

1. NAME AND ADDRESS

Michael A. Carpenter
College of Engineering
Colleges of Nanoscale Science and Engineering
SUNY Polytechnic Institute
257 Fuller Road
Albany, NY 12203

2. EARNED DEGREES

University of Rochester, Rochester, NY
Ph.D in Physical Chemistry, **1996**
M.S. in Physical Chemistry, **1993**

Ph.D. Thesis Title: “Crossed Beam Studies on the Dynamics of Proton and Hydrogen/Deuterium Atom Transfer Reactions”

Ph.D. and M.S. Advisor: Dr. James M. Farrar

State University of New York at Geneseo
B. S. in Chemistry, **1991**

3. PROFESSIONAL APPOINTMENTS

2019 – present Interim Dean, SUNY Polytechnic Institute, College of Engineering

2017 – 2019 Interim Dean, SUNY Polytechnic Institute, College of Nanoscale Engineering and Technology Innovation

2014 – Present Associate Professor (tenured), SUNY Polytechnic Institute, Colleges of Nanoscale Science and Engineering

2009 – 2014 Associate Professor (tenured), College of Nanoscale Science and Engineering – SUNY, Albany, NY

2002 – 2009 Assistant Professor, College of Nanoscale Science and Engineering, University at Albany – SUNY, Albany, NY

2000 - 2002 Staff Scientist, Albany Nanotech, University at Albany – SUNY, Albany, NY

1998 - 2000 Postdoctoral Associate, Pacific Northwest National Laboratory, Richland, WA, **Advisor:** Dr. James P. Cowin

1996 - 1998 Postdoctoral Associate, Chemistry Department, Cornell University, Ithaca, NY, **Advisor:** Dr. Paul L. Houston

4. HONORS AND AWARDS

- Invited lecturer for Nanotechnology/Nanosciences, University of Tsukuba, Japan, Summer 2013
- SUNY Research Foundation Promising Inventor Award - 2004
- Arnold Weissberger Fellowship, 1994-1995
- Sherman Clark Fellowship, 1993-1996

5. SCHOLARLY ACTIVITIES

5.1. Books and Book Chapters

Work at SUNY Polytechnic Institute, Colleges of Nanoscale Science and Engineering and Work at the University at Albany

1. N. Karker, G. Dharmalingam, M. A. Carpenter, “Survey of Optical Gas Sensors for Harsh Environments”, in *Advances in Sensors: Reviews Volume 6, Chemical Sensors and Biosensors*, Ed. S. Y. Yurish, International Frequency Sensor Association Publishing, (2018).
2. Z. Zhao, M. A. Carpenter, M. A. Petrukhina,^[SEP]”Semiconductor Quantum Dots for Photoluminescence-based Sensing”, *Semiconductor Gas Sensors*,^[SEP]Eds. R. Jaaniso and O. K. Tan, Woodhead Publishing, UK, (2013)
3. N. A. Joy, M. A. Carpenter, “Optical Sensing Methods for Metal Oxide Nanocomposites”, *Metal Oxide Nanomaterials for Chemical Sensors*, Eds. M. A. Carpenter, S. Mathur, A. Kolmakov, Springer, NY, NY (2013)
4. *Metal Oxide Nanomaterials for Chemical Sensors*, Eds. M.A. Carpenter, S. Mathur, A. Kolmakov, Springer (2013)

5.2. Refereed Articles

Work at SUNY Polytechnic Institute, Colleges of Nanoscale Science and Engineering and the University at Albany-SUNY

1. R. A. Potyrailo, J. Brewer, B. Cheng, M. A. Carpenter, N. Houlihan, A. Kolmakov, “Bio-Inspired Gas Sensing: Boosting Performance with Sensor Optimization Guided by “Machine Learning”, *Faraday Discussions*, <https://doi.org/10.1039/D0FD00035C> (2020)

2. N. M. Houlihan, M. A. Carpenter, “*Morpho*-Butterfly Inspired Lamella-based Optical Sensors for Measuring Percent Level Concentrations of H₂ and CO with Au and CeO₂, MRS Advances, DOI: <https://doi.org/10.1557/adv.2020.318> (2020)
3. V. A. V. Rossi, M. A. Carpenter, “Non-invasive optical pressure sensing using a scalable reflective polydimethylsiloxane membrane”, *Sensors and Transducers*, **239**, 34-40 (2019).
4. R. A. Potyrailo, J. Brewer, B. Scherer, V. Srivastava, M. Nayeri, C. Henderson, C. Collazo-Davila, M. A. Carpenter, N. Houlihan, V. Vulcano Rossi, A. Shapiro, “Multi-Gas Sensors for Enhanced Reliability of SOFC Operation”, *ECS Transactions*, **91**, 319-28 (2019).
5. V. A. V. Rossi, M. A. Carpenter, “Reusable polystyrene wafer coating as an antiadhesive layer for PDMS film production”, *Materials Letters*, <https://doi.org/10.1016/j.matlet.2019.127045> (2019).
6. L. Banu, R. A. Potyrailo, M. A. Carpenter, “Kinetics analysis of multichannel hydrogen reactions on plasmonic based Au-GdC thin film nanocomposites”, *J. Phys. Chem. C*, **123**, 17925-32 (2019).
7. N. Houlihan, N. Karker, R. A. Potyrailo, M. A. Carpenter, “High sensitivity plasmonic sensing of hydrogen over a broad dynamic range using catalytic Au-CeO₂ thin film nanocomposites”, *ACS Sensors*, **3**, 2684-92 (2018).
8. R. A. Potyrailo, N. Karker, M. A. Carpenter, A. Minnick, “Multivariable bio-inspired photonic sensors for non-condensable gases: initial results, *Journal of Optics, Special Issue on Biomimetic Photonics*, **20**, 024006 (2018).
9. G. Dharmalingam, M. A. Carpenter, “Chemical Sensing Dependence on Metal Oxide Chemistry and Thickness for High Temperature Plasmonics Based Sensors”, *Sensors Actuators B.*, **251**, 1104 - 11 (2017).
10. N. Karker, M. A. Carpenter, “High Figure of Merit Hydrogen Sensor Using Multipolar Plasmon Resonance Modes”, *Sensors Actuators B*, **252**, 385-90 (2017).
11. J. Elwood, Z. Zhao, L. M. Saupe, T. D. Strayer, R. N. Odell, M. A. Carpenter, “Gold Nanoparticles Embedded in Soda-lime Glass Substrate for Temperature Sensing”, *Sensing and Biosensing Research*, **11**, 37- 44 (2016).
12. Z. Zhao, V. A. Vulcano Rossi, J. P. Baltrus, P. R. Ohodnicki, M. A. Carpenter “Ag Nanoparticles supported on Yttria-stabilized Zirconia: A Synergistic System within Redox Environments”, *J. Phys. Chem. C*, **120**, 5020-32 (2016).

13. Z. Zhao, J. Elwood, M. A. Carpenter, "Phonon Anharmonicity of PdO Studied by Raman Spectrometry", *J. Phys. Chem. C*, **119**, 23094 (2015).
14. N. Karker, G. Dharmalingam, M. A. Carpenter, "Thermal Energy Near-infrared radiation and accessing low temperatures with plasmonic sensors", *Nanoscale*, **7**, 17798 (2015).
15. N. Karker, G. Dharmalingam, M. A. Carpenter, "Thermal Energy Harvesting Plasmonic Based Chemical Sensors", *ACS Nano*, **8**, 10953-62 (2014).
16. J. P. Baltrus, P. R. Ohodnicki, N. A. Joy, M. A. Carpenter, "Examination of Charge Transfer in Au/YSZ for High-Temperature Optical Gas Sensing", *Applied Surface Science*, **313**, 19-25 (2014).
17. N. A. Joy, B. K. Janiszewski, S. Novak, T. W. Johnson. S-H Oh, A. Raghunathan, J. Hartley, M. A. Carpenter,^[1]^[2]^[3] "Thermal Stability of Gold Nanorods for High Temperature Plasmonic Sensing",^[1]^[2]^[3] *Journal of Physical Chemistry C*, **117**, 11718-24 (2013)
18. Z. Zhao, M. A. Carpenter, "Support Free Bimodal Distribution of Plasmonically Active Ag/AgOx Nanoparticle Catalysts: Attributes and Plasmon Enhanced Surface Chemistry",^[1]^[2] *Journal of Physical Chemistry C*, **117**, 11124-32 (2013)
19. G. Dharmalingam, N. A. Joy, B. Grisafe, M. A. Carpenter, "Plasmonic Based Detection of H₂ and CO: Discrimination Between Reducing Gases Facilitated by Material Control", *Beilstein Journal of Nanotechnology*, **3**, 712-21 (2012).
20. N. A. Joy, P. H. Rogers, M. I. Nandasiri, S. Thevuthasan, M. A. Carpenter "Plasmonic Based Sensing Using an Array of Au-Metal Oxide Thin Films", *Analytical Chemistry*, **84**, 10437-44 (2012).
21. N. A. Joy, M. I. Nandasiri, P. H. Rogers, W. Jiang, T. Varga, S. V. N. T. Kuchibhatla, S. Thevuthasan, M. A. Carpenter, "Selective Plasmonic Gas Sensing: H₂, NO₂ and CO Spectral Discrimination by a Single Au-CeO₂ Nanocomposite Film", *Analytical Chemistry*, **84**, 5025-34 (2012).
22. A. Rubio-Rios, B. A. Aguilar-Castillo, S. Flores-Gallardo, C. A. Hernandez-Escobar, A. E. Zaragoza-Contreras, Z. Zhao, M. A. Carpenter, "Effects of Synthesis Variables on the Fluorescence Properties of CdSe Polystyrene Latexes", *Journal of Polymer Research*, **19**, 1-7, (2012)
23. J. H. Lee, M. A. Carpenter, R. E. Geer, "Novel growth mode of solid-liquid-solid (SLS) silica nanowires", *Journal of Materials Research*, **26**, 2232-2239 (2011).
24. N. A. Joy, C. M. Settens, R. J. Matyi, M. A. Carpenter, "Plasmonic Based Kinetic Analysis of Hydrogen Reactions within Au-YSZ Nanocomposites", *Journal of Physical Chemistry C* **115**, 6283-6289, (2011).

25. Z. Zhao, T. M. Dansereau, M. A. Petrukhina, M. A. Carpenter, "Nanopore Array Dispersed Semiconductor Quantum Dots as Nanosensors for Gas Detection", *Applied Physics Letters*, **97**, 113105 -113105-3 (2010).
26. P. H. Rogers, M. A. Carpenter, "Particle Size Sensitivity Dependence of Nanocomposites for Plasmonic-Based All-Optical Sensing Applications", *Journal of Physical Chemistry C*, **114**, 11033-39 (2010).
27. O. Vassiltsova, D. A. Jayez, Z. Zhao, M. A. Carpenter, M. A. Petrukhina, "Synthesis of Nanocomposite Materials with Controlled Structures and Optical Emissions: Application of Various Methacrylate Polymers for CdSe Quantum Dots Encapsulation", *Journal of Nanoscience and Nanotechnology*, **10**, 1635-1642 (2010).
28. H. Amiri, Z. Zhao, T. M. Dansereau, M. A. Petrukhina, M. A. Carpenter, "Dependence of Hydrocarbon Sensitivity on the Distance of Linked Phenyl Group to CdSe Quantum Dot Surfaces", *Journal of Physical Chemistry C*, **114**, 4272-78 (2010).
29. P. H. Rogers and M. A. Carpenter, "Defect State Dampening of Surface Plasmons in Au-YSZ Nanocomposites", *Proceedings of the SPIE*, 7395, 739519/1 – 739519/9 (2009).
30. P. H. Rogers and M. A. Carpenter, "Characterization of Surface Plasmon Peak Shifts and Dampening in Au-YSZ Nanocomposites", *Proceedings of the SPIE*, 7393, 739309/1 – 739309/10 (2009).
31. Z. Zhao, M. Arrandale, O. V. Vassiltsova, M. A. Petrukhina, M. A. Carpenter, "Sensing mechanism investigation on semiconductor quantum dot/polymer thin film based hydrocarbon sensor", *Sensors and Actuators, B: Chemical*, **B141** 26-33 (2009).
32. O. V. Vassiltsova, S. K. Panda, Z. Zhao, M. A. Carpenter, M. A. Petrukhina, "Ordered Fabrication of Luminescent Multilayered Thin Films of CdSe Quantum Dots", *Dalton Transactions*, **43**, 9426-32 (2009).
33. K. Yokoyama, H. Cho, S. P. Cullen, M. Kowalik, N. M. Briglio, H. J. Hoops, Z. Zhao and M. A. Carpenter, "Microscopic Investigation of Reversible Nanoscale Surface Size Dependent Protein Conjugation", *International Journal of Molecular Sciences*, **10**, 2348-66 (2009).
34. P. H. Rogers, G. Sirinakis, M. A. Carpenter, "Plasmonic Based Detection of NO₂ in a Harsh Environment", *Journal of Physical Chemistry C*, **112**, 8784-90 (2008).
35. P. H. Rogers, G. Sirinakis, M. A. Carpenter, "Direct Observations of Electrochemical Reactions within Au-YSZ Thin Films via Absorption Shifts in the Au Nanoparticle Surface Plasmon Resonance", *Journal of Physical Chemistry C*, **112**, 6749-57 (2008).

36. Z. Zhao, O. V. Vassiltsova, M. Arrandale, M. A. Petrukhina, M. A. Carpenter, "Nanomaterials Enabled Chemical Sensors: The Detection of Hydrocarbons with a High Degree of Sensitivity and Selectivity", Proceedings of the I MECH E Part N Journal of Nanoengineering and Nanosystems, **221**, 73-79 (2008).
37. Z. Zhao, M. Knight, S. Kumar, E. T. Eisenbraun, M. A. Carpenter, "Humidity Effects on Pd/Au-based All-Optical Hydrogen Sensors", Sensors and Actuators B, **129**, 726-33 (2008).
38. O. V. Vassiltsova, Z. Zhao, M. A. Petrukhina, M. A. Carpenter, "Surface Functionalized CdSe Quantum Dots for the Selective Detection of Hydrocarbons", Sensors and Actuators B, **123**, 522-29 (2007).
39. G. Sirinakis, R. Siddique, P. H. Rogers, I. Manning, M. A. Carpenter, "Development and Characterization of Au-YSZ Surface Plasmon Resonance Based Sensing Materials: High Temperature Detection of CO", Journal of Physical Chemistry B, **110**, 13508-11 (2006).
40. Z. Zhao, M. A. Carpenter, D. Welch, H. Xia "All-Optical Hydrogen Sensor Based on a High Alloy Content Palladium Thin Film", Sensors and Actuators B, **113**, 532-38 (2006).
41. E. T. Eisenbraun, M. A. Carpenter, R. Siddique, S. Naczas, W. Zeng, F. Luo, A. E. Kaloyeros, "Atomic Layer Deposition: Emerging Materials, Processes, and Nanoscale Technical Applications", ECS Transactions, **1**, 29-36 (2006)
42. G. Sirinakis, R. Siddique, K. A. Dunn, Harry Efstathiadis, M. A. Carpenter, and A. E. Kaloyeros, "Spectro-Ellipsometric Characterization of Au-Y₂O₃ Stabilized ZrO₂ Nanocomposite Films", Journal of Materials Research, **20**, 3320-28 (2005).
43. G. Sirinakis, R. Siddique, C. Monokroussos, M. A. Carpenter, and A. E. Kaloyeros, "Microstructure and Optical Properties of Y₂O₃-stabilized ZrO₂-Au Nanocomposite Films", Journal of Materials Research, **20**, 2516-22 (2005).
44. Z. Zhao, M. A. Carpenter, "Annealing Enhanced Hydrogen Absorption in Nanocrystalline Pd/Au Sensing Films", Journal of Applied Physics, **97**, 124301/1 – 124301/7 (2005).
45. Z. Zhao, Y. Sevryugina, M. A. Carpenter, D. Welch, H. Xia, "All-Optical Hydrogen Sensing Materials Based on Tailored Palladium Alloy Thin Films", Analytical Chemistry, **76**, 6321-26 (2004).
46. M. A. Carpenter, E. Lifshin, R. Gauvin, "SEM-EDS Quantitative Analysis of Aerosols \geq 80nm: Impacts on Atmospheric Aerosol Characterization Campaigns", Microscopy and Microanalysis 8 (Suppl. 2) (2002).

Work Elsewhere (before August 2000)

47. R. S. Disselkamp, M. A. Carpenter, J. P. Cowin, C. M. Berkowitz, E. G. Chapman, R. A. Zaveri, N. S. Laulainen, "Ozone Loss in Soot Aerosols", *Journal of Geophysical Research D*, **105(D8)**, 9767-71 (2000).
48. R. S. Disselkamp, M. A. Carpenter, J. P. Cowin, "A Chamber Investigation of Nitric Acid-Soot Aerosol Chemistry at 298K", *Journal of Atmospheric Chemistry*, **37**, 113-23 (2000).
49. S. T. Lee, E. R. O'Grady, M. A. Carpenter, J. M. Farrar, "Dynamics of the Reaction of O^- with D_2 at Low Collision Energies: Reagent Rotational Energy Effects", **Invited Paper**, *Physical Chemistry Chemical Physics*, **2**, 679-85 (2000).
50. M. A. Carpenter, J. M. Farrar, "Vibrational State-Resolved Study of the $O^- + D_2$ Reaction: High Energy Dynamics from 0.47 eV to 1.2 eV", *Journal of Physical Chemistry*, **101**, 6870-75 (1997).
51. M. A. Carpenter, J. M. Farrar, "Vibrational State-Resolved Study of the $O^- + D_2$ Reaction: Low Energy Dynamics from 0.25 eV to 0.37 eV", *Journal of Physical Chemistry*, **101**, 6475-84 (1997).
52. M. A. Carpenter, J. M. Farrar, "Dynamics of Hydrogen Atom Abstraction in the $O^- + CH_4$ Reaction: Product Energy Disposal and Angular Distributions", *Journal of Chemical Physics*, **106**, 5951-60 (1997).
53. M. A. Carpenter, M. T. Zanni, J. M. Farrar, "Product State Resolved Study of the $O^- + D_2$ Reaction: Anomalous Vibrational State Distributions at Low Collision Energies", *Journal of Physical Chemistry*, **99**, 1380-83 (1995).
54. M. A. Carpenter, M. T. Zanni, D. J. Levandier, D. F. Varley, J. M. Farrar, "Proton Transfer Dynamics on Highly Attractive Potential Energy Surfaces: Induced Repulsive Energy Release in $O^- + HF$ at High Collision Energies", *Canadian Journal of Chemistry*, **72**, 828-35 (1994).
55. D. J. Levandier, D. F. Varley, M. A. Carpenter, J. M. Farrar, "A Crossed-Beam Study of Ion-Molecule Proton Transfer Dynamics: Vibrational State-Resolved Products in the $O^- + HF$ Reaction", *Journal of Chemical Physics*, **99**, 148-52 (1993).
56. M. A. Carpenter, C. S. Willand, T. L. Penner, D. J. Williams, S. Mukamel, "Aggregation in Hemicyanine Dye Langmuir-Blodgett Films: Ultraviolet-Visible Absorption and Second Harmonic Generation Studies", *Journal of Physical Chemistry*, **96**, 2801-4 (1992).

5.3. Unrefereed Publications

Work at the SUNY Polytechnic, Colleges of Nanoscale Science and Engineering and the University at Albany-SUNY

1. V. A. Vulcano Rossi, M. R. Mullen, N. A. Karker, Z. Zhou, M. W. Kowarz, P. K. Dutta, M. A. Carpenter, "Microfabricated electrochemical sensors for combustion applications", Proc. SPIE 9491, Sensors for Extreme Harsh Environments II, 94910J (May 13, 2015); doi:10.1117/12.2177335
2. G. Dharmalingam, M. A. Carpenter, "Investigation of the optical and sensing characteristics of nanoparticle arrays for high temperature applications", Proc. SPIE 9491, Sensors for Extreme Harsh Environments II, 949108 (May 13, 2015); doi:10.1117/12.2177572.
3. N. Karker, G. Dharmalingam, M. A. Carpenter, "Thermal stability and energy harvesting characteristics of Au nanorods: Harsh environment chemical sensing", Proc. SPIE 9491, Sensors for Extreme Harsh Environments II, 94910I (May 13, 2015); doi:10.1117/12.2177211.
4. P. H. Rogers, N. Joy, M. A. Carpenter, "Plasmonic Based Harsh Environment Compatible Chemical Sensors" Proceedings of the 4th International Conference on Sensing Technology, (June 2010)
5. P. H. Rogers, N. Joy, M. A. Carpenter, "Plasmonic-based Detection of Harsh Environment Emissions Gases by Thin Film Nanocomposites", Materials Research Society Proceedings, (December 2009)
6. P. H. Rogers, N. Joy, M. A. Carpenter, "Characterization of Charge Exchange and Oxygen Ion Formation by Localized Surface Plasmon Resonance Shifts in Au Ytria-Stabilized Zirconia Nanocomposites", Materials Research Society Proceedings, (December 2009)
7. J. H. Lee, M. Carpenter, E. Eisenbraun, Y. Xue, R. Geer, "Synthesis and Characterization of Ni/Si Nanowires for Electrical Transport", Nano Science and Technology Institute: Nanotech 2008.
8. J. H. Lee, P. Rogers, M. Carpenter, E. Eisenbraun, Y. Xue, R. Geer, "Synthesis and Properties of Templated Si-based Nanowires for Electrical Transport", IEEE – Nano 2008.
9. Z. Zhao, M. Arrandale, O. Vassiltsova, M. A. Petrukhina, M. A. Carpenter, "Semiconductor Quantum Dot/Polymer Thin Film Based Hydrocarbon Sensor: Characterization of Sensing Properties", IEEE Sensors 2007
10. P. H. Rogers, G. Sirinakis, M. A. Carpenter, "Au-(Y₂O₃)_x(ZrO₂)_{1-x} Thin Films as an All-Optical Method for Measuring Emissions at High Temperatures", IEEE Sensors 2007

11. P. H. Rogers, G. Sirinakis, M. A. Carpenter, "Au-(Y₂O₃)_x(ZrO₂)_{1-x} Thin Films for High Temperature Gas Detection via Changes in Optical Absorption: Interfacial Influences on Metallic Nanoparticle Optical Properties", IEEE Sensors 2007
12. M. A. Carpenter, "Nanomaterials Enabled Chemical Sensors: The Detection of Hydrocarbons with a High Degree of Sensitivity and Selectivity", IEEE Sensors 2006, Daegu, South Korea
13. Rezina Siddique, George Sirinakis, Michael. A. Carpenter, "Low Temperature Synthesis of Silicon Oxide Nanowires", Mat. Res. Soc. Proc., V879E, Spring 2005

5.4. Professional Presentations

1. M. A. Carpenter, "Harsh environment compatible multivariable chemical sensors" Fall 2019 MRS Conference, **Invited**
2. M. A. Carpenter, "Harsh environment compatible multivariable chemical sensors" 31st Annual Electronics Packaging Symposium- Small Systems Integration, 2019, **Invited**
3. M. A. Carpenter, "Oxygen anion and hydrogen reactions: experiments without lasers", Farrar Symposium, University of Rochester, Department of Chemistry, June 2018, **Invited**
4. M. A. Carpenter, "Plasmonics: What is it and what is it good for?", SUNY Geneseo, Chemistry Department, December 2017, **Invited**
5. M. A. Carpenter, "Harsh Environment Compatible Plasmonics Based Chemical Sensors", University of North Texas, Materials Science and Engineering Department, November 2017, **Invited**
6. M. A. Carpenter, "Plasmonics Based Harsh Environment Chemical Sensors", Army Research Laboratories, Adelphi, MD, September 2017, **Invited**
7. M. A. Carpenter, "M. A. Carpenter, "Harsh Environment Compatible Plasmonics Based Chemical Sensors" Optical Society of America, New Orleans (2017), **Invited**
8. M. A. Carpenter, "Plasmonics: What is it and what is it Good For", Knolls Atomic Power Laboratory, January 2017, **Invited**
9. M. A. Carpenter, "Thermal Energy Harvesting Plasmonics Based Chemical Sensing", DOE-NETL, 2016, **Invited**
10. M. A. Carpenter, "Chemical Sensors: Use of Dipole and Multipole Plasmonics", Fall 2015 MRS Meeting, **Invited**

11. M. A. Carpenter, “Plasmonics Enabled Chemical Sensors with Thermal Energy Harvesting Attributes”, Chemical and Biomolecular Engineering Department, University of Connecticut, Fall 2015, **Invited**
12. V. A. Vulcano Rossi, M. R. Mullen, N. A. Karker, Z. Zhou, M. W. Kowarz, P. K. Dutta, M. A. Carpenter, “Microfabricated electrochemical sensors for combustion applications”, SPIE DSS, Sensors for Extreme Harsh Environments II, May 13, 2015
13. G. Dharmalingam, M. A. Carpenter, “Investigation of the optical and sensing characteristics of nanoparticle arrays for high temperature applications”, SPIE DSS, Sensors for Extreme Harsh Environments II, May 13, 2015
14. N. Karker, G. Dharmalingam, M. A. Carpenter, “Thermal stability and energy harvesting characteristics of Au nanorods: Harsh environment chemical sensing”, SPIE DSS, Sensors for Extreme Harsh Environments II, May 13, 2015
15. M. A. Carpenter, “Thermal Energy Harvesting Plasmonics Based Chemical Sensors”, Spring 2015 ACS Meeting, **Invited**
16. M. A. Carpenter, “Plasmonics Based Chemical Sensors”, Department of Chemistry, Union College, NY (February 2015) **Invited**
17. M. A. Carpenter, “Thermal Energy Harvesting Plasmonics Based Chemical Sensors”, Fall 2014 MRS Meeting, **Invited**
18. M. A. Carpenter, “Thermal Energy Harvesting Plasmonics Based Chemical Sensors”, Department of Chemical Engineering and Materials Science, Stevens Institute of Technology, NJ (November 2014) **Invited**
19. N. Joy, N. Karker, M. A. Carpenter, “Emissions Sensing at High Temperatures Using Plasmonic Arrays: Probing Sensitivity and Selectivity Using Patterned Nanostructures”, 57th ISA POWID Division Symposium, Phoenix, Az (June 2014).
20. G. Dharmalingam, M. A. Carpenter, “Morphological control of YSZ encapsulated gold nanoparticles for emissions sensing: Discrimination between reducing gases facilitated by material control”, 57th ISA POWID Division Symposium, Phoenix, Az (June 2014).
21. M. A. Carpenter, “Hyperspectral Plasmonics Based Harsh Environment Compatible Chemical Sensors”, American Chemical Society, Dallas, Tx (2014) **Invited**
22. M. A. Carpenter, “Hyperspectral Plasmonics Based Harsh Environment Compatible Chemical Sensors”, Tsukuba Nanotechnology Symposium, University of Tsukuba, Tsukuba, Japan (2013). **Invited**
23. M. A. Carpenter, “Hyperspectral Plasmonics Based Harsh Environment Compatible Chemical Sensors”, Gold 2012 Conference, Tokyo, Japan.

24. N. Joy, M. Nandasiri, T. Varga, W. Jiang, V. Shutthanandan, P. Nachimuthu, S. Thevuthasan, M. A. Carpenter “Hyperspectral Plasmonics Based Harsh Environment Compatible Chemical Sensors”, Noble Metal Nanoparticles, Gordon Conference 2012.
25. G. Dharmalingam, N. Joy, B. Grisafe, M. A. Carpenter “Plasmonics based detection of H₂ and CO: discrimination between reducing gases facilitated by material control”, Materials Research Society Fall 2012.
26. N. A. Joy, M. A. Carpenter, “Electron Beam Lithographically Patterned Au Nanorods for High Temperature Plasmonic-Based Gas Sensing”, Materials Research Society, Fall 2012
27. M. A. Carpenter, “Plasmonic Based Harsh Environment Compatible Chemical Sensors”, University of Texas at El Paso, Department of Mechanical Engineering, (2012), **Invited**
28. M. A. Carpenter, “Plasmonic Based Harsh Environment Compatible Chemical Sensors”, The Minerals, Metals and Materials (TMS) 2012 Conference, (2012), **Invited**
29. M. A. Carpenter, “Plasmonic Based Harsh Environment Compatible Chemical Sensors”, Electrical and Computer Engineering Department, University of Minnesota-Twin Cities, (2011), **Invited**
30. M. A. Carpenter, “Plasmonic Based Harsh Environment Compatible Chemical Sensors”, 7th Annual Minnesota Nanotechnology Workshop, University of Minnesota-Twin Cities, (2011), **Invited**
31. M. A. Carpenter, “Plasmonic Based Harsh Environment Compatible Chemical Sensors”, Composites at Lake Louise, Calgary, Alberta, (2011), **Invited**
32. N. A. Joy, M. Nandasiri, T. Varga, V. Shutthanandan, W. Jiang, P. Nachimuthu, S. Kuchibhatla, S. Thevuthasan, M. A. Carpenter “Harsh Environment Plasmonic Sensing Using an Array of Gold-Metal Oxide Nanocomposite Films”, Materials Research Society Fall 2011.
33. N. A. Joy, M. Nandasiri, T. Varga, V. Shutthanandan, W. Jiang, P. Nachimuthu, S. Kuchibhatla, S. Thevuthasan, M. A. Carpenter, “Growth and Characterization of Au-implanted MBE Grown CeO₂ Thin Films for Plasmonic Based Chemical Sensors”, American Vacuum Society (2011).
34. M. A. Carpenter, “Plasmonic Based Harsh Environment Compatible Chemical Sensors”, Department of Materials Science and Engineering, Stony Brook University-SUNY, (2011), **Invited**
35. M. A. Carpenter, “Plasmonic Based Harsh Environment Compatible Chemical Sensors”, Goodrich Inc., (2011), **Invited**

36. M. A. Carpenter, “Plasmonic Based Harsh Environment Compatible Chemical Sensors”, Department of Chemistry, The Ohio State University, (2011), **Invited**
37. M. A. Carpenter, “Plasmonic Based Harsh Environment Compatible Chemical Sensors”, 12th International Ceramics Congress, CIMTEC 2010, Montecatini Terme, Italy, (2010), **Invited**
38. M. A. Carpenter, “Plasmonic Based Harsh Environment Compatible Chemical Sensors”, 4th International Conference on Sensing Technology, ICST 2010, Lecce, Italy, (2010)
39. M. A. Carpenter, “Plasmonic Based Harsh Environment Compatible Chemical Sensors”, American Chemical Society, (2010), **Invited**
40. P. H. Rogers, N. Joy, M. A. Carpenter, “Plasmonic-based Detection of Harsh Environment Emissions Gases by Thin Film Nanocomposites”, Materials Research Society, (2009)
41. P. H. Rogers, N. Joy, M. A. Carpenter, “Characterization of Charge Exchange and Oxygen Ion Formation by Localized Surface Plasmon Resonance Shifts in Au Ytria-Stabilized Zirconia Nanocomposites”, Materials Research Society, (2009)
42. M. A. Carpenter, “Plasmonics Based Harsh Environment Compatible Chemical Sensors”, PACRIMS 8, American Ceramics Society Meeting, (2009), **Invited**
43. M. A. Carpenter, “Plasmonics Based Harsh Environment Compatible Electrochemical Sensors”, National Nanotechnology Initiative –Nanotechnology Enabled Sensing Workshop, May 2009, **Invited**
44. P. H. Rogers, M. A. Carpenter, “Defect State Dampening of the Au Nanoparticle SPR Band in Au-YSZ Nanocomposites in Harsh Environments”, 33rd International Conference on Advanced Ceramics and Composites, American Ceramics Society, (2009).
45. P. H. Rogers, M. A. Carpenter, “Development and Study of Au-(Y₂O₃)_x(ZrO₂)_y Nanocomposites Films for All-Optical Harsh Environment Chemical Sensing Applications”, 33rd International Conference on Advanced Ceramics and Composites, American Ceramics Society, (2009). **-Invited**
46. M. A. Carpenter, “Optically Active Nanomaterials For Use As Chemical Sensors”, Nano-Net 2008, 3rd International Conference on Nano-Networks, Boston, MA – **Invited**
47. J. H. Lee, M. Carpenter, E. Eisenbraun, Y. Xue, R. Geer, “Synthesis and Characterization of Ni/Si Nanowires for Electrical Transport”, Nano Science and Technology Institute: Nanotech 2008.

48. J. H. Lee, P. Rogers, M. Carpenter, E. Eisenbraun, Y. Xue, R. Geer, "Synthesis and Properties of Templated Si-based Nanowires for Electrical Transport", IEEE – Nano 2008.
49. M. Arrandale, Z. Zhao, O. Vassiltsova, M. A. Petrukhina, M. A. Carpenter, "Nanomaterials Enabled Chemical Sensors: Development of a Hydrocarbon Sensor", American Chemical Society National Meeting, Spring 2008.
50. P. H. Rogers, G. Sirinakis, M. A. Carpenter, "Interfacial Influences on Metallic Nanoparticle Optical Properties at High Temperatures in Au-YSZ Nanocomposites", American Chemical Society National Meeting, Spring 2008.
51. M. A. Carpenter, P. H. Rogers, G. Sirinakis, "All-Optical Observations of Electrochemical Reactions Within Au-YSZ Nanocomposite Films", American Chemical Society National Meeting, Spring 2008.
52. M. A. Carpenter, "Plasmonic Based Harsh Environment Compatible Chemical Sensors", General Electric – Global Research, Niskayuna, NY, 2008, **Invited**
53. M. A. Carpenter, "Development and Study of Au-YSZ Nanocomposites as Optically Active Materials for Harsh Environment Compatible Chemical Sensing Applications", American Ceramics Society, 2008
54. Z. Zhao, M. Arrandale, O. Vassiltsova, M. A. Petrukhina, M. A. Carpenter, "Semiconductor Quantum Dot/Polymer Thin Film Based Hydrocarbon Sensor: Characterization of Sensing Properties", IEEE Sensors 2007
55. P. H. Rogers, G. Sirinakis, M. A. Carpenter, "Au-(Y₂O₃)_x(ZrO₂)_{1-x} Thin Films as an All-Optical Method for Measuring Emissions at High Temperatures", IEEE Sensors 2007
56. P. H. Rogers, G. Sirinakis, M. A. Carpenter, "Au-(Y₂O₃)_x(ZrO₂)_{1-x} Thin Films for High Temperature Gas Detection via Changes in Optical Absorption: Interfacial Influences on Metallic Nanoparticle Optical Properties", IEEE Sensors 2007
57. M. A. Carpenter, "Surface Functionalized CdSe Quantum Dots for the Detection of Hydrocarbons", Eastern Analytical Society Meeting, 2007, **Invited**
58. M. A. Carpenter, "Advanced Sensor Technologies for Harsh Environment Applications", New Energy New York Meeting, Alfred University, 2007
59. M. A. Carpenter, "Advanced Sensor Technologies for Harsh Environment Applications", Mohawk Valley Community College, May 2007, **Invited**
60. M. A. Carpenter, "Nanotechnology Enabled Smart Sensor Systems: Real-Time Jet Engine Control", Advanced Sensors Technical Center, Goodrich Corporation, 2006, **Invited**

61. M. A. Carpenter, “Nanomaterials Enabled Chemical Sensors: The Detection of Hydrocarbons with a High Degree of Sensitivity and Selectivity”, IEEE Sensors 2006, Daegu, South Korea, **Invited**
62. O. Vassiltsova, D. Jayez, Z. Zhao, M. A. Carpenter, M. A. Petrukhina, “Surface-Functionalized CdSe Nanoparticles in Poly(lauryl)methacrylate as a Material for Hydrocarbon Sensing” American Chemical Society National Meeting, Fall 2006
63. E. T. Eisenbraun, M. A. Carpenter, R. Siddique, S. Naczas, W. Zeng, F. Luo, A. E. Kaloyeros, “Atomic Layer Deposition: Emerging Materials, Processes, and Nanoscale Technical Applications”, ECS Transactions, 1(10, Atomic Layer Deposition), 29-36 (2006).
64. I. C. Schaefer, M. E. Hagerman, M. A. Carpenter, Z. Zhao, “NSOM Studies of Chromophore Aggregation Within Laponite Nanocomposite Films”, American Chemical Society National Meeting, Spring 2006
65. G. Sirinakis, R. Siddique, P. H. Rogers, I. Manning, M. A. Carpenter, “All-Optical Detection of CO and NO₂ at High Temperatures by Au-YSZ Nanocomposites”, Materials Research Society Meeting, Spring 2006
66. M. Arrandale, Z. Zhao, O. Vassiltsova, M. A. Petrukhina, M. A. Carpenter, “Selective and Sensitive Hydrocarbon Detection Based on Tailored CdSe Quantum/Dot Polymer Systems”, Materials Research Society Meeting, Spring 2006
67. Z. Zhao, O. Vassiltsova, M. A. Petrukhina, M. A. Carpenter, “Surface-tailored CdSe Quantum Dots/Polymer Composite Films for the Selective and Sensitive Detection of Hydrocarbons”, Materials Research Society Meeting, Fall 2005
68. O. Vassiltsova, Z. Zhao, M. A. Petrukhina, M. A. Carpenter, “Tailor Designed CdSe Quantum Dot Based Chemical Sensors for Hydrocarbon Detection”, American Chemical Society National Meeting, Fall 2005
69. M. E. Hagerman, M. A. Carpenter, “Optical Nanomaterials Based on Self-Assembled Laponite Architectures”, American Chemical Society National Meeting, Spring 2005
70. R. Siddique, G. Sirinakis, M. A. Carpenter, “Low Temperature Synthesis of Silicon Oxide Nanowires”, Materials Research Society, Spring 2005.
71. G. Sirinakis, R. Siddique, Z. Zhao, M. A. Carpenter, “All-Optical Chemical Gas Sensors for Harsh Environments Based on Au-YSZ Nanocomposites”, Materials Research Society, Spring 2005
72. M. A. Carpenter, “Nanocomposite Materials for Harsh Environment Compatible Chemical Sensors”, Chemistry Department, SUNY – Geneseo, 2005, **Invited**

73. M. A. Carpenter, "Design of Chemical Sensors for Harsh Environment and Hydrocarbon Applications", Chemistry Department, Union College, 2005, **Invited**
74. M. A. Carpenter, "Nanocomposite Materials for Harsh Environment Compatible Chemical Sensors", Chemistry Department, SUNY – ESF, 2005, **Invited**
75. G. Sirinakis, L. Sun, R. Siddique, H. Efstathiadis, M. A. Carpenter, A. E. Kaloyeros, "Synthesis and Spectroellipsometric Characterization of Y_2O_3 -stabilized ZrO_2 -Au Nanocomposite Films for Smart Sensor Applications", Materials Research Society, Fall 2004
76. Z. Zhao, G. Sirinakis, M. A. Carpenter, O. Vassiltsova, Y. Sevryugina and M. A. Petrukhina, "Environmental Sensing by Surface Modified CdSe Nanocrystals", American Chemical Society National Meeting, Fall 2004
77. M. A. Carpenter, "Design of Chemical Sensors for Harsh Environments: Tailored Nanomaterials", Hudson-Mohawk ASME meeting, Spring 2004, **Invited**
78. Z. Zhao, G. Sirinakis, M. A. Carpenter, O. Vassiltsova, M. Petrukhina, "Surface Functionalization of Nanoparticles for Environmental Sensing", Hudson-Mohawk ASME meeting, Spring 2004
79. M. A. Carpenter, "Design of Chemical Sensors for Harsh Environments: Tailored Materials", Clarkson University, 2004, **Invited**
80. M. A. Carpenter, "Nanotechnology Enabled Chemical Sensors", Heslin Rothenberg Farley and Mesiti P.C., 2004, **Invited**
81. Z. Zhao; G. Sirinakis, Y. Sevryugina, M. A. Carpenter, M. A. Petrukhina, "Surface Functionalization of CdSe Quantum Dots for Environmental Sensing", American Chemical Society National Meeting, Fall 2003
82. Y. Sevryugina, Z. Zhouying, M. Carpenter, "Nanoscale $Pd_{0.9}Ag_{0.1}$ Alloy Films and Their Hydrogen Interaction Characteristics: Annealing Dependence" American Chemical Society National Meeting, Fall 2003
83. Y. Sevryugina, Z. Zhao, M. A. Carpenter, "Nanoscale Palladium-Silver Alloy Films and Their Hydrogen Interaction Characteristics: Annealing Dependence", Northeast Regional Meeting of the American Chemical Society, 2003
84. G. Sirinakis, Z. Zhao, Y. Sevryugina, M. Petrukhina, M. A. Carpenter, A. Tayi, "Tailored Nanomaterials: Highly Selective & Sensitive Chemical Sensors for Hydrocarbon Analysis", Northeast Regional Meeting of the American Chemical Society, 2003

85. Z. Zhao, G. Sirinakis, A. Tayi and M. A. Carpenter,” Photoactivated Luminescence of Cadmium Selenide Quantum Dots”, Northeast Regional Meeting of the American Chemical Society, 2003
86. M. A. Carpenter, “Chemical Sensors: Detection of Target Gases and Aerosols”, University at Albany School of Public Health, 2002, **Invited**
87. M. A. Carpenter, “Heterogeneous Chemistry of Lab Generated Aerosols and Characterization of Atmospheric Aerosols”, Physics Department, Union College, 2001, **Invited**
88. M. A. Carpenter, “Heterogeneous Chemistry of Lab Generated Aerosols and Characterization of Atmospheric Aerosols”, Physics Department, University at Albany, 2000, **Invited**

5.5. Patents

1. M. A. Carpenter, “Plasmonic Ion Focussing Device”, Technology Disclosure Filed (2014)
2. M. A. Carpenter, “Thermal Energy Harvesting Based Chemical Sensors”, Provisional patent filed (June 2015)
3. Z. Zhao, M. A. Carpenter, “Development of Plasmonically Active Nanocomposites with Bimodal Nanoparticle Distributions”, Patent filed (April 2015)
4. Carpenter, Michael A.; Sirinakis, George, “Optical Methods and Systems for Detecting a Constituent in a Gas Containing Oxygen in Harsh Environments”, PCT/US2007/64665, (2007).
5. Carpenter, Michael A. Zhao, Zhouying, “Methods for Forming Palladium Alloy Thin Films and Optical Hydrogen Sensors Employing Palladium Alloy Thin Film”, US2005/0169807, (2005)

6. TEACHING

6.1. Academic Offerings

SUNY Polytechnic Institute, University at Albany – SUNY

1. NNSE 603 “Nanomaterials Processing”, Fall 2015 (*first time course was offered*)
2. NENG/NSCI 115 “Chemical Principles of Nanoscale Science and Engineering Laboratory I”, Fall 2014, 2015, 2016

3. NENG/NSCI 110 “Chemical Principles of Nanoscale Science and Engineering” Fall 2010 (*first time course was offered*), Fall 2011, Fall 2012, Fall 2013
4. NENG/NSCI 112 “Chemical Principles of Nanoscale Science and Engineering” Spring 2010 (*first time course was offered*), Spring 2011
5. NSCI 320 “Advanced Physical/Chemical Concepts for Nanoscale Science”, Spring 2013 (*first time course was offered*), Spring 2014, 2015, 2016, 2017, 2019
6. CNSE 679 “Nanoparticles and Nanoparticle Interactions in Environmental Sensing” Fall 2003 (*first time course was offered*), Fall 2006
7. CNSE 641 “Principles of Chemical and Biological Sensors” – taught in conjunction with Professor Nathaniel Cady, Fall 2007 (*first time course was offered*)
8. NNSE 506 “Foundations of Nanotechnology: Practical Quantum Mechanics” – Fall 2006 (*first time course was offered*), Fall 2007, 2008, 2009, Fall 2016, 2017, 2018
9. NNSE 504 “Chemical Principles of Nanotechnology”, Fall 2016
10. CNSE 509 “Foundations of Nanotechnology: Surfaces and Interfaces” – Spring 2007 (*first time course was offered*), Spring 2008, Spring 2009
11. CHM 544 “Theory and Techniques of Biophysics and Biophysical Chemistry” –taught in conjunction with Professors Igor Lednev and Alexander Shekhtman Spring 2005

6.1.2 University of Tsukuba – Tsukuba, Japan

In the Summer of 2013 Professor Carpenter was invited to be one of 4 Invited professors to teach a 10 lecture short course on Nanotechnology/Nanosciences at the University of Tsukuba, Tsukuba, Japan. A modified version of the NSCI 320 course was used to teach a short course on Spectroscopic Nanomaterials Characterization.

6.1.3 Academic Outreach - Instruction

1. 2002-2008 Professor Carpenter assisted in the development of the NanoHigh educational program with tasks that have included:
 - Assisted in developing the NanoHigh curriculum being taught at Albany High School and have developed laboratories for this curriculum which are held at CNSE
 - 2008 Excelsior Scholars Program – Nanoscale Science Summer Institute for 25 8th grade students from the Capital Region
 - Hosting Albany High School students as research interns in my laboratory
 - Developed laboratory modules for a 2 week Nanoengineering educational module in April 2007 (20 students) and April 2008 (16 students) from the Albany High School Abrookin Technical Center

2. University at Albany - Albany High School “Teach Out” – 2005, provided a guest lecture at Albany High School for a General Physics class
3. Guest Lecturer for ISP301: The Information Environment – presented a guest lecture on “Nanotechnology Basics: Applications for Chemical Sensor Networks” - 11/2002

6. Student Advisement

Research Group Advisees – Graduate Students

1. George Sirinakis, Ph.D. in Nanoscale Science and Engineering, Completed 2007
Thesis Topic: “Microstructure, Optical Properties, and Sensing Performance of Gold-Yttria-Stabilized-Zirconia Nanocomposites for Aggressive-Environment Applications”
2. Rezina Siddique, M.S. in Nanoscale Science and Engineering, Completed 2006
Thesis Topic: “Low Temperature Synthesis, Characterization and Sensing Potential of Silicon Nanowires”
3. Phillip Rogers, Ph.D. in Nanoscience, Completed 2009
Thesis Topic: Plasmonic Based Chemical Sensors for Harsh Environments
4. Luis Talamantes, visiting Ph.D. student, CIMAV, MX Summer 2007
Research Topic: Time Dependent Fluorescence Studies of polymer-quantum dot nanocomposite Films
5. Mayrita Arrandale, M.S. in Nanoengineering, Completed 2008
Thesis Topic: “Development of a Portable, Cost Effective Sensitive Hydrocarbon Sensor Based on Functionalized Quantum Dots”
6. Hasti Amiri, M.S. in Nanoscience, 2009
Research Topic: Sensing Mechanism Studies of Quantum Dot Based Hydrocarbon Sensors
7. Nicholas Joy, Ph.D. in Nanoengineering, Completed 2013
Thesis Topic: Plasmonic Based Chemical Sensors for Harsh Environments
8. Dharmalingam, Gnanaprakash, Ph.D. in Nanoengineering, Completed 2016
Research Topic: Investigation of the Optical and Sensing Characteristics of Nanoparticle Arrays for High Temperature Applications
9. Nicholas Karker, Ph.D. in Nanoengineering, 2018
Research Topic: Plasmonic gas sensing and Multivariate Analysis with Au Nanoparticles for High Temperature Applications
10. Laila Banu, Ph.D Nanoengineering, 2019
Research Topic: Plasmonic based chemical sensors

11. Vitor Rossi, Ph.D. in Nanoengineering, 2019

Research Topic: Investigation of thin membranes and their applications in sensor technology

12. Nora Houlihan, Ph.D in Nanoengineering, 2020

Research Topic: The development of multivariable optical sensors for measuring percent level concentrations of hydrogen and carbon monoxide in an anaerobic environment

Supervising Postdoctoral Fellows

1. Dr. Zhouying Zhao, 2002-2004, Currently Dr. Zhao became a research scientist and worked in Professor Carpenter's laboratory from 2004 – 2017.

Research Area: Development of Pd alloy all-optical hydrogen sensors, Development of quantum dot based hydrocarbon sensors, Development of plasmonic based chemical sensors, Raman studies of interfacial reactions

2. Dr. Oxana Vassiltsova, 2004-2007, In collaboration with Dr. Marina Petrukhina, UAlbany Chemistry Department

Research Area: Synthesis and characterization of surface tailored CdSe quantum dots for the detection of hydrocarbons.

3. Dr. Subhendu K. Panda, 2008-present, In collaboration with Dr. Marina Petrukhina, UAlbany Chemistry Department

Research Area: Synthesis and characterization of surface tailored CdSe quantum dots for the detection of hydrocarbons.

Intern Advisement – Since 2000 Professor Carpenter has hosted the following Undergraduate and High School Interns in his laboratory

1. Samuel Straney, Summer 2018 – 2020

2. David Leff, Summer 2017 – 2019

3. Yudong Li, Spring 2017, University at Albany

4. Justin Lynch, Summer 2016 – Fall 2016, University at Albany

5. Andres Sotos, Fall 2014, University at Albany

6. Duncan McCloskey, Fall 2014-2015, University at Albany

7. Jacqueline Elwood, Fall 2013 - 2015, University at Albany

8. Jerry Shih, Summer 2013, University at Albany

9. Eduardo Ferreira, Summer 2013, Brazil
10. Joseph Carpenter, Summer 2013, University of Arizona
11. Ben Grisafe, summer 2012, University at Albany
12. Brian Janiszewski, summer 2011- spring 2013, University at Albany
13. Pascal Garczynski, Fall 2012, University at Albany
14. Michael Briggs, summer 2011, Spring 2012, Spring 2013, University at Albany
15. Emily Scampini, summer 2011, SUNY Geneseo
16. Chia-Cheng Chang, Fall 2008 - 2009, Berkshire School, MA
17. Esteban Morales, summer 2008, Universidad de las Américas, Puebla, Cholula, MX
18. Russell King, 2007- 2009, Schuylerville High School
19. Phuong Dau, summer 2007, SUNY – Geneseo, Chemistry, Accepted into Ph.D. program at Brown University, Chemistry Department
20. Benjamin Amodeo, summer 2007, Albany High School, Accepted into Cornell University
21. Keith Ratta, 2006, Albany High School
22. Sam Schuman, 2006, Albany High School
23. Ian Manning 2005-2006 Intern, BS in Physics at the University at Albany, 2006, Ph.D. Student in Physics at Pennsylvania State University
24. Ian Schaefer, 2005-2006 Intern, BS in Chemistry, Union College, 2006, Currently a Research Associate at U.S. Genomics
25. Young Yoon 2006 Summer Intern, Boston College, Chemistry
26. Matt Fowler Research Support Specialist - Spring 2006, Northeastern University, Computer Science
27. Jeremy Goren 2005 Summer Intern, Columbia University, Applied Physics
28. Mark Schwab 2005 Summer Intern, Bethlehem High School, graduate of Yale, Chemical Engineering

29. Kenneth Rudinger Summer 2004 Intern, Albany High School, BS Physics University of Chicago, Ph.D. Physics, University of Wisconsin-Madison, Postdoctoral associate Sandia National Laboratory
30. Damira Pon Fall 2004 Intern, University at Albany, Information Sciences
31. Eric Tucker Summer 2004 Intern, Elmira College, Chemistry
32. Manuel Fletterman Spring 2004 Intern, Fontys Hogeschool, Netherlands
33. Joris Maas Fall 2003 Intern, Fontys Hogeschool, Netherlands
34. Rachael Miller Summer 2003 Intern, Albany High School
35. Max Xia Summer 2003 Intern, Niskayuna High School
36. Ashley Chapple Summer 2003 Intern, Albany High School
37. Bas Prinssen, Spring 2002 Intern, Fontys Hogeschool, Netherlands
38. Corrinne DePersis, Summer 2001, SUNY Geneseo
39. Mary Gifford, Bethlehem High School, Summer 2001, undergraduate degree SUNY-ESF
40. Bram Margry Fall 2001 Intern, Fontys Hogeschool, Netherlands
41. Jurjen Dijk Fall 2001 Intern, Fontys Hogeschool, Netherlands
42. Alok Tayi Summer 2001, 2002 Intern Niskayuna High School, 2006 B.S. Cornell University, Materials Science, Ph.D. Northwestern University, Currently a Postdoctoral Associate with George Whitesides, Harvard University

Academic Advisement – Serving as an academic advisor for Nanoscience and Nanoengineering graduate and undergraduate students. Currently an academic advisor for 10 students

1. SERVICE

a. Service to the University

1. Interim Dean, College of Engineering, SUNY Polytechnic Institute (2019-present)
 - Oversee strategic planning for the College, advance College mission, maintain accreditation, promote acquisition of external funding and investment, recruit and evaluate faculty and staff, manage state, federal and private resources, provide

- direction and support to departments to ensure goals, programs, activities and personnel practices are consistent with the Institution's
- 2.
 3. Interim Dean, College of Nanoscale Engineering and Technology Innovation, SUNY Polytechnic Institute (2017-2019)
 - Oversee strategic planning for the College, advance College mission, maintain accreditation, promote acquisition of external funding and investment, form and manage College's Industrial Advisory Board, recruit and evaluate faculty and staff, manage state, federal and private resources, provide direction and support to departments to ensure goals, programs, activities and personnel practices are consistent with the Institution's
 4. Member, Council on Promotions and Continuing Appointments – CNSE College Senate, SUNY Polytechnic Institute (2014- 2017)
 - The council examines all files containing documents pertaining to individual applications for promotion and/or continuing appointment. Upon review the council recommends to the Provost and President individuals for promotion in rank and/or continuing appointment, in accordance with the Guidelines Concerning Promotion and Continuing Appointment and the Policies of the Board of Trustees.
 5. Member, Council on Promotions and Continuing Appointments – University at Albany-SUNY (2011- 2013)
 - The council examines all files containing documents pertaining to individual applications for promotion and/or continuing appointment. Upon review the council recommends to the Provost and President individuals for promotion in rank and/or continuing appointment, in accordance with the Guidelines Concerning Promotion and Continuing Appointment and the Policies of the Board of Trustees.
 6. Senate Member, CNSE College Senate, SUNY Polytechnic Institute (2014-present)
 - The senate participates in the initiation, development, and implementation of the educational programs of CNSE, including its instructional, research, outreach and services programs, recruitment, admission and assessment of undergraduate and graduate students, development of policies and standards for appointment, promotion and continuing appointment, and implementation of research, service and outreach programs of the CNSE faculty.
 7. Associate Head of Nanoengineering Constellation, SUNY Polytechnic Institute (2017)
 - An Associate Head is responsible for assisting with administrative functions for the Constellation under the direction of the respective Constellation Head, including coordinating search committees, retention, promotion, tenure cases, teaching assignments and course schedules, accreditation and program reviews, faculty and student recruitment curriculum reviews, and advising

8. Chair, CNSE College Senate, SUNY Polytechnic Institute (2016-2017)
 - The senate participates in the initiation, development, and implementation of the educational programs of CNSE, including its instructional, research, outreach and services programs, recruitment, admission and assessment of undergraduate and graduate students, development of policies and standards for appointment, promotion and continuing appointment, and implementation of research, service and outreach programs of the CNSE faculty.
9. Vice Chair, CNSE College Senate, SUNY Polytechnic Institute (2015-2016)
 - The senate participates in the initiation, development, and implementation of the educational programs of CNSE, including its instructional, research, outreach and services programs, recruitment, admission and assessment of undergraduate and graduate students, development of policies and standards for appointment, promotion and continuing appointment, and implementation of research, service and outreach programs of the CNSE faculty.
10. Chair, Governance Council, CNSE College Senate, SUNY Polytechnic Institute (2015-2016)
 - The council seeks to improve governance and enhance consultation among administration, governance bodies, and their constituencies. The council works in conjunction with the constellations, administration, SUNY-wide University Faculty Senate, Undergraduate Student Association, and Graduate Student Association. Its functions include institutional support and education, assessment of the effectiveness on consultation and governance, and liaison and elections.
11. Council Member, SUNY-College of Nanoscale Science and Engineering, (2005-2014)
 - The council participates in the initiation, development, and implementation of the educational programs of CNSE, including its instructional, research, outreach and services programs.
12. Committee on Graduate Curriculum, SUNY-College of Nanoscale Science and Engineering, (Chairman Fall 2008 – 2012, Member, 2005-2014)
 - Assisted in the development of the Foundations of Nanotechnology module course offerings for first year graduate students
 - Develop and maintain degree programs, curriculum and course offerings
 - Develop and maintain content for graduate proficiency exams
13. Member, Undergraduate Academic Council, SUNY Polytechnic Institute, (2014 – 2017)
 - Assist in the development, maintenance and assessment of degree programs, curriculum and course offerings
14. Member, Committee on Undergraduate Curriculum, SUNY-College of Nanoscale Science and Engineering, (2011 – 2014)
 - Develop and maintain degree programs, curriculum and course offerings

15. Member, Qualifying Exam Committee, SUNY Polytechnic Institute, (2014-present)
 - Aided the development and administration of the bi-annual Nanoengineering Qualifying exam

16. Member, Qualifying Exam Committee, SUNY-College of Nanoscale Science and Engineering, (2007-2014)
 - Aided the development and administration of the bi-annual Nanoengineering Qualifying exam

17. Member, Committee on Admission, Academic Standing and Appeals, SUNY-College of Nanoscale Science and Engineering, (2014-2017))
 - Undergraduate Admissions Review Subcommittee (2014-2017)
 - Review CNSE undergraduate student applications for potential admission

18. Member, Committee on Admission, Academic Standing and Appeals, SUNY-College of Nanoscale Science and Engineering, (2005-2009))
 - Admissions Review Subcommittee (2005-2009)
 - Review CNSE graduate student applications for potential admission into the M.S. or Ph.D. programs
 - Chair, Internship Review subcommittee (2004-2008)
 - Coordination and review of CNSE internship applications for both summer and school year internship opportunities
 - Academic Standing and Appeals subcommittee (2005-2009)
 - Developed policies for academic standards for graduate study

19. Member, Faculty Search Committee, SUNY-College of Nanoscale Science and Engineering, (2005-2009, 2013-2014)
 - Reviewing candidate's CVs, evaluating strengths and weaknesses of candidate through phone and on-site interviews

20. Member, Nanoengineering Faculty Search Committee – SUNY Polytechnic Institute-Colleges of Nanoscale Engineering and Technology Innovation, (2014-2016)
 - Reviewing candidates CV's, evaluating strengths and weaknesses of candidate through phone and on-site interviews

21. Member, Nanoengineering Faculty Search Committee – SUNY-College of Nanoscale Science and Engineering, (2007-2010)
 - Reviewing candidate's CVs, evaluating strengths and weaknesses of candidate through phone and on-site interviews

22. Coordinated the University at Albany College of Nanoscale Science and Engineering **2003** (18 undergraduates and 7 high school students), **2004** (10 undergraduates and 5 high school students) and **2005** (20 Undergraduates) summer intern program

23. Member, University at Albany Presidential Steering Committee for the formation of a strategic alliance between Albany High School and the University at Albany to leverage combined strengths for the development of young talent and the prosperity of the Albany community (2005-2006)
24. Member, Council on Educational Policy – University at Albany (2003-2004)
 - Council is responsible for the overseeing of the total academic plan of the campus and for indicating educational priorities; evaluates the educational performance of the University as a whole and of its various components, reviews proposals for new programs and for the discontinuance of existing programs with respect to budgetary implications

b. Other Professional Service

1. Editorial Board Member, Sensors, (ISSN 1424-8220, <http://www.mdpi.com/journal/sensors/>, impact factor 3.3), (2019 – present)
2. Invited to serve as a member of the New York State Leadership Team for review of the Next Generation Science Standards (2011 – 2013)
3. Journal Reviewer – Nanoletters, Journal of Physical Chemistry C, Journal of Physical Chemistry B, Sensors and Actuators B, Sensors, Applied Physics Letters, Journal of Non-Crystalline Solids, Semiconductor Science and Technology, Scripta Materialia, Nanotechnology, 11th World Multi-Conference on Systemics, Cybernetics and Informatics (WMSCI 2007)
4. National Nanotechnology Initiative, Nanotechnology Enabled Sensing Workshop, May 2009 – **Invited Participant**
5. Nanoscale Research Workshop, FHWA, Turner Fairbanks Highway Research Center, Mclean, VA, March 2009 – **Invited Participant**
6. Proposal Reviewer - Alberta Ingenuity Fund, Canada, “Alberta Ingenuity Scholar in Nanofabrication” Fall 2008
7. Served on the Department of Transportation Intermodal Research Working Group – Nanotechnology (2007- 2011)
8. Project Review Panel - Department of Energy, Non-proliferation Research and Development (2008)
9. Organizer for the 3rd International Symposium on Nanostructured Materials and Nanocomposites: In Honor of Professor Koichi Niihara. At the 33rd International Conference and Exposition on Advanced Ceramics and Composites, Daytona Beach, FL (2009)

10. Organizer for the Advanced Sensor Technology symposium at the 35th International Conference and Exposition on Advanced Ceramics and Composites, Daytona Beach, FL (2011)
11. Consultant – Omega Advanced Solutions, Inc. (2008)
12. Grant Reviewer – U.S. Civilian Research and Development Foundation (CRDF) Cooperative Grants Program (2005)
13. National Science Foundation Proposal Reviewer– Small Business Innovative Research Program (2001-2003), Career Awards – (2011- 2012)

2. PROFESSIONAL AFFILIATIONS

a. Professional Societies

1. American Chemical Society, 1994 – present
2. American Ceramics Society, 2007 – 2012
3. Materials Research Society, 2004 – 2006

b. Summary of Major Research Collaborations

Name	Affiliation	Research Activities	Time Period
Radislav Potyrailo	General Electric	SOFC chemical sensors	2016-present
Pelagia-Irene Gouma	University at Stony Brook	Metal oxide catalysts	2013-2016
Sarbajit Banerjee	Texas A&M	Metal oxide catalysts	2013-2015
Kathleen Dunn	SUNY Poly	Metal oxide based gas sensors	2012 - 2019
Paul Ohodnicki	Department of Energy - NETL	Plasmonic based chemical sensors	2012 - 2018
Sang-Hyun Oh	University of Minnesota	Plasmonic based chemical sensors	2010 -2014
Marek Kowarz	MicroAdventure Technologies Inc.	Thin film based chemical sensors	2010 - 2016
Susanna Carranza	Makel Engineering	Thin film based chemical sensors	2012 -2015
Suntharampillai Thevuthasan	Pacific Northwest National Laboratory	Metal oxide based chemical sensors	2010 - 2013
Alessandro Martucci	Università di Padova, Ingegneria Meccanica - Settore Materiali - Italy	Sol gel synthesized plasmonically active chemical sensors	2010 - 2015
Prabir Dutta	The Ohio State University	Metal oxide based gas sensors	2010 -2016
John Hartley	University at Albany	Plasmonic based chemical sensors	2009 - 2015
Marina Petrukhina	University at Albany	Quantum dot based chemical sensors	2003 - 2013
Robert Geer	University at Albany	Near field optical microscopy and growth of nanowires	2004 - 2012
Eric Eisenbraun	University at Albany	Coatings for Chemical Sensors	2005 - 2011
Sanjay Goel	University at Albany	Chemical Sensor Networks	2005 - 2011
Rigoberto Ibarra	CIMAV - Mexico	Quantum dot – polymer encapsulation methods	2006 - 2009
Armondo Zaragoza	CIMAV - Mexico	Quantum dot – polymer encapsulation methods	2006 - 2009
Tom Wiegele	United Technologies- Aerospace Systems	Harsh environment compatible chemical sensors	2005 - 2014
Kazushige Yokoyama	SUNY - Geneseo	Gold nanoparticle – protein aggregate characterization	2004 - 2006
Suresh Dhaniyali	Clarkson University	Hydrocarbon chemical sensors	2004 - 2005
Michael Hagerman	Union College	Hydrocarbon chemical sensors	2003 - 2005
Don Welch	MTI – Instruments	Hydrogen Sensors	2002 - 2004
Jeffrey Ambs	Rupprecht and Patashnik	Development and testing of a corona discharge aerosol collector	2001 - 2003

9.0 MICHAEL A. CARPENTER CITED REFERENCE SEARCH

<https://scholar.google.com/citations?user=by8w4REAAAJ&hl=en>

(GOOGLE SCHOLAR, FEBRUARY 2017)

	Publication	Volume	Page	Year	Citations
1	Sensors and Actuators B: Chemical	113	532	2006	107
2	The Journal of Physical Chemistry	96	2801	1992	76
3	Sensors and Actuators B: Chemical	123	522	2007	76
4	Analytical chemistry	76	6321	2004	70
5	The Journal of Physical Chemistry B	110	13508	2006	62
6	Journal of geophysical research	105	9767	2000	54
7	The Journal of Physical Chemistry C	112	6749	2008	49
8	<i>Metal Oxide Nanomaterials for Chemical Sensors</i> , Editors M.A. Carpenter, S. Mathur, A. Kolmakov, Springer (2013)			2013	48
9	Sensors and Actuators B: Chemical	129	726	2008	42
10	Analytical chemistry	84	5025	2012	40
11	The Journal of Physical Chemistry C	112	8784	2008	35
12	Journal of applied physics	97	124301	2005	32
13	Journal of atmospheric chemistry	37	113	2000	32
14	The Journal of Physical Chemistry C	115	6283	2011	24
15	ACS Nano	8	10953	2014	21
16	The Journal of Physical Chemistry C	117	11718	2013	21
17	Sensors and Actuators B: Chemical	141	26	2009	20

18	The Journal of Physical Chemistry C	114	11033	2010	19
19	Journal of materials research	20	3320	2005	18
20	Analytical Chemistry	84	10437	2012	16
21	Beilstein Journal of Nanotechnology	3	712	2012	11
22	Canadian journal of chemistry	72	828	1994	10
23	Journal of Physical Chemistry C	117	11124	2013	9
24	Applied Physics Letters	97	113105	2010	9
25	The Journal of chemical physics	99	148	1993	9
26	Optical methods and systems for detecting a constituent in a gas containing oxygen in harsh environments		US Patent 7,864,322	2011	8
27	Applied Surface Science	313	19	2014	7
28	The Journal of Physical Chemistry A	101	6870	1997	7
29	Journal of Nanoscience and Nanotechnology	10	1635	2010	7
30	International journal of molecular sciences	10	2348	2009	7
31	The Journal of Physical Chemistry A	101	6475	1997	7
32	Journal of Polymer Research	19	1	2012	7
33	Dalton Trans.	43	9426	2009	6
34	The Journal of Physical Chemistry A	101	6475	1997	6
35	The Journal of Physical Chemistry	99	1380	1995	6
36	Journal of materials research	26	2232	2011	5
37	Sensors, 2006. 5th IEEE Conference on		444	2006	5

38	Proc. of SPIE	7395	739519	2009	5
39	The Journal of chemical physics	106	5951	1997	5
40	METHODS FOR FORMING PALLADIUM ALLOY THIN FILMS AND OPTICAL HYDROGEN SENSORS EMPLOYING PALLADIUM ALLOY THIN FILMS		WO Patent 7521252	2009	4
41	Journal of Materials Research	20	2516	2005	4
42	The Journal of Physical Chemistry C	114	4272	2010	3
43	Journal of Physical Chemistry C	120	5020	2016	2
44	Journal of Physical Chemistry C	119	23094	2015	2
45	Metal Oxide Nanomaterials for Chemical Sensors- <i>book chapter</i>			2013	2
46	Nanotechnology, 2008. NANO'08. 8th IEEE Conference on Nanotechnology		584	2008	2
47	Proceedings of the Institution of Mechanical Engineers, Part N: Journal of Nanoengineering and Nanosystems	221	73	2007	2
48	Physical Chemistry Chemical Physics	2	679	2000	2
49	Nanoscale	7	17798	2015	1
50	Semiconducting quantum dots for photoluminescence based gas sensing – <i>Semiconductor Gas sensors</i>			2013	1

51	MRS Proceedings	879	Z10	2005	1
52	Sensors - IEEE		663	2007	1
53	Sensors - IEEE		415	2007	1
54	Microscopy and Microanalysis	8	1482	2002	1
				TOTAL	1027

10.0 FUNDING HISTORY FOR PROFESSOR MICHAEL CARPENTER - COLLEGE OF NANOSCALE SCIENCE AND ENGINEERING, UNIVERSITY AT ALBANY AND COLLEGES OF NANOSCALE SCIENCE AND ENGINEERING, SUNY POLYTECHNIC INSTITUTE

<u>Start Date</u>	<u>End Date</u>	<u>Sponsor</u>	<u>Award Title</u>	<u>PI</u>	<u>Co-PI</u>	<u>Total Award</u>	<u>Peer Reviewed</u>
4/2001	4/2002	Rupprecht and Patashnik	Feasibility of an Innovative Instrument for an Indoor Air Particulate Mass and Chemical Speciation Sensor	Carpenter	None	\$24,975	No
8/2001	12/2006	NYS Science Technology and Academic Research	Syracuse Center of Excellence – Environmental Quality Systems	Carpenter	Demerjian UAlbany	\$1,887,000	Yes
5/2002	11/2003	NYS Science Technology and Academic Research	Design and Production of Hydrogen and Carbon Monoxide Sensors for Optimization of Fuel Cell Operations	Carpenter	None	\$90,000	Yes
5/2002	11/2003	MTI-Instruments	Design and Production of Hydrogen and Carbon Monoxide Sensors for Optimization of Fuel Cell Operations	Carpenter	None	\$45,000	No
11/2002	11/2003	US Department of Energy	Feasibility of a SOFC Stack Integrated Optical Chemical Sensor	Carpenter	none	\$49,986	Yes
10/2004	10/2005	Federal Highway Administration	Development of a Portable Petroleum Hydrocarbon Sensor	Carpenter	Petrukchina UAlbany	\$149,990	Yes
10/2004	10/2007	US Department of Energy	Innovative Concepts Phase II	Carpenter	none	\$129,485	Yes
2/2005	8/2006	NYS Energy Research and Development Authority	Design and Optimization of All Optical Hydrogen Sensors	Carpenter	none	\$63,295	Yes
5/2005	5/2006	NYS Energy Research and Development Authority/ Clarkson	Micro Instrumentation for Aerosol Hydrocarbon Detection	Dhaniyali Clarkson	Carpenter	\$33,898	Yes

		University						
8/2005	8/2007	US Department of Energy	Innovative Concepts Phase II	Carpenter	none	\$70,502	Yes	
11/2005	11/2006	US Department of Transportation	(Year 2) Development of a Portable Petroleum By-products Chemical Sensor	Carpenter	Petrukhina UAlbany	\$149,944	Yes	
5/2006	5/2007	Goodrich Inc.	Nanotechnology Enabled Sensor Systems for Emission Control Jet Engines	Carpenter	none	\$25,000	No	
6/2007	6/2009	US Department of Transportation	Next Generation of Field Portable Hydrocarbon Analysis	Carpenter	Petrukhina UAlbany	\$200,000	No	
6/2007	6/2009	US Department of Transportation	Next Generation of Field Portable Hydrocarbon Analysis	Carpenter	Petrukhina UAlbany	\$200,000	No	
6/2007	6/2008	US Department of Transportation	Development of Portable Hydrocarbon Sensors	Carpenter	none	\$50,000	Yes	
8/2007	8/2008	Environmental Protection Agency	Development of a Portable Quantum Dot Hydrocarbon Sensor	Carpenter	none	\$32,744	Yes	
1/2008	1/2009	US Department of Transportation	Development of Highly Sensitive Portable Hydrocarbon Sensors	Carpenter	None	\$50,000	Yes	
5/2008	11/2008	NYS Education Department	2008 Excelsior Scholars Program – Nanoscale Science Summer Institute	Carpenter	Geer CNSE	\$120,000	Yes	
1/2009	1/2012	US Department of Energy	Plasmonics Based Harsh Environment Compatible Chemical Sensor	Carpenter	None	\$300,000	Yes	
8/2010	9/2013	National Science Foundation	Parallel Plasmonics and Raman In-Situ Study of Au Nanoparticle: Metal Oxide Interfacial Catalytic Reactions	Carpenter	John Hartley CNSE	\$431,666	Yes	

12/2010	8/2011	Goodrich Inc. (now UTAS)	Development of Harsh Environment Compatible Chemical Sensors	Carpenter	none	\$50,000	No
10/2011	9/2015	U.S. Department of Energy	Heat Activated Plasmonics Based Harsh Environment Chemical Sensors	Carpenter	Sang- Hyun Oh, University of Minnesota	\$300,000	Yes
7/2013	6/2015	National Science Foundation	Microfabricated Electrochemical Sensors for Combustion Applications	Carpenter	Prabir Dutta, Ohio State University	\$600,000	Yes
9/2013	6/2017	Bechtel Marine Propulsion Corporation	Plasmonic Based Sensors	Carpenter	none	\$405,063	No
10/2016	6/2018	US DOE	Highly Selective and Stable Multivariable Gas Sensors for Enhanced Robustness and Reliability of SOFC Operation	Radislav Potyrailo - GE	Carpenter	\$156,641	Yes
10/2018	9/2020	US DOE	Multi-Gas Sensors for Enhanced Reliability of SOFC Operation	Radislav Potyrailo - GE	Carpenter	\$159,746	Yes

TOTAL: \$5,774,935