

Gretchen Rollwagen-Bollens, Ph.D.

School of the Environment
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Education

Ph.D. Integrative Biology, University of California, Berkeley, 2003.

M.S. Biological Oceanography, University of Hawaii, 1996.

A.B. *cum Laude* Biology, Harvard University, 1985.

Positions Held

Associate Professor School of the Environment & School of Biological Sciences Washington State University Vancouver	As of Aug 2017
Clinical Professor	2016 – 2017
Associate Clinical Professor	2010 – 2016
Assistant Clinical Professor School of the Environment & School of Biological Sciences Washington State University Vancouver	2006 – 2010
Interim Director of Research and Graduate Education Washington State University Vancouver	2007 – 2008
Assistant Research Professor School of Biological Sciences, Washington State University Vancouver	2004 – 2006
Assistant Research Scientist and Lecturer Romberg Tiburon Center for Environmental Studies & Department of Biology, San Francisco State University	2003 – 2004
Graduate Student Instructor/Researcher Department of Integrative Biology, University of California, Berkeley	1996 – 2003
Instructor Department of Biology, College of Marin, Kentfield, California	2000 – 2001
Lecturer Department of Oceanography, University of Hawaii	1994 – 1996
Science Coordinator and Assistant Scientist Sea Education Association, Woods Hole, Massachusetts	1987 – 1994

Scientific Research Interests

My research interests fall broadly within Biological Oceanography and Aquatic Ecology, with primary expertise in the population and community ecology of plankton. In particular, I am interested in the trophic role of heterotrophic planktonic protists 2-200 μm in size (“microzooplankton”) and metazoan planktonic animals 200-2,000 μm in size (“mesozooplankton”) as mediators of carbon and energy flow from primary producers to higher trophic levels such as invertebrates and fish, and especially how these small grazers influence the dynamics of harmful algal blooms and impact ecosystems when introduced to novel environments. I am also actively involved in interdisciplinary studies across the domains of aquatic science, political science, and science education.

Research Productivity

Peer-reviewed Publications

(*Graduate students and ⁺Undergraduates under my direct supervision)

- Rollwagen-Bollens G, Thiers P.** (In press) Teaching socio-environmental synthesis to undergraduates: A case study with non-traditional college students. *Teaching Issues and Experiments in Ecology*.
- Hawthorne D, Jiru M, **Rollwagen-Bollens G**, Rashid K, Solomon C, Thiers P. (2017) Engaging undergraduate students in socio-environmental synthesis. *Teaching Issues and Experiments in Ecology*, Vol. 12: Commentary. <http://tiee.esa.org/vol/v12/issues/commentary.html>
- Hassett* W, Bollens S, Counihan T, **Rollwagen-Bollens G**, Zimmerman J, Katz S, Emerson J. (2017) Veligers of the invasive Asian clam *Corbicula fluminea* in the Columbia River Basin: Broad-scale distribution, abundance and ecological associations. *Lake and Reservoir Management*. DOI: 10.1080/10402381.1294218
- Rose⁺ V, **Rollwagen-Bollens G**, Bollens S. (2017) Interactive effects of phosphorus and zooplankton grazing on harmful algal blooms in a shallow temperate lake. *Hydrobiologia* 788: 345-359.
- Lee* T, Bollens S, **Rollwagen-Bollens G**, Emerson J. (2016) The effects of eutrophication and invasive species on zooplankton community dynamics in a shallow temperate lake. *Fundamental and Applied Limnology* 188: 215-231.
- Bowen* A, **Rollwagen-Bollens G**, Bollens S, Zimmerman J. (2015) Feeding of the invasive copepod *Pseudodiaptomus forbesi* on natural microplankton assemblages within the lower Columbia River. *Journal of Plankton Research* 37: 1089-1094.
- Lee* T, **Rollwagen-Bollens G**, Bollens S. (2015) The influence of water quality variables on cyanobacteria blooms and phytoplankton community composition in a shallow temperate lake. *Environmental Monitoring and Assessment* 187: 315. doi:10.1007/s10661-015-4550-2
- Dexter* E, Bollens S, **Rollwagen-Bollens G**, Emerson J, Zimmerman J. (2015) Persistent vs. ephemeral invasions: 8.5 years of zooplankton community dynamics in the Columbia River. *Limnology & Oceanography* 60: 527-539.
- Breckenridge J, Bollens S, **Rollwagen-Bollens G**, Roegner C. (2015) Plankton assemblage variability in a river-dominated temperate estuary during late spring (high flow) and late summer (low flow) periods. *Estuaries and Coasts* 38: 93-103.
- Lee* T, **Rollwagen-Bollens G**, Bollens S, Faber-Hammond J. (2015) Environmental influences on cyanobacteria abundance and microcystin toxin production in a shallow temperate lake. *Ecotoxicology and Environmental Safety* 114: 318-325.

- Dresner M, Braun S, Handelman C, **Rollwagen-Bollens G.** (2014) Environmental identity, pro-environmental behaviors and civic engagement of volunteer stewards in Portland area parks. *Environmental Education Research* 21: 991-1010.
- Chang H, Thiers P, Netusil N, Yeakley A, **Rollwagen-Bollens G**, Bollens S, Singh S. (2014) Relationships between environmental governance and water quality in a growing metropolitan area of the Pacific Northwest, USA. *Hydrology and Earth Systems Science* 18: 1383-1395.
- Rollwagen-Bollens G**, Bollens S, Gonzalez A, Zimmerman J, Lee* T, Emerson J. (2013) Feeding dynamics of the copepod *Diacyclops thomasi* before, during and following filamentous cyanobacteria blooms in a large, shallow temperate lake. *Hydrobiologia* 705: 101-118.
- Bollens S, Quenette* J, **Rollwagen-Bollens G.** (2012) Predator-enhanced diel vertical migration in a planktonic dinoflagellate. *Marine Ecology Progress Series* 447: 49-54.
- Friedenberg* L, Bollens S, **Rollwagen-Bollens G.** (2012) Feeding dynamics of larval Pacific herring (*Clupea pallasii*) on natural assemblages of microplankton. *Fisheries Oceanography* 21: 95-108.
- Bollens S, Breckenridge J, Cordell J, **Rollwagen-Bollens G**, Kalata O. (2012) Invasive copepods in the Lower Columbia River Estuary: Seasonal abundance, co-occurrence and potential competition with native copepods. *Aquatic Invasions* 7: 101-109. doi: 10.3391/ai.2012.7.1.011.
- Boyer* J, **Rollwagen-Bollens G**, Bollens S. (2011) Microzooplankton grazing before, during and after a cyanobacterial bloom in Vancouver Lake, Washington, USA. *Aquatic Microbial Ecology* 64: 163-174.
- Rollwagen-Bollens G**, Gifford* S, Bollens S. (2011) The Role of Protistan Microzooplankton in the Upper San Francisco Estuary Planktonic Food Web: Source or Sink? *Estuaries & Coasts* 34: 1026-1038.
- Bollens S, **Rollwagen-Bollens G**, Quenette* J, Bochdanský A. (2011) Cascading migrations and implications for vertical fluxes in pelagic ecosystems. *Journal of Plankton Research* 33: 349-355.
- Bochdanský A, Bollens S, **Rollwagen-Bollens G.** (2010) The effect of microzooplankton and copepods on vertical carbon fluxes in and around phytoplankton thin layers. *Marine Ecology Progress Series* 401: 179-196.
- Gifford*, S.M., **Rollwagen-Bollens, G.C.**, Bollens, S.M. (2007) Mesozooplankton omnivory in the upper San Francisco Estuary. *Marine Ecology Progress Series* 348: 33-46
- Slaughter, A.M., Bollens, S.M., **Rollwagen Bollens, G.C.** (2006) Grazing impact of mesozooplankton in an upwelling region off northern California, 2000-2003. *Deep-Sea Research II* 53: 3099-3115
- Rollwagen Bollens, G.C.**, Bollens, S.M., Penry, D.L. (2006) Vertical distribution of micro- and nanoplankton in the San Francisco Estuary, in relation to hydrography and predators. *Aquatic Microbial Ecology* 44:143-163
- Rollwagen Bollens, G.C.** and Penry, D.L. (2003) Feeding dynamics of *Acartia* spp. copepods in a large, temperate estuary (San Francisco Bay, CA). *Marine Ecology Progress Series* 257: 139-158
- Rollwagen Bollens, G.C.** and Landry, M.R. (2000) The biological response to iron fertilization in the eastern equatorial Pacific (IronEx II). II. Mesozooplankton abundance, biomass, depth distribution and grazing. *Marine Ecology Progress Series* 201: 43-56.
- Coale, K., Johnson, K., Fitzwater, S., Gordon, R., Tanner, S., Chavez, F., Ferioli, L., Sakamoto, C., Rogers, P., Millero, F., Steinberg, P., Nightingale, P., Cooper, D., Cochlan, W., Landry, M., Constantinou, J., **Rollwagen, G.**, Trasvina, A., Kudela, R. (1996) A massive phytoplankton bloom induced by an ecosystem-scale iron fertilization experiment in the equatorial Pacific Ocean. *Nature* 383: 495-501.

Manuscripts in Peer Review

Dexter* E, Vuilleumier S, Goudet J, Pfeifer S, Bollens S, **Rollwagen-Bollens** G, Cordell J, Soh H. (Submitted) The invasion history of the calanoid copepod *Pseudodiaptomus inopinus*. *Biological Invasions*.

Rollwagen-Bollens G. (In review) Oceanography Manual. *WSU Extension Master Naturalist On-line Certificate Program*.

Rollwagen-Bollens G. (In review) Ecology Manual. *WSU Extension Master Naturalist On-line Certificate Program*.

Hassett* W, Zimmerman J, **Rollwagen-Bollens** G, Bollens S, Counihan T. (Submitted) An experimental evaluation of the efficacy of the FlowCam for detecting Dreissenid and Corbiculid bivalve veligers in Columbia River Basin waters. *Journal of Plankton Research*.

Dexter* E, Bollens S, **Rollwagen-Bollens** G. (Submitted) The trouble with stress. *Marine Ecology Progress Series*.

Manuscripts in Preparation

Rollwagen-Bollens G, Bollens S, Dexter* E, Breckenridge J, Cordell J, Kalata O. Plankton dynamics of the lower Columbia River Estuary: Responses to environmental variables and predator-prey interactions. For submission to *Limnology & Oceanography*.

Granstmanship

Current Research and Training Grants

(\$831,529 in total)

Rollwagen-Bollens G. 2017-2018. Incorporating a “Course-based Undergraduate Research Experience” (CURE) into Biology 106L on the WSU Vancouver campus. *WSU Smith Teaching and Learning Improvement Grant*. **\$7,000**

Strigul N, Harrison J, **Rollwagen-Bollens** G. 2017-2018. Development of a hyperspectral remote sensing approach for detection of algae blooms and methane emissions from SW Washington lakes. *WSU Vancouver Faculty Mini-Grant*. **\$7,000**

Bollens S, Cordell J, **Rollwagen-Bollens** G. 2016-2017. Invasive zooplankton of California estuaries. *California State Lands Commission*. **\$17,702**

Bollens S, Cordell J, **Rollwagen-Bollens** G. 2016-2017. Invasive zooplankton of Washington estuaries. *Washington Department of Fish and Wildlife*. **\$8,483**

Bollens S, Cordell J, **Rollwagen-Bollens** G. 2016-2017. Invasive zooplankton of Pacific Northwest estuaries. *Washington Sea Grant/NOAA*. **\$9,959**

Nelson T, Kruse S, Morrison J, **Rollwagen-Bollens G**. 2016-2020. Collaborative research: The next generation of STEM teacher preparation in Washington State. *National Science Foundation*.
\$296,234

Rollwagen-Bollens G, Bollens S, Nelson T. 2016-2018. “Columbia River Estuary Science Education and Outreach (CRESCENDO): A Landscape-scale University-High School Partnership Integrating Scientific and Educational Research.” *Washington Sea Grant/NOAA*.
\$219,570

Rollwagen-Bollens G, Bollens S. 2016. “Supplement to New REU Site: Landscape Ecology and Ecosystem Dynamics: Integrating Terrestrial and Aquatic Perspectives.” *National Science Foundation*.
\$6,000

Rollwagen-Bollens G, Bollens S. 2015-2018. “REU SITE: Landscape Ecology and Ecosystem Dynamics: Integrating Aquatic and Terrestrial Perspectives.” *National Science Foundation*.
\$259,581

Pending Grant Proposals

Parker B, Counihan T, Bollens S, **Rollwagen-Bollens G**. 2017 – 2018. “Enhancing Tribal Aquatic Invasive Species (AIS) Monitoring Capacity in the Columbia River Basin - Dreissenid Mussel Early Detection Monitoring.” *Bureau of Indian Affairs*.
\$36,000

Rollwagen-Bollens G, Wu J, Bollens S, Gawel J, Tepper J. 2017 – 2020. “Predicting Harmful Algal Blooms in a Model Freshwater Ecosystem: Spanaway Lake, Washington.” *US Environmental Protection Agency*.
\$759,982

Bollens S, Stark J, Hampton S, **Rollwagen-Bollens G**, Hufford L. 2017 – 2018. “FSML Planning Grant: Developing a Strategic Plan and Infrastructure Needs Assessment for Washington State University's Meyer's Point Environmental Field Station.” *National Science Foundation*.
\$24,939

Rollwagen-Bollens G, Nelson T, Bollens S. 2018 – 2020. “Washington Estuaries Science Education and Outreach (WASHENDO): A Landscape-scale University-High School Partnership Integrating Scientific and Educational Research.” *Washington Sea Grant/NOAA*.
\$263,779

Past Grants Awarded

(\$6,459,537 in total)

Rollwagen-Bollens G. 2015-2017. “Enhanced monitoring and investigation of the spread and potential impact of aquatic invasive mussels in the Columbia River Basin.” *Murdock Charitable Trust*.
\$15,000

Bollens S, Brady M, Choiunard H, Harrison J, **Rollwagen-Bollens G**, Wandschneider P. 2015-2016. “Seed Grant: An integrated biophysical-economic study of a model FEW system: Columbia River reservoir storage and spill.” *WSU Center for Environmental*

<i>Research, Education and Outreach/State of Washington Water Research Center/WSU Center for Sustaining Agriculture and Natural Resources.</i>	\$24,943
Rollwagen-Bollens G. 2015. “Master Naturalist Certification Program: Oceanography and Ecology On-Line Teaching Modules.” <i>Washington State University Extension.</i>	\$10,000
Rollwagen-Bollens G, Bollens S. 2014-2015. “Interactive effects of nutrients and grazing on the control of cyanobacteria blooms: a comparison across a eutrophication gradient in freshwater systems in Washington state.” <i>United States Geological Survey/State of Washington Water Research Center.</i>	\$27,478
Bollens S, Rollwagen-Bollens G , Counihan T, Goldberg C. 2014-2015. “Enhanced monitoring and investigation of the spread and potential impact of aquatic invasive mussels in the Columbia River Basin; Supplement for a Pilot Study of eDNA.” <i>U.S. Department of Interior/Bonneville Power Administration.</i>	\$83,695
Bollens S, Rollwagen-Bollens G , Counihan T. 2012-2015. “Enhanced monitoring and investigation of the spread and potential impact of aquatic invasive mussels in the Columbia River Basin.” <i>US Department of Interior/Bonneville Power Administration.</i>	\$613,283
Bollens S, Harrison J, Rollwagen-Bollens G , Thiers P, Stephan M. 2010-2015. “Collaborative Research: ULTRA-EX: How do feedbacks between governance and biophysical systems affect resilience of urban socio-ecological systems?” Submitted as a collaborative proposal to the <i>National Science Foundation</i> with OSU, PSU and WSU for a total of \$500,000. WSU portion:	\$81,341
Rollwagen-Bollens G , Bollens S, Lock B, Nelson T, Tissot B. 2008 – 2015. “New GK-12: Global Change in a Local Context: Partners in Discovery of the Columbia River Watershed.” <i>National Science Foundation.</i>	\$2,716,137
Thiers P, Rollwagen-Bollens G. 2012-2014. “Socio-environmental Synthesis Teaching Study.” Socio-Environmental Synthesis Center, <i>National Science Foundation.</i>	\$59,019
Rollwagen-Bollens G. 2011-2013. “The Role of Planktonic Grazers on Toxin Production by Cyanobacteria in Vancouver Lake, WA.” <i>Murdock Charitable Trust.</i>	\$15,000
Rollwagen-Bollens G , Bollens S. 2011-2012. “Understanding toxin production by harmful algae: Vancouver Lake as a model system.” <i>United States Geological Survey/State of Washington Water Research Center.</i>	\$30,000
Bollens S, Rollwagen-Bollens G. 2009-2010. “Cyanobacteria growth and grazing in Vancouver Lake.” <i>Washington Department of Ecology/Clark County Public Works.</i>	\$64,183
Rollwagen-Bollens G , Bollens S. 2009-2010. “Understanding Controls on Cyanobacteria Blooms: Vancouver Lake as a Model System.” <i>United States Geological Survey/State of Washington Water Research Center.</i>	\$27,455
Bollens S, Rollwagen-Bollens G. 2008-2009. “Biological Assessment of Vancouver Lake – Process Studies” <i>Vancouver Lake Watershed Partnership.</i>	

\$80,000

Bollens S, **Rollwagen-Bollens G.** 2007-2008. "Biological Assessment of Vancouver Lake."
Vancouver Lake Watershed Partnership.

\$100,000

Bollens S, **Rollwagen-Bollens G.** 2006-2009. "Grazing impacts of diverse zooplankton taxa on thin layers." *Office of Naval Research.*

\$279,301

Rollwagen-Bollens G. 2005-2006. "Assessing ciliate diversity in the Columbia River Estuary using morphological and genetic techniques." *WSU Vancouver Faculty Mini-grant.*

\$3,900

Stubbs J, Tanner K, **Rollwagen Bollens G,** O'Sullivan K. 2004-2009. "GK-12 Track 2: SFSU/SFUSD Science Teacher and Research Partnership." *National Science Foundation.*

\$1,999,464

Rollwagen Bollens G, Bollens S. 2003-2006. "Protistan Microzooplankton in the Suisun Bay Food Web: Source or Sink?" *California Sea Grant/CALFED Bay Delta Science Program.*

\$229,338

Teaching Philosophy

My approach to teaching science is based on three interrelated principles. First, science is a process of observing the natural world and developing questions, devising both quantitative and qualitative approaches to answer these questions, and then using observations and evidence to support explanations about natural phenomena. Second, science is at its core a collaborative endeavor where the coordinated insights, contributions and expertise of multiple people are critical for the field to move forward. And third, advances in science rely upon the ability of scientists to critically evaluate information, to interpret its significance, and to effectively communicate their conclusions to peers. I believe that the teaching of science must mirror the conduct of science, and thus I have structured my courses at all levels to emphasize these three principles of process, collaboration and critical thinking, in addition to mastering subject matter content.

Teaching Award

2015-16 Students' Award for Teaching Excellence

Washington State University Vancouver

May 2016

The Students' Award for Teaching Excellence recognizes a faculty member on the WSU Vancouver campus who commits time outside of the classroom to prevent students from falling through the cracks, demonstrates an enthusiasm for the subject matter, and instills enthusiasm and passion in students.

Teaching Experience

Courses Taught

Graduate courses

Washington State University Vancouver

- ESRP 465 Aquatic Microbial Ecology (6 semesters)

- ESRP 592 Environmental Aquatic Microbiology (1 semester)
- ESRP 593 Graduate Skills Seminar (3 semesters)
- ESRP 593/NATRS 585 Science Pedagogy Seminar for GK-12 Fellows (10 semesters)

San Francisco State University

- BIOL 863 Protist Ecology, San Francisco State University (Fall 03)

University of California, Berkeley

- IB 303 Teaching Colloquium, UC Berkeley (Fall 99; Fall 00)

Oregon State University

- OC 649 Biological Oceanography, Oregon State University (Summer 97)

Undergraduate courses for science majors

Washington State University Vancouver

- BIO 106 Introductory Organismal Biology (with lab) (11 semesters)
- BIO 308 Marine Biology (6 semesters)
- ENVSCI 491 Senior Seminar (4 semesters)

Undergraduate courses for non-majors

Washington State University Vancouver

- GEOL 230 Introduction to Oceanography (9 semesters)
- GE 106 Global Change in a Local Context (Spring 09)
- GE 105 Land, River, Sea: People and the Watershed (Fall 08)

San Francisco State University

- BIO 160 Marine Biology (Spring 04)

College of Marin, California

- BIO 110 Introductory Biology (Summer 00, 01)

University of Hawaii, Manoa

- OCE 201 Science of the Sea (Co-Instructor) (Fall 95; Spring 96)

Mentoring Experience

Major Professor (Co-Chair)

Vanessa Rose, PhD Environmental and Natural Resource Sciences	Fall 2014 – present
Tammy Lee, PhD Environmental and Natural Resource Sciences	Fall 2008 – Fall 2015
Kristin Connelly, MS Environmental Sciences	Fall 2017 – present
Ben Bolam, MS Environmental Sciences	Fall 2015 – present
Sean Nolan, MS Environmental Science	Fall 2016 – present
Alyssa Bowen, MS Environmental Science	Fall 2010 – Spring 2014
Jennifer Boyer, MS Environmental Science	Fall 2007 – Fall 2009
Scott Gifford, MS Marine Biology (San Francisco State Univ.)	Fall 2004 – Spring 2006

Committee Member

Eric Dexter, PhD Environmental and Natural Resource Sciences	Spring 2014 – present
Whitney Hassett, MS Environmental Science	Fall 2013 – Fall 2015
Jesse Adams, MS Environmental Science	Spring 2013 – Spring 2014
Eric Dexter, MS Environmental Science	Fall 2012 – Spring 2014
Josh Emerson, MS Environmental Science	Spring 2011 – Spring 2012
Carl Wepking, MS Environmental Science	Spring 2011 – Spring 2012

Keith Sorenson, MS Environmental Science	Fall 2010 – Summer 2012
Sarah Whitley, MS Environmental Science	Spring 2010 – Spring 2012
Joel Quenette, MS Environmental Science	Spring 2008 – Fall 2010
Kate Olson, MS Environmental Science	Spring 2008 – Fall 2009
Laura Friedenber, MS Environmental Science	Spring 2008 – Fall 2009
Joanne Breckenridge, MS Zoology	Fall 2007 – Summer 2009
Kaitlin Graiff, MS Environmental Science	Fall 2007 – Fall 2008
Eileen Graham, MS Environmental Science	Fall 2007 – Summer 2008
Lisa Marko, MS Environmental Science	Spring 2007 – Summer 2008
Jennifer Bright, MS Environmental Science	Spring 2005 – Fall 2007

Undergraduate Honors Theses

Kate Perkins, BS Biology	Fall 2015 – Spring 2017
Joseph McGill, BS Environmental Science/BS Biology	Fall 2014 – Spring 2016
Vanessa Rose, BS Environmental Science	Fall 2012 – Spring 2014

Undergraduate Research Mentoring

Michelle Devlaeminck, WSU Vancouver	Summer 2016
Kate Perkins, WSU Vancouver	Summer 2015

High School Teacher Mentoring

Carol Sandison, Biology teacher, Columbia River High School	Spring 2015 – Spring 2017
Jennifer Dean, Biology teacher, Camas High School	Spring 2011 – Spring 2013

High School Student Mentoring (Intel Science Fair projects)

Spencer Vines, Skyview High School	Aug 2007 – Feb 2008
Jennifer Heer, Columbia River High School	Oct 2005 – May 2006
Michelle Larson, Columbia River High School	Oct 2005 – May 2006

Conference Presentations (Since 2010)

(*Graduate students, +Undergraduates, °High school teachers, all under my supervision)

Sandison° C, **Rollwagen-Bollens** G, Bolam B, Bollens S. The spread and potential impact of aquatic invasive bivalves in the Columbia River Basin: What is the feeding rate of the invasive clam *Corbicula fluminea*? Murdock Charitable Trust “Partners in Science” Annual Meeting, San Diego, CA. January 2017.

Rollwagen-Bollens G, Bowen* A, Bollens S, Zimmerman J. Feeding of the invasive copepod *Pseudodiaptomus forbesi* on natural microplankton assemblages in the lower Columbia River, USA. Marine and Freshwater Invasive Species: Biology, Impact and Management. Aquatic Ecosystem Health and Management Society Biennial Meeting. Buenos Aires, Argentina. May 2016.

Bollens S, **Rollwagen-Bollens** G, Breckenridge J, Zimmerman J, Emerson J. The Columbia River Estuary as a highly invaded ecosystem. Marine and Freshwater Invasive Species: Biology, Impact and Management. Aquatic Ecosystem Health and Management Society Biennial Meeting. Buenos Aires, Argentina. May 2016.

McGill+ J, **Rollwagen-Bollens** G. The effects of trout hatchery effluent on a small stream. 10th Annual Research Showcase, Washington State University Vancouver. Vancouver, WA. April 2016.

- Perkins⁺ K, **Rollwagen-Bollens** G, Bollens S. Influence of environmental factors on the vertical distribution of phytoplankton in Lacamas Lake, Washington. 10th Annual Research Showcase, Washington State University Vancouver. Vancouver, WA. April 2016. ****Best Undergraduate Poster Award**
- Nolan⁺ S, Bollens S, **Rollwagen-Bollens** G, Zimmerman J. Diel vertical migration of zooplankton in response to hypoxia in Lacamas Lake. 10th Annual Research Showcase, Washington State University Vancouver. Vancouver, WA. April 2016.
- Sandison^o C, **Rollwagen-Bollens** G, Bollens S. The spread and potential impact of aquatic invasive bivalves in the Columbia River Basin. Murdock Charitable Trust “Partners in Science” Annual Meeting, San Diego, CA. January 2016.
- Bollens S, **Rollwagen-Bollens** G, Zimmerman J, Goldberg C, Counihan T, Hardiman J. Aquatic invasive species in the Columbia River Basin: From A (Arthropods) to Z (Zebra/Quagga Mussels). Northwest Power and Conservation Council, Portland, OR. December 2015.
- Bollens S, **Rollwagen-Bollens** G, Zimmerman J, Goldberg C, Counihan T, Hardiman J. Invasive mussel monitoring in the Columbia River Basin - past, present, and future. Washington State Lakes Protection Association Annual Conference, Walla Walla, WA. October 2015.
- Bollens S, **Rollwagen-Bollens** G, Zimmerman J, Goldberg C, Counihan T, Hardiman J. Aquatic invasive species in the Columbia River Basin: From A (Arthropods) to Z (Zebra/Quagga Mussels). Oregon Invasive Species Council, Portland, OR. October 2015.
- Bollens S, **Rollwagen-Bollens** G, Zimmerman J, Goldberg C, Counihan T, Hardiman J. Aquatic invasive species in the Columbia River Basin: From A (Arthropods) to Z (Zebra/Quagga Mussels). Washington Invasive Species Council, Wenatchee, WA. September 2015.
- Hassett* W, Bollens S, Counihan T, **Rollwagen-Bollens** G, Zimmerman J, Emerson J. Broad-scale distribution, ecological associations, and potential impacts of the invasive Asian clam *Corbicula fluminea* in the Columbia River Basin. Ecological Society of America Annual Meeting, Baltimore, MD. August 2015.
- Perkins⁺ K, **Rollwagen-Bollens** G, Bollens S, Zimmerman J. Influence of environmental factors on vertical distribution of phytoplankton in Lacamas Lake, WA. Summer Undergraduate Research Symposium, WSU Vancouver. August 2015.
- Perry⁺ M, Bollens S, **Rollwagen-Bollens** G. Vertical distribution of microplankton in relation to hypoxia in Lacamas Lake, WA. Summer Undergraduate Research Symposium, WSU Vancouver. August 2015.
- Rollwagen-Bollens** G, Bollens S. New NSF REU Site at Washington State University Vancouver: Landscape Ecology and Ecosystem Dynamics – Integrating Aquatic and Terrestrial Perspectives. Pacific Estuarine Research Society Annual Meeting, Seattle, WA. March 2015.
- Rollwagen-Bollens** G, Bollens S, Lee* T, Boyer* J, Zimmerman J. Assessing the role of biotic and abiotic factors on the development and decline of harmful cyanobacteria blooms in a large, tidally-influenced flood plain lake. Pacific Estuarine Research Society Annual Meeting, Seattle, WA. March 2015.
- Lee* T, Bollens S, **Rollwagen-Bollens** G, Emerson J. The effects of cyanobacterial blooms and invasive species on zooplankton community dynamics in a tidally-influenced shallow temperate lake. Pacific Estuarine Research Society Annual Meeting, Seattle, WA. March 2015.
- Rose* V, **Rollwagen-Bollens** G, Bollens S. Interactive effects of phosphorus and zooplankton grazing on harmful algal blooms in a shallow temperate lake. Pacific Estuarine Research Society Annual Meeting, Seattle, WA. March 2015.
- Hassett* W, Bollens S, **Rollwagen-Bollens** G, Counihan T, Zimmerman J, Emerson J. Broad-scale distribution, ecological associations, and potential impacts of the invasive Asian clam *Corbicula fluminea* in the Columbia River Basin. Pacific Estuarine Research Society Annual Meeting, Seattle, WA. March 2015.

- McGill⁺ J, **Rollwagen-Bollens** G, Bollens S, Zimmerman J. Effects of trout hatchery effluent on a small stream. WSU Showcase for Undergraduate Research and Creative Activities, Pullman, WA. March 2015.
- Newman^o T, Bollens S, **Rollwagen-Bollens** G, Zimmerman J. Aquatic invasive species and diatoms: assessment in two contrasting environments using the FlowCAM. Murdock Charitable Trust “Partners in Science” Annual Meeting, San Diego, CA. January 2015.
- Bollens S, **Rollwagen-Bollens** G, Counihan T, Hardiman J, Zimmerman J, Hassett W, Emerson J. Invasive Mussel Monitoring in the Columbia River Basin — Past, Present, and Future. Oregon Lakes Association Annual Meeting, Astoria, OR. October 2014.
- Rollwagen-Bollens** G, Bollens S, Boyer J, Lee T, Zimmerman J, Emerson J. Assessing the role of zooplankton grazing on the development and decline of harmful cyanobacteria blooms in a tidally-influenced floodplain lake (Vancouver Lake, WA, USA), Joint Aquatic Sciences/Association of the Sciences of Limnology and Oceanography International Conference, Portland, OR, May 2014
- Rollwagen-Bollens** G, Bollens S, Nelson T, Kennedy A, Tissot B. GK12: Partners in Discovery on the Columbia River. Joint Aquatic Sciences/Association of the Sciences of Limnology and Oceanography International Conference, Portland, OR. May 2014.
- Bollens S, **Rollwagen-Bollens** G, Counihan T, Hardiman J. Invasive mussel monitoring in the Columbia River Basin - past, present, and future. Joint Aquatic Sciences/Association of the Sciences of Limnology and Oceanography International Conference, Portland, OR, May 2014
- Dexter* E, Bollens S, **Rollwagen-Bollens** G. The Columbia River Estuary as a Highly Invaded Ecosystem. Joint Aquatic Sciences/Association of the Sciences of Limnology and Oceanography International Conference, Portland, OR. May 2014.
- Bowen* A, Bollens S, Rollwagen-Bollens G, Zimmerman J. Feeding of the invasive copepod *Pseudodiaptomus forbesi* on natural microplankton assemblages in the Lower Columbia River. Joint Aquatic Sciences/Association of the Sciences of Limnology and Oceanography International Conference, Portland, OR. May 2014.
- Lee* T, **Rollwagen-Bollens** G, Bollens S. Seasonal succession and environmental forcing of the zooplankton community in a shallow eutrophic lake, Joint Aquatic Sciences/Association of the Sciences of Limnology and Oceanography International Conference, Portland, OR. May 2014.
- Rose⁺ V, **Rollwagen-Bollens** G, Bollens S. The interactive effects of phosphorus and mesozooplankton grazers on harmful algal blooms in Vancouver Lake, Washington. WSU Showcase for Undergraduate Research and Creative Activities, Pullman, WA. March 2014.
****Boeing Gray Award for Organismal, Population, Ecological, and Evolutionary Biology**
- Bowen* A, Bollens S, **Rollwagen-Bollens** G, Zimmerman J. Feeding of the invasive copepod *Pseudodiaptomus forbesi* on natural microplankton assemblages in the Lower Columbia River. Pacific Estuarine Research Society annual meeting, Newport, OR. March 2014.
- Rollwagen-Bollens** G, Nelson T, Kennedy A, Graves^o M, Bollens S. Partners in Discovery: Building scientist-teacher collaborations to support student learning and inquiry skills in aquatic science. ASLO-AGU Ocean Sciences Meeting, Honolulu, HI. February 2014.
- Rollwagen-Bollens** G, Bollens S, Lee* T, Boyer* J, Zimmerman J. Assessing the role of biotic and abiotic factors on the development and decline of harmful cyanobacteria blooms in a large, tidally-influenced flood plain lake. ASLO-AGU Ocean Sciences Meeting, Honolulu, HI. February 2014.
- Bollens S, **Rollwagen-Bollens** G, Counihan T, Hardiman J. Invasive mussel monitoring in the Columbia River Basin — past, present, and future. ASLO-AGU Ocean Sciences Meeting, Honolulu, HI. February 2014.
- Dexter* E, Bollens S, **Rollwagen-Bollens** G. The Columbia River as a heavily invaded ecosystem: Discerning patterns of abundance of native and non-native zooplankton. ASLO-AGU Ocean Sciences Meeting, Honolulu, HI. February 2014.

- Newman^o T, Bollens S, **Rollwagen-Bollens** G, Zimmerman J. Aquatic invasive species and diatoms: assessment in two contrasting environments using the FlowCAM. Murdock Charitable Trust “Partners in Science” Annual Meeting, San Diego, CA. January 2014.
- Bollens S, **Rollwagen-Bollens**, G, Counihan T, Hardiman J. Invasive mussel monitoring in the Columbia River Basin — Past, present, and future. Washington Lake Protection Society-Oregon Lakes Association Joint Annual Meeting, Vancouver, WA. October 2013.
- Rollwagen-Bollens** G, Bollens S, Boyer* J, Lee* T, Zimmerman J, Emerson J. Assessing the role of zooplankton grazing on the development and decline of cyanobacteria blooms in Vancouver Lake, WA, USA. Washington Lake Protection Society-Oregon Lakes Association Joint Annual Meeting, Vancouver, WA. October 2013.
- Lee* T, **Rollwagen-Bollens** G, Bollens S. The influence of environmental variables on cyanobacteria blooms in Vancouver Lake, Washington. Washington Lake Protection Society-Oregon Lakes Association Joint Annual Meeting, Vancouver, WA. October 2013.
- Bollens S, **Rollwagen-Bollens**, G, Counihan T, Hardiman J. Invasive mussel monitoring in the Columbia River Basin — Past, present, and future. Western Regional Panel on Aquatic Invasive Species Annual Meeting, Portland, OR. September 2013.
- Rollwagen-Bollens** G, Thiers P. Teaching socio-environmental synthesis to non-traditional college students by linking natural science and social science courses. Ecological Society of America Annual Meeting, Minneapolis, MN. August 2013.
- Berkowitz A, Alvare B, Grant B, Hall K, Hawthorne D, Jiru M, Rashid K, **Rollwagen-Bollens** G, Solomon C, Thiers P. The SESYNC Socio-Environmental Synthesis Teaching Study: Defining, measuring and fostering student learning. Ecological Society of America Annual Meeting, Minneapolis, MN. August 2013.
- Rollwagen-Bollens** G, Bollens S, Boyer* J, Lee* T, Zimmerman J, Emerson J. “Assessing the role of zooplankton grazing on the development and decline of cyanobacteria blooms in Vancouver Lake, WA, USA.” Aquatic Ecosystem Health and Management Society Annual Meeting, Victoria, BC, Canada. June 2013.
- Bollens S, **Rollwagen-Bollens** G, Cordell H, Kolata O. “Invasive copepods and plankton dynamics of the Columbia River Estuary.” Aquatic Ecosystem Health and Management Society Annual Meeting, Victoria, BC, Canada. June 2013.
- Bollens S, **Rollwagen-Bollens**, G, Counihan T, Hardiman J. Monitoring and investigation of the spread and potential impact of aquatic invasive mussels in the Columbia River Basin. 100th Meridian Initiative, Columbia River Basin Team, Annual Meeting, Vancouver, WA. May 2013.
- Dean^o J, **Rollwagen-Bollens** G, Bollens S. “Assessing the influence of zooplankton grazing pressure on cyanobacteria diversity, growth and toxin production in Vancouver Lake, WA, using qPCR analysis.” MJ Murdock Charitable Trust “Partners in Science” Annual Meeting, San Diego, CA. January 2013.
- Yeakley A, Duncan S, Bollens S, Ozawa C, Shandas V, Chang H, Dresner M, Gordon S, Harrison J, Kline J, Morzillo A, Netusil N, **Rollwagen-Bollens** G, Stephan M, Thiers P. “Portland-Vancouver ULTRA-Ex: Evaluating relationships between governance and environmental quality in urban ecosystems.” Ecological Society of America Annual Meeting, Portland, OR. June 2012.
- Bollens S, Breckenridge J, **Rollwagen-Bollens** G, Cordell H, Kolata O. “Non-indigenous copepods and plankton dynamics of the lower Columbia River Estuary.” Ecological Society of America Annual Meeting, Portland, OR. June 2012.
- Lee* T, **Rollwagen-Bollens**, Bollens S. “The use of qPCR to monitor changes of toxin and non-toxin producing cyanobacteria populations in Vancouver Lake, WA, in response to water quality variables.” Ecological Society of America Annual Meeting, Portland, OR. June 2012.
- Rollwagen-Bollens** G, Nelson T, Kennedy A Lock B, Graves⁺ M, Bollens S, Tissot B. “Building scientist-teacher collaborations to support student learning and inquiry skills.” Ecological Society of America Annual Meeting, Portland, OR. June 2012.

- Rollwagen-Bollens** G, Bollens S, Boyer* J, Lee* T, Zimmerman J, Emerson J. “Assessing the role of zooplankton grazing on the development and decline of cyanobacteria blooms in Vancouver Lake, WA, USA.” Ecological Society of America Annual Meeting, Portland, OR. June 2012.
- Rollwagen-Bollens** G, Bollens S, Boyer* J, Lee* T, Gonzalez A, Emerson J. “Assessing the role of zooplankton grazing on the development and decline of cyanobacteria blooms in Vancouver Lake, WA, USA.” Estuarine Coastal and Shelf Science International Conf., Venice, Italy. June 2012.
- Bollens S, Breckenridge J, **Rollwagen-Bollens** G, Cordell H, Kolata O. “Invasive copepods and plankton dynamics of the Columbia River Estuary.” Estuarine Coastal and Shelf Science International Conference, Venice, Italy. June 2012.
- Rollwagen-Bollens** G, Lock B, Graves⁺ M, Nelson T, Kennedy A, Tissot B, Bollens S, James⁺ K. “Partners in Discovery of the Columbia River Watershed GK-12 Project: Building Lasting Collaboration through Scientist-Teacher Partnerships.” National Science Foundation GK-12 Program Annual Meeting, Washington, DC. March 2012.
- Rollwagen-Bollens** G, Bollens S, Boyer* J, Lee* T, Gonzalez A, Emerson J. “Assessing the role of zooplankton grazing on the development and decline of cyanobacteria blooms in Vancouver Lake, WA.” 2012 Urban Ecology and Conservation Symposium, Portland, OR. February 2012.
- Lee* T, **Rollwagen-Bollens**, Bollens S. “Environmental influences on cyanobacteria harmful algal blooms in Vancouver Lake, Washington.” 2012 Urban Ecology and Conservation Symposium, Portland, OR. February 2012.
- Rollwagen-Bollens** G, Lock B, Graves^o M, Bollens S, Tissot B, Nelson T, Kennedy A. “Partners in Discovery GK-12 project at WSU Vancouver: Building scientist-teacher collaborations to support student learning and inquiry skills.” 2012 Urban Ecology and Conservation Symposium, Portland, OR. February 2012.
- Thiers P, Chang H, Singh S, Yeakley A, Bollens S, Harrison J, **Rollwagen-Bollens** G, Netusil N, Kincaid M, Walker A. “Effects of Land Cover and Governance on Water Quality in the Portland-Vancouver metropolitan area.” 2012 Urban Ecology and Conservation Symposium, Portland, OR. February 2012.
- Dean^o J, **Rollwagen-Bollens** G, Bollens S. “Impacts of grazing pressure on toxin production in cyanobacterial blooms.” MJ Murdock Charitable Trust “Partners in Science” Annual Meeting, San Diego, CA. January 2012.
- Rollwagen-Bollens** G, Bollens S, Boyer* J, Lee* T, Zimmerman J, Emerson J. “Assessing the role of zooplankton grazing on the development and decline of cyanobacteria blooms in Vancouver Lake, WA.” Coastal and Estuarine Research Federation Biennial Meeting, Daytona Beach, FL. November 2011.
- Rollwagen-Bollens** G, Bollens S, Boyer* J, Lee* T, Zimmerman J, Emerson J. “Assessing the role of zooplankton grazing on the development and decline of cyanobacteria blooms in Vancouver Lake, WA.” State of Washington Water Research Center “Water Conference.” Skamania, WA. November 2011.
- Rollwagen-Bollens** G, Bollens S, Boyer* J, Lee* T, Zimmerman J, Emerson J. “Assessing the role of zooplankton grazing on the development and decline of cyanobacteria blooms in Vancouver Lake, WA.” National Association of Lake Management Society Annual Meeting, Spokane, WA. November 2011.
- Lee* T, **Rollwagen-Bollens** G, Bollens S. “Environmental influences on phytoplankton community composition and toxic cyanobacteria blooms in a shallow temperate lake (Vancouver, Washington, USA).” State of Washington Water Research Center “Water Conference.” Skamania, WA. November 2011.
- Rollwagen-Bollens** G, Bollens S, Gonzalez A, Zimmerman J, Lee* T, Emerson J. “Feeding dynamics of the copepod *Diacyclops thomasi* before, during and following filamentous cyanobacteria blooms in Vancouver Lake, WA.” Washington State University Vancouver Research Showcase, Vancouver, WA. April 2011.

- Rollwagen-Bollens G, Lock B, Graves^o M, Bollens S, Tissot B, Nelson T, Kennedy A.** “Partners in Discovery of the Columbia River Watershed GK-12 Project: Digging Deeper into Science.” National Science Foundation GK-12 Program Annual Meeting, Washington, DC. March 2011.
- Lee* T, **Rollwagen-Bollens G, Bollens S.** “Environmental influences on phytoplankton community composition and toxic cyanobacteria blooms in a shallow temperate lake (Vancouver, Washington, USA).” ASLO Aquatic Sciences Meeting, San Juan, Puerto Rico. February 2011.
- Rollwagen-Bollens G, Bollens S, Tissot B, Nelson T, Kennedy A, Lock B.** “Partners in Discovery of the Columbia River Watershed GK-12 Project: Connecting Kids to Their Environment Through Student-Driven Research.” National Science Foundation GK-12 Program Annual Meeting, Washington, DC. March 2010.
- Rollwagen-Bollens G, Boyer* J, Bollens S, Gonzalez A, Zimmerman J, Lee* T.** The role of zooplankton grazing on a noxious cyanobacteria bloom in Vancouver Lake, WA. Urban Ecology and Conservation Symposium, Portland, OR. February 2010.
- Rollwagen-Bollens G, Boyer* J, Bollens S, Gonzalez A, Zimmerman J.** “Assessing the role of micro- and mesozooplankton grazing on the development and decline of a noxious cyanobacteria bloom.” ASLO-AGU Ocean Sciences Meeting, Portland, OR. February 2010.
- Bollens S, Breckenridge J, **Rollwagen-Bollens G.** “Plankton dynamics of the Lower Columbia River Estuary.” ASLO-AGU Ocean Sciences Meeting, Portland, OR. February 2010.
- Rollwagen-Bollens G, Bollens S, Tissot B, Nelson T, Kennedy A, Lock B.** “Partners in Discovery of the Columbia River Watershed GK-12 Project: Connecting Kids to Their Environment Through Student-Driven Research.” ASLO-AGU Ocean Sciences Meeting, Portland, OR. February 2010.
- Prewitt^o S, Bollens S, **Rollwagen-Bollens G.** “Impact of Mesozooplankton on Blue-Green Algal Blooms in Vancouver Lake.” Murdock Charitable Trust “Partners in Science” National Conference, San Diego, CA. January 2010.

Invited Colloquia Since 2010

- Department of Biology, Portland State University, Portland, OR. “Plankton dynamics in the Columbia River Estuary: Harmful algal blooms, invasive species, and climate change.” May 2014.
- USGS Oregon Water Center, Portland, OR. “The Role of Zooplankton Grazing on Noxious Cyanobacteria Blooms in Vancouver Lake, WA.” December 2010.
- Department of Zoology, University of Otago, Dunedin, New Zealand. “The role of zooplankton grazing on noxious cyanobacteria blooms in Vancouver Lake, Washington, USA.” May 2010.
- Department of Marine Science, University of Otago, Dunedin, New Zealand. “Microzooplankton in Pelagic Food Webs: From Blooms to Behavior.” May 2010.
- Department of Biology, University of Portland, Portland, OR. “Plankton in Marine Food Webs: From Blooms to Behavior.” February 2010.

<i>Service Activities</i>

University Service

WSU System-wide:

WSU President's Commission on the Status of Women	2007 – 2012
Chair, Sexual Misconduct Subcommittee	2010 – 2012
Executive Committee Member and Membership Coordinator	2008 – 2009
Subcommittee on Family-friendly policies	2007 – 2009
WSU Partners for Innovative Education in STEM	2013 – 2015
WSU STEM Education Partnership Executive Committee	2012 – 2013

WSU Vancouver Campus-wide:

WSUV Scholarship Committee	2011 – present
WSUV Enrollment Management Strategy Team	2015 – 2016
1 st and 2 nd Year Experience Sub-Committee	2015 – 2016
WSUV UCORE Transition Committee	2012 – 2013
Interim Director of Research & Graduate Education	2007 – 2008
WSUV Faculty Professional Development Planning Committee	2007 – 2008
WSUV Diversity Council	2005 – 2007
Subcommittee on Student Retention	2005 – 2006
Subcommittee on Curriculum	2006 – 2007
WSUV Annual Teaching Assistant Training Workshop	2011 – present
WSUV/SW Washington Medical Center Grant Review Committee	May 2007
WSUV Faculty Mini-Grant Review Committee	2006 – 2007

WSU Vancouver College of Arts & Sciences:

Program Leader, Environmental Sciences	2016 – present
Program Leader, Natural Sciences Graduate Studies	2015 – 2016
Program Leader, Environmental Sciences	2013 – 2015
Arts & Sciences Undergraduate Curriculum Committee	2012 – present
Undergraduate advising, BS Biology/BS Env Sci (10-12 students/semester)	2004 – present
Faculty Search Committees:	
Tenure-track faculty in Environmental Chemistry	2014 – 2015
Tenure-track faculty in Hydrology	2013 – 2014
Tenure-track faculty in Environmental Geochemistry	2005 – 2006
Coordinator of Science Programs Seminar Series	2004 – 2005

WSU School of the Environment:

Student Awards and Scholarships committee	2014 – present
Graduate Studies committee	2013 – 2015
Recruitment committee	2007 – 2008

WSU School of Biological Sciences:

Communication Committee	2015 – present
Introductory Biology Teaching Laboratory Improvement	2014 – 2015

Community Outreach

Southwest Washington College Access Network	2013 – present
Invited speaker and host, ESD 112 Principal's Café	December 2012

K-12 Science Education Forum Invited speaker and host, SW Washington Workforce Development Council and Mt St Helens Institute “STEM Institute” for selected HS students in Clark County	May 2012
Teacher Professional Development Committee, Vancouver Public Schools Planning Group for new STEM HS	2010 – 2012
Career Mentor, Jobs Acquisition Skills Program, Washougal HS	2004 – present
Keynote speaker, AAUW Annual Recognition Awards Ceremony (Vancouver, WA, branch)	April 2009
Invited speaker, AAUW Meeting: Status of Women in Science (Vancouver, WA, branch)	January 2009
Keynote speaker, AAUW Annual Recognition Awards Ceremony (Hudson’s Bay, WA, branch)	April 2008
Board member, Camas HS Sci-Tech Magnet Advisory Board	2008 – 2013
Research mentor, Skyview HS Intel Science Fair Project	2007 – 2008
Science activity station, SW Washington MESA Math/Science Day	Oct 2006
Mentor to two Columbia River HS students’ science fair project	2005 – 2006
Led a one-day field trip for Evergreen HS’s A.P. Env Sci class	June 2005
Science Fair judge, Columbia River HS	May 2005
Co-convener “K-20 STEM Education Summit”	April 2005

Professional service

Peer reviewer of proposals for the National Science Foundation (Ecosystems Studies Program, Polar Programs, Biological Oceanography Program)	2005 – present
Peer reviewer of manuscripts for publication (<i>Marine Ecology Progress Series, Journal of Plankton Research, Hydrobiologia, Estuaries & Coasts, Archiv fur Hydrobiologie, CalCOFI Reports</i>)	2004 – present

Professional Affiliations

Association for the Sciences of Limnology
and Oceanography
International Society of Protozoologists
Coastal & Estuarine Research Federation

Pacific Estuarine Research Society
National Science Teachers Association
National Association of Biology Teachers
Sigma Xi Research Society