based maskless lithography (submitted to DARPA SWEEPER program).

TEACHING

CLASSROOM TEACHING

Undergraduate

EK307 Introduction to Circuits – Fall 2017

EK100 Freshman Seminar

Boston University

(core undergraduate course)

Undergraduate

ECEN2250 Introduction to Circuits – Fall 2015

ECEN3400 Electromagnetism – Spring 2014, Spring 2015

ECEN4106 Introduction to Photonics – Fall 2011

University of Colorado Boulder

(core undergraduate course)

(core undergraduate course)

Graduate **Boston University**
EC700A1 Silicon Photonics – Fall 2016 (designed new course)

Graduate **University of Colorado Boulder**
ECEN5645 Physical Optics – Fall 2013 (core graduate course)
ECEN6006 Silicon Photonics – Fall 2010, Fall 2012 (designed new course)
ECEN4645/5645 Intro to Optical Electronics – Spring 2010, Spring 2012 (core graduate course)

(parental leave: Spring 2011, Fall 2015; faculty fellowship: Spring 2013)

Guest Lectures at

Harvard University Prof. M. Loncar, Optics and Photonics (ES273, grad) – Fall 2008
MIT Prof. Karl K. Berggren, Nanostructure Fabrication (6.781J, grad) – Spring 2007

UNDERGRADUATE, GRADUATE AND POSTDOCTORAL RESEARCH SUPERVISION

[SUMMARY: 7 PHDs (2 GRADUATED), 4 POSTDOCS (2 CURRENT), 4 MS (1 CURRENT), 15 UNDERGRADS (2 CURRENT)]

Postdoctoral Research Supervision **University of Colorado Boulder**
Jeffrey Shainline (PhD Brown) Aug 2011-Feb 2013
Topic: CMOS photonics *current position: NRC postdoc, NIST Boulder*
Rajesh Kumar (PhD Ghent, Belgium) Sep 2013-Dec 2014
Topic: CMOS photonics *current position: Faculty, Indian Institute of Technology, Roorkee*
Fabio Pavanello (PhD IEMN-CNRS, France) Jan 2014-June 2016
Topic: CMOS photonics
Yossef Ehrlichman (PhD Tel Aviv University, Israel) June 2015-present
Topic: RF photonics

Graduate Research Supervision (2 graduated in Fall 2015)

PHD **University of Colorado Boulder**
Xiaoge Zeng (Physics) Spring 2010-Fall 2015
Topic: photonic circuits for nonlinear and quantum optics
Yangyang Liu (ECEE) Fall 2010-present
Topic: light force and nanoacoustic photonic circuits
Mark Wade (ECEE, NSF GRFP Fellow) Fall 2011-Fall 2015
Topic: CMOS photonics
Cale Gentry (ECEE) Fall 2011-present
Topic: quantum and nonlinear photonic circuits
Nathan Dostart (ECEE, NSF GRFP Fellow) Fall 2014-present
Topic: light force and nanoacoustic photonics
Imbert Wang (ECE) Fall 2015-present
Topic: nonlinear and quantum photonics
Hayk Gevorgyan (ECE) Spring 2016-present
Topic: CMOS photonics
Kenaish Al-Qubaisi (ECE) Fall 2016-present
Topic: CMOS photonics
Josep Maria Fargas Cabanillas (Universitat Polytechnica de Catalunya, Spain) Fall 2016-present
Topic: quantum and nonlinear photonic circuits
Bohan Zhang (ECE) Fall 2016-present
Topic: electromagnetic theory and computational electromagnetics
Deniz Onural (ECE) Fall 2017-present
Topic: integrated photonics

BS/MS **University of Colorado Boulder**
Kareem Nammari (ECEE) Fall 2012-Summer 2013
Topic: efficient grating couplers for CMOS silicon photonics (research only, no thesis)
**1 peer-reviewed conference paper (+7 more co-authored)*
Gil Triginer (Universitat Polytechnica de Catalunya, Spain) May 2014-May 2015

Thesis: Classical and quantum applications of four-wave mixing
 Josep Maria Fargas Cabanillas (Universitat Polytechnica de Catalunya, Spain) Aug 2015-May 2016
Thesis: NEMS devices for quantum photonic circuits

M.Eng.

Mingyan Fan (MIT, EECS), Co-Advisor: Prof. Franz X. Kärtner MIT (Cambridge, MA)
 Sep 2005-July 2006
Thesis: Efficient Out-of-Plane Microphotonic Fiber-to-Chip Coupler Designs (MIT, June 2006)

Undergraduate Research Supervision

University of Colorado Boulder

Supervised about 17 undergraduate students (incl. DLA, NSF REU, NSF NNIN REU programs). Several have won best paper awards for their work in our lab (see Awards section above). Several have gone onto graduate school at MIT, UC Berkeley, U. British Columbia and CU Boulder.

Katrina Bossert (CU Boulder, ECEE)	Spring 2010
<i>Topic: Study of adiabatic and non-adiabatic couplers</i>	<i>Now: PhD student at CU Boulder</i>
Stevan Urosevic (University of Novi Sad, Serbia)	Spring 2010-Summer 2010
<i>Topic: High-efficiency, nanoantenna array grating couplers</i>	<i>Now: PhD student at MIT</i>
Fletcher Richman (CU Boulder, ECEE)	Fall 2011-Spring 2012
<i>Topic: Microring thermally tunable filter controller</i>	<i>Now: Managing director, Spark Boulder</i>
Ian Franklin (CU Boulder, ECEE)	Fall 2011-Spring 2013
<i>Topic: Optical mode solvers and optical resonator data study</i>	<i>Now: Northrop Grumman</i>
Daniel Klemme (Bethel University)	NSF NNIN REU, Summer 2012
<i>Topic: Microring resonator fabrication by e-beam lithography</i>	<i>Now: PhD student at UBC</i>
Juan Llinas (University of Illinois at Urbana-Champaign)	NSF REU, Summer 2012
<i>Topic: Thermo-optic tuning of silicon microring resonators</i>	<i>Now: PhD student at UC Berkeley</i>
Kareem Nammari (CU Boulder, ECEE)	Summer 2012-Summer 2013
<i>Topic: CMOS photonics grating coupler and active device design & expts</i>	<i>Now: CU Boulder</i>
<i>*1 peer-reviewed conference paper (+7 more co-authored)</i>	
Miljan Dasic (University of Belgrade, Serbia)	May-November 2012
<i>*1 best paper (student conf.), 1 peer-reviewed conference paper</i>	<i>Now: Inst. for Physics Belgrade</i>
Emily Donahue (Cornell University)	NSF NNIN REU, Summer 2013
<i>Topic: Fabrication of push-pull square cavity photonics</i>	<i>Now: Cornell University/Sandia</i>
Derek Gann (CU Boulder, engineering physics)	Summer 2013
<i>Topic: Characterization of passive and active photonics</i>	<i>Now: CU Boulder</i>
Christopher Poulton (CU Boulder, ECEE)	Spring 2012-Spring 2014
<i>Topic: Photonic crystals in zero-change CMOS photonics</i>	<i>Now: PhD student at MIT</i>
<i>*1 best poster (student conf.), 2 peer-reviewed journal and 5 peer-reviewed conference papers</i>	
Andrew Kee (CU Boulder, ECEE)	Nov 2013-August 2014
<i>Topic: Modeling of silicon photonic circuits</i>	<i>Now: CU Boulder</i>
Jelena Notaros (CU Boulder, ECEE)	Spring 2013-present
<i>Topic: Complex-k band solvers and ultraefficient grating couplers</i>	<i>Now: PhD student at MIT</i>
<i>*1 best paper (student conf.), 1 peer-reviewed journal and 4 peer-reviewed conference papers</i>	
Jonathan Quinn (CU Boulder, ECEE)	Fall 2014
<i>Topic: Silicon nitride platform for nonlinear optics, microring modeling</i>	<i>Now: CU Boulder</i>
Ji-Hoon Kim (CU Boulder, ECEE)	Fall 2015
<i>Topic: Modeling of the roughness induced scattering of light from waveguides</i>	<i>Now: CU Boulder</i>
Joseph Theis (CU Boulder, Engineering Physics)	Fall 2015-Spring 2016
<i>Topic: Automated characterization of passive and active photonic devices</i>	<i>Now: CU Boulder</i>

SERVICE

Member: IEEE (1998-present), Optical Society of America (2005-present), SPIE (2008-2011)

Reviewer for: IEEE Photon. Technol. Lett., J. Lightwave Technol., IEEE J. Quantum Electron. Opt. Commun., Optics Express, Appl. Phys. Lett., Optics Letters, Nature Commun., Nature Nanotechnology, Nature Scientific Reports, Nature Photonics, Optica, Nature Physics.

NSF EPMD Proposal Review Panel, Nov 2011; DOE SBIR Panel, Oct 2012

Serving on Technical Program Committees/Organizing Committees:

Conference Chair, IEEE Group IV Photonics 2018.

Subcommittee Chair, Integrated Photonics Research Conference, IPR (2011-present)
TPC member, Conference on Lasers and Electro-Optics, CLEO (2010-2012)
TPC member, Optical Fiber Communication Conference, OFC (2011-2013)
TPC member, IEEE Group IV Photonics, GFP (2012-2013)
TPC member, IEEE Photonics Conference, IPC (2013-2015)
TPC member, IEEE Summer Topical Meeting on Low Energy Interconnects (2017)
Topic convener, URSI/GASS 2017.
Technical Program Committee, IEEE Summer Topical Meeting on Low Energy Integrated Nanophotonics, July 10-12, 2017, Puerto Rico.
Session Convener, URSI/GASS 2017 (Montreal, Canada, Aug 19-26, 2017).
Member of organizing committee, Single Photon Workshop 2017, Boulder CO, July 31-Aug 4, 2017.

Local Chair, OSA Optics & Photonics Congress, Colorado Springs, CO, July 2012.

Invited participant/contributor, NSF Workshop on Emerging Technologies in Interconnects, Feb 2012.

BU ECE Department:	Graduate Committee	2016-present
	Publicity Committee	2017
	Search Committee	2017

US STATUS Permanent resident (Green Card holder)

CITIZENSHIP Canadian **BORN** Zajecar, Serbia (Apr 21, 1977)

LANGUAGES English (native speaker), French (proficient), Serbo-Croat (native speaker).

PUBLICATIONS

2 book chapters, 18 issued patents/9 pending, 166 papers: 47 journal (5 invited), 119 conference (43 invited)

[this publication list, with full PDF available for recent paper, is accessible at <http://plab.colorado.edu>]

H-index: 32 (as of 2017)

Google Scholar: <http://scholar.google.com/citations?user=J8VuA0gAAAAJ>

Blue, italicized = students/postdocs from Popovic Research Group at CU Boulder

Theses:

- T2. M. Popović, "Theory and design of high-index-contrast microphotonic circuits," Ph.D. Thesis, Dept. of Elec. Engineering and Computer Science, Massachusetts Institute of Technology (MIT), Cambridge, Massachusetts, USA, Feb. 2008.
- T1. M. Popović, "Air trenches for dense silica integrated optics," M.S. Thesis, Department of Electrical Engineering and Computer Science, Massachusetts Institute of Technology (MIT), Cambridge, Massachusetts, USA, Feb. 2002.

Book Chapters:

- B2. K. Wada, J.F. Liu, S. Jongthammanurak, D.D. Cannon, D.T. Danielson, D.H. Ahn, S. Akiyama, M. Popović, D.R. Lim, K.K. Lee, H.-C. Luan, Y. Ishikawa, X. Duan, J. Michel, H.A. Haus and L.C. Kimerling, "Si Microphotonics for Optical Interconnection," in *Optical Interconnects, The Silicon Approach*, L. Pavesi and G. Guillot, Eds., Springer Series in Optical Sciences, vol. 119, Springer, 2006, Chapter 11, p. 291-310.
- B1. H.A. Haus, M. Popović, M.R. Watts, C. Manolatos, B.E. Little, S.T. Chu, "Optical resonators and filters," in *Optical Microcavities* (Adv. Series in Appl. Phys., vol. 5), Kerry Vahala, Ed., World Scientific, 2004.

Patents (18 granted, 9 pending):

- P27. F. Pavanello and M.A. Popovic, "Improved CMOS Compatible Optical Modulators," CU Case CU3871B, filed July 2015.
- P26. R. Meade, Z. Sternberg, O. Tehar-Zahav, J. Orcutt, J. Shainline, M. Popovic and V. Stojanovic, "BEOL waveguide integration and formation of hybrid BEOL/FEOL waveguides," MIT Case 16586JK (joint MIT-CU-Micron), filed 9/19/2013.
- P25. O. Tehar-Zahav, Z. Sternberg, E. Megged, R. Meade, V. Stojanovic, M. Popovic, J. Orcutt, "Deep and shallow trench for optical circuits," MIT Case 16585J (joint MIT-CU-Micron), filed 9/19/2013.
- P24. O. Tehar-Zahav, Z. Sternberg, E. Megged, R. Meade, V. Stojanovic, M. Popovic, J. Orcutt, "Integration of Salicide Block for Low Loss P-Si WG's," MIT Case 16587JK (joint MIT-CU-Micron), filed 9/19/2013.
- P23. M.A. Popović J. Shainline, J.S. Orcutt and V. Stojanović, "Depletion-mode carrier-plasma optical modulator in zero-change advanced CMOS," US Provisional Patent Application, **University of Colorado Case CU3372B** (provisional filed June 12, 2013). The utility filed is "Optical modulator from standard fabrication processing," WO2014201286 A1.
- P22. M.A. Popović, J.S. Orcutt and V. Stojanovic, "CMOS photonics fiber-chip and intra/inter-chip couplers," US Provisional Patent Application, **University of Colorado Case CU3255B** (filed January 10, 2013).
- P21. M.A. Popović and M. Wade, "Pole-zero resonant demultiplexers," US Provisional Patent Application, **University of Colorado Case CU3254B** (filed January 10, 2013).
- P20. M.A. Popović, "Ring optical-wiggler-mode resonators," US Provisional Patent Application, **University of Colorado Case CU3253B** (filed January 10, 2013).
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- C29. M.A. Popović, E.P. Ippen and F.X. Kärtner, "Low-Loss Bloch Waves in Open Structures and Highly Compact, Efficient Si Waveguide-Crossing Arrays," presented at the 20th **Annual Meeting of the IEEE Lasers and Electro-Optics Society (LEOS)**, Lake Buena Vista, Florida, Oct 2007, paper MF5.
- C28. F. Gan, T. Barwicz, M.A. Popović, M.S. Dahlem, C.W. Holzwarth, P.T. Rakich, H.I. Smith, E.P. Ippen and F.X. Kärtner, "Maximizing the Thermo-Optic Tuning Range of Silicon Photonic Structures," presented at **IEEE/LEOS Photonics in Switching Conference**, San Francisco, CA, Aug 2007, paper TuB3.3.
- C27. M.A. Popović, T. Barwicz, M.S. Dahlem, F. Gan, C.W. Holzwarth, P.T. Rakich, H.I. Smith, E.P. Ippen and F.X. Kärtner, "Tunable, Fourth-Order Silicon Microring-Resonator Add-Drop Filters," presented at the **European Conference on Optical Communication (ECOC)**, Berlin, Germany, Sep 2007, paper 1.2.3.

- C26. M.A. Popović, T. Barwicz, F. Gan, M.S. Dahlem, C.W. Holzwarth, P.T. Rakich, H.I. Smith, E.P. Ippen and F.X. Kärtner, "Transparent wavelength switching of resonant filters," presented at **Conference on Lasers and Electro-Optics (CLEO)**, Baltimore, MD, May 10, 2007, postdeadline paper CPDA2.
- C25. R. Amatya, C.W. Holzwarth, M.A. Popović, F. Gan, H.I. Smith, F. Kärtner and R.J. Ram, "Low Power Thermal Tuning of Second-order Microring Resonators," in **Conference on Lasers and Electro-Optics (CLEO)**, OSA Technical Digest (Optical Society of America, Washington DC, May 6-11, 2007), paper CFQ5.
- C24. M.A. Popović, "Sharply-defined optical filters and dispersionless delay lines based on loop-coupled resonators and 'negative' coupling," in **Conference on Lasers and Electro-Optics (CLEO)**, OSA Technical Digest (Optical Society of America, Washington DC, May 6-11, 2007), paper CThP6.
- C23. M. Fan, M.A. Popović and F.X. Kärtner, "High Directivity, Vertical Fiber-to-Chip Coupler with Anisotropically Radiating Grating Teeth," in **Conference on Lasers and Electro-Optics (CLEO)**, OSA Technical Digest (Optical Society of America, Washington DC, May 6-11, 2007), paper CTuDD3.
- C22. T. Barwicz, C.W. Holzwarth, P.T. Rakich, M.A. Popović, E.P. Ippen and H.I. Smith, "Metallic-Contamination-Induced Optical Loss in Silicon Microphotonic Waveguides," in **Conference on Lasers and Electro-Optics (CLEO)**, OSA Technical Digest (Optical Society of America, Washington DC, May 6-11, 2007), paper CTuG5.
- *C21. H.I. Smith, T. Barwicz, C.W. Holzwarth, M.A. Popović, M.R. Watts, P.T. Rakich, M. Qi, R. Barreto, F.X. Kärtner and E.P. Ippen, "Strategies for fabricating strong-confinement microring filters and circuits (Invited)," in **Optical Fiber Communication Conference (OFC/NFOEC)** Technical Digest (Optical Society of America, Washington, DC, March 25-29, 2007), paper OThC2.
- *C20. S.J. Spector, T.M. Lyszczarz, M.W. Geis, D.M. Lennon, J.U. Yoon, M.E. Grein, R.T. Schuelein, F.X. Kärtner, R. Amatya, G. Barbastathis, H. Byun, F. Gan, C.W. Holzwarth, J.L. Hoyt, E.P. Ippen, O.O. Olubuyide, J.S. Orcutt, M.J. Park, M.H. Perrott, M.A. Popović, P.T. Rakich, R.J. Ram, H.I. Smith, "Integrated optical components in silicon for high speed analog-to-digital conversion (Invited)," in **Proceedings of the SPIE, Silicon Photonics II**; vol. 6477-paper 22, Jan. 2007. (Photonics West 2007, San Jose, CA, Jan 24, 2007)

2006

- *C19. F.X. Kärtner, R. Amatya, G. Barbastathis, H. Byun, F. Gan, C.W. Holzwarth, J.L. Hoyt, E.P. Ippen, O.O. Olubuyide, J.S. Orcutt, M. Park, M. Perrott, M.A. Popović, P.T. Rakich, R.J. Ram, H.I. Smith, S. Takahashi, M. Geis, M.E. Grein, T.M. Lyszczarz, S.J. Spector and J.U. Yoon, "Silicon Electronic Photonic Integrated Circuits for High Speed Analog to Digital Conversion (Invited)," presented at the 3rd **International Conference on Group IV Photonics (GFP)**, Ottawa, Canada, Sep 14, 2006, paper ThC3.
- C18. C. Holzwarth, T. Barwicz, M. Popović, P. Rakich, E. Ippen, F. Kärtner and H. Smith, "Accurate Resonant-Frequency Spacing of Microring Filters Without Post-Fabrication Trimming," presented at the Fiftieth International Conference on **Electron, Ion, and Photon Beams and Nanolithography (EIPBN)**, Baltimore, MD, June 2006, paper 8B.4.
- C17. P.T. Rakich, M.A. Popović, M.R. Watts, T. Barwicz, H.I. Smith and E.P. Ippen, "Ultra-widely tunable photonic microcavities through evanescent field perturbation," in **Conference on Lasers and Electro-Optics (CLEO)**, OSA Technical Digest (Optical Society of America, Washington DC, May 21-26, 2006), paper CTuM2.
- C16. M.A. Popović, T. Barwicz, E.P. Ippen and F.X. Kärtner, "Global design rules for silicon microphotonic waveguides: sensitivity, polarization and resonance tunability," in **Conference on Lasers and Electro-Optics (CLEO)**, OSA Technical Digest (Optical Society of America, Washington DC, May 21-26, 2006), paper CTuCC1.
- *C15. M.R. Watts, T. Barwicz, M.A. Popović, M. Qi, P.T. Rakich, L. Socci, E.P. Ippen, F.X. Kärtner, H.I. Smith and M. Romagnoli, "High-index-contrast microphotonic, from concept to implementation (Invited)," in **Conference on Lasers and Electro-Optics (CLEO)**, OSA Technical Digest (Optical Society of America, Washington DC, May 21-26, 2006), paper CTuM3.
- *C14. T. Barwicz, M.A. Popović, P.T. Rakich, M.R. Watts, F.X. Kärtner, E.P. Ippen and H.I. Smith, "Fabrication control of the resonance frequencies of high-index-contrast microphotonic cavities (Invited)," in **Proc. Integrated Photonics Research and Applications and Nanophotonics Topical Meeting (IPRA/Nano)**, Uncasville, Connecticut, April 2006, paper JWA3.
- C13. M.A. Popović, Hermann A. Haus and M.R. Watts, "General approach to hitless switching and FSR extension for resonators in integrated photonic circuits," in **Optical Fiber Communication Conference (OFC/NFOEC)** Technical Digest (Optical Society of America, Washington, DC, March 5-10, 2006), paper OWI66.
- *C12. F.X. Kärtner, S. Akiyama, G. Barbastathis, T. Barwicz, H. Byun, D.T. Danielson, F. Gan, F. Grawert, C.W. Holzwarth, J.L. Hoyt, E.P. Ippen, M. Kim, L.C. Kimerling, J. Liu, J. Michel, O.O. Olubuyide, J.S. Orcutt, M. Park, M. Perrott, M.A. Popović, P.T. Rakich, R.J. Ram, H.I. Smith and M.R. Watts, "Electronic photonic integrated circuits for high speed, high resolution, analog to digital conversion (Invited)," in **Proceedings of the SPIE, Silicon Photonics**; vol. 6125, pp. 612503, Jan. 2006. (Photonics West 2006, San Jose, CA, Jan. 2006).

2005

- C11. M.R. Watts, M. Qi, T. Barwicz, M. Popović, P. Rakich, L. Socci, E.P. Ippen, F. Kaertner and H.I. Smith, "Towards polarization independent high-index contrast microphotonic," presented at XXVIIIth **General Assembly of the International Union of Radio Science (URSI)**, New Delhi, India, Session D07A, Oct 28, 2005.

- C10. M.A. Popović, T. Barwicz, M.R. Watts, P.T. Rakich, L. Socci, E.P. Ippen, F.X. Kärtner and H.I. Smith, "Multistage high-order microring-resonator filters with relaxed tolerances for high through-port extinction," in **Conference on Lasers and Electro-Optics (CLEO)**, Baltimore, MD, May 22-27, 2005 [*Highlighted as one of CLEO/QELS Hot Topics papers*].
- C9. M.R. Watts, T. Barwicz, M.A. Popović, P.T. Rakich, L. Socci, E.P. Ippen, H.I. Smith and F. Kaertner, "Microring-Resonator Filter with Doubled Free-Spectral-Range by Two-Point Coupling," in **Conference on Lasers and Electro-Optics (CLEO)**, Baltimore, MD, May 22-27, 2005.
- C8. M.A. Popović, M.R. Watts, T. Barwicz, P.T. Rakich, L. Socci, E.P. Ippen, F.X. Kärtner and H.I. Smith, "High-index-contrast, wide-FSR microring-resonator filter design and realization with frequency-shift compensation," in **Optical Fiber Communication Conference** (Optical Society of America, Washington, DC, 2005), paper OFK1.

2004

- C7. S. Akiyama, K. Wada, J. Michel, L.C. Kimerling, M.A. Popović and Hermann A. Haus, "Air trench waveguide bend for high-density optical integration," **Proc. SPIE Int. Soc. Opt. Eng.** 5355, 14 (2004).
- C6. C. Manolatu, M.A. Popović, P.T. Rakich, T. Barwicz, H.A. Haus and E.P. Ippen, "Spectral anomalies due to coupling-induced frequency shifts in dielectric coupled-resonator filters," in Proceedings of **Optical Fiber Communication Conference** (Session TuD5), Los Angeles, CA, February 2004.
- C5. T. Barwicz, M.A. Popović, P.T. Rakich, M.R. Watts, H.A. Haus, E.P. Ippen and H.I. Smith, "Fabrication and analysis of add-drop filters based on microring resonators in SiN," in Proceedings of **Optical Fiber Communication Conference** (Session TuL4), Los Angeles, CA, February 2004.

2003

- C4. M. Popović, "Complex-frequency leaky mode computations using PML boundary layers for dielectric resonant structures," in Proceedings of **Integrated Photonics Research** 2003, Washington, DC, June 17, 2003, paper ITuD4.
- C3. S. Akiyama, K. Wada, J. Michel, M. Popović and H. A. Haus, "Realization of Air Trench Waveguide for Future Microphotonics," presented at **Materials Research Society Spring Meeting** 2003, Symposium J, San Francisco, CA, Apr 22, 2003.

2002

- C2. M. Popović, K. Wada, S. Akiyama, H.A. Haus and J. Michel, "Micron-size bending radii in silica-based waveguides (design)," in **Proceedings of the SPIE, Integrated Optics: Devices, Materials, and Technologies VI**; Yakov S. Sidorin, Ari Tervonen; Eds., vol. 4640, p. 54-63, June 2002. (Photonics West 2002, San Jose, CA, January 21, 2002); (same title, but different paper than below)

2001

- C1. K. Wada, M. Popović, S. Akiyama, H.A. Haus and J. Michel, "Micron-size bending radii in silica-based waveguides," in Proceedings of the **LEOS Summer Topical Meeting on WDM Components**, Copper Mountain, CO, Aug 2001.

Invited talks (peer reviewed venues): (these are also included in the full conference paper list above, same paper numbers)

2016

- *C116. M. Popovic, "CMOS Integration and Integrated Quantum Photonic Circuits," presented at Frontiers in Optics, Oct 19, 2016.
- *C110. M.A. Popovic, "What Subwavelength Structures can do for CMOS Electronics-Photonics Integration," presented at the **OSA Subwavelength Photonics Incubator**, 21-23 September, 2016.
- *C109. M.A. Popovic, "Microprocessor with integrated photonic I/O enabled by "More-than-Moore" CMOS design," presented at the **IEEE Photonics Society Summer Topicals Meeting**, Newport Beach, CA, July 11-13, 2016.

2015

- *C105. F. Pavanello, M.T. Wade, J. Notaros, J.M. Shainline, C.V. Poulton, C. Sun, M. Georgas, L. Alloatti, A. Atabaki, R. Kumar, B. Moss, S. Lin, R.J. Ram, V. Stojanović and M.A. Popović, "Efficient nanoscale photonic devices and monolithic electronic-photonic subsystems in sub-100 nm SOI CMOS," in Proceedings of the **IEEE Photonics Conference (IPC)**, Reston, VA (Oct 2015).
- *C103. M.A. Popović et al., "Harnessing the concept of imaginary coupling in passive and active photonic devices," to be presented at **IEEE Group IV Photonics (GFP) Conference**, August 2015, Vancouver, British Columbia, Canada.
- *C102. M.A. Popović et al., "Efficient Photonic Devices and Monolithic Transmitters in Sub-100nm SOI CMOS," to be presented at **IEEE Summer Topical Meeting on On-Chip Optical Interconnects (OCOI)**, July 2015, Nassau, Bahamas.

- *C101. M.A. Popović, M.T. Wade, J.S. Orcutt, J.M. Shainline, C. Sun, M. Georgas, B. Moss, F. Pavanello, J. Notaros, L. Alloatti, R. Kumar, Y.-H. Chen, A. Atabaki, J. Leu, V. Stojanovic and R.J. Ram, "Photonics as a More-than-Moore Device Technology within Sub-100 nm SOI CMOS", to be presented at **PIERS Symposium on Photonics** (Focus Session on Technologies for On-Chip Optical Networking, Chair: Yeshiahu Fainman), July 2015, Prague, Czech Republic.
- *C98. M.A. Popović, "Prospects for monolithic electronics-photonics integration: silicon photonics as a More-than-Moore device technology in sub-100nm CMOS (**Invited**)," presented at **Photonica 2015**, Belgrade, Serbia, August 24, 2015.
- *C95. M.A. Popović, M.T. Wade, J.S. Orcutt, J.M. Shainline, C. Sun, M. Georgas, B. Moss, R. Kumar, L. Alloatti, F. Pavanello, Y.H. Chen, K. Nammari, J. Notaros, A. Atabaki, J.C. Leu, V. Stojanovic, R.J. Ram, "Monolithic Silicon Photonics in a Sub-100nm SOI CMOS Microprocessor Foundry: Progress from Devices to Systems (**Invited**)," in SPIE Photonics West: OPTO Silicon Photonics X, February 2015, paper 9367-21.
- *C94. R.J. Ram et al., "Photonic-Electronic Integration with Polysilicon Photonics in Bulk CMOS (**Invited**)," in SPIE Photonics West: OPTO Silicon Photonics X, February 2015, paper 9367-22.

2013

- *C77. M. Popović, "Synthesis of active, nonlinear and quantum photonic circuits," presented at the **OSA Frontiers in Optics Conference**, Orlando, FL, Oct 2013, paper FTu5C.3.
- *C68. R. Meade, O. Tehar-Zahav, Z. Sternberg, E. Megged, G. Sandhu, J.S. Orcutt, R. Ram, V. Stojanovic, M.R. Watts, E. Timurdogan, J. Shainline and M. Popović, "Integration of silicon photonics in a bulk CMOS memory flow," in Proceedings of the **IEEE Optical Interconnects Conference**, pp. 114-115, Santa Fe, NM, 5-8 May 2013.

2012

- *C60. J.S. Orcutt et al., "Photonic Integration in State-of-the-Art Silicon Electronics Processes," presented at **Integrated Photonics Research (IPR)**, Colorado Springs, Colorado, June 17-22, 2012.
- *C59. J.S. Orcutt, B. Moss, C. Sun, J. Leu, M. Georgas, S. Urosevic, H. Li, J. Sun, M. Weaver, E. Zraggen, R.J. Ram, V. Stojanovic, J. Shainline and M. Popovic, "Low loss waveguide integration within a thin-SOI CMOS foundry," in Proceedings of the **IEEE Optical Interconnects Conference**, pp. 25-26, 20-23 May, 2012.

2011

- *C58. M.A. Popović, "Linewidth Unlimited Resonators: Stepping Around Conventional Performance Limits of Silicon Photonics," presented at the **IEEE Photonics Conference (IPC)**, Arlington, Virginia, Oct 12, 2011, paper WB1.

2010

- *C57. V. Stojanović, R. Ram, M. Popović, J. Orcutt, M. Georgas, J. Leu, B. Moss, C. Sun, J. Sun and Hanqing Li, "EOS: A Monolithic CMOS Photonic Platform," presented at the **43rd International Symposium on Microarchitecture (WINDS 2010: Workshop on the Interaction between Nanophotonic Devices and Systems)**, Atlanta, Georgia, Dec 5, 2010.
- *C56. M.A. Popović, P.T. Rakich and Z.H. Wang, "Nano-Optomechanical Photonic Circuits Based on Light Forces," in **Integrated Photonics Research, Silicon and Nanophotonics**, OSA Technical Digest (CD) (Optical Society of America, 2010), paper IMF3, Monterey California, July 25, 2010.
- *C52. M.A. Popović, J.S. Orcutt, A.N. Khilo, C.W. Holzwarth, H. Li, A. Joshi, B. Moss, M. Georgas, J. Leu, F.X. Kärtner, H.I. Smith, R.J. Ram and V.M. Stojanovic, "Designing energy efficient chip-scale optical communication links from the bottom up: a perspective from first principles device design of integrated photonic devices," presented at **IEEE Photonics Society Summer Topical Meeting on Optical Networks and Devices for Data Centers**, Playa del Carmen, Mexico, July 19, 2010.
- *C51. P.T. Rakich, Z.H. Wang and M.A. Popović, "Engineering optical forces in waveguides and cavities based on optical response." *Laser Resonators and Beam Control XII*, Editors: A.V. Kudryashov, A.H. Paxton and V.S. Ilchenko, San Francisco, California, USA, **Proceedings of the SPIE** (Photonics West, paper 7579-52) 7579, 75790C-15 (2010).
- *C50. M.A. Popović, J.S. Orcutt, A.N. Khilo, C.W. Holzwarth, H. Li, A. Joshi, B. Moss, M. Georgas, J. Leu, F.X. Kärtner, R.J. Ram and V.M. Stojanovic, "Photonic devices and circuits for electronic-photonics integration and on-chip interconnects in deeply scaled CMOS processes", presented at **Photonics West**, Jan 2010, paper 7579-51.

2009

- *C49. M.A. Popović, P.T. Rakich, M.S. Dahlem, C.W. Holzwarth, T. Barwicz, F. Gan, H.I. Smith, F.X. Kärtner and E.P. Ippen, "Dynamical Systems in Nanophotonics: from Energy Efficient Modulators to Light Forces and Optomechanics," presented at the **LEOS Annual Meeting 2009**, Belek-el-Antalya, Turkey, Oct 3-8, 2009, paper WV1.
- *C47. M.A. Popović and P.T. Rakich, "Optonomechanical Self-Adaptive Photonic Devices based on Light Forces: A Path to Robust High-Index-Contrast Nanophotonic Circuits," in **Proceedings of the SPIE** 7219, 72190A (2009); presented at **Photonics West**, Jan 2009.

- *C46. C.W. Holzwarth, R. Amatya, M. Araghchini, J.R. Birge, H. Byun, L.-J. Chen, M.S. Dahlem, N.A. DiLello, F. Gan, J.L. Hoyt, E.P. Ippen, F.X. Kärtner, A.M. Khilo, J.W. Kim, M. Kim, A.R. Motamedi, J.S. Orcutt, M.J. Park, M.H. Perrott, M.A. Popović, R.J. Ram, H.I. Smith, G. Zhou, S.J. Spector, T.M. Lyszczarz, M.W. Geis, D.M. Lennon, J.U. Yoon, M.E. Grein and R.T. Schulein, "High speed analog-to-digital conversion with silicon photonics," in **Proceedings of the SPIE 7220, 72200B** (2009); presented at **Photonics West**, Jan 2009.

2008

- *C44. M.A. Popović and P.T. Rakich, "'Smart' nanophotonic elements and all-optical feedback control through optical forces and potentials (Invited)," in proceedings of the **XXIX General Assembly of the International Union of Radio Science** (Union Radio Scientifique Internationale-URSI), Chicago, Illinois, USA, August 15, 2008, paper D08.3.
- *C41. M.A. Popović, P.T. Rakich, T. Barwicz, M.S. Dahlem, F. Gan, C.W. Holzwarth, H.I. Smith, F.X. Kärtner and E.P. Ippen, "Circuit theory and microphotonic circuit design: from telecom-grade filters to light-powered micromachines," in proceedings of the **Integrated Photonics and Nanophotonics Research and Applications (IPNRA)** OSA Topical Meeting, Boston, MA, USA, July 13-16, 2008, paper ITuA6.
- *C40. T. Barwicz, M.A. Popović, C.W. Holzwarth, M.R. Watts, P.T. Rakich, F. Gan, M. Dahlem, F.X. Kärtner, E.P. Ippen and H.I. Smith, "Challenges in nanofabrication of strong-confinement photonic devices (Invited)," presented at the Fifty-Second International Conference on **Electron, Ion, and Photon Beams and Nanolithography (EIPBN)**, Portland, Oregon, May 27-30, 2008.
- *C35. M.A. Popović, "Advances in silicon microphotonics: from telecom-grade filters to light-powered micromachines," presented at the Silicon Photonics Integrated Devices Workshop, Haifeng Li (Tyco Telecommunications, USA), Organizer; at the **Optical Fiber Communication Conference (OFC)**, Feb 26, 2008, session OSuB.
- *C34. F.X. Kärtner, R. Amatya, M. Aranghini, H. Byun, J. Chen, M. Dahlem, N.A. DiLello, F. Gan, C.W. Holzwarth, J.L. Hoyt, E.P. Ippen, A. Khilo, J. Kim, A. Motamedi, J.S. Orcutt, M. Park, M. Perrott, M.A. Popović, R.J. Ram, H.I. Smith, G.R. Zhou, S.J. Spector, T.M. Lyszczarz, M.W. Geis, D.M. Lennon, J.U. Yoon, M.E. Grein and R.T. Schulein, "Photonic Analog-to-Digital Conversion with Electronic-Photonic Integrated Circuits," presented at **Photonics West**, San Jose, CA, Jan 19-24, 2008.
- *C33. M.A. Popović, T. Barwicz, M.S. Dahlem, F. Gan, C.W. Holzwarth, P.T. Rakich, M.R. Watts, H.I. Smith, E.P. Ippen and F.X. Kärtner, "Hitless-Reconfigurable and Bandwidth-Scalable Silicon Photonic Circuits for Telecom and Interconnect Applications (Invited)," presented at **Optical Fiber Communication Conference (OFC)**, Feb 26, 2008, paper OTuF4.
- *C32. T. Barwicz, M.A. Popović, F. Gan, M.S. Dahlem, C.W. Holzwarth, P.T. Rakich, E.P. Ippen, F.X. Kärtner and H.I. Smith, "Reconfigurable silicon photonic circuits for telecommunication applications," presented at **Photonics West LASE2008**, San Jose, CA, Jan 19-24, 2008.
- *C31. T. Barwicz, M.A. Popović, M.R. Watts, P.T. Rakich, C.W. Holzwarth, F.X. Kärtner, E.P. Ippen and H.I. Smith, "Strategies for the successful realization of strong confinement microphotonic devices," presented at **Photonics West OPTO2008**, San Jose, CA, Jan 19-24, 2008.

2007

- *C30. M.A. Popović, T. Barwicz, M.R. Watts, P.T. Rakich, M.S. Dahlem, F. Gan, C.W. Holzwarth, L. Socci, H.I. Smith, F.X. Kärtner, E.P. Ippen and H.I. Smith, "Strong-confinement microring resonator photonic circuits (Invited)," presented at the 20th **Annual Meeting of the IEEE Lasers and Electro-Optics Society (LEOS)**, Lake Buena Vista, Florida, Oct 2007, paper TuCC3.
- *C21. H.I. Smith, T. Barwicz, C.W. Holzwarth, M.A. Popović, M.R. Watts, P.T. Rakich, M. Qi, R. Barreto, F.X. Kärtner and E.P. Ippen, "Strategies for fabricating strong-confinement microring filters and circuits (Invited)," in **Optical Fiber Communication Conference (OFC/NFOEC)** Technical Digest (Optical Society of America, Washington, DC, March 25-29, 2007), paper OThC2.
- *C20. S.J. Spector, T.M. Lyszczarz, M.W. Geis, D.M. Lennon, J.U. Yoon, M.E. Grein, R.T. Schulein, F.X. Kärtner, R. Amatya, G. Barbastathis, H. Byun, F. Gan, C.W. Holzwarth, J.L. Hoyt, E.P. Ippen, O.O. Olubuyide, J.S. Orcutt, M.J. Park, M.H. Perrott, M.A. Popović, P.T. Rakich, R.J. Ram, H.I. Smith, "Integrated optical components in silicon for high speed analog-to-digital conversion (Invited)," in **Proceedings of the SPIE, Silicon Photonics II**; vol. 6477-paper 22, Jan. 2007. (Photonics West 2007, San Jose, CA, Jan 24, 2007)

2006

- *C19. F.X. Kärtner, R. Amatya, G. Barbastathis, H. Byun, F. Gan, C.W. Holzwarth, J.L. Hoyt, E.P. Ippen, O.O. Olubuyide, J.S. Orcutt, M. Park, M. Perrott, M.A. Popović, P.T. Rakich, R.J. Ram, H.I. Smith, S. Takahashi, M. Geis, M.E. Grein, T.M. Lyszczarz, S.J. Spector and J.U. Yoon, "Silicon Electronic Photonic Integrated Circuits for High Speed Analog to Digital Conversion (Invited)," presented at the 3rd **International Conference on Group IV Photonics (GFP)**, Ottawa, Canada, Sep 14, 2006, paper ThC3.
- *C15. M.R. Watts, T. Barwicz, M.A. Popović, M. Qi, P.T. Rakich, L. Socci, E.P. Ippen, F.X. Kärtner, H.I. Smith and M. Romagnoli, "High-index-contrast microphotonics, from concept to implementation (Invited)," in **Conference on Lasers and Electro-Optics (CLEO)**, OSA Technical Digest (Optical Society of America, Washington DC, May 21-26, 2006), paper CTuM3.

- *C14. T. Barwicz, M.A. Popović, P.T. Rakich, M.R. Watts, F.X. Kärtner, E.P. Ippen and H.I. Smith, "Fabrication control of the resonance frequencies of high-index-contrast microphotonic cavities (Invited)," in **Proc. Integrated Photonics Research and Applications and Nanophotonics Topical Meeting (IPRA/Nano)**, Uncasville, Connecticut, April 2006, paper JWA3.
- *C12. F.X. Kärtner, S. Akiyama, G. Barbastathis, T. Barwicz, H. Byun, D.T. Danielson, F. Gan, F. Grawert, C.W. Holzwarth, J.L. Hoyt, E.P. Ippen, M. Kim, L.C. Kimerling, J. Liu, J. Michel, O.O. Olubuyide, J.S. Orcutt, M. Park, M. Perrott, M.A. Popović, P.T. Rakich, R.J. Ram, H.I. Smith and M.R. Watts, "Electronic photonic integrated circuits for high speed, high resolution, analog to digital conversion (Invited)," in **Proceedings of the SPIE, Silicon Photonics**; vol. 6125, pp. 612503, Jan. 2006. (Photonics West 2006, San Jose, CA, Jan. 2006).

Unreferreed venue invited talks, lectures and workshop presentations: (these are not included in the conference papers)

Scheduled:

- UI39. S. Moazeni, A. Atabaki, F. Pavanello, C. Baicco, D. Coolbaugh, M. Popovic, R. Ram and V. Stojanovic, "Integration of Polysilicon-based Photonics in a 12-inch Wafer 65nm Bulk CMOS Process," E3S Symposium & Steep Transistors Workshop, University of California, Berkeley, Oct 19-20, 2017.

Given:

- UI38. M.A. Popović, "Building the first microprocessor that communicates using light," presented at Lockheed Martin Coherent Technologies, Louisville, Colorado, April 28, 2016.
- UI37. M.A. Popović, "Integrated Quantum Photonic Circuits and CMOS Integration," presented at the Third Workshop on Scalable Information Processing with Quantum Nano-Photonics (SIPQNP), Raytheon BBN Technologies, March 31, 2016.
- UI36. M.A. Popović, "Photonic Device Design from the Complex Plane to the Microprocessor: Keeping Information, Energy and Entropy Under Control," Boston University, Department Seminar, Feb 23, 2016.
- UI35. M.A. Popović, "Photonic Device Design from the Complex Plane to the Microprocessor: Keeping Information, Energy and Entropy Under Control," Stanford University, Ginzton Lab Optics and Electronics Seminar, Jan 16, 2016.
- UI34. M.A. Popović, "Photonic Device Design from the Complex Plane to the Microprocessor: Keeping Information, Energy and Entropy Under Control," University of California Berkeley Solid State Seminar, Dec 4, 2015.
- UI33. M.A. Popović, "Integrated Photonics as a More-than-Moore CMOS Technology," Intel Labs, Santa Clara, CA, Dec 2, 2015.
- UI32. M.A. Popović, "From the Complex Plane to Complex Photonic Circuits," MIT Optics and Quantum Electronics Seminar, Nov 18, 2015.
- UI31. M.A. Popović, "Integrated Photonics as a More-than-Moore CMOS Technology: from Processor-to-Memory Interconnects to the Quantum Foundry," Harvard University, Nov 17, 2015.
- UI30. M.A. Popović, "Silicon photonics in a commercial microprocessor foundry," Aerospace Ventures Day, Sep 2015.
- UI29. M.A. Popović, "Silicon photonics in a commercial microprocessor foundry," Aerospace Ventures Day, Sep 2014.
- UI28. M.A. Popović, "Silicon Photonics as a More-than-Moore CMOS Technology: from Processor-to-Memory Interconnects to Quantum Foundries," ECEE Department Seminar, University of Colorado Boulder, Sep 2014.
- UI27. M.A. Popović, "More than Moore: Monolithic Silicon Photonics in Advanced CMOS Microelectronics," HP Labs, June 2014.
- UI26. M. Popović, "More than Moore: Monolithic Silicon Photonics in Advanced CMOS Microelectronics," U. Toronto, Apr 2014.
- UI25. M.A. Popović, "Monolithically integrated silicon photonics in standard microelectronics SOI CMOS and bulk CMOS processes," MIT Microphotonics Center Fall Meeting, Oct 2013.
- UI24. M.A. Popović, "Silicon photonic circuits: From ultralow energy communication to quantum and light-force-based photonics," Packard Fellows Meeting, Denver, CO, Sep 2013.
- UI23. M.A. Popović, "Silicon Photonics: from Energy Efficient On-Chip Optical Communication to Photonic Molecules and Light-Force Devices," NSF NNIN REU program, seminar to undergraduate students taking part in the program, June 2013.
- UI22. M.A. Popović, "Strong-Confinement Silicon Photonics from First-Principles Explorations to VLSI Interconnects," Columbia University, Mar 2013.
- UI21. M.A. Popović, "Strong-Confinement Silicon Photonics from First-Principles Explorations to VLSI Interconnects," Karlsruhe Institute of Technology, Feb 2013.
- UI20. M.A. Popović, "Monolithic Silicon Photonics for Processor-to-Memory Interconnects," Samsung, Hwaseong, Korea, August 2012.

- UI19. M.A. Popović, "Mixed Electronic-Photonic Devices," 2-hour tutorial at Nanokiss: the Korean International Summer School on Nanoelectronics, Seoul National University, Seoul, Korea, August 2012.
- UI18. M.A. Popović, "Strong-Confinement Silicon Photonics from Telecom-Grade Signal Processing to VLSI Electronics-Photonics Integration," Joint Quantum Institute/NIST, Gaithersburg, MD, Nov 2011.
- UI17. M.A. Popović, "Strong-Confinement Silicon Photonics from Telecom-Grade Signal Processing to VLSI Electronics-Photonics Integration," UCLA, Oct 2011.
- UI16. M.A. Popović, "Silicon Photonics from Advanced Device Concepts to Dense CMOS Integration," Lockheed Martin Coherent Technologies, Aug 2011.
- UI15. M.A. Popović, "Silicon Photonics for New Science and Technology Applications," NIST, Boulder, CO, Feb 2011.
- UI14. M.A. Popović, "Silicon Photonics for New Science and Technology Applications," New Laser Scientists Conference, Rochester, NY, Oct 2010.
- UI13. M.A. Popović, "Silicon Photonics for New Science and Technology Applications," Boulder Seminar Series on Optical, Electronic and Quantum Systems (OEQS), Boulder, CO, Oct 2010.
- UI12. M.A. Popović, "Silicon nanophotonics, optoelectronics and light-forces-based optomechanics for telecommunication and computing applications," MIT Center for Integrated Photonics Systems (CIPS), Dec 2009.
- UI11. M.A. Popović, "Silicon nanophotonics, optoelectronics and light-forces-based optomechanics for telecommunication and computing applications," presented at the Faculty of Electrical and Electronic Engineering, University of Belgrade, Belgrade, Serbia on Oct. 16, 2009; at McGill University (LEOS Chapter Speaker) on Nov. 11, 2009; at University of Colorado, Boulder on Nov. 17, 2009.
- UI10. M.A. Popović, "Toward self-adaptive optonomechanical photonic devices based on light forces," Optics Seminar Series, Department of Electrical Engineering, Columbia University, Nov 17, 2008.
- UI9. M.A. Popović and P.T. Rakich, "Toward self-adaptive optonomechanical photonic devices based on light forces," Electrical and Computer Engineering Department Seminar, Cornell University, Oct 10, 2008.
- UI8. M.A. Popović, "Nanophotonics for Optical Communication and Electronic-Photonic Signal Processing: from Telecom-Grade Wavelength Routers to Nanomachines based on Light Forces," presented at the Photonics Workshop USA-Netherlands, Enschede, Netherlands, June 16, 2008.
- UI7. M.A. Popović, "Integrated nanophotonics, optoelectronics and optomechanics: from telecom-grade wavelength routers to light-powered nanomachines," presented at the Faculty of Electrical and Electronic Engineering, University of Belgrade, Belgrade, Serbia, June 25, 2008.
- UI6. M.A. Popović and P.T. Rakich, "Toward self-Adaptive devices based on light forces: exploiting nanoscale optomechanics in the strong coupling regime," presented at the 5th Annual Meeting of the MIT Center for Integrated Photonic Systems (CIPS), Cambridge, MA, USA, May 14, 2008.
- UI5. P.T. Rakich and M.A. Popović, "Manipulating microcavities with optical forces and potentials: Toward self-aligning "smart" microcavities and picometer-scale optomechanical control (Invited)," IEEE Lasers and Electro-Optics Society (LEOS) Series Seminar, presented at MIT Lincoln Laboratories, Lexington, MA, USA, Jan. 10, 2008.
- UI4. M.A. Popović, "Silicon microphotonic circuits for telecommunication applications," presented at the Faculty of Electrical and Electronic Engineering, University of Belgrade, Belgrade, Serbia, Oct. 8-9, 2007.
- UI3. M.A. Popović, "Light processors on a silicon chip: optical integrated circuits for telecommunications," presented at the Faculty of Mining Engineering and Information Sciences, Bor, Serbia, Oct. 4, 2007.
- UI2. M.A. Popović, T. Barwicz, M.R. Watts, P.T. Rakich, L. Socci, E.P. Ippen, F.X. Kärtner and H.I. Smith, "Taming strong-confinement photonics and building high-performance microring resonator filters (Invited)," presented at the MIT Microphotonics Center Fall Meeting, Cambridge, MA, Oct 19, 2006.
- UI1. M. Popović and H.A. Haus, "Loss, switching, tuning and polarization in high-index-contrast integrated optics (Invited)," at the OIDA/PTAP Optical Microresonators Workshop, San Diego, CA, July 2003.

MEDIA COVERAGE OF WORK (SELECTED)

- N16. "OptiBit's energy-efficient computer chip wins MIT's Clean Energy Prize," The Boston Globe's BetaBoston.com, May 12, 2015 (<http://www.betaboston.com/news/2015/05/12/optibits-energy-efficient-computer-chip-wins-mits-clean-energy-prize/>).
- N15. "New Devices Could Realize Optical Microprocessing," Photonics.com (<http://www.photonics.com/Article.aspx?AID=55871>); "Waveguide optical modulator and tunable filter fabricated using standard CMOS techniques," Laser Focus World (<http://www.laserfocusworld.com/articles/2014/02/waveguide-optical->

- [modulator-and-tunable-filter-fabricated-using-standard-cmos-techniques.html](#)); "A step closer to the photonic future," R&D Magazine, Feb 2014.
- N14. "Better Optical Modulators Boost Silicon Photonics," <http://www.photonics.com/Article.aspx?AID=55013>, and Photonics Spectra magazine, Dec 2013, p. 20. (Press release: <http://www.colorado.edu/news/features/cu-mit-breakthrough-photonics-could-allow-faster-and-faster-electronics>)
- N13. Guest on Brian Lehrer science show on CUNY TV (largest university television station in the US) on the subject of photonics in microprocessors (<http://www.cuny.tv/show/brianlehrer/PR2002322>), Oct 2013.
- N12. W. Thomas Payne, "MIT researchers develop theory for powering chips with light: electricity eliminated and replaced by single wavelengths of light," Associated Content, posted Nov 15, 2007. (http://www.associatedcontent.com/article/448342/mit_researchers_develop_theory_for.html)
- N9. A. Trafton, "MIT works toward 'smart' optical microchips: light-powered micro-machines could advance telecommunications," *MIT Tech Talk*, web edition, posted Thu, Nov 1, 2007 (<http://web.mit.edu/newsoffice/2007/optical-control-1101.html>). Press release carried by over 20 news websites, including:
- "Scientists create smart microchip theory," United Press International, posted Nov 5, 2007. (http://www.upi.com/NewsTrack/Science/2007/11/05/scientists_create_smart_microchip_theory/2426/)
- N7. J. Robertson (Associated Press), "MIT Team Details Optics-On-A-Chip Device," *New York Times*, posted Feb 11, 2007. (<http://www.nytimes.com/aponline/technology/AP-Optics-on-a-Chip.html>).
Also carried by: Forbes.com, USA Today, Boston Globe, Washington Post, BusinessWeek, The China Post, San Francisco Chronicle, International Herald Tribune, Wired Magazine, ABC 5 Eyewitness News, Fox News.
- N6. D. Halber, "MIT 'optics on a chip' may revolutionize telecom, computing: Research integrates photonic circuitry on a silicon chip," *MIT Tech Talk*, web edition, posted Thu, Feb 6, 2007 (<http://web.mit.edu/newsoffice/2007/optics.html>). Press release carried by over 100 news websites, including:
- N5. K. Bullis, "A Nano Solution to Increasing Bandwidth - MIT researchers develop microphotonic devices for communications, clearing the way for higher-performance optical networks," *MIT Technology Review Magazine*, web edition, posted Wed, Jan 17, 2007 (http://www.technologyreview.com/read_article.aspx?id=18074&ch=nanotech).
- N2. *The National* (Canadian Broadcasting Corporation Nightly News), story (paraphrased): Canadian [Queen's University solar car] team leads World Solar Challenge race across Australian desert, Oct 18, 1999.
Also on the web: "Queens U. [solar car] leading the pack in Australia", posted Oct 18, 1999. (<http://www.cbc.ca/world/story/1999/10/18/worldsolarchallenge101899.html>)
- N1. "Student Winners Announced from Motorola's 1998 University Design Contest", *Business Wire*, on CNN.com, web edition, posted Aug 4, 1998.