

**Curriculum Vitae**  
**CARMEN S. MENONI**

**Professor**

Department of Electrical and Computer Engineering  
Fort Collins, CO 80523-1373  
Tel. (970) 491-8659 - Fax. (970) 491-8671  
E-mail: [menoni@engr.colostate.edu](mailto:menoni@engr.colostate.edu)

**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 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**

- 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 Calendar 2010
- 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 to be 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, grade: Fellow
- Member of the American Physical Society, grade: Fellow
- Member of the Optical Society of America, grade: Fellow
- Member of the International Society for Optical Engineering
- Member of the American Society of Mass Spectrometry
- Member of the American Association of University Women

RESEARCH INTERESTS

- Nanoscale optical engineering using ultraviolet lasers: nanometer-scale resolution imaging, nano-patterning, nano-machining and nano-spectrometry
- Advanced thin films for interference coatings of high power lasers: growth and characterization

RESEARCH ACCOMPLISHMENTS

- Co-PI Army Research Office – Multi-university Research Initiative (ARMY-JTO-MRI) on “Thermal effects on optical coatings”, PI: W. Rudolph, U. New Mexico., 2011-2015.
- PI Office of Naval Research –Multi-university Research Initiative (ONR-JTO-MRI) on “Fundamental Understanding of Oxide Coatings for High Energy Lasers”, 2007-2012. Co-PIs: University of New Mexico, Stanford University.

- Co-PI and Faculty Member of the National Science Foundation Engineering Research Center for Extreme Ultraviolet Science and Technology, 2003-2011. This is a CSU Program of Research and Scholarly Excellence. Leader of high resolution imaging with extreme ultraviolet lasers. This was a CSU Program of Research and Scholarly Excellence.
- 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.
- Established the Optical Spectroscopy Laboratory at Colorado State University for the study of the physics of semiconducting heterostructures and nanostructures, and active semiconductor devices.
- Developed a reactive ion beam etching system for material processing, and a process for etching of wide-bandgap nitrides.
- 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. "Semiconductor Lasers for Lightwave Communication Systems", Proceedings of SPIE, volume 4533, editors: **C.S. Menoni** and R.P. Mirin, 2001.
2. "Semiconductor Lasers for Lightwave Communication Systems", Proceedings of SPIE, to be published November 2002, editors: R.P. Mirin and **C.S. Menoni**, 2002.

### Journals edited:

1. IEEE Photonics Journal – 2009-Present – Editor-in-Chief
2. "Breakthroughs in Photonics 2010", IEEE Photonics Journal, **3**, (2) 244, 2011.
3. "Breakthroughs in Photonics 2009", IEEE Photonics Journal, **2**, (2) 206, 2010.
4. 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).
5. Feature issue in "Extreme Ultraviolet Sources and Applications", **C.S. Menoni**, IEEE Journal of Quantum Electronics, **42** (1): 1-1, (2006).

PEER REVIEWED JOURNAL PUBLICATIONS

**2011**

1. 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).
2. 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*. 42A(1): p. 71-75.

**2010**

3. D.N. Nguyen, L.A. Emmert, D. Patel D, **C.S. Menoni**, W. Rudolph, "Transient phenomena in the dielectric breakdown of HfO<sub>2</sub> optical films probed by ultrafast laser pulse pairs," *Appl. Physics Letters*, Vol. **97**, Article Number: 191909, (2010).
4. 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).
5. 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).
6. 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).

**2009**

7. P.W. Wachulak, L. Urbanski, M.G. Capeluto, D. Hill, W.S. Rockward, C. Lemmi, 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.
8. 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.
9. 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)
10. 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.
11. F. Brizuela, Y. Wang, C. A. Brewer, F. Pedaci, W. Chao, E. H. Anderson, Y. Liu, K. A. Goldberg, P. Naulleau, 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).

## 2008

12. 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).
13. 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).
14. 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).
15. 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).
16. 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).
17. 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).

## 2007

18. 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.)*
19. 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).
20. 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)

## 2006

21. 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).
22. 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  $\lambda = 46.9$ -nm Laser", *IEEE Transactions on Nanotechnology* **5**, 3, (2006).
23. M.G. Capeluto, P. Wachulak, M.C. Marconi, D. Patel, **C.S. Menoni**, J.J. Rocca, C. Lemmi, E.H. Anderson, W. Chao, and D.T. Attwood, "Table-top nanopatterning with extreme ultraviolet laser illumination", *Microelectronic Engineering*, **84**, 721, (2007).

24. 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.*)
25. 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  $\text{In}_{0.4}\text{Ga}_{0.6}\text{As}_{0.995}\text{N}_{0.005}/\text{GaAs}$  single Quantum Well", *Applied Physics Letters*, **89** (17): Art. No. 171112, (2006).
26. 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).
27. 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).
28. 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  $1.3\mu\text{m}$  InGaAsN lasers in the range  $T=10-80^\circ\text{C}$ ", *Photonics Technology Letters* **18**, 1774-1776, (2006).

## 2005

29. 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.*)
30. L. Juha, M. Bittner, D. Chvostova, J. Krasa, M. Kozlova, M. Pfeifer, J. Polan, A.R. Prag, B. Rus, M. Stupka, J. Feldhaus, V. Letal, Z. Otcenasek, J. Krzywinski, R. Nietubyc, J.B. Pelka, A. Andrejczuk, R. Sobierajski, L. Ryc, F.P. Boody, H. Fiedorowicz, A. Bartnik, J. Mikolajczyk, R. Rakowski, P. Kubat, L. Pina, M. Horvath, M.E. Grisham, G.O. Vaschenko, **C.S. Menoni**, and J.J. Rocca, "Short-wavelength ablation of molecular solids: pulse duration and wavelength effects", *Journal of Microlithography Microfabrication and Microsystems* **4** (3): Art. No. 033007, 2005.
31. 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).
32. L. Juha, M. Bittner, D. Chvostova, V. Letal, J. Krasa, Z. Otcenasek, M. Kozlova, J. Polan, A.R. Prag, B. Rus, M. Stupka, J. Krzywinski, A. Andrejczuk, J.B. Pelka, R. Sobierajski, L. Ryc, J. Feldhaus, F.P. Boody, M.E. Grisham, G. Vaschenko, **C.S. Menoni**, J.J. Rocca, "XUV-laser induced ablation of PMMA with nano-, pico-, and femtosecond pulses", *Journal of Electron Spectroscopy and Related Phenomena* **144**: 929-932, (2005).
33. O. Anton, **C.S. Menoni**, J.Y. Yeh, L.J. Mawst, J.M. Pikal, and N. Tansu, "Frequency response of strain-compensated InGaAsN/GaAsP/GaAs SQW lasers", *IEEE Journal of Selected Topics in Quantum Electronics*, **11**, 1079-1088, (2005).
34. L. Juha, M. Bittner, D. Chvostova, J. Krasa, Z. Otcenasek, A.R. Prag, J. Ullschmied, Z. Pientka, J. Krzywinski, J.B. Pelka, A. Wawro, M.E. Grisham, G. Vaschenko, **C.S. Menoni**, and J.J. Rocca, "Ablation of organic polymers by 46.9-nm laser radiation", *Applied Physics Letters*, **86**, 034109, (2005).

35. O. Anton, **C.S. Menoni**, J.Y. Yeh, L.J. Mawst, J.M. Pikal, and N. Tansu, "Increased monomolecular recombination in MOCVD grown 1.3  $\mu\text{m}$  InGaAsN/GaAsP/GaAs QW lasers from carrier lifetime measurements", *Photonics Technology Letters* **17** (5): 953-955, (2005).
36. S. Kohli, C.D. Rithner, P.K. Dorhout, A.M. Dummer, and **C.S. Menoni**, "Comparison of nanometer-thick films by x-ray reflectivity and spectroscopic ellipsometry", *Review of Scientific Instruments*, **76** (2), 023906, (2005). (*This article has been selected for the January 24, 2005 issue of Virtual Journal of Nanoscale Science & Technology*).
37. M.A. Larotonda, B.M. Luther, Y. Wang, Y. Liu, D. Alessi, M. Berrill, A. Dummer, F. Brizuela, **C.S. Menoni**, M.C. Marconi, V.N. Shlyaptsev, J. Dunn, and J.J. Rocca, "Characteristics of a Saturated 18.9 nm Tabletop Laser Operating at 5 Hz Repetition Rate", *IEEE Journal of Selected Topics in Quantum Electronics*, **10**, 1363-1367, (2005). (**Invited**)

## **2004**

38. D. Patel, L.F. Xu, R. Pownall, O. Anton, and **C.S. Menoni**, "Amplified Spontaneous Emission measurements in a diamond anvil cell: A tool to investigate laser diode gain under high pressure", *Physica Status Solidi*, **241** (14): 3420-3426, (2004).
39. S. Kohli, P.R. McCurdy, C.D. Rithner, P.K. Dorhout, A.M. Dummer, F. Brizuela, and **C.S. Menoni**, "X-ray characterization of  $\beta$ -Tantalum films", *Thin Solid Films* **469-70**: 404-409, Sp. Iss. SI, (2004).
40. O.H. Anton, D. Patel, G. Vaschenko, **C.S. Menoni**, J.M. Pikal, "Small-signal response of 1.3- $\mu\text{m}$  InAsP-InGaAsP quantum-well laser diodes obtained with a terahertz-bandwidth frequency comb", *IEEE Journal Of Quantum Electronics* **40** (8): 982-988, (2004).
41. M. Grisham, G. Vaschenko, **C.S. Menoni**, J.J. Rocca, Yu.P. Pershyn, E.N. Zubarev, D.L. Voronov, V.A. Sevryukova, V.V. Kondratenko, A.V. Vinogradov, and I.A. Artioukov, "Damage of Extreme Ultraviolet Sc/Si Multilayer Mirrors Exposed to Intense 46.9 nm Laser Pulses", *Optics Letters*, **29**, 620-622, (2004).

## **2003**

42. G. Vaschenko, Y. Godwal, **C.S. Menoni**, C. Montcalm, R. Blacker, and D. Siegfried, "Characterization of thin film losses with a synchronously pumped ringdown cavity", *Applied Optics* **42** (22): 4584-4589, (2003).
43. G. Vaschenko, **C.S. Menoni**, D. Patel, C.N. Tomé, B. Clausen, N.F. Gardner, J. Sun, W. Götz, H.M. Ng, and A.Y. Cho, "Nonlinear polarization in nitrides revealed with hydrostatic pressure", *Physics Status Solidi*, **235**, 238-247, (2003).

## **2002**

44. J.L. Shaw, R.E. Treece, D. Patel, **C.S. Menoni**, J.R. Smith, and J.I. Pankove, "Electron emission from GaN *n-p* junctions", *Applied Physics Letters*, **81**, 3076-3078, (2002).
45. G. Vaschenko, D. Patel, **C.S. Menoni**, H.M. Ng, A.Y. Cho, "Nonlinear macroscopic polarization in GaN/Al<sub>x</sub>Ga<sub>1-x</sub>N quantum wells", *Applied Physics Letters*, **80**, 4211, (2002).

## **2001**

46. G. Vaschenko, D. Patel, **C.S. Menoni**, N.F. Gardner, J. Sun, W. Götz, C.N. Tome, and B. Claussen, "Pressure dependence of piezoelectric field in InGaN/GaN Quantum Wells", *Physics Status Solidi*, B **228** (1), 73 –76, (2001).



47. G. Vaschenko, D. Patel, **C.S. Menoni**, N.F. Gardner, J. Sun, W. Götz, C.N. Tome, and B. Claussen, "Significant strain dependence of piezoelectric constants in  $\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$  quantum wells", *Physical Review B* **64**, 241308(R), (2001).
48. G. Vaschenko, D. Patel, **C.S. Menoni**, S. Keller, U.K. Mishra, and S.P. DenBaars, "Dominant role of the piezoelectric field in the pressure behavior of  $\text{InGaN}/\text{GaN}$  quantum wells", *Applied Physics Letters* **78**, 640, (2001).

#### **2000-1994**

49. **C.S. Menoni**, L. Miao, D. Patel, O.I. Micic, and A.J. Nozik, "Three-dimensional confinement in the conduction band structure of  $\text{InP}$ ", *Physical Review Letters* **84**, 4168, (2000).
  50. J. Pikal, **C.S. Menoni**, P. Thiagarajan, G.Y. Robinson, and H. Temkin, "Temperature dependence of the recombination coefficients in  $\text{InAsP}$  lasers", *Applied Physics Letters* **76**, 2659, (2000).
- 1999-1984
51. D. Patel, J.M. Pikal, **C.S. Menoni**, K.J. Thomas, F.A. Kish, and M.R. Hueschen, "Effect of Indirect Minima Carrier Population on the Output Characteristics of  $\text{AlGaInP}$  Light Emitting Diodes", *Applied Physics Letters* **75**, 3201, (1999).
  52. J. Pikal, **C.S. Menoni**, H. Temkin, P. Thiagarajan, and G.Y. Robinson, "Carrier lifetime and Recombination in Long Wavelength Quantum Well Lasers", *IEEE Journal of Selected Topics of Quantum Electronics*, **5**, 613, (1999).
  53. G. Vaschenko, M. Giudici, J.J. Rocca, **C.S. Menoni**, J.R. Tredicce, and S. Balle, "Temporal Dynamics of Semiconductor Lasers with Optical Feedback", *Physical Review Letters* **81** 5536, (1998).
  54. J.M. Pikal, **C.S. Menoni**, H. Temkin, P. Thiagarajan, and G.Y. Robinson, "Impedance independent optical carrier lifetime measurements in semiconductor lasers", *Review of Scientific Instruments* **69**, 4247, (1998).
  55. G.J. Fetzer, L. Miao, J.L.A. Chilla, J.M. Pikal, and **C.S. Menoni**, " $\text{NO}_2$  photometer Based on Solid-State Light Sources", *Applied Optics* **37**, 5590 - 5595, (1998).
  56. M. Giudici, J.R. Tredicce, G. Vaschenko, J.J. Rocca and **C.S. Menoni**, "Spatio-temporal dynamics in vertical cavity surface emitting lasers excited by fast electrical pulses", *Optics Communications*, **158**, 313, (1998).
  57. K. Interholzinger, D. Patel, **C.S. Menoni**, P. Thiagarajan, and G.Y. Robinson, "Strain induced modifications in the electronic structure and band alignments of  $\text{In}_x\text{Ga}_{1-x}\text{P}/\text{In}_{0.5}\text{Al}_{0.5}\text{P}$  heterostructures", *IEEE Journal of Quantum Electronics*, **34**, 93, (1998).
  58. S.J. Rehse, A.D. Glueck, S.A. Lee, A.B. Goulakov, **C.S. Menoni**, D.C. Ralph, K.S. Johnson and M. Prentiss, "Nanolithography with metastable neon atoms: Enhanced rate of contamination resist formation for nanostructure fabrication", *Applied Physics Letters*, **71**, 1427, (1997).
  59. **C.S. Menoni**, O. Buccafusca, M.C. Marconi, D. Patel, J.J. Rocca, G.Y. Robinson and S.M. Goodnick, "Effect of Indirect gamma-L and gamma-X transfer on the carrier dynamics of  $\text{InGaP}/\text{InAlP}$  Multiple Quantum Wells", *Applied Physics Letters*, **70**, 120, (1997).
  60. D. Patel, K. Interholzinger, P. Thiagarajan, G. Robinson, and **C.S. Menoni**, "Identification of the L-band in  $\text{InGaP}/\text{InAlP}$  MQWs", *Physica Status Solidi*, **198**, 337, (1996).
  61. D. Patel, **C.S. Menoni**, A.A. Bernussi, and H. Temkin, "Non-monotonic behavior of the threshold current of  $1.3\mu\text{m}$  compressively strained lasers with hydrostatic pressure", *Physica Status Solidi*, (b) **198**, 375, (1996).



62. D. Patel, K. Interholzinger, P. Thiagarajan, G. Robinson and **C.S. Menoni**, "L-band recombination in In<sub>x</sub>Ga<sub>1-x</sub>P/In<sub>0.5</sub>Al<sub>0.5</sub>P multiple quantum wells", *Physical Review*, **B53**, 12633, (1996).
63. C.J. McMahon, C.W. Bae, **C.S. Menoni**, D. Patel, 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", *Applied Physics Letters*, **66**, 2171, (1995).
64. C.H. McMahon, J.W. Bae, **C.S. Menoni**, D. Patel, S. Feld, C. Wilmsen, H. Temkin, P. Brusenbach, and R. Leibenguth, "Pressure and temperature induced detuning of gain and reflectivity spectra in vertical cavity surface emitting lasers", *Journal of Physics and Chemistry of Solids*, **56**, 663, (1995).
65. D. Patel, **C.S. Menoni**, D.W. Schult, T. McMahon and S.M. Goodnick, "Effect of pressure on the output characteristics of p-GaAs/AlGaAs heterojunction field effect transistors", *Journal of Physics and Chemistry of Solids*, **56**, 669, (1995).
66. M. Prasad, O.E. Martinez, **C.S. Menoni**, J.J. Rocca, M. Hafich, H.Y. Lee and G.Y. Robinson, "Transient grating measurements of ambipolar diffusion and carrier recombination in InGaP/InAlP multiple quantum wells and InGaP bulk", *J. Electronic Materials* **23**, 359, (1994).
67. D. Patel, M.J. Hafich, G.Y. Robinson and **C.S. Menoni**, "Direct Determination of the band discontinuities in InGaP/InAlP multiple quantum wells", *Physical Review*, **B48**, 18031, (1993).
68. D. Patel, **C.S. Menoni**, H. Temkin, R.A. Logan and D. Coblenz, "Enhanced characteristics of InGaAsP buried quaternary lasers with pressures up to 1.5GPa", *Applied Physics Letters* **62**, 2459, (1993).
69. D. Patel, **C.S. Menoni**, H. Temkin, C. Tome, R.A. Logan, and D. Coblenz, "Optical properties of Semiconductor lasers with hydrostatic pressure", *Journal of Applied Physics* **74**, 737, (1993).
70. O. Buccafusca, J.L.A. Chilla, **C.S. Menoni**, J.J. Rocca, M.J. Hafich, L.M. Woods, and G.Y. Robinson, "Non-resonant tunneling in InGaP/InAlP asymmetric double quantum wells", *Applied Physics Letters*, **62**, 399, (1993).
71. O. Buccafusca, J.J. Rocca, M.C. Marconi and **C.S. Menoni**, "Generation of synchronized trains of picosecond laser pulses at two wavelengths in a single cavity synchronously mode-locked dye laser", *Review of Scientific Instruments* **64**, 259, (1993).
72. 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, "Picosecond Absorption Dynamics of Photoexcited InGaP Epitaxial Films", *Applied Physics Letters*, **59**, 90, (1991).
73. D. Patel, **C.S. Menoni**, and I.L. Spain, "Pressure Induced Changes in the Electrical Properties and Crystal Structure of Bulk InP", *J. Applied Physics* **66**, 1658, (1989).
74. **C.S. Menoni** and I.L. Spain, "Equation of State of InP to 19 GPa", *Physical Review*, **B38**, 1170, (1987).
75. J.Z. Hu, L.D. Merkle, **C.S. Menoni**, and I.L. Spain, "Crystal data for High Pressure phases of Si", *Physical Review*, **B34**, 4679, (1986).
76. **C.S. Menoni**, J.Z. Hu, and I.L. Spain, "Germanium at High Pressure", *Physical Review*, **B34**, 362, (1986).
77. **C.S. Menoni**, H.D. Hochheimer, and I.L. Spain, "High Pressure study of Photoluminescence in Indium Phosphide at low temperature", *Physical Review*, **B33**, 5896, (1986).
78. I.L. Spain, D.R. Black, L.D. Merkle, J.Z. Hu, and **C.S. Menoni**, "X-Ray Diffraction in the Diamond Anvil Cell: Techniques and Application to Si", *High Temp.- High Press.* **16**, 507, (1984).
79. **C.S. Menoni** and I.L. Spain, "Effects of Synchrotron Beam Heating in High Pressure, Energy Dispersive X-Ray Diffraction Experiments", *High Temp. High Press* **16**, 157, (1984).

80. I.L. Spain, J.Z. Hu, **C.S. Menoni**, and D.R. Black, "New Phases of Semiconductors at High Pressure", Journal de Physique Colloque **C8**, 407, (1984).
81. **C.S. Menoni** and I.L. Spain, "Extension of NaCl and CsCl High Pressure Scales for Use at Low Temperature", High Temp. High Press. **16**, 119, (1984).
82. I.L. Spain, D.R. Black, and **C.S. Menoni**, "Simple collimator for use with Diamond Anvil Cells in a Synchrotron Beam", Review of Scientific Instruments **55**, 1511, (1984).

#### PATENTS

1. "Nanometer-Scale Lithography Using Extreme Ultraviolet/Soft X-Ray Laser Interferometry". Mario Marconi, **Carmen S. Menoni**, Jorge Rocca, Erik Anderson, Weilun Chao, Przemyslaw Wachulak. U.S. Patent Application 11/840,890.
2. U.S. Provisional Patent Application, No. 12/861,627, "Nanometer Ablation Using Focused, Coherent Extreme Ultraviolet/Soft X-Ray Light," **Carmen S. Menoni** et al. (Granted 2011)
3. U.S. Provisional Patent Application, No. 61/234,176, "Extreme Ultraviolet Ablation-Mass Spectrometry Instrumentation for Assessing Chemical Composition of Cells, Tissue and Micro-Organisms at the Single and Sub-Cellular Level with Nanometer Resolution EUV ablation of biological materials for composition analysis at the sub-cell level by mass spectrometry", **Carmen S. Menoni** et al.
4. U.S. Provisional Patent Application, No. 61/432,447, "Extreme ultraviolet ablation and ionization mass spectrometry imaging nanoprobe", **C.S. Menoni et al.**

#### INVITED CONFERENCE ABSTRACTS AND PROCEEDINGS

##### 2011

1. **C.S. Menoni**, "Movies of nanoscale dynamics by extreme ultraviolet microscopy," Progress in Quantum Electronics Conference, Snowbird, UT, January 2-6, 2011.

##### 2010

2. M. C. Marconi, P. Wachulak, L. Urbanski, **C. S. Menoni**, J. J. Rocca, A. Isoyan, F. Jiang, Y.-C. Cheng and F. Cerrina, "Extreme Ultraviolet Lasers Demonstrate New Nano-Patterning Schemes," 23rd IEEE Photonics Society Annual Meeting, Denver, CO, November 7-11, 2010.
3. **C.S. Menoni**, "Advances in ion beam sputtered optical interference coatings", presented at SPIE Laser Damage Symposium, September 27-29, Boulder, CO, 2010.
4. **C.S. Menoni**, "Nanoscale Microscopy with Table-Top Extreme Ultraviolet Lasers", presented at 19th International Workshop "Laser Physics", Iguazu Falls, Brazil, July 4-9. 2010.
5. **C.S. Menoni**, F. Brizuela, S. Carbajo, Y. Wang, D. Alessi, B. M. Luther, A. Sakdinawat, K. Goldberg, D. T. Attwood, A. V. Vinogradov, I. A. Artioukov, M.C. Marconi, , J.J. Rocca "Reflection microscope for actinic mask inspection and other progress in soft x-ray laser nano-imaging", 12<sup>th</sup> International Conference on X-Ray Lasers, Gwengju, South Korea, May 31-June 4<sup>th</sup>, 2010.
6. **C.S. Menoni**, F. Brizuela, P. Watchulak, M.C. Marconi, and J.J. Rocca, "Nanoscale imaging and patterning using bright beams of soft x-ray light from table-top lasers," 40<sup>th</sup> Progress in Quantum Electronics Symposium, Snowbird, UT, Jan. 3-6, (2010).

##### 2009

7. **C. S. Menoni**, F. Brizuela, C. Brewer, Y. Wang, F. Pedaci, B. M. Luther, W. Chao, E. H. Anderson, D. T. Attwood, A. V. Vinogradov, I. A. Artioukov, A. G. Ponomareko, V. V. Kondratenko, M. C. Marconi, and J. J. Rocca, "Nanoscale Microscopy with Table-Top Extreme Ultraviolet Lasers," in *Frontiers in Optics*, OSA Technical Digest (CD) (Optical Society of America, 2009), paper FTu22.
8. **C.S. Menoni**, F. Brizuela, Y. Wang, C.A. Brewer, B.M. Luther, F. Pedaci, P.W. Wachulak, M.C. Marconi, J.J. Rocca, W. Chao, E.H. Anderson, Y. Liu, K.A. Goldberg, D.T. Attwood, A.V. Vinogradov, I.A. Artyukov, Y.P. Pershyn, and V. Kondratenko, "Advances in full field microscopy with table-top soft x-ray lasers," *Soft X-Ray Lasers and Applications VIII*, J. Dunn and G.J. Tallents, eds., SPIE, 2009, p. 74510I.
9. **C.S. Menoni**, F. Brizuela, C. Brewer, D. Martz, P. Wachulak, F. Jimenez, M.C. Marconi, J.J. Rocca, W. Chao, E.H. Anderson, D.T. Attwood, A.V. Vinogradov, I.A. Artioukov, Y.P. Pershyn, and V.V. Kondratenko, *Advances in Nanoscale Resolution Soft X-Ray Laser Microscopy*, in *X-Ray Lasers 2008, Proceedings*, C.L.S. Lewis and D. Riley, Editors. 2009. p. 341-347.
10. **C.S. Menoni**, F. Brizuela, C. Brewer, Y. Wang, F. Pedacci, B. Luther, M.C. Marconi and J. J. Rocca, W. Chao, E. H. Anderson, K. Goldberg, Y.W. Liu and D. T. Attwood, A. V. Vinogradov and I. A. Artioukov, A.G. Ponomareko and V. V. Kondratenko, "Nanometer Scale Imaging with Extreme Ultraviolet Lasers" 39<sup>th</sup> Progress in Quantum Electronics Symposium, Snowbird, Utah, January 4-8, 2009.
11. M. Marconi, P. Wachulak, L. Urbanski, **C.S. Menoni**, and J.J. Rocca, "Nano-imaging and nano-patterning with compact EUV lasers: new opportunities in nanotechnology with a table top system," 17<sup>th</sup> International Conference on Advanced Laser Technologies, Antalya, Turkey, Sept. 26 – Oct. 1, (2009).
12. J.J. Rocca, F.J. Furch, B.A. Reagan, Y. Wang, D. Alessi, D. Martz, B. Luther, M. Berrill, S. Domingue, D. Kemp, F. Pedaci, V.N. Shlyaptsev, M. Marconi, and **C.S. Menoni**, "Progress in the development of compact high-repetition-rate soft x-ray lasers: gain saturation at 10.9 nm and first demonstration of an all-diode-pumped soft x-ray laser," *Soft X-Ray Lasers and Applications VIII*, J. Dunn and G.J. Tallents, eds., SPIE, 2009, p. 745106.

## 2008

13. J.J. Rocca, Y. Wang, F. Pedaci, M. Berrill, B. Luther, D. Alessi, D. Martz, B. Reagan, F. Furch, E. Granados, F. Brizuela, P. Wachulak, M. C. Marconi, **C. S. Menoni**, "Phase-coherent Soft X-ray Lasers at Wavelengths down to 13.2nm," 30th European Conference on Laser Interaction with Matter, XXX ECLIM, Darmstadt, Germany, August 31 – September 5, (2008).
14. J.J. Rocca, Y. Wang, F. Pedaci, B. Luther, M. Berrill, F. Furch, B. Reagan, D. Alessi, V.N. Shlyaptsev, M. Man Shakya, S. Gilbertson, Z. Chang, M. Marconi, and **C.S. Menoni**, "High coherence injection-seeded table-top soft x-ray lasers at wavelengths down to 13.2 nm and other advances in compact soft x-ray lasers," in *X-Ray Lasers 2008, Proceedings*, C.L.S. Lewis and D. Riley, Editors. 2009. p. XXX
15. J.J. Rocca, Y. Wang, B. Luther, M. Berrill, D. Alessi, M. Larotonda, E. Granados, D. Patel, **C. Menoni**, and V.N. Shlyaptsev, "High brightness table-top soft x-ray lasers at high repetition rate," CAP Congress 2007, Saskatchewan, Canada, June 17-20, (2007).
16. M.M. Murnane, J.J. Rocca, J. Miao, R. Yang, K. Nelson, E. Anderson, M. Aeschlimann, **C. Menoni**, M. Marconi, and H.C. Kapteyn, "Harnessing Attosecond Science for Visualizing the Nanoworld," Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science Conference and Photonic Applications Systems Technologies 2008, Technical Digest (Optical Society of America, Washington, DC, 2008), QMF1, (2008).

## 2007

17. **C. S. Menoni**, D. Patel, B. Langdon, D. Alessi, Y. Wang, F. Tomasel, J. J. Rocca, P. Langston, A. Ogloza, A. Markosyan, R. Route, M.M. Fejer, R. Cravetchi, D. Ngyuen, W. Rudolph, M. Shinn, "Influence of process conditions on the loss and resistance to laser damage of HfO<sub>2</sub>/SiO<sub>2</sub> coatings for high power lasers", Directed Energy Professional Society (DEPS) Annual Meeting, Huntsville, AL, Nov. 5-9, 2007.
18. **C.S. Menoni**, F. Brizuela, C. Brewer, H. Bravo, B. Langdon, D. Martz, G. Vaschenko, B. Luther, M.C. Marconi and J. J. Rocca, W. Chao, E. H. Anderson, and D. T. Attwood, A. V. Vinogradov, I. A. Artioukov, Y. P. Pershyn and V. V. Kondratenko, IEEE-LEOS Annual Meeting, Orlando, FL, October 22-25, 2007.
19. J.J. Rocca, Y. Wang, B.M. Luther, E. Granados, M.A. Berrill, M.A. Larotonda, D.A. Alessi, D.H. Martz, D. Patel, F. Pedaci, **C.S. Menoni**, and V.N. Shlyaptsev, "High-brightness tabletop soft x-ray lasers at high repetition rate: injection-seeding of dense plasma amplifiers and other developments," SPIE, San Diego, California, August, (2007).
20. **C.S. Menoni**, F. Brizuela, C. Brewer, H. Bravo, B. Langdon, M. Berrill, D. Martz, G. Vaschenko, and J. J. Rocca, W. Chao, E. H. Anderson, and D. T. Attwood, A. V. Vinogradov and I. A. Artioukov, Y. P. Pershyn and V. V. Kondratenko, O. Hemberg, B. Frazer, and S. Bloom, "Sub-100 nm resolution nanoprobe based on EUV lasers", Conference on Lasers and Electro-Optics, CLEO 2007.
21. **C.S. Menoni**, "Nano-scale imaging with soft x-ray lasers", 36<sup>th</sup> Winter Colloquium on The Physics of Quantum Electronics, Utah, January 2-6, 2007.

## 2006

22. J.J. Rocca, B.M. Luther, S. Heinbuch, M.A. Larotonda, Y. Wang, D. Alessi, M. Berrill, M.C. Marconi, **C.S. Menoni**, and V.N. Shlyaptsev, "High repetition rate table-top soft x-ray lasers with capillary discharges and laser-created plasmas", AIP Conference Proceedings, **808**, 241, (2006).
23. J.J. Rocca, Y. Wang, M. Larotonda, B. Luther, D. Alessi, M. Berrill, S. Heinbuch, M.C. Marconi, V. Shlyaptsev, and **C.S. Menoni**, "High Repetition Rate Soft X-Ray Lasers: A Doorway to Coherent Soft X-Ray Science on a Tabletop", Frontiers in Optics 2006, Rochester, New York, October 8 – 12, 2006.
24. J.J. Rocca, Y. Wang, M. Larotonda, B. Luther, M. Berrill, D. Alessi, A. Weith, M.C. Marconi, D. Patel, **C.S. Menoni**, V.N. Shlyaptsev, Y.W. Liu, D.T. Attwood, J. Dunn, M Man Shakya, S. Gilbertson, and Z. Chang, "Advances in High Repetition Rate Soft X-Ray Lasers", 10<sup>th</sup> International Conference on X-Ray Lasers, Berlin, Germany, August 21 – 25, 2006.
25. **C.S. Menoni**, G. Vaschenko, F. Brizuela, C. Brewer, Y. Wang, M.A. Larotonda, B.M. Luther, M.C. Marconi, J.J. Rocca, W. Chao, J.A. Liddle, Y. Liu, E.H. Anderson, D.T. Attwood, A.V. Vinogradov, I.A. Artioukov, Y.P. Pershyn and V.V. Kondratenko, "Nano-scale imaging with table-top soft x-ray lasers", 10<sup>th</sup> International Conference on X-Ray Lasers, Berlin, Germany, August 21 – 25, 2006.
26. J.J. Rocca, Y. Wang, M. Larotonda, B. Luther, M. Berrill, D. Alessi, A. Weith, M.C. Marconi, D. Patel, **C.S. Menoni**, V.N. Shlyaptsev, Y.W. Liu, D.T. Attwood, J. Dunn, M Man Shakya, S. Gilbertson, and Z. Chang, "Advances in High Repetition Rate Soft X-Ray Lasers", 10<sup>th</sup> International Conference on X-Ray Lasers, Berlin, Germany, August 21 – 25, 2006.

## 2006

27. J.J. Rocca, B.M. Luther, Y. Wang, S. Heinbuch, M.A. Larotonda, D. Alessi, M. Berrill, M.C. Marconi, **C.S. Menoni**, and V.N Shlyaptsev, "High average power tabletop soft x-ray lasers at wavelengths

down to 13.2 nm”, Joint Conference on Ultrafast Optics V and Applications of High Field and Short Wavelength Sources XI, Nara, Japan, September 25-30, 2005.

28. J.J. Rocca, B.M. Luther, Y. Wang, M. Larotonda, D.A. Alessi, M.A. Berrill, **C.S. Menoni**, M.C. Marconi, and V.N. Shlyaptsev, “Demonstration of saturated high-repetition-rate table-top soft x-ray lasers at wavelength down to 13.9 nm”, SPIE conference on Soft X-Ray Lasers and Applications, San Diego, July 31-August 4 2005, Proceedings of SPIE **5919**, 1, (2005).
29. J.J. Rocca, B.M. Luther, S. Heinbuch, M.A. Larotonda, Y. Wang, D. Alessi, M. Berrill, M.C. Marconi, **C.S. Menoni**, and V.N. Shlyaptsev, “High repetition rate table-top soft x-ray lasers with capillary discharges and laser-created plasmas”, 6<sup>th</sup> International Conference on Dense Z-pinches, Oxford, Great Britain, July 24-28, 2005; AIP Conference Proceedings, **808**, 241, (2006).

#### 2005-2000

30. J.J. Rocca, B.M. Luther, S. Heinbuch, Y. Wang, M.A. Larotonda, M. Grisham, D. Alessi, M. Berrill, M.C. Marconi, V.N. Shlyaptsev, A. Dummer, F. Brizuela, and **C.S. Menoni**, “Demonstration of high repetition rate desk-top and table-top soft x-ray lasers”, The 17<sup>th</sup> Annual Meeting of the IEEE Lasers and Electro-Optics Society, LEOS, Puerto Rico, November 7-11, 2004; Conference Proceedings **2**, 886, (2004).
31. J.J. Rocca, B.M. Luther, S. Heinbuch, M.A. Larotonda, Y. Wang, M. Grisham, D. Alessi, M. Berrill, M.C. Marconi, V.N. Shlyaptsev, A. Dummer, F. Brizuela, and **C.S. Menoni**, “Demonstration of High Repetition Rate Desk-Top and Table-Top Soft X-Ray Lasers”, The 9<sup>th</sup> International Conference on X-Ray Lasers, Beijing, China, May 24-28, 2004; X-ray Lasers 2004, Institute of Physics Conference Series Number **186**, 19, (2006).
32. J.J. Rocca, B. Luther, Y. Wang, J. Filevich, E. Hammarsten, E. Jankowska, M.C. Marconi, **C.S. Menoni**, V.N. Shlyaptsev, and S. Moon, “Small scale soft x-ray lasers and highly ionized plasma waveguides based on fast capillary discharges”, Applications of High Field and Short Wavelength Sources X, pp 28-36, Biarritz, France, October 12-15, 2003.
33. J.J. Rocca, M.C. Marconi, J. Filevich, E.C. Hammarsten, E. Jankowska, B. Luther, Y. Wang, M. Grisham, G. Vaschenko, **C.S. Menoni**, S.J. Moon, and V.N. Shlyaptsev, “Small Scale soft x-ray lasers excited by fast discharges and applications”, 34<sup>th</sup> Meeting of the Division of Atomic, Molecular and Optical Physics (DAMOP), Boulder, Colorado, May 21-24, 2003; Bulletin of the American Physical Society **48**, No 3, p.73, 2003.
34. J.J. Rocca, M.C. Marconi, Y. Wang, B.M. Luther, F. Pedacci, M. Grisham, G. Vaschenko, **C.S. Menoni**, J. Filevich, L. Juha, Yu. P. Pershin, E.N. Zubarev, D.L. Voronov, V.A. Sevryukova, V.V. Kondratenko, V.V. Shlyaptsev, A. Vinogradov, and I. Artioukov, “Recent results in capillary discharge soft x-ray laser research”, Proc. SPIE Vol. **5197**, p. 174-183, Soft X-Ray Lasers and Applications V; E.E. Fill, S. Suckewer; Eds., Dec 2003.
35. **C.S. Menoni**, O. Anton, D. Patel, G. Vaschenko, G.Y. Robinson, and J. Pikal, “Improvements in the frequency response of InAsP lasers”, presented on the Ultrafast Phenomena in Semiconductors VI Symposium, Photonics West, San Jose, CA, Jan. 24-25, 2002.
36. **C.S. Menoni**, G. Vaschenko, D. Patel, C.N. Tomé, B. Clausen, N.F. Gardner, J. Sun, W. Götz, H.M. Ng and A.Y. Cho, “Nonlinear polarization in nitrides revealed with hydrostatic pressure”, presented at the 8<sup>th</sup> International Conference on High Pressure Semiconductor Physics, Gilford, England, August 5-8, 2002.

37. **C.S. Menoni**, "Optical properties of low-dimensional semiconductor materials at high pressures", Fall Meeting of the Argentinean Physical Society, Rosario, Argentina, September 17-22, 2001. **(Invited Plenary Talk)**
38. **C.S. Menoni**, D. Patel, L. Miao, O.I. Mičić, and A.J. Nozik, "Probing The Effects Of Three-Dimensional Confinement On The Electronic Structure Of InP Under Hydrostatic Pressure", NATO Meeting on Frontiers of High Pressure Research II: Application of High Pressure to Low Dimensional Novel Electronic Materials, Pingree Park, CO, June, 2001.

#### CONTRIBUTED REFEREED ABSTRACT AND PROCEEDINGS

#### 2011

1. J. Filevich, I. Kuznetsov, F. Dong, B. Schroeder, E.R. Bernstein, D.C. Crick, M. McNeil, A. Sakdinawat, Y. Liu, D.T. Attwood, J. J. Rocca, and C.S. Menoni, "Sub-micrometer spatial resolution EUV-laser-ablation mass spectrometry imaging," 59<sup>th</sup> American Society for Mass Spectrometry, Denver, CO, June 5-9, 2011.
2. I. Kuznetsov, F. Dong, J. Filevich, E.R. Bernstein, W. Chao, E.H. Anderson, A. Sakdinawat, Y. Liu, M. McNeil, D. C. Crick, J.J. Rocca C.S. Menoni, "EUV laser ablation-ionization depth profiling of compound semiconductor heterostructures", 59<sup>th</sup> American Society for Mass Spectrometry, Denver, CO, June 5-9, 2011.
3. S. Carbajo, F. Brizuela, A. Sakdinawat, Y. Liu, W. Chao, E. H. Anderson, A. Vinogradov, I. Artioukov, D. T. Attwood, M. C. Marconi, J. Rocca, K. Buchanan, and C. Menoni, "Single-Shot Imaging of Nanoscale Dynamics by Extreme Ultraviolet Microscopy," in CLEO:2011 - Laser Applications to Photonic Applications, OSA Technical Digest (CD) (Optical Society of America, 2011), paper JWA121
4. L. Urbanski, P. Wachulak, A. Isoyan, A. Stein, C. Menoni, J. Rocca, and M. C. Marconi, "Talbot Effect: A Venerable Idea with New Applications in Nanofabrication," in CLEO:2011 - Laser Applications to Photonic Applications, OSA Technical Digest (CD) (Optical Society of America, 2011), paper CMEE4.
5. D. N. Nguyen, L. Emmert, W. Rudolph, D. Patel, and C. Menoni, "The reduction of laser damage resistance of optical coatings to subpicosecond pulse trains under vacuum," in *CLEO:2011 - Laser Applications to Photonic Applications*, OSA Technical Digest (CD) (Optical Society of America, 2011), paper CTuE3.
6. M. D. Seaberg, D. E. Adams, W. F. Schlotter, Y. Liu, C. Menoni, M. Murnane, and H. C. Kapteyn, "Sub-30nm Spatial Resolution Imaging Using a Tabletop 13nm High Harmonic Source," in *CLEO:2011 - Laser Applications to Photonic Applications*, OSA Technical Digest (CD) (Optical Society of America, 2011), paper CTuH3.
7. C.S. Menoni, J. Filevich, I. Kuznetsov, F. Dong, B. Schroder, E.R. Bernstein, J.J. Rocca, M. McNeil, D. C. Crick, "Extreme ultraviolet mass spectrometry imaging nanoprobe for single cell composition mapping", presented at the RCE NIH Annual Meeting., April 3-5, 2011, Denver, CO.
8. J. Filevich, I. Kuznetsov, F. Dong, B. Schroder, E.R. Bernstein, J.J. Rocca, M. McNeil, D. C. Crick and C.S. Menoni, "Extreme Ultraviolet Laser Ablation Mass Spectrometry", presented at the 2011 Annual Meeting of the AAAS, Washington DC, February 17-21.

#### 2010

9. D. H. Martz, D. Alessi, B. M. Luther, Y. Wang, M. Berrill, D. Kemp, D. Patel, **C. S. Menoni** and J. J. Rocca, "Table-top Soft X-ray Laser Operating at 13.9 nm with Increased Average Power," 23rd IEEE Photonics Society Annual Meeting, Denver, CO, November 7-11, 2010.
1. S. Carbajo, F. Brizuela, D. H. Martz, D. Alessi, Y. Wang, M. C. Marconi, J. J. Rocca, C. S. Menoni, A.



- Sakdinawat, E. H. Anderson, K. A. Goldberg, D. Attwood, and B. La Fontaine, "Laser Based Aerial Microscope for At-Wavelength Characterization of Extreme Ultraviolet Lithography Masks," 23rd IEEE Photonics Society Annual Meeting, Denver, CO, November 7-11, 2010.
2. **C. S. Menoni**; E. M. Krous; D. Patel; P. Langston; J. Tollerud; D. N. Nguyen; L. A. Emmert; A. Markosyan; R. Route; M. Fejer; W. Rudolph, "Advances in ion beam sputtered Sc<sub>2</sub>O<sub>3</sub> for optical interference coatings," (Proceedings Paper), Proceedings SPIE Vol. 7842, Laser-Induced Damage in Optical Materials: 2010, Gregory J. Exarhos; Vitaly E. Gruzdev; Joseph A. Menapace; Detlev Ristau; M. J. Soileau, Editors, 784202
  3. D. N. Nguyen; L. A. Emmert; W. Rudolph; D. Patel; **C. S. Menoni**, "The vacuum effect of femtosecond LIDT measurements on dielectric films", (Proceedings Paper), Proceedings SPIE Vol. 7842, Laser-Induced Damage in Optical Materials: 2010, Gregory J. Exarhos; Vitaly E. Gruzdev; Joseph A. Menapace; Detlev Ristau; M. J. Soileau, Editors.
  4. L. A. Emmert; M. Mero; D. N. Nguyen; W. Rudolph; D. Patel; E. Krous; **C. S. Menoni**, "Femtosecond pulse S on 1 LIDT in dielectric materials: comparison of experiment and theory," (Proceedings Paper), Proceedings SPIE Vol. 7842, Laser-Induced Damage in Optical Materials: 2010, Gregory J. Exarhos; Vitaly E. Gruzdev; Joseph A. Menapace; Detlev Ristau; M. J. Soileau, Editors.
  5. F. Brizuela, S. Carbajo, D. Alessi, Y. Wang, D. Martz, A. Sakdinawat, K. Goldberg, D. Attwood, M. Marconi, J. Rocca, and **C.S. Menoni**, "Full-field microscope for EUVL mask characterization\* International X-Ray Microscopy Conference, Chicago, IL, August 16-20, 2010.
  6. S. Carbajo, F. Brizuela, O. Buccafusca, E.H. Anderson, W. Chao, D.T. Attwood, J.J. Rocca, and **C.S. Menoni**, "Stop-action extreme ultraviolet imaging" International X-Ray Microscopy Conference, Chicago, IL, August 16-20, 2010. *This paper won 1 of 3 awards for best student paper at the conference.*
  7. 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 Multilayer Dielectric Gratings for High Energy Laser Pulse Compression," Ultrashort Pulse Laser Workshop, Directed Energy Professional Society, Broomfield, CO, June 15-18, 2010.
  8. L. Urbanski, P. Wachulak, F. Cerrina, A. Isoyan, F. Jiang, Y. C. Cheng, **C.S. Menoni**, J.J. Rocca, and M.C. Marconi, "Nanopatterning using Coherent Imaging Techniques," 12th International Conference on X-Ray Lasers, Gwangju, South Korea, May 31-June 4th, 2010.
  9. **C.S. Menoni**, J. Filevich, I. Kuznetzov, D. Fang, J.J. Rocca, E.R. Bernstein, M.R. McNeil, and D.C. Crick, "Extreme Ultraviolet Laser Ablation Spectrometry (EUV-LAMS): an enabling tool for probing composition at the sub-cell level," RMRCE National Annual Meeting, Las Vegas, NV, April 8-10, 2010.
  10. D.A. Alessi, D.H. Martz, B.M. Luther, Y. Wang, M.A. Berrill, D.J. Kemp, D. Patel, **C.S. Menoni** and J.J. Rocca "High energy 13.9 nm table-top soft x-ray laser operating at 2.5 hz repetition rate", in Conference on Lasers and Electro-Optics. (2010). Optical Society of America, JThD1.
  11. F. Brizuela, S. Carbajo, A. Sakdinawat, Y. Wang, D. Alessi, D. Martz, B. Luther, K.A. Goldberg, D.T. Attwood, B.L. Fontaine, J. Rocca and C. Menoni "Table-top extreme ultraviolet laser aerial imaging of lithographic masks", Conference on Laser Electro-Optics: Applications (2010). Optical Society of America, AFA5.
  12. S. Carbajo, F. Brizuela, A. Sakdinawat, Y. Liu, W. Chao, E.H. Anderson, A.V. Vinogradov, I.A. Artioukov, D.T. Attwood, M.C. Marconi, J.J. Rocca and C.S. Menoni "Movies at the nanoscale using extreme ultraviolet laser light", Frontiers in Optics, Optical Society of America (2010), PDPB2, *Postdeadline paper.*
  13. L.A. Emmert, D.N. Nguyen, M. Mero, W. Rudolph, E. Krous, D. Patel and C.S. Menoni "Fundamental processes controlling the multiple subpicosecond laser pulse damage behavior of dielectric optical coatings", in Optical Interference Coatings. (2010). Optical Society of America,



- FA4, Optical Society of America.
14. E. Krous, D. Patel, P. Langston, C. Menoni, A. Markosyan, R. Route, M. Fejer, D. Nguyen, L. Emmert and W. Rudolph "Scandium oxide thin films deposited by dual ion beam sputtering for high-power laser applications", in Optical Interference Coatings. (2010). Optical Society of America, FA10.
  15. J. Filevich, I. Kuznetsov, F. Dong, B. Schroeder, E. Bernstein, M. McNeil, D.C. Crick, J.J. Rocca, and **C.S. Menoni**, "Extreme Ultraviolet Laser Ablation Mass Spectrometry," RMRCE Meeting, Estes Park, CO, September 26-28, 2010.
  16. P. Langston, D. Patel, A. Markosyan, E.M. Krous, D. Nguyen, L.A. Emmert, W. Rudolph, R. Route, M. Fejer and C.S. Menoni "Effect of annealing on the optical properties of  $\text{HfO}_2$ ", in Optical Interference Coatings. (2010). Optical Society of America, ThA7.
  17. D.H. Martz, H.T. Nguyen, D. Patel, J.A. Britten, D. Alessi, E. Krous, Y. Wang, M. 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", in Conference on Lasers and Electro-Optics. (2010). Optical Society of America, CTuK7.
  18. D.N. Nguyen, L.A. Emmert, W.A. Rudolph, E. Krous, D. Patel, C.S. Menoni and M. Shinn "Multiple subpicosecond pulse laser damage behavior of optical coatings in a vacuum environment", in Optical Interference Coatings. (2010). Optical Society of America, FA5.
  19. F. Brizuela, S. Carbajo, D. Martz, D. Alessi, Y. Wang, B. Luther, A. Sakdinawat, W. Chao, E. H. Anderson, Y. Liu, K. A. Goldberg, D. T. Attwood, B. LaFontaine, J. J. Rocca, **C. S. Menoni**, and M. C. Marconi, "Table-top Microscope for the Actinic Aerial Imaging Inspection of Extreme Ultraviolet Lithography Masks", 54th International Conference on Electron, Ion and Photon Beam Technologies and Nanofabrication, EIPBN, June 1-4, Anchorage, Alaska, US.

## 2009

20. F. Brizuela, Y. Wang, C.A. Brewer, F. Pedaci, W.L. Chao, E.H. Anderson, Y.W. Liu, K.A. Goldberg, P. Naulleau, P. Wachulak, M.C. Marconi, D.T. Attwood, J.J. Rocca, and C.S. Menoni, "Table-top microscope for at-wavelength inspection of Extreme Ultraviolet Lithography Mask," in 2009 IEEE Leos Annual Meeting Conference Proceedings, Vols 1 and 2. (2009), IEEE: New York. p. 51-52.
21. M.C. Marconi, L. Urbanski, P. Wachulak, A. Isoyan, F. Jiang, Y. Cheng, J.J. Rocca, C.S. Menoni, and F. Cerrina, *Table top ultraviolet lasers enable new nano-patterning schemes*, in 2009 IEEE Leos Annual Meeting Conference Proceedings, Vols 1 and 2. 2009. p. 53-54.
22. P.W. Wachulak, M.C. Marconi, W. Rockward, D. Hill, E.H. Anderson, C.S. Menoni, and J.J. Rocca, "Interferometric Lithography with a Desk-Top Size Soft X-Ray Laser," in X-Ray Lasers 2008, Proceedings, C.L.S. Lewis and D. Riley, Editors. 2009. p. 495-500.
23. P.W. Wachulak, M.C. Marconi, R. Bartels, C.S. Menoni, and J.J. Rocca, "Soft X-Ray Holography with Wavelength Resolution," in X-Ray Lasers 2008, Proceedings, C.L.S. Lewis and D. Riley, Editors. 2009. p. 357-364.
24. R.L. Sandberg, P.W. Wachulak, D.A. Raymondson, A. Paul, A.E. Sakdinawat, B. Amirbekian, E. Lee, Y. Liu, C. La-O-Vorakiat, C. Song, M.C. Marconi, C.S. Menoni, M.M. Murnane, J.J. Rocca, H.C. Kapteyn, and J. Miao, "Lensless Imaging Using Table-Top Soft X-Ray Lasers and High Harmonics Sources Reaching 70 nm Resolution," in X-Ray Lasers 2008, Proceedings, C.L.S. Lewis and D. Riley, Editors. 2009. p. 433-437.
25. M.C. Marconi, P.W. Wachulak, C. Brewer, F. Brizuela, R. Bartels, C.S. Menoni, J.J. Rocca, E. Anderson, and W. Chao, "Resolution and Feature Size Assessment in Soft X-Ray Microscopy Images," in X-Ray Lasers 2008, Proceedings, C.L.S. Lewis and D. Riley, Editors. 2009. p. 483-488.

26. L.A. Emmert, D. Nguyen, M. Mero, W. Rudolph, D. Patel, E. Krous, and C.S. Menoni, "The role of native and transient laser-induced defects in the femtosecond breakdown of dielectric films," in 2009 Conference on Lasers and Electro-Optics and Quantum Electronics and Laser Science Conference. 2009. p. 1353-1354.
27. H. Bravo, B.T. Szapiro, P.W. Wachulak, M.C. Marconi, W. Chao, E.H. Anderson, D.T. Attwood, C.S. Menoni, and J.J. Rocca, "Nanometer-Scale Machining by Laser Ablation with a Focused Extreme Ultraviolet Laser Beam," in 2009 Conference on Lasers and Electro-Optics and Quantum Electronics and Laser Science Conference. 2009. p. 2843-2844.
28. 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," in X-Ray Lasers 2008, Proceedings, C.L.S. Lewis and D. Riley, Editors. 2009. p. 381-389.
29. P. Langston, D. Pate, A. Markosyan, E. Krous, D. Nguyen, L. Emmert, W. Rudolph, R. Route, M. Fejer, M. Shinn, and C. Menoni, "Modifications in the Optical Properties of Thin Film Oxides with Annealing," in Frontiers in Optics, OSA Technical Digest (CD) (Optical Society of America, 2009), paper FThS7.
30. L. A. Emmert, D. Nguyen, M. Mero, W. Rudolph, D. Patel, E. Krous, and C. S. Menoni, "The Role of Native and Transient Laser-Induced Defects in the Femtosecond Breakdown of Dielectric Films," in Conference on Lasers and Electro-Optics/International Quantum Electronics Conference, OSA Technical Digest (CD) (Optical Society of America, 2009), paper CTuEE5.
31. L. Urbanski, P. Wachulak, A. Isoyan, F. Jian, Y.-C. Cheng, J.J. Rocca, **C.S. Menoni**, F. Cerrina, and M. Marconi, "Talbot nano-patterning with a table-top soft X-ray laser," Four Corners Section of the APS: Annual Meeting, Colorado School of Mines, Golden, CO, Oct. 23-24, (2009).
32. **C.S. Menoni**, F. Brizuela, Y. Wang, D. Alessi, S. Carbajo, B. Luther, A. Sakdinawat, W. Chao, Y. Liu, E. Anderson, K. Goldberg, D. Attwood, M. Marconi, and **J. Rocca**, "First At-Wavelength Defect Characterization of EUV Lithography Reticles Using a Table-Top Laser," 2009 International Symposium on Extreme Ultraviolet Lithography, Prague, Czech Republic, Oct. 18 – 21, (2009).
33. L. Urbanski, P.W. Wachulak, A. Isoyan, F. Jian, Y.-C. Cheng, J.J. Rocca, **C.S. Menoni**, M.C. Marconi, and F. Cerrina, "Table Top Schemes for Nano-Patterning with Extreme Ultraviolet Lasers," in *Frontiers in Optics*, OSA Technical Digest (CD) (Optical Society of America, 2009), paper FTuS2.
34. **C.S. Menoni**, F. Brizuela, Y. Wang, C. Brewer, F. Pedaci, W. Chao, E.H. Anderson, Y. Liu, K. Goldberg, P. Naulleau, P. Wachulak, M.C. Marconi, D. Attwood, and **J.J. Rocca**, "Table-Top Microscope for At-Wavelength Inspection of Extreme Ultraviolet Lithography Mask," IEEE LEOS Annual Meeting, Antalya, Turkey, Oct. 2 – 7, (2009).
35. M.C. Marconi, L. Urbanski, P. Wachulak, A. Isoyan, F. Jian, Y.-C. Cheng, J.J. Rocca, **C.S. Menoni**, and F. Cerrina, "Table Top Ultraviolet Lasers Enable New Nano-Patterning Schemes," IEEE LEOS Annual Meeting, Antalya, Turkey, Oct. 2 – 7, (2009).
36. S. Carbajo, F. Brizuela, Y. Wang, C.A. Brewer, F. Pedaci, W. Chao, E.H. Anderson, Y. Liu, K.A. Goldberg, P. Naulleau, 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 tabletop laser illumination," Four Corners Section of the APS: Annual Meeting, Colorado School of Mines, Golden, CO, Oct. 23-24, (2009).
37. E. Krous, P. Langston, D. Patel, F. Furch, B. Reagan, J.J. Rocca, **C.S. Menoni**, A. Markosyan, R. Route, M. Fejer, L. Emmert, D. Nguyen, and W. Rudolph, "Growth and characterization of

transition metal oxide thin films by dual ion beam sputtering,” Four Corners Section of the APS: Annual Meeting, Colorado School of Mines, Golden, CO, Oct. 23-24, (2009).

38. F. Brizuela, Y. Wang, C.A. Brewer, F. Pedaci, W. Chao, E.H. Anderson, Y. Liu, K.A. Goldberg, P.P. Naulleau, P.W. Wachulak, M.C. Marconi, D.T. Attwood, J.J. Rocca, and **C.S. Menoni**, “Inspection 13.2-nm table-top full-field microscope,” Alternative Lithographic Technologies, San Jose, CA, USA: SPIE, 2009, pp. 72713F-7.
- A. Isoyan, F. Jiang, Y. Cheng, P. Wachulak, L. Urbanski, J. Rocca, **C.S. Menoni**, M. Marconi, and F. Cerrina, “Extreme ultraviolet holographic lithography with a table-top laser,” Alternative Lithographic Technologies, F.M. Schellenberg and B.M.L. Fontaine, eds., SPIE, 2009, p. 72713O.
39. L.A. Emmert, D.N. Nguyen, M. Mero, W. Rudolph, D. Ristau, K. Starke, M. Jupe, **C.S. Menoni**, D. Patel, and E. Krous, “Fundamental processes controlling the single and multiple femtosecond pulse damage behavior of dielectric oxide films,” Laser-Induced Damage in Optical Materials: 2009, G.J. Exarhos, V.E. Gruzdev, D. Ristau, M.J. Soileau, and C.J. Stolz, eds., SPIE, 2009, p. 75040P.
40. E.M. Krous, D. Patel, A. Markosyan, D.N. Nguyen, L.A. Emmert, P. Langston, R. Route, M. Fejer, W. Rudolph, M. Shinn, and **C.S. Menoni**, “Optimization of scandia thin films for high power laser coating applications,” Laser-Induced Damage in Optical Materials: 2009, G.J. Exarhos, V.E. Gruzdev, D. Ristau, M.J. Soileau, and C.J. Stolz, eds., SPIE, 2009, p. 750407.
41. E.M. Krous, D. Patel, A. Markosyan, L.A. Emmert, B. Langdon, P. Langston, F.J. Furch, J.J. Rocca, R. Route, M.M. Fejer, W. Rudolph, M.D. Shinn, and **C.S. Menoni**, “Tailoring of process parameters to optimize optical and structural properties of SiO<sub>2</sub>/HfO<sub>2</sub> multilayers,” Soft X-Ray Lasers and Applications VIII SPIE Optics and Photonics, San Diego, CA, Aug. 4-9, (2009).
42. H. Bravo, B.T. Szapiro, P.W. Wachulak, M.C. Marconi, W. Chao, E.H. Anderson, D.T. Attwood, Jr., **C.S. Menoni**, and J.J. Rocca, “Nanometer-scale machining with soft x-ray lasers,” Soft X-Ray Lasers and Applications VIII SPIE Optics and Photonics, San Diego, CA, Aug. 4-9, (2009).
43. H. Bravo, B. Szapiro, P. Wachulak, M.C. Marconi, W. Chao, E. Anderson, D.T. Attwood, **C.S. Menoni**, and J.J. Rocca, “Nanometer-Scale Machining by Laser Ablation with a Focused Extreme Ultraviolet Laser Beam,” 2009 CONFERENCE ON LASERS AND ELECTRO-OPTICS AND QUANTUM ELECTRONICS AND LASER SCIENCE CONFERENCE (CLEO/QELS 2009), VOLS 1-5, Pages: 2843-2844, 2009.
44. L.A. Emmert, D. Nguyen, M. Mero, W. Rudolph, D. Patel, E. Krous, C.S. Menoni CS, “The role of native and transient laser-induced defects in the femtosecond breakdown of dielectric films,” 2009 CONFERENCE ON LASERS AND ELECTRO-OPTICS AND QUANTUM ELECTRONICS AND LASER SCIENCE CONFERENCE (CLEO/QELS 2009), VOLS 1-5 Pages: 1353-1354, 2009.
45. F. Brizuela, Y. Wang, C.A. Brewer, F. Pedaci, W. Chao, E.H. Anderson, Y. Liu, K.A. Goldberg, P.Naulleau, P. Wachulak, M.C. Marconi, D.T. Attwood, J.J. Rocca, and **C.S. Menoni**, “13.2 nm Table-Top Inspection Microscope for Extreme Ultraviolet Lithography Mask Defect Characterization,” 2009 CONFERENCE ON LASERS AND ELECTRO-OPTICS AND QUANTUM ELECTRONICS AND LASER SCIENCE CONFERENCE (CLEO/QELS 2009), VOLS 1-5 Pages: 2458-2459, 2009.
46. A. Isoyan, F. Jian, Y.-C. Cheng, P. Wachulak, L. Urbanski, J.J Rocca, **C.S. Menoni**, M.C. Marconi, and F. Cerrina, “Coherent Imaging Nano-Patterning with Extreme Ultraviolet Laser Illumination,” 2009 CONFERENCE ON LASERS AND ELECTRO-OPTICS AND QUANTUM ELECTRONICS AND LASER SCIENCE CONFERENCE (CLEO/QELS 2009), VOLS 1-5 Pages: 2462-2463, 2009.

47. **C.S. Menoni**, E. M. Krous, P.F. Langston, D. Patel, L. A. Emmert, D. Nguyen, W. Rudolph, A. Markosyan, R. Route, M. Fejer, M. Shinn, "Impact of annealing on the optical properties of thin film oxides", Directed Energy Society Meeting, San Antonio Texas, Nov. 2009.

## 2008

48. D. Patel, P. Langston, A. Markosyan, E.M. Krous, B. Langdon, F. Furch, B. Reagan, R. Route, M.M. Fejer, J.J. Rocca, and **C.S. Menoni**, "SiO<sub>2</sub>/HfO<sub>2</sub> multilayers: impact of process parameters and stack geometry on the optical and structural properties," Laser-Induced Damage in Optical Materials: 2008, G.J. Exarhos, D. Ristau, M.J. Soileau, and C.J. Stolz, eds., SPIE, 2008, p. 71320L.
49. D.L. Voronov, E.N. Zubarev, Y.P. Pershyn, V.A. Sevryukova, V.V. Kondratenko, A.V. Vinogradov, I.A. Artioukov, Y.A. Uspenskiy, M. Grisham, G. Vaschenko, **C.S. Menoni**, and J.J. Rocca, "Structural transformations in Sc/Si multilayers irradiated by EUV lasers," Soft X-Ray Lasers and Applications VII, G.J. Tallents and J. Dunn, eds., SPIE, 2007, p. 67020U.
50. D.N. Nguyen, L.A. Emmert, W. Rudolph, D. Patel, E. Krous, **C.S. Menoni**, and M. Shinn, "Studies of femtosecond laser induced damage of HfO<sub>2</sub> thin film in atmospheric and vacuum environments," Laser-Induced Damage in Optical Materials: 2009, G.J. Exarhos, V.E. Gruzdev, D. Ristau, M.J. Soileau, and C.J. Stolz, eds., SPIE, 2009, p. 750403.
51. P.W. Wachulak, M.C. Marconi, R.A. Bartels, **C.S. Menoni**, and J.J. Rocca, "Sub-50nm extreme ultraviolet holographic imaging," Holography: Advances and Modern Trends, M. Miler and M. Hrabovsky, eds., SPIE, 2009, p. 735806.
52. M.C. Marconi, P.W. Wachulak, L. Urbanski, A. Isoyan, F. Jiang, Y.C. Cheng, J.J. Rocca, C.S. Menoni, and F. Cerrina, "Tabletop soft x-ray lithography," Soft X-Ray Lasers and Applications VIII, J. Dunn and G.J. Tallents, eds., SPIE, 2009, p. 74510J.
53. D.N. Nguyen, L. Emmert, M. Mero, W.G. Rudolph, D. Patel, E. Krous, and C.S. Menoni, "The effect of annealing on the subpicosecond breakdown behavior of hafnia films," Laser-Induced Damage in Optical Materials: 2008, G.J. Exarhos, D. Ristau, M.J. Soileau, and C.J. Stolz, eds., SPIE, 2008, p. 71320N.
54. D.N. Nguyen, L.A. Emmert, W. Rudolph, D. Patel, E. Krous, and C.S. Menoni, "The effect of nitrogen doping on the multiple-pulse subpicosecond dielectric breakdown of hafnia films," Laser-Induced Damage in Optical Materials: 2009, G.J. Exarhos, V.E. Gruzdev, D. Ristau, M.J. Soileau, and C.J. Stolz, eds., SPIE, 2009, p. 750402.
55. M.C. Marconi, P.W. Wachulak, C. Brewer, F. Brizuela, R. Bartels, C.S. Menoni, J.J. Rocca, E. Anderson, and W. Chao, *Resolution and Feature Size Assessment in Soft X-Ray Microscopy Images*, in *X-Ray Lasers 2008, Proceedings*, C.L.S. Lewis and D. Riley, Editors. 2009. p. 483-488.
56. 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*, in *X-Ray Lasers 2008, Proceedings*, C.L.S. Lewis and D. Riley, Editors. 2009. p. 381-389.
57. P.W. Wachulak, M.C. Marconi, W. Rockward, D. Hill, E.H. Anderson, C.S. Menoni, and J.J. Rocca, *Interferometric Lithography with a Desk-Top Size Soft X-Ray Laser*, in *X-Ray Lasers 2008, Proceedings*, C.L.S. Lewis and D. Riley, Editors. 2009. p. 495-500.
58. P.W. Wachulak, M.C. Marconi, R. Bartels, C.S. Menoni, and J.J. Rocca, *Soft X-Ray Holography with Wavelength Resolution*, in *X-Ray Lasers 2008, Proceedings*, C.L.S. Lewis and D. Riley, Editors. 2009. p. 357-364.
59. R.L. Sandberg, P.W. Wachulak, D.A. Raymondson, A. Paul, A.E. Sakdinawat, B. Amirbekian, E. Lee, Y. Liu, C. La-O-Vorakiat, C. Song, M.C. Marconi, C.S. Menoni, M.M. Murnane, J.J. Rocca, H.C. Kapteyn, and J. Miao, *Lensless Imaging Using Table-Top Soft X-Ray Lasers and High Harmonics*

- Sources Reaching 70 nm Resolution*, in *X-Ray Lasers 2008, Proceedings*, C.L.S. Lewis and D. Riley, Editors. 2009. p. 433-437.
60. **C.S. Menoni**, D. Patel, A. Markosian, E. Krous, P. Langston, B. Langdon, M. Mero, L. Emmert, R. Route, M. Fejer, M. Shinn and W. Rudolph, "Impact of process parameters and stack geometry on the optical and structural properties of SiO<sub>2</sub>/HfO<sub>2</sub> multilayers" Directed Energy Professional Society Annual Meeting, Honolulu, HI, Nov. 17-21, 2008.
  61. M. Berrill, F. Brizuela, B. Langdon, H. Bravo, **C.S. Menoni**, J.J. Rocca, "Photoionized Plasmas Created by Soft X-Ray Laser Irradiation of Solid Targets," 50<sup>th</sup> Annual Meeting of the Division of Plasma Physics, Dallas, Texas, November 17-21, (2008), UO4.00011.
  62. F. Brizuela, C. Brewer, D. Martz, M. C. Marconi, J. J. Rocca, **C. S. Menoni**, W. Chao, E. H. Anderson, and D. T. Attwood, A. V. Vinogradov and I. A. Artioukov, A. G. Ponomareko and V. V. Kondratenko, "Single-shot Extreme Ultraviolet Microscopy with 54 nm Resolution using a Desktop size Capillary Discharge Laser," IEEE Lasers and Electro-Optics Society Annual Meeting, Newport Beach, CA, Oct. 13-16, 2008.
  63. M. Marconi, P. Wachulak, C. Brewer, F. Brizuela, R. Bartels, **C.S. Menoni**, J. Rocca, E. Anderson, and W. Chao, "Analysis of Resolution and Feature Size in Extreme Ultraviolet Microscopy Images," 21<sup>st</sup> IEEE Lasers and Electro-Optics Society Annual Meeting, Newport Beach, CA, Oct. 9-13, 2008. DOI: 10.1109/LEOS.2008.4688877.
  64. F. Brizuela, Y. Wang, F. Pedaci, C. A. Brewer, P. Wachulak, W. Chao, Y. Liu, K. Goldberg, P. Naulleau, E. H. Anderson, D. T. Attwood, M. C. Marconi, J. J. Rocca, and **C. S. Menoni**, "High resolution 13.2 nm reflection microscopy on a table top", SPIE Microlithography, Lake Tahoe, NV, Sept. 29- Oct. 1, 2008.
  65. P. Langston, D. Patel, A. Markosyan, E. M. Krous, B. Langdon, R. Route, M. Fejer and **C.S. Menoni**, "SiO<sub>2</sub>/HfO<sub>2</sub> multilayers: impact of process parameters and stack geometry on the optical and structural properties", in *Frontiers in Optics*, OSA Technical Digest (CD) (Optical Society of America, 2008), paper JSuA27.
  66. B. Langdon, D. Patel, E. Krous, P. Langston, **C.S. Menoni**, M. Shinn, "Electron spin resonance and x-ray photo electron spectroscopy investigation of ion beam sputtered HfO<sub>2</sub> and SiO<sub>2</sub> thin films", Laser-Induced Damage in Optical Materials: 2008, Gregory J. Exarhos; Detlev Ristau; M. J. Soileau; Christopher J. Stolz, Editors, Proc. SPIE vol. 7132, 71320M
  67. D. Patel, P. Langston, A. Markosyan, E. M. Krous, B. Langdon, F. Furch, B. Reagan, R. Route, M.M. Fejer, J.J. Rocca, and **C.S. Menoni**, "SiO<sub>2</sub>/HfO<sub>2</sub> multilayers: impact of process parameters and stack geometry on the optical and structural properties", Laser-Induced Damage in Optical Materials: 2008, Gregory J. Exarhos; Detlev Ristau; M. J. Soileau; Christopher J. Stolz, Editors, Proc. SPIE vol. 7132, 71320L
  68. **C. S. Menoni**, M.C. Marconi, J.J. Rocca, "Bright beams of extreme ultraviolet light an enabling tool for nanoscale imaging and patterning", International Conference on Microwave Magnetics, Fort Collins, CO, September 12-14, 2008.
  69. **C.S. Menoni**, F. Brizuela, C. Brewer, Y. Wang, D. Alessi, P. Wachulak, B.M. Luther, M. C. Marconi, J. J. Rocca, W. Chao, E. H. Anderson, D. T. Attwood, A. V. Vinogradov, I. A. Artioukov, Y. P. Pershyn and V. V. Kondratenko, "Full Field Imaging With Extreme Ultraviolet Lasers At Near Wavelength Resolution," International Conference on Nonlinear Near Field Optics, Buenos Aires, Argentina,
  70. F. Brizuela, P.W. Wachulak, C.A. Brewer, **C. S. Menoni**, W.Chao, E.H. Anderson, R.A. Bartels, J.J. Rocca, and M.C. Marconi, "Simultaneous determination by correlation of feature size and spatial resolution in EUV images of patterned nanostructures," 9<sup>th</sup> International Conference on X-Ray Microscopy - XRM2008, Zürich, Switzerland, July 21 - 25, (2008).
  71. F. Brizuela, C.A. Brewer, D. Martz, P. Wachulak, M. C. Marconi, J. J. Rocca, E.H. Anderson, W.L. Chao, D. Attwood, I. Artioukov, A. Vinogradov, A. Ponomareko, and V. Kondratenko, "50 nm



- spatial resolution single shot microscopy with a 46.9 nm laser”, 9<sup>th</sup> International Conference on X-Ray Microscopy - XRM2008, Zürich, Switzerland, July 21 - 25, (2008).
72. C. Brewer, F. Brizuela, D. Martz, P. Wachulak, M. C. Marconi, J. J. Rocca and **C. S. Menoni**, “50 nm Resolution Extreme Ultraviolet Imaging with a Desktop-size Laser, 52<sup>nd</sup> International Electron, Ion and Photon Beam Technology and Nanofabrication (EIPBN) Conference, Portland, Oregon, May 27-30.
  73. M.C. Marconi, P.W. Wachulak, W. Rockward, D. Hill, E. Anderson, **C.S. Menoni**, J.J. Rocca, “Ultra compact interferometric lithography system realized with a desk-top extreme ultraviolet laser,” International Conference on Electron, Ion and Photon Beam Technology and Nanofabrication. Portland, May 26-May 31, (2008).
  74. P. Wachulak, M. Marconi, R. Bartels, **C.S. Menoni**, and J.J. Rocca, "Extreme Ultraviolet Holography with Wavelength Resolution," in *Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science Conference and Photonic Applications Systems Technologies*, OSA Technical Digest (CD) (Optical Society of America, 2008), paper CMCC3.
  75. R. Sandberg, C. Song, P. Wachulak, D. Raymondson, A. Paul, B. Amirbekian, A. Sakdinawat, E. Lee, C. La-O-Vorakiat, M. Marconi, **C.S. Menoni**, M. Murnane, J. Rocca, H. Kapteyn, and J. Miao, "70 nm Lensless Diffractive Microscopy Using Tabletop Soft X-Ray Sources," in *Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science Conference and Photonic Applications Systems Technologies*, OSA Technical Digest (CD) (Optical Society of America, 2008), paper CMCC5.
  76. F. Brizuela, C. Brewer, D. Martz, M. Marconi, J.J. Rocca, **C.S. Menoni**, W. Chao, E. Anderson, D. Attwood, A. Vinogradov, I. Artioukov, A. Ponomareko, and V. Kondratenko, "Near-Wavelength Resolution Extreme Ultraviolet Imaging with a Desktop-Size Laser," in *Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science Conference and Photonic Applications Systems Technologies*, OSA Technical Digest (CD) (Optical Society of America, 2008), paper CMCC7
  77. P. Wachulak, M. Marconi, W. Rockward, D. Hill, E. Anderson, **C.S. Menoni**, and J.J. Rocca, "Extreme Ultraviolet Interferometric Lithography with a Desk-Top System," in *Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science Conference and Photonic Applications Systems Technologies*, OSA Technical Digest (CD) (Optical Society of America, 2008), paper CMX5.
  78. M. Marconi, P. Wachulak, C. Brewer, F. Brizuela, R. Bartels, **C.S. Menoni**, J. Rocca, E. Anderson, and W. Chao, "Analysis of Resolution and Feature Size in Extreme Ultraviolet Microscopy Images," in *Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science Conference and Photonic Applications Systems Technologies*, OSA Technical Digest (CD) (Optical Society of America, 2008), paper JWA80.
  79. M. Berrill, F. Brizuela, B. Langdon, H. Bravo, **C.S. Menoni**, and J.J. Rocca, "Photoionized Plasmas Created by Soft X-Ray Laser Irradiation of Solid Targets," in *Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science Conference and Photonic Applications Systems Technologies*, OSA Technical Digest (CD) (Optical Society of America, 2008), paper JWB5.
  80. M. Berrill, F. Brizuela, B. Langdon, H. Bravo, **C.S. Menoni**, and J. Rocca, "Photoionized Plasmas Created by Soft X-Ray Laser Irradiation of Solid Targets," in *Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science Conference and Photonic Applications Systems Technologies*, OSA Technical Digest (CD) (Optical Society of America, 2008), paper JWB5.
- 2007**
81. M. C. Marconi, P. W. Wachulak, R. A. Bartels, **C. S. Menoni**, J.J. Rocca. “Holographic nano-imaging realized with compact extreme ultraviolet lasers”. LEOS 2007 Annual Conference. Lake Buena Vista, Florida, October 21- 25 2007.

82. M.C. Marconi, P. W. Wachulak , M.G. Capeluto, D. Patel, **C. S. Menoni**, J.J. Rocca. "Nanopillars and arrays of nanoholes fabricated by extreme ultraviolet interferometric laser lithography". LEOS 2007 Annual Conference. Lake Buena Vista, Florida, October 21- 25 2007.
83. Kuo-Jui Hsiao, J. M. Blanco Rodriguez, J. T. Jensen, D. Patel, D. Alessi, E. Granados Mateo, Y. Wang, J.J. Rocca, **C. S. Menoni**, Peter Langston and Albert Ogloza, "Influence of process conditions on the optical properties HfO<sub>2</sub>/SiO<sub>2</sub> thin films for high power laser coatings," *Frontiers in Optics*, San Jose, Sept. 16-20, 2007.
84. **C.S. Menoni**, F. Brizuela, C. Brewer, G. Vaschenko, M.C. Marconi, J.J. Rocca, W. Chao, E.H. Anderson, D.T. Attwood, A.V. Vinogradov, I.A. Artioukov, Y.P. Pershyn, and V.V. Kondratenko, "70 nm Spatial Resolution Microscope using Desktop-size Extreme Ultraviolet Laser illumination," *Ultrafast Optics-High Fields and Short Wavelength Conference (UFO-HFSW)*, Santa Fe, New Mexico, September 2-7, (2007).
85. M. Berrill, F. Brizuela, B. Langdon, H. Bravo, **C.S. Menoni**, A. Vinogradov, I. Artioukov, Yu.P. Pershing, V. Kondratenko, and J.J. Rocca, "Photoionized plasmas created by soft x-ray laser irradiation of solid targets," *UFO-HFSW conference*, Santa Fe, New Mexico, September 2-7, (2007).
86. M.C. Marconi, P.W. Wachulak, M.G. Capeluto, D. Patel, **C.S. Menoni**, and J.J. Rocca, "Fabrication of arrays of sub-100 nm pillars and holes with table top soft x-ray laser," *UFO-HFSW conference*, Santa Fe, New Mexico, September 2-7, (2007).
87. M.C. Marconi, P.W. Wachulak, R.A. Bartels, **C.S. Menoni**, and J.J. Rocca, "Nano-holography with table top soft x-ray lasers," *UFO-HFSW conference*, Santa Fe, New Mexico, September 2-7, (2007).
88. R. Sandberg, A. Paul, D. Raymondson, M. Murnane, H. Kapteyn, P. Wachulak, M.C. Marconi, **C.S. Menoni**, J.J. Rocca, C. Song, J. Miao, A. Sakdinawat. "Lensless imaging using table top EUV sources", *UFO-HFSW*, Santa Fe, New Mexico, September 2-7, (2007).
89. F. Brizuela, H. Bravo, M.A. Berrill, B. Langdon, G.O. Vaschenko, **C.S. Menoni**, J.J. Rocca, O.E. Hemberg, B.H. Frazer, W. Chao, E.H. Anderson, and D.T. Attwood, Jr., "Nanoscale ablation with soft x-ray lasers," *Conference on Soft X-Ray Lasers and Applications VII*, SPIE, Vol.6702, (2007).
90. M.C. Marconi, P. Wachulak, D. Patel, M.G. Capeluto, **C. S. Menoni**, and J.J. Rocca, "Interferometric lithography with sub-100-nm resolution using a tabletop 46.9-nm laser," *Conference on Soft X-Ray Lasers and Applications VII*, SPIE, Vol.6702, (2007).
91. P. Wachulak, M.C. Marconi, R.A. Bartels, **C.S. Menoni**, and J.J. Rocca, "Tabletop soft x-ray holography with sub-200-nm spatial resolution," *Conference on Soft X-Ray Lasers and Applications VII*, SPIE, Vol.6702, (2007).
92. C.A. Brewer, F. Brizuela, D.H. Martz, M.C. Marconi, J.J. Rocca, **C.S. Menoni**, W. Chao, E.H. Anderson, D. T. Attwood, Jr., A.V. Vinogradov, I.A. Artioukov, Y.P. Pershyn, and V. Kondratenko, "Compact 70-nm spatial resolution microscope using a desktop-size soft x-ray laser," *Conference on Soft X-Ray Lasers and Applications VII*, SPIE, Vol.6702, (2007).
93. D. L. Voronov, E.N. Zubarev, Y.P. Pershyn, V.A. Sevryukova, V.V. Kondratenko, A.V. Vinogradov, I.A. Artioukov, Y.A. Uspenskiy, M.E. Grisham, G.O. Vaschenko, **C.S. Menoni**, and J.J. Rocca, "Structural transformations in multilayers and bulk materials irradiated by EUV lasers," *Conference on Soft X-Ray Lasers and Applications VII*, SPIE, Vol.6702, (2007).
94. R.Sandberg, P. Wachulak, A. Paul, D. Raymondson, C. Song, M. Marconi, **C.S. Menoni**, J.J. Rocca, M. Murnane, H. Kapteyn, J. Miao. "Lensless Imaging Using Tabletop Extreme-Ultraviolet Sources". *Coherence 2007. International Workshop on Phase Retrieval and Coherent Scattering*. Berkeley, CA, June 25-28 2007.
95. P. Wachulak, M.G. Capeluto, M.C. Marconi, **C.S. Menoni**, J.J. Rocca. "Table top Patterning of Arrays of nano-dots with extreme ultraviolet laser interferometric lithography", *International*



- Conference on Electron, Ion and Photon Beam Technology and Nanofabrication. Denver, May 29-June 1st 2007.
96. M.G. Capeluto, P. Wachulak, M.C. Marconi, D. Patel, **C.S. Menoni**, J.J. Rocca, C. Lemmi, E.H. Anderson, W. Chao, D.T. Attwood. "Printing arrays of nano-holes with EUV Compact lasers". 4th Latin-American Symposium on Scanning Probe Microscopy IV LASPM May 2-4. Mar del Plata. Argentina
  97. 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 table-top soft x-ray laser using a dense plasma amplifier," Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science Conference and Photonic Applications Systems Technologies 2007, Proc. CLEO '07 Technical Digest, JFA1, (2007).
  98. P.W. Wachulak, M.G. Capeluto, M.C. Marconi, **C.S. Menoni**, and J.J. Rocca, "Arrays of sub-100 nm features fabricated with table top extreme ultraviolet interferometric laser lithography," Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science Conference and Photonic Applications Systems Technologies 2007, Proc. CLEO '07 Technical Digest, CThCC3, (2007).
  99. P.W. Wachulak, R.A. Bartels, M.C. Marconi, **C.S. Menoni**, and J.J. Rocca, "Table top extreme ultraviolet holography," Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science Conference and Photonic Applications Systems Technologies 2007, Proc. CLEO '07 Technical Digest, CMX3, (2007).
  100. E. Granados, Y. Wang, M.A. Larotonda, M. Berrill, B.M. Luther, D. Patel, **C.S. Menoni**, and J.J. Rocca, "Demonstration of a high brightness injection-seeded soft x-ray laser amplifier using a dense plasma," Proc. American Physical Society, BAPS.2007.MAR.B32.2, (2007).
  101. M. Marconi, P. Wachulak, D. Patel, M.G. Capeluto, **C.S. Menoni**, and J.J. Rocca, "Sub-100 nm interferometric lithography realized with table top extreme ultraviolet lasers," Proc. American Physical Society, BAPS.2007.MAR.D43.10, (2007).
  102. F. Brizuela, C. Brewer, G. Vaschenko, Y. Wang, M. Larotonda, B. Luther, M. Marconi, J. Rocca, **C.S. Menoni**, W. Chao, Y. Liu, E. Anderson, D. Attwood, A. Vinogradov, I. Artioukov, Y. Pershyn, and V. Kondratenko, "Nano-scale resolution full-field microscopy using tabletop extreme ultraviolet lasers," Proc. American Physical Society, BAPS.2007.MAR.D38.10 (2007).
  103. J.J. Rocca, Y. Wang, B. Luther, M. Berrill, M. Larotonda, D. Alessi, V.N. Shlyaptsev, E. Granados, and **C.S. Menoni**, "Compact high repetition rate soft x-ray lasers: a doorway to high intensity coherent soft x-ray science on a table-top" Atomic Processes in Plasmas, J.D. Gillaspay, W.L. Wiese, eds., Proc. AIP 926, 135, (2007).
  104. P.W. Wachulak, M.C. Marconi, R.A. Bartels, **C.S. Menoni**, and J.J. Rocca, "Table Top Extreme Ultraviolet Holography. Present and future capabilities," Proc. American Physical Society, BAPS.2007.MAR.R1.120 (2007).
  105. H. Bravo, F. Brizuela, G. Vaschenko, **C.S. Menoni**, J.J. Rocca, O. Hemberg, B. Frazer, S. Bloom, W. Chao, E.H. Anderson, and D.T. Attwood, "Sub-100 nm scale ablation by direct focusing of an extreme ultraviolet laser," Proc. American Physical Society, BAPS.2007.MAR.R1.157, (2007).
  106. D. Patel, Y. Wang, M. Larotonda, J. Lovewell, J. Jensen, K.J. Hsiao, E. Krous, J.J. Rocca, **C.S. Menoni**, F. Tomasel, S. Kholi, and P. McCurdy, "Assessing the impact of atomic oxygen in the damage threshold and stress of Hafnia films grown by ion beam sputter deposition," Laser-Induced Damage in Optical Materials: 2006, G.J. Exarhos, A.H. Guenther, K.L. Lewis, D. Ristau, M.J. Soileau, C.J. Stolz, eds., Proc. SPIE **6403**, 640314, (2007).

## 2006

107. M.C. Marconi, P.W. Wachulak, M.G. Capeluto, G. Vaschenko, H. Bravo, **C.S. Menoni**, J.J. Rocca, E.H. Anderson, W. Chao, D. Attwood, O. Hemberg, B. Frazer, and S. Bloom, "Nanopatterning and Nanomachining with Table-top Extreme Ultraviolet Lasers", Proceedings of the Material Research Society, 2006.
108. **C.S. Menoni**, G. Vaschenko, F. Brizuela, C. Brewer, Y. Wang, M.A. Larotonda, B.M. Luther, M.C. Marconi, J.J. Rocca, W. Chao, J.A. Liddle, Y. Liu, E.H. Anderson, D.T. Attwood, A.V. Vinogradov, I.A. Artioukov, Y.P. Pershyn, and V.V. Kondratenko, "Nano-scale imaging with table-top extreme ultraviolet lasers", Mater. Res. Soc. Symp., Boston, Nov. 2006.
109. M.G. Capeluto, P. Wachulak, M.C. Marconi, **C.S. Menoni**, J.J. Rocca, E.H. Anderson, W. Chao, and D.T. Attwood, "Development of a table top Nanopatterning tool with Extreme Ultraviolet laser illumination", 32nd International Conference on Micro and Nano Engineering 2006, Barcelona, September 17-21 2006.
110. M.G. Capeluto, P. Wachulak, M.C. Marconi, **C.S. Menoni**, J.J. Rocca, E.H. Anderson, W. Chao, and D.T. Attwood, "Table top Nanopatterning using Extreme Ultraviolet lasers", 10<sup>th</sup> International Conference on X-Ray Lasers, Berlin, Germany, August 21 – 25, 2006.
111. P.W. Wachulak, R.A. Bartels, **C.S. Menoni**, J.J. Rocca, and M.C. Marconi. "Holography Using Compact EUV Laser Source," American Vacuum Society, School of Mines, Golden, CO, September, (2006).
112. P.W. Wachulak, M.C. Marconi, R. Bartels, **C.S. Menoni**, and J.J. Rocca, "Soft X ray holographic imaging with sub-micron resolution", 10<sup>th</sup> International Conference on X-Ray Lasers, Berlin, Germany, August 21 – 25, 2006.
113. **C.S. Menoni**, G.O. Vaschenko, F. Brizuela, C. Brewer, Y. Wang, M.A. Larotonda, B.M. Luther, M.C. Marconi, J.J. Rocca, W. Chao, J. Liddle, Y.W. Liu, E.H. Anderson, D. Attwood, A.V. Vinogradov, I.A. Artioukov, Y.P. Pershyn, and V.V. Kondratenko, "Nanometer-scale Resolution Microscopy with Compact Extreme Ultraviolet Lasers", IEEE LEOS Annual Meeting, Montreal, Quebec, Canada, October 29 – November 2, 2006.
114. **C.S. Menoni**, G.O. Vaschenko, H. Bravo, F. Brizuela, J.J. Rocca, W. Chao, E.H. Anderson, D. Attwood, O. Hemberg, B. Frazer, and S. Bloom, "Nano-scale Ablation with a Compact Extreme Ultraviolet Laser", IEEE LEOS Annual Meeting, Montreal, Quebec, Canada, Oct. 29 – Nov. 2, 2006.
115. **C.S. Menoni**, D. Patel, J. Lovewell, H-J- Hsiao, Y. Wang, M. Larotonda, J.J. Rocca, F. Tomasel, S. Kholi, P. McCurdy, and M. Shinn, "The role of atomic oxygen in the damage threshold and stress of ion beam sputtered Hafnia coatings for high power Free Electron Lasers", Directed Energy Professional Society Meeting, Albuquerque, NM October 29-November 2, 2006.
116. J.J. Rocca, Y. Wang, M. Larotonda, B. Luther, D. Alessi, M. Berrill, M. Marconi, G. Vaschenko, C. Brewer, F. Brizuela, **C.S. Menoni**, Y. Liu, W. Chao, E. Anderson, and D. Attwood, "Table-Top EUV Lasers for Metrology", 2006 International Symposium on EUV Lithography, Barcelona, Spain, October 15 – 18, 2006.
117. F. Brizuela, C. Brewer, G. Vaschenko, Y. Wang, M. Larotonda, B. Luther, M.C. Marconi, J.J. Rocca, **C.S. Menoni**, W. Chao, J.A. Liddle, Y. Liu, E.H. Anderson, and D.T. Attwood, "Imaging with Sub-38nm Spatial Resolution Using a Tabletop 13nm Wavelength Laser", Frontiers in Optics 2006, Rochester, New York, October 8 – 12, 2006.
118. F. Brizuela, H. Bravo, G. Vaschenko, **C.S. Menoni**, J.J. Rocca, O. Hemberg, B. Frazer, S. Bloom, W. Chao, E.H. Anderson, and D.T. Attwood, "Ablation of Nanometer-Scale Features Using a Table-Top Soft X-ray Laser", Frontiers in Optics 2006, Rochester, New York, October 8 – 12, 2006.

119. **C.S. Menoni**, D. Patel, F. Brizuela, Y. Wang, M. Larotonda, K.J. Hsiao, J.J. Rocca, H.T. Nguyen, T.C. Carlson, C.R. Hoaglan, J.D. Nissen, M.D. Aasen, J.E. Peterson, and J.A. Britten, "Ion Beam Deposition of (NbTa)<sub>2</sub>O<sub>5</sub>/SiO<sub>2</sub> Multilayers for High-Efficiency 800 nm Dielectric Gratings for High Average Power Laser Systems", Presented at the Laser-Induced Damage in Optical Materials: 2006, Boulder CO, September 25-27, 2006.
120. H.T. Nguyen, T.C. Carlson, C.R. Hoaglan, J.D. Nissen, M.D. Aasen, J.E. Peterson, J.A. Britten, D. Patel, F. Brizuela, J.J. Rocca, and **C.S. Menoni**, "High-Efficiency 800 nm Multi-Layer Dielectric Gratings for High Average Power Laser Systems", ICUIL 2006, International Conference on Ultrahigh Intensity Lasers Development, Science and Emerging Applications, Cassis, France, September 25 - 29, 2006.
121. C. Brewer, G. Vaschenko, F. Brizuela, Y. Wang, M.A. Larotonda, B.M. Luther, M.C. Marconi, J.J. Rocca, **C.S. Menoni**, W. Chao, J.A. Liddle, Y. Liu, E.H. Anderson, and D.T. Attwood, "Sub-38 nm resolution microscopy with a tabletop 13 nm wavelength laser", CLEO/QELS, Long Beach, California, May 21-26, 2006; Technical Digest, CME4, (2006).
122. I.A. Artiukov, F. Brizuela, G. Vaschenko, C. Brewer, M. Grisham, **C.S. Menoni**, M.C. Marconi, J.J. Rocca, W.L. Chao, J.A. Liddle, E. Anderson, D.T. Attwood, Yu.P. Pershyn, A.G. Ponomarenko, D.L. Voronov, V.V. Kondratenko, R.M. Fechtchenko, Yu.S. Kasianov, Yu.A. Uspenskii, and A.V. Vinogradov, "Towards laboratory soft x-ray microscopes based on reflective and diffractive optics and compact x-ray sources", The 8<sup>th</sup> International Conference on the Physics of X-ray Multiplayer Structures (PXRMS 2006), Sapporo, Japan, March 12-16, 2006.
123. G. Vaschenko, F. Brizuela, C. Brewer, M.A. Larotonda, Y. Wang, B.M. Luther, M.C. Marconi, **C.S. Menoni**, J.J. Rocca, W. Chao, E.H. Anderson, Y. Liu, and D. Attwood, "EUV imaging with a 13 nm tabletop laser reaches sub-38 nm spatial resolution", Conference on Microlithography, San Jose, California, February 20-24 2006; Proceedings of SPIE **6151**, 61510X, (2006).
124. M.G. Capeluto, G. Vaschenko, M. Grisham, M.C. Marconi, S. Luduena, L. Pietrasanta, Y. Lu, B. Parkinson, **C.S. Menoni**, and J.J. Rocca, "Nanopatterning with a high repetition rate  $\lambda$ =46.9 nm capillary discharge table-top laser", The 9<sup>th</sup> International Conference on X-Ray Lasers, Beijing, China, May 24-28, 2004; X-ray Lasers 2004, Institute of Physics Conference Series Number **186**, 521, (2006).
125. G. Vaschenko, M. Grisham, **C.S. Menoni**, J.J. Rocca, Yu.P. Pershyn, E.N. Zubarev, D.L. Voronov, V.A. Sevryukova, V.V. Kondratenko, A.V. Vinogradov, and I.A. Artiukov, "Damage threshold and damage mechanism of Sc/Si multilayer mirrors exposed to intense nanosecond 46.9 nm laser pulses", The 9<sup>th</sup> International Conference on X-Ray Lasers, Beijing, China, May 24-28, 2004; X-ray Lasers 2004, Institute of Physics Conference Series Number **186**, 559, (2006).

## 2005

126. O. Anton, **C.S. Menoni**, Jeng-Ya Yeh, T.T.V. Roy, L.J. Mawst, and N. Tansu, "Effect of nitrogen content and temperature on the f3dB bandwidth of 1.3  $\mu$ m Dilute Nitride SQW Lasers", 2005 Conference on Lasers and Electro-Optics CLEO/QELS Digest, Baltimore, May 23-27, 2005.
127. L.F. Xu, D. Patel, G. Vaschenko, O. Anton, **C.S. Menoni**, Jeng-Ya Yeh, T.T.V. Roy, L.J. Mawst, and N. Tansu, "Investigation of the Carrier Dynamics of Strain Compensated InGaAsN Quantum Wells", 2005 Conference on Lasers and Electro-Optics CLEO/QELS Digest, Baltimore, May 23-27, 2005.
128. G. Vaschenko, F. Brizuela, C. Brewer, M. Grisham, Y. Wang, M.A. Larotonda, B.M. Luther, M. Marconi, **C.S. Menoni**, J.J. Rocca, W.L. Chao, J.A. Liddle, E.H. Anderson, D.T. Attwood, Y.P. Pershyn, V.V. Kondratenko, A.V. Vinogradov, and I.A. Artiukov, "Nano-imaging with compact extreme ultraviolet laser sources", Proceedings of SPIE **5752**, 375, (2005).

129. G. Vaschenko F. Brizuela, C. Brewer, M. Grisham, Y. Wang, M.A. Larotonda, B.M. Luther, **C.S. Menoni**, M.C. Marconi, J.J. Rocca, W.L. Chao, J.A. Liddle, E.H. Anderson, D.T. Atwood, A.V. Vinogradov, I.A. Artioukov, Y.P. Pershyn and V.V. Kondratenko, "Nanoimaging with compact extreme ultraviolet sources", *Procc. SPIE*, **5752**, pp. 375-383, Metrology, Inspection and Process Control for Microlithography XIX, Richard M. Silver ed.
130. F. Brizuela, G. Vaschenko, C. Brewer, M.E. Grisham, **C.S. Menoni**, H. Mancini, M.C. Marconi, J.J. Rocca, W. Chao, A. Liddle, E.H. Anderson, D.T. Attwood, A.V. Vinogradov, I.A. Artioukov, Y.P. Pershin, and V.V. Kondratenko, "Demonstration of nanometer scale imaging with a compact soft x-ray laser", *Soft X-ray lasers and Applications VI*, SPIE Annual Meeting, San Diego, Aug. 2-3, 2005. *Proc. SPIE Vol. 5919*, p. 179-185, *Soft X-Ray Lasers and Applications VI*; Ernst E. Fill; Ed.
131. G. Vaschenko, C. Brewer, F. Brizuela, Y. Wang, M.A. Larotonda, B.M. Luther, **C.S. Menoni**, M. Marconi, J.J. Rocca, W. Chao, J.A. Liddle, E.H. Anderson, Y. Liu, and D.T. Attwood, "Sub-40 nm spatial resolution imaging with 13.2 nm wavelength illumination from a table-top laser", 4<sup>th</sup> International Extreme Ultra Violet Lithography Symposium, San Diego, California, Nov. 2005.
132. F. Brizuela, G.O. Vaschenko, C. Brewer, M. Grisham, **C.S. Menoni**, H. Mancini, M.C. Marconi, J.J. Rocca, W. Chao, A. Liddle, E.H. Anderson, D. Attwood, A.V. Vinogradov, I.A. Artioukov, Y.P. Pershyn, and V.V. Kondratenko, "Nanometer-scale imaging with a compact soft x-ray laser", SPIE conference on Soft X-ray lasers and Applications, San Diego, August 2005; *Proceedings of SPIE 5919*, 179, (2005).
133. 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, Yu.P. Pershyn, and V.V. Kondratenko, "Nano-scale imaging with a compact EUV laser", CLEO/QELS Conference, Baltimore, May 22-27, 2005; *Technical Digest, JThG4*, (2005).
134. G. Vaschenko, F. Brizuela, C. Brewer, M. Grisham, Y. Wang, M.A. Larotonda, B.M. Luther, M. Marconi, **C.S. Carmen**, J.J. Rocca, W.L. Chao, J.A. Liddle, E.H. Anderson, D.T. Attwood, Y.P. Pershyn, V.V. Kondratenko, A.V. Vinogradov, and I.A. Artioukov, "Nano-imaging with compact extreme ultraviolet laser sources", SPIE International Symposium on Microlithography, San Jose, California, February 27-March 4, 2005; *Proceedings of SPIE 5752*, 375, (2005).

## 2004

135. O. Anton, **C.S. Menoni**, Jeng-Ya Yeh, T.T.V. Roy, L.J. Mawst, and N. Tansu, "The 3dB Bandwidth of Strain-Compensated Dilute-Nitride Quantum-Well Lasers", 2004 IEEE-LEOS Meeting, Puerto Rico, Nov. 7-11, (2004).
136. O. Anton and **C.S. Menoni**, "Frequency response measurements in pulsed laser diodes by frequency offset detection", IEEE-LEOS Meeting, Puerto Rico, Nov. 7-11, 2004.
137. D. Patel, L.F. Xu, R. Pownall, O. Anton and **C.S. Menoni**, "Amplified Spontaneous Emission measurements in a diamond anvil cell: A tool to investigate laser diode gain under high pressure", 14<sup>th</sup> International High Pressure Semiconductor Physics Conference, Berkeley, CA, Aug. 2-5, 2004.
138. O. Anton, D. Patel, **C.S. Menoni**, J.M. Pikal, Jeng-Ya Yeh, L. Mawst, and N. Tansu, "Comparison of the carrier lifetime in  $\text{In}_{0.4}\text{Ga}_{0.6}\text{As}_{0.995}\text{N}_{0.005}/\text{GaAs}_{0.85}\text{P}_{0.15}/\text{GaAs}$  ( $\lambda=1.3\mu\text{m}$ ) and  $\text{In}_{0.4}\text{Ga}_{0.6}\text{As}/\text{GaAs}_{0.85}\text{P}_{0.15}/\text{GaAs}$  ( $\lambda=1.2\mu\text{m}$ ) SQW lasers", CLEO/IQEC, San Francisco, May 16-21, 2004.
139. S. Kholi, P.R. McCurdy, C.D. Rithner, P.K. Dorhout, A.M. Dummer, F. Brizuela, and **C.S. Menoni**, "X-Ray characterization of  $\beta$ -Tantalum thin films", International conference of metallurgical coatings and thin films, San Diego, April 18-23 (2004).
140. M.G. Capeluto, G. Vaschenko, M.C. Marconi, M. Grisham, **C.S. Menoni**, and J.J. Rocca, "Interferometric lithography at 47nm with a table-top EUV laser", The 17<sup>th</sup> Annual Meeting of the

- IEE Lasers and Electro-Optics Society, LEOS, Puerto Rico, November 7-11, 2004; Conference Proceedings **2**, 888, (2004).
141. G.O. Vaschenko, M. Grisham, **C.S. Menoni**, J.J. Rocca, Y.P. Pershin, E.N. Zubarev, D.L. Voronov, V.A. Sevryukova, V.V. Kondratenko, A.V. Vinogradov, and I.A. Artioukov, "Study of irradiation damage of Sc/Si multiplayer mirrors with a 46.9-nm tabletop laser", The International Symposium on Optical Science and Technology, SPIE 49<sup>th</sup> Annual Meeting, Denver, Colorado, August 2-6 2004; Proceedings of SPIE **5534**, 53, (2004).
  142. A.M. Dummer, F. Brizuela, C. Duskis, J. George, B. Luther, M. Larotonda, S. Kohli, P. Mccurdy, J.J. Rocca, and **C.S. Menoni**, "Investigation of damage threshold of ion beam deposited oxide thin film optics for high-peak-power short-pulse lasers", The International Symposium on Optical Science and Technology, SPIE 49<sup>th</sup> Annual Meeting, Denver, Colorado, August 2-6 2004; Proceedings of SPIE, **5527**, 93, (2004).
  143. L. Juha, M. Bittner, D. Chostova, V. Letal, J. Krasa, Z. Otcenasek, M. Kozlova, J. Polan, A.R. Praeg, B. Rus, M. Stupka, J. Krzywinski, A. Andrejczuk, J.B. Pelka, R.H. Sobierajski, L. Ryc, J. Feldhaus, F.P. Boody, H. Fiedorowicz, A. Bartnik, J. Mikolajczyk, R. Rakowski, P. Kubat, L. Pina, M.E. Grisham, G.O. Vaschenko, **C.S. Menoni**, and J.J. Rocca, "Short-wavelength ablation of solids: pulse duration and wavelength effects", The International Symposium on Optical Science and Technology, SPIE 49<sup>th</sup> Annual Meeting, Denver, Colorado, August 2-6 2004; Proceedings of SPIE **5534**, 95, (2004).
  144. M. Bittner, L. Juha, D. Chostova, V. Letal, J. Krasa, Z. Otcenasek, M. Kozlova, J. Polan, A.R. Praeg, B. Rus, M. Stupka, J. Krzywinski, A. Andrejczuk, J.B. Pelka, R.H. Sobierajski, J. Feldhaus, F.P. Boody, M.E. Grisham, G.O. Vaschenko, **C.S. Menoni**, and J.J. Rocca, "Comparing ablation induced by fs, ps, and ns XUV-laser pulses", The International Symposium on Optical Science and Technology, SPIE 49<sup>th</sup> Annual Meeting, Denver, Colorado, August 2-6 2004; Proceedings of SPIE **5448**, 827, (2004).
  145. M.G. Capeluto, G.O. Vaschenko, M.E. Grisham, M.C. Marconi, **C.S. Menoni**, J.J. Rocca, S. Luduena, and L. Pietrasanta, "Interferometric lithography at 46.9 nm", The International Symposium on Optical Science and Technology, SPIE 49<sup>th</sup> Annual Meeting, Denver, Colorado, August 2-6 2004; Proceedings of SPIE **5622**, 735, (2004).
  146. G. Vaschenko, M. Grisham, **C.S. Menoni**, J.J. Rocca, Yu.P. Pershyn, E.N. Zubarev, D.L. Voronov, V.A. Sevryukova, V.V. Kondratenko, A.V. Vinogradov, and I.A. Artioukov, "Damage of Sc/Si multilayer mirrors exposed to intense nanosecond 46.9 nm laser pulses", Conference on Lasers and Electro-Optics, CLEO, San Francisco, May 16-21, 2004; Conference Proceedings **1**, 1507, International Quantum Electronics Conference, IQEC, San Francisco, May 16-21, 2004; Conference Proceedings, p.950-953, Joint CLEO/IQEC conference – published in both conferences proceedings.
  147. M.G. Capeluto, M.C. Marconi, S. Luduena, L. Pietrasanta, M. Grisham, B. Reagan, **C.S. Menoni**, and J.J. Rocca, "Nano patterning of PMMA using  $\lambda=46.9$  nm table-top laser", Conference on Lasers and Electro-Optics, CLEO, San Francisco, May 16-21, 2004; Conference Proceedings **2**, 2pp, (2004).

## **2003**

148. J.B. Wang, G. Vaschenko, S.R. Johnson, C.Z. Guo, **C.S. Menoni**, and Y.H. Zhang, "Optical properties of GaAsSb/GaAs Quantum Wells", 2003 IEEE LEOS Meeting, Tucson, AZ, October 23-30, 2003.
149. J.J. Rocca, M.C. Marconi, J. Filevich, E.C. Hammarsten, E. Jankowska, B. Luther, Y. Wang, M. Grisham, G. Vaschenko, **C.S. Menoni**, S.J. Moon, and V.N. Shlyaptsev, "Small Scale soft x-ray lasers excited by fast discharges and applications", 34<sup>th</sup> Meeting of the Division of Atomic, Molecular and Optical Physics (DAMOP), Boulder, CO, May 21-24, 2003, Bulletin of the American Physical Society, Vol. 48, No 3, p.73.
150. J.J. Rocca, M. Grisham, G. Vaschenko, S. Heinbuch, **C.S. Menoni**, E. Hammarsten, E. Jankowska, J. Filevich, M. Marconi, Y. Wang, B.M. Luther, L. Juha, I. Artioukov, V.V. Kondratenko, A. Vinogradov,



and V. Shlyaptsev, "Recent results in capillary discharge soft x-ray laser Research", In SPIE Conference on Soft X-Ray Lasers and Applications V, San Diego, California, August 6-7 2003; Proceedings of SPIE **5197**, 174, (2003).

## 2002

151. G. Vaschenko, Y. Godwal, and **C.S. Menoni**, C. Montcalm, R. Blacker, and D. Siegfried, "Measuring optical losses in thin films with ringdown cavity", presented at the American Vacuum Society Meeting, Denver, CO, Nov. 2002.
152. Lawrence H. Robins, Bruce Steiner, Norman A. Sanford, and **C.S. Menoni**, "Examination Of Polishing And Etching Effects On The Optical Properties Of Bulk Single-Crystal Gallium Nitride Using Cathodoluminescence And High-Resolution X-Ray Diffraction Imaging", Fall 2002 Materials Research Symp., Boston, MA, Dec. 2-6, 2002.
153. G. Vaschenko, Y. Godwal, **C.S. Menoni**, C. Montcalm, R. Blacker, and D. Siegfried, "Characterization of thin film losses with a synchronously pumped ringdown cavity", presented at the OSA Annual Meeting 2002, Orlando, Florida, September 29 – October 3, 2002.
154. O. Anton, G. Vaschenko, D. Patel, J.M. Pikal, and **C.S. Menoni**, "Small Signal Frequency Response of laser diodes using a femtosecond frequency comb", presented at the Semiconductor Lasers for Lightwave Communication Symposium, ITCOM 02, Boston, July 29-30, 2002.
155. G. Vaschenko, D. Patel, **C.S. Menoni**, H.M. Ng, and A.Y. Cho, "Nonlinear piezoelectric effect in GaN/AlGaIn quantum wells", presented at Electronic Materials Conference, Santa Barbara, CA, June 26-28, 2002.
156. O. Anton, G. Vaschenko, D. Patel, J.M. Pikal, and **C.S. Menoni**, "Femtosecond Optical Modulation Measurements of the 3 dB Bandwidth of 1.3  $\mu\text{m}$  InAsP lasers", Conference and Lasers and Electro-optics, CLEO 2002, Technical Digest, pp. 540, 2002.
157. G. Vaschenko, D. Patel, **C.S. Menoni**, H.M. Ng, and A.Y. Cho, "Nonlinear polarization response in GaN/AlGaIn quantum wells", presented at March Meeting 2002, American Physical Society, APS Bulletin, vol. 47, No. 1, Part II, pp. 920, 2002.

## 2001

158. D. Patel, G. Vaschenko, **C.S. Menoni**, S. Keller, U.K. Mishra, S.P. DenBaars, N.F. Gardner, J. Sun, W. Götz, and C.N. Tomé, "Pressure studies in InGaIn/GaN quantum wells", Frontiers of High Pressure Research II: Application of High Pressure to Low Dimensional Novel Electronic Materials, NATO ASI Series, Kluwer Academic Publishing, The Netherlands, (2001).
159. O. Anton, D. Patel, G. Vaschenko, G.Y. Robinson, J. Pikal, and **C.S. Menoni**, "Analysis of the modulation response of 1.3 $\mu\text{m}$  strained InAsP lasers", presented at the "Semiconductor Lasers for Lightwave Communications Symposium, ITCOM 2001, Denver, CO, August 22-23, 2001.
160. G. Vaschenko, D. Patel, **C.S. Menoni**, N.F. Gardner, J. Sun, W. Götz, C.N. Tome and B. Claussen, "Pressure dependence of piezoelectric field in InGaIn/GaN Quantum Wells", International Conference on Nitrides, Denver, CO, July 17-22, 2001.
161. G. Vaschenko, D. Patel, **C.S. Menoni**, S. Keller, U.K. Mishra, S.P. DenBaars, C. Tome, N.F. Gardner, J. Sun, and W. Götz, "Non-linear piezoelectricity in InGaIn/GaN quantum wells with Si-doped barriers", 43<sup>rd</sup> Electronic Materials Conference, Notre-Dame, IN, June 20-22, 2001.
162. D. Patel, G. Vaschenko, **C.S. Menoni**, S. Keller, U.K. Mishra, S.P. DenBaars, N.F. Gardner, J. Sun, W. Götz, and C.N. Tomé, "Pressure studies in InGaIn/GaN quantum wells", NATO Meeting on Frontiers of High Pressure Research II: Application of High Pressure to Low Dimensional Novel Electronic Materials, Pingree Park, CO, June, 2001.

163. G. Vaschenko, D. Patel, **C.S. Menoni**, S. Keller, U.K. Mishra, S.P. DenBaars, C. Tome, and B. Claussen, "Tuning piezoelectric fields in InGaN/GaN quantum wells", presented at 2001 Conference on Lasers and Electro-Optics, Baltimore, MD, May 6-11, 2001.
164. G. Vaschenko, D. Patel, **C.S. Menoni**, S. Keller, U.K. Mishra, S.P. DenBaars, C.N. Tome, and B. Clausen, "Nonlinear piezoelectric effect in InGaN/GaN quantum wells revealed at high pressures", presented at the 2001 March Meeting of the American Physical Society, Seattle, WA, March, 2001.

## 2000

165. O. Anton, S. Piper, G. Vaschenko, **C.S. Menoni**, G.Y. Robinson, and J.M. Pikal, "Understanding the influence of carrier transport processes in the high frequency response of 1.3 $\mu$ m InAsP lasers", presented at the Four Corner Meeting, Fort Collins, CO, September 29-30, (2000).
166. Goulakov D. Patel, **C.S. Menoni**, J. Torvik, J. Pankove, P.G. Schroeder, C.B. France, and B.A. Parkinson, "Chemically Assisted Ion Beam Etching of GaN-based waveguides", presented at the Four Corner Meeting, Fort Collins, CO, September 29-30, (2000).
167. G. Vaschenko, D. Patel, **C.S. Menoni**, M.S. Minsky, S. Keller, E. Hu, U.K. Mishra, and S.P. DenBaars, "Pressure study of Si-doped InGaN/GaN quantum wells", presented at the Four Corner Meeting, Fort Collins, CO, September 29-30, (2000).
168. D. Patel, G. Vaschenko, **C.S. Menoni**, M.S. Minsky, S. Keller, E. Hu, U.K. Mishra, and S.P. DenBaars, "Anomalous pressure dependence of the emission in Si-doped InGaN/GaN quantum wells", Conference on Lasers and Electro-Optics CLEO 2000 Digest, pp. 214.
169. Goulakov, D. Patel, **C.S. Menoni**, J. Torvik, J. Pankove, P.G. Schroeder, C.B. France, and B. Parkinson, "Chemically Assisted Ion Beam Etching of GaN-Based Waveguides and Photodetectors", presented at 42<sup>nd</sup> Electronic Materials Conference, Denver, CO, June 21-23, 2000.
170. R. Slaby, G. Vaschenko, **C.S. Menoni**, G.Y. Robinson, J.M. Pikal, and C.M. Sotomayor Torres, "Carrier Capture in 1.3 $\mu$ m InAsP/InGaAsP quantum well laser structures", Conference on Lasers and Electro-Optics CLEO 2000 Digest, pp. 176.
171. G. Vaschenko, R. Slaby, **C.S. Menoni**, G.Y. Robinson, J.M. Pikal, and C.M. Sotomayor Torres, "Carrier Capture In 1.3 $\mu$ m InAsP/InGaAsP Quantum Well Structures", Bulletin of the American Physical Society 45, No. 1, pp. 293, March, 2000.
172. D. Patel, G. Vaschenko, **C.S. Menoni**, M.S. Minsky, S. Keller, E. Hu, U.K. Mishra, and S.P. DenBaars, "Anomalous pressure dependence of emission in Si-doped InGaN/GaN quantum wells", Bulletin of the American Physical Society 45, No. 1, pp. 293, March, 2000.

## 1999-1978

173. G. Vaschenko, R. Slaby, **C.S. Menoni**, G.Y. Robinson, J.M. Pikal, and C.M. Sotomayor Torres, "Carrier capture in 1.3  $\mu$ m InAsP/InGaAsP quantum well laser structures", presented at CLEO 2000, San Francisco, CA, May 7-12, 1999.
174. D. Patel, G. Vaschenko, **C.S. Menoni**, M.S. Minsky, S. Keller, E. Hu, U.K. Mishra, and S.P. DenBaars, "Anomalous pressure dependence of emission in Si-doped InGaN/GaN quantum wells reveals variations in the piezoelectric field", presented at CLEO 2000, San Francisco, CA, May 7-12, 1999.
175. **C.S. Menoni**, L. Miao, D. Patel, O. Micic, and A. Nozik, "Effects of Quantum Confinement in the Electronic Structure of InP Quantum Dots", 12<sup>th</sup> Annual Laser and Electro-Optics Society Meeting, San Francisco, CA, Nov. 8-11, 1999.
176. J. Pikal, **C.S. Menoni**, H. Temkin, P. Thiagarajan, and G.Y. Robinson, "Intrinsic Recombination Coefficients in Quantum Well Semiconductor Lasers", 12<sup>th</sup> Annual Laser and Electro-Optics Society Meeting, San Francisco, CA, Nov. 8-11, 1999.



177. L. Miao, D. Patel, **C.S. Menoni**, O. Micic and A. Nozik, "Band structure modifications of InP Dots at high pressure", 41<sup>st</sup> Electronic Materials Conference, Santa Barbara, CA, June 29-July 2, 1999.
178. G. Vaschenko, M.S. Minsky, L.S. Assis, R.L. Pidcock, **C.S. Menoni**, S. Keller, E. Hu, and S.P. Denbaars, "Role of Below Bandgap States in the Radiative Emission of InGaN/GaN Quantum Well Structures", 41<sup>st</sup> Electronic Materials Conference, Santa Barbara, CA, June 29-July 2, 1999.
179. G. Vaschenko, M.S. Minsky, L.S. Assis, R.L. Pidcock, **C.S. Menoni**, S. Keller, E. Hu, and S.P. Denbaars, "Optical Characterization of InGaN/GaN quantum well structures with Si-doped barriers", Proceedings Conference on Lasers and Electro-optics, CLEO'99, Baltimore, M.D., May 23-28, 1999.
180. D. Patel, J.M. Pikal, L. Miao, **C.S. Menoni**, K.J. Thomas, F.A. Kish, and M.R. Hueschen, "Effect of Band Structure Modification on the output characteristics of AlGaInP light emitting diodes", Proceedings Conference on Lasers and Electro-optics, CLEO'99, Baltimore, M.D., May 23-28, 1999.
181. M. Giudice, S. Balle, G. Vashenko, J.J. Rocca, **C.S. Menoni**, and J.R. Tredicce, "Time resolved spectral dynamics of semiconductor lasers with optical feedback in the regime of low-frequency fluctuations", Proceedings Conference on Lasers and Electro-optics, CLEO'99, Baltimore, M.D., May 23-28, 1999.
182. L. Miao, D. Patel, **C.S. Menoni**, O. Micic, and A. Nozik, "Band structure modification of InP quantum dots at high pressure", Centennial APS March Meeting, Atlanta, GA, March 1999, Bulletin of the APS, Vol 44, No. 1, pp. 1833.
183. G. Vaschenko, M.S. Minsky, L.S. Assis, R.L. Pidcock, **C.S. Menoni**, S. Keller, E. Hu, and S.P. Denbaars, "Optical Characterization of InGaN/GaN Quantum Well Structures with Si-doped Barriers", Centennial APS March Meeting, Atlanta, GA, March 1999, Bulletin of the APS, Vol 44, No. 1, pp. 1846.
184. D. Patel, J. Pikal, L. Miao, **C.S. Menoni**, K.J. Thomas, F.A. Kish and M.R. Hueschen, "Effect of electronic structure changes on the output of AlGaInP light emitting diodes", Centennial APS March Meeting, Atlanta, GA, March 1999, Bulletin of the APS, Vol 44, No. 1, pp. 210.
185. **C.S. Menoni**, "Career: Research on Blue Laser Materials and Early Motivation of Electrical Engineering Students", National Science Conference on Careers Awardees, January 14-16, 1999.
186. G. Vaschenko, **C.S. Menoni**, J.J. Rocca, M. Giudici, J.R. Tredicce, and S. Balle, "Picosecond characterization of Low-Frequency Fluctuations in edge emitting semiconductor lasers with optical feedback", Procc. 23<sup>rd</sup> International Congress on High Speed Photonics, ICHSPP'98, Moscow, Russia, Sept. 20-25, 1998.
187. M. Giudici, J.R. Tredicce, G. Vaschenko, J.J. Rocca, and **C.S. Menoni**, "Spatio-temporal dynamics in vertical cavity surface emitting lasers excited by fast electrical pulses", presented at Patterns in Nonlinear Optical Systems Conference, Alicante, Spain, PI-24, 1998.
188. D. Patel, J.M. Pikal and **C.S. Menoni**, "Effect of band structure modification on the internal loss of 1.3 $\mu$ m InGaAsP lasers", Conference on Lasers and Electro-Optics, CLEO 98, Technical Digest, pp. 237-238, San Francisco, CA, May 3-8, 1998.
189. **C.S. Menoni**, D. Patel, and J.M. Pikal, "Variation of the Internal Loss of 1.3 $\mu$ m InGaAsP Lasers with Hydrostatic Pressure and their impact on the Laser Output", presented at the 1998 March Meeting, American Physical Society, APS Bulletin, 43, No.1, pp.648, 1998.
190. G. Vaschenko, **C.S. Menoni**, J.J. Rocca, M. Giudici, J.R. Tredicce, and S. Balle, "Picosecond Characterization Of Low-Frequency Fluctuations In Edge Emitting Semiconductor Lasers With Optical Feedback", 23<sup>rd</sup> International Congress on High-Speed Photography and Photonics (ICHSPP-98), Moscow, Russia, Sep 20-Sep 25, 1998; Proceedings of SPIE **3516**, 763 (1999).

191. J.M. Pikal, **C.S. Menoni**, H. Temkin, P. Thiagarajan, and G.Y. Robinson, "Laser impedance independent optical carrier lifetime measurements", 10<sup>th</sup> Annual Meeting of the IEEE Lasers and Electro-Optics Society, LEOS' 97, Conf. Proceedings pp. 140-141, San Francisco, CA, Nov. 10-13, 1997.
192. S. Costantino, A. Yacomotti, A.V. Bragas, S.M. Landi, O.E. Martínez, **C.S. Menoni**, G.Y. Robinson, and P. Thiagarajan, "Band offset measurement using tunneling spectroscopy technique under ambient conditions", 9th International Conference on Scanning Tunneling Microscopy/Spectroscopy and Related Techniques STM'97, Hamburg, 1997.
193. G. Vaschenko, D. Patel, **C.S. Menoni**, Y. Qiu, and H. Temkin, "Carrier dynamics in unstrained Zn<sub>0.93</sub>Cd<sub>0.07</sub>Se/ZnSe quantum wells with different well widths", 1997 Electronic Materials Conference, pp 53, Fort Collins, CO, June 25-27, 1997.
194. S.J. Rehse, A.D. Glueck, A.B. Goulakov, S.A. Lee, **C.S. Menoni**, K.S. Johnson, M. Prentiss, and D.C. Ralph, "Nanostructure fabrication using metastable neon atom lithography and chemically assisted ion beam etching", 1997 Electronic Materials Conference, pp 53, Fort Collins, CO, June 25-27, 1997.
195. J.M. Pikal, P. Thiagarajan, **C.S. Menoni**, G.Y. Robinson, and H. Temkin, "Carrier Lifetimes and Gain in 1.3 $\mu$ m InAsP/InGaAsP Multiple Quantum Well Lasers", Conference on Lasers and Electro-Optics, CLEO 97, Technical Digest pp. 158-159, Baltimore, Maryland, May 1997.
196. S.J. Rehse, A.D. Glueck, S.A. Lee, A.B. Goulakov, **C.S. Menoni**, D.C. Ralph, K.S. Johnson, and M. Prentiss, "Nanostructure fabrication using atom beam lithography and chemically assisted reactive ion beam etching", presented at SPIE Photonic West 97, Atomic-Optics Conference, San Jose, CA, February 8-14, 1997.
197. D. Patel, **C.S. Menoni**, P. Connors, M. Ochiai, A.A. Bernussi, and H. Temkin, "Enhancement and Deterioration of the Output Characteristics of Compressively Strained InGaAsP Lasers with Hydrostatic Pressure", presented at Conference on Lasers and Electrooptics, CLEO 96, Los Angeles, CA, June 3-7, 1996.
198. D. Patel, C. S. Menoni, P. Connors, M. Ochiai, A. A. Bernussi, H. Temkin, "Enhancement and Deterioration of the Output Characteristics of Compressively Strained InGaAsP Lasers with Hydrostatic Pressure", CLEO 96, Los Angeles, CA, June 3-7, 1996.
199. D. Patel, K. Interholzinger, P. Thiagarajan, G.Y. Robinson, and **C.S. Menoni**, "L-band recombination in InGaP/InAlP multiple quantum wells", presented at the 38<sup>th</sup> Electronics Materials Conference, Santa Barbara, CA, June 26-28, 1996.
200. D. Patel, K. Interholzinger, P. Thiagarajan, G.Y. Robinson, and **C.S. Menoni**, "Direct determination of the L-band in InGaP/InAlP Multiple quantum wells", Bulletin of the American Physical Society, Vol 41, No1, pp 646, 1996.
201. D. Patel, **C.S. Menoni**, A.A. Bernussi, and H. Temkin, "Non-monotonic behavior of the threshold current of 1.3 $\mu$ m compressively strained lasers with hydrostatic pressure", presented at the High Pressure Semiconductor Physics Conference, Stuttgart, Germany, July 28-31, 1996.
202. D. Patel, K. Interholzinger, P. Thiagarajan, G.Y. Robinson and **C.S. Menoni**, "L-band recombination in InGaP/InAlP multiple quantum wells", presented at the High Pressure Semiconductor Physics Conference, Stuttgart, Germany, July 28-31, 1996.
203. K. Interholzinger, D. Patel, **C.S. Menoni**, O. Buccafusca, L.M. Woods, P. Thiagarajan, G.Y. Robinson, and J.E. Fouquet, "Band structure and band alignments of strained and lattice matched InGaP/InAlP heterostructures", presented at the 1995 Electronics Materials Conference, Charlottesville, VA, June 21-23, 1995.

204. O. Buccafusca, M.C. Marconi, D. Patel, **C.S. Menoni**, M. Prasad, J.J. Rocca and G.Y. Robinson, "Effect of  $\Gamma$ -X coupling on the carrier lifetime of InGaP/InAlP multiple quantum wells", presented at the 1995 Electronics Materials Conference, Charlottesville, VA, June 21-23, 1995.
205. C.H. McMahon, J.W. Bae, **C.S. Menoni**, D. Patel, S. Feld, C. Wilmsen, H. Temkin, P. Brusenbach, and R. Leibenguth, "Pressure and temperature induced detuning of gain and reflectivity spectra in vertical cavity surface emitting lasers", presented at the High Pressure Semiconductor Physics Conference, HPSP VI, Vancouver, Canada, August 22-24, 1994.
206. D. Patel, **C.S. Menoni**, D.W. Schult, T. McMahon and S.M. Goodnick, "Effect of pressure on the output characteristics of p-GaAs/AlGaAs heterojunction field effect transistors", presented at the High Pressure Semiconductor Physics Conference, HPSP VI, Vancouver, Canada, August 22-24, 1994.
207. 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.
208. 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.
209. 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", 36<sup>th</sup> Electronic Materials Conference, Boulder CO, June 22-24, (1994).
210. 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).
211. 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).
212. D. Patel, **C.S. Menoni**, H. Temkin, R.A. Logan, and D. Coblenz, "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.
213. **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.
214. 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.
215. D. Patel, **C.S. Menoni**, H. Temkin, R.A. Logan and D. Coblenz, "Pressure dependence of the output characteristics of 1.3 $\mu$ m InGaAsP buried heterostructure lasers", Procc. Conference of Lasers and Electro-Optics CLEO'93, pp. 24, Baltimore, Maryland, 4-7 May 1993.
216. 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 and InGaP-InAlP multiple quantum wells", Quantum Electronics and Laser Science Conference QELS'92, Anaheim, California, May (1992).
217. 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).
218. **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.121, North Holland, N.Y., 1984.
  219. 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, 331, ed. Cohen, Russ, Leyden, Barrett and Predecki, Plenum Publ. Corp. 1984.
  220. 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, 1982.
  221. **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.
  222. 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, 1981.
  223. 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.
  224. **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.

#### SCIENCE NEWS ARTICLES

1. 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).
2. 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).
3. 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).
4. 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).
5. 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).
6. G. Vaschenko, F. Brizuela, C. Brewer, M. Grisham, **C.S. Menoni**, M.C. Marconi, J.J. Rocca, W. Chao, J.A. Liddle, E.H. Anderson, D.T. Attwood, A.V. Vinogradov, I.A. Artiukov, Y.P. Persyn, V.V.

Kondratenko, “Nano-Imaging with Compact Extreme Ultraviolet Lasers”, “Optics in 2005”, **16**, No 12, p. 25, (2005).

#### PRESS RELEASE ARTICLES ON OUR WORK

- “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](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 SEMINAR TALKS

1. **C.S. Menoni**, “Imaging at the nanoscale using bright extreme ultraviolet laser light,” Microbiology, Immunology and Pathology Seminar Series, Colorado State University, February 23, 2011.
2. **C.S. Menoni**, “ Exploring the world at the nanoscale with bright beams of extreme ultraviolet light”, New Paltz, City University fo New York, February 17, 2011.
3. **C.S. Menoni**, “imaging at the nanoscale with extreme ultraviolet laser light’, Inverse Problem Seminar, Department of Mathematics, Colorado State University, February 10, 2011.
4. **C.S. Menoni** and D. Crick, “Nanoscale imaging of biological systems with extreme ultraviolet laser beams”, School of Biomedical Engineering Seminar Series, Colorado State University, January 31, 2011.
5. **C.S. Menoni**, “Nanoscale microscopy and spectroscopy with extreme ultraviolet laser light”, Colorado State University, Cancer Supercluster Seminar Series, College of Vet. Met, January 24, 2011.

6. **C. S. Menoni**, M. C. Marconi and J. J. Rocca, "Nanoscale imaging and patterning using bright beams of extreme ultraviolet light from table-top lasers," SEMATECH Workshop, Albany, NY, Feb. 10, 2010.
7. "Fundamentals of oxide ion beam sputtering for high power laser interference coatings," **C.S. Menoni**, Chemistry Department, Colorado State University, June 15, 2009.
8. "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.
9. "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.
10. "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.
11. "Nanoscale imaging at extreme ultraviolet wavelengths," **C.S. Menoni**, Vice-President for Research Imaging Symposium, CSU, January 31, 2008.
12. "*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.
13. "*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.
14. "*Luz coherente en el ultravioleta lejano: una nueva herramienta para explorar aplicaciones en nanociencia y nanotecnología*", C.S. Menoni, Department of Physics Colloquium Series, Universidad de Buenos Aires, Argentina, April 12, 2007.
15. "*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.
16. "*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.
17. "*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.
18. Invited Speaker "Panel on Women in Optics", SPIE 2004 Annual Meeting, Denver, CO, Aug. 6, 2004.
19. "*The physical properties of laser diodes for communications*," The School of Engineering and TECNUN, University of Navarra, San Sebastian, Spain, June 23, 2004.
20. "Optical probing of semiconductor heterostructures and their devices", Department of Electrical & Computer Engineering, Arizona State University, February 2004.
21. "*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.
22. "*Long wavelength laser diodes: optical and electrical behavior*", **C.S. Menoni**, Cielo Communications, Inc., Broomfield, CO, February 2001.



23. "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.
24. "Optical properties of InP Quantum Dots", **C.S. Menoni**, Colloquium series Physics Dept, Sept 18, 2000.
25. "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.
26. "Nanostructure fabrication using block copolymer masks ", **C.S. Menoni**, Annual Meeting of the Colorado Advanced Materials Institute, Denver, CO, May 6, 1999.
27. "Optical Characterization of Semiconductor Materials and Devices," **C.S. Menoni**, Dept. of Electrical and Computer Engineering, University of Colorado, Boulder, March 12, 1999.
28. "Intrinsic Loss Mechanisms in 1.3 $\mu$ m lasers," **C.S. Menoni**, NIST Seminar, Boulder, CO, Feb. 24, 1999.
29. "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.
30. "Optical Probing of Band Structure Changes in III-V materials and devices", **C.S. Menoni**, April 25, 1997, Texas Tech University, Lubbock, TX.
31. "Effect of strain on the Electronic Band Structure of a Colorado Material: In<sub>x</sub>Ga<sub>1-x</sub>P/InAlP heterostructures for visible semiconductor lasers", **C.S. Menoni**, 1996 Colloquium Series of the Department of Physics, Colorado State University, October 7, 1996.
32. "Band structure and band alignment of strained In<sub>x</sub>Ga<sub>1-x</sub>P/InAlP Multiple Quantum Wells", **C.S. Menoni**, Annual Meeting of the American Vacuum Society, Rocky Mountain Chapter, Arvada, CO, August 22, 1996.
33. "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.
34. "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
35. "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.
36. "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.
37. "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

- Symposium Organizer, "Extreme Ultraviolet and Soft X-Ray small scale sources, science and applications", OSA Frontiers in Optics, October 2011.
- Presider OSA Frontiers in Optics, sessions FMC1 and FMJ1, "Extreme Ultraviolet and Soft X-Ray small scale sources, science and applications", October 2011.

- SPIE Laser Damage, symposium organizer, “UV coatings”, September 2011
- IEEE Spectrum Editorial Advisory Board Representative and liaison to PSPB, 2011
- Member of IEEE PSPB Strategic Planning Committee, 2011
- Panelist, Career 2010, National Science Foundation
- Editor-in-Chief, IEEE Photonics Journal, 2009-
- Topical Editor, Optics Letters, 2008-2010.
- Organizing Committee Member, Laser Damage Symposium, 2010, 2011
- 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, 2006-2008.
- 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 Synthesis Group, NSF ERC Annual Meeting, Nov. 2007.
- 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 29-31<sup>st</sup>, 2002.

- Local Organizer Committee member, 8<sup>th</sup> 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 55<sup>th</sup> 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 -
- 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

#### ESTABLISHED INDUSTRIAL COLLABORATIONS:

- *BOEING CORPORATION*, Albuquerque, NM: optical coatings for free electron lasers with high resistance to laser damage.
- *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*, Holmdel, NJ – collaborated in the investigation of the optical properties of AlGaIn/GaN materials, 2002-2003, Collaborator: H.M. Hock.
- *CIELO Communications*, Broomfield, CO – Collaborated in the investigation of 1.3  $\mu\text{m}$  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 InGaIn/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<sub>2</sub> 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 Proyecto 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  $\mu\text{m}$  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  $\mu\text{m}$  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 Laboratory:** We are working on developing optical coatings to solve specific problems at the National Ignition Facility.
- 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.
- David Attwood, and Erik Anderson – 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

- “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”

### 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

<b>Name</b>	<b>Degree</b>		
		Yogesh Godwal	- MSB 2003
Manoj Prasad	- M.S. 1993	Cyrus Damavandi	- MS 2003
Katherine Interholzinger	- M.S. 1995	Ann Fitzgerald Dummer	- MS 2005
Paula Connors	- M.S. 1995	Ovidio Anton	- Ph.D 2007
Paul E. Armstrong	- M.S. 1996	Fernando Brizuela	- MS 2006
Georgiy Vashenko	- M.S. 1998	Lifang Xu	- Ph.D 2007
Linshi Miao	- M.S. 1999	Courtney Brewer	- M.S. 2008
Jon Pikal	- PhD 1999	Erik Krous	- M.S. 2010
Chris Mc Mahon	- MSB 2002	Fernando Brizuela	- Ph.D 2010
Ovidio Anton	- M.S. 2002		
Georgiy Vaschenko	- Ph.D. 2002		

#### In Progress

<b>Name</b>	<b>Degree</b>
Peter Langston	- Ph.D 2012
Sergio Carbajo	- M.S. 2011
Jonathan Tollerud	- M.S. 2011
Ilya Kuznetzov	- PhD 2013
Isela Howlet	- M.S. 2012

#### Visiting Graduate Students

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*

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

*Visiting undergraduate students from the European Union participating in a 3-month research internship*  
 Caroline Hainguerlot, University of Lille, Dept. Electrical Engineering, May –July 2011.

### UNDERGRADUATE STUDENTS

#### Senior Project Advisees

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

#### NSF Research Experience for Undergraduate Scholars

John Andersen	- B.S. EE 1994 (Bucknell University)
<i>Emily Warlick</i>	- M.S. EE 1995 (M.I.T.)
<i>Kayleen Hubert</i>	- 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)
<i>Shannon Baker</i>	- B.S. EE 1999 (Colorado State University)
Robert Pickcock	- 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)
<i>Katheryn Leenerts</i>	- B.S. EE 2002 (Colorado State University)
Jason Forsyth	- B.S. EE 2003 (Colorado State University)
<i>Autumn Mills</i>	- B.S. EE 2002 (Colorado State University)
<i>Megan Sauter</i>	- B.S. Eng. S. 2002 (Colorado State University)
<i>Naomi Villa</i>	- B.S. ECE 2004 (Colorado State University)
<i>Paul Rimmer</i>	- B.S. Physics 2005 (University of Colorado, Denver)
<i>Charissa Duskis</i>	- B.S. ECE 2004 (Colorado State University)
<i>Courtney Brewer</i>	- B.S. ECE 2005 (Colorado State University)
<i>Gerald Castillo</i>	- B.S. ECE 2005 (Colorado State University)
Kevin Lee	- B.S. ECE 2005 (University of California at San Diego)
<i>Haydee Guzman</i>	- B.S. Physics and Math 2005 (University of Puerto Rico, Rio Piedras)
Erik Krous	- B.S. ECE 2007(Colorado State University)
<i>Jessica Lovewell</i>	- B.S. Physics 2006 (Colorado State University)
<i>William Walker</i>	- B.S. Physics, 2010 (Morehouse College)
Chris Krumm	- B.S. ECE, 2008 (Colorado State University)
<i>Kendra Krueger</i>	- B.S. ECE 2009 (Rensselaer Institute of Technology)
<i>Margaret Garvan</i>	- B.S. ECE 2010 (University of Florida)
<i>Diana Peterson</i>	- B.S. ECE 2011 (Colorado State University)
<i>Leah Belval</i>	- B.S. ECE 2011 (Colorado State University)
<i>Sabrina Thompson</i>	- B.S. ECE 2011 (Olin College)
<i>Isela Howlett</i>	- 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
<i>Catalina Tome</i>	- 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, 2014
<i>Katherine Mantell</i>	- B.S. Electrical & Computer Engineering, CSU, 2013

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)
<i>Christopher Padilla</i>	- B.S. EE 1995 (Colorado State University)
<i>Cassandra R. Young</i>	- 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)

Fachhochschule Regensburg - Colorado State University Practical Training Advisees

Bernard Hopferberger	- March - July 1992
<i>Sabrina Betz</i>	- March - July 1996
<i>Daniela Wolf</i>	- March - July 1998
Sebastian Zurek	- March - July 1999

K-12 Students

*Katherine Bonnette* – 12<sup>th</sup> grade - Fort Collins High School, Fort Collins, CO – Summer internship 2001.

*Krista Miller* - 10<sup>th</sup> grade - Poudre High School, Fort Collins, CO - Summer internship 2000.

*Krista Miller* - 11<sup>th</sup> grade - Poudre High School, Fort Collins, CO - Summer internship 2001.

*Catalina Tome* – 11<sup>th</sup> grade- Santa Fe, New Mexico, Summer Research Internship, 2006.

*Melissa Maciejewski* – 11<sup>th</sup> grade – Rocky Mountain High, Fort Collins, CO, Summer Research Internship 2006.

*Catalina Tome* – 11<sup>th</sup> 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.
- Engineering Recruitment Day, Presentation, February 2010, February 2011.
- 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 early since 2004 to present.
- Provided counseling to the Robotics Team at Poudre High School led by Steve Sayers, February 1999.

- Developed an Optics Demonstration for 8<sup>th</sup> graders at Boltz Jr. High, Spring 1998.
- Developed a 6-week hands-on workshop, entitled “Amazing Experiments in Optics,” which was offered to 11<sup>th</sup> 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 4<sup>th</sup> graders entitled “Let’s make crystals”, Kruse Elementary, 1994, 1996.

**Current Research Funding**

<b>Title</b>	<b>Role</b>	<b>Sponsor</b>	<b>Start/End Date</b>
Planarization studies in optical coatings	PI	LLNL	6/2011-12/2011
Extreme Ultraviolet Laser Ablation Ionization imaging mass spectrometry	PI	NIH	8/2009-7/2011
Multidisciplinary Research Initiative: Fundamental Understanding of Optical Coatings and Novel Strategies for Power Scaling of High Power Free Electron Lasers.	PI	DoD/ONR	10/2007-9/2012
Advanced Thin Films for Optical Components in High Power Free Electron Lasers -	PI	DoD/ONR	5/2006-2011
Center for Extreme Ultraviolet Science and Technology	Co-PI	NSF	6/2003 - 2013
Robust optical coatings for high power cw lasers	Co-PI	DoD/ARO	10/2010-9/2013