LAUREL GRIGGS LARSEN

United States Geological Survey
National Research Program
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Research Interests

Systems hydroecology, focused on understanding and predicting changes in the structure and function of aquatic ecosystems in response to environmental change or restoration. Areas of subspecialty include simulation modeling, environmental fluid mechanics, and the dynamics of fine sediment and organic matter.

Education

Ph.D. 2008, Civil, Environmental, and Architectural Engineering, University of Colorado
"Hydroecological Feedback Processes Governing Landscape Self-Organization in the Florida Everglades"

M.A. 2003, Earth and Planetary Sciences, Washington University in St. Louis
"Development and Testing of a Coupled Heat and Moisture Transfer Model to Assess Subsurface Moisture Gradients"

B.S. 2003, Systems Science and Mathematics, Environmental Studies, Washington University in St. Louis
Summa Cum Laude

Appointments

7/2008-present: **Research Hydrologist**, USGS National Research Program, Reston, VA
Field, numerical, and laboratory analysis of hydroecological feedback processes in streams and wetlands

2003-2008: **Graduate Research Fellow,** University of Colorado, Boulder, CO
Studies of physical-biological interactions driving landscape evolution in the Everglades wetland

2001-2003: **Undergraduate/Graduate Research Assistant,** Washington University, St. Louis, MO
Development of remote sensing and numerical tools to determine unsaturated zone soil moisture

2000: **Undergraduate Research Assistant,** University of Central Florida, Orlando, FL
GIS and field studies of habitat fragmentation and species biogeography

1999: **Howard Hughes Prefreshman Biology Scholar,** Washington University, St. Louis, MO
Radar remote sensing of biogeomorphological evolution of Missouri River floodplain

Funded Research Proposals

NSF-EAR 0636079 – Geosciences directorate, Hydrologic Sciences Program (2007-2010, $209,933)
The role of flocculent organic sediment transport as a feedback mechanism that controls landscape dynamics and restoration success in the Everglades (Through PIs John Crimaldi and Judson Harvey)

Canon National Parks Science Scholarship (2005-2008, $78,000)
An investigation of hydrodynamic feedback mechanisms responsible for the formation and maintenance of the ridge and slough landscape, Everglades, Florida

National Wildlife Refuge System Centennial Scholarship (2006-2007, $15,000)
An investigation of hydrodynamic feedback mechanisms responsible for the formation and maintenance of the ridge and slough landscape, Everglades, Florida

Beverly Sears Graduate Student Research Grant, University of Colorado (2005, $1,000)
The role of hyporheic exchange in the maintenance of the ridge and slough province, Everglades, Florida

Missouri Space Grant Consortium (2002, $5,000)
Using ASTER to map soil moisture on Mauna Kea, Hawaii

Honors

Best Dissertation Award, University of Colorado, College of Engineering and Applied Science (2008)

Hertz Foundation Fellow (2003-2008)

National Science Foundation Graduate Research Fellow (2005-2008)

Invited Participant, American Society of Limnology and Oceanography Eco-DAS (Ecological Dissertations in Aquatic Sciences) Symposium (2008)

Outstanding Student Paper Award, American Society of Limnology and Oceanography (June 2008 and Feb 2007)

Outstanding Student Paper Award, American Geophysical Union, Hydrology Section, (Dec 2007 and Dec 2002)

Midwestern Association of Graduate Schools Outstanding Masters Thesis Award (2003)

Morris K. Udall Scholar in Environmental Studies (2002)

Alexander B. Langsdorf Fellow in Engineering, Washington University, (1999-2003)

Steven J. Fossett Research Fellow, Washington University, (2001-2003)

Washington University Women's Society Leadership Award (2003)

Outstanding Achievement in the Natural Sciences Senior Award, Washington University (2003)

G.A. Sullivan and Associates Professional Achievement Award, Washington University (2003)

Systems Science and Mathematics Outstanding Junior Award, Washington University (2002)

Systems Science and Mathematics Outstanding Sophomore Award, Washington University (2001)

Antoinette Frances Dames Prize, Washington University School of Engineering (2001)

Golden Key National Honor Society Scholarship, Washington University (2001)

Howard Hughes Medical Institute Prefreshman Biology Summer Scholar, Washington University (1999)

National Merit Scholar (1999)

Peer-Reviewed Publications

Harvey, J.W., R.W. Schaffranek, G.B. Noe, **L.G. Larsen**, D. Nowacki, and B.L. O'Connor, 2009. Hydro-ecological factors governing surface-water flow on a low-gradient floodplain. *Water Resources Research*, in press.

Larsen, L. G., J. W. Harvey, and J. P. Crimaldi, 2009. Morphologic and transport properties of natural organic floc, *Water Resources Research* 45, W01410, doi:10.1029/2008WR006990.

Larsen, L.G., J.W. Harvey, G. B. Noe, and J. P. Crimaldi, 2009. Predicting organic floc transport dynamics in shallow aquatic ecosystems: Insights from the field, the laboratory, and numerical modeling, *Water Resources Research* 45, W01411, doi:10.1029/2008WR007221.

Larsen, L.G., J.W. Harvey, and J.P. Crimaldi, 2007. A delicate balance: ecohydrological feedbacks governing landscape morphology in a lotic peatland, *Ecological Monographs* 77(4), 591-614.

Larsen, L.G. and J.P. Crimaldi, 2006. The effect of photobleaching on PLIF, *Experiments in Fluids* 41(5), 803-812.

Papers In Review

Larsen, L. G., J. W. Harvey, J. P. Crimaldi, and G. B. Noe. A model for shear partitioning in complex vegetated flows. Submitted, *Geophysical Research Letters.*

Larsen, L. G., J. W. Harvey, and J. P. Crimaldi. Prediction of bed shear stresses and landscape restoration potential in the Everglades. Submitted, *Ecological Engineering.*

Larsen, L. G. and J. W. Harvey. How sediment transport feedbacks drive landscape pattern change in Everglades and wetlands worldwide. In USGS internal review.

Larsen, L.G., G. R. Aiken, J. W. Harvey, G.B. Noe, and J. P. Crimaldi. Resolution of small-scale changes in organic matter source and redox state with fluorescence spectroscopy in a subtropical peatland, Florida Everglades. In revision.

Noe, G. B., J. W. Harvey, R. W. Schaffranek, and **L. G. Larsen**. Vegetative, hydrologic, and meteorological controls on suspended sediment characteristics and transport in a subtropical wetland. Submitted, *Wetlands.*

Invited Presentations

Larsen, L.G., 2009. Biophysical feedback, stability, and catastrophic shifts in a patterned Everglades ecosystem. Cary Institute of Ecosystem Studies, 16 April 2009, Millbrook, NY.

Larsen, L.G., 2009. Hydroecological feedbacks controlling landscape patterning and restoration success in the Everglades. USGS Chief Hydrologist's Seminar, 21 January 2009, Reston, VA.

Larsen, L.G., 2007. A complex adaptive systems approach to the prediction of landscape evolution in the Florida Everglades. National Research Program, U.S. Geological Survey, 7 December 2007, Reston, VA.

Larsen, L.G. 2007. Predicting landscape evolution in the Everglades. Seminar at Virginia Polytechnic Institude, Dept. of Biological Systems Engineering, 3 December 2007, Blacksburg, VA.

Larsen, L.G., 2007. Roles of redox and phosphorus biogeochemistry, water level, and flow in the degradation and restoration of the Everglades ridge and slough landscape. USGS Florida Integrated Science Center seminar, 22 October 2007, Ft. Lauderdale, FL.

Larsen, L.G., J.W. Harvey, and J. P. Crimaldi, 2006. Ecohydrological feedbacks controlling microtopography, vegetation diversity, and landscape pattern in low-gradient, lotic peatlands. Geological Society of America Annual Meeting, 22-25 October 2006, Philadelphia, PA. Paper no. 104-4.

Larsen, L.G., 2006. Ecohydrological feedbacks in the ridge and slough landscape and implications for restoration. Seminar at South Florida Water Management District, West Palm Beach, FL.

Larsen, L.G., 2006. Feedback in environmental systems: Why is sawgrass exploding in the Everglades? Keynote address at international Canon Envirothon competition, 23-29 July 2006, Winnipeg, Manitoba.

Larsen, L.G., 2005. A conceptual model of hydrodynamic feedbacks involved in pattern maintenance in the ridge and slough landscape, Florida Everglades. National Research Program, U.S. Geological Survey, Reston, VA.

Professional Service

2008	Session organizer, American Geophysical Union fall meeting, 14-19 December 2008, San Francisco, CA.
2008	Session organizer, American Society of Limnology and Oceanography summer meeting, 8-13 June 2008, St. John's, Newfoundland, Canada
2007-present	Member, Community Surface Dynamics Modeling System Terrestrial working group
2007-present	Member, Decompartmentalization Physical Model working group, Comprehensive Everglades Restoration Plan
2007	Co-chair, 2nd annual Hydrologic Sciences Student Symposium, University of Colorado
2006	Chair, 1st annual Hydrologic Sciences Student Symposium, University of Colorado
2006	Panel member, Workshop on Restoring the Ridge and Slough Landscape, Greater Everglades Ecosystem Restoration Conference, Lake Buena Vista, FL
2006-2008	Student member, American Geophysical Union Sediment and Landscape Dynamics technical committee
2005-present	Journal referee, *Limnology and Oceanography*, *Water Resources Research*, *Wetlands*, *Aquatic Ecology*, *Ecological Monographs*, *Ecology*, *Ecosystems*, *Ecological Applications American Naturalist*,*Landscape Ecology*
2005-2008	Volunteer for Science, US Geological Survey
2005-2008	Founding member, Hydrologic Sciences Program Graduate Student Steering Committee, University of Colorado
2004-2005	Member, Engineers Without Borders

Professional Development

2007	NSF FORWARD in STEM Professorship workshop, Gallaudet University, Washington, D.C.
2006	National Center for Earth Dynamics (NCED) short-course on geomorphology of low-gradient and sand bed streams, Johns Hopkins University, Baltimore, MD

Professional Memberships

American Geophysical Union, American Society of Limnology and Oceanography, Geological Society of America, Society of Wetlands Scientists, Ecological Society of America, Florida Coastal Everglades Long-term Ecological Research (LTER) Network, Association of Women Geoscientists, Tau Beta Pi Engineering Honor Society, Community Surface Dynamics Modeling System Terrestrial Working Group

Teaching and Mentorship

2007-present **Author, <u>One Night in the Everglades</u>**
In progress: development of a nonfiction book about Everglades hydrology and ecosystem processes for 4th-5th graders. An installment of the NSF LTER (Long Term Ecological Research) childrens' book series and curricular development.

2006-2007 **Supervisor of Undergraduate Research Assistant Kevin Brett,** University of Colorado
Trained student in design of field equipment, MATLAB code development, image processing for assessment of sediment transport processes, and flume experimentation.

2006-present **Science Fair Advisor and Mentor,** Forest Hill Community High School
Advised, oversaw, and trained six groups of students on design and execution of experiments examining species distribution and organic matter origin, fate, and transport in the Everglades. Gave guest lecture to AP Environmental Science course.

2002-2003 **Mentor to Undergraduate Research Assistants,** Washington University in St. Louis
Trained and assisted undergraduate in ecological remote sensing field work and numerical modeling.

2002 **Guest Lecturer, Prefreshman Program in Biology and Biomedical Research,** Washington University in St. Louis
Lecture topics: hydrology, geology, ecology, and policy affecting local rivers. Led field trip on the Merrimac River.

2001 **Project Manager, Aria-3 Mission,** Washington University in St. Louis
Coordinated elementary school students in Australia and the US in the preparation of a small experiment module (SEM) containing scientific experiments for space flight.

2000-2001 **High School Math Tutor**, Y-Tutor Program, Washington University in St. Louis

1999-2000 **Leader, Geology Teaching Team,** Washington University in St. Louis
Outreach to local elementary schools

Skills

Programming Languages and Software: MATLAB, C++, IDL, ENVI, MODFLOW, Groundwater Vistas, Surfer, JMP statistical software (SAS Institute), Comsol Multiphysics, Excel

Foreign Languages: Proficient in Spanish (reading, writing, speaking)

Machine shop certification

SCUBA certification

Graduate Advisers

Jud Harvey (U.S. Geological Survey), John Crimaldi (University of Colorado), Diane McKnight (University of Colorado), George Aiken (U.S. Geological Survey), John Pitlick (University of Colorado).