

## **RICHARD M. OSGOOD, JR.**

Columbia University

Higgins Professor, Departments of Applied Physics and Electrical Engineering

Fu Foundation School of Engineering

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### **Professional History**

1988-20014: Higgins Professor Emeritus of Applied Physics and of Electrical Engineering

2010-2012: Director, Columbia University Center for Integrated Science and Engineering

2000-2002: Associate Laboratory Director, Brookhaven National Laboratory

1988-20014: Higgins Professor of Applied Physics and of Electrical Engineering

1982-1987: Professor, Departments of Applied Physics and of Electrical Engineering,  
Columbia University

1981-1982: Associate Professor, Department of Electrical Engineering, Columbia University

1995 (3 mos.): Visiting Researcher, IBM T.J. Watson Research Laboratory

1994-1995: Visiting Professor, Department of Electrical Engineering, Mass. Inst. of Tech.

1989: Visiting Researcher, Max Planck Institute of Quantum Optics, Garching, Germany

1990-present: Technical Director, Columbia Radiation Laboratory

1984-1990: Co-Director, Columbia Radiation Laboratory

1986-1990: Director, Columbia Microelectronics Sciences Laboratories

1983-1986: Acting Director, Columbia Microelectronics Sciences Laboratories

1980-1981: Project Leader, Direct-Write Processing Program, Lincoln Laboratory, MIT

1973-1980: Staff Member, Lincoln Laboratory, Massachusetts Institute of Technology

1976 (Aug.): Visiting Scientist, Los Alamos Scientific Laboratory

1966-1969: Research Officer (Capt. U.S. Air Force), U.S.A.F. Avionics Laboratory

1965-1966: Research Officer, U.S.A.F. Materials Laboratory

### **Education**

Ph.D. (Physics), Massachusetts Institute of Technology, 1973

M.S. (Physics), Ohio State University, 1968

B.S., U.S. Military Academy, 1965

### **Publications**

Total number of publications >**485** including journal papers, refereed proceedings and book chapters; Cumulative citation index ISI: **13330**, **h=60**, (with **26** papers with more than 100 citations); **5** “Highly Cited Paper”; Designation, Scholar: **13642**, **h=66**, **23** US patents issued and pending, **2** Major Software Licenses

### **Special Grants, Awards, and Appointments**

Member National Academy of Inventors, 2015

IEEE Photonics Society - Quantum Electronics Award, 2015

American Physical Society Traveling Lectureship, 1992

R.W. Wood Prize from the American Optical Society, 1991

Awarded Japanese Honorary Lectureship for OITDA (Optical Device Association) 1991

IEEE LEOS Traveling Lecturer 1986-1987

John Simon Guggenheim Fellowship, 1989

Fellow, American Physical Society (APS)

Fellow, Institute of Electrical and Electronic Engineers (IEEE)  
Fellow, Optical Society of America (OSA)  
Councilor, Materials Research Society, (1983 - 1987)  
Hertz Foundation Predoctoral Fellow at M.I.T., (1970 - 1973)  
Samuel Burka Award (with Dr. W. Eppers), best technical paper, Air Force Avionics Lab., 1968  
Associate Editor, *IEEE Journal of Quantum Electronics*, (1981 - 1988)  
Co-Editor, *Materials Science and Engineering* series (Springer-Verlag)  
Co-Editor, *Applied Physics*, (1983-1995)  
Scientific Advisory Board (Vice Chairman) - Brookhaven National Laboratory (1998-2000)  
Chair, Brookhaven National Laboratory Search Committee – Associate Lab, Director of BES.  
Visiting Board, ARO Physics Division Program Review, 2003  
Visiting Board - Chemical Science and Technology, Los Alamos National Lab (1986 - present)  
Visiting Board - Chemical Sciences, Pacific Northwest Labs (1997)  
Advisory Board, MIT Spectroscopy Lab (1983 - 1990)  
Consultant, MIT Lincoln Laboratory, Solid-State Electronics Division (1993-1994)  
Member, DOE Basic Energy Sciences Advisory Committee (1989-1991)  
Member, DOE Energy Research Advisory Panel on Advanced Isotope Separation, 1980  
Member Materials Research Council (DARPA) (1984-1990)  
Member of Steering Committee, Defense Sciences Research Council, DARPA (1991-1998)  
Ad Hoc Member U.S.A.F. Scientific Advisory Board (Electronics) (1997)  
Organizing Comm., 1997 OSA Topical Meeting, Chem. and Phys. of Small-Scale Structures  
Organizing Committee, 1996-99 Physical Electronics Conferences  
Selection Committee, R.W. Wood Prize, Optical Society of America (1995)  
Committee of Visitors: DOE BES Chemistry (2003); DOE BES Facilities (2004); DOE EFRCs(2013);  
Chair: DOE BES Facilities (2006); SubChair, Board of Visitors BES Facilities (2009) (Nanocenters)  
Review panel PNNL, Environmental Molecular Science Lab (2008, 2010)  
Subsection Leader for DOE Workshop on Future Light Sources (2008-2009)  
DOE BESAC Review Panel on Further Light Sources and Science (2013)  
DoE Review Panel, PNNL – Chemical Physics, Northwestern Catalysis Center  
American Institute of Physics: Venture Partnership Fund Committee (2016 -2016)

**Research Areas:** Surface physics and physical chemistry; Advanced devices and fabrication techniques; Optical physics and engineering; Materials processing.

## **Courses Taught and Developed:**

Developed several new graduate courses, including Surface Science and Analysis; Physics of Micro-Fabrication; Photonic Integrated Circuits

## **PhD Graduate Students and Post-Graduates advised and sponsored:**

*Postdoctoral or Research Scientists:* Mayank Bahl, Ravi Bhat, Peter Brewer, Nick Camillone III, Julian Chen, Jack Chu, Thomas Fink, Jeffery Fitts, Heinz Gilgen, Gad Haase, Hidong Kwak, Miguel Levy, Ping-He Lu, Joseph Moryl, Gabor Nagy, James O'Neill, Kyung Park, Dragan Podlesnik, Grace Reksten, Robert Scarmozzino, Mike Schmidt, David Slater, Abneesh Srivastava, Michael Steel, Nenad Stojilovic, George Totir, Charles Wang, Quin-Yun Yang, Mehmet Yilmaz, C.F. Yu, X.C. Zhang, N. Zaki

*PhD Graduate Students (61):* Kaveh Adib, Rokan Ahmad, Mayank Bahl, Theodore Cacouris, Lina Cao, Julian Chen, Alex Chen, Lee Chen, Oliver Chen, Jeffrey Driscoll, Djordje Djukic, Louay Eldada, Richard Espinola, Michael Freiler, Junichiro Fujita, Ophir Gaathon, Richard Grote, Osman Ghandour, Ming Han, William Holber, Sung Young Hong, Hai Hu, John Huang, Hsu-Cheng Huang, Igor Ilic, Andy Hsieh, Tomoyuki Izuhara, Khalid Khan, Kevin Knox, Robert Krchnavek, Peter Lasky, David Levy, Zhisheng Li, Vladimir Liberman, Thomas Licata, Xiaoping Liu, Zhong Lu, Yi Luo, Avishi Ofan, Bertrand Quinoiu, Dragan Podlesnik, Hongling Rao, Tony Radojevic, Tarek Ramadan, Ryan Roth, Mark Ruberto, Esaul Sanchez, Wolfgang Schwartz, Ping-Shine Shaw, Ming-Chang Shih, Xiao Shen, Joseph Shor, Serban Smadici, Brian Souhan, Victor Treyz, Franklyn Tong, Alan Willner, Po-Chu Yeh, Nader Zaki, Nong-Fan Zhu, Zuoming Zhu

## **Major Masters Projects (US, 2 papers):**

Scott Halle, Doug Gaines, A.J. Nahata, Vladimir Bulovic, Roberto Paiella, Y-S Le, Eddie Chou, Stan Wang, Grace Le, Sarah Hood, Yue Liu

### International Student Education

*European Masters Students Supervised:* Sebastian Duetsch (ETH, Switzerland), Guiem Cerda-Pons (Universitat Politècnica de Catalunya, Barcelona), Guiseppe Camarda (Universita' degli Studi di Palermo, Palermo), Fabio Pizzuto (Universita' degli Studi di Palermo, Palermo), Guiseppe Scelsi (Universita' degli Studi di Palermo, Palermo), Victor Guyonnet (Cherbourg), Nicola Barrocu, (University of Cagliari, Italy), Alex Wertmueller (ETH, Switzerland), Yuya Shoji (University of Tokyo, Japan), Chinese cooperative students: Zhaofeng, Hao (Institute of Physics, Nankai University), Yang Lou (Research Institute of Industrial Catalysis, East China University of Science & Technology, Shanghai), David Nobis (Lehrstuhl für Festkörperphysik Universität Erlangen-Nürnberg, Germany)

### International Visitors

Takao Someya, University of Tokyo; Manolis Antonoyiannakis, European Science Organization; Amador Muriel, Marko Kralj and Ida Delac, Institute of Physics, Croatia; Yang Lou, East China University of Science And Technology, China.

Directorship or Local Director of Major Group Sponsored-Research Awards and Programs  
BNL/ Columbia DOE Program on Nanoscale Physics – 2003 - Present

Small Group Program (DTRA) – Radiation Effects in Advanced Semiconducting Materials (2011 – 2016)

MURI (NRL/DARPA) – Interfacial Chemical Processing for Electronics; 1985-1990

MURI (AFOSR/DARPA) - Advanced Optical Isolation, - 1991 - 1996

MURI (AFOSR) - New Materials Approaches for Future Graphene-Based Devices – 2009 - 2014

AFOSR Optics Center Research; 1987-1998

DARPA OptoCenter; 1989-2000

NSF XYZ on a Chip (Biochips); 2000-2003

IBM Center – Interfacial Materials Processing; 1984-1987

### **Current Collaborations: Institutions**

Brookhaven National Laboratory; University of Maryland at Baltimore Campus; IBM Watson Research Lab; University of Bonn, Germany; Elettra Synchrotron, Trieste Italy, University of Albany, Institute of Physics, Zagreb; University of Albany; INTEC, University of Ghent, University of Erlangen.

### **Major University Committees or Responsibilities**

Tenure Review Advisory Committee (TRAC), Committee on Technology and Science, Clean-Room Committee, DoD Point of Contact for Ellen Smith, University Relations, BNL Basic Energy Sciences Point of Contract, Planning and Execution Director for Microelectronics Sciences Floors (9 & 10) of Schapiro Building Construction, Directed Renovation of Full 13<sup>th</sup> Floor of Mudd Building, Columbia Representative Science & Technology Committee for Brookhaven National Laboratory, Director – CISE (June 2010- February 2012)

### **Recent Reviewing:**

NSF, DOE, ARO, AFOSR, Swiss Science Foundation, J.Vac. Sci. Technology, Applied Physics Letters, Chem. Physics Letters, Nanoletters, Nature and Nature Photonics, Surface Science, Phys. Rev., Optical Materials, ACS Nano, J. Phys Chem., Phys. Rev. Letters, J. Lightwave Tech.; J. Phys. Chem., J. Appl. Physics., Brookhaven CFN Proposals, Nature Photonics, Optical Materials

### **Service in Recent External Tenure Cases:**

Harvard, MIT, U. Md, U. Florida, Pittsburgh, Purdue, UMBC, Tufts, U. C. Davis, Stanford, Stony Brook, Albany, UCL, Brookhaven National Laboratory, U Texas

### **External Thesis Committees:**

ETH Lausanne, University of Sidney

### **External Student Awards (Best Paper, Travel Grants, etc.):**

Jeff Driscoll, Sung-Young Hong, Ted Cacoris, Ophir Gaathon, Ryan Roth, Kaveh Adib, Alex Meng

### **External University Advisory Boards**

Board of Advisors: MIT Spectroscopy Laboratory

Science and Technology Board Brookhaven National Lab. (Vice Chair)  
Scientific Advisory Board Harvard S&T Center  
Scientific Advisory Board Wisconsin MRSEC

### **Major Addresses:**

CLEO/IQEC.– “Laser Microchemistry” (*Plenary*) R.M. Osgood, Jr. June 22-25, 1982  
The Rank Prize Funds Symposium Workshop; Photolytic Deposition of Metals, Semiconductors and Dielectrics. “UV Laser Surface Processing.” (*Invited, Keynote*) R. M. Osgood, Jr. 1984  
CLEO/IQEC. “Laser Processing for Microelectronics” (*Plenary*) R.M. Osgood, Jr. April 27-30, 1987  
OSA Frontiers in Optics/Laser Science tutorial presentation (*Tutorial Presentation*). Richard Osgood, Jr, “Engineering Nonlinearities in Optical Nanosystems.” September 16-20, 2007  
PIERS Progress In Electromagnetics Research Symposium (*Plenary*). R. Osgood, “An Overview of Optical Isolation on Integrated Platforms.” August 12-15, 2013  
OSA’s Annual Meeting, Frontiers in Optics 2013. (*Tutorial Presentation*). R. Osgood, “Mid-IR nonlinear integrated silicon photonics.” October 6-10, 2013

### **Major Technology Advances:**

- Laser Chemical Processing – Revise, Inc., used in many industries
- Integrated Optics Software Package – R Soft
- Crystal Ion Slicing – used by variety of startups for thin-film LiNbO<sub>3</sub>

### **Invited Talks Last Seven Years:**

1. Harvard University EFRC Seminar Series (*Invited*):” Four problems in interfacial chemistry and physics of weakly bound layers” March 25, 2016, Cambridge Mass
2. Harvard University, Seminar Series (*Invited*) “Tuning the Electronic Structure in 2D Transition-Metal-Dichalcogenide Crystals” March 1, 2016, Cambridge, Mass
3. The Photonics North Conference 2014(*Invited*). R. R. Grote, J. B. Driscoll, J. Rothenberg, R. M. Osgood, Jr., “Amplitude Modulation by Coherent Perfect Loss: Another Application for Si Wires.” June 2014, Montreal, Canada.
4. SPIE NanoScience + Engineering 2015 (*Invited*). R. Osgood., N. Panoiu, “Optical pulse engineering and processing using nonlinearities of tapered and photonic crystal waveguides made of silicon.” 9 - 13 August 2015; San Diego, CA
5. QE Series at MIT, 1 April 2015 (*Invited*) R.M. Osgood, Jr., Columbia University “Looking Back and Mid-IR Nonlinear Integrated Silicon Photonics”,
6. APS March meeting 2015 (*Invited*). R. Osgood Jr., D. Potapenko, Z. Li, “TMAA surface-molecule photon interactions on Au-supported TiO<sub>2</sub> nanocrystals.” March 2-6, 2015; San Antonio, TX

7. SPIE Photonics West (**Invited**). R. Osgood “Devices and System Measurements of Mode- and Wavelength-Division-Multiplexing in the Si Wire Platform.” San Francisco, CA, 7-12 February, 2015
8. AVS 61st International Symposium & Exhibition (**Invited**). R. Osgood “Layer-Dependent Electronic and Physical Structure of 2D van der Waals Crystals.” Baltimore, MD, November 9 - 14, 2014
9. Columbia University, Research Conference 2013-2014; Department of Applied Physics and Applied Mathematics (**Invited**). R. Osgood “Covering a Broad Band Width: Research in the Osgood Lab.” November 11, 2014
10. Physics Colloquium (**Invited**) R. Osgood, “Layer-Dependent Electronic and Physical Structure of 2D materials.” Michigan Technological University, September 18 (2014)
11. REU Symposium 2014 (**Lecture for undergraduates**) R. Osgood, “Light-Driven Charge-Transfer Dynamics in Oxides: Materials, Devices”, Columbia University, New York.
12. Colloquia at Yeshiva University (**Invited**) R. Osgood, “What dimensionality does to crystals: The new 2D crystals.” R. Osgood; April 8, 2014; New York, NY
13. LPS Conference on Advanced Photonic Integration and Nonlinear Optics 2014 (**Invited**). R. Osgood, “Nonlinear optics of Si-wires in the Mid IR”, June 20, 2014; College Park, MD
14. 2014 IEEE Summer Topical Meeting on Nonlinear-Optical Signal Processing (NOSP) (**Invited**). R. Osgood, “Mid-IR Nonlinear Integrated Photonics; Physics and Devices.” R.M. Osgood, Jr. ; 14-16 July, 2014; Montreal, Canada
15. PCSI-41: 41st Conference on the Physics and Chemistry of Surfaces and Interfaces (**Invited**). R. Osgood, “Structural and Electronic Characterization of MoS<sub>2</sub> Using LEEM, LEED, and Angle-Resolved Photoemission Spectroscopy/Microscopy.” January 12-16, 2014; La Fonda Hotel; Santa Fe, New Mexico, USA
16. Columbia University, Graduate Student Seminar Series; Department of Physics (**Invited**). R. Osgood “2D Metal-Dichalcogenide Crystals: How does atomic thickness effect electronic properties?” December 6, 2013
17. Columbia University, Research Conference 2013-2014; Department of Applied Physics and Applied Mathematics (**Invited**). R. Osgood “Under Stress.” November 15, 2013
18. OSA 2013 Frontiers in Optics/Laser Science XXIX (FiO/LS) meeting (**Invited**). R. Osgood, Jr., “Mid-IR Nonlinear Integrated Silicon Photonics.” Orlando, FL; October 6-10, 2013
19. OSA’s Annual Meeting, Frontiers in Optics 2013. (**Invited Tutorial Presentation**). R. Osgood, “Mid-IR nonlinear integrated silicon photonics.” October 6-10, 2013

20. Nanotechnology and sustainability: New Research in Italy and the United States workshop. **(Invited)**. R. Osgood, "Flatland: Electrons Moving at Surfaces." Columbia University, Italian Academy in New York City; October 2-3, 2013
21. CLEO 2013 **(Invited)**. J. Dadap, S.-Y. Hong., N. Petrone, P.-C. Yeh, J. Hone, R. Osgood, "Optical Third-Harmonic Microscopy of Graphene." June 9-14, 2013
22. PIERS Progress In Electromagnetics Research Symposium **(Plenary)**. R. Osgood, "An Overview of Optical Isolation on Integrated Platforms." August 12-15, 2013
23. Graduate Student Seminar series at Columbia University Department of Physics **(Invited)**. R. Osgood "The Electronic Structure of Low-Dimensional Nanocrystals: Femtosecond and High-Resolution ARPES and Low-Temperature STM." February 1, 2013
24. Research Conference at Columbia University **(Invited)**. R.M. Osgood," Interfacial Physics of Condensed Matter Systems; Ultrafast and Ultrasmall Probe." October 26, 2012
25. Columbia University Optics Seminar **(Invited)**. R. Osgood Jr., "Squeezing Light in Wires: The Fascinating Optical Physics of Silicon Nanowires." April 23, 2012
26. University College London, London **(Invited)**. R. Osgood Jr., "High-Gain Nonlinear Silicon Photonics at IR Wavelengths." April 19, 2012
27. SPIE Photonics Europe 2012 Symposium, Brussels **(Invited)**. R. Osgood Jr., "High-gain nonlinear silicon photonics." 16-19 April 2012
28. Rutgers University **(Invited)**. R. Osgood Jr., "Smoothing it out! Graphene's 2D Morphology and Electronic Structure." March 28, 2012
29. APS March meeting 2012 **(Invited)**. R. Osgood Jr., "Probing Nanointerfaces of Nanoparticle-Based Solar Energy Conversion: Molecular Dynamics on the Angstrom Scale." February 27 - March 2 2012
30. Colloquium, University of Erlangen **(Invited)**. R.M. Osgood, Jr. "Microphotoemission of Exfoliated Graphene: Pulling 2D Electronic Structure Out of the Fog", February 7, 2012
31. Rutgers University **(Invited)**. R. Osgood Jr., "Smoothing it out! Graphene's 2D Morphology and Electronic Structure", February 2, 2012
32. Colloquium Columbia University **(Invited)**, Richard Osgood, Phil Kim, Peter Johnson, and Andy Millis, Probing Electronic Structure & Dynamics in Low-Dimensional Nanoscale Condensed-Matter Systems, November, 2011
33. Graphene Day at Columbia **(Invited)**. R. Osgood Jr., "Nonlinear Properties of Graphene." November 17, 2011
34. ONR/AFOSR MURI review in Monterey **(Invited)**. R. Osgood Jr., "Nonlinear Optical properties of Graphene." December 5-8, 2011

35. J. I Dadap, M. Kralj, M. Petrovic, K. Knox, R., Bhandari, Po-Chun Yeh, N. Zaki, R. M. Osgood, Jr., D., Niesner, T. Fauster, "Observation of Image States in Graphene on Ir(111) by Two-Photon Photoemission." **(Invited)** Cornell University, MURI meeting May 13, 2011
36. European Conference on Lasers and Electro-Optics and the XIIth European Quantum Electronics Conference 2011 **(Invited)**. N.C. Panoiu, C.C. Biris, F. Ye, L. Cao, and R.M. Osgood, Jr., "Nonlinear Optics in Subwavelength Plasmonic Nanostructures." May, 2011
37. SPIE Photonics West **(Invited)**. R.M. Osgood, Jr., "On-Chip Silicon Nonlinear Optical Circuits: Letting Light Make Decisions." January 27, 2011
38. MRS Fall Meeting 2010 **(Invited)**. R.M. Osgood, Jr., "Optical Isolation on Integrated Platforms – A Perspective." December 1, 2010
39. The 23rd Annual Meeting of the IEEE Photonics Society **(Invited)**. W.M.J. Green, X. Liu, R.M. Osgood, Jr., and Y.A. Vlasov, "High-Gain Si-Chip Optical Parametric Mixing Beyond Two-Photon Absorption." November, 2010
40. Columbia University Physics Graduate Student Seminar **(Invited)**. R.M. Osgood, Jr., "Physics on Nanosurfaces" November 5, 2010
41. Columbia University APAM symposium **(Invited)**. R.M. Osgood, Jr., "Physics on Nanosurfaces." October, 2010
42. Cornell University **(Invited)**. R.M. Osgood, Jr., K.R. Knox, A. Locatelli, and A. Morgante, "Smoothing it out! Measurements of Graphene's 2D Morphology and Electronic Structure." October 4, 2010
43. Tufts University **(Invited)**. R.M. Osgood, Jr., "Crossing Over to the Other Side: Light-Driven Charge-Transfer Dynamics, Materials, and Devices." September 14, 2010
44. 2010 IEEE Photonics Society Summer Topical Meetings **(Invited)**. W.M.J. Green, X. Liu, R.M. Osgood, Jr., and Y.A. Vlasov, "Mid-Infrared Nonlinear Optics in Silicon Photonic Wire Waveguides." July 19, 2010
45. 2010 IEEE Photonics Society Summer Topical Meetings **(Invited)**. J.I. Dadap and R.M. Osgood, Jr., "Nonlinear Optics in Si Wires." July 19, 2010
46. PIERS 2010 **(Invited)**. N.C. Panoiu, L. Cao, C.C. Biris, F. Ye, R.M. Roth, and R.M. Osgood, Jr., "Computational Modeling of Linear and Nonlinear Optical Properties of Plasmonic Nanostructures" July 6, 2010
47. 15th Optoelectronics and Communications Conference: OECC2010 **(Invited, declined)**. R.M. Osgood, Jr., "Four Wave Mixing in Silicon Nanowires in the Mid Infrared." July 5-9, 2010

48. PIERS 2010. Nicolae C. Panoiu, Lina Cao, Claudiu C. Biris, Fangwei Ye, Ryan M. Roth, Richard M. Osgood, Jr. (*Invited*), "Computational Modeling of Linear and Nonlinear Optical Properties of Plasmonic Nanostructures" July, 2010
49. University of Texas (*Invited*) R. M. Osgood "Skating on a Very Small Surface: Motion of Electrons on 1 and 2D NanoSurfaces", April 29th, 2010
50. University College, London –Department of Electrical Engineering (*Invited*). R.M. Osgood, "Making Si Go Nonlinear", April 13, 2010
51. SPIE Europe (*Invited*). R.M. Osgood, "Advances in Nonlinear Optical Propagation in Integrated Silicon Wires", April 12, 2010
52. Spring MRS Spring Meeting 2010 (*Invited*). R.M. Osgood, Jr., K.R. Knox (deferred to by R. Osgood), A. Locatelli, D. Cvetko, T.O. Menten, M.A. Niño, S. Wang, M.B. Yilmaz, P. Kim, and A. Morgante, "Measuring Corrugation in Exfoliated Graphene with Microspot Diffraction and Low Energy Electron Microscopy." April 7, 2010
53. Laboratory for Physical Sciences Seminar (*Invited*). R.M. Osgood, "Fiber on a Chip: Advances in Nonlinear Optics in Integrated Silicon Wires" March 24, 2010.
54. Boston University Seminar (*Invited*). R.M. Osgood, "Lifting-Off Single-Crystal Layers: Oxide Membranes & Graphene Monolayers", 26 February, 2010
55. SPIE Photonics West (*Invited*). R.M. Osgood, O. Gaathon, A. Ofan, "Advanced LiNbO<sub>3</sub> Devices and Materials Technology for Optical Circuit Applications." January 28, 2010
56. Columbia University Applied Physics and Applied Mathematics Seminar (*Invited*). R.M. Osgood, "Laser and Synchrotron Studies of Surface Physics." November 15, 2009.
57. Columbia University Physics-Student Seminar (*Invited*). R.M. Osgood, Jr., "Low-Dimensional Surface Physics." November, 2009
58. AFOSR Nanophotonic, Silicon Photonics, and Nanomembrane Program Review (*Invited*). R.M. Osgood, Jr., "Nonlinear Si Photonics: Devices, Applications, and Physics." November 5, 2009
59. 6th IEEE International Conference on Group IV Photonics (*Postdeadline*). X. Liu, R.M. Osgood, Jr., Y.A. Vlasov, W.M.J. Green, "Broadband mid-infrared parametric amplification, net off-chip gain, and cascaded four-wave mixing in silicon photonic wires." September 11, 2009
60. 25th Anniversary of the Center for High Technology Materials, UNM (*Invited, Keynote*). R.M. Osgood, Jr., "Searching for New Science and Finding New Applications: Serendipity Unleashed." August 14, 2009
61. 83rd ACS Colloid & Surface Science Symposium (*Invited*). R.M. Osgood, Jr., "TiO<sub>2</sub> Nanocrystals for Surface Reaction Dynamics Studies." June 16, 2009

62. MRS Spring Meeting (*Invited*). R.M. Osgood, Jr., L. Cao, N.C. Panoiu, W. Fan, S. Zhang, K.J. Malloy, S.R.J. Brueck, “Nonlinear Plasmonics.” April 2009
63. University of Physics, Zagreb (*Invited*). R.M. Osgood, Jr., “Spectromicroscopy of Single & Multilayer Graphene Sheets.” January 15, 2009
64. 2009 IEEE/LEOS Winter Topical Meeting (*Invited*). R.M. Osgood, Jr., S. Brueck, N. Panoiu, J. Dadap, Y. Vlasov, “Nanoscale Nonlinear Optics.” Innsbruck, Austria January, 2009
65. Italian Academy for Advanced Studies in America (*Invited*). A. Morgante, K.R. Knox, R.M. Osgood, Jr., “Emergent Nanoscience.” December, 2008
66. Workshop on Tunable and Active Silicon Photonics (*Invited*). R.M. Osgood, Jr., “Advances in Nonlinear Optics in Integrated Silicon Wires.” Hamburg, Germany, September 30, 2008
67. 5th International Conference on Group IV Photonics Sorrento, Italy (*Invited*). R.M. Osgood Jr., “Nonlinear Optics in Si Wires on an SOI Platform.”, 17-19 Sept 2008
68. URSI General Assembly (*Invited*). R. M. Osgood, Jr., “Nonlinear Optics in Si Wires on an SOI Platform.” August 14, 2008
69. OFC Conference (*Invited*). R.M. Osgood, Jr., “Ultrafast nonlinear propagation in Si-wires using SOI.” February 25, 2008
70. SPIE Photonics West (*Invited*). R.M. Osgood, X. Chen, I. Hsieh, J.I. Dadap, N.C. Panoiu, W.M.J. Green, Y.G.A. Vlasov, “Fiber on a Chip: Nonlinear Optics for Data Communication via Silicon Photonic Wires.” January 23, 2008
71. SPIE Photonics West (*Invited*). R.M. Osgood, I. Hsieh, J.I. Dadap, N.C. Panoiu, “Integrated Optical Isolation: Advances and Perspective.” January 22, 2008
72. OSA Frontiers in Optics/Laser Science tutorial presentation (*Invited*). Richard Osgood, Jr, “Engineering Nonlinearities in Optical Nanosystems.” September 16-20, 2007
73. AGED STAR Meeting on Photonic Integration (*Invited*). R. M. Osgood, “Advanced, Negative-Index Metamaterials.” July 25-26, 2007
74. DARPA Ultra-Low Loss Waveguide Workshop (*Invited*). R. M. Osgood, “Ultralow Loss, High Confinement Waveguides: Si and LiNbO<sub>3</sub>.” June 4, 2007
75. DARPA/MTO Components from Metamaterials Workshop. Richard Osgood, “Exact Ab Initio Design of Metamaterials.” (*Invited*) May 2-3, 2007
76. Brookhaven National Laboratory (*Invited*). R. M. Osgood Jr., “Nanoplasmonics.” April 26, 2007

77. Boston University Seminar (*Invited*). R. M. Osgood, “Making Photonics Systems Small: Scaling Si for Lightwave Control.” April 23, 2007
78. University of Maryland, Baltimore County (*Invited*). R. M. Osgood, “Nonlinear Guided Optics in Si Wires.” April 20, 2007
79. IEEE/LEOS 2007 (*Invited*). R. M. Osgood, Jr., “Si-wire Photonics – Fiber on a Chip!” February 7-10, 2007
80. SPIE Symposium on Integrated Optoelectronic Devices 2007 (*Invited*). R. M. Osgood, Jr., “Interaction of Metal-Oxide Functionality on Optical Chips.” January 22-24, 2007
81. Columbia University, APAM (*Invited*). R. M. Osgood, Jr., “New Optics: Physics, Materials, and Wild Ideas.” October 13, 2006
82. MIT EECS/RLE Seminar Series (*Invited*). R. M. Osgood, Jr., “Nonlinear Optics in Si-Wires.” October 4, 2006
83. Columbia University, APAM (*Invited*). N.-C. Panoiu. “Linear and Nonlinear Optical Properties of Sub-wavelength Nanostructured Materials – Theory and Device Applications.” April 7, 2006
84. Columbia University, APAM (*Invited*). R. M. Roth. “Ion Beam Analysis of Ion-Implanted Optical Oxides.” April 7, 2006
85. OSA Frontier in Optics 2006 (*Invited*). R. M. Osgood, Jr., N.-C. Panoiu, R. Chatterjee, K. Liu, C.-W. Wong, S. Brueck, S. Zhang, and W. Fan, “Advanced Optical Negative Index Materials.” October 12, 2006
86. OSA FiO Best of the Topicals (*Invited*). R. Roth, N.-C. Panoiu, and R. M. Osgood, Jr., “Polarization-Sensitive Extraordinary Transmission through Periodic Arrays of Crossed Nano-Slits Mediated by Local Surface Plasmons.” October 12, 2006
87. OSA Frontier in Optics 2006. N.-C. Panoiu, X.-G. Chen, and R. M. Osgood, Jr., “XPM-Induced Modulation Instability in SOI Photonic Nanowires.” October 8-12 2006
88. OSA Frontier in Optics 2006 (*Poster session*). M.B. Yilmaz, K. Knox, N. Zaki, S. Wang, J. I. Dadap, R. M. Osgood, Jr., T. Valla, P. Johnson, “Occupied and Unoccupied States of Clean Stepped Cu(775) Surfaces.” October 8-12 2006
89. IEEE/LEOS 2006 (*Invited*). R. M. Osgood, Jr., “Ultrafast Pulse Propagation on Si Chips.” October 29-November 2, 2006
90. IEEE International Symposium on Antennas and Propagation. S. R. J. Brueck, W. Fan, S. Zhang, K. J. Malloy, N.-C. Panoiu and R. M. Osgood, Jr., (*Invited*) “Metamaterials and Plasmonics: Linear and Nonlinear Optical Properties.” July 9-14, 2006

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2. Jacob Rothenberg, C. P. Chen, Jason J. Ackertz, J. Dadap, Andrew Knights, K. Bergman, R. M. Osgood, Jr, R. R. Grote, "Experimental demonstration of coherent perfect absorption in a silicon photonic racetrack resonator" Optics Letts, (2016)
3. Alex Meng, R. M. Osgood, Jr "A rigorous theoretical analysis of a surface-plasmon nanolaser with monolayer MoS<sub>2</sub> gain medium"
4. Denis Potapenko, Gisele, Gomes, R. M. Osgood, Jr."Correlation between O-H bond energy and nanoscale elastic surface strain on a rutile TiO<sub>2</sub>(110) surface." (In Review, 2016)
5. Denis Potapenko, Zhisheng, Li, R. M. Osgood, Jr, "Photoreactions on a Single Isolated TiO<sub>2</sub> Nanocrystal on Au(111): Photodecomposition of TMAA" J. Phys. Chem.: C, (Accepted 2015)
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