Curriculum Vitae

CARMEN S. MENONI

University Distinguished Professor

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EDUCATION:

1987	Ph.D. in Physics, Colorado State University, Fort Collins, CO 80523 Dissertation Title: "The influence of pressure on Ge and InP" Adviser: Prof. Ian L. Spain
1978	Physics Diploma, University of Rosario, Argentina

PROFESSIONAL CAREER

2010 – Present	President XUV Lasers
2010 - Present	Professor School of Biomedical Engineering
2009 - Present	Affiliate Professor, Department of Chemistry, Colorado State University
2003 - Present	Professor Department of Electrical & Computer Engineering, Colorado State University
1997 – 2003	Associate Professor Department of Electrical Engineering, Colorado State University
1991 - 1997	Assistant Professor Department of Electrical Engineering, Colorado State University
1988 - 1991	Research Assistant Professor Department of Electrical Engineering, Colorado State University
1987 - 1988	Research Associate Department of Physics, Colorado State University
1979 - 1987	Graduate Research and Teaching Assistant Department of Physics, Colorado State University
Summer 1985	Visiting Scientist Max Planck Institute fur Festkoperforschung, Stuttgart, Germany
1978 - 1979	Research Associate Comision Nacional de Energia Atomica, Buenos Aires, Argentina

HONORS AND AWARDS

2014	IEEE Distinguished Lecture Award
2014	University Distinguished Professor
2013	Fellow SPIE, "*For innovative contributions to extreme ultraviolet and soft x-ray imaging and for contributions to advancing optical materials.*"
2013	Best oral paper award, SPIE Laser Damage Conference (http://spie.org/x32270.xml)
2012	Scholarship Impact Award, Colorado State University

2009-Present	Founding editor and present Editor-in-Chief, IEEE Photonics Journal
2010	Fellow Institute of Electrical and Electronic Engineers, "*For contributions to nano-scale imaging with ultraviolet lasers, and semiconductor optical materials and devices"*
2010	Selected by APS as an influential scientist in Lasers and Optics and highlighted in the "LaserFest " website. (http://www.laserfest.org/lasers/pioneers/menoni.cfm)
2009	Fellow American Physical Society, *"For advancing nano-scale imaging using extreme ultraviolet laser light and seminal contributions to the understanding of semiconductor optical materials and laser diodes"*
2009	Fellow Optical Society of America, *"For contributions to nano-scale imaging using extreme ultraviolet lasers and to the understanding of semiconductor optical materials and devices"*
2009	Selected by SPIE as an influential scientist in Optics and highlighted in SPIE Women in Optics Planner 2009 (http://spie.org/x5155.xml).
2009	College of Engineering Abell Outstanding Research Faculty Award
2009	Hazaleous Award, Women Studies Program, CSU
2008	Research and Development R&D 100 Award for the invention of EUVM-1, full field extreme ultraviolet microscope
2008	Selected by SPIE as an influential scientist in Optics and highlighted in SPIE Women Calendar 2009
2007	College of Engineering Abell Outstanding Faculty Teaching and Service Award
1999	Senior Member IEEE
1998, 2001	Colorado Technology Transfer Award
1997	Engineering Dean's Council Award
1995	National Science Foundation Career Award, 1995-1999
1978	Research Fellowship CONICET, Argentina

PROFESSIONAL SOCIETIES

Member of the Institute of Electrical and Electronics Engineers (IEEE), *grade: Fellow*

Member of the American Physical Society (APS), *grade: Fellow*

Member of the Optical Society of America (OSA), *grade: Fellow*

Member of the International Society for Optical Engineering (SPIE), *grade: Fellow*

Member of the American Association for the Advancement of Science (AAAS)

Member of the American Association of University Women (AAUW)

RESEARCH INTERESTS

- Extreme ultraviolet/soft x-ray photonics: nanometer-scale resolution imaging, nano-patterning, nano-machining and nano-spectrometry
- Optical materials science and engineering: ion beam sputtering of metal oxide thin films for interference coatings of high power lasers; laser/material interactions.

RESEARCH ACCOMPLISHMENTS

- Established the Advanced thin film deposition laboratory at Colorado State University which focuses on advancing the material and optical sciences related to the development of interference coatings for high power lasers. This lab is the only facility in the US with the capabilities to grow interference coatings by ion beam sputtering and to diagnose them.
- Co-PI and Faculty Member of the National Science Foundation Engineering Research Center for Extreme Ultraviolet Science and Technology, 2003-2013. This is a CSU Program of Research and Scholarly Excellence. Leader of high resolution imaging with extreme ultraviolet lasers.
- Established the Optical Spectroscopy Laboratory at Colorado State University for the study of the physics of semiconducting heterostructures and nanostructures, and active semiconductor devices.
- Faculty Member of the NSF Optoelectronic Computing System Center - 1994 - 1998. This was a CSU Program of Research and Scholarly Excellence.

PUBLICATIONS

Book Chapters

1. **C.S. Menoni**, I.L. Spain, "Pressure Measurements at Ultrahigh Pressure", "High Pressure Measurement Techniques", pp. 125-175, ed. G.N. Peggs, Applied Science Publishers, (1983).
2. **C.S. Menoni**, "Photoluminescence of InP at High Pressure", "Properties of InP", EMIS Data reviews Series 1991.
3. M.E. Grisham, G. Vaschenko, **C.S. Menoni**, L. Juha, M. Bittner, Yu.P. Rershin, V.V. Kondratenko, E.N. Zubarev, A.V. Vinogradov, I.A. Artioukov, J.J. Rocca, "Materials modification with intense extreme ultraviolet pulses from a compact laser", "Laser Ablation and its Applications", Chapter 21, p. 521, (2006).

Books edited:

1. X-Ray Lasers and Coherent X-Ray Sources: Development and Applications X, Editor(s): Annie Klisnick; **Carmen S. Menoni,** Published: 18 October 2013; 244 pages; ISBN: 9780819496997.
2. "Semiconductor Lasers for Lightwave Communication Systems", Proceedings of SPIE, volume 4533, editors: **C.S. Menoni** and R.P. Mirin, 2001.
3. "Semiconductor Lasers for Lightwave Communication Systems", Proceedings of SPIE, volume XXXX, editors: R.P. Mirin and **C.S. Menoni**, 2002.
4. Anniie's

Journals edited:

1. IEEE Photonics Journal – 2009-Present – Editor-in-Chief
2. "Breakthroughs in Photonics 2012", IEEE Photonics Journal , **5**, (2) 0200101, 2013.
3. "Breakthroughs in Photonics 2011", IEEE Photonics Journal, **4**, (2) 564, 2012.
4. "Breakthroughs in Photonics 2010", IEEE Photonics Journal, **3**, (2) 244, 2011.
5. "Breakthroughs in Photonics 2009", IEEE Photonics Journal, **2**, (2) 206, 2010.

6. Feature issue on "Optical frequency synthesis: A new tool for precision optical metrology", **C.S. Menoni**, IEEE Journal of Quantum Electronics, **37** (12): 1481-1481, (2001).
7. Feature issue in "Extreme Ultraviolet Sources and Applications", **C.S. Menoni**, IEEE Journal of Quantum Electronics, **42** (1): 1-1, (2006).

PATENTS

1. "Nanometer scale Ablation Using Focused, Coherent Extreme Ultraviolet/Soft X-Ray Light," **Carmen S. Menoni** et al. US Patent No. 7,931,850.
2. "Nanometer-Scale Lithography Using Extreme Ultraviolet/Soft X-Ray Laser Interferometry". Mario Marconi, **Carmen S. Menoni**, Jorge Rocca, Erik Anderson, Weilun Chao, Przemesylaw Wachulak. U.S. Patent No. 7705332.
3. "Planarization of multilayer optical coating defects", C.J. Stolz, C.C. Walton, J.A. Folta, J. Wolfe, P.B. Mirkarimi, R. Soufli, **C.S. Menoni** and D. Patel, Provisional Patent, DOE S-129,577, July 2012.
4. "Method for creating a nano-stamp and a matched reader for anti-counterfeiting applications," Mario Marconi, **Carmen S. Menoni,** Jorge J. Rocca, Provisional Patent, No. 61915761, December 2013.

PEER REVIEWED JOURNAL PUBLICATIONS

1. D. Seršić, A. Sović, and **C. S. Menoni** , "Restoration of soft x-ray laser images of nanostructures", Optics Express, **22**, 13846-13859 (2014).
2. P. Langston, E. Krous, D. Schiltz, D. Patel, L. Emmert, A. Markosyan, B. Reagan, K. Wernsing, Y. Xu, Z. Sun, R. Route, M. Fejer, J. Rocca, W. Rudolph, and **C.S. Menoni,** "Point defects in Sc2O3 thin films by ion beam sputtering," Applied Optics **53**, A276-A280 (2014).
3. C. Stolz, J. Wolfe, J. Adams, M. Menor, N. Teslich, P. Mirkarimi, J. Folta, R. Soufli, **C. S. Menoni**, and D. Patel, "High laser-resistant multilayer mirrors by nodular defect planarization," Applied Optics, **53**, A291-A296 (2014). (INVITED), ***(****Article selected for the cover of the special issue of Applied Optics*).
4. B. A. Reagan, W. Li, L. Urbanski, K. A. Wernsing, C. Salsbury, C. Baumgarten, M. C. Marconi, **C. S. Menoni,** and J. J. Rocca, "Hour-long continuous operation of a tabletop soft x-ray laser at 50-100 Hz repetition rate," Opt. Express **21**, 28380-28386 (2013).
5. W. Li, V. Martinez Esquiroz, L. Urbanski, D. Patel, **C. S. Menoni**, M. C. Marconi, A.Stein, W. Chao, and E. H. Anderson, "Defect-free periodic structures using extreme ultraviolet Talbot lithography in a tabletop system," Journal of Vacuum Science & Technology B **31**, 06F604 (2013); doi: 10.1116/1.4826344.
6. A.S. Markosyan, R Route, M.M. Fejer, D Patel, **C.S. Menoni**, "Study of spontaneous and induced absorption in amorphous Ta2O5 and SiO2 dielectric thin films." Journal of Applied Physics, 2013. **113**(13): p. 133104-133104-7.
7. L. Urbanski, A. Isoyan, A. Stein, J. J. Rocca, **C. S. Menoni**, and M. C. Marconi, "Defect-tolerant extreme ultraviolet nanoscale printing," Opt. Lett. **37**, 3633-3635 (2012).
8. L.F. Xu, D. Patel, **C.S. Menoni**, J.M. Pikal, J.Y. Yeh, J.Y.T. Huang, L.J. Mawst, and N. Tansu, "Carrier Recombination Dynamics Investigations of Strain-Compensated InGaAsN Quantum Wells." IEEE Photonics Journal, **4**(6): p. 2382-2389, (2012).
9. L.F. Xu, D. Patel, **C.S. Menoni**, J.Y. Yeh, L.J. Mawst, and N. Tansu, "Experimental Evidence of the Impact of Nitrogen on Carrier Capture and Escape Times in InGaAsN/GaAs Single Quantum Well." IEEE Photonics Journal, **4**(6): p. 2262-2271, (2012).

10. R.A. Weber, C. Rodriguez, D.N. Nguyen, L.A. Emmert, D. Patel, **C.S. Menoni**, and W. Rudolph, "Third harmonic microscopy of intrinsic and induced material anisotropy in dielectric thin films." Optical Engineering, 2012. **51**(12) 121807.
11. S. Carbajo, I. Howlett, F. Brizuela, K. S. Buchanan, M. C. Marconi, W. Chao, E. H. Anderson, I. Artioukov, A. Vinogradov, J.J. Rocca, and **C.S. Menoni**, "Sequential single-shot imaging of nanoscale dynamic interactions with a table-top soft x-ray laser," Opt. Letters, **37**, pp. 2994-2996 (2012). *[This article was selected by the Editors for publication in the August 2012 issue of the Virtual Journal of Biomedical Optics (VJBO)].*
12. B.A. Reagan, K.A. Wernsing, A.H. Curtis, F.J. Furch, B.M. Luther, D. Patel, **C.S. Menoni,** and J. J. Rocca, "Demonstration of a 100 Hz repetition rate gain-saturated diode-pumped table-top soft x-ray laser," Optics Letters, **37**, pp. 3624-3626 (2012).
13. L. Urbanski, J. Rocca, **C.S. Menoni,** M.C. Marconi, A. Isoyan, A. Stein, "Defect Tolerant Extreme Ultraviolet Lithography Technique", J. Vacuum Science and Technology B, **30,** 06F502-1, (2012).
14. F. Brizuela.; I.D.Howlett.; S. Carbajo; D. Peterson; A. Sakdinawat; Y. Liu.; D.T. Attwood; M.C. Marconi; J.J. Rocca; **C.S. Menoni** , "Imaging at the Nanoscale With Practical Table-Top EUV Laser-Based Full-Field Microscopes," INVITED PAPER, Selected Topics in Quantum Electronics, 2012. 18(1): p. 434-442.
15. H. Bravo, H.; B.T. Szapiro; P.W. Wachulak; M.C. Marconi; W. Chao; E.H. Anderson; **C.S. Menoni**; J.J. Rocca; "Demonstration of Nanomachining With Focused Extreme Ultraviolet Laser Beams," INVITED PAPER, Selected Topics in Quantum Electronics, IEEE Journal of, 2012. **18**(1): p. 443-448.
16. M.D. Seaberg; D.E. Adams; E.L. Townsend; D.A. Raymondson; W.F. Schlotter; Y.W. Liu; **C.S. Menoni**; L. Rong; C.C. Chen; J.W. Miao; H.C. Kapteyn; M.M. Murnane, "Ultrahigh 22 nm resolution coherent diffractive imaging using a desktop 13 nm high harmonic source," Optics Express, **19** 22470-22479, (2011).
17. L. Urbanski, M.C. Marconi, A. Isoyan, A. Stein, C.S. Menoni, J.J. Rocca, "Analysis of a scheme for de-magnified Talbot lithography", Journal of Vacuum Science and Technology B, **29**, 06F504 (2011).
18. D.N. Nguyen, L.A. Emmert, P. Schwoebel, D. Patel, **C.S. Menoni**, M. Shinn and W. Rudolph "Femtosecond pulse damage thresholds of dielectric coatings in vacuum." Opt. Express **19**, 5690 (2011).
19. S. Kohli, P.R. McCurdy, C.D. Rithner, P.K. Dorhout, A.M. Dummer, and C.S. Menoni, "Effect of Annealing on the Interfacial and Structural Properties of Amorphous Silicon-Hafnia Films." Metallurgical and Materials Transactions a-Physical Metallurgy and Materials Science. **42**A(1): p. 71-75.
20. D.N. Nguyen, L.A. Emmert, D. Patel D, **C.S. Menoni**, W. Rudolph, "Transient phenomena in the dielectric breakdown of HfO2 optical films probed by ultrafast laser pulse pairs," Appl. Physics Letters, Vol. **97**, Article Number: 191909, (2010).
21. F. Brizuela, S. Carbajo, A. Sakdinawat, D. Alessi, D. H. Martz, Y. Wang, B. Luther, K. A. Goldberg, I. Mochi, D. T. Attwood, B. La Fontaine, J. J. Rocca, and **C. S. Menoni**, "Extreme ultraviolet laser-based table-top aerial image metrology of lithographic masks," Opt. Express **18**, 14467-14473 (2010).
22. P.W. Wachulak, M.C. Marconi, C.S. Menoni, J.J.Rocca, H. Fiedorowicz, A. Bartnik, "Imaging and Patterning on Nanometer Scale Using Coherent EUV Light," ACTA PHYSICA POLONICA A, **117,** 403-407, (2010).
23. P.W. Wachulak, M.C. Marconi, R.A. Bartels, **C.S. Menoni**, J.J. Rocca, "Holographic imaging with a nanometer resolution using compact table-top EUV laser,"OPTO-ELECTRONICS REVIEW, **18** , 80-90 (2010).

24. P.W. Wachulak, L. Urbanski, M.G. Capeluto, D. Hill, W.S. Rockward, C. Iemmi, E.H. Anderson, **C.S. Menoni**, J.J. Rocca, and M.C. Marconi, "New opportunities in interferometric lithography using extreme ultraviolet tabletop lasers", Journal of Micro-Nanolithography Mems and Moems, 2009. **8**(2) p. 1537-1646.
25. Y.P. Pershyn, E.N. Zubarev, D.L. Voronov, V.A. Sevryukova, V.V. Kondratenko, G. Vaschenko, M. Grisham, **C.S. Menoni**, J.J. Rocca, I.A. Artioukov, Y.A. Uspenskii, and A.V. Vinogradov, "Mechanisms of radiation damage to Sc/Si multilayer mirrors under EUV laser irradiation." Journal of Physics D-Applied Physics, 2009. **42**(12) 125407.
26. A. Isoyan, F. Jiang, Y.C. Cheng, P. Wachulak, L. Urbanski, J. Rocca, **C.S. Menoni**, M.C. Marconi, F. Cerrina. Nanometer scale Talbot patterning with a table top soft X-ray (EUV) laser." Journal of Vacuum Science and Technology B, **B27**, 2931-2936, (2009)
27. D.H. Martz, H.T. Nguyen, D. Patel, J.A. Britten, D. Alessi, E. Krous, Y. Wang, M.A. Larotonda, J. George, B. Knollenberg, B.M. Luther, J.J. Rocca, and **C.S. Menoni**, "Large area high efficiency broad bandwidth 800 nm dielectric gratings for high energy laser pulse compression." Optics Express, 2009. **17**(26): p. 23809-23816.
28. F. Brizuela, Y. Wang, C. A. Brewer, F. Pedaci, W. Chao, E. H. Anderson, Y. Liu, K. A. Goldberg, P. Naulleau,2 P. Wachulak, M. C. Marconi, D. T. Attwood, J. J. Rocca, and **C. S. Menoni**, "Microscopy of extreme ultraviolet lithography masks with 13.2 nm table-top laser illumination", Optics Letters, **34**, No. 3, 271-273, (2009).
29. P. W. Wachulak, M. C. Marconi, R. A. Bartels, **C. S. Menoni**, and J. J. Rocca, "Soft x-ray laser holography with wavelength resolution", JOSA B, **25**, Issue 11, pp. 1811-1814, (2008).
30. M. Berrill, F. Brizuela, B. Langdon, H. Bravo, **C.S. Menoni**, and J.J. Rocca, "Warm Photoionized Plasmas Created by Soft X-Ray Laser Irradiation of Solid Targets," Journal of the Optical Society of America B **25**, pp.B32-B38 (2008).
31. P. W. Wachulak, C. A. Brewer, F. Brizuela, **C. S. Menoni**, W. Chao, E. H. Anderson, R. A. Bartels, J. J. Rocca, and M. C. Marconi, "Analysis of extreme ultraviolet microscopy images of patterned nanostructures based on a correlation method," JOSA B, **25**, Issue 7, pp. B20-B26. (2008).
32. P. Wachulak, M. Grisham, S. Heinbuch, D. Martz, W. Rockward, D. Hill, J. J. Rocca, **C. S. Menoni**, E. Anderson, and M. Marconi, "Interferometric lithography with an amplitude division interferometer and a desktop extreme ultraviolet laser," JOSA B, **25**, Issue 7, pp. B104-B107 (2008).
33. C.A. Brewer, F. Brizuela, P. Wachulak, D.H. Martz, W. Chao, E.H. Anderson, D.T. Attwood, A.V. Vinogradov, I.A. Artyukov, A.G. Ponomareko, V.V. Kondratenko, M.C. Marconi, J.J. Rocca, and **C.S. Menoni**, "Single shot extreme ultraviolet laser imaging of nanostructures with wavelength resolution," Optics Letters **33**, 518 (2008).
34. R.L. Sandberg, C. Song, P.W. Wachulak, D.A. Raymondson, A. Paul, B. Amirbekian, E. Lee, A.E. Sakdinawat, C. La-O-Vorakiat, M.C. Marconi, **C.S. Menoni**, M.M. Murnane, J.J. Rocca, H.C. Kapteyn, and J. Miao, "High Numerical Aperture Table Top Soft X Ray Diffraction Microscopy with 70 nm Resolution," Proceedings of the National Academy of Science, **105**, 24, (2008).
35. P.W. Wachulak, M.G. Capeluto, M.C. Marconi, D. Patel, **C.S. Menoni**, and J.J. Rocca, "Nanoscale patterning in high resolution HSQ photoresist by interferometric lithography with table top EUV lasers," Journal of Vacuum Science and Technology, **25**, 2094, (2007). *This article has been selected for publication in the Virtual Journal of Nanoscale Science & Technology Dec. 24, 2007.)*
36. P. W. Wachulak, M. C. Marconi, R. A. Bartels, **C. S. Menoni**, and J. J. Rocca, "Volume extreme ultraviolet nano-holographic imaging with numerical optical sectioning", Optics Express, **15**, 10622-10628, (2007).

37. P. W. Wachulak, M.G. Capeluto, M.C. Marconi, **C.S. Menoni**, and J.J. Rocca, "Patterning of nano-scale arrays by table-top extreme ultraviolet laser interferometric lithography", Optics Express, **15**, pp. 3465-3469, (2007)
38. F. Brizuela, H. Bravo, M. Berrill, G. Vaschenko, B. Longhon, E.H. Anderson, W. Chao, D.T. Attwood, O. Hamberg, S. Bloom, J.J. Rocca, and **C.S. Menoni**, "Ablation of Sub-100-nm Features with a Tabletop Soft X-ray Laser", Optics and Photonics News, "Optics in 2007", 18, 45, (2007).
39. P.W. Wachulak, M.C. Marconi, R.A. Bartels, **C.S. Menoni**, and J.J. Rocca, "Numerical Optical Sectioning for 3D Holographic Images with EUV Lasers," Optics and Photonics News, "Optics in 2007", **18**, 22, (2007).
40. G. Vaschenko, F. Brizuela, C. Brewer, Y. Wang, M.A. Larotonda, B.M. Luther, M.C. Marconi, J.J. Rocca, **C.S. Menoni**, E.H. Anderson, W. Chao, B.D. Harteneck, J.A. Liddle, Y. Liu, and D.T. Attwood, "Sub-38 nm resolution tabletop microscopy with 13 nm wavelength laser light", Optics Letters **31**, 1214, (2006).
41. M.G. Capeluto, G. Vaschenko, M. Grisham, M.C. Marconi, S. Ludueña, L. Pietrasanta, Y. Lu, B. Parkinson, **C.S. Menoni**, and J.J. Rocca, "Nanopatterning With Interferometric Lithography Using a Compact λ = 46.9-nm Laser", IEEE Transactions on Nanotechnology **5**, 3, (2006).
42. M.G. Capeluto, P. Wachulak, M.C. Marconi, D. Patel, **C.S. Menoni**, J.J. Rocca, C. Iemmi, E.H. Anderson, W. Chao, and D.T. Attwood, "Table-top nanopatterning with extreme ultraviolet laser illumination", Microelectronic Engineering, **84**, 721, (2007).
43. G. Vaschenko, A. Garcia Etxarri, **C.S. Menoni**, J.J. Rocca, O. Hemberg, S. Bloom, W. Chao, E.H. Anderson, and D.T. Attwood, "Nanometer scale ablation with a table-top soft x-ray laser", Optics Letters **31**, pp. 3615-3617, (2006). (*This article has been selected for publication in the Virtual Journal of Nanoscale Science & Technology 2006.)*
44. L. Xu, D. Patel, **C .S. Menoni**, J.Y. Yeh, L.J. Mawst, and N. Tansu, "Optical determination of the electron effective-mass of strain compensated $In_{0.4}Ga_{0.6}As_{0.995}N_{0.005}$/GaAs single Quantum Well", Applied Physics Letters, **89** (17): Art. No. 171112, (2006).
45. P.W. Wachulak, R.A. Bartels, M.C. Marconi, **C.S. Menoni**, J.J. Rocca, Y. Lu, and B. Parkinson, "Sub 400 nm spatial resolution extreme ultraviolet holography with a table top laser", Optics Express **14** (21): 9636-9642, (2006).
46. Y. Wang, E. Granados, M.A. Larotonda, M. Berrill, B.M. Luther, D. Patel, **C.S. Menoni**, and J.J. Rocca, "High-brightness injection-seeded soft-x-ray-laser amplifier using a solid target", Physical Review Letters **97** (12): Art. No. 123901, (2006).
47. O. Anton, L.F. Xu, D. Patel, **C.S. Menoni**, J.Y. Yeh, T.T. Van Roy, L.J. Mawst, and N. Tansu, "The intrinsic frequency response of SQW-MOCVD 1.3µm InGaAsN lasers in the range T=10-80°C", Photonics Technology Letters **18**, 1774-1776, (2006).
48. C. Brewer, F. Brizuela, G. Vaschenko, Y. Wang, M.A. Larotonda, B.M. Luther, M.C. Marconi, J.J. Rocca, **C.S. Menoni**, E.H. Anderson, W. Chao, Y. Liu, and D.T. Attwood, "Light-Based Microscopy Reaches Sub-38nm Resolution with Extreme UV Laser", Optics & Photonics News, "Optics in 2006", **17**, No. 12, 45, (2006).
49. J.J. Rocca, H. Kapteyn, D. Attwood, M. Murnane, **C.S. Menoni**, and E. Anderson, "Tabletop Lasers in the Extreme Ultraviolet", Optics & Photonics News, **17**, No. 11, pg. 30, (2006).
50. Y. Wang, E. Granados, M.A. Larotonda, M. Berrill, B.M. Luther, D. Patel, **C.S. Menoni**, and J.J. Rocca, "High Brightness Soft X-ray Laser by Injection Seeding of a Dense Plasma Amplifier", Optics & Photonics News, "Optics in 2006", **17**, No. 12, p. 46, (2006).
51. G. Vaschenko, F. Brizuela, C. Brewer, M. Grisham, H. Mancini, **C.S. Menoni**, M. Marconi, J.J. Rocca, W. Chao, A. Liddle, E. Anderson, D. Attwood, A.V. Vinogradov, I.A. Artioukov, Y.P. Pershyn, and V.V. Kondratenko, "Nano-imaging with a compact extreme ultraviolet laser", Optics Letters **30**, 2095, (2005). (*This article has been selected for publication in the Virtual*

Journal of Nanoscale Science & Technology 2005.)

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53. F. Brizuela, G. Vaschenko, C. Brewer, M. Grisham, **C.S. Menoni**, M. Marconi, J.J. Rocca, W. Chao, A. Liddle, E. Anderson, D. Attwood, A.V. Vinogradov, I.A. Artioukov, Y.P. Pershyn and V.V. Kondratenko, "Reflection mode microscope using a compact extreme ultraviolet laser light source", Optics Express **13**, 3983-3989, (2005).
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326. C.W. Bae, C.J. McMahon, D. Patel, **C.S. Menoni**, S. Feld, C. Wilmsen, H. Temkin, T. Uchida, P. Brusenbach, and R. Leibenguth, "Detuning of gain and reflectivity spectra and its effect on the output characteristics of vertical cavity surface emitting laser", presented at the 52nd Annual Device Research Conference, Boulder, CO, June 20-22, 1994.
327. O. Buccafusca, G.A. Patrizi, L.M. Woods, **C.S. Menoni**, J.J. Rocca, G.Y. Robinson, and J.E. Fouquet, "Optical Properties of Lattice-Matched InGaP/InAlP Multiple Quantum Wells", presented at the 36th Electronic Materials Conference, Boulder, CO, June 22-24, 1994.
328. O.F. Buccafusca, G.A. Patrizi, L.M. Woods, **C.S. Menoni**, J.J. Rocca, G.Y. Robinson, and, J.E. Fouquet, "Optical Properties of Lattice-Matched InGaP/InAlP Multiple Quantum Wells", 36th Electronic Materials Conference, Boulder CO, June 22-24, (1994).
329. M. Prasad, O.E. Martinez, **C.S. Menoni**, J.J. Rocca, J.L.A. Chilla, M. Hafich, and G.Y. Robinson, "Transient grating measurements of ambipolar diffusion and carrier recombination in InGaP/InAlP multiple quantum wells and InGaP bulk", 1993 Electronic Materials Conference, Santa Barbara, CA, June 23-25, (1993).
330. O.F. Buccafusca, J.L.A. Chilla, **C.S. Menoni**, J.J. Rocca, M.J. Hafich, L.M. Woods, and G.Y. Robinson, "Picosecond Photoluminescence study of tunneling in InGaP/InAlP asymmetric double

quantum wells", Procc. Quantum Electronics Laser Science Conference, QELS'93, pp. 179, Baltimore, Md., May (1993).

331. D. Patel, **C.S. Menoni**, H. Temkin, R.A. Logan, and D. Coblentz, "Enhanced characteristics of InGaAsP buried quaternary lasers with pressures in the diamond anvil cell", presented at the Joint AIRAPT/APS Conference, Colorado Springs, CO, June 28 - July 2, 1993.
332. **C.S. Menoni**, D. Patel, M.J. Hafich, and G.Y. Robinson, "Band Offsets in InGaP/InAlP multiple quantum wells using high pressure", presented at the Joint AIRAPT/APS Conference, Colorado Springs, CO, June 28 - July 2, 1993.
333. M. Prasad, O.E. Martinez, **C.S. Menoni**, J.J. Rocca, J.L.A. Chilla, M. Hafich, and G.Y. Robinson, "Transient grating measurements of ambipolar diffusion and carrier recombination in InGaP/InAlP multiple quantum wells and InGaP bulk", Electronic Materials Conference, Santa Barbara, CA, June 23-25, 1993.
334. D. Patel, **C.S. Menoni**, H. Temkin, R.A. Logan and D. Coblentz, "Pressure dependence of the output characteristics of 1.3µm InGaAsP buried heterostructure lasers", Procc. Conference of Lasers and Electro-0ptics CLEO'93, pp. 24, Baltimore, Maryland, 4-7 May 1993.
335. M.C. Marconi, **C.S. Menoni**, O. Buccafusca, M. Prasad, J.J. Rocca, M.J. Hafich, and G.Y. Robinson, "Photoexcited carrier relaxation in InGaP bulk an InGaP-InAlP multiple quantum wells", Quantum Electronics and Laser Science Conference QELS'92, Anaheim, California, May (1992).
336. P. Thiagarajan, J.F. Schmerge, **C.S. Menoni**, M.C. Marconi, O.E. Martinez, J.J. Rocca, M. Hafich, H.Y. Lee, and G.Y. Robinson, "Study of the picosecond carrier dynamics in photoexcited InGaP epitaxial films", Quantum Electronics and Laser Science Conference QELS'91, Baltimore, Maryland 12 -17, (1991).
337. **C.S. Menoni**, J.Z. Hu, and I.L. Spain, "Silicon and Germanium under high pressure", High Pressure in Science and Technology - Part III - Editors C. Homan, R.K. Mac-Crone, E. Whalley - Material Research Society, Simposia Proc. Vol 22, Part III p.l2l, North Holland, N.Y., l984.
338. D.R. Black, **C.S. Menoni**, and I.L. Spain, "Energy Dispersive Diffraction in a Diamond Anvil High Pressure Cell Using Synchrotron and Conventional X-Radiation", Advances in X-ray Analysis 27, 33l, ed. Cohen, Russ, Leyden, Barrett and Predecki, Plenum Publ. Corp. 1984.
339. E.F. Skelton, I.L. Spain, S.B. Qadri and **C.S. Menoni**, "Variable Pressure and Temperature System for Energy Dispersive Analysis of Diffracted Synchrotron Radiation", High Pressure in Research and Industry, pp. 544, eds. C.M. Backman, T. Johannisson, L. Tegner, Arkitektkopia, Uppsala, Sweden, l982.
340. **C.S. Menoni**, T. Palacios, and D. Arias, "Intermetallic Precipitates in Zircaloy-4", Proceedings of Solid-Solid Transformations Conference, pp. 763, H.I. Aaronson Editor, ASM, 1982.
341. I.L. Spain, S.B. Qadri, **C.S. Menoni**, A.W. Webb, and E.F. Skelton, "Structural Studies at High Pressure and Temperature Using Synchrotron Radiation", Physics of Sol. Under Press, pp. 73, J.S. Schilling and R.N. Shelton, eds. North Holland Publishing Company, l98l.
342. E.F. Skelton, S.B. Qadri, **C.S. Menoni,** and I.L. Spain, "A System for Ultra-Rapid Acquisition of Structural Information at Elevated Pressures or Temperatures Using Synchrotron Radiation", Proc. of the 8th Symposium on Thermophysical Properties NBS, Gaithersburg, Md., J. Sengers, ed., 1981.
343. **C.S. Menoni,** and D. Arias, "Transformaciones de fase a alta temperatura en Zircaloy-4", VII Reunion Nacional y II Encuentro Latinoamericano Asociacion Argentina de Tecnologia Nuclear, 1978.

<u>PRESS RELEASE ARTICLES</u>

- "Photonics and high power lasers' , Feature article on C.S. Menon's research, International Innovation, Issue 119, pp. 56-58, (http://www.research-europe.com/magazine/ENVIRONMENT/ADD3/index.html).
  International Innovation is the leading global dissemination resource for the wider scientific, technology and research communities, dedicated to disseminating the latest science, research and technological innovations on a global level.
- IEEE Women in Engineering, Live Chat with Carmen Menoni, Editor in Chief of IEEE Photonics Journal and Liason to IEEE WIE in PSPB (http://www.youtube.com/watch?v=LezFAUlHyos).
- "Extreme Ultraviolet: A New Frontier for Lasers," Hank Hogan, Contributing Editor, Photonics Spectra, 2011. (http://www.photonics.com/Article.aspx?AID=48973)
- "Bringing Extreme UV Microscopy to the Tabletop" , Scattering, Optics and Photonics News, April 2009.
- "EUV microscope inspects masks on-site", Optics.org, http://optics.org/cws/article/research/37914, 2009.
- "Engineering Professor Wins 'Invention Oscar", Colorado State University, http://www.colostate.edu/features/carmen-menoni.aspx
- "EUVM-1, Nanoscale resolution 46.9 nm wavelength microscope", R&D 100 Magazine
- PHOTONIC FRONTIERS: EXTREME-UV SOURCES, "Coherent light sources reach the extreme-ultraviolet", Laser Focus World, vol 42, No. 12, Dec. 2006.
- TECHNOLOGY REVIEW 2006: *The exotic and the everyday spur innovation -"Imaging on the edge"* Laser Focus World, vol. 42, No. 12, 2006.
- J.R. Minkel*, "A Table-top EUV microscope*", IEEE Spectrum, Sept. 2006.
- *"38 nm Spatial resolution EUV microscope",* Highlights of CLEO 2006 – AIP- 1 of 6 papers selected for General News Release from ~1700 submissions
- G. Overton, *'Compact EUV laser enables nanoimaging,'* Laser Focus World, v. 41, p. 32 (2005).
- J.T. Abiade, *'Nanoscale Features Imaged Using Compact Extreme Ultra-Violet Laser,'* Materials Research Society, Materials Connections (online at http://www.mrs.org/connections/matl_news.html) (2005).
- J. Tyrrell, *'EUV microscope explores nanoscale,'* in Optics.org (2005).
- R. Serna, *'Damage threshold of extreme-ultraviolet multilayer mirrors measured,'* Materials Research Society Bulletin, April Issue, p. 225 (2004).

INVITED SEMINARS

1. "Laser/material interactions from the infrared to the extreme ultraviolet", **C.S. Menoni**, Colloquium Department of Physics, University of Denver, April 4, 2014.
2. "Laser/material interactions from the infrared to the extreme ultraviolet", **C.S. Menoni,** Colloquium Department of Physics, Colorado School of Mines, November 19, 2013.
3. " Advances in nanoscale resolution 3D Imaging mass spectrometry of biological samples", **C. S. Menoni**, Agilent Labs, Santa Clara, CA, June 2013.
4. "Exploring the Nano-World with Bright Beams of Extreme Ultraviolet Light," **C.S. Menoni**, Booz Allen Hamilton Distinguished Colloquium in Electrical and Computer Engineering, University of Maryland, May 10, 2013.
5. ""Discovering the nano-world with bright laser beams of extreme ultraviolet light", **C.S. Menoni,** Institute of Physics, Prague, Czech Republic, April 17, 2013.
6. "Nanoscale imaging and patterning with bright beams of extreme ultraviolet light," **C.S. Menoni**, Nanotechnology group, NIST, Boulder, CO, March 2013.

7. “What role do point defects play in the laser damage behavior of metal oxides? **C.S. Menoni**, Physics Colloquium, Colorado State University, Feb. 25, 2013.
8. “Imaging at the nanoscale with bright beams of extreme ultraviolet laser light", **C. S. Menoni** , Rocky Mountain Optical Society of America, Boulder, October 2012.
9. “Exploring the nanoworld with extreme ultraviolet laser light”, **C. S. Menoni**, Department of Physics, Colorado State University, September 2012.
10. "Exploring the nano-world with bright beams of extreme ultraviolet light", **C. S. Menoni**, University of Paris Sud, France, June 2012.
11. “Nanoscale resolution 3D Imaging mass spectrometry of biological samples”, **C. S. Menoni**, Agilent Labs, Santa Clara, CA, February 2012, Carmen S. Menoni
12. “Imaging at the nanoscale using bright extreme ultraviolet laser light,” **C.S. Menoni**, Microbiology, Inmunology and Pathology Seminar Series, Colorado State University, February 23, 2011.
13. “Exploring the world at the nanoscale with bright beams of extreme ultraviolet light”, **C.S. Menoni**, New Paltz, City University fo New York, February 17, 2011.
14. “Imaging at the nanoscale with extreme ultraviolet laser light’, **C.S. Menoni**, Inverse Problem Seminar, Department of Mathematics, Colorado State University, February 10, 2011.
15. “Nanoscale imaging of biological systems with extreme ultraviolet laser beams”, **C.S. Menoni** and D. Crick, School of Biomedical Engineering Seminar Series, Colorado State University, January 31, 2011.
16. “Nanoscale microscopy and spectroscopy with extreme ultraviolet laser light”, **C.S. Menoni**, Colorado State University, Cancer Supercluster Seminar Series, College of Vet. Met, January 24, 2011.
17. “Nanoscale imaging and patterning using bright beams of extreme ultraviolet light from table-top lasers,” **C. S. Menoni**, M. C. Marconi and J. J. Rocca, SEMATECH Workshop, Albany, NY, Feb. 10, 2010.
18. “Fundamentals of oxide ion beam sputtering for high power laser interference coatings,” **C.S. Menoni**, Chemistry Department, Colorado State University, June 15, 2009.
19. “Bright extreme ultraviolet laser beams: an enabling tool for nanoscience and nanotechnology applications,” **C.S. Menoni**, Physical Chemistry Seminar, Chemistry Department, Colorado State University, August 28, 2008.
20. “Towards High Power Free Electron Lasers: Demands on the Resonator Optics”, **C.S. Menoni**, presented at Scientific Assessment of Free-Electron Laser Technology for Naval Applications, National Academy of Sciences, April 4, 2008.
21. “Nanoscale resolution extreme ultraviolet imaging at a table-top”, **C.S. Menoni**, Physics Seminar, University of Nebraska at Kerney, March 13, 2008. Sponsored by the American Physical Society Women Speaker Program.
22. “Nanoscale imaging at extreme ultraviolet wavelengths,” **C.S. Menoni**, Vice-President for Research Imaging Symposium, CSU, January 31, 2008.
23. “*Bright Extreme ultraviolet laser beams: an enabling tool for nanoscience and nanotechnology applications”*, **C. S. Menoni**, Department of Mechanical and Aerospace Engineering Colloquium Series, Princeton University, October 12, 2007.
24. “*Extreme ultraviolet laser Light: an enabling tool for nanoscience and nanotechnology applications*”**,** **C.S. Menoni**, Department of Physics Colloquium, Arizona State University, Sept. 6, 2007.
25. *“Luz coherente en el ultravioleta lejano: una nueva herramienta para explorar aplicaciones en nanocienca y nanotechnologia”,* C.S. Menoni, Department of Physics Colloquium Series, Universidad de Buenos Aires, Argentina, April 12, 2007.
26. *“Exploring the nano-world with table-top extreme ultraviolet lasers”*, **C.S. Menoni**, M.C. Marconi, J.J. Rocca, **Keynote Speaker** Information Storage Energy Consortium, Fort Collins, CO, Nov. 2006.

27. "*The intricate behavior of laser diodes. And why I love to do research*", Seminar Series Department of Electrical & Computer Engineering, University of Wisconsin at Madison, October 15, 2005.
28. *"Laser Research at Colorado State University opens inroads into High peak power laser driver technology, extreme ultraviolet lasers, and applications"*, Free Electron Laser Technical Working Group, ONR, Albuquerque, December 12, 2005.
29. Invited Speaker "Panel on Women in Optics", SPIE 2004 Annual Meeting, Denver, CO, Aug. 6, 2004.
30. "*The physical properties of laser diodes for communications,"* The School of Engineering and TECNUN, University of Navarra, San Sebastian, Spain, June 23, 2004.
31. "Optical probing of semiconductor heterostructures and their devices", Department of Electrical & Computer Engineering, Arizona State University, February 2004.
32. *"A dance between photons and electrons exposes intrinsic physical processes in low dimensional semiconductors and their devices",* **C.S. Menoni**, Department of Physics Seminar Series, Colorado School of Mines, October 15, 2002.
33. *"Long wavelength laser diodes: optical and electrical behavior",* **C.S. Menoni**, Cielo Communications, Inc., Broomfield, CO, February 2001.
34. *"Optically probing of laser diode materials: A tool to understand physical processes that affect the diode output characteristics",* **C.S. Menoni**, Seminar Series, Department of Electrical and Computer Engineering, University of Wyoming, Laramie, April 2001.
35. *"Optical properties of InP Quantum Dots",* **C.S. Menoni**, Colloquium series Physics Dept, Sept 18, 2000.
36. "*From infrared to the UV, semiconductor lasers are a case study*", **C.S. Menoni**, presented at University of Buenos Aires, Department of Physics Seminar Series, July 10, 1999.
37. *"Nanostructure fabrication using block copolymer masks ",* **C.S. Menoni**, Annual Meeting of the Colorado Advanced Materials Institute, Denver, CO, May 6, 1999.
38. *"Optical Characterization of Semiconductor Materials and Devices,"* **C.S. Menoni**, Dept. of Electrical and Computer Engineering, University of Colorado, Boulder, March 12, 1999.
39. *"Intrinsic Loss Mechanisms in 1.3μm lasers,"* **C.S. Menoni**, NIST Seminar, Boulder, CO, Feb. 24, 1999.
40. *"Carrier Transport in ZnSe/ZnCdSe MQWs,"* **C.S. Menoni**, presented at the Basic Science Division, National Renewable Energy Laboratory NREL, Golden, CO, July 16, 1998.
41. *"Optical Probing of Band Structure Changes in III-V materials and devices"*, **C.S. Menoni**, April 25, 1997, Texas Tech University, Lubbock, TX.
42. *"Effect of strain on the Electronic Band Structure of a Colorado Material: $In_xGa_{1-x}P$/InAlP heterostructures for visible semiconductor lasers",* **C.S. Menoni**, 1996 Colloquium Series of the Department of Physics, Colorado State University, October 7, 1996.
43. *"Band structure and band alignment of strained $In_xGa_{1-x}P$/InAlP Multiple Quantum Wells",* **C.S. Menoni**, Annual Meeting of the American Vacuum Society, Rocky Mountain Chapter, Arvada, CO, August 22, 1996.
44. *"Optical Characterization of Transport and Recombination in Visible Semiconductor Laser Heterostructures",* **C.S. Menoni**, Annual Meeting of the Colorado Advanced Materials Institute, Denver, CO, May 5, 1994.
45. *"Characterization of carrier transport and recombination in InGaP/InAlP multiple quantum wells from transient grating measurements",* **C.S. Menoni**, presented at the Basic Science Division, National Renewable Energy Laboratory NREL, Golden, CO, June 28, 1994
46. *"Research funding opportunities for a young faculty*" - **C.S. Menoni,** presented at the 4th National Science Foundation Conference on Minority in the Science and Engineering Workforce, Washington DC, September 1995.

47. *"Characterization of semiconductor lasers and materials using ultrahigh pressure",* **C.S. Menoni,** 2nd Annual National Conference on Diversity in the Scientific and Technological Workforce, National Science Foundation, Washington D.C., Oct 28-30, 1993.
48. *"Picosecond absorption response of photoexcited InGaP epitaxial films,"* **C.S. Menoni**, 1991 Annual Symposium of the American Vacuum Society, Rocky Mountain Chapter, Denver, Colorado, August 1991.

PROFESSIONAL ACTIVITIES

- Co-Chair X-Ray Laser Conference, SPIE, 2012-2013.
- Co-Chair International Conference on X-Ray Lasers, May 26-30, 2014
- Member of the International Committee of OSA Optical Interference Coatings Conference, 2011 - 2012, 2013, 2014.
- Member organizing committee SPIE Laser Damage Symposium, 2010, 2011, 2012, 2013, 2014.
- Member of IEEE Publications Services Product Board (PSPB) Strategic Planning Committee, 2011-2016.
- Member of IEEE Fellow Committee, 2014.
- Member of Publications Strategic Planning Committee, 2010, 2011, 2012, 2013, 2014.
- Voting member and representative of IEEE PSPB on the IEEE Technical Advisory Board
- IEEE Spectrum Editorial Advisory Board Member and liason to PSPB, 2011,2012,2013
- IEEE Women in Engineering liason to IEEE PSPB, 2012, 2013, 2014.
- Presider, Applications Session, SPIE X-Ray Laser Conference, 2013.
- Presider, SPIE Laser Damage Conference, 2013.
- Panelist NSF IDBR division. Reviewer of proposals on nano-biophotonics, October 24, 2013.
- Panelist NSF SBIR Phase II, August 24, 2013.
- Reviewer of NIH CETR Phase I review, September 2013.
- Reviewer for Applied Optics, Nature Photonics.
- Member of Technical Advisory Working Group, Directed Energy Division, Office of Naval Research, 2008-2013.
- Presider SPIE Boulder Damage Symposium, Boulder, CO, September 2012.
- Organizer with R. Falcone (LBNL) of a Symposium in Novel EUV and SXR sources and their science, OSA Frontiers in Optics, 2011.
- Presider Sessions FMC and FMJ, OSA Frontiers in Optics, 2011.
- Panelist, IGERT in Bio-engineering, National Science Foundation, Sept. 2011.
- Panelist, Career 2010, National Science Foundations
- Editor-in-Chief, IEEE Photonics Journal, 2009-
- Topical Editor, Optics Letters, 2008-2010.
- Organizing Committee Member, Laser Damage Symposium, 2010, 2011, 2012, 2013
- Member of the Committee HIGH POWER, SOLID STATE AND SHORT WAVELENGTH – IEEE Photonics Society Annual Meeting, 2009, 2010, 2011.
- Vice-President for Publications, IEEE-LEOS, 2007-2008.

- Member of the Board of Governors, IEEE-LEOS 2006-2008.
- Member of LEOS Awards Selection Committee, 2008.
- Panelist, National Science Foundation, EECS, BRIGE Program, April 2008.
- Member Scholarship Committee SPIE 2005-2008
- Member of the Technical Committee of the International Conference on Near Field Electromagnetic Characterization and Imaging, ICONIC 2007.
- Member of the Doctorate Committee (Rapporteur) of Francesco Pedaci, "Control of Cavity Solutions and Modal dynamics in semiconductor lasers: a experimental study", University of Nice Sophia Antipoli, and Institute Nonlineare, Nice, France, Directors Profs. J. Tredicce and M. Giudici. Nov. 2006.
- Panelist National Science Foundation ECS Division– November 2005.
- Reviewer MPS Division, National Science Foundation, 2005.
- President of Session CWL "Novel Low Dimensional Emitter", CLEO 05, Baltimore, May 2005.
- Member of Committee 6, Optical Materials, Fabrication and Characterization, 2003-2005 Conference on Lasers and Electro-Optics.
- Member of Selection Committee IEEE-LEOS Distinguished Speaker, 2004-05, 2007.
- Presider of Sessions CTuM "Controlled Nanostructures", Conference on Lasers and Electro-optics, CLEO 04, San Francisco, May 2004.
- Chair, Vice Chair and Secretary IEEE-LEOS Denver Chapter, 2001-2003
- NSF Panel –Research Experience for Undergraduates, Materials Science Directorate, Nov. 2003.
- NSF Panel – EECS Directorate, October 2003.
- Presider of Sessions CMF "Quasiphasematching", CtuL "Structured Materials" and CthT "Optical Materials Fabrication and Characterization", Conference on Lasers and Electro-optics, CLEO 03, June 2-6, Baltimore, MD 2003.
- Member of the Board of Editors, Review of Scientific Instruments, 2002 – 2005.
- Member of the organizing committee (Subcommittee 6) Conference on Lasers and Electro-Optics, Baltimore, MA, June 2003.
- Committee Member, Semiconductor Lasers for Lightwave Communications, ITCom 2003-2004.
- Session Chair, Semiconductor Lasers for Lightwave Communications, ITCom 2003.
- Co-chair, Symposium " Semiconductor Lasers for Lightwave Communications", ITCom 2002, Boston, MA, July 29-31st, 2002.
- Local Organizer Committee member, 8th International Conference on X-Ray Lasers, Aspen, CO, May 30 – June 2, 2002
- Panelist and reviewer, National Science Foundation, Electrical & Communication System Division, National Science Foundation, February 2002.
- Co-chair, Symposium "Semiconductor Lasers for Lightwave Communications", ITCom 2001, Denver, CO, August 22-23 2001.
- Guest Editor, Invited issue on "Optical frequency synthesis: a new tool for precision optical metrology", IEEE Journal of Quantum Electronics, August 2001.
- Associate Editor, IEEE Journal of Quantum Electronics, 2000 – 2002; 2002 – 2005.
- Vice-Chair, Treasurer, IEEE LEOS Denver Chapter, 2001, 2002.
- Panelist and reviewer, Information Technology Initiative, National Science Foundation, July 17-19, 2001.

- Panelist on 'Physics of Nanostructure materials" roundtable discussion, Frontiers of High Pressure Research II: Application of High Pressure to Low Dimensional Novel Electronic Materials, NATO Meeting, Pingree Park, June 11-15, 2001.
- Session Chair, Four Corners Meeting of the American Physical Society, Nov. 2000.
- Reviewer Physical Review B , CRDF, IEE Proceedings, Review of Scientific Instruments
- Panelist IGERT 2000, National Science Foundation, September 2000.
- Panelist and Reviewer, SBIR Phase II, Engineering, National Science Foundation, April 2000.
- Panelist and Reviewer, MRSEC Centers, National Science Foundation, November 1999.
- Reviewer for the Electronic Materials Division, National Science Foundation, 1999.
- Reviewer ECS-Engineering Division, National Science Foundation
- Reviewer of a Technology Center Proposal, National Science Foundation, Electronics, Photonics and Device Technology Division, November 1999.
- Panelist and Reviewer for the National Science Foundation, Electronics, Photonics and Device Technology Division, September 20, 1999, (10 proposals).
- Panelist and Reviewer National Science Foundation, Electronic Materials, March 9, 1998, (10 proposals).
- Reviewer for the NSF Division of Engineering Education and Centers
- Reviewer, IEEE J. Quantum Electronics, Physical Review B
- Reviewer of the new edition of "Electromagnetics," by Kraus, McGraw Hill, 1998.
- 1997 Local Arrangement Co-chair and Member of the Organizing Committee - IEEE-EDS 55th Device Research Conference.
- Panelist and Reviewer National Science Foundation, Foundations for Enabling Technologies Division, Engineering, June 19, 1997.
- Reviewer Foundations for Enabling Technologies Division, 1997.
- Panelist and Reviewer National Science Foundation STTR thrust in Optoelectronics - Lightwave Technology- Division of Quantum Electronic Waves & Beams - May 1996.
- Panelist and Reviewer National Science Foundation SBIR Phase I - Lightwave Technology - Division of Quantum Electronic Waves & Beams - September 1995.
- Panelist and Reviewer National Science Foundation - University-Ft. Mourmouth Collaboration - Semiconductor Microstructures - Division of Quantum Electronic Waves & Beams - May 1995.
- Panelist and Reviewer National Science Foundation SBIR Phase I- Lightwave Technology - Division of Quantum Electronic Waves & Beams - September 1993.
- Reviewer for National Science Foundation, Division of Materials Research and Division of Quantum Electronic Waves & Beams - 1993-1998.
- Reviewer for CIMD (Coalition to Increase Minority Degrees) - 1993-1998
- Panelist and Facilitator in the Student Research Presentations -Graduate Eng. Education Program for Women, Minorities and Person with Disabilities, of the 4th National Science Foundation Conference of Diversity in the Scientific and Technological Workforce.

UNIVERSITY PROFESSIONAL SERVICE

- Adviser Engineering Physics Program, 2011 – Present.
- Member of the search committee for Honors Program Director, 2012.

- College of Engineering Liaison to the University Honors Program, 2008- Present
- Department of Electrical and Computer Engineering, Honors Adviser, 2008 - Present
- College of Engineering, Smart Grid Search Committee Member, Spring 2009
- Chemistry Department Search Committee Member, 2009-2010.
- Chair President's Commission on Women and Gender Equity, 2008-2009.
- Member Commission on Women and Gender Equity, 2007.
- Member Search Committee Industrial Liaison for the Extreme Ultraviolet Science and Technology Center, 2006-2007.
- Member Faculty Search Committee, Physics Department – 2006-2007.
- Member Faculty Search Committee, ECE Department – 2006-2007.
- Member of the CSU President Commission on Women and Gender Equity, 2006-2007.
- Member Faculty Search Committee, ECE Department – 2005-2006.
- Member of Search Committee for the selection of the Dean of Engineering at CSU, 2004/05.
- Lead and member of the organizing committee of the CSU's first "Distinguished Women in Science and Engineering" Lecture Series, 2003-Present
- Chair search committee for faculty search, ECE department 2003-2004 that resulted in the hiring of Prof. Marconi and Reising.
- Search Committee Administrative Director and Education Coordinator, NSF Center for Extreme Ultraviolet Science and Technology, 2003, 2004.
- Member of Graduate Curriculum Committee: 2002-Present
- Member of the search committee for the Department Head in Chemical Engineering, 2000-2001.
- Advisor Student Branch IEEE – 1999- 2007.
- Chair and organizer of a session on the "Merits of Graduate Education", Engineering Exploration Days, September 1999.
- Member of the Advisory Board of Women and Minority Program – College of Engineering, Colorado State University, 1997-2001.
- Member of the Professional Committee – College of Engineering, Colorado State University, 1996-1998
- College of Engineering Dean Search Committee, 1997-98
- Judge at the 1997 Undergraduate Education Symposium
- Member of undergraduate recruiting committee Department of Electrical & Computer Engineering

<u>ESTABLISHED INDUSTRIAL COLLABORATIONS:</u>

- *Boeing Corporation*, Albuquerque, NM: optical coatings for free electron lasers with high resistance to laser damage, M. Curtin.
- *Agilent Laboratories, Palo Alto, CA – Extreme ultraviolet mass spectrometry imaging, Randall Urdahl.*
- *JMAR Technologies, San Diego, CA* – Through this collaboration we are developing a nano-probe for chemical probing of surfaces using laser induced breakdown spectroscopy. Collaborators: O. Hemberg, S. Bloom, B. Frazier.

- *Agilent Laboratories*, Fort Collins, CO – One of my students was the recipient of their Graduate Fellowship – 2001-2005, Collaborator: S. Hunter.
- *Astralux, Inc.*, Boulder, CO – Developed dry etching of GaN 2000-2003 – engineering dielectric coatings for ultraviolet nitride lasers, 2004- Present, Collaborators: J. Pankove, and J. Smith.
- *Lucent – Bell Laboratories*, Homdel, NJ – collaborated in the investigation of the optical properties of AlGaN/GaN materials, 2002-2003, Collaborator: H.M. Hock.
- *CIELO Communications*, Broomfield, CO – Collaborated in the investigation of 1.3 μm laser diodes for communication, 2003, Collaborator: A. Jackson.
- *Veeco-IonTech*, Fort Collins, CO - collaborated in designing and characterizing notch filters for wavelength division multiplexing. Through this collaboration we developed a sensitive optical technique to measure losses in single layer dielectric films in the ppm range. 2001-2002. Collaborators: D. Siegfried, C. Montcalm.
- *Agilent Technologies, Optoelectronic Division*, San Jose, CA – Using spectroscopy at high pressure identified the main cause in the degradation of the emission efficiency in InGaP LEDs. 1999. Collaborator: F. Kish.
- *Lumileds Inc.*, San Jose, CA – Collaborated in study of InGaN/GaN LEDs, 1999-2000. Collaborator: N.F. Gardner.
- *Ball Aerospace Corporation,* Boulder, CO – Developed a process to fabricate arrays of diffractive optical elements for space applications. 1998-1999. Collaborator: T. Wise.
- *Monitor Labs*, Englewood, CO – Developed an NO_2 analyzers – 1997-1998. Collaborator: G. Fetzer.

UNIVERSITY COLLABORATIONS

Dean Crick and Michael McNeil, Dept. Microbiology, Immunology and Pathology, and E. Bernstein, D. Chemistry, Colorado State University – With this group we are developing novel EUV ablation, mass spectrometry of micro-organisms.

Anne Sakdinawat, Y. Liu, EECS, U. California, Berkeley – With this group we collaborate on high resolution imaging with table-top EUV/SXR lasers.

Margaret Murnane and Henry Kapteyn- University of Colorado - With this group we collaborate on lensless imaging with extreme ultraviolet lasers.

Wolfgang Rudolph, University of New Mexico – With this group we are collaborating in understanding of the mechanisms that affect the laser induced damage threshold of oxide materials and their stacks, components of interference coatings in mid-infrared high power lasers.

Martin Fejer, Roger Route, Ashot Markosyan- Stanford University – With this group we collaborate in characterizing high power optical coatings.

Hector Mancini – University of Navarra, SPAIN – Collaborative work has been carried out in high resolution imaging and ablation of materials with extreme ultraviolet lasers. Two undergraduate students Aitzol Etcheverry and Eduardo Granados Mateos have conducted their Projecto de Carrera on extreme ultraviolet lasers and applications.

Luke Mawst – University of Wisconsin - Through this ongoing partnership we are investigating the impact of nitrogen incorporation on the DC and high frequency output characteristics of InGaAsN, 1.3 μm laser diodes.

J. Tredicce' group – Institute Nonlinere, University of Nice, Sophia Antipoli – With this group we have collaborated in the investigation of the nonlinear dynamics in the emission of semiconductor laser diodes. Two of their PhD students, Massimo Giudici and Xavier Hachair (presently at CSU) have

spent twelve and six months respectively in my group implementing these experiments in collaboration with my graduate students. Part of this work was the PhD thesis of Massimo Giudici.

H. Temkin, M. Holtz – Texas Tech University – With this group we are working in investigation of optical and electronic properties of 1.3 μm InGaAsN lasers for communications.

S.A. Lee – Physics, **CSU** – Through this collaboration we built a molecular beam epitaxy system to investigate laser manipulation of atoms.

S. DenBaars, E. Hu, S. Keller and M. Minsky – University of California, Santa Barbara – This group provided samples for our initial studies of the optical properties of InGaN alloys. One of their students, M. Minsky spent one weeks at CSU working together with one of my graduate students G. Vaschenko.

Oscar Martinez – University of Buenos Aires. In this collaboration we focus on the development of ultrafast measurements on III-V semiconductor materials.

Clivia Sotomayor Torres – Wuppertal University - We have collaborated with this group in the investigation of transport processes in long wavelength laser diode materials.

COLLABORATIONS WITH NATIONAL LABORATORIES

Christopher Stolz, Lawrence Livermore National Labortory: We are working on developing optical coatings to solve specific problems at the National Ignition Facilty.

Michelle Shinn, Jefferson Laboratory, Free Electron Laser Division Group: We are working with this group in developing optical interference coatings for 100KW-1MW Mid-infrared Free Electron Lasers.

Hoang Nguyen, and Gerald Britten, Lawrence Livermore Lab: We are working with this group in developing multilayer dielectric gratings for high peak power chirped amplified lasers at 800 nm.

Erik Anderson, Weilun Chao, Patrick Naulleau – Center for X-Ray Optics, Lawrence Berkeley Laboratory – With this group we are developing table-top nanoimaging and patterning tools based on compact extreme ultraviolet lasers.

Arthur Nozik's group – National Renewable Energy Laboratory - Nozik's group grows for us colloidal InP nanocrystals which can achieve dimensions as small as 25 Å, and which we are using to investigate the modifications of the electronic structure of InP with increased confinement.

Carlos Tome – Los Alamos National Laboratory – This group provides computational support that allows us to quantify the changes in strain generated through application of hydrostatic pressure. These types of calculations have been instrumental for demonstrating nonlinear piezoelectric effects in nitrides.

EDUCATIONAL ACCOMPLISHMENTS

COURSE DEVELOPMENT

- "Experimental Nanophotonics" – ECE 580 (1st year graduate course). This course is project-oriented. Its objectives are: 1) to train students in optical diagnostics and optical fabrication methods; 2) to help them develop independence in research; 3) to incentivate inquiry and creativity.
- "Introduction to Electrical Engineering Fundamentals" - EECC 192/ EE 100 (Freshmen class) - I developed the curriculum of this class with the goal of introducing students to Electrical Engineering and help them develop analytical, computational, hands-on and team-working skills. To achieve this goal I develop a set 10 experiments which are complemented with lectures and homework. The

development of this class was the subject of the educational component of my NSF Career Award. In this class, I incorporated all elements that are needed to be successful in our program:

- "Semiconductor Materials and Devices " – EE 574 (Graduate class)
- "Optical Information Processing" - EE 457 (Senior Class, with experiments)
- "Visualizing Electromagnetics": Developed four laboratories, three of which introduce students to high frequency measurements in transmission lines for the Electromagnetics EE 341/342 sequence. These are the first of their kind in the ECE curriculum.
- ECE 505 - "Nanostructures: fundamentals and applications"
- HH IU 193 – "High Tech Toys". Honors class introductes students to exciting new technologies created by engineers that affect other fields broadly.

OTHER COURSES TAUGHT:

- "Electromagnetic Fields I and II" – ECE 341/ 342
- "Fourier Optics:, ECE 457
- "Physical Electronics" – ECE 372
- "Principles of Semiconductors" - ECE/PH 672
- "Semiconductor Devices", ECE 471,
- "Advanced topics in Solid State", ECE 774
- "Optical processes in materials", ECE 574
- "Nanostructures Fundamentals and Applications," ECE 505
- "High Tech Toys," H IU- 193, University Honors Program

SHORT COURSES

- "Extreme Ultraviolet Metrology: Imaging and Nanopatterning", short one week course offered at CSU, July, 2011.
- Invited Lecturer, graduate course on "Semiconductor lasers: their physics and applications", The School of Engineering, University of Navarra, San Sebastian, Spain, June 21-25, 2004.

INVITED PUBLICATIONS

- "Introduction to Electrical Engineering", **C.S. Menoni**, Success 101, vol 1, pp 11-12, 1996.

EDUCATION OF STUDENTS

GRADUATE STUDENTS

Degree Completed

Name	**Degree**	Katherine Interholzinger	- M.S. 1995
Manoj Prasad	- M.S. 1993	Paula Connors	- M.S. 1995

Paul E. Armstrong	- M.S. 1996	Fernando Brizuela	- M.S. 2006
Georgiy Vashenko	- M.S. 1998	Ray Zhiao	- M.S. 2007
Linshi Miao	- M.S. 1999	Lifang Xu	- Ph.D 2007
Jon Pikal	- PhD 1999	Courtney Brewer	- M.S. 2008
Chris Mc Mahon	- MSB 2002	Erik Krous	- M.S. 2010
Ovidio Anton	- M.S. 2002	Fernando Brizuela	- Ph.D 2010
Georgiy Vaschenko	- Ph.D. 2002	Jonathan Tollerud	- M.S. 2011
Yogesh Godwal	- MSB 2003	Christopher Smith	-M.S. 2011
Cyrus Damavandi	- M.S. 2003	Sergio Carbajo	- M.S. 2011
Ann Fitzerald Dummer	- M.S. 2005		
Ovidio Anton	- Ph.D 2007		

In Progress

Name	**Degree**
Peter Langston	- Ph.D 2014
Ilya Kuznetzov	- PhD 2014
Isela Howlet	- M.S. 2013 (Plan B)
Drew Schiltz	-MSc 2014

Visiting Graduate Students

2012-2013 Cornellius Oster, Hochschule ReimMeim, University of Applied Science, Germany

2011 – 2012 Jaroslav Nedjev, Institute of Physics, Czech Republic -

2001 - Xavier Hachair - Institute Nonlineare, University of Nice, Sophia Antipoli

1998 , 1999 - Massimo Giudice – Institute Nonlineare, University of NICE, Sophia Antipoli - Part of his Doctorate thesis work was done at CSU.

1999-2000 - Ralph Slaby – University of Wuppertal, Germany - Performed part his MS thesis work at CSU.

Stefan Fisher - B.S. 2001 - Technical University of Munich Germany - Performed his Senior Research project at CSU.

Students from TECNUN, University of Navarra who carried out their Thesis project at CSU under my supervision

Jon Peeman Arregui, 2013

Victor Martinez Esquiroz, 2013

Aitzol Garcia – 2005 -2006

Jose Manuel Blanco – 2006-2007

Jon Jozeba Yarza - 2007- 2008

Sonia Fernandez - 2007- 2008

Sergio Carbajo – 2008-2009

Ibon Otero – 2010-2011

UNDERGRADUATE STUDENTS

Senior Project Advisees

Lisa Sanchez	- B.S. EE 1992
Steven R. Carlson	- B.S. EE 1992
Paul W. Spencer	- B.S. EE 1992
Michael Montagne	- B.S. EE 1993
Adrien J. Joseph	- B.S. EE 1993
Joan M. Legerskii	- B.S. EE 1994
Chris M. McMahon	- B.S. EE 1994
Christopher Padilla	- B.S. EE 1995
Stan Werne	- B.S. EE 1996
Michael Montaigne	- B.S. EE 1996
Larry Handjojo	- B.S. EE 1997
Joseph Jordan	- B.S. EE 1997
Jeffrey Dad	- B.S. EE 1997
Laura Leyba-Newton	- B.S. EE 1997
Jon Oster	- B.S. EE 1997
Jeron Mamula	- B.S. EE 1998
Michael Dawd	- B.S. EE 1998
Shannon Baker	*- B.S. EE 1999*
Robert Pickock	- B.S. EE 1999
Ryan Friehaus	- B.S. EE 1999
Roger Baxter	- B.S. EE 2000
Sean Pieper	- B.S. EE 2001
Ali Hussain	- B.S. EE 2001
Megan Sauter	- B.S. Eng. S. 2002
Jim McAulley	- B.S. 2002
Naomi Villa	- B.S. 2003
Jeffrey Rock	- B.S. 2003
John Powel	- B.S. 2003
Michael Beau Vaughn	- B.S. 2003
Charissa Duskis	- B.S. 2004
Steve Torres	- B.S. 2004
Jeff Shoengarth	- B.S. 2004
Courtney Brewer	- B.S. 2005
Abbie Tippie	-B.S. 2006
Christopher Kauz	-B.S. 2006
Eric Eifeldt	-B.S. 2006
Erik Krous	-B.S. 2007
Christopher Krumm	–B.S. 2008
Nengyun Zhang,	- B.S. 2013
Brian Kirchgessner	- B.S. 2015

NSF Research Experience for Undergraduate Scholars

John Andersen	- B.S. EE 1994 (Bucknell University)
Emily Warlick	- M.S. EE 1995 (M.I.T.)
Kayleen Hubert	- B.S. EE 1997 (Univ. Missouri at La Rolla)
Mark Pecault	- B.S. EE 1998 (Trumman State University)
Jeron Mamula	- B.S. EE 1998(Colorado State University)
Michael Dawd	- B.S. EE 1998(Colorado State University)
Shannon Baker	- B.S. EE 1999 (Colorado State University)
Robert Pickock	- B.S. EE 1999 (Colorado State University)

Ryan Friehaus	- B.S. EE 1999 (Colorado State University)
Roger Baxter	- B.S. EE 2000 (Colorado State University)
Jim Wegart	- B.S. EE 2000 (Oregon Institute of Technology)
Sean Pieper	- B.S. EE 2001 (Colorado State University)
Katheryn Leenerts	- B.S. EE 2002 (Colorado State University)
Jason Forsyth	- B.S. EE 2003 (Colorado State University)
Autumn Mills	- B.S. EE 2002 (Colorado State University)
Megan Sauter	- B.S. Eng. S. 2002 (Colorado State University)
Naomi Villa	- B.S. ECE 2004 (Colorado State University)
Paul Rimmer	- B.S. Physics 2005 (University of Colorado, Denver)
Charissa Duskis	- B.S. ECE 2004 (Colorado State University)
Courtney Brewer	- B.S. ECE 2005 (Colorado State University)
Gerald Castillo	- B.S. ECE 2005 (Colorado State University)
Kevin Lee	- B.S. ECE 2005 (University of California at San Diego)
Haydee Guzman	- B.S. Physics and Math 2005 (University of Puerto Rico, Rio Piedras)
Erik Krous	- B.S. ECE 2007(Colorado State University)
Jessica Lovewell	- B.S. Physics 2006 (Colorado State University)
William Walker	- B.S. Physics, 2010 (Morehouse College)
Chris Krumm	- B.S. ECE, 2008 (Colorado State University)
Kendra Krueger	- B.S ECE 2009 (Renseleer Institute of Technology)
Margaret Garvan	- B.S. ECE 2010 (University of Florida)
Diana Peterson	- B.S. ECE 2011 (Colorado State University)
Leah Belval	- B.S. ECE 2011 (Colorado State University)
Sabrina Thompson	- B.S. ECE 2011 (Olin College)
Isela Howlett	- B.S. Optical Sciences (U. Arizona), 2010
Jeffrey Chia	- B.S. Optical Sciences (U. Arizona), 2012
Gregory Jacob	- B.S. Optical Sciences (U. Arizona), 2012
Catalina Tome	- B.S. Biology, University of Santa Cruz, 2011
Nengyun Zhang	- B.S. Electrical & Computer Engineering, CSU, 2013
Richard Schulte	- B.S. Engineering Physics, Santa Clara University, 2013
Katherine Mantell	- B.S. Electrical & Computer Engineering, CSU, 2013
Samuel Nerenberg	- B.S. Optical Sciences (U. Arizona), 2013
Joel Steward	- B.S. Physics, Sewannee, University of the South, 2014

CCHE Scholars - The undergraduate support from CCHE originated in 1992, after the CSU President designated the CSU Optoelectronic Program, "*Program of Research and Scholarly Excellence*."

Chris M. McMahon - B.S. EE 1994 (Colorado State University)

Christopher Padilla - B.S. EE 1995 (Colorado State University)

Cassandra R. Young - B.S. EE 1997 (Colorado State University)

Larry Handjojo - B.S. EE 1997 (Colorado State University)

Joseph Jordan - B.S. EE 1997 (Colorado State University)

Fachhoschule Regensburg - Colorado State University Practical Training Advisees

Bernard Hopferberger - March - July 1992

Sabrina Betz - March - July 1996

Daniela Wolf - March - July 1998

Sebastian Zurek - March - July 1999

U. Lille, Dept. Electrical Engineering France

Caroline Hainguerlot -May –August 2011

K-12 Students

Katherine Bonnette – 12th grade - Fort Collins High School, Fort Collins, CO – Summer internship 2001.

Krista Miller - 10th grade - Poudre High School, Fort Collins, CO - Summer internship 2000.

Krista Miller - 11th grade - Poudre High School, Fort Collins, CO - Summer internship 2001.

Catalina Tome – 11th grade- Santa Fe, New Mexico, Summer Research Internship, 2006.

Melissa Maciejewski – 11th grade – Rocky Mountain High, Fort Collins, CO, Summer Research Internship 2006.

Catalina Tome – 11th grade – Santa Fe Academy, Santa Fe, New Mexico, Summer Research Internship, 2007.

K-12 Teachers

Tammy Foley, Summer Intern, St. Vrain Middle School Teacher, Summer 2007.

Italics identify students from minority groups in Physical Science and Engineering.

MENTORING ACTIVITIES - K-12

- "Let's make light" workshop, presented to elementary school girls program offered by College of Engineering, Feb. 2011, Feb. 2012.
- Engineering Exploration Day, Presentation, February 2010, February 2011, October 2011, February 2012.
- Developed a workshop for elementary school girls "Let's make Light", presented at CSU, Nov. 2003, Oct. 2004, March 2006, October 2006.
- Co-author of a 2-week workshop on Lasers and Optics for high school students, presented at CSU from 2004 to present.

- Provided counseling to the Robotics Team at Poudre High School led by Steve Sayers, February 1999.
- Developed an Optics Demonstration for 8th graders at Boltz Jr. High, Spring 1998.
- Developed a 6-week hands-on workshop, entitled "Amazing Experiments in Optics," which was offered to 11th graders from Fort Collins high schools at CSU in the Spring of 1996.
- Invited Speaker, Chemistry class-Fort Collins High School, "What it takes to be an Electrical Engineer," Spring 1995.
- Math Olympiads Coach Kruse Elementary, 1994-1998;
- Science Fair Judge, Kruse Elementary, 1996
- Developed a demonstration to 4th graders entitled "Let's make crystals", Kruse Elementary, 1994, 1996.