

CURRICULUM VITAE

Steven G. Buckley

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Personal Information

- 1995 **Ph.D.** University of California, Berkeley
Department of Mechanical Engineering
Advisors: Prof. Robert F. Sawyer, Prof. Catherine P. Koshland, Dr. Donald Lucas
Major field: Combustion; *Minor fields:* Air Pollution, Environmental Health Sci.
Dissertation: "Laser Detection of Toxic Metals in Combustion Systems"
- 1994 **M.S.** University of California, Berkeley
Department of Mechanical Engineering
- 1991 **B.S.** Princeton University, *cum laude*
Department of Mechanical and Aerospace Engineering

Research Experience

- 7/06 – *Associate Director, Center for Energy Research, University of California, San Diego*
- 7/05 – *Associate Professor, Department of Mechanical and Aerospace Engineering, Center for Energy Research, University of California, San Diego*
Research Interests: Energy and environmental research, focusing on combustion-generated air pollution, novel sensors, applied diagnostics, general combustion and fire research problems.
- 7/03 – 6/05 *Assistant Professor, Department of Mechanical and Aerospace Engineering, Center for Energy Research, University of California, San Diego*
- 3/99 – 6/03 *Assistant Professor, Department of Mechanical Engineering, University of Maryland, College Park*
- 8/01 – 6/03 *Affiliate Faculty, Department of Fire Protection Engineering, University of Maryland, College Park*
- 7/98 – 2/99 *Senior Member of Technical Staff, Center for Exploratory Systems and Development, Sandia National Laboratories*
- 2/98 – 7/98 *Limited-Term Staff, Combustion Research Facility, Sandia National Laboratories*
- 12/95 – 2/98 *Postdoctoral Research Associate, Combustion Research Facility, Sandia National Laboratories*
- 12/92 – 11/95 *Graduate Research Assistant, Combustion Chemistry and Diagnostics Laboratory, Lawrence Berkeley National Laboratory*
- 12/91 – 12/92 *Graduate Research Assistant, Combustion Byproducts Laboratory, U.C. Berkeley*
- 2/90 – 3/91 *Undergraduate Research Assistant, Princeton University Combustion Laboratory*

Business / Industrial Experience

- 2001-2003 *President, Advance Diagnostics, Inc.*
- Laser-Induced Breakdown Spectroscopy instrument design, software, and analysis
- 1997-1998 *Engineering and Development, Solo Energy Corporation*
- Assist with the development of business and technical plan for startup company.
 - Co-author of two patents (in application), responsible for patent filing for Company.
 - Arrange meetings with major potential partners, represent Company on a technical basis.
- 1992-1995 *Consultant, S.G. Buckley and Associates*
- Wrote assessment of potential emissions from chlorinated, high-temperature industrial process to estimate metal and PAH emissions.
 - Measured SO₂ emissions at industrial site.
 - Advised on potential SCAQMD rule to regulate restaurant particulate emissions.
 - Continued work with W.L. Gore and Associates (see below).
- 1990-1991 *Business Manager, The Princeton Tower Club*
- Managed all aspects of \$500,000 per year business, including accounting and budgeting.
 - Implemented health plan for employees.
 - Assisted in supervising five employees.
- 1989-1991 *Engineering Associate, W. L. Gore and Associates*
- Developed engineering computer code for application involving industrial sealants, including graphics and user interface.
- 1986-1988 *Student Contractor, U.S. Army Ballistic Research Laboratory*
- Computer programming and system administration.
 - Developed novel method for determining rate of propellant grain burning using graphical animation.

Consultancies

Thermo-Electron, Inc. (2005-2006)
Corning, Inc. (2000-2001)
Fire litigation consulting (2001-2002)

Fellowships, Prizes, and Awards

2001 National Science Foundation Early Career Award
2001 Office of Naval Research Young Investigator
1992-1993 Air and Waste Management Association Scholarship, 1st place award
1991 Princeton Univ. MAE Dike Award: Best Undergraduate Independent Work
Sigma Xi (1991 induction)
1990 International Gas Turbine Institute Scholarship

Book Chapter

S.G. Buckley, “**LIBS for the Analysis of Chemical and Biological Hazards.**” Chapter 13 of *Laser Induced Breakdown Spectroscopy*, J.P. Singh, S.N. Thakur, editors, Elsevier Science B.V., to be published Spring 2007.

Refereed Research Publications (*author names in boldface indicate students*)

1. S.S. Shy, P.D. Ronney, S.G. Buckley, V.I. Yakhot, “**Experimental Simulation of Premixed Turbulent Combustion Using Aqueous Autocatalytic Reactions,**” *Proceedings of the Combustion Institute, Vol. 24*, (1992).
2. S.G. Buckley, C.S. McEnally, R.F. Sawyer, C.P. Koshland, and D. Lucas, “**Metal Emissions Monitoring Using Excimer Laser Fragmentation-Fluorescence Spectroscopy,**” *Combustion Science and Technology*, 118: 1-3, p. 171 (1996).
3. S.G. Buckley, C.P. Koshland, R.F. Sawyer, and D. Lucas, “**A Real-Time Monitor for Toxic Metal Emissions from Combustion Systems,**” *Proceedings of the Combustion Institute, Vol. 26*, pp 2455-2462 (1996).
4. S.G. Buckley, C. Damm, W.M. Vitovec, L.A. Sgro, R.F. Sawyer, C.P. Koshland, and D. Lucas, “**Ammonia Detection and Monitoring Using Fragmentation-Fluorescence,**” *Applied Optics*, 37:36, pp 8382 - 8391 (1998).
5. A.L. Robinson, S.G. Buckley, and L.L. Baxter, “**In Situ Measurements of the Thermal Conductivity of Ash Deposits,**” *Proceedings of the Combustion Institute, Vol. 27*, pp 1727-1735 (1998).
6. S.G. Buckley, A.L. Robinson, and L.L. Baxter, “**Energetics to Energy: Combustion and Environmental Considerations Surrounding the Reapplication of Energetic Materials as Boiler Fuels,**” *Proceedings of the Combustion Institute, Vol. 27*, pp. 1317-1325 (1998).
7. A.L. Robinson, H. Junker, S.G. Buckley, G. Sclipa, and L.L. Baxter, “**Interactions Between Coal and Biomass When Cofiring,**” *Proceedings of the Combustion Institute, Vol. 27*, pp 1351-1359 (1998).
8. S.G. Buckley, H.A. Johnsen, K.R. Hencken, and D.W. Hahn, “**Laser-Induced Breakdown Spectroscopy as a Continuous Emissions Monitor for Toxic Metals in Thermal Treatment Facilities,**” *Waste Management*, 20, pp 455-462 (2000).
9. S.G. Buckley, R. Moehrle, J. Lipkin, G. Mower, L.L. Baxter, “**Combustion Properties Relevant to Cofiring of Solid Rocket Motor Washout Material,**” 5th International Symposium on Special Topics in Chemical Propulsion: Combustion of Energetic Materials, Stresa, Italy, June 2000.
10. A.L. Robinson, S.G. Buckley, L.L. Baxter, “**Experimental Measurements of the Thermal Conductivity of Ash Deposits: Part 1. Measurement Technique,**” *Energy and Fuels*, 15 (1) pp 66-74 (2001).
11. A.L. Robinson, S.G. Buckley, N. Yang, L.L. Baxter, “**Experimental Measurements of the Thermal Conductivity of Ash Deposits: Part 2. Effects of Sintering and Deposit Microstructure,**” *Energy and Fuels*, 15 (1) pp 75-84 (2001).
12. M.M. Ohadi and S.G. Buckley, “**High Temperature Heat Exchangers and Microscale Combustion Systems: Applications to Thermal System Miniaturization,**” *Experimental Thermal and Fluid Science*, 25 (5) pp 207-217 (2001).
13. B.T. Fisher, H.A. Johnsen, S.G. Buckley, D.W. Hahn, “**Temporal Gating for the Optimization of Laser-Induced Breakdown Spectroscopy Detection and Analysis of Toxic Metals,**” *Applied Spectroscopy*, 55 (10) pp 1312-1319 (2001).
14. S.G. Buckley, R.F. Sawyer, C.P. Koshland, D. Lucas, “**Laser Measurements of Lead and Lead Particulate in Flames,**” *Combustion and Flame*, 128 (4) pp 435-446 (2002).

15. **P. Sivanesan**, J. Sirkis, Y. Murata, and S.G. Buckley, “**Optimal Wavelength Pair Selection and Accuracy Analysis of Dual Fiber Grating Sensors for Simultaneously Measuring Strain and Temperature,**” *Optical Engineering* 41 (10) pp 2456-2463 (2002).
16. **F. Ferioli**, P. Puzinauskas, and S.G. Buckley, “**Laser-Induced Breakdown Spectroscopy for On-Line Engine Equivalence Ratio Measurements,**” *Applied Spectroscopy* 57 (9) pp 1183-1189 (2003).
17. J. Hybl, **G. Lithgow**, and S.G. Buckley, “**Laser-Induced Breakdown Spectroscopy Detection of Biological Material,**” *Applied Spectroscopy* 57(10) pp 1207-1215 (2003).
18. **S. Pandetti**, and S.G. Buckley, “**Molten Salt Oxidation of Chlorobenzene,**” *Combustion Science and Technology* 176 (2): pp 257-276 (2004).
19. **M. Gharavi** and S.G. Buckley, “**A Single Diode Laser Sensor for Wide Range Temperature and H₂O Concentration Measurements,**” *Applied Spectroscopy* 58 (4) pp 468-473 (2004).
20. **G.A. Lithgow**, A.L. Robinson, and S.G. Buckley, “**Ambient Measurements of Metal-Containing PM 2.5 in an Urban Environment Using Laser-Induced Breakdown Spectroscopy,**” *Atmospheric Environment* 38 (20) pp 3319-3328 (2004).
21. **M. Gharavi** and S.G. Buckley, “**Diode Laser Absorption Spectroscopy Measurement of Line Strengths and Pressure Broadening Coefficients of the Methane 2v₃ Band at Elevated Temperatures,**” *Journal of Molecular Spectroscopy* 229 pp 78-88 (2005).
22. S.G. Buckley, “**Laser-induced breakdown spectroscopy for toxic metal emission measurements: Experimental considerations and oxygen quenching,**” *Environmental Engineering Science* 22 (2) pp 195-204 (2005).
23. **S. Heatwole**, C.P. Cadou, and S.G. Buckley, “**In situ Infrared Diagnostics in a Silicon-Walled Microscale Combustion Reactor: Initial Measurements,**” *Combustion Science and Technology* 177 (8) pp 1449-1461 (2005).
24. **G. Lithgow** and S.G. Buckley, “**Effects of Focal Volume and Spatial Inhomogeneity on Uncertainty in Single-Aerosol Laser-Induced Breakdown Spectroscopy Measurements,**” *Applied Physics Letters* 87 (1), Art. No. 011501 (2005).
25. **G. Lithgow** and S.G. Buckley, “**Influence of Particle Location Within Plasma and Focal Volume on Precision of Single-Particle LIBS Measurements,**” *Spectrochimica Acta B* 60 (7-8) pp 1060-1069 (2005).
26. J.L. Consalvi, B. Porterie, M. Coutin, L. Audoin, C. Casselman, A. Rangwala, S.G. Buckley, J.L. Torero, “**Upward Propagation over PMMA: Theory, Experiment and Numerical Modeling,**” 8th International Symposium on Fire Safety Science, Beijing, China, Sept. 18-23, 2005.
27. **F. Ferioli** and S.G. Buckley, “**Measurements of Hydrocarbons using Laser-Induced Breakdown Spectroscopy,**” *Combustion and Flame*, 144 (3) 435-447 (2006).
28. **F. Ferioli**, S.G. Buckley, and P.V. Puzinauskas, “**Real Time Measurement of Equivalence Ratio using Laser-Induced Breakdown Spectroscopy,**” *International Journal of Engine Research* 7 (6) pp 447 – 457 (2006).
29. **S. Heatwole**, **A. Veeraragavan**, C. P. Cadou, and S.G. Buckley, “**In-situ Species and Temperature Measurements in a Micro-combustor,**” *accepted, Nanoscale and Microscale Thermophysical Engineering*.

30. **A. Rangwala**, S.G. Buckley, and J.L. Torero, "Upward Flame Spread on a Vertically-Oriented Fuel Surface: The Effect of Finite Width." *to appear, Proceedings of the Combustion Institute* **31** (2007).
31. **M. Gharavi** and S.G. Buckley, "Pressure broadening parameters of H₂O absorption transitions of 2v₁ and 2v₂+v₃ bands at elevated temperatures," *submitted, Journal of Quantitative Spectroscopy & Radiative Transfer*.
32. **M. Gharavi** and S.G. Buckley, "Calibration-free wavelength modulation spectroscopy for temperature and H₂O concentration measurement using a single diode laser," *submitted, Applied Optics*.
33. **E.S. Simpson, G.A. Lithgow**, and S.G. Buckley, "Three-dimensional distribution of signal from single monodisperse aerosol particles in a LIBS plasma: initial measurements," *submitted, Spectrochimica Acta B*.
34. **C.B.E. Wildman** and S.G. Buckley, "Pressure effects on laser-induced breakdown spectroscopy measurements of methane-air mixtures," *submitted, Spectrochimica Acta B*.
35. **E.M. Kommer**, P.V. Puzinauskas, and S.G. Buckley, "The fluid dynamics of a miniature dilution tunnel for internal combustion engine aerosol measurement" *submitted, Experimental Thermal and Fluid Science*.
36. **A.S. Rangwala**, S.G. Buckley, J.L. Torero, "Verification of the constant B-number assumption while modeling flame spread," *submitted, Combustion and Flame*.
37. **Z.M. Ibrahim**, F.A. Williams, and S.G. Buckley, "An acoustic-energy method for estimating the onset of acoustic instabilities in premixed gas turbine combustors," *in preparation for Journal of Engineering for Gas Turbines and Power*.
38. **C. Dumitrescu**, P.V. Puzinauskas, S.G. Buckley, and A.P. Yalin, "Fiber-Optic Spark Delivery for Gas-Phase Laser Induced Breakdown Spectroscopy," *in preparation for Applied Physics Letters*.

Invited talks: Seminars and Conferences

1. "Real-Time Monitoring of Toxic Metals, Chlorinated Hydrocarbons, and Ammonia in Flames and Postcombustion Gases," University of California, San Diego, February 13, 1997
2. "Laser Methods for Real-Time, In situ Measurements of Metals in Combustion Systems," Naval Research Laboratory, Washington, D.C. April 19, 1999.
3. "Laser Methods for Real-Time, In situ Measurements of Metals in Combustion Systems," National Institute of Standards, Gaithersburg, MD May 11, 1999.
4. "Implementation of Laser-Induced Breakdown Spectroscopy as a Continuous Emissions Monitor for Toxic Metals," NASA Glenn Research Center / U.S. Army Vehicle Technology Directorate, September 20, 2000.
5. "Laser-Induced Breakdown Spectroscopy for Particulate Detection, Composition, and Sizing," University of Wisconsin, Department of Mechanical Engineering, Engine Research Center, February 12, 2001.
6. "Rapid Elemental Analysis Using Laser-Induced Breakdown Spectroscopy," Stevens Institute of Technology, Department of Chemical, Biochemical, and Materials Engineering, February 27, 2002.
7. "Multi-Media Diagnostics Using Laser-Induced Breakdown Spectroscopy (LIBS)," University of Maryland, Department of Chemical and Nuclear Engineering, March 19, 2002.
8. "Combustion and Environmental Analysis Using Laser-Induced Breakdown Spectroscopy (LIBS)," Rutgers University, Mechanical and Aerospace Engineering Department, April 3, 2002.
9. "Combustion and Environmental Analysis Using Laser-Induced Breakdown Spectroscopy (LIBS),"

- University of California, San Diego, November 22, 2002.
10. "Combustion and Environmental Analysis Using Laser-Induced Breakdown Spectroscopy (LIBS)," Stanford University, Palo Alto, CA, January 9, 2003.
 11. "Emerging Techniques for Real-Time, Real-World Combustion Analysis," Chemical Engineering Seminar Series, Brigham Young University, April 10, 2003.
 12. "Combustion System Analysis Using Laser-Induced Breakdown Spectroscopy," Paper 403, 22nd International Congress on Applications of Lasers and Electro-Optics, Jacksonville, FL, October 13-16, 2003.
 13. "Optical Diagnostics for Microscale Combustion Experiments," Aerospace and Mechanical Engineering Seminar Series, University of Southern California, Dec 3, 2003.
 14. "Laser-Induced Breakdown Spectroscopy for the Measurement of Aerosol Particles," Advanced Energy Technology Group Seminar Series, March 18, 2004.
 15. "Laser-Induced Breakdown Spectroscopy for the Measurement of Aerosol Particles," Mechanical Engineering Seminar, San Diego State University, April 1, 2004.
 16. "Measurement of Gas-Phase Hydrocarbon Concentrations Using Laser-Induced Breakdown Spectroscopy," Federation of Analytical Chemistry and Spectroscopy Societies (FACSS) Meeting, Portland, OR, October 5, 2004.
 17. "Particulate Matter and Gas Composition Measurements using LIBS," Mechanical Engineering Department Seminar, U.C. Riverside, October 13, 2004.
 18. "Laser-Induced Breakdown Spectroscopy for Detection of Biological Aerosols – Potential and Perspective," PITTCON 2005, Orlando FL, Feb. 27-Mar. 4, 2005.
 19. "Particulate Matter and Gas Composition Measurements using Laser-Induced Breakdown Spectroscopy," Physical Optics Corp., Torrance, CA, April 12, 2005.
 20. "Particulate Matter and Gas Composition Measurements Using Practical Optical Techniques," National Energy Technology Laboratory, Morgantown, WV, June 6, 2005.
 21. "Optical Methods for the Detection of Biological and Chemical Agents," Brimrose Corp., Columbia, MD, August 3, 2005.
 22. "Enhanced Detection of Aerosol Particles Using Laser-Induced Breakdown Spectroscopy," European and Mediterranean Symposium on Laser-Induced Breakdown Spectroscopy, Aachen, Germany, September 6-9, 2005.
 23. "(Towards) Optimal Detection of Aerosol Particles Using Laser-Induced Breakdown Spectroscopy," PacificChem 2005, Honolulu, HI, Dec 15-20, 2005.
 24. "Real-Time Optical Measurements in Practical Systems," Engineering the Automotive Future Workshop, University of Alabama, Tuscaloosa, AL, January 24-25, 2006.
 25. "On-line Determination of Gas and Particulate Composition Using Laser-Induced Breakdown Spectroscopy," Eastern Analytical Symposium, Somerset, NJ, Nov 13-16, 2006.

Non-refereed Research Publications

Conference Papers (author names in boldface indicate students)

1. S.G. Buckley, S.S. Shy, P.D. Ronney, "**Experimental Simulation of Premixed Turbulent Combustion Using a Liquid-Phase Autocatalytic Reaction**," Combustion Institute Western States Spring Meeting, Boulder, CO, March 1991.
2. S.G. Buckley, C.P. Koshland, D. Lucas, and R.F. Sawyer, "**Combustion of Methyl Chloride and Ethyl Chloride in a Diffusion Flame Burner**," Combustion Institute Western States Spring Meeting, Corvallis, OR, March 1992.
3. Sawyer, R., Koshland, C., Lucas, D., Buckley, S., Engleman, S., Higgins, B., Lee, S., McEnally, C., and Thomson, M., "**The Thermal Destruction of Chlorinated Hydrocarbons**," Proceedings of the Russian-Japanese Seminar on Combustion, Moscow, Russia, pp. 5-8, October 1993.

4. S.G. Buckley, C.S. McEnally, R.F. Sawyer, C.P. Koshland, and D. Lucas, **“Excimer Laser Fragmentation-Fluorescence for Total Metal Emissions Monitoring,”** Combustion Institute Central States Spring Meeting, June 1994.
5. D. Lucas, C.P. Koshland, R.F. Sawyer, C.S. McEnally, S.G. Buckley, and B.S. Higgins, **“Measurement and Control of Combustion Byproducts,”** *Pacific Basin Environmental Conference*, Alberta, Canada, May 1995.
6. S.G. Buckley, D. Lucas, R.F. Sawyer, C.P. Koshland, **“In Situ Monitoring of Toxic Metal Emissions Using Excimer Laser Fragmentation-Fluorescence Spectroscopy,”** *International Specialty Conference on Optical Remote Sensing for Environmental and Process Monitoring*, San Francisco, CA, September 1995.
7. S.G. Buckley, R.F. Sawyer, C.P. Koshland, and D. Lucas, **“Laser Methods for Lead Monitoring in Flames and Postflame Gases,”** Combustion Institute Western States Fall Meeting, Stanford, CA, October 1995.
8. S.G. Buckley, C.P. Koshland, R.F. Sawyer, and D. Lucas, **“A Real-Time Monitor for Toxic Metal Emissions from Combustion Systems”** Combustion Institute Western States Spring Meeting, Tempe, AZ, March 1996.
9. S.G. Buckley, C.J. Morey, A.L. Robinson, and L.L. Baxter, **“Feasibility of Energetic Materials Combustion in Utility Boilers: Pilot-Scale Study,”** Combustion Institute Western States Spring Meeting, Livermore, CA, April 1997.
10. S.G. Buckley, A.L. Wilson, R.F. Sawyer, C.P. Koshland, and D. Lucas, **“Detection of Toxic Metal Aerosol Particles Using ELFFS”** Combustion Institute Western States Spring Meeting, Livermore, CA, April 1997.
11. A.L. Robinson, G. Sclipa, S.G. Buckley, and L.L. Baxter, **“In Situ Measurements of the Thermal Conductivity of Ash Deposits Formed in a Pilot-Scale Combustor,”** The Engineering Foundation Conference on Impact of Mineral Impurities in Solid Fuel Combustion, Kona, HI, November 1997.
12. S.G. Buckley, C. Damm, W. Vitovec, L.A. Sgro, R.F. Sawyer, C.P. Koshland, and D. Lucas **“Ammonia Detection Using Photofragmentation-Fluorescence,”** Combustion Institute Western States Spring Meeting, Berkeley, CA, March 23-24, 1998.
13. S.G. Buckley, M.M. Lunden, A.L. Robinson, D. Allen, A. Sandoval, A. Grebenkov, and L.L. Baxter, **“Fate of Sr and Cs in Biomass Combustion,”** Combustion Institute Western States Spring Meeting, Berkeley, CA, March 23-24, 1998.
14. S.G. Buckley, R.F. Sawyer, C.P. Koshland, D. Lucas, **“Laser Method for Monitoring Lead in Flames and Postflame Gases,”** Paper 99-221, Joint Meeting of the U.S. Sections of the Combustion Institute, Washington, D.C., March 1999.
15. S.G. Buckley, H.A. Johnsen, K.R. Hencken, and D.W. Hahn, **“Implementation of Laser-Induced Breakdown Spectroscopy as a Continuous Emissions Monitor for Toxic Metals,”** International Conference on Incineration and Thermal Treatment Technologies, Orlando, FL, May 1999.
16. S.G. Buckley, G.C. Sclipa, J.R. Ross, L.L. Baxter, and G. Mower, **“Cofiring as an Alternative to Landfill Disposal of Solid Rocket Motor Washout Material,”** International Conference on Incineration and Thermal Treatment Technologies, Orlando, FL, May 1999.
17. S.G. Buckley, P.M. Walsh, et al., **“Measurements of Alkali Concentrations in an Oxygen-Natural Gas-Fired Soda-Lime-Silica Glass Furnace,”** 60th Conference on Glass Problems, Urbana-Champaign, IL, October 1999.
18. M.M. Ohadi and S.G. Buckley, **“High-Temperature Heat Exchangers and Microscale Combustion Systems: Applications to Thermal System Integration,”** 3rd CREST Thermal Engineering Conference, Japan, March 2000.
19. M.G. Christiansen, S. Chen, C. Baldwin, J. Niemczuk, J. Kiddy, P. Chen, H. Kopola, M. Aikio, P. Suopajarvi, S.G. Buckley, **“Digital Spatial Wavelength Domain Multiplexing (DSWDM) Using a**

- Prism-Grating-Prism (PGP) and a CMOS Imager: Implementation and Initial Testing,”** SPIE 8th Annual Symposium on Smart Structures and Materials, Newport Beach, CA, March 4-8, 2001.
20. **M. Gharavi, G. Lehnasch, S.G. Buckley, “Quantification of Near-IR Tunable Diode Laser Measurements of Methane in Particle-Laden Flames,”** 2nd Joint Meeting of the U.S. Sections of the Combustion Institute, Oakland, CA, March 25-28, 2001.
 21. **S. Pandeti, J. Patil, J. Salan, S.G. Buckley, “Molten Salt Oxidation for the Treatment of Chlorinated and Metal-Containing Wastes,”** Paper 02S-39, Technical Meeting of the Western States Section of the Combustion Institute, San Diego, CA, March 25-26, 2002.
 22. **S.G. Buckley and H.A. Johnsen, “Effects of Oxygen Quenching on Laser-Induced Breakdown Spectroscopy Measurements,”** Paper 02S-44, Technical Meeting of the Western States Section of the Combustion Institute, San Diego, CA, March 25-26, 2002.
 23. **S. Pandeti, J. Patil, J. Salan, S.G. Buckley, “Thermal Treatment of Chlorinated and Metal-Containing Wastes Using Molten Salt Oxidation,”** 21st Annual International Conference on Incineration and Thermal Treatment Technologies, New Orleans, LA, May 13-17, 2002.
 24. **M. Gharavi, S.G. Buckley, “Wide Range Temperature and H₂O Concentration Measurements Using a Single Diode Laser,”** 3rd Joint Meeting of the U.S. Sections of the Combustion Institute, Chicago, IL, March 16-19, 2003.
 25. **F. Ferioli, P.V. Puzinauskas, S.G. Buckley, “Laser-Induced Breakdown Spectroscopy for Rapid Engine Equivalence Ratio Measurements,”** 3rd Joint Meeting of the U.S. Sections of the Combustion Institute, Chicago, IL, March 16-19, 2003.
 26. **M. Gharavi, S.G. Buckley, “Diode Laser Absorption Spectroscopy Measurement of Line Strengths and Pressure Broadening Coefficients of the Methane 2v₃ Band at Elevated Temperatures,”** 3rd Joint Meeting of the U.S. Sections of the Combustion Institute, Chicago, IL, March 16-19, 2003.
 27. **S. Pandeti, S.G. Buckley, “Molten Salt Oxidation of Chlorobenzene,”** 3rd Joint Meeting of the U.S. Sections of the Combustion Institute, Chicago, IL, March 16-19, 2003.
 28. **T.B. McGrath, S.G. Buckley, G.S. Jackson, “Propagation of Spherically Symmetric Hard Detonations in Open Environments of Fuel/Air Mixtures,”** 3rd Joint Meeting of the U.S. Sections of the Combustion Institute, Chicago, IL, March 16-19, 2003.
 29. **M. Coutin, A.S. Rangwala, J.L. Torero, S.G. Buckley, “Material Properties Governing Co-Current Flame Spread: The Effect of Air Entrainment,”** 7th NASA Microgravity Combustion Workshop, Cleveland, OH, June 3-6, 2003.
 30. **S.G. Buckley, F. Ferioli, M. Gharavi, “Real-Time Diagnostics Applied to Mixing and Combustion Issues,”** 16th ONR Propulsion Meeting, Los Angeles, CA, June 9-11 2003.
 31. **S.G. Buckley, F. Ferioli, G.A. Lithgow, “Combustion System Analysis Using Laser-Induced Breakdown Spectroscopy,”** Paper 403, 22nd International Congress on Applications of Lasers and Electro-Optics, Jacksonville, FL, October 13-16, 2003.
 32. **A.S. Rangwala, J.L. Torero, S.G. Buckley, “Towards determination of the B number for co-current flame spread using the Fire Dynamic Simulator (FDS) code: Comparison between model and experiment,”** Paper 03F-36, Fall Technical Meeting of the Western States Section of the Combustion Institute, University of California, Los Angeles, October 20-21, 2003.
 33. **S. Heatwole, C.P. Cadou, S.G. Buckley, “In situ Infrared Diagnostics in a Silicon-Walled Microscale Combustion Reactor: Initial Measurements,”** Paper 03F-21, Fall Technical Meeting of the Western States Section of the Combustion Institute, University of California, Los Angeles, October 20-21, 2003.
 34. **S.G. Buckley, T. Tempel, F. Ferioli, and M. Gharavi, “Laser Diagnostics Applied to Combustion and High Speed Mixing Problems,”** 17th ONR Propulsion Meeting, Massachusetts Institute of Technology, Cambridge, MA, June 16-18, 2004.

35. **A.S. Rangwala**, S.G. Buckley, and J.L. Torero, "Modeling and Analysis of the Upward Burning of PMMA," 43rd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 10-13, 2005.
36. **A. Zang, T. Tempel**, S.G. Buckley, and K.H. Yu, "Experimental Characterization of Cavity-Augmented Supersonic Mixing," 43rd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 10-13, 2005.
37. **A. Veeraragavan, S. Heatwole**, C.P. Cadou, and S.G. Buckley, "Infrared Diagnostic Technique for Microscale Combustors," 43rd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 10-13, 2005.
38. **M. Gharavi** and S.G. Buckley, "A Multiplexed Diode Laser Sensor Based on Wavelength Modulation Spectroscopy for Simultaneous Measurement of Temperature and Concentration of H₂O and CH₄," 4th Joint Meeting of the U.S. Sections of the Combustion Institute, Philadelphia, PA, March 20-23, 2005.
39. **A. Rangwala**, S.G. Buckley, and J.L. Torero, "A new scaling for upward burning flames in natural convection, with applications to material flammability assessment," 4th Joint Meeting of the U.S. Sections of the Combustion Institute, Philadelphia, PA, March 20-23, 2005.
40. **F. Ferioli, G.A. Lithgow, E.S. Simpson**, and S.G. Buckley, "Initial Characterization of the Laser-Induced Breakdown Spectroscopy Plasma for Diagnostics," Paper 05-F4, Fall Meeting of the Western States Section of the Combustion Institute, Stanford, CA October 17-18, 2005.
41. **A.S. Rangwala**, S.G. Buckley, J.L. Torero, "An analysis of upward burning utilizing experimentally measured stand-off distances," Paper 05-F16, Fall Meeting of the Western States Section of the Combustion Institute, Stanford, CA October 17-18, 2005.
42. **Z.M. Ibrahim**, F.A. Williams, S.G. Buckley, J.C.Y. Lee, "An Acoustic Energy Approach to Modeling Combustion Oscillations," ASME Turbo-Expo, May 2006, Barcelona, Spain.
43. **Z.M. Ibrahim**, F.A. Williams, S.G. Buckley and C.Z. Twardochleb, "A Method for Estimating the Onset of Acoustic Instabilities in Premixed Gas-Turbine Combustors," to be presented, ASME Turbo Expo, 2007, Montreal, Canada.

Patents

U.S. Patent # 6,085,829 "Regenerator Type Heat Exchanger", July 11, 2000. With R. Mongia, P. Neuhaus, R. Dibble

U.S. Patent # 6,141,953 "Multi-shaft Reheat Turbine Mechanism for Generating Power", November 7, 2000. With R. Mongia, R. Dibble, G. Touchton

Presentations

Conference Presentations w/o papers

1. S.G. Buckley, R.F. Sawyer, C.P. Koshland, and D. Lucas, "**Excimer Laser Fragmentation-Fluorescence for Monitoring Air Toxics**" *The Fourth International Congress on Toxic Combustion Byproducts*, Berkeley, CA, June 1995.
2. S.G. Buckley, A.L. Wilson, R.F. Sawyer, C.P. Koshland, and D. Lucas, "**Detection of Toxic Metal Aerosol Particles Using ELFFS**" Combustion Institute Western States Spring Meeting, Livermore, CA, April 1997.
3. S.G. Buckley, A.L. Robinson and L.L. Baxter, "**The Reapplication of Energetic Materials as Boiler Fuels**," Global Demilitarization Symposium and Exhibition, Reno, NV, May 1997.

4. S.G. Buckley, A.L. Wilson, R.F. Sawyer, C.P. Koshland, and D. Lucas, **“Detection of Toxic Metals in Aerosol Particles Using ELFFS,”** The Fifth International Congress on Toxic Combustion Byproducts, Dayton, OH, June 1997.
5. S.G. Buckley, A.L. Robinson, C.J. Morey, and L.L. Baxter, **“Combustion Properties of Energetic Materials,”** The Fifth International Congress on Toxic Combustion Byproducts, Dayton, OH June, 1997.
6. A.L. Robinson, G. Sclipa, S.G. Buckley, and L.L. Baxter, **“In Situ Measurements of the Thermal Conductivity of Ash Deposits Formed in a Pilot-Scale Combustor,”** The Engineering Foundation Conference on Impact of Mineral Impurities in Solid Fuel Combustion, Kona, HI, November 1997.
7. S.G. Buckley, M.M. Lunden, A.L. Robinson, D. Allen, A. Grebenkov, and L.L. Baxter **“Aerosol Generation from Cs- and Sr-doped Biomass Combustion,”** AIChE Spring National Meeting, March 8-12, 1998.
8. S.G. Buckley, A.L. Robinson, G. Mower, and L.L. Baxter, **“Combustion Properties of Solid Rocket Motor Washout Residue,”** Global Demilitarization Symposium and Exhibition, Cor d’Alene, ID, May 1998.
9. S.G. Buckley, G.C. Sclipa, J.R. Ross, L.L. Baxter, and G. Mower, **“Cofiring as an Alternative to Landfill Disposal of Solid Rocket Motor Washout Material,”** National Defense Industrial Association Environmental Conference, Denver, CO, March 1999.
10. S.G. Buckley, R. Moehrle, J.R. Ross, J. Lipkin, L.L. Baxter, G. Mower, **“Combustion Experiments Related to Cofiring of Solid Rocket Motor Washout Material,”** Global Demilitarization Symposium and Exhibition, Tulsa, OK, May 1999.
11. S.G. Buckley and H.A. Johnsen, **“Continuing Development of Laser-Induced Breakdown Spectroscopy as a Continuous Emissions Monitor for Toxic Metals: Research and Field Test Results,”** Global Demilitarization Symposium and Exhibition, Tulsa, OK, May 1999.
12. S.G. Buckley, J. Lipkin, L.L. Baxter, R. Moehrle, J.R. Ross, G. Mower, W.O. Munson, **“Cofiring of Propellant Washout Residue with Traditional Boiler Fuels: Resolution of Operational and Environmental Issues,”** NATO Advanced Research Workshop, *Application of Demilitarized Gun and Rocket Propellants in Commercial Explosives*, Moscow, Russia, 18-21 October, 1999.
13. S.G. Buckley, R. Moehrle, J. Lipkin, G. Mower, L.L. Baxter, **“Combustion Properties Relevant to Cofiring Solid Rocket Motor Washout Material,”** 5th International Symposium on Issues of Chemical Propulsion, Stresa, Italy, June 18-22, 2000.
14. S.G. Buckley, H.A. Johnsen, D.W. Hahn, **“Effects of Oxygen Concentration on Laser-Induced Breakdown Spectroscopy Measurements of Toxic Metals,”** 1st International Conference on Laser Induced Plasma Spectroscopy and Applications, Tirrenia, Italy, October 8-12 2000.
15. G.A. Lithgow, A.L. Robinson, and S.G. Buckley, **“Ambient Measurements of Inorganic Species in an Urban Environment Using LIBS,”** Second International Conference on Laser-Induced Plasma Spectroscopy, Orlando, FL, September 24 – 27, 2002.
16. F. Ferioli, P.V. Puzinauskas, and S.G. Buckley, **“LIBS for Real-Time Equivalence Ratio Measurements in Spark-Ignited Engines,”** Second International Conference on Laser-Induced Plasma Spectroscopy, Orlando, FL, September 24 – 27, 2002.
17. J. Patil, S. Pandetti, J.S. Salan, S.G. Buckley, **“Assessment of Metal and Chlorine Emissions from Molten Salt Oxidation using Laser-Induced Breakdown Spectroscopy,”** Second International Conference on Laser-Induced Plasma Spectroscopy, Orlando, FL, September 24 – 27, 2002.
18. S.G. Buckley, M.M. Lunden, A.L. Robinson, D.C. Allen, A.J. Grebenkov, and L.L. Baxter, **“Chernobyl Remediation via Biomass Combustion and Subsequent Radionuclide Recovery,”** ASME Environmental and Waste Processes, Hartford, CT, Aug 18-20, 2003.
19. S.G. Buckley, **“Laser-Induced Breakdown Spectroscopy for Stack and Ambient PM Monitoring,”**

ASME Environmental and Waste Processes, Hartford, CT, Aug 18-20, 2003.

20. **G.A. Lithgow** and S.G. Buckley, "Detection and Classification of Biological Aerosols Using Laser-Induced Breakdown Spectroscopy," Paper 10B4, American Association of Aerosol Research Annual Conference, Anaheim, CA, October 20-24, 2003.
21. **G.A. Lithgow**, A.L. Robinson, S.G. Buckley, "Ambient Particle Measurements in an Urban Environment Using Laser-Induced Breakdown Spectroscopy (LIBS)," Paper 11E4, American Association of Aerosol Research Annual Conference, Anaheim, CA, October 20-24, 2003.
22. **S. Heatwole**, S.G. Buckley, and C.P. Cadou, "In-Situ Measurements of Concentration and Temperature in a Microscale Combustion Reactor" MEMS Alliance Symposium, Johns Hopkins Applied Physics Laboratory, March 29-30, 2004
23. **A.S. Rangwala**, S.G. Buckley, J.L. Torero, "Understanding Material Property Impacts on Co-Current Flame Spread: Improving Understanding Crucial for Fire Safety," Workshop on Strategic Research to Enable NASA's Exploration Missions; Cleveland, OH June 22-23, 2004
24. S.G. Buckley, "New Technologies for Protecting the Environment: Air Emissions," ASME Environmental and Waste Processes Conference, Walnut Creek, CA, August 8-10, 2004.
25. **G.A. Lithgow** and S.G. Buckley, "Influence of Particle Location Within Plasma Volume and Focal Volume on Precision of Single-Particle LIBS Measurements," Third International Conference on Laser Induced Plasma Spectroscopy and Applications, Torremolinos, Spain, September 28 – October 2, 2004.
26. **F. Ferioli** and S.G. Buckley, "Measurement of Gas-Phase Hydrocarbon Concentrations Using Laser-Induced Breakdown Spectroscopy, Federation of Analytical Chemistry and Spectroscopy Societies Meeting, Portland, OR, October 3-7. 2004.
27. **C.B.E. Wildman** and S.G. Buckley, "Equivalence Ratio Measurements at High Pressure Using Laser Induced Breakdown Spectroscopy," Fourth International Conference on Laser Induced Plasma Spectroscopy and Applications, Montreal, Canada, September 5-8, 2006.
28. **M. Gharavi** and S.G. Buckley, "Near-Infrared Optical sensor for Monitoring NH₃ using Wavelength Modulation Spectroscopy," Federation of Analytical Chemistry and Spectroscopy Societies Meeting, Lake Buena Vista, FL, September 24 – 28, 2006.

Posters

1. S.G. Buckley, C.S. McEnally, R.F. Sawyer, C.P. Koshland, and D. Lucas "**Excimer Laser Fragmentation-Fluorescence Spectroscopy for Metals Monitoring from Combustion Processes**," work-in-progress poster, *25th International Combustion Symposium*, Irvine, CA, 1994.
2. **S. Heatwole**, C.P. Cadou, S.G. Buckley, "In Situ FTIR Measurements in a Micro-Channel Flame," Poster 115-05, *30th International Combustion Symposium*, Chicago, IL, July 30- 4 August 4, 2004.
3. **F. Ferioli** and S.G. Buckley, "Measurements of Hydrocarbons Using Laser-Induced Breakdown Spectroscopy," Poster 4F4-04, *30th International Combustion Symposium*, Chicago, IL, July 30- 4 August 4, 2004.
4. **A. Zang, T. Tempel**, S.G. Buckley, K.H. Yu, "Experimental Characterization of Cavity-Augmented Supersonic Mixing and Combustion," Poster 5F1-11, *30th International Combustion Symposium*, Chicago, IL, July 30- 4 August 4, 2004.
5. **F. Ferioli** and S.G. Buckley, "Hydrocarbon Measurements in Flames and Fuel/Air Mixtures using Laser-Induced Breakdown Spectroscopy," Third International Conference on Laser Induced Plasma Spectroscopy and Applications, Torremolinos, Spain, September 28 – October 2, 2004. **Best Poster Award**
6. **T. Tempel, A. Zang**, K.H. Yu, and S.G. Buckley, "Measurements in a Supersonic Shear Layer of He

/ Air Using Laser-Induced Breakdown Spectroscopy,” Third International Conference on Laser Induced Plasma Spectroscopy and Applications, Torremolinos, Spain, September 28 – October 2, 2004.

7. **M. Gharavi** and S.G. Buckley, “Wavelength Modulation Spectroscopy for Simultaneous Temperature and H₂O Concentration Measurement in a Flame,” Federation of Analytical Chemistry and Spectroscopy Societies (FACSS) Meeting, Portland, OR, October 2, 2004.
8. **E.S. Simpson, G.A. Lithgow,** and S.G. Buckley, “Particle Location Effects and Laser Triggering for Single-Particle Aerosol LIBS Measurements,” Fourth International Conference on Laser Induced Plasma Spectroscopy and Applications, Montreal, Canada, September 5-8, 2006.
9. **A.R. Zimmerman, C. Dumitrescu,** P.V. Puzinauskas, S.G. Buckley, “Towards Single-Shot LIBS Equivalence Ratio Measurements,” Fourth International Conference on Laser Induced Plasma Spectroscopy and Applications, Montreal, Canada, September 5-8, 2006.

Teaching and Advising

Spring 2007: *UCSD MAE 170 / Experimental Techniques* (with F. Beg)
Spring 2007: *UCSD ENG 100L / Team Engineering Laboratory*
Winter 2007: *UCSD MAE 207 / Advanced Energy Technologies (graduate)*
Winter 2007: *UCSD ENG 100L / Team Engineering Laboratory*
Fall 2005: *UCSD MAE 118a / Non-Nuclear Energy Technologies*
Fall 2006: *UCSD ENG 100L / Team Engineering Laboratory*
Spring 2006: *UCSD MAE 170 / Experimental Techniques* (with F. Beg)
Spring 2006: *UCSD ENG 100L / Team Engineering Laboratory*
Winter 2006: *UCSD ENG 100L / Team Engineering Laboratory*
Fall 2005: *UCSD MAE 118a / Non-Nuclear Energy Technologies*
Fall 2005: *UCSD ENG 100L / Team Engineering Laboratory*
Fall 2005: *UCSD MAE 1 / Introduction to Mechanical Engineering*
Spring 2005: *UCSD MAE 170 / Experimental Techniques* (with F. Beg)
Winter 2005: *UCSD MAE 211 / Introduction to Combustion (graduate)*
Fall 2004: *UCSD MAE 118a / Non-Nuclear Energy Technologies*
Fall 2004: *UCSD MAE 1 / Introduction to Mechanical Engineering* (with G. Tynan)
Spring 2004: *UCSD MAE 170 / Experimental Techniques* (with F. Beg and P. Bandaru)
Winter 2004: *UCSD CENG / MAE 210A / Graduate Fluid Mechanics I (graduate)*
Winter 2004: *UCSD MAE 087 / Freshman Seminar: Energy Options for the 21st Century*

University of Maryland ENES 221 / Dynamics: Fall 1999, Spring 2000, Spring 2001, Fall 2001
University of Maryland ENME 707 / Combustion and Reacting Flow: Fall 2000, Fall 2002
University of Maryland HONR 209F / Our Atmosphere (seminar): Spring 2002, Spring 2003

Short Courses

1. Miniaturization of Thermal Systems. CEEE Short course Spring 2000, Fall 2000, I taught a one-hour segment.
2. Risk Analysis of Fire Scenarios. University of Poitiers / Niort, FRANCE, January 17-20,

- 2000, with José Torero and Carol Smidts, UMCP.
3. Combustion Heat and Mass Balances, Combustion Basics Short Course, International Incineration and Thermal Treatment Technologies Conference, New Orleans, LA, May 13, 2002.
 4. Combustion Fundamentals, Combustion Basics Short Course, International Incineration and Thermal Treatment Technologies Conference, Orlando, FL, May 12, 2003.
 5. Combustion Fundamentals, Combustion Basics Short Course, International Incineration and Thermal Treatment Technologies Conference, Phoenix, AZ, May 10, 2004.

Advising: Research Direction

Undergraduate

1. Scott Heatwole (UMCP Class of 2003), Infrared Spectroscopy in Microscale systems.
2. Sam Krehnbrink (UMCP Class of 2003), Programming Control for Engineering Instruments.
3. Steven O'Hara (UMCP Class of 2004), Design of a Combustion-Driven Flow Reactor.
4. Tom Serra (UMCP Class of 2004), Fabrication of Fiber Bragg Gratings.
5. David Hoffman (UCSD Class of 2005), Design and Testing of a Novel Aerosol Spectrometer.
6. Geoff Rapoport (UCSD Class of 2005), Interfacing of Tunable Diode Laser Sensors for Combustion Control.
7. Christine Lao (UCSD Class of 2007), Tunable Diode Laser Measurements of CO and CO₂.
8. Halden Oxenbol (UCSD Class of 2007), Design of a Biofuel Burner.
9. Jason Harp (UCSD Class of 2007), A Robust Liquid Fuel Vaporizer.
10. Jimmy Kerins (UCSD Class of 2007), A Robust Liquid Fuel Vaporizer.
11. Michael Gollner (UCSD Class of 2007), Combustion of Biodiesel.

Masters

1. Sivashankar Pandetti, UMCP M.S. December 2002, "Thermal Treatment of Chlorobenzene using Molten Salt Oxidation." Thesis / research advisor.
2. Jayakumar Patil, M.S. UMCP May 2003, "Development of a Laser-Induced Breakdown Spectroscopy Based Metal Monitor and Application to Molten Salt Oxidation." Thesis / research advisor.
3. Eric Kommer, M.S. UMCP Fall 2003, "Variations of Engine Particulate Matter in a Miniature Dilution Tunnel." Thesis / research advisor.
4. Travis Tempel, M.S. UMCP May 2004, "Investigation of Supersonic Mixing Using Laser-Induced Breakdown Spectroscopy." Thesis / research advisor.
5. Scott Heatwole, B.S. / M.S. UMCP August 2004, "*In situ* Infrared Diagnostics for a Microscale Combustion Reactor." Thesis / research co-advisor with Prof. Chris Cadou.
6. Kyle Kratzsch, M.S. UMCP M.S. Fall 2004, "Effects of Temperature and Aerosol Content on Laser-Induced Breakdown Spectroscopy Detection Limits." Thesis / research advisor.

7. Ezra Chen, B.S. / M.S. UMCP Spring 2005, "Temperature Mapping of an Acoustically-Forced Laminar Diffusion Flame Using Planar Laser Rayleigh Scattering." Thesis / research advisor.
8. Ariel Schuger, M.S. UCSD M.S. Spring 2005, "Diode Laser Measurement of H₂O, OH, and Temperature in a Premixed Methane and Air Flame through the Application of Wavelength Modulation Spectroscopy." Thesis / research advisor.
9. Alex Zimmerman, UCSD M.S. Summer 2006, "Quantitative Study of Laser-Induced Breakdown Spectroscopy for Equivalence Ratio Measurement in Laminar Premixed Methane-Air Flames." Thesis / research advisor.
10. Erin Simpson, UCSD M.S. Fall 2006, "Signal Enhancement in Laser Induced Breakdown Spectroscopy of Single-Particle Aerosol Samples." Thesis / research advisor.
11. Marco Leon, M.S. UCSD start Spring 2004 (working student), CO and NO Detection in High Pressure Combustion Systems at Elevated Temperatures.
12. Jeff Yin, UCSD M.S. Start Spring 2006 / expected spring 2007, Laser-Induced Incandescence Measurements Compared with a Scanning Mobility Particle Sizer.

Doctoral

1. Martin Christiansen, UMBC Ph.D. Fall 2001, "Spectrometer with CMOS Demodulation of Fiber Optic Bragg Grating Sensors" – I co-advised this student with Prof. Koh of UMBC. Dissertation / Research advisor. Presently: Northrup Grumman
2. Ponniah Sivaneson, UMCP Ph.D. (Physics) Spring 2002, "Fiber Bragg Grating Sensor and Demodulation System for the Simultaneous Measurement of Temperature and Strain." Dissertation / Research advisor. Presently: Physical Optics Corporation
3. Chris Baldwin, UMCP Ph.D. Fall 2003, "Distributed Sensing for Flexible Structures Using a Fiber Optic Sensor System." Dissertation / Research advisor. Presently: Aither Engineering, Inc.
4. Mohammadreza Gharavi, UMCP Ph.D. Fall 2004, "Infrared Optical Sensor for Combustion Diagnostics Using Wavelength Modulation Spectroscopy." Dissertation / research advisor. Presently: Post-doctoral Researcher, UCSD
5. Francesco Ferroli, UMCP Ph.D. Summer 2005, "Experimental Characterization of Laser-Induced Plasmas and Application to Gas Composition Measurements." Dissertation / research advisor. Presently: Postdoctoral Researcher, TU Delft
6. Ali Rangwalla, UCSD Ph.D. Spring 2006, "Flame-Spread Analysis using a Variable B-Number." Dissertation / research advisor. Presently: Assistant Professor, Worcester Polytechnic Institute
7. Gregg Lithgow, UCSD Ph.D. start May 2001 / expected 2007, Laser-Induced Breakdown Spectroscopy for Aerosol Measurement. Dissertation / research advisor.
8. Zuhair Ibrahim, UCSD Ph.D. start May 2004 / expected Spring 2007, Prediction and Mitigation of Oscillatory Instabilities in Lean Premixed Combustion. (Joint with Prof. Forman Williams) Dissertation / research advisor.
9. Melanie Zauscher, UCSD Ph.D. start September 2005 / expected 2009, Chemistry of

Biodiesel Combustion. Dissertation / research advisor.

10. Andrew Effenberger. UCSD Ph.D. (Chemistry) start March 2006. Physics of Laser-Induced Breakdown Plasmas Relevant to Hazardous Material Detection. Dissertation / research advisor.

12. Shivani Singh. UCSD Ph.D. start September 2006. Advanced Thermoelectrics for Energy Generation. (Joint with Prof. Prabhakar Bandaru) Dissertation / research advisor.

Post-doctoral / Research staff

1. Mickael Coutin, (2001-2002) Post-doctoral researcher, flame spread processes, joint with Prof. José Torero, Fire Protection Engineering.

2. Ponniah Sivanesan (January 2002 –May 2002) Post-doctoral researcher, optical sensors.

3. Warren Choi (June 2002 – July 2003) Programmer.

4. Bruce Thomas (July 2003 – present) Laboratory technician.

5. Mohammadreza Gharavi (February 2005 – present).

Independent Study, Tutorial, Post-doc, Internship Supervision.

European Diploma Student Projects

Guillaume Lehnasch (University of Poitiers, Diploma Student, April – September 2000)

Thomas Schmid (Technical University Manheim, Diploma Student, April – September 2001)

Aurelien Most (University of Poitiers, Diploma Student, April – September 2001)

Marco Borchers (University of Munich, Diploma Student, November 2005 – June 2006)

Project Funding

Total project funding of approximately \$5.7M (as PI and Co-I) since 1999. Funding sources include the National Science Foundation, National Aeronautics and Space Administration, Office of Naval Research, Department of Energy, various Air Force and Navy Laboratories, and industry.

Title	Granting Agency	Amount of Total Award (including indirect costs)	Time period of contract/grant	Role, e.g. PI, co-investigator, project leader, etc
"In Situ Elemental Detection in Spent Fuel Reprocessing Facilities using Laser-Induced Breakdown Spectroscopy (LIBS)"	Idaho National Laboratory	\$180,000	February 2007 – September 2008	PI (100%)
"IT-E3Tools: Information Technology Engineering and Environmental Education Tools"	National Science Foundation	\$1,199,743	Dec 2006 – Dec 2009	Co-Investigator Buckley (UCSD) approximately 1/3 share PI: Jeanne Ferrante (Computer Science), Co-I Silvia Mah
"Flame-Induced Window Breakage"	Schirmer Engineering, Inc.	\$11,000 gift	June 2006 - present	PI (100%)
"Studies of Combustion Instabilities"	Solar Turbines, Inc.	Various gifts totaling ~ \$200,000	June 2004 - present	PI, (60%) with Forman Williams (40%)
"Development of Fiber-Optically Coupled Combustion and Flow Sensor for IC Engines and Other Severe Environments"	National Science Foundation	\$430,474	Aug. 2004 – July 2007	Co-Investigator Buckley (UCSD) \$100,000; PI Puzinauskas and Co-Investigator Olcmen \$330,474 (University of Alabama)
"Multiplexed Sensor for Synthesis Gas Composition and Temperature"	U.S. Department of Energy	\$199,746	Sept. 2004 – Sept. 2007	PI, 100%
"NER: Novel Aerosol Spectrometer for Size and Composition of Nanoparticles"	National Science Foundation	\$116,713	Aug. 2004 – July 2005	PI, 100%
"Ultra-fast combustion emissions and performance sensor"	Von Liebig Center, UCSD	\$50,000	Sept. 2004 – Feb. 2005	PI, 100%
"Wear Debris Measurements from a Gas Turbine using LIBS"	DoD Phase II SBIR and Maryland Industrial Partnerships (with Systems	\$280,000	August 2003 – July 2005	PI, \$280,000 represented the University of Maryland share of this contract. I

	Planning and Analysis, Inc.)			transferred the management of this grant to Prof. Michael Zachariah but continued to advise students supported hereunder.
“Maritime Harbor Safety”	Naval Surface Warfare Center, Indian Head	\$850,000	Dec 2002 – Dec 2004	Co-I, left this grant with Co-I Greg Jackson when I moved to UCSD
“Wear Debris Measurements from a Gas Turbine using LIBS”	DoD Phase I SBIR (with Systems Planning and Analysis, Inc.)	\$33,000	June 2002 – May 2003	PI, 100%
“Maritime Harbor Safety”	Naval Surface Warfare Center, Indian Head	\$237,500	Jan. 2002 – Sept. 2002	Co-PI (with PI Davinder Anand)
“Ship Structural health Monitoring Using Fiber Optic Sensing”	DoD Phase II SBIR Option (with Systems Planning and Analysis, Inc.)	\$50,000	Oct 2001 – March 2002	PI, with Co-PI B. Balachandran
“Environmental Measurements for the Confined Burn Facility”	Naval Surface Warfare Center, Indian Head Division	\$50,000 (w/\$25K ONR match)	Sept. 2001 – Sept. 2002	PI, 100%
“Particle and TRI Diagnostics for Navy Vehicles and Operations”	Office of Naval Research Young Investigator	\$342,500	May 2001 – April 2005	PI, 100% Note: This award remained at University of Maryland to fund students, Buckley was funded at UCSD by a subcontract.
“CAREER: Investigation of Laser-Induced Breakdown Spectroscopy of Analysis of Airborne Particulate Matter”	National Science Foundation	\$375,000	Feb. 2001 – Jan. 2005	PI, 100% Note: This award was originally at University of Maryland and was moved to UCSD.
“Laser-Induced Breakdown Spectroscopy for Measurement of Ambient Aerosols and Source Apportionment”	Department of Energy (subcontract to Carnegie Mellon)	\$176,097	Feb. 2001 – May 2004	PI, 100%
“Material Properties Governing Concurrent Flame Spread in Microgravity”	National Aeronautics and Space Administration Microgravity Combustion Program	\$400,000	Feb. 2001 – Jan. 2005	PI Buckley, 85%, Consultant Torero 15% Note: This award was moved from the University of Maryland to UCSD.
“Ship Structural Health Monitoring Using Fiber Optic Sensing”	DoD Phase I SBIR and Maryland Industrial Partnerships (with Systems	\$35,000	Oct. 2000 – Aug. 2001	PI, with Co-PI B. Balachandran

	Planning and Analysis, Inc.)			
“Towed Array Shape Measurement using Fiber Bragg Gratings”	DoD Phase II SBIR and Maryland Industrial Partnerships (with Systems Planning and Analysis, Inc.)	\$80,000	Oct. 2000 – May 2002	Co-PI (with PI B. Balachandran)
“Assessment of Accuracy in Single-Species and Multiplexed Tunable Diode Laser Measurements in Practical Fire Scenarios”	National Institute of Standards and Technology Building Fire Research Grant	\$67,466	Oct. 2000 – Sept 2001	PI , 100%
“Molten Salt Oxidation – Reaction Chemistry and Environmental Verification”	Naval Surface Warfare Center, Indian Head Division	\$190,791	March 2000 – Sept 2001	PI, 100%
“Accuracy and Quantification of Tunable Diode Laser Measurements in Practical Fire Scenarios”	National Institute of Standards and Technology Building Fire Research Grant	\$83,396	Oct. 1999 – Sept 2000	PI, 100%
“LIBS and Energetic Materials Project Support”	Sandia National Laboratories	\$75,000	March 1999 – Sept 1999	PI, 100%

Service

Scholarly Service

Reviewing Activities for Journals

The Combustion Institute (1996 – present)
Combustion Science and Technology (1998-present)
Applied Optics (1998 – present)
Applied Spectroscopy (1999 – present)
Optics Letters (2006 – present)
Chemical Physics Letters (2005 – present)
Spectrochimica Acta B (2002 - present)
Applied Physics Letters (2005 – present)
Journal of Optics A: Pure and Applied Optics (2005)
Journal of Aerosol Science (2005)
Combustion Theory and Modeling (2003- present)
Combustion and Flame (2005-present)
Atmospheric Environment (2003-present)
Journal of Applied Physics (2003 – present)
Journal of Physics: D (2004 – present)
Experimental Thermal and Fluid Science (2004)
Environmental Engineering Science (1999)
Measurement Science and Technology (2002)
Chemical Engineering Journal (2001- present)
Chemical Engineering Science (2006 – present)
Canadian Journal of Analytical Sciences and Spectroscopy (2002)
Journal of Propulsion and Power (2002)
International Journal for Hydrogen Energy (1997)

In total, I review approximately 20-25 papers for peer-reviewed publications annually.

Reviewing activities for agencies.

DOE Laboratory Technology Research Program (2001)
DOE Small Business Innovative Research Grants (1998 – present)
DOE International Science and Technology Center (2002)
DOE Basic Energy Science (2005)
NSF SBIR Review Panel (April 2002, April 2003)
NSF Environmental Engineering (BES) CAREER Review Panel (Nov. 2002)
NSF Environmental Engineering (BES) and Chemical and Thermal Sciences Programs (2003 - present)
NSF Geosciences Program Panel (2005)
Ontario Research Foundation (Canada) (2006)
I have reviewed between 1 and 5 proposals for DOE annually since 1998.

Scholarly commissions and advisory panels.

Program Advisory Committee, *International Conference on Incineration and Thermal Treatment Technologies*, (2002, 2003, 2004)

- Committee critically reviews papers for acceptance, organizes short courses, recruits exhibitors, oversees finances of this annual conference.

Technical Advisory Committee, *International Conference on Laser Induced Plasma Spectroscopy and Applications* (2002, 2004, 2006 and continuing)

- Committee responsible for technical oversight and location of this biannual conference

Organizer, “21st Century LIBS” Symposium, *Pittcon 2006*, with Rick Russo and Peter Castle, ~ 120 attendees, 20 talks.

Professional Service

Offices and committee memberships held in professional organizations.

The Combustion Institute - Western States Section Board of Directors (2005 -)

Local Host, 2007 US National Combustion Meeting, San Diego, CA (expected 550 attendees)

American Society of Mechanical Engineers – the Environmental Engineering Division, a 1,400 + (primary), 8,000 + (total) member division of ASME

Chair, Environmental Engineering Division (July 2002 – June 2003)

Vice Chair, Environmental Engineering Division (July 2001 – June 2002)

Secretary / Treasurer, Environmental Engineering Division (July 2004 – June 2005) – the executive committee asked me to rotate through this position as I had skipped over it earlier.

Executive Committee, July 2001 – June 2006

Chair, Air Pollution Control Committee (2000 - 2002)

- Committee addresses air pollution issues for industry, government, and academia. I helped to form this committee.

Chair, Inter-Council Committee on Federal R&D, EPA Task Force (2003)

Member, 2001-2002

- In 2001 and 2002, wrote both a short summary and a 6-page critique of the Federal EPA research and development budget. This is typically included in AAAS summaries and in ASME documents concerning the FY 2002 budget.

Member, Committee on Technical Planning (2002 – 2006)

- Council on Engineering Committee to develop and nurture ASME’s technical capabilities

Representative of ASME to Air and Waste Management Assoc. (2001 – 2004)

President, Princeton Student Chapter (1990-1991)

American Association of Aerosol Research
Education Committee (2005 – present)

Campus Service

Departmental Service

UMCP Department of Mechanical Engineering Learning Enhancement Committee (2000 – 2003)

- Reviews undergraduate curriculum, faculty teaching performance / distribution.

UMCP Department of Mechanical Engineering Research Day Committee (Fall 2000)

- Committee of 6 members completely planned research day showcase, which had over 80% faculty participation and over 200 participants in total. Responsibilities included logistics and signage, as well as reviewing advertising materials.

UMCP Department of Mechanical Engineering Distinguished Lecture Series Coordinator (Fall 2000 – Spring 2003) (www.enme.umd.edu/dls) See the bottom of the webpage for links to previous years.

- Select, invite, and host approximately four well-known scholars in Mechanical Engineering to give Departmental lectures each year, distributed across the discipline.

UCSD MAE Department Laboratories and Shops Committee (Fall 2003 – present)

- Responsible for allocation of resources to maintain and improve departmental lab and shop space.

UCSD Center for Energy Research Executive Committee (2005 -)

Department / College Service

Search Committee, Energy Focus, MAE Department (UCSD) (Fall 2006 – Spring 2007)

MAE Department Labs and Shops Committee (UCSD) (2003-2005)

Advisor, American Society of Mechanical Engineers student section (UCSD) (2004-present)

Jacobs School “Teams in Engineering Service” Advisory Board (UCSD) (2005 -)

UCSD Jacobs School Research Review 2004, MAE Dept. Co-Chair (with Prof. Colm Caulfield)

UMCP Engineering Faculty Council (reports to the Dean of Engineering) (Spring 2001 – Spring 2003)

- APT Ad Hoc Review Committee provided structure and uniformity throughout the college to the promotion and tenure process.

Search Committee, Director of Instructional Technologies, UMCP School of Engineering (Spring 2001)

University Service

Associate Director, Center for Energy Research (July 2006 -)

Steering Committee, Environmental Sustainability Initiative (2005 -)

Delegate, UCSD Academic Senate (elected from MAE Department)(Fall 2006 – Spring 2008)

Hinman CEOs Program committee (UMCP), (June 2000 – May 2001).