

*Curriculum Vita*

**MATTHEW R. OPDYKE**

*Associate Professor of Environmental Science  
Point Park University • Department of Natural Sciences and Engineering Technology  
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**EDUCATION**

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**Ph.D., Aquatic Biogeochemistry (2005)**

University of Illinois, Urbana-Champaign, IL

Dissertation: Investigation of chemical, hydrologic, and stream geomorphic mechanisms that affect in-stream nitrogen processes in agriculturally-dominated watersheds; supported by empirical models to compare nitrogen removal by denitrification between channelized and meandering streams to improve nutrient management in the region

**Master of Science in Environmental Science (2000)**

Indiana University, School of Public and Environmental Affairs, Bloomington, IN

Thesis: Application of aquatic macroinvertebrates as indicators of water quality in urban streams

**Bachelor of Science, Environmental Biology concentration (1998)**

Mansfield University, Mansfield, PA

Minors: Chemistry and geography

**PROFESSIONAL EMPLOYMENT**

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**Associate Professor of Environmental Science (2007-present)**

Point Park University, Pittsburgh, PA

- Courses taught: 1) ecology, 2) biological evolution, 3) botany, 4) chemistry, 5) introduction to natural sciences, 6) environmental policy, 7) environmental health
- Primary advisor of Funeral Service program and the Environmental Science concentration in Biological Sciences
- Mentored research students in: 1) assessing physical, chemical and biological health of watersheds for coldwater fish conservation in Fishing Creek, Columbia County, PA; 2) studying the application of lichens as bioindicators of air and habitat quality in southwestern Pennsylvania; 3) rehabilitation and monitoring of wetland plants in a floodplain wetland

**Postdoctoral Research Associate in Stable Isotope Biogeochemistry (2006-2007)**

Michigan State University, East Lansing, MI

- Research coordinator: applied novel mass spectrometry techniques using nitrous oxide isotopomers (distribution of nitrogen atoms in the linear N<sub>2</sub>O molecule) to investigate microbial sources of soil-derived N<sub>2</sub>O at Long-Term Ecological Research Network sites that included the Kellogg Biological Station, MI and the Sevilleta National Wildlife Refuge, NM

Matthew R. Opdyke

- Designed and implemented sampling protocols for measuring nitrous oxide emissions from soil using in-situ gas chambers
  - Analyzed gas samples on a multicollector IsoPrime mass spectrometer interfaced with a continuous flow trace gas inlet system
- Assisted in designing an automated gas-chamber sampler for carbon dioxide, methane and nitrous oxide emissions from soil

**Visiting Assistant Professor (2004 & 2005)**

University of Illinois, Urbana-Champaign, IL

- Course taught: Aquatic Ecosystem Conservation
- Mentored student enrolled in the James Scholar Honors Program on the application of aquatic macroinvertebrates as bioindicators of stream channel alteration

**Environmental Scientist (2000-2002)**

Savannah River Ecology Laboratory, Savannah River Site, Aiken, SC

- Research coordinator: collaborated with the U.S. Department of Energy to develop a constructed wetland tank system for treating coal waste from coal-fired power plants
  - Designed and implemented sampling protocols for measuring nutrients and heavy metals in soil, water and plant tissues
  - Analyzed samples on an inductively coupled plasma mass spectrometer, nitrogen and phosphorus auto-analyzer, total organic carbon analyzer
- Participated in a study with the U.S. Department of Defense to study the impact of military and forest management activities on soil nitrogen processes on the Savannah River Site and at Fort Benning, GA
  - Designed and implemented sampling protocols for topsoil and subsurface analyses of nitrogen species and analyzed samples on a nitrogen and phosphorus auto-analyzer

**Adjunct Professorships:**

- Basic Chemistry (2007), Lansing Community College, Lansing, MI
- Chemistry of Life (2005), Parkland College, Champaign, IL
- Environmental Science (2001), Georgia Military Community College, Martinez, GA

**Student Internships:**

- **Fallwood Nature Center** (1999), Morgan County Soil and Water Conservation District, Martinsville, IN
  - Developed land-use management plans, designed interactive K-12 nature guides, and conducted biodiversity assessments of plants and wildlife
- **U.S. Department of Agriculture, Pasture Systems and Watershed Research Laboratory** (1998), Pennsylvania State University, State College, PA
  - Evaluated the biological integrity of agricultural watersheds throughout Pennsylvania based on aquatic macroinvertebrate studies
- **U.S. Forest Service, White Mountain National Forest** (1997), Conway, NH
  - Assisted in the Audubon Society's Breeding Bird Survey and biodiversity surveys of fish, aquatic macroinvertebrates, amphibians, and small mammals

## **RESEARCH AND GRANTS**

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### **Fishing Creek Watershed Assessment (2010-present)**

Coldwater Heritage Partnership Grant (\$6,042)

- Principal investigator: partnered with the Fishing Creek Sportsman Association, Trout Unlimited and Western Pennsylvania Conservancy to develop a conservation plan for coldwater fishes in Fishing Creek watershed in Columbia County, PA based on physical, chemical and biological studies
- Studying the response of aquatic macroinvertebrates and periphyton algae to stream channel alteration due to flooding

### **Wingfield Pines Wetland Remediation (2008-present)**

Allegheny Land Trust Grants (\$1,970)

- Principal investigator: partnered with Allegheny Land Trust and Duquesne University to establish and implement sampling protocols to assess the rehabilitation of a floodplain wetland on a previously strip-mined property
- Monitor wetland plant diversity and growth

### **Application of Lichen as Indicators of Air Quality (2008-2010)**

Pennsylvania Department of Conservation and Natural Resources, Wild Resource Conservation Grant (\$5,287)

- Principal investigator: researched the application of epiphytic lichens as bioindicators of air and habitat quality in southwestern PA

## **AWARDS AND RECOGNITIONS**

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- Pittsburgh Tribune-Review "Newsmaker" - featured as a notable Pittsburgher for research on coldwater fishes in Fishing Creek watershed, Columbia County, PA (6 March 2010)
- Point Park University's 21<sup>st</sup> Century Alumni Society keynote speaker on engaging students in studying wetland biodiversity (16 October 2008)
- Runner-up for best-applied research presentation - N. American Benthological Society Meeting (2005)
- Ph.D. research assistantship - University of Illinois (2002-2005)
- Nauman Scholarship Award for outstanding research achievements in environmental biology - Mansfield University (1997)

## **CERTIFICATIONS AND MEMBERSHIPS**

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- ArcGIS Desktop I: Getting Started with GIS certification (2009)
- U.S. Army Corps of Engineers Certification in Wetland Delineation (1998)
- Active memberships: 1) Ecological Society of America  
2) American Bryological and Lichenological Society  
3) Pennsylvania Academy of Science  
4) Allegheny Land Trust - stewardship board member

## SELECTED SCHOLARLY CONTRIBUTIONS

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### Research Publications († students)

- **Opdyke, M.R.**, B.E. Dolney<sup>†</sup>, L. Frost, and J.D. Roy<sup>†</sup>. (2011) A study of epiphytic lichen communities in urban and rural environments in southwestern Pennsylvania. *Journal of Pennsylvania Academy of Science* 85:151-158.
- Smemo, K.A., N.E. Ostrom, **M.R. Opdyke**, P.H. Ostrom, S. Bohm, and G.P. Robertson. (2011) Improving process-based estimates of N<sub>2</sub>O emissions from soil using temporally extensive chamber techniques and stable isotopes. *Nutrient Cycling in Agroecosystems*, DOI: 10.1007/s10705-011-9452-2.
- **Opdyke, M.R.** (2011) Fishing Creek Watershed Coldwater Conservation Plan. Final Grant Report. Coldwater Heritage Partnership, Pennsylvania.
- **Opdyke, M.R.** (2011) Wingfield Pines Wetland Plant Monitoring Report 2008-2011. Final Grant Report. Allegheny Land Trust, Pennsylvania.
- **Opdyke, M.R.** (2010) Lichen Community Structure Across an Urban to Rural Landscape Gradient. Final Grant Report (WRCP-08296). Pennsylvania Department of Conservation and Natural Resources, Wild Resource Conservation Program.
- **Opdyke, M.R.** (2010) Non-point source pollution. *Green Series Volume 4: Green Cities* (eds. P. Robbins, N. Cohen, and G.J. Golson). Sage Publications, California.
- **Opdyke, M.R.**, N.E. Ostrom, and P.H. Ostrom. (2009) Evidence for the predominance of denitrification as a source of N<sub>2</sub>O in temperate agricultural soils based on isotopologue measurements. *Global Biogeochemical Cycles*, 23. doi:10.1029/2009GB003523.
- **Opdyke, M.R.**, and M.B. David. (2007) Response of sediment denitrification rates to environmental variables in streams heavily impacted by agriculture. *Journal of Freshwater Ecology*, 22:371-382.
- **Opdyke, M.R.**, M.B. David, and B.L. Rhoads. (2006) Influence of geomorphological variability in channel characteristics on sediment denitrification in agricultural streams. *Journal of Environmental Quality*, 35:2103-2112.

### Educational Publications

- **Opdyke, M.R.** (2012) Cladistics: A Tool for Teaching about Evolutionary Relationships. *Green Teacher* 95:31-35.
- **Opdyke, M.R.** (2011) Foliose Lichens of Southwestern Pennsylvania. Identification Guide. *Point Park University Printing Office*, Pennsylvania.
- **Opdyke, M.R.** (2009) Discovering lake management. *Teaching Green-The High School Years: Hands-on Learning in Grades 9-12* (eds. T. Grant and G. Littlejohn), pp. 46-52. Green Teacher, Ontario, Canada.
- **Opdyke, M.R.** (2007) Discovering Lake Management: Getting Students' Feet Wet. *Green Teacher*, 80:33-38.

### Mentored Student Publications & Presentations

- Roy, J. (2010) Lichen abundance and diversity as an indicator of larger changes in biodiversity in western Pennsylvania. Publication in "Viewpoint," Point Park University's undergraduate research journal, 1.1:15-20.
- Frantz, M. (2010) The world is dying: Why the current "mass extinction" is much different from the previous five. Paper presented at Northeast Regional Honors Council Conference.
- Roy, J.D., **M.R. Opdyke**, and B. Dolney. (2010) Lichen distribution in southwestern Pennsylvania as an indicator of environmental conditions. Paper presented at *Pennsylvania Academy of Science Meeting*, Abstract 26.

- Dolney, B.E., **M.R. Opdyke**, and L. Frost. (2009) Lichen distribution across a landscape gradient as an indicator of air pollution and habitat alteration. Poster presented at *Ecological Society of America Meeting*, Abstract PS 95-189.
- Dolney, B.E., **M.R. Opdyke**, and L. Frost. (2009) Lichen distribution across an urban to rural landscape gradient as an indicator of air pollution and habitat alteration. Poster presented at *Pennsylvania Academy of Science Meeting*, Abstract 57.
- Clark, M.B., J.C. Deighan, B.E. Dolney, M.W. Frantz, B. Haburjak, A. Kelesky, and **M.R. Opdyke**. (2008) Evolutionary history of primates and saltwater fish from the Pittsburgh Zoo & Aquarium. Poster presented at *Pittsburgh Zoo & Aquarium Education Complex*.

### Professional Presentations

- **Opdyke, M.R., R.S. Opdyke, Fishing Creek Sportsman Association, and Western Pennsylvania Conservancy** (2012) Coldwater conservation plan for Fishing Creek, Columbia County, PA. Poster presented at *Keystone Coldwater Conference*.
- **Opdyke, M.R.** (2012) Monitoring wetland plant diversity and growth at Wingfield Pines. Research presented at *Allegheny Land Trust Meeting*.
- **Opdyke, M.R.** (2011) GigaPan Technology: A web-based platform for ecological research and outreach. Poster presented at *Ecological Society of America Meeting*, Abstract PS 4-44.
- **Opdyke, M.R.** (2010) Getting the most out of a wetland: captivating an urban student audience. Paper presented at *Ecological Society of America Meeting*, Abstract COS 96-1.
- **Opdyke, M.R.**, and J.D. Kuikahi. (2009) Dendrochronology as an assessment tool of tree growth in wetland restoration projects. Poster presented at *Ecological Society of America Meeting*, Abstract PS 82-73.
- **Opdyke, M.R.**, P.H. Ostrom, N.E. Ostrom, R.L. Sinsabaugh, and C.L. Crenshaw. (2008) Nitrous oxide production from bacteria and fungi in a semiarid grassland soil from central N. Mexico. Paper presented at *Ecological Society of America Meeting*, Abstract COS 75-7.
- **Opdyke, M.**, P.H. Ostrom, N.E. Ostrom. (2007) Denitrification is the primary source of soil-derived nitrous oxide in a terrestrial ecosystem: evidence from isotopologues. Paper presented at *American Geophysical Union Meeting*, Abstract B41G-05.
- **Opdyke, M.**, R. Sutka, N. Ostrom, P. Ostrom, and H. Gandhi. (2006) Application of nitrous oxide isotopomers to identify microbial sources of soil fluxes. Poster presented at *LTER All-Scientists Meeting*, Abstract 101.
- Smemo, K.A., G.P. Robertson, N.E. Ostrom, S. Bohm, **M. Opdyke**, and M.H. Ostrom. (2006) Development of an automated chamber system for temporally integrated estimates of nitrous oxide flux from soils. Poster presented at *LTER All-Scientist Meeting*, Abstract 72.
- **Opdyke, M.R.**, M.B. David, and B.L. Rhoads. (2005) Linking denitrification to channel geomorphology in agricultural streams. Paper presented at *North American Benthological Society Meeting*, Abstract NB23E-01.
- David, M.B., T.V. Royer, J.L. Tank, and **M.R. Opdyke**. (2005) Importance of stream denitrification in the nitrogen mass balance of a midwestern agricultural region. Paper presented at *North American Benthological Society Meeting*, Abstract NB31D-04.
- **Opdyke, M.R.**, and B.R. Vermillion. (2004) Managing nitrogen and phosphorus in the Midwestern United States. Poster presented at *Environmental Horizons Meeting*.
- **Opdyke, M.R.**, D.P. Coughlin, R.R. Sharitz, and B.S. Collins. (2002) Elemental composition in aquatic macrophytes from a constructed treatment wetland. Paper presented at *Association of Southeastern Biologists Meeting*.
- **Opdyke, M.R.** (2002) Nitrogen composition in soils among loblolly pine treatments ranging from a mixed, pine/deciduous forest to a recently thinned, 60-year old pine plantation. Poster presented at *Association of Southeastern Biologists Meeting*.

### Outreach Presentations

- **Opdyke, M.R.** (15 October 2011) Lichens of Southwestern Pennsylvania. Field trip leader and presenter at Wild Resource Festival organized by Pennsylvania Department of Conservation and Natural Resources, Wild Resource Conservation Program.
- **Opdyke, M.R.** (10 October 2011) What are Lichens and What Do They Say About Air Quality in Our Region. Speaker at *Botanical Society of Western Pennsylvania* public meeting.
- **Opdyke, M.R.** (26 July 2011) Learn About lichens. Field trip leader at Fern Hollow Nature Center, Sewickley organized by *Allegheny Land Trust*.
- **Opdyke, M.R.** (5 July 2011) Results of developing a Coldwater Conservation Plan in Fishing Creek watershed in Columbia and Sullivan Counties, PA. Speaker at the *Fishing Creek Sportsman Association* special meeting.
- **Opdyke, M.R.** (2 May 2011) What are Lichens and What Do They Say About Air Quality in Our Region. Speaker at *Café Scientifique-Pittsburgh*. Online at <http://itunes.apple.com/us/podcast/carnegie-science-centers-podcast/id442127176>.
- **Opdyke, M.R.** (8 September 2010) What Fluffy Dust, Candle Flame, and Other Lichens, Tell Us About the Air. Interviewed by *The Allegheny Front*, an environmental radio program. Online at <http://www.alleghenyfront.org/story.html?storyid=201009081101360.76823>.
- **Opdyke, M.R.** (11 May 2010) Developing a conservation plan of coldwater fishes in Fishing Creek watershed in Columbia and Sullivan Counties, PA. Speaker at the *Fishing Creek Sportsman Association* public meeting.
- **Opdyke, M.R.** (18 February 2010) Developing a conservation plan of coldwater fishes in Fishing Creek watershed in Columbia and Sullivan Counties, PA. Speaker at the *Columbia County Chapter of Trout Unlimited* public meeting.