

# Curriculum Vitae

## David R. Bowling

10 July 2015

---

Professor, Department of Biology, University of Utah  
257 S. 1400 E., Salt Lake City, UT 84112-0840  
(801) 581-2130  
david.bowling@utah.edu

### **Research Interests**

Ecosystem ecology of forest, mountain, and arid biomes, biogeochemistry, biosphere-atmosphere interactions, environmental change

### **Academic Positions (University of Utah)**

2014 – present Professor, Dept. of Biology  
2006 – present Adjunct Professor, Dept. of Atmospheric Sciences  
2008 – 2014 Associate Professor, Dept. of Biology  
2003 – 2008 Assistant Professor, Dept. of Biology  
2001 – 2002 Research Assistant Professor, Dept. of Biology  
1999 – 2001 Postdoctoral Scientist, Dept. of Biology, with J. Ehleringer

### **Education**

1999 Ph.D. Biology University of Colorado, Boulder, with R. Monson  
1994 M.S. Electrical Engineering University of Colorado, Boulder, with D. Etter  
1991 B.S. Electrical Engineering New Mexico State University

### **Peer-Reviewed Publications**

(graduate students underlined, undergraduates underlined with \*)

#### *in review:*

Maurer GE, Chan AM, Trahan NA, Moore DJP, Bowling DR (in review) Carbon isotopes of forest soil respiration in the decade following bark beetle and stem girdling disturbances in the Rocky Mountains, submitted 07/15 to *Plant, Cell, and Environment*

Hall SJ, Weintraub SR, Baker MA, Jones SB, Stark JM, Bowling DR (in review) From meadows to lawns: comparing soil nitrogen dynamics across a montane to urban semi-arid watershed, submitted 06/15 to *Ecosystems*

Moyes AB, Bowling DR (in review) Plant community composition and phenological stage drive soil carbon cycling along a tree-meadow ecotone, submitted 04/15 to *Plant and Soil*

Bowling DR, Egan JE, Hall SJ, Risk DA (in review) Environmental forcing does not induce diel or synoptic variation in carbon isotope content of forest soil respiration, submitted 04/15 to *Biogeosciences*

#### *in press:*

Hall SJ, Hale RL, Baker MA, Bowling DR, Ehleringer JR, Riparian plant isotopes reflect anthropogenic nitrogen perturbations: Robust patterns across land use gradients, *Ecosphere*

Maurer GE, Bowling DR, Dust effects on snowpack melt and related ecosystem processes are secondary to those of forest canopy structure and interannual snowpack variability, *Ecohydrology*, doi: 10.1002/eco.1558

*published:*

57. Miller OL, Solomon DK, Fernandez DP, Cerling TE, Bowling DR (2014) Evaluating the use of strontium isotopes in tree rings to record the isotopic signal of dust deposited on the Wasatch Mountains, *Applied Geochemistry* 50:53-65.
56. Hall SJ, Maurer GE, Hoch SW, Taylor R, Bowling DR (2014), Impacts of anthropogenic emissions and cold air pools on urban to montane gradients of snowpack ion concentrations in the Wasatch Mountains, Utah, *Atmospheric Environment*, 98:231-241.
55. Maurer GE, Bowling DR (2014) Seasonal snowpack characteristics influence soil temperature and water content at multiple scales in interior western U.S. mountain ecosystems, *Water Resources Research*, 50, 5216-5234, doi: 10.1002/2013WR014452
54. Bowling DR, Ballantyne AP, Miller JB, Burns SP, Menzer O, Conway TJ, Stephens BB, Vaughn BH (2014) Ecological processes dominate the <sup>13</sup>C land disequilibrium in a Rocky Mountain subalpine forest, *Global Biogeochemical Cycles*, 28:352-370, doi:10.1002/2013GB004686.
53. Moyes AB, Bowling DR (2013) Interannual variation in seasonal drivers of soil respiration in a semi-arid Rocky Mountain meadow, *Biogeochemistry*, 113:683-697, DOI 10.1007/s10533-012-9797-x
52. Brooks, B-G J, Desai AR, Stephens BB, Bowling DR, Burns SP, Watt AS, Heck SL, Sweeney C (2012), Assessing filtering of mountaintop CO<sub>2</sub> mole fractions for application to inverse models of biosphere-atmosphere carbon exchange, *Atmospheric Chemistry and Physics*, 12:2099-2115.
51. Wilcox BP, Turnbull L, Young MH, Williams CJ, Ravi S, Seyfried MS, Bowling DR, Scott RL, Germino MJ, Caldwell TG, Wainwright J (2011) Invasion of shrublands by exotic grasses: ecohydrological consequences in cold versus warm deserts, *Ecohydrology* DOI: 10.1002/eco.247
50. Blonquist Jr JM, Montzka SA, Munger JW, Yakir D, Desai AR, Dragoni D, Griffis TJ, Monson RK, Scott RL, Bowling DR (2011) The potential of carbonyl sulfide as a proxy for gross primary production at flux tower sites, *Journal of Geophysical Research – Biogeosciences*, 116, G04019, doi:10.1029/2011JG001723.
49. Bowling DR, Massman WJ (2011) Persistent wind-induced enhancement of diffusive CO<sub>2</sub> transport in a mountain forest snowpack, *Journal of Geophysical Research – Biogeosciences*, 116, G04006, doi:10.1029/2011JG001722
48. Bowling DR, Grote EE, Belnap J (2011) Rain pulse response of soil CO<sub>2</sub> exchange by biological soil crusts and grasslands of the semiarid Colorado Plateau, United States, *Journal of Geophysical Research – Biogeosciences*, 116, G03028, doi:10.1029/2011JG001643
47. Strong C, Stwertka C, Bowling DR, Stephens BB, Ehleringer JR (2011) Urban carbon dioxide cycles within the Salt Lake Valley: a multiple box model validated by observations, *Journal of Geophysical Research – Atmospheres*, 116, D15307, doi:10.1029/2011JD015693
46. Gamnitzer U, Moyes AB, Bowling DR, Schnyder H (2011) Measuring and modeling the isotopic composition of soil respiration: insights from a grassland tracer experiment, *Biogeosciences* 8, 1333–1350, www.biogeosciences.net/8/1333/2011/
45. Riveros-Iregui DA, Hu J, Burns SP, Bowling DR, Monson RK (2011) An inter-annual assessment of the relationship between the stable carbon isotopic composition of

- ecosystem respiration and climate in a high elevation subalpine forest, *Journal of Geophysical Research – Biogeosciences* 116, G02005, doi:10.1029/2010JG001556.
44. Bowling DR, Bethers-Marchetti S, Lunch CK, Grote EE, Belnap J (2010) Carbon, water, and energy fluxes in a semi-arid cold desert grassland during and following multi-year drought, *Journal of Geophysical Research - Biogeosciences*, 115, G04026, doi:10.1029/2010JG001322
  43. Moyes AB, Gaines S\*, Siegwolf RTW, Bowling DR (2010) Diffusive fractionation complicates isotopic partitioning of autotrophic and heterotrophic sources of soil respiration, *Plant, Cell, and Environment*, 33:1804-1819, doi: 10.1111/j.1365-3040.2010.02185.x
  42. Moyes AB, Schauer AJ, Siegwolf RTW, Bowling DR (2010) An injection method for measuring the carbon isotope content of soil carbon dioxide and soil respiration with a tunable diode laser absorption spectrometer, *Rapid Communications in Mass Spectrometry*, 24: 894-900.
  41. Bowling DR, Miller JB, Rhodes ME\*, Burns SP, Monson RK, Baer D (2009) Soil, plant, and transport influences on methane in a subalpine forest under high ultraviolet irradiance, *Biogeosciences*, 6:1311–1324, [www.biogeosciences.net/6/1311/2009/](http://www.biogeosciences.net/6/1311/2009/).
  40. Bowling DR, Massman WJ, Schaeffer SM, Burns SP, Monson RK, Williams MW (2009) Biological and physical influences on the carbon isotope content of CO<sub>2</sub> in a subalpine forest snowpack, Niwot Ridge, Colorado, *Biogeochemistry*, 95:37-59, doi 10.1007/s10533-008-9233-4.
  39. Schwinning S, Belnap J, Bowling DR, Ehleringer JR (2008) Sensitivity of the Colorado Plateau to change: climate, ecosystems, and society. *Ecology and Society* 13(2): 28, <http://www.ecologyandsociety.org/vol13/iss2/art28/>
  38. Schaeffer SM, Miller JB, Vaughn BH, White JWC, Bowling DR (2008) Long-term field performance of a tunable diode laser absorption spectrometer for analysis of carbon isotopes of CO<sub>2</sub> in forest air, *Atmospheric Chemistry and Physics*, 8:5263–5277.
  37. Zobitz JM, Burns SP, Reichstein M, Bowling DR (2008) Partitioning net ecosystem carbon exchange and the carbon isotopic disequilibrium in a subalpine forest, *Global Change Biology*, 14:1785-1800, doi: 10.1111/j.1365-2486.2008.01609.x
  36. Schaeffer SM, Anderson DE, Burns SP, Monson RK, Sun J, Bowling DR (2008) Canopy structure and atmospheric flows in relation to the  $\delta^{13}\text{C}$  of respired CO<sub>2</sub> in a subalpine coniferous forest, *Agricultural and Forest Meteorology*, 148:592-605.
  35. Bowling DR, Pataki DE, Randerson J (2008) Carbon isotopes in terrestrial ecosystem pools and CO<sub>2</sub> fluxes (Tansley Review), *New Phytologist*, 178:24-40, doi: 10.1111/j.1469-8137.2007.02342.x.
  34. Zobitz JM, Moore DJP, Sacks WJ, Monson RK, Bowling DR, Schimel DS (2008) Integration of process-based soil respiration models with whole-ecosystem CO<sub>2</sub> measurements, *Ecosystems*, doi:10.1007/s10021-007-9120-1.
  33. Zobitz JM, Burns SP, Ogee J, Reichstein M, Bowling DR (2007) Partitioning net ecosystem exchange of CO<sub>2</sub>: comparison of a Bayesian/isotope approach to environmental regression methods, *Journal of Geophysical Research-Biogeosciences*, 112, G03013, doi:10.1029/2006JG000282.
  32. Fuentes JD, Wang D, Bowling D, Potosnak M, Monson RK, Delany AC, Stockwell WR, Goliff WS (2007) Biogenic hydrocarbon chemistry within and above a mixed deciduous forest, *Journal of Atmospheric Chemistry*, DOI 10.1007/s10874-006-9048-4.
  31. Zobitz JM, Keener JP, Schnyder H, Bowling DR (2006) Sensitivity analysis and quantification of uncertainty for isotopic mixing relationships in carbon cycle research, *Agricultural and Forest Meteorology*, 136:56-75.

30. Wahl EH, and 12 others (2006) Applications of cavity ring-down spectroscopy to high precision isotope ratio measurement of  $^{13}\text{C}/^{12}\text{C}$  in carbon dioxide, *Isotopes in Environmental and Health Studies*, 42:21-35, doi:10.1080/10256010500502934.
29. Pataki DE, Bowling DR, Ehleringer JR, Zobitz JM (2006) High resolution atmospheric monitoring of urban carbon dioxide sources, *Geophysical Research Letters*, 33, L03813, doi:10.1029/2005GL024822.
28. Bowling DR, Burns SP, Conway T, Monson R, White JWC (2005) Extensive observations of  $\text{CO}_2$  carbon isotope content in and above a high-elevation subalpine forest, *Global Biogeochemical Cycles*, 19, GB3023, doi:10.1029/2004GB002394.
27. Roden JS, Bowling DR, McDowell NG, Bond B, Ehleringer JR (2005) Carbon and oxygen isotope ratios of tree ring cellulose along a precipitation transect in Oregon, USA, *Journal of Geophysical Research - Biogeosciences*, 110, G02003, doi:10.1029/2005JG000033.
26. Baldocchi DD, and Bowling DR (2005) Theoretical examination of Keeling-plot relationships for carbon dioxide in a temperate broadleaved forest with a biophysical model, CANISOTOPE, in, Flanagan LB, Ehleringer JR, Pataki DE, Eds. *Stable Isotopes and Biosphere-Atmosphere Interactions: Processes and Biological Controls*, Elsevier, Amsterdam, pp 109-124.
25. McDowell NG, Bowling DR, Schauer A, Irvine J, Bond BJ, Law BE, Ehleringer JR (2004) Associations between carbon isotope ratios of ecosystem respiration, water availability and canopy conductance, *Global Change Biology*, 10, 1767–1784, doi: 10.1111/j.1365-2486.2004.00837.x
24. McDowell NG, Bowling DR, Bond BJ, Irvine J, Law BE, Anthoni P, Ehleringer JR (2004) Response of the carbon isotopic content of ecosystem, leaf and soil respiration to meteorological and physiological driving factors in a *Pinus ponderosa* ecosystem, *Global Biogeochemical Cycles*, 18, GB1013, doi:10.1029/2003GB002049.
22. Bowling DR, McDowell NG, Welker JM, Bond BJ, Law BE, Ehleringer JR (2003) Oxygen isotope content of  $\text{CO}_2$  in nocturnal ecosystem respiration: 1: Observations in forests along a precipitation transect in Oregon, USA, *Global Biogeochemical Cycles*, 17(4), 1120, doi:10.1029/2003GB002081.
21. Bowling DR, McDowell NG, Welker JM, Bond BJ, Law BE, Ehleringer JR (2003) Oxygen isotope content of  $\text{CO}_2$  in nocturnal ecosystem respiration: 2: Short-term dynamics of foliar and soil component fluxes in an old-growth ponderosa pine forest, *Global Biogeochemical Cycles*, 17(4), 1124, doi:10.1029/2003GB002082.
20. Pataki DE, Bowling DR, Ehleringer JR (2003) The seasonal cycle of carbon dioxide and its isotopic composition in an urban atmosphere: anthropogenic and biogenic effects, *Journal of Geophysical Research- Atmospheres*, 108(D23), 4735, doi:10.1029/2003JD003865.
19. Bowling DR, Sargent SD, Tanner BD, and Ehleringer JR (2003) Tunable diode laser absorption spectroscopy for stable isotope studies of ecosystem-atmosphere  $\text{CO}_2$  exchange, *Agricultural and Forest Meteorology*, 118, 1-19.
18. Schauer AJ, Lai C-T, Bowling DR, Ehleringer JR (2003) An automated sampler for collection of atmospheric trace gas samples for stable isotope analyses, *Agricultural and Forest Meteorology*, 118, 113-124.
17. Bowling DR, Pataki DE, and Ehleringer JR (2003), Critical evaluation of micrometeorological methods for measuring ecosystem-atmosphere isotopic exchange of  $\text{CO}_2$ , *Agricultural and Forest Meteorology*, 116, 159-179.
16. Pataki DE, Ehleringer JR, Flanagan LB, Yakir D, Bowling DR, Still CJ, Buchmann N, Kaplan JO, and Berry J (2003) The application and interpretation of Keeling plots in

- terrestrial carbon cycle research, *Global Biogeochemical Cycles*. 17(1), 1022, doi:10.1029/2001GB001850.
15. Baldocchi DD, and Bowling DR (2003) Modelling the discrimination of  $^{13}\text{CO}_2$  above and within a temperate broad-leaved forest canopy on hourly to seasonal time scales, *Plant, Cell, and Environment*, 26:231-244.
  14. Ehleringer JR, Bowling DR, Flanagan LB, Fessenden J, Helliker B, Martinelli LA, Ometto JP (2002) Stable isotopes and carbon cycle processes in forests and grasslands, *Plant Biology*, 4:181-189.
  13. Bowling D, McDowell N, Bond B, Law B, and Ehleringer J (2002)  $^{13}\text{C}$  content of ecosystem respiration is linked to precipitation and vapor pressure deficit, *Oecologia*, 131:113-124.
  12. Bowling DR, Cook CS, and Ehleringer JR (2001) Technique to measure  $\text{CO}_2$  mixing ratio in small flasks with a bellows/IRGA system, *Agricultural and Forest Meteorology*, 109, 61-65.
  11. Bowling DR, Tans PP, and Monson RK (2001) Partitioning net ecosystem carbon exchange with isotopic fluxes of  $\text{CO}_2$ , *Global Change Biology*, 7:127-145.
  10. Bowling DR, Baldocchi DD, and Monson RK (1999) Dynamics of isotopic exchange of carbon dioxide in a Tennessee deciduous forest, *Global Biogeochemical Cycles*, 13:903-922.
  9. Bowling DR, Delany AC, Turnipseed AA, Baldocchi DD, and Monson RK (1999) Modification of the relaxed eddy accumulation technique to maximize measured scalar mixing ratio differences in updrafts and downdrafts, *Journal of Geophysical Research- Atmospheres*, 104:9121-9133.
  8. Baldocchi D, Fuentes J, Bowling D, Turnipseed A, and Monson R (1999) Scaling isoprene fluxes from leaves to canopies: test cases over a boreal aspen and a mixed species temperate forest, *Journal of Applied Meteorology*, 38:885-898.
  7. Katul G, Hsieh C-I, Bowling D, Clark K, Shurpali N, Turnipseed A, Albertson J, Tu K, Hollinger D, Evans B, Offerle B, Anderson D, Ellsworth D, Vogel C, and Oren R (1999) Spatial variability of turbulent fluxes in the roughness sublayer of an even-aged pine forest, *Boundary-Layer Meteorology*, 93:1-28.
  6. Singsaas E, Laporte M, Shi J, Monson R, Bowling D, Johnson K, Lerdau M, Jasentuliytana A, and Sharkey T. (1999) Kinetics of leaf temperature fluctuation affects isoprene emission from red oak (*Quercus rubra* L.) leaves, *Tree Physiology*, 19:917-924.
  5. Bowling DR, Turnipseed AA, Delany AC, Baldocchi DD, Greenberg JP, and Monson RK (1998) The use of relaxed eddy accumulation to measure biosphere- atmosphere exchange of isoprene and other trace gases, *Oecologia*, 116:306- 315.
  4. Demmig-Adams B, Adams III WW, Barker DH, Logan BA, Bowling DR, and Verhoeven AS (1996) Using chlorophyll fluorescence to assess the fraction of absorbed light allocated to thermal dissipation of excess excitation, *Physiologia Plantarum* 98:253-264.

*technical reports:*

23. American Institute of Biological Sciences. (2004) Ecological Aspects of Biogeochemical Cycles: Report from a NEON Science Workshop. Washington, DC: AIBS.
3. Durand S and Bowling D (1990) *Data Acquisition for Photovoltaic Power Plants*, EPRI Publication GS-7082, Electric Power Research Institute.
2. Durand S, Bowling D, and Risser V (1990) Lessons Learned From Testing Utility Connected PV Systems, *Proc. 21st IEEE PV Specialists Conference*, 909-913.

1. Rosenthal A, Lane C, and Bowling D (1990) *Photovoltaic System Performance Assessment for 1988*, EPRI Publication GS-6696, Electric Power Research Institute.

### **Awards**

- 2007 Editors' Citation for Excellence in Refereeing, Journal of Geophysical Research-Atmospheres  
 1999 Best Student Poster in Physiological Ecology, Ecological Society of America  
 1995 STAR Graduate Student Fellow, US Environmental Protection Agency

### **Extramural Grant Support**

- Predicting CO<sub>2</sub> Emissions Associated With Urban Development in the Western U.S.*, NOAA, PIs Lin, Bowling, Buchert, Pataki, Strong, **\$848k**, 1/15-12/17.  
*Multi-scale carbon cycle observations and ecosystem process modeling at Niwot Ridge, Colorado*, U. S. Dept of Energy, Terrestrial Ecosystem Science, PIs Bowling, Koven, Stephens, Williams, **\$988k**, 9/13-8/16.  
*Acquisition of an Isotope Ratio Mass Spectrometer for Tracing Human-Environment Interactions*, NSF Division of Biological Infrastructure - Major Research Instrumentation, **\$687k**, PIs: Bowen, Bowling, Cerling, Ehleringer, Pataki, 9/13-8/16.  
*Observing Snow and Wind: Using the Environment to Engage Students in Science and Engineering*, NSF D. Undergraduate Educ., PIs Horel, Bowling, Pardyjak, Perry, Whiteman, **\$135k**, 7/10-6/12.  
*Carbon cycling dynamics in response to pine beetle infection and climate variation*, U. S. Dept of Energy, Terrestrial Carbon Cycle Research, PIs Monson, Bowling, Grandy, Lehman, Moore, Townsend, (**\$416k** U of U subcontract), 10/10-9/13.  
*Isotope Ratio Mass Spectrometers for Environmental Research*, NSF Major Research Instrumentation, **\$405k**, PIs: Ehleringer, Cerling, Bowling, 9/07-8/10.  
*Long-term assessment of isotopic exchange of carbon dioxide in a subalpine forest (Niwot Ridge AmeriFlux site)*, U. S. Department of Energy, DE-FG02-04ER63904, **\$649.8k**, PI: Bowling and Miller, 9/04-9/07.  
*Field-deployable gas analyzer for MMV applications (Phase I)*, U. S. Department of Energy, SBIR program, PI: Anthony O'Keefe, Los Gatos Research, Bowling subcontract **\$14.8k**, 2/07-3/07.  
*Technical proposal for the development of a Fourier-transform infrared gas analyzer to measure carbon isotopes of CO<sub>2</sub>*, U.S. Department of Energy, SBIR program, PI: Larry Jacobsen, Campbell Scientific, Inc., Bowling subcontract **\$15.2k**, 8/05-7/06.  
*Ultra-sensitive portable isotope ratio analyzer*, US Department of Energy, SBIR DE-FG03-01ER83250-A002, PI: Dmitri Permogorov, Picarro, Inc., Bowling subcontract **\$122k**, 5/02-5/04.

Graduate student fellowships (I contributed as Ph.D. advisor):

- Comparison and assessment of methods to partition net ecosystem exchange of CO<sub>2</sub> in heterogeneous environments*, US Department of Energy Global Change Education Program, Graduate Research Environmental Fellowship, **\$54k**, (2005-2008), (awarded to John Zobitz)  
*Quantifying evapotranspiration and snowmelt dynamics of montane coniferous forests in the Wasatch region*, NSF iUTAH EPSCoR Program, **\$114k** (2012/15) (awarded to Allison Chan)

*Global Change and Sustainability Center Graduate Fellowship, \$27k, 2013/14 (awarded to Emily Schulze)*

### **Intramural Grant Support**

- Trace Gas Analyzer for Gas Calibration Facility, Research Instrumentation Fund, University of Utah, PI Bowling, \$37.3k, 4/15-3/16.*
- Acquisition of an Ion Chromatograph for Natural Water Samples, Research Instrumentation Fund, University of Utah, PI Solomon, co-Is Cerling, Johnson, Fernandez, Bowling, \$35.5k, 7/11-6/12.*
- Salt Lake City inversions and ionic deposition in snow in the Wasatch Mountains, University of Utah Funding Incentive Seed Grant Program, PI Bowling, \$32k, 7/10-6/11.*
- Environmental instrumentation, University of Utah Interdisciplinary Teaching Seed Grant Program, \$12k, PIs Horel, Bowling, Pardyjak, 7/10-6/11.*
- Development of a novel real-time method to measure the stable isotope content of carbon dioxide respired from soil, University of Utah Funding Incentive Seed Grant Program, \$27k, PI: Bowling, 7/06-6/07.*
- System upgrade for Biology's shared tunable diode laser absorption spectrometer, Research Instrumentation Fund Award, University of Utah, \$7.1k, PI: Bowling, 7/05.*
- Instrumentation purchase for a shared tunable diode laser absorption spectrometer, Research Instrumentation Fund Award, University of Utah, \$77.6k, PI: Bowling, 6/03.*
- Ecosystem carbon cycling in a desert grassland, University Research Committee Faculty Research and Creative Grant, University of Utah, \$5.4k, PI: Bowling, 5/03-5/04.*

### **Teaching**

#### *Primary courses (main instructor or significant role):*

- Ecosystem Ecology (2004/06/08/10/12/14, BIOL 5490): This lecture course for 50-60 upper division and graduate students examines the biological, physical, and chemical factors that control storage and cycling of the major elements (carbon, nitrogen, and phosphorus) within terrestrial ecosystems.*
- Biophysical Ecology (2005/07/11/13/15, BIOL/ATMOS/GEO 5495): This lecture and laboratory course for 25 upper division and graduate students examines the physical environment in which plants, animals, and soil organisms live, how the physical environment affects their physiological function, and how organisms in turn affect their physical environment.*
- Stable Isotope Ecology (team-taught summers 2003-2015, GEO 5470/6470): This summer 2-week course attracts top-notch graduate students, postdocs, and faculty from around the world, including Univ. of Utah students. The course focuses on environmental science applications of stable isotope theory, methods, instrumentation, experimental design, lab and fieldwork.*

#### *Graduate courses (varying roles):*

- SpeakerFest (2011, BIOL 7406): main instructor*
- Adv. Topics Ecology and Evolution (2011, 2012, 2013, 2015, BIOL 7964): lecture contributor*
- Bootcamp (2010, 2012, 2014 BIOL 7964): lecture contributor*
- Environmental Instrumentation (2012, 2014, ATMOS 6050): lecture contributor*

Global Changes and Society (2013, BIOL 7961): lecture contributor  
 Geochemistry (2013, GEO 6660): lecture contributor  
 Carbon Cycle (2015, GEO 6680): lecture contributor

*Special topics courses (varying roles):*

Individual Research (2011, BIOL 4955): Supervision of undergraduate research projects.  
 Current Topics in Biogeosciences (2009, BIOL 7406): This graduate core seminar examines current topics in biogeosciences, including drought, fire, climate change, and insects.  
 Biological Responses to Climate Change (2005, BIOL 7406): This graduate core seminar examines observed responses of biological systems to climate change, such as increased growing season length, altered migration patterns, changes in species abundance, etc.  
 Water and Ecology of Western Ecosystems (2003, BIOL 7406): This graduate core seminar examines the importance of water to animals, plants, insects, and microbes in ecosystems of the western U.S.  
 Summer Course on Flux Measurements and Advanced Modeling (team-taught, Summers 2008-2012, [www.fluxcourse.org](http://www.fluxcourse.org)): This summer 2-week course at the University of Colorado attracts graduate students and postdocs from around the world. It was modeled after the Utah stable isotope course (GEO 5470 above) and focuses on forest micrometeorology.

**University of Utah Service**

University Committees

- Transformative Excellence Program – Society, Water, and Climate Faculty Cluster Hire Search Committee (Co-chair) – 2014/15, (member) 2015/16
- Social and Behavioral Science Intellectual Explorations Gen. Ed. Requirement Committee; fall 2012 – spring 2015
- Rio Mesa Center (formerly Entrada Field Station) Faculty Advisory Committee, spring 2008, 2008/09, 2010/11
- International Gen. Ed. Requirement Committee, fall 2005 – spring 2009

Global Change and Sustainability Center

- Founding Member
- Seminar Series Director 2010/11
- Faculty Recruitment Search Committee member 2011
- Seminar Committee member 2011/12
- Executive Committee Biology Representative 2011/12
- Graduate Student Recruitment Committee (chair) 2011/12
- Executive Committee College of Science Representative 2012/13, 2013/14, 2014/15
- Graduate Travel Grant Review Committee 2012/13
- Postdoc Mentoring Program (founder and co-chair) 2013/14
- Graduate Student Fellowship Selection Committee (College of Science Rep) 2014

iUTAH NSF-EPSCoR Project (Utah State-Wide)

- Research Focus Area 1 Science Co-Lead, 2014-present
- Faculty Instrumentation Lead for Red Butte Canyon Watershed, 2012-present
- U. of Utah Hydrology Technician Search Committee (Chair) 2012
- Utah State U. Hydrology Technician Search Committee 2012



- Brigham Young U. Hydrology Technician Search Committee 2012
- Research Focus Area 1 Postdoc Selection Committee 2013
- iFellow Undergraduate Research Program Mentor (summer 2013)

Science Overnight Orientation, Faculty Volunteer, 2005-2009

Proposal Reviews for Funding Incentive SEED Grant Program

Department of Biology Committees

- 2002/03 Graduate Admission
- 2003/04 Graduate Admission, Communication, BioURP Steering, Red Butte Canyon
- 2004/05 Graduate Admission, BioURP Steering, Red Butte Canyon
- 2005/06 Graduate Admission, Curriculum and Teaching, Red Butte Canyon, Riser Award
- 2006/07 Graduate Admission, Curriculum and Teaching, Red Butte Canyon
- 2007/08 Graduate Admission (co-chair), Curriculum and Teaching, Red Butte Canyon
- 2008/09 Graduate Admission (co-chair), Web Site, Red Butte Canyon, Environmental Biology Faculty Search
- 2009/10 Sabbatical Leave
- 2010/11 Executive, Curriculum, Microbial Biology Faculty Search
- 2011/12 Executive, Communications, Microbial Ecology Faculty Search, RPT Advocate
- 2012/13 Executive (alt), Red Butte Canyon (co-chair), Communications
- 2013/14 Red Butte Canyon, Communications
- 2014/15 Graduate Admission (co-chair)

### **Professional Service**

Utah Governor Jon Huntsman's Blue Ribbon Advisory Council on Climate Change:  
Member of Climate Change Science Advisory Panel, 2007

Active with National Ecological Observatory Network (NEON, <http://www.neoninc.org/>)

- Member, Domain Science and Education Coordination Committee for Great Basin Domain 13, since 7/2009
- Member, Domain Science and Education Coordination Committee for Southern Rockies Domain 15, since 7/2009
- Site evaluation visits to Onaqui-Benmore area in Utah for Great Basin Domain 15 Core Site, 4/2007, and 5/2008.
- Rocky Mountain Ecological Observatory Network (ROMEOnet) Regional Meetings, Ft. Collins, CO, 11/2004, Boulder, CO, 4/2004.
- Invited participant, NEON Workshop, Boulder, CO, 7/2004 – co-authored an associated publication (in list above)

Editorial Boards:

- Oecologia, 2014-present
- Agricultural and Forest Meteorology, 2008-2014
- Journal of Geophysical Research – Biogeosciences, 2004-2008, 2010-2014

AmeriFlux Network Scientific Steering Committee member, which oversees a national flux tower CO<sub>2</sub> monitoring network, 2004-present  
(<http://ameriflux.ornl.gov/organization.html>)

Manuscript reviews:

Agricultural and Forest Meteorology, Analytical Chemistry, Applied Geochemistry, Applied Spectroscopy, Atmospheric Environment, Atmospheric Measurement Technology, Australian J. of Plant Physiology, Biogeochemistry, Biogeosciences, Chemical Geology, Ecological Applications, European J. of Soil Biology, Functional Ecology, Geochimica et Cosmochimica Acta, Global Biogeochemical Cycles, Global Change Biology, Isotopes in Environmental and Health Studies, J. of Applied Meteorology, New Phytologist, Oecologia, Plant, Cell, and Environment, PLoS One, PNAS, Rangeland Ecology and Management, Rapid Communications in Mass Spectrometry, Soil Biology and Biochemistry, Tellus, Tree Physiology

Grant proposal reviews (U.S.)

- NSF Directorate for Biological Sciences, Division of Environmental Biology
  - Ecosystem Science cluster
  - Instrumentation and Instrumentation Development
  - Major Research Instrumentation
- NSF Directorate for Geosciences
  - Division of Atmospheric Sciences
  - Division of Earth Sciences, Instrumentation and Facilities
  - Division of Ocean Sciences, Ocean Technology and Interdisciplinary Coordination Program
- DOE Terrestrial Ecosystem Science Program
- DOE National Institute for Global Environmental Change
  - Northeast Regional Center
  - Southeast Regional Center
  - Great Plains Regional Center
- DOE National Institute for Climatic Change Research
  - Northeast Regional Center
  - Southeast Regional Center
- DOE Small Business Innovation Research
- NOAA Climate and Global Change Program
- NOAA Climate - Earth System Science - Global Carbon Cycle Program
- Kearney Foundation for Soil Science (U. California system)

Grant proposal reviews (international)

- Austrian Science Fund (Austria)
- Deutsche Forschungsgemeinschaft (Germany)
- Experimentation in Ecosystem Research (ExpeER, European Union)
- Israel Science Foundation (Israel)
- Minerva Weizmann Foundation of the Max Planck Society (Germany)
- Natural Environment Research Council (United Kingdom)
- Natural Sciences and Engineering Research Council (Canada)
- Swiss Federal Institute of Technology (ETH) Zürich (Switzerland)
- Swiss National Science Foundation (Switzerland)
- US-Israel Binational Science Foundation (Israel)

Grant proposal review panels:

US National Science Foundation, US Environmental Protection Agency

Tenure/promotion reviews:

Universities in United States, United Kingdom, Finland

Book chapter and technical report reviews:

- Phenology of Ecosystem Processes, Springer
- United States Geological Survey

External dissertation reviews:

- Australian National University, Research School of Biological Sciences (Australia)
- Dalhousie University, Dept. of Earth Sciences (Canada)
- Technische Universität Muenchen (Germany)

Interaction with public/press

- Panel discussion about forests for Utah Film Center associated with IUFRO World Congress 2014, 10/7/14
- KCPW radio article about iUTAH EPSCoR Project, 5/8/14  
(<http://exploreutahscience.org/science-topics/science-and-society/item/146-from-pristine-to-polluted-following-the-journey-of-an-urban-stream>)
- EPA STAR Fellow Success Story 7/13  
(<http://www.scgcorp.com/fellowship/stories.aspx/>)
- global change public discussion panel for KCPW radio, 6/16/06
- KCPW radio article, 3/16/06
- Newspaper article, Salt Lake Tribune, 8/7/06
- Newspaper article, Daily Utah Chronicle, 4/11/06
- Op-ed article, Daily Utah Chronicle, 9/17/04

Professional Society Membership:

- American Geophysical Union, since 1998
- Ecological Society of America, since 2000

**Public Datasets Generated by Research**

Forest carbon dioxide stable isotope composition, Niwot Ridge, Colorado

- funded by U.S. Dept of Energy and National Science Foundation
- period of record Sept 2005 – present, and summer 2003, half-hourly data
- [http://biologylabs.utah.edu/bowling/niwot\\_data.html](http://biologylabs.utah.edu/bowling/niwot_data.html)

Desert grassland carbon dioxide, water, and energy fluxes, Corral Pocket, Utah

- part of the AmeriFlux network of towers
- funded by University of Utah and U. S. Geological Survey
- period of record April 2001 – December 2007, half-hourly data
- <http://ameriflux.ornl.gov/fullsiteinfo.php?sid=210>

**Graduate Students Trained (D. Bowling as graduate advisor)**

Seth Arens (MS 2010), "Ion deposition in Wasatch mountain snow: influence of Great Salt Lake and Salt Lake City" (now at State of Utah Division of Air Quality)  
Mark Blonquist (MS 2012), "The potential of carbonyl sulfide as a proxy for gross primary production at flux tower sites" (now a scientist at Apogee Instruments)  
Dr. Greg Maurer (PhD 2014), "The influence of seasonal snowpack variability on biogeochemical processes in western U.S. montane ecosystems" (now a postdoc at University of New Mexico)  
Dr. Andrew Moyes (PhD 2010), "The contribution of recently-assimilated carbon to soil respiration" (now a scientist at U.C. Berkeley, California)  
Emily Schulze (MS 2015) "Revisiting streamside tree water use in the context of the two water worlds hypothesis" (now a scientist at Los Alamos National Laboratory)  
Dr. John Zobitz (PhD 2007), "Mathematical approaches to partition net ecosystem exchange of carbon dioxide in a high-elevation subalpine forest" (now a faculty member at Augsburg College, Minnesota)

Allison Chan (PhD in progress, started 2011)

#### **Postdoctoral Scientists Trained (D. Bowling as postdoctoral advisor)**

Dr. Steven Hall (2013-2015), now a faculty member at Iowa State University  
Dr. Brett Raczka (2014-present)  
Dr. Sean Schaeffer (2005-2008), now a faculty member at University of Tennessee

#### **Other Students and Employees Trained**

Undergraduates: Jessica Baker, Brett Boyer, Susan Bush, Ryan Dillingham, Sarah Gaines, Claire Hall, Adrian Harrison, Simone Jackson, Zach James, Tina Jensen, Lori Long, Richard Malyn, Brianne Palmer, Stephanie Plummer, Harrison Quinn, Sarah Reed, Christian Ryser, Raili Taylor, Jillian Turner

High School Students: Davis Unruh, Tasha Heilweil

Graduate Student Supervisory Committees:

- Biology: Susan Bush, Tomas Domingues, Sylvia Englund, Carolina Gomez-Navarro, Erin Hanlon, David Love, Anthony Macharia, Jessica Pearce, Duncan Smith, Christy Turnbull, Adam West, Jeb Williamson, Brett Wolfe
- Atmospheric Sciences: Carolyn Stwertka
- Civil and Environmental Engineering: Dasch Houdeshel, Austin Orr
- Mechanical Engineering: Prathap Ramamurthy
- Geography: Yi Qi
- Geology and Geophysics: Greg Carling, Mike Davis, Tyler Huth, Olivia Miller
- Professional Master of Science and Technology: Ryan Campbell
- Brigham Young University: Biology, Lafe Connor

Technicians: Suzanne Bethers, Dave Eiriksson, David Galvez, Dr. Maria Garcia, Dr. Shashi Kalaskar, Shannon Kincaid, Claire Lunch, Andy Schauer

#### **Invited Lectures (D. Bowling)**

2015 University of Innsbruck, Institute of Ecology, Innsbruck, Austria

- European Geosciences Union General Assembly, Vienna, Austria
- 2014 Dept. of Watershed Sciences, Utah State University
- 2013 Stable Isotopes in Biosphere-Atmosphere Earth System Research, Wroclaw, Poland  
Max Planck Institute for Biogeochemistry, Jena, Germany
- 2012 University of Innsbruck, Institute of Ecology, Innsbruck, Austria  
University of Nevada, Reno and Desert Research Institute, Joint Graduate Program in Hydrologic Sciences and Ecology, Evolution, and Conservation Biology
- 2011 American Geophysical Union Fall Meeting, San Francisco, CA
- 2010 Dept. of Geology and Geophysics, University of Utah
- 2008 Dept. of Meteorology, Mountain Meteorology Group, University of Utah  
Dept. of Biology, Utah Valley University  
Dept. of Geography, University of Utah
- 2007 Biosphere-Atmosphere Stable Isotope Network Meeting, Berkeley, CA  
AmeriFlux Network Annual Meeting, Boulder, CO  
School of Biological Sciences, Washington State University  
Technische Universität München, Freising, Germany
- 2006 Department of Ecology and Evolutionary Biology, University of Arizona
- 2005 American Society of Agronomy Annual Meeting, Salt Lake City, UT  
Dept. of Geography, University of Utah  
Dept. of Environmental Sciences, University of Virginia
- 2004 Biosphere-Atmosphere Stable Isotope Network, Marshall, CA  
Dept. of Biology, Bowdoin College, ME  
ESF Scientific Programme, Stable Isotopes in Biospheric-Atmospheric Exchange (SIBAE), Interlaken, Switzerland
- 2003 Ecological Society of America Annual Meeting, Savannah, GA

ESF Scientific Programme, Stable Isotopes in Biospheric-Atmospheric Exchange (SIBAE), Orvieto, Italy

2002 Fluxnet Synthesis Workshop, Orvieto, Italy

Stable Isotopes and Biosphere-Atmosphere Interactions International Workshop, Banff, Alberta, Canada

2001 Columbia University's Biosphere2 Center, Oracle, AZ

Dept. of Geology and Geophysics, University of Utah

Mathematical Biology Seminar Series, University of Utah

1999 American Geophysical Union Fall Meeting, San Francisco, CA

1997 AmeriFlux Network Annual Meeting, St. Louis, MO

**Other Lectures (various presenters, only the presenter listed)**  
(graduate students underlined)

2014 Bowling, D, American Geophysical Union Fall Meeting, San Francisco, CA  
Hall, S, American Geophysical Union Fall Meeting, San Francisco, CA  
Ballantyne, A, American Geophysical Union Fall Meeting, San Francisco, CA

2013 Bowling, D, American Geophysical Union Fall Meeting, San Francisco, CA

2012 Bowling, D, American Geophysical Union Fall Meeting, San Francisco, CA  
Maurer G, American Geophysical Union Fall Meeting, San Francisco, CA

2011 Blonquist M, American Geophysical Union Fall Meeting, San Francisco, CA

2010 Blonquist M, American Geophysical Union Fall Meeting, San Francisco, CA  
Maurer G, American Geophysical Union Fall Meeting, San Francisco, CA  
Trahan N, American Geophysical Union Fall Meeting, San Francisco, CA  
Wilcox B, American Geophysical Union Fall Meeting, San Francisco, CA

2009 Gamnitzer U, European Geosciences Union General Assembly, Vienna, Austria

2008 Moyes A, American Geophysical Union Fall Meeting, San Francisco, CA

2007 Bowling D, American Geophysical Union Fall Meeting, San Francisco, CA  
Moyes A, Ecological Society of America annual meeting, San Jose, CA  
Schaeffer S, Ecological Society of America annual meeting, San Jose, CA

2006 Bowling D, American Geophysical Union Fall Meeting, San Francisco, CA  
Moyes A, American Geophysical Union Fall Meeting, San Francisco, CA  
Schaeffer S, American Geophysical Union Fall Meeting, San Francisco, CA  
Zobitz J, US. Dept. of Energy Global Change Education Program Summer  
Orientation Workshop, Portland, Oregon

- 2005 Zobitz J, American Geophysical Union Fall Meeting, San Francisco, CA  
Roden J, Annual Meeting of the American Society of Plant Biologists
- 2004 Crosson E, International Workshop on Stable Isotope Ratio Infrared Spectrometry: New Developments and Applications, Vienna, Austria
- 2003 McDowell N, American Geophysical Union Fall Meeting, San Francisco, CA
- 2002 Baldocchi D, Stable Isotopes and Biosphere-Atmosphere Interactions International Workshop, Banff, Alberta
- 2001 Bowling D American Geophysical Union Fall Meeting, San Francisco, CA  
Baldocchi D, American Geophysical Union Fall Meeting, San Francisco, CA  
McDowell N, American Geophysical Union Fall Meeting, San Francisco, CA  
McDowell N, IUFRO Canopy Processes Workshop
- 2000 Bowling D, American Geophysical Union Fall Meeting, San Francisco, CA