

JENNIFER EVARTS LINEBACK, PH.D.

C U R R I C U L U M V I T A E

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EDUCATION

- Ph.D. in Mathematics and Science Education**, joint doctoral program 2012
University of California San Diego & San Diego State University, San Diego, CA
- Research area: Science teaching and learning
 - Thesis title: *Mrs. Miller's evolution in teaching science as inquiry: A case study of teacher change*
 - Thesis advisor: Dr. Fred Goldberg, SDSU
- M.S. in Zoology**, Miami University, Oxford, OH 1997
- Research area: Freshwater ecology
 - Thesis title: *Spatial and temporal variation in nitrogen and phosphorus release from sediments in a eutrophic reservoir*
 - Thesis advisor: Dr. Mike Vanni
- B.S. in Zoology**, Miami University, Oxford, OH 1995
B.A. in Chemistry, Miami University, Oxford, OH

RESEARCH AND OTHER PROFESSIONAL INTERESTS

To date, my professional work has primarily centered on two areas: (1) encouraging instructors at all levels (i.e. primary, secondary, post-secondary, STEM professionals) to teach more responsively to their students' thinking (e.g. encouraging teachers to elicit, make sense of, and incorporate student ideas into ongoing instruction), and (2) working with biology instructors specifically to implement alternative pedagogical strategies (e.g. collaborative learning, using manipulatives during lectures) in their classroom to help students make sense of fundamental biological concepts. Currently, my research focus is centered on investigating how instructors learn and implement new teaching strategies, like responsive teaching and collaborative learning and assessing the implications of such instructional approaches on student engagement, conceptual understanding, and performance on both formal and informal assessments.

RESEARCH EXPERIENCE

Research activities involving teaching and learning

Educational Researcher:

- Served as co-PI on the IDEA grant entitled, “*Improving student learning and classroom experience using mentoring in weekly observation and planning: Measuring success through targeted IDEA Teaching Methods and PRO scores*” Jo Clemmons (PI).
 - Worked closely with PLNU Chemistry faculty member to enact and determine the effectiveness of student-centered pedagogies in an introductory level chemistry class (2016-2017)
- Engaged in action research in a Master’s level course on Research Design for PLNU School of Education students
 - Explored the effectiveness of a teaching sequence on qualitative analysis in training novice educational researchers (2016)

Educational Consultant: *SDSU Noyce Mathematics and Science Master Teaching Fellowship Program* (National Science Foundation). Lisa Lamb (PI), Randy Philipp, Susan Nickerson, Donna Ross, and Kathy Williams (co-PIs).

- Assisted in the analysis of teacher and student progress across mathematics and science learning objectives, 2014 - present
- Coded video recordings of participating grade 6-12 mathematics and science teachers’ classroom instruction, 2013 - present
- Assisted in development of scoring rubrics for assessing middle and high school mathematics and science teachers along different dimensions (i.e. teachers’ elicitation of student ideas, quality of teachers’ facilitation of student discourse, teachers’ content understanding), 2013-2014

Graduate Research Associate: *Learning Progressions for Scientific Inquiry: A Model Implementation in the Context of Energy*, (National Science Foundation grant 0732233). Fred Goldberg (PI), Sharon Bendall, Janet Coffey, David Hammer, April Cordero Maskiewicz (co-PIs).

- Assisted in the generation and promotion of a browser-based electronic resource for science educators and professional developers interested in engaging in and supporting responsive teaching, 2012
- Assisted in generation of pilot curricular and professional development materials for use by the elementary and middle school teachers associated with our project and the larger educational community, 2008-2011
- Collaborated with project staff regarding conceptualization of student and teacher learning and possible “learning progressions” in the context of scientific inquiry instruction, 2008-2011
- Assisted in ongoing research by operating video equipment and debriefing teachers as they implemented novel instructional approaches, 2008-2010

Research activities concerning conceptual assessment in biology

Graduate Research Associate working with biology professors Kathleen Fisher and Kathy Williams (SDSU) to develop, validate, and administer conceptual assessments in biology at the undergraduate level

- Participated in international working meetings regarding the development, dissemination, and administration of conceptual assessments in biology: Conceptual Assessments in Biology II (January, 2008) in Asilomar, CA and Conceptual Assessments in Biology III (May, 2010) in Point Loma, CA
- Conducted independent research by administering conceptual assessments to a population of biology experts and inviting them to comment on the individual test items. Results served to help modify the assessments and provide external validation for the instruments, summer 2008, summer 2009
- Assisted in creating, revising, and administering conceptual assessments to undergraduates in five areas of biology: osmosis and diffusion, evolution and natural selection, cell division, energy, and the natural of science, 2007-2008
- Assisted in the collection and quantitative analysis of large amounts of data regarding student performance on biology conceptual assessments, 2007-2008
- Conducted semi-structured individual interviews concerning students' understanding of diffusion and osmosis, SDSU, fall 2007

Research Assistant: Participated in a research apprenticeship with Drs. Gabriele Wienhausen and Steve Wasserman (UCSD) to analyze different types of multiple-choice assessment items and develop a working set of guidelines for how undergraduate faculty might construct more effective multiple-choice tests, spring 2008

Additional research activities

Research Assistant: Conducted preliminary meta-analyses of the relevant 2007 literature on problem-based learning in science education for REESE Knowledge Diffusion grant proposal: Deriving empirically grounded effective principles for science problem design, spring, 2009

Research Assistant: Collected video data on grade 10 students participating in an innovative physical science unit on robotics at a charter high school. 30-hour research apprenticeship with Dr. Donna Ross, SDSU, spring 2008

HHMI Fellowship Research Assistant: Compared the mammary gland morphologies and immunohistochemistries of the short-tailed fruit bat (*Carollia perspicillata*) and the mouse (*Mus musculus*), National Institutes of Health, summer 2002

Research Assistant: Assisted in collecting, filtering and analyzing water samples for the NSF funded *Four Mile Creek Watershed Project*, Miami University, 1995-1997

TEACHING EXPERIENCE: UNDERGRADUATE / PROFESSIONAL DEVELOPMENT

Associate Professor, Dept. of Biology & School of Education (PLNU) 2015 - present

- Courses taught: Genetics (Biology), Science Education seminar (Biology), Introduction to Biology (BIO 101 – UNOW), Research

<ul style="list-style-type: none"> • Coordinator for culminating research project mentor and mentees for Education Master's (MAT, MATL, MA-SpED) students; responsible for assigning mentors to student mentees and promoting successful completion of mentees' Master's projects 	2012 –2015
<p>Part-Time Faculty, Dept. of Biology & School of Education (PLNU)</p> <ul style="list-style-type: none"> • Courses taught: Ecology of Plants and Animals (Biology), Genetics (Biology), Cell Biology/Biochemistry Lab (Biology), Introduction to Biology (BIO 101 – UNOW), Research Pilot Study (Biology), Research Design Methods (Biology, Education), Mathematics Methods (Education) • Mentored experienced faculty member with respect to using novel pedagogical approaches and progressive teaching strategies in a larger lecture course in anatomy and physiology (BIO 130) • Helped redesign introductory GE Biology course (BIO 103) to be more grounded in educational learning theory, incorporating collaborative learning techniques and inquiry-based pedagogical strategies into curriculum • Supervised MAT student's independent study, where student coded elementary teacher's classroom practice according to an elaborate coding scheme 	
<p>Educational Consultant, Space and Naval Warfare Command (SPAWAR), U.S. Navy</p> <ul style="list-style-type: none"> • Worked with practicing STEM professionals to generate high quality instructional sessions/workshops for high school/college students 	Summer 2012
<p>Adjunct Professor, Dept. of Biology, Point Loma Nazarene University</p> <ul style="list-style-type: none"> • Courses: Ecology of Plants and Animals (graduate level), Ecology (majors), Ecology and Conservation (non-majors), Research Design (graduate level) 	Summer 2011 Spring 2012
<p>Assistant Instructor, Center for Research in Mathematics and Science (SDSU)</p> <ul style="list-style-type: none"> • Assisted in planning and enacting inquiry-based professional development summer workshops and bi-weekly meetings (practicing elementary and middle school teachers) 	2008-2011
<p>Co-Instructor, Dept. of Biology, San Diego State University (SDSU)</p> <ul style="list-style-type: none"> • Course: Biology Concept Development & Integration (majors) • Collaborated with co-instructor to plan and teach course for upper-level biology majors interested in teaching 	Spring 2009
<p>Presenter, Office of Science Education- NIH, Bethesda, MD</p> <ul style="list-style-type: none"> • Assisted in professional development workshops demonstrating biology and health related curricular supplements (practicing elementary and secondary teachers) 	2002-2005
<p>Adjunct Professor, Science Dept., Miami-Dade Community College, Miami, FL</p> <ul style="list-style-type: none"> • Courses: Introduction to Biology (lecture and lab) 	1999-2001
<p>Graduate Teaching Assistant, Dept. of Zoology, Miami University, Oxford, OH</p> <ul style="list-style-type: none"> • Courses: Developmental Biology Laboratory (majors), Introduction to Botany, Microbiology, Zoology Laboratory (majors) 	1995-1997

TEACHING EXPERIENCE: K-12 INSTRUCTION

Secondary Science Teacher (*High School unless otherwise noted*)

- International School of Port of Spain, Trinidad and Tobago 2005-2007
 - Courses: Biology, Advanced Placement (AP) Biology, Environmental Science
- Landon School, Bethesda, MD 2001-2005
 - Courses: Biology, AP Biology
- Center for Talented Youth (Johns Hopkins University), Lancaster, PA Summer 2003
 - Course: Fast-Paced High School Biology (3-week course)
- Palmer Trinity School, Miami, FL 1998-2001
 - Courses: Biology, Honors Biology, AP Biology, Quantitative Physical Science, Middle School Life Science

Teaching Internship (*High School*)

- Miss Porter's School, Farmington, CT 1997-1998
 - Courses: Biology, Word processing

GRANT WRITING EXPERIENCE

- Awarded IDEA Impact Grant (with PI-Jo Clemmons) to work with a PLNU faculty member to implement novel pedagogies in a lecture classroom 2016-2017
- Awarded PLNU Alumni Association Faculty Grant with colleague Rob Elson to redesign Anatomy and Physiology course (BIO 130) to be more student-centered Summer 2014
- Awarded Parents' Association Grant to visit Ecuador and the Galapagos Islands for professional development purposes Summer 2003

PUBLICATIONS

- Lineback, J. E.** & Maskiewicz, A. C. (2016). Common elements that promote productive scientific reasoning in responsive teaching classrooms. *Manuscript submitted.*
- Lineback, J. E.** (2015). Methods to assess teacher responsiveness *in situ*. In A. Robertson, R. Scherr, and D. Hammer, (Eds.), *Responsive Teaching in Science and Mathematics* (pp. 203-226). New York: Routledge.
- Lineback, J. E.** (2014). The redirection: An indicator of how teachers respond to student thinking. *Journal of the Learning Sciences*. 24(3): 419-460. DOI: [10.1080/10508406.2014.930707](https://doi.org/10.1080/10508406.2014.930707)
- Maskiewicz, A. C. & **Lineback, J. E.** (2013). Misconceptions are so 'yesterday!' *CBE – Journal of Life Science Education*, 12, 352-356.
- Fisher, K. M., Williams, K. S., & **Lineback, J. E.** (2011). Osmosis and diffusion conceptual assessment. *CBE – Journal of Life Science Education*, 10, 418-429.
- Lineback, J. E.** & Goldberg, F. (2010, June). *Using changes in framing to account for differences in a teacher's classroom behavior*. In K. Gomez, L. Lyons, & J. Radinsky (Eds.), *Learning in the Disciplines: Proceedings of the 9th International*

Conference of the Learning Sciences (ICLS 2010) - Volume 1, Full Papers (pp. 145-152). International Society of the Learning Sciences: Chicago IL. [Also under Conference Presentations]

Nowlin, W. H., **Evarts, J. L.** & Vanni, M. (2005). Release rates and potential fates of nitrogen and phosphorus from sediments in a eutrophic reservoir. *Freshwater Biology*, 50, 301-322.

Evarts, J. L., Rasweiler, J. J., Behringer, R. R., Hennighausen, L. & Robinson, G.W. (2004). A morphological and immunohistochemical comparison of mammary tissues from the short-tailed fruit bat (*Carollia perspicillata*) and the mouse. *Biology of Reproduction*, 70, 1573–1579.

PRESENTATIONS, WORKSHOPS, AND SPEAKING ENGAGEMENTS

Conference Presentations and Contributed Papers

Williams, K.S., Fisher, K.M., & **Lineback, J.E.** (2012, August) *BioHUB: An internet HUB for the Conceptual Assessment in Biology (CAB) community*. Paper presented at the Ninety-seventh Annual Meeting of the Ecological Society of America, Portland, OR.

Lineback, J.E. & Lardy, C. (2011, March). *Using authentic activities in the classroom*. Paper presented at the National Science Teachers of America National Conference on Science Education, San Francisco, CA.

Lineback, J. E. & Goldberg, F. (2010, June). *Using changes in framing to account for differences in a teacher's classroom behavior*. Paper presented at the Ninth International Conference of the Learning Sciences, Chicago, IL.

Williams, K.S., Fisher, K.M., Anderson, D.L., Smith, M.U., & **Lineback, J.E.** (2008, January). Using diagnostic test items to assess conceptual understanding of basic biology ideas: A plan for programmatic assessment. Paper presented at the Second Conceptual Assessment in Biology (CAB II) meeting, Asilomar, CA.

Barnett, T., Botti, J., & **Evarts, J. L.** (2004, November). Ethics in the classroom. Presentation at the Association of Independent Maryland Schools (AIMS) Annual Fall Conference, Baltimore, MD.

Evarts, J. L. & Vanni, M. J. (1997, May). Sediment release of phosphorus in Acton Lake. Paper presented at the Ohio Lake Management Society's first annual Ohio Limnology Conference, Delaware, OH.

Evarts, J. L. (1996, November). Nutrient release from sediments to open waters in Acton Lake. Paper presented at the Ohio River Basin Consortium for Research and Education's Twelfth Annual Scientific Symposium, Oxford, OH.

Poster Presentations

Goldberg, F., Bendall, S., Hammer, D., McKean, M., Coffey, J., Maskiewicz, A., **Lineback, J.**, & Jabar, L. (2012, June). *Browser-based resource for responsive teaching in science: A product of the Learning Progressions in Scientific Inquiry Project*. Poster presented at: DRK-12 PI meeting – Washington, D.C.

Lineback, J.E. (2012, January). *Characterizing “redirections”: A method to describe teacher change*. Poster presented at: A Tribute to the Career of Dr. Judith Sowder: Linking Research and Practice in Mathematics Education – San Diego, C.A.

Coffey, J.E., Maskiewicz, A.C., Hammer, D., Jaber, L., Finkelstein, C., Radoff, J., Bendall, S., Goldberg, F., & **Lineback, J.** (2010, December). *The Dynamics of Progress: A case study of elementary teachers’ engagement in science*. Poster presented at: DRK-12 PI meeting - Washington, D.C.

Goldberg, F., Bendall, S., Winters, V. **Lineback, J.E.**, Hammer, D., Coffey, J., Sikorski, T.R., Cunningham, J.M., Finkelstein, C., Radoff, J. & Maskiewicz, A. (2009, November). *Learning Progressions in Scientific Inquiry*. Poster presented at: DRK-12 PI meeting – Washington, D.C.

Williams, K.S., Fisher, K.M., **Lineback, J.** (2009, July). *Learning how students think about science: Developing diagnostic questions*. Poster presented at: Transforming Undergraduate Education in Biology: Mobilizing the Community for Change Conference – Washington, D.C.

Professional Development (Single Session) Workshops

Vannier, D.M. & **Lineback, J.E.** (2005, May). The brain: Understanding neurobiology through the study of addiction. Workshop given at: Learning and the Brain Conference, Cambridge, MA.

Fuchs, B.A. & **Evarts, J.L.** (2004, July). NIH: Human Genetic Variation. Workshop given at: Environmental Health Sciences Summer Institute, Austin, TX.

Fuchs, B.A. & **Evarts, J.L.** (2004, July). NIH: Emerging & re-emerging infections diseases. Workshop given at: Environmental Health Sciences Summer Institute, Austin, TX.

Evarts, J.L. (2004, July). The brain and addiction: A new approach to teaching neurobiology in the high school classroom. Workshop given at: Biotechnology Conference, Blacksburg, VA.

Evarts, J.L. (2004, July). The brain: Understanding neurobiology through the study of addiction. Workshop conducted for: Wisconsin Teacher Enhancement Program (WisTEP), Madison, WI.

Vannier, D.M. & **Evarts, J.L.** (2003, November). The brain: Understanding neurobiology through the study of addiction. Workshop given at: National Science Teachers Association (NSTA) Area Conference, Minneapolis, MN.

Guest Lecturer Invitations (Courses/Location and contexts)

Mission Hills, United Church of Christ (San Diego, CA): Gave talk and led discussion entitled “*Reconciling Faith and Biological Evolution*” with colleague April Cordero Maskiewicz (PLNU), June 2014

University City, United Church of Christ (San Diego, CA): Gave talk and led discussion entitled “*Reconciling Faith and Biological Evolution*” with colleague April Cordero Maskiewicz (PLNU), April 2014

TE 914 (Teaching and Learning: Content Area): Discussed and practiced the process of crafting interesting, engaging, and generative questions with pre-service secondary science education students, SDSU, November 2011

MSED 296 (Graduate Seminar): Taught class session introducing mathematics and science education doctoral students to the topic of scientific inquiry, UCSD, January 2011

TE 914 (Teaching and Learning: Content Area): Discussed different types of teaching opportunities with pre-service secondary science education students, including teaching positions in private institutions and teaching abroad, SDSU, September 2008

TE 910C (Teaching Science in Elementary School): Introduced students to research topics in science education, SDSU, September 2008

SERVICE TO COMMUNITY

- Served on multiple PLNU Master's final project presentation panels (Education)
- Served on thesis committee for MS candidate in Biology
- Served on two PLNU undergraduate student honors committees (2014-2015)
- Reviewer for submitted papers to 2014 International Conference of the Learning Sciences (ICLS) held in Boulder, CO
- Reviewer for peer-reviewed journal: BioScience
- Regularly help to mediate and facilitate discussions on various topics in teaching and learning in biology/science education (i.e. Designing assessment questions at higher cognitive levels) during PLNU biology department lunch discussions.
- Career Day guest speaker: Shared thoughts about being a scientist and a science educator with second graders. Johnson STEM Magnet School, June 2011.

PROFESSIONAL AND ACADEMIC ASSOCIATION MEMBERSHIPS

- Center for Research in Mathematics and Science Education (CRMSE) at San Diego State University
- International Society of the Learning Sciences (ISLS)
- National Association of Biology Teachers (NABT)
- National Council of Teachers of Mathematics (NCTM)
- National Science Teachers of America (NSTA)

AWARDS AND HONORS

- Inducted into the SDSU chapter of the Phi Kappa Phi Honor Society, April 2010
- Received San Diego State University College of Sciences Fellowship, 2007-2008
- Recognized in Who's Who Among American Teachers, 9th (2004-2005) and 10th ed, (2005-2006) editions
- Received HHMI Teacher Fellowship to assist in a molecular biology research laboratory at the National Institutes of Health, summer 2002
- Awarded the Birely J. Landis scholarship by the faculty of the Dept. of Zoology, Miami University, 1995-1996
- Inducted into Gamma Theta Phi local chemistry honor society, Miami University, September 1994