Christopher Bruce Stipe

Seattle University
Mechanical Engineering, E512
901 12th Avenue
P.O. Box 222000
Seattle, WA 98122-1090

Office: (206) 296-6941
Fax: (206) 296-2209
Email: stipec@seattleu.edu

http://www2.seattleu.edu/scieng/me/Default.aspx?id=13926

EDUCATION

2003 Ph.D. **University of California, Berkeley**
Mechanical Engineering
Major: Thermosciences/Combustion
Minors: Energy and Resources, Public Policy, Spectroscopy
Advisors: Donald Lucas, Catherine Koshland, and Robert Sawyer
Dissertation: "Excimer Laser Irradiation for Nanoparticle Production and Measurement"

2001 M.S. **University of California, Berkeley**
Mechanical Engineering

1998 B.S. **Montana State University, Bozeman**
Mechanical Engineering
Graduated with Highest Honors

1996 **Lancaster University, England**
College of Engineering
Foreign Exchange Student

PROFESSIONAL EXPERIENCE

9/10 – Present **Associate Professor of Mechanical Engineering**, Seattle University, Seattle, WA
Research Interests: Development of laser induced breakdown spectroscopy (LIBS), nanoparticle generation and measurement for atmospheric studies, nanomaterial synthesis, and emissions monitoring from hydrogen powered vehicles.

9/04 – 8/10 **Assistant Professor of Mechanical Engineering**, Seattle University, Seattle, WA

2/05 – 7/11 **Affiliate Faculty Member of Mechanical Engineering**, University of Washington, Seattle, WA

1/08 – Present **Research Engineering Consultant**, Photon Machines Inc., Redmond, WA
Laser induced breakdown spectroscopy of solid and liquid samples, development of chemometric data analysis techniques, aerosol lens design, aerosol time-of-flight, photo-fragmentation laser induced fluorescence.

10/10 – 11/10 **Visiting Associate in the Geological and Planetary Sciences Department**, California Institute of Technology, Pasadena, CA
Conducted laser induced breakdown spectroscopy studies on geological samples to assess the accuracy and precision of potassium quantification in support of future Mars rover mission.

11/09 – 3/10 **Expert Witness,** Gordon, Edmunds, Elder PLLC, Bellevue, WA
Heat transfer analysis of ice formation for a slip and fall case.

6/07 – 8/07 **Engineering Consultant,** FSi Consulting Engineers, Seattle, WA
HVAC analysis and design, LEED certification analysis, Trace 700 simulations of energy efficient buildings, Finite Element Analysis of mechanically cooled electrical duct bank.

6/06 – 8/06 **Summer Assistant Research Professor,** Desert Research Institute, Reno, NV
Research Interests: Development of nanoparticle production devices, characterization of nanoparticles with nephelometer, photo-acoustic instrument, SMPS, SEM, and EC/OC analysis.

8/03 - 8/04 **NIH Post-Doctoral Researcher**, University of Minnesota-Twin Cities, Minneapolis, MN
Research Interests: Axon guidance for nerve regeneration therapy, self-assembly, protein patterning techniques (μ-CP and MIMIC), imaging techniques (XPS, AFM, SEM, TEM).

8/99 - 7/03 **Graduate Research Assistant**, University of California-Berkeley and Lawrence Berkeley National Laboratory (LBNL), Berkeley, CA
Research Interests: Development of nanoparticle production and measurement techniques using UV laser, nanoparticle production using controllable inverted non-premixed flame, and LIF of electrically induced microbuoyant droplet flame.

6/98 - 7/99 **Mechanical Engineer**, National Wind Turbine Center, National Renewable Energy Laboratory (NREL), Golden, CO
Research Interests: Design of structural testing equipment for wind turbine blades and blade components, material testing, and FEA for analysis of turbine blade modes.

8/97 - 12/97 **Undergraduate Engineering Co-op**, Data Storage Department, Imation Corporation, St. Paul, MN
Interests: Programming robotic coordinate measuring arm for dimensional analysis.

10/96 - 4/97 **Undergraduate Researcher**, Hydro-Power Generator Project, Lancaster University, England
Research Interests: Design and fabrication of attachment arm to miniature hydro-power generator, experimental testing of generator efficiency.

TEACHING EXPERIENCE

2004 – 2012 Mechanical Engineering Department, Seattle University
MEGR 230: Dynamics
MEGR 322: Thermodynamics II
MEGR 324: Heat Transfer and Laboratory
MEGR 435: Dynamic Systems and Laboratory
MEGR 493: Introduction to Combustion
MEGR 493: Renewable Energy
MEGR 488: Engineering Design II
MEGR 489: Engineering Design III
MEGR 487,488, 489: Faculty Advisor for Engineering Design
2004-2005: Design and Installation of a Solar Array
2005-2006: Thermal Design and Testing of Kenworth Sleeper Cab
2006-2007: Spectroscopic Measurement of a Pulse Detonation Engine
2007-2008: Waste Heat Recovery from Diesel Exhaust Gases
2008-2009: Costco Energy Efficiency HVAC Analysis
2009-2010: Waste Heat Recovery from Cray Computers
2010-2011: FSI User Interface for Solid Fertilizer Distribution
2011-2012: Backpack Portable LIBS System
2012-2013: Air Quality Monitor for Underground Mines

Fall 2003 Invited Lecturer, Mechanical Engineering Department, University of Minnesota - Twin Cities
Discussed relationship between aerosol science and biotechnology. Co-organized a tour of the TSI Corporation, a world leading particle instrumentation company.

Fall 2002 Invited Lecturer, Energy and Resources Group, University of California - Berkeley
Lectured on thermodynamics related to combustion energy generation systems.

Fall 2001 Graduate Student Instructor, Energy and Resources Group, University of California - Berkeley
ER100/200: Energy and Society
Worked closely with Prof. Kammen and Prof. Koshland to restructure the interdisciplinary course on energy systems, pollution, and economic analysis. Received Outstanding Graduate Student Instructor award from the University of California at Berkeley.

Fall 2001 Attended ME 301: Teaching Mechanical Engineering at the University of California - Berkeley
Discussed effective teaching strategies, alternative learning styles, and use of media resources.

RESEARCH FUNDING

2012	National Science Foundation – Major Research Instrumentation Grant ($265,908)
2010	Department of Energy, SBIR Phase I, Co-PI (~$100k)
2010	National Science Foundation, SBIR Phase I, Outside Consultant (~$150k)
2009	Independent Colleges of Washington (ICW) – Puget Sound Energy, Energy Efficiency Grant ($10,000)
2005-2006	National Science Foundation – Major Research Instrumentation Grant, #0521678 ($153,021)
	Seattle University Summer Faculty Fellowship (2005, 2008, 2011)

HONORS AND AWARDS

2003-2004	National Institute of Health (NIH) Post-Doctoral Research Fellowship
2002-2003	SAE Doctoral Scholar
2001-2003	University of California Toxic Substances Research & Teaching Fellowship
Fall 2001	U.C. Berkeley Outstanding Graduate Student Instructor Award
1998	Engineering R.L. Durkee Scholarship
1998	Engineer-in-Training (EIT)
1993-1997	Tozer Foundation Scholarship
1993-1997	National Showmen's League Scholarship
1994-1997	Midwest Showmen's League Scholarship

PUBLICATIONS

Refereed Journal Publications

1. **C.B. Stipe**, A.L. Miller, J. Brown, E. Guevara, E. Cauda, "Quantification of Silica in Coal Dust Via Laser-induced Breakdown Spectroscopy: Evaluating a Potential Near Real-time Monitoring Application," in press in Appl. Spectrosc., 2012.
2. **C.B. Stipe**, E. Guevara, J. Brown, G.R. Rossman, "Quantitative Laser-Induced Breakdown Spectroscopy of Potassium for In-Situ Geochronology on Mars," Spectrochim. Acta B, 2012, doi:10.1016/j.sab.2012.04.010.
3. R.K. Chakrabarty, H. Moosmuller, M.A. Garro, **C.B. Stipe**, "Observation of Supperaggregates from a Reversed Gravity Low-Sooting Flame," Aerosol Sci. and Technol., **46**:1, i-iii , 2012.
4. **C.B. Stipe**, B.D. Hensley, J.L. Boersema, S.G. Buckley, "Laser Induced Breakdown Spectroscopy of Steel: A Comparison of Univariate and Multivariate Calibration Methods," Appl. Spectrosc. **64**, 154-160, 2010.
5. V.F. McNeill, R.L.N. Yatavelli, J.A. Thornton, **C.B. Stipe**, O. Landgrebe, "The Heterogeneous OH Oxidation of Palmitic Acid in Single Component and Internally Mixed Aerosol Particles: Vaporization and the Role of Particle Phase," Atmos. Chem. Phys., 8, 5465 – 5476, 2008.
6. A.L. Miller, **C.B. Stipe**, M.C. Habjan, and G.G. Ahlstrand, "Role of Lubrication Oil in Particulate Emissions from a Hydrogen-Powered Internal Combustion Engine," Environmental Science and Technology, 41, 6828-6835, 2007.
7. J.H. Choi, **C.B. Stipe**, C.P. Koshland, and D. Lucas, "In-Situ, Real-time Detection of Soot Particles Coated with NaCl Using 193 nm Light," Applied Physics B: Lasers and Optics, DOI: 10.1007/s00340-006-2341-8, 2006.
8. **C.B. Stipe**, D. Lucas, C.P. Koshland, and R.F. Sawyer, "Soot Particle Disintegration and Detection by Two-Laser Fragmentation Fluorescence Spectroscopy," Applied Optics, 44, 6537-6544, 2005.

9. J.H. Choi, **C.B. Stipe**, D. Lucas, R.F. Sawyer, and C.P. Koshland, "NaCl Particle Interaction with 193nm Light: Ultraviolet Photofragmentation and Nanoparticle Production," Journal of Applied Physics, 97, 124315, 2005.
10. **C.B. Stipe**, B.S. Higgins, D. Lucas, C.P. Koshland, and R.F. Sawyer, "Inverted Co-Flow Diffusion Flame for Producing Soot," Review of Scientific Instrumentation, 0230908-1-5, 2005.
11. **C.B. Stipe**, J.H. Choi, D. Lucas, R.F. Sawyer, and C.P. Koshland, "Nanoparticle Production by UV Irradiation of Combustion Generated Soot Particles," Journal of Nanoparticle Research, 6, 467-477, 2004.
12. M.J. Papac, D. Dunn-Rankin, **C.B. Stipe**, and D. Lucas, "CARS Temperature and LIF Oxygen Concentration Measurements in an Electrically Induced Microbuoyant Flame," Combustion and Flame, 133, 241-254, 2003.
13. **C.B. Stipe**, B.S. Higgins, D. Lucas, R.F. Sawyer, and C.P. Koshland, "Soot Detection Using Excimer Laser Fragmentation Fluorescence," Proceedings of the Combustion Institute, 29, 2759-2766, 2002.

Conference Papers

1. S.G. Buckley, G.A. Lithgow, **C.B. Stipe**, "LIBS in Industry: Sparks Fly," Optical Society of America Conference, 2010 Applied Industrial Optics: Spectroscopy, Imaging, and Metrology, Tucson, Arizona, June 7-10, 2010.
2. **C.B. Stipe,** J.H. Choi, D. Lucas, R.F. Sawyer, and C.P. Koshland, "UV Photofragmentation of Combustion Generated Particles," Paper PH4, 3rd *Joint Meeting of the U.S. Sections of the Combustion Institute*, Chicago, Illinois, March 16-19, 2003.
3. **C.B. Stipe**, D. Lucas, R.F. Sawyer, and C.P. Koshland, "Two Laser Photofragmentation of Soot Particles," Paper D19, 3rd *Joint Meeting of the U.S. Sections of the Combustion Institute*, Chicago, Illinois, March 16-19, 2003.
4. M.J. Papac, D. Dunn-Rankin, **C.B. Stipe**, and D. Lucas, "CARS Temperature and LIF Oxygen Concentration Measurements in an Electrically Induced Microbuoyant Flame," Paper 02S-43, *Combustion Institute Western States Spring Meeting*, San Diego, California, March 25-26, 2002.
5. **C.B. Stipe**, D. Lucas, R.F. Sawyer, and C.P. Koshland, "Detection of Cerium Chloride and Cerium Sulfate Particles with Excimer Laser Fragmentation Fluorescence," Paper #234, *2nd Joint Meeting of the U.S. Sections of the Combustion Institute*, Oakland, California, March 25-28, 2001.
6. **C.B. Stipe**, B.S. Higgins, D. Lucas, R.F. Sawyer, and C.P. Koshland, "ELFFS Detection of Cerium and the Effect of Cerium Salt Addition on the Production of Soot in a Co-flow Diffusion Flame," Paper 01F-10, *Combustion Institute Western States Fall Meeting*, Salt Lake City, Utah, October 15-16, 2001.

SCHOLARLY PRESENTATIONS

Invited Talks

1. "LIBS: In the lab, out of the lab, and on other planets," Lawrence Livermore National Laboratory, March 22, 2012.
2. "Detection of Potassium in USGS Standard Basalt Glasses," CalTech University/Jet Propulsion Lab, Mars Science Laboratory Program, October 28, 2010.
3. "Measurement of Optical Properties of Combustion Generated Particulate Matter", University of Washington, Fire Sciences Laboratory, May 23, 2007.
4. "The Role of Lubrication Oil on the Emissions of Particulate Matter from a Hydrogen Engine," University of Washington, December 6, 2006.
5. "Combustion Generated Nanoparticle Production and Measurement," Desert Research Institute, February 24, 2006.
6. "Controlled Axon Guidance Using Patterned Substrates and Chemical Gradients," Univeristy of Minnesota, July 14, 2004.
7. "Controlled Nerve Growth," Seattle University, March 12, 2004.
8. "UV Photofragmentation for Particle Modification and Measurement," University of Minnesota, Particle Technology Laboratory, October 8, 2003.

Conference Podium Presentations

1. R.K. Chakrabarty, H. Moosmuller, C.B. Stipe, "Carbonaceous Superaggregates from a Reversed Gravity Flame," 30th Annual American Association of Aerosol Research Conference, Minneapolis, MN, October 8-12, 2012.
2. C.B. Stipe, G.R. Rossman, E. Guevara, S.G. Buckley, "In-situ Geochronology on Mars by Laser Induced Breakdown Spectroscopy," 2011 GSA Annual Meeting, Minneapolis, MN, October 9-12, 2011.
3. R.K. Chakrabarty, H. Moosmuller, C.B. Stipe, "Carbonaceous Superaggregates from a Reversed Gravity Flame," 29th Annual American Association of Aerosol Research Conference, Orlando, FL, October 3-7, 2011.
4. C.B. Stipe, E. Guevara, S.G. Buckley, G.R. Rossman, "Geochronology by LIBS: Development of a Method Suitable for Mars," 3rd North American Symposium on Laser Induced Breakdown Spectroscopy, Clearwater Beach, FL, July 18-20, 2011.

5. C.B. Stipe, A.L. Miller, G.A. Lithgow, S.G. Buckley, "Towards Development of a Portable Coal Dust Analyzer for Silica with Laser Induced Breakdown Spectroscopy," 29th Annual American Association of Aerosol Research Conference, Portland, OR, October 25-29, 2010.
6. C.B. Stipe, B.D. Hensley, J.L. Boersema, S.G. Buckley, "Laser Induced Breakdown Spectroscopy of Steel: A Comparison of Univariate and Multivariate Calibration Methods," 24th International Forum on Process Analytical Technology, IFPAC, Baltimore, Maryland, February 2-4, 2010.
7. S.G. Buckley, C.B. Stipe, D. Hoffman, G. Schmidt, P. Efthimion, K. Kaye, "Laser-Assisted Microwave Plasma Spectroscopy (LAMPS) Performance for Solid Sample Analysis," FACSS Conference, Louisville, Kentucky, October 18-22, 2009.
8. "Two Laser Photofragmentation of Soot Particles," 3rd Joint Meeting of the U.S. Sections of the Combustion Institute, Chicago, Illinois, March 16-19, 2003.
9. "Soot Detection Using Excimer Laser Fragmentation Fluorescence," 29th International Symposium on Combustion, July 21-26, 2002.
10. "ELFFS Detection of Cerium and the Effect of Cerium Salt Addition on the Production of Soot in a Co-flow Diffusion Flame," Combustion Institute Western States Fall Meeting, Salt Lake City, Utah, October 15-16, 2001.

Poster Presentations

1. **C.B. Stipe,** J. Brown, S.G. Buckley, "Development of a Coal Dust Analyzer for Silica by Laser Induced Breakdown Spectroscopy," 3rd North American Symposium on Laser Induced Breakdown Spectroscopy, Clearwater Beach, FL, July 18-20, 2011.
2. T. Likes, N. McMillan, K. Yetter, J. Dowe, M. Wise, S. Buckley, G. Lithgow, **C. Stipe**, and P. Torrione, "Determining the Provenance of Gemstones Using the Materialytics Geomaterial Sequencing System (MG2S)," International Gemological Symposium, Carlsbad, CA, May 29-30, 2011.
3. R.K. Chakrabarty, H. Mooosmuller, **C.B. Stipe**, "One-Step Continuous Flame Synthesis of Carbon Aerogels," 10th International Conference on Carbonaceous Particles in the Atmosphere, Vienna, Austria, June 26-29 2011.
4. M. Sullivan, **C.B. Stipe**, "Weather Station Data for Energy Efficient Building Operation," National Conferences on Undergraduate Research, University of Montana – Missoula, April 15-17, 2010.
5. A. Eastman, E. Tyler, **C.B. Stipe**, "Towards Reducing the Uncertainty of Soot's Effect on Global Climate Change: Generation and Measurement of Soot from an Inverted Burke Schumann Flame," National Conferences on Undergraduate Research, Dominican University of California, April 12-14, 2007.
6. **C.B. Stipe**, A.L. Miller, M.C. Habjan, G.G. Ahlstrand, "The Role of Lubrication Oil in Particulate Emissions from a Hydrogen-Powered Internal Combustion Engine," 7th International Aerosol Conference, St. Paul, MN, September 10-15, 2006.
7. G.G. Ahlstrand, A.L. Miller, and **C.B. Stipe**, "Characterization of Particulate Emissions from a Hydrogen Engine," Microscopy Society of America, Chicago, IL, July 30 – August 3, 2006.
8. **C.B. Stipe**, J.H. Choi, R.F. Sawyer, C.P. Koshland, D. Lucas, "Excimer Laser Irradiation for Nanoparticle Production and Measurement," Seattle University Celebration of Faculty Scholarship and Research, 2005.
9. J.H. Choi, **C.B. Stipe**, R.F. Sawyer, C.P. Koshland, D. Lucas, "Soot Particle Interactions with UV Light," *30th International Symposium on Combustion*, Chicago, IL, July 25-30, 2004.
10. **C.B. Stipe**, D. Lucas, C.P. Koshland, R.F. Sawyer, "Soot Particle Disintegration and Measurement by Fragmentation Fluorescence Spectroscopy," 2003 Gordon Conference on Laser Diagnostics in Combustion, Oxford University, England.
11. N. O'Donovan, **C.B. Stipe**, J.H. Choi, B.S. Higgins, D. Lucas, R.F. Sawyer, C.P. Koshland, "Development of a Laser Diagnostic Tool for Detecting Lead in Soil and Combustion Generated Particles," *Annual NIEHS/EPA Basic Research and Training Meeting*, Tucson, AZ, November 3-6, 2002.
12. **C.B. Stipe**, B.S. Higgins, D. Lucas, R.F. Sawyer, C.P. Koshland, "Development of a Diagnostic Tool for Monitoring Diesel Soot and a Cerium Fuel Additive," 15th Annual U.C. Toxic Substances Research and Teaching Program Symposium, Long Beach, California, April 5-6, 2002.
13. **C.B. Stipe**, D. Lucas, R.F. Sawyer, and C.P. Koshland, "Detection of Cerium Particles by ELFFS," *Annual NIEHS/EPA Basic Research and Training Meeting*, Berkeley, CA, January 30, 2001.

<u>OTHER CONFERENCES ATTENDED</u>

1. North American Symposium on Laser Induced Breakdown Spectroscopy, New Orleans, LA, July 2009.
2. Laser Induced Breakdown Spectroscopy, LIBS2008 International Conference, Berlin, Germany, September 2008.
3. Meeting the New California Air Resources Board Zero Emission Vehicle Mandate Requirements: Grid-connected

Hybrids and City Electric Vehicles, Davis, CA, May 15-16, 2001.

4. *28th International Symposium on Combustion*, Edinburgh, Scotland, July 30-August 4, 2000.

PROFESSIONAL ASSOCIATIONS and ACTIVITIES

American Association for Aerosol Research (2006-present)
American Society for Engineering Education (2004 - 2008)
Society of Automotive Engineers (2003 - 2005)
Air and Waste Management Association (2002 - 2004)
Session Chairperson Western States Section/Combustion Institute Meeting Fall (2001)

SERVICE

University

2011 – Present	Academic Assembly
2011 – Present	Faculty Technology Committee
2010 – Present	Facilities Planning Committee
2009	College of Science and Engineering External Review of Tenure Candidates Committee
2005 – 2008	College of Science and Engineering Faculty Development Committee, Chair (2007-2008)
2007 – Present	Freshman Orientation Faculty Presenter
Winter 2007	Seattle University, *Science Splash!*, Project Mentor
Winter 2006	Discussion Panelist, *Global Climate Change*, Prof. John Bean
Winter 2006	Discussion Panelist, *Fine Arts Senior Synthesis*, Prof. Karen Overbey

Departmental

2004 – Present	ABET Accreditation Data Collection
2004 – Present	Quarterly Academic Advising (~ 20 students)
2010	Math 233/234 Revision Study
2009	University Self-Study for Mechanical Engineering Department
2006 – Present	Mechanical Engineering Recruitment, Highland, Everett, Bellevue, Shoreline Community College
2005	Search Committee for Machine Shop Supervisor
2005 – Present	Mechanical Engineering Industry Advisory Board
2005 – Present	Departmental Exam Review, Fluid Dynamics
2004, 2010	ABET Report Preparation

Scholarly

Undergraduate Student Research Advising

2012	David Funnell: Laser-Induced Breakdown Spectroscopy
2011 – 2012	Jonathan Brown and Edward Guevara: Laser-Induced Breakdown Spectroscopy
2009 – 2010	Michael Sullivan: Weather Station Data for Improved Building Energy Efficiency
2008 – 2009	Brian Hensley: Laser Induced Breakdown Spectroscopy of Steel
Summer 2007	Christopher Stoll: Nanoparticle Coating
2005 – 2007	Andrew Eastman: Nanoparticle Lab Development and Research
Summer 2004	Margo Smith (NNIN REU): Controlled Neuron Growth by Pattern Protein Gradients

Graduate Student Research Advising

Mechanical Engineering Master's Thesis Advisor and Committee Member (University of Washington)

2005 – 2006	Keith Boyd Fackler: Renewable Energy Opportunities for Haleakala National Park: Kipahulu District
2004 – 2005	Eron Jacobson: Minimizing the Cost of Wind Energy for Vashon Island

Journal Article Reviewing
Applied Spectroscopy, Spectroscopy Letters, Aerosol Science & Technology, Environmental Science & Technology, Journal of Environmental Monitoring, Sensors & Actuators: B. Chemical, Journal of Power and Energy, National Occupational Institute of Occupations Safety and Health (NIOSH) Internal Reviewer, American Society of Engineering Education, Journal of Nanoparticle Research

Proposal Reviewing
NASA Experimental Program to Stimulate Competitive Research (EPSCoR), Department of Energy Small Business Innovative Research Proposal Reviewer (DOE-SBIR), National Science Foundation Proposal Reviewer on Radiative Transport

Community

2010	Solar Energy Lecture and Tour, Garfield High School Students
2005	Upward Bound Career Shadow Volunteer, Seattle University
2002	Invited Speaker at Hayward High School: Advised students about college and science fields
1997 – 1998	Volunteer Tutor: Third grade and middle school reading comprehension tutor
1996 – 1997	Exchange Student Guide and Curriculum Advisor, Lancaster University, England