Stephanie M. Gardner

Associate Professor of Biological Sciences, Purdue University
Research Group website: https://www.bio.purdue.edu/lab/gardner/

Education

- **2001-2004** Johns Hopkins University School of Medicine, postdoctoral fellowship.
  - Concentration: Neuroscience
  - Advisor: Dr. Richard Huganir
- **2000** University of Wisconsin-Madison, 1997-2000, Ph.D., Physiology.
  - Concentration: Neurophysiology
  - Advisor: Dr. Donata Oertel
- **1997** University of Wisconsin- Madison, 1995-1997, M.S., Physiology.
- **1993** Grinnell College, Grinnell, IA, 1989-1993, B.A., Biology.

Appointments

- **2020-present** Associate Professor and Convenor of the Biology Education Area, Department of Biological Sciences, Purdue University
- **2019-2020** Associate Professor and Deputy Convenor of the Biology Education Area, Department of Biological Sciences, Purdue University
- **2016-present** Adjunct Assistant Professor, Department of Cellular and Integrative Physiology, Indiana University School of Medicine
- **2013-2019** Assistant Professor, Department of Biological Sciences, Purdue University
- **2009-2012** Continuing Lecturer, Department of Biological Sciences, Purdue University
- **2007-2009** Visiting Assistant Professor, Department of Biological Sciences, Purdue University
- **2004-2006** Visiting Assistant Professor, Department of Biology, Dickinson College

Honors and Awards

- **2020 –** Teaching Leadership Award. Support for work on initiatives to improve education at all levels and change departmental culture.
- **2019 –** College of Science Diversity Award, Purdue University. Recognizing leadership with graduate teaching assistant professional development with inclusive teaching practices
- **2018 –** Faculty Fellow of the Year
- **2017 -** Exceptional Early Career Award. Highest university-level teaching award for assistant professors, Purdue University
- **2016** Favorite Faculty Award Nominee
- **2015** Chiscon Award for Undergraduate Teaching, Department of Biological Sciences, Purdue University
- **2015** College of Science Award for Outstanding Contributions to Undergraduate Teaching by an Assistant Professor, Purdue University
- **2012** College of Science Outstanding Teacher Award , Purdue University
- **2012** Science Prize for Inquiry Based Instruction (with BJ Gasper, DJ Minchella, GC Weaver and LN Csonka)
- **2012** Alpha Lambda Delta Phi Eta Sigma Honor Societies, Honorary Member
- **2011-2012** National Academies of Science Education Fellow in the Life Sciences
- **2011-2012** National Academies of Science Education Mentor in the Life Sciences
- **2001** - Ruth L. Kirschstein National Research Service Award (NIH)
- **2000 -** Jerzy Rose award for best doctoral thesis in neuroscience, University of Wisconsin-Madison

Fellowships and Grants:

Funded national awards:

- **Purdue University Molecular Biophysics Training Program** (AWARDED, 7/1/19; 2019-2024) NIH-NIGMS # 1T32GM132024-01 $2million (PI: John Tesmer; Co-PIs: Tamara Kinzer-Ursem, Cynthia Stauffacher, Yulia Pushkar; **Education Co-Investigator: Stephanie Gardner**). http://grantome.com/grant/NIH/T32-GM132024-01 & https://molbiophys.science.purdue.edu/about/organization.html
- **Grappling with Graphs: Researching and improving student graphing skills using an interactive digital graphing tool** (AWARDED, 9/1/2017; 2017-2021) NSF # 1726180 $475,000 (**PI: Stephanie Gardner**; Co-PIs: Joel Abraham, CSU-

Fullerton and Eli Meir, SimBiotic Software). https://nsf.gov/awardsearch/showAward?AWD_ID=1726180&HistoricalAwards=false

- **Exploring Biological Evidence (EBE): Helping Students Understand the Richness and Complexity of Evidentiary Constructs in Biology**. Samarapunguvan A (PI), Rogat A, Pelaez NJ, Clase K, **Gardner SM** (**Co-PIs**). NSF-CORE (AWARDED,9/1/2017 $1,000,000; 2017-8/31/2021) NSF #1661124 https://nsf.gov/awardsearch/showAward?AWD_ID=1661124&HistoricalAwards=false
- **Advancing Competencies in Experimentation - Biology (ACE-Bio), NSF Research Coordination Network – Undergraduate Biology Education** (RCN-UBE) PI: Nancy Pelaez **Co-PIs, Stephanie Gardner** and Trevor Anderson (AWARDED January 2014, $500,000; 2014-10/31/2020). NSF # 1346567 https://nsf.gov/awardsearch/showAward?AWD_ID=1346567&HistoricalAwards=false
- **Deviating from the Standard: Integrating Statistics and Experimental Design in to Life Science Education.** Minchella D (PI), Pelaez NJ, Clase K, Forney J, McCabe G, Bartlett EL, Rundell A, **Gardner SM** (**Co-PIs**). 2011-2015. AWARDED, $1,000,000.
- **An Adaptation of a Research-Based Laboratory Model to Life Sciences.** (NSF # 0941921), 3 years of funding to implement the CASPiE model in Introductory Biology labs. Investigators: Minchella D, Weaver G, **Gardner SM**, Curtis J. Purdue University, 2010-2013. AWARDED; $200,000

Funded internal institutional awards:

- Learning Outcomes Assessment Grant, Purdue University. Critical thinking in Engineering and Science. PI: Michael Fosmire, Co-PIs: **Stephanie M. Gardner**, Senay Purzur, Brian Dillman, Bob Jacko, Karen Chang, Amy Van Epps 2012-2013. **Awarded.**

Peer-reviewed Research Articles

Accepted/In-press:

Published (* indicates undergraduate authors):

Lira ME and **Gardner SM** (2020) Leveraging multiple analytic frameworks to assess the stability of students' knowledge in physiology. CBE Life Sci Educ 19 (1): ar3 *doi: 10.1187/cbe.18-08-0160*

Angra A and **Gardner SM** (2018) The Graph Rubric: Development of a Teaching, Learning, and Research Tool. (CBE-Life Sciences Education). CBE-Life Sciences Education 17: ar65 doi: 1187/cbe.18-01-0007

Pelaez N, Anderson TR, **Gardner SM**, Yin Y, Abraham JK, Bartlett EL, Gormally C, Hurney CA, Long TM, Newman DL, Sirum K, Stevens MT (2018). A Community-Building Framework for Collaborative Research Coordination across the Education and Biology Research Disciplines. CBE-Life Sciences Education 17: es 2: 1-10 doi:10.1187/cbe.17-04-0060

Angra A and **Gardner SM** (2017). Reflecting on graphs: Attributes of graph choice and construction practices in biology. CBE-Life Sciences Education 16 (3): ar 53 doi:10.1187/cbe.16-08-0245

Lira ME and **Gardner SM** (2017) Structure-function relations in physiology education: Where's the mechanism? Advances in Physiology Education 41 (2): 270-278. doi:10.1152/advan.00175.2016

Angra A and **Gardner SM** (2016). Development of a Framework for Graph Choice and Construction. Advances in Physiology Education 40: 123–128. doi:10.1152/advan.00152.2015

Gasper BJ and **Gardner SM** (2013) Engaging Students in Authentic Microbiology Research in an Introductory Biology Laboratory Course is Correlated with Gains in Student Understanding of the Nature of Authentic Research and Critical Thinking. Journal of Microbiology and Biology Education Vol 14(1): 25-34.

Rabang CF, Parthasarathy A, Venkataraman Y, Fisher ZL*, **Gardner SM**, and Bartlett EL (2012,). A computational model of inferior colliculus responses to amplitude modulated sounds in young and aged rats. Frontiers in Neural Circuits, 2012;6:77.

Gasper BJ, Minchella DJ, Weaver GC, Csonka LN, and **Gardner SM** (2012) IBI Series Winner: Adapting to Osmotic Stress and the Process of Science. Science. Mar 30;335(6076):1590-1.

Gasper BJ, McCreight JC*, Banschbach K*, Bustion A*, Davis C*, Divecha R*, Donoho M*, Elmore AG*, Garrison CM*, Glenn S*, Goeman DC*, Haby M*, Hooks T*, Korman AM*, Kowal J*, Kuschke S*, Mellencamp JE*, Meyer M*, Myers AN*,

Nichols MF*, Pfeifer A*, Porucznik A*, Qu X*, Ramos-Miller M*, Reed RR*, Sagintayev A*, Singel JM*, Smith A*, Valle ME*, Venderley A*, Weber CA*, Zaffino AJ*, Csonka LN, **Gardner SM.** (2012) Isolation and Preliminary Characterization of Amino Acid Substitution Mutations That Increase the Activity of the Osmoregulated ProP Protein of Salmonella enterica Serovar Typhimurium. DNA Cell Biol. Jun;31(6):956-67. http://online.liebertpub.com/doi/abs/10.1089/dna.2011.1510

Gardner SM, Adedokun OA, Weaver GC, Bartlett EL (2011) Student brains engaged in rat brains: Student-driven neuroanatomy research in an introductory biology lab course. Journal of Undergraduate Neuroscience Education**,** Fall 2011, 10(1): A24-A36.

- ***Doctoral and postdoctoral research*** -

Gardner SM, Takamiya K, Xia J, Suh JG, Johnson R, Yu S, Huganir RL. (2005) Calcium-permeable AMPA receptor plasticity is mediated by subunit-specific interactions with PICK1 and NSF. Neuron. 2005 Mar 24;45(6):903-15.

Gardner SM, Trussell LO, Oertel D. (2001) Correlation of AMPA receptor subunit composition with synaptic input in the mammalian cochlear nuclei. J Neurosci. 2001 Sep 15;21(18):7428-37.

Oertel D, Bal R, **Gardner SM**, Smith PH, Joris PX. (2000) Detection of synchrony in the activity of auditory nerve fibers by octopus cells of the mammalian cochlear nucleus. Proc Natl Acad Sci U S A. 2000 Oct 24;97(22):11773-9.

Gardner SM, Trussell LO, Oertel D. (1999) Time course and permeation of synaptic AMPA receptors in cochlear nuclear neurons correlate with input. J Neurosci. 1999 Oct 15;19(20):8721-9.

Ferragamo MJ, Golding NL, **Gardner SM**, Oertel D. (1998) Golgi cells in the superficial granule cell domain overlying the ventral cochlear nucleus: morphology and electrophysiology in slices. J Comp Neurol. 1998 Nov 2;400(4):519-28.

- ***Lab manager and researcher (Washington University)*** -

Wolf JS, Jr., Humphrey PA, Rayala HJ, **Gardner SM**, Mackey, RB, Clayman RV (1996) Comparative ureteral microanatomy. Journal of Endourology 10:527-531.

Nakada SY, Soble JJ, **Gardner SM**, Wolf JS, Jr., Figenshau, RS, Pearle MS, Humphrey PA, Clayman RV (1996) Comparison of acucise endopyelotomy and endoballoon rupture for management of secondary proximal ureteral stricture in the porcine model. Journal of Endourology 10:311-318.

Gardner SM, Wolf JS, Jr., Nakada SY, Moon YT, Figenshau, RS, Pearle MS, Soble JJ, Humphrey PA, Clayman RV (1996) The unintubated ureterotomy endourologically revisited. Journal of Urology 156:1160-1163.

Figenshau RS, Clayman RV, Klutke CG, McDougall EM, Pearle MS, Moon YT, **Gardner SM**, Tiemann DD (1996) Laparoscopic bladder seromyotomy: laboratory experience. Journal of Endourology 10:267-271.

Nakada SY, Pearle MS, Soble JJ, **Gardner SM**, McClennan, BL, Clayman RV (1995b) Extracorporeal shock-wave lithotripsy of middle ureteral stones: are ureteral stents necessary?. Urology 46:649-652.

Nakada SY, McDougall EM, **Gardner SM**, Gonzalez G, Clayman, RV. (1995a) Comparison of newer laparoscopic port closure techniques in the porcine model. Journal of Endourology 9:397-401.

Moon YT, Kerbl K, Pearle MS, **Gardner SM**, McDougall EM, Humphrey P, Clayman RV (1995) Evaluation of optimal stent size after endourologic incision of ureteral strictures. Journal of Endourology 9:15-22.

Gardner SM, Clayman RV, McDougall EM, Moon YT, Fadden P, Anderson KR, Pearle MS, Royal H, Humphrey PA, Pingleton E, et al. (1995) Laparoscopic pneumodissection: a unique means of tissue dissection. Journal of Urology 154:591-594.

Pearle MS, Moon YT, Endicott RC, **Gardner SM**, Humphrey P, Clayman RV (1994) Comparison of retrograde endo-pyelotomy and endo-balloon rupture of the ureteropelvic junction in a porcine model. Journal of Urology 152:2232-2239.

Peer-reviewed conference proceedings

Suazo-Flores E, Angra A, and **Gardner SM** (2018) Working on the edge of mathematics, statistics, and biology: Biology undergraduate students' graph constructions. Psychology of Mathematics Education – North America.

Nunes L Moss J, Wang C, Carlson E, **Gardner SM**, & Levesque-Bristol, C (2018, talk) Motivation in the classroom: The effects of control and the use of technology. International Conference on Motivation.

Ala Samarapungavan (Co-Chair), Kari Clase, Nancy Pelaez, **Stephanie M. Gardner**, Chandrani Misra, Ravit Duncan (Co-Chair), Clark Chinn (Co-Chair), Sarit Barzilai, Leema Berland, Katherine McNeill, Eve Manz, Alison Wylie William Sandoval (2018, symposium) Unpacking Dimensions of Evidentiary Knowledge and Reasoning in the Teaching and Learning of Science. International Conference on the Learning Sciences, Symposium1052.

Yin Y, Anderson TR, **Gardner SM**, Pelaez NJ (2015). "Evaluating a Network of Scientists and Educational Specialists Developing Standards for Experimental Design in Biology" AERA

Book Chapters

Gardner SM and Weaver GC (May, 2015). The Impact of Engaging Biology and Chemistry Undergraduates in Authentic Research Experiences in Their Introductory Lab Courses. Foundations for Critical Thinking, Toni Vakos, Editor.

Submitted/Under peer review:

Gardner SM, Suazo-Flores E, Karippadath A, Maruca S, Abraham JK, and Meir E (submitted). Biology Undergraduate Students' Graphing Practice In Digital versus Pen-and-Paper Graphing Environments. *Journal of Science Education and Technology*

Professional Leadership

- Chair, Invited Speaker Committee for the Society for the Advancement of Biology Education Research, (2019-present)
- Annual Meeting Committee for the Society for the Advancement of Biology Education Research (2020-present)
- Faculty Expert - IMPACTX+ program design (laboratory instruction) - consultant to the program, Purdue University
- Discussion Leader, Research Experiences and other High Impact Practices: New approaches to providing access to high quality, authentic learning environments, Undergraduate Biology Education Research-Gordon Research Conference, 2017
- Journal Editor positions
    - Monitoring Editor, CBE-Life Sciences Education (2018-present)
    - Research Section Editor, Journal of Microbiology and Biology Education, (2017-2018)
- Participant or panelist at small, invitation-only meetings/workshop/taskforces
    - August 7-9, 2019. Advancing the Introductory Biology Experience, National Association of Biology Teachers meeting at HHMI
    - March, 2016- CURE Assessment meeting. Atlanta, Georgia
    - working group taskforce during 2012-2013.
    - November, 2013. Best Practices in Introductory Biology networking workshop at UC Denver
    - August 28-30, 2013 Vision and Change Conference co-sponsored by AAAS, NSF, NIH, HHMI, NAS Gardner SM , Weaver G, and Minchella DJ Enhancement of critical thinking skills in research-based introductory biology laboratory courses (poster)
    - July 2012. - Introductory Biology Project (IBP) meeting. Gardner SM, Adedokun OA, Weaver GC, and Minchella, DJ. Engaging first year students in research projects in introductory biology lab classes (poster)
    - June 25-28, 2012 - National Academies Summer Institutes Leadership Summit. Selected to be a member of the "National Presence" committee
    - November 2019 - Investigating Students' Scientific Reasoning about Biological Experiments. Introductory Biology Project (IBP) mini-grant meeting, Purdue University
- Breakout session moderator at the HHMI PD Constellation Studio meeting "Big Data, MOOCs, and Quantitative Education for Biologists.", 2015
- Floating facilitator for responsive revisions at the first CUREnet Summer Institutes Faculty Professional Development CURE design workshop, Austin, TX, summer 2015
- Planning committee for the Vision and Change Midwest/Great Plains Regional Network Meeting, St. Louis 2014-2016
- PULSE Circle member, 2015- present.
- Director of the HHMI Summer URE program (with assistance from George McCabe (Statistics), 2014-15 (Summer)
- Co-director of the HHMI Summer URE program (with Ann Rundell (BME) and George McCabe (Statistics), 2013 (Summer)

Presentations

Plenary-style invited talks

- **December 5, 2018** Keynote speaker, *Undergraduate Research Conference*, *Southwest Minnesota State University.* 'What are you trying to say?: Scaffolding student learning of data communication'.
- **May 28, 2018** – Update lecture speaker, *Human Anatomy and Physiology Society Annual Meeting, The Ohio State University*. 'How and why questions in physiology: Examining student explanations for physiological phenomena'
- **October 21, 2016** Keynote speaker. *Indiana Biology College Teachers Association Annual Meeting, St. Josephs College.* 'What are you Trying to Say? Scaffolding Student Learning of Data Communication'
- **September 19, 2015 -** Speaker**.** *Integrating Cognitive Science with Innovative Teaching in STEM Disciplines: Spatial Learning in STEM, Northwestern University*. 'Plotting the course for space exploration: Identifying elements for graph construction'.

Invited seminars/workshops:

- **June 14, 2018-** Using Rubrics for Teaching and Research, workshop, University of Georgia
- **June 13, 2018** – From thought to plot: Revealing student reasoning for graph choice and construction in biology. University of Georgia
- **November 29, 2017** –Using sequential scaffolds to reveal features of students' mechanistic reasoning in physiology. Purdue University, Chemical Education Research Seminar Series.
- **April 11, 2017 –** Plotting the course: Scaffolding and evaluating learning of graph choice and construction in undergraduate biology. Arizona State University
- **April 24, 2015** – From Thought to Plot: Understanding and Remediating Student Difficulties with Graphing of Biological Data. Iowa State University.
- **2014-2016 (summer meeting)** Midwest/ Great Plains Vision and Change (PULSE), Washington University, St. Louis, MO (led breakout sessions)
- **August 2013-** Selected as one of 15 people to summarize and report out working group recommendations to the entire Vision and Change meeting. Prepared a brief PowerPoint presentation and presented a 5-minute summary to 350 meeting attendees that represented university faculty and administrators and funding agency and professional society representatives (NSF, NIH, HHMI, AAAS, USDA, NAS) from around the United States.
- **October 11, 2011 –** "Clickerize it!" Invited talk on the ITAP iClicker panel. Purdue University
- **September 14, 2011** – "Drawing Conclusions: Strategies to Improve Visual Representations of data by students". Chemistry Education Seminar Series, Purdue University
- **September 22, 2010** – "Engage! Incorporating Authentic Research Experiences into Introductory Biology Laboratory Courses", Division of Science and Mathematics Education, Michigan State University

Peer-reviewed presentations (* indicates undergraduate authors):

Hart OM, **Gardner SM**, Levesque-Bristol C. Too many carrots: Are we preparing our students effectively for life-long learning? FASEB 2020 Apr 34(1S)

Samarapungavan A, Clase K, Mishra C, Pelaez N, **Gardner SM**, Willis J, Karakis N, Li S (summer 2019, poster) Using CADE to deconstruct students' evidentiary reasoning in secondary biology laboratory tasks. European Science Education Research Association meeting.

Pelaez N, Clase K, Liu S, **Gardner SM**, Samarapungavan A (summer 2019, talk) The Impact of Instructional Scaffolding on Students' Evidentiary Reasoning in the Context of an Evolutionary Tree-Thinking Investigation. European Science Education Research Association meeting.

Misra, C, Clase K, Samarapungavan A, Pelaez N, **Gardner SM**, Karakis N, Li S (summer 2019, poster) Collaborating with biology teachers to engage students in evidentiary reasoning through instructional scaffolding. European Science Education Research Association meeting.

Abraham JK, Suazo-Flores E, Meir E, Maruca S, and **Gardner SM** (summer 2019, round table) Identifying knowledge bases for graphing in biology: A student theoretical model. Society for the Advancement of Biology Education Research

Suazo-Flores E, **Gardner SM,** Abraham JK, Maruca S, and Meir E (summer 2019, short talk). Going around the evidence-based design wheel to develop a digital assessment of undergraduate biology students' graphing ability. Society for the Advancement of Biology Education Research

Suazo-Flores E, Karippadath A, **Gardner SM**, Abraham JK, Meir E, and Maruca S. (summer 2019, poster) Characterizing students' graphing practices in pen-and-paper and digital formats. Society for the Advancement of Biology Education Research

Flowers, S and **Gardner SM** (summer 2019, poster) Biofilms as a Context for Understanding Mechanistic Reasoning by Undergraduates. Society for the Advancement of Biology Education Research

Lui S, **Gardner SM**, Samarapungavan A, Liu C, Clase K, and Pelaez N (summer 2019, poster) How different scaffolding helped students reason with evidence for evolution in the biology lab. GRC - Undergraduate Biology Education Research

Suazo-Flores E, Karippadath A, Abraham JK, Maruca S, Meir E and Gardner SM (spring 2019) Characterizing undergraduate biology students' graphing practices. United States Conference on Teaching Statistics meeting.

Suazo-Flores E, Angra A, **Gardner SM** (summer 2018, poster) Pushing the boundary to reveal student competence with graph choice and construction. Society for the Advancement of Biology Education Research

Suazo-Flores E, Allison-Bunnell SW, Maruca S, Quick J, Abraham JK, Meir E, and **Gardner SM** (summer 2018, poster) Developing a digital tool to evaluate and teach graphing in introductory biology. Society for the Advancement of Biology Education Research

Gardner SM, Yin Y, Abraham JK, Newman DL, Beck C, Anderson TR, Pelaez NH (summer 2018, short talk) Development and testing of competencies for experimentation in biology. Society for the Advancement of Biology Education Research

Gardner SM, Wilson KJ, Newman DL, Harris MA (summer 2018, workshop) Development and testing of assessments for measuring experimentation competence in biology. Society for the Advancement of Biology Education Research

Mercader J* and **Gardner SM** (2018) Investigating graph construction practices and reasoning of undergraduate biology students. Purdue Undergraduate Research Conference, Purdue University

Mercader J* and **Gardner SM** (2018) Investigating graph construction practices and reasoning of undergraduate biology students. Purdue Undergraduate Research Conference, Purdue University

Lira ME, Richards CA*, and **Gardner SM** (summer 2017, poster) How and why questions in physiology: Examining student explanations for physiological phenomena. Society for the Advancement of Biology Education Research

Angra A, Li M, **Gardner SM** (spring 2017, poster) Differences in Graph Construction Knowledge and Reasoning along the Novice-Expert Continuum in Biology, NARST

Angra A, and **Gardner SM** (summer 2017, talk) Evaluating and improving data handling and graphing knowledge and skills with the use of evidence-based instructional tools. Society for the Advancement of Biology Education Research

Fanara AG*, DeMarco EC*, Bartlett EL, **Gardner SM** (2016) Characterization of mitochondria in the inferior colliculus of young and aged animals. Undergraduate Research and Poster Symposium, Purdue University.

Angra A and **Gardner SM** (summer 2016, talk) Revealing metarepresentational competence with graph choice and construction in expert and novice biologists. Society for the Advancement of Biology Education Research

Lira ME and **Gardner SM** (summer 2016, talk) Using the Structures-Behaviors-Functions framework to assess students' Conceptual understandings in neuroscience. Society for the Advancement of Biology Education Research

Lira ME and **Gardner SM** (summer 2016, poster) Using the cognitive clinical interview to identify instructional scaffolds in physiology Society for the Advancement of Biology Education Research

Li M and **Gardner SM** (summer 2016, poster) Differences in Context: Revealing Expert-Novice Graph Knowledge in Biology. Society for the Advancement of Biology Education Research

Yin Y, Pelaez NJ, **Gardner SM**, Anderson TR (2015). "Evaluating a Network of Scientists and Educational Specialists Developing Standards for Experimental Design in Biology" NARST 2015 annual meeting in Chicago, IL (April 11 - April 14, 2015)

Mark A*, Gooding F*, Bartlett EL, **Gardner SM** (2015). Dendritic complexity of Golgi-stained neurons in the inferior colliculus of young and aged rats. Undergraduate Research and Poster Symposium, Purdue University

Kober SHE*, Fanara AG*, Bartlett EL, and **Gardner SM** (2015) Levels of cytochrome c oxidase in the inferior colliculus of young and aged animals. Undergraduate Research and Poster Symposium, Purdue University.

Gardner SM, Yin Y, Pelaez NJ, Gardner SM, Anderson TR (summer 2015, poster) Assessing Competence for Experimentation in Biology (ACE- Bio). Gordon Research Meeting, Undergraduate Biology Education Research

Angra A, and **Gardner SM** (summer 2015, poster) Development of an Analytic Rubric to Evaluate Undergraduate Student Graphs and Diagnose Difficulties in Graph Choice and Construction. Society for the Advancement of Biology Education Research

Angra A and **Gardner SM** (summer 2015, poster) Assessing graphical competency in an upper-level physiology laboratory course. Society for the Advancement of Biology Education Research

Gardner SM and Weaver GC (February, 2014, poster) Enhancement of critical thinking skills in research-based introductory biology laboratory courses. Course-based Undergraduate Research Experiences network (CUREnet) meeting**.**

Alperin,B*, Pujari E*, Kober SHE*, Bartlet EL, and **Gardner SM** (2014, poster) Characterization of VGluT2-positive axon terminals in the MGB of young and aged rats. Undergraduate Research and Poster Symposium, Purdue University

Zabreky K*, Nelson M*, Bartlett EL, and **Gardner SM** (2014, poster) Age-related changes in GAD65/67 Expressing neurons in the dorsal lateral lemniscus. Undergraduate Research and Poster Symposium, Purdue University.

Angra A, and **Gardner SM** (summer 2014, poster) Illustrating the expert-novice continuum in graph construction in biological sciences. Society for the Advancement of Biology Education Research

Angra A and **Gardner SM** (summer 2014, talk) Assessing graphical competency in an upper-level physiology laboratory course. Society for the Advancement of Biology Education Research

Gardner SM and Minchella DJ (2013, poster) An Adaptation of a Research-based Laboratory Model to the Life Sciences. NSF TUES Principle Investigators Meeting.

Kober SEH*, Bartlett EL, and **Gardner SM** (2013, poster) Characterization of VGluT2–positive axon terminals in the rat medial geniculate body. Undergraduate Research and Poster Symposium, Purdue University

McCullough A*, Bartlett, EL, and **Gardner SM** (2013, poster) Age-related changes in neuronal expression of GAD 65/67 in the rat inferior colliculus. Undergraduate Research and Poster Symposium, Purdue University

Zabrecky K*, Bartlett EL, and **Gardner SM** (2013, poster) Age-related changes in GAD 65/67 in the dorsal and lateral lemniscus. Undergraduate Research and Poster Symposium, Purdue University

Angra, A and **Gardner SM** (2013, poster) Elucidating the reasoning used by novices and experts when graphing biological data. Society for the Advancement of Biology Education Research

Angra, A and **Gardner SM** (2013, poster) Elucidating the reasoning used by novices and experts when graphing biological data. Gordon Research Conferences – Visualizations

Gardner SM , Weaver GC and Minchella DJ (2013, poster) Enhancement of critical thinking skills in research-based introductory biology laboratory courses, Vision and Change meeting.

Angra, A and **Gardner SM** (October, 2013,talk) Using Student Reflections on Graphing Choices to Improve Student Learning of Quantitative Literacy in an Upper-Division Undergraduate Physiology Course. Assessment Institute in Indianapolis.

Gardner SM, Adedokun OA, Weaver GC, and Minchella, DJ. (2012, poster) Engaging first year students in research projects in introductory biology lab classes. Introductory Biology Project (IBP) meeting.

Gasper BJ and **Gardner SM**. (2012, talk) Enhancement of critical thinking skills in research-based introductory biology laboratory courses. Society for the Advancement of Biology Education Research (SABER)

Kober SEH*, Bartlett EL, and **Gardner SM** (2012, poster) Characterization of VGluT2–positive axon terminals in the rat medial geniculate body. Society for Neuroscience meeting.

Gardner SM, Minchella DJ, Adedokun OA, Weaver GC, Bartlett EL (2011, poster) Human brains engaged in rat brains: Student-driven neuroanatomy research in an introductory biology lab course. Society for Neuroscience meeting.

Gasper BJ, Csonka LN, Minchella DJ, Weaver GC, Adedokun OA, **Gardner SM** (2011, poster) Engaging Students in Novel Research in an Introductory Biology Laboratory Course. American Society for Microbiology Conference on Undergraduate Education.

Gardner SM, Curtis J, Gasper BJ, Weaver GC, Adedokun OA, Minchella DJ (2011, poster) A Research-based Laboratory Model for the Life Sciences. NSF CCLI/TUES Principle Investigators Meeting.

Gasper BJ, Csonka LN, Minchella DJ, Weaver GC, **Gardner SM** (2010, poster) Incorporating Authentic Research Experience into a General Skills-based Biology Laboratory Curriculum for Honors Freshmen Students. The American Society for Microbiology annual meeting.

Teaching Experience

Purdue University

- **2007-present** - Principles of Physiology (Biol 32800), lecture with laboratory (~72 students)
- **2007-2012 -** Laboratory in Neurophysiology (54200) (~8 students)
- **2008-2009** – Assistant Laboratory Coordinator, Biology 203-204 Human Anatomy and Physiology, Purdue University.
- **2010-2012 (spring)** – CASPiE Introductory Biology Laboratory (Biol 19500/14502 –Bacterial Genetics), CURE lab course (13-22 students)
- **2010-present (fall)** – CASPiE Introductory Biology Laboratory (Biol 19500/14501 –Neuroanatomy of auditory pathways), CURE lab course (13-22 students)
- **2012 (fall)** – Advanced Ecology Discussion (BIOL 65200), *Two lectures/discussions*. Course organizer: Dr. Jeffrey Dukes (6 students)

Indiana University School of Medicine

- **2017- present (Spring and Fall)** – Cardiovascular physiology didactic and nondidactic sessions of first and second-year medical student Fundamentals of Health and Disease and Understanding Diseases of Systems courses, IU School of Medicine-West Lafayette (24 students)

Dickinson College

- **2004-2006** – Biology of Behavior with laboratory (Bio 124), Biology Seminar (special topic, Bio 412), Neurobiology with laboratory (Bio 330), Life at the Extremes with laboratory (Bio 120), supervisor for independent research student (Bio 550), Physiology with laboratory (Bio 333, Spring 2006), Dickinson College.

Trainees

Graduate

Primary advisor

- Anupriya Karippadath (doctoral advisor 2019 – present)
- Sharleen Flowers (doctoral advisor 2017- present)
- Mozhu Li (Master's degree advisor, 2015-2016)
- Aakanksha Angra (member of qualifier exam committee and doctoral advisor 2012-2016)

Committee member

- Chelsea Dankenbring (preliminary exam committee, 2019)
- Kathy Wierzchowski (member of doctoral committee, 2015-2019)
- Richard Lie (member of doctoral committee, 2016-2019)
- Emily Han (member of doctoral committee (2014-present)
- Jeff Radloff (member of qualifier exam committee, AY 2013-2014)
- Laura Ploughe (member of qualifier exam committee, AY 2013-2014)
- Stephen Chabot (member of Master's defense committee, spring 2013)
- Bret Moore (member of qualifier exam committee, AY 2010-2011)

Postdoctoral

- Elizabeth Suazo Flores (2018-2019)
- Matthew Lira (2015-2017)

Undergraduate

- Riley Stehr (2019-2020)
- Eryn Sale (2018-present)
- Jacqueline Mercader (2017-2018)
- Carly Richards (2016-2017)
- Alexandrou Ivan (2017)
- Mary Welker (2016-2017)
- Elisabeth DeMarco (2016)
- Alysa Fanara (2015-2016)
- Faith Gooding (2015-2016)
- Sydney Cason (Summer 2014, 2015 and 2015-2016 academic year; DePauw University)
- Amanda Mark (Summer 2014, HHMI URE and 2014-2015 academic year)
- Betsy Alperin (2013-2014 academic year)
- Megan Nelson (2013-2014 academic year)
- Jingwei Song (Summer 2013, HHMI URE, co-advisor with Ed Bartlett)
- Alexandria Brennan (Summer 2013, HHMI URE)
- Kristin Zabrecky (Spring 2013- Spring 2014)
- Eric Pujari (Spring 2013-2014)
- Anna McCullough (Summer 2012, HHMI URE, co-advisor with Ed Bartlett and Spring 2013)
- Zulmarie Diaz (Summer 2012, SROP URE, co-advisor with Ed Bartlett)
- Devin Hursey (Summer 2012, HHMI URE)
- Sarah Kober (Spring and Fall, 2012, Fall 2013- 2015)
- Zachery Fisher (Summer 2011, HHMI URE)
- Bio-CASPiE students (Spring 2010, Fall 2010, Spring 2011, Fall 2011, Spring 2012, Fall 2012)
- Afif Kulaylat (2005-2006, Dickinson College)

Mentoring and Informal Teaching Experience

Graduate, undergraduate and high school level

- Head of the Graduate Assistant Development and Guidance Educational Team (GADGET) in the Department of Biological Sciences, Purdue University. Worked with a committee of four graduate students to develop and implement two professional development workshops for graduate teaching assistants in the areas of professionalism and inclusive teaching. 2019-present (Fall and Spring)
- Interactive panel member for Purdue undergraduate Women in Science Programs- The Importance of Getting to Know Faculty, 2019 (fall)
- Participated in graduate school mock interviews as part of undergraduate Biol 393 professional development course, 2019 (spring)
- Faculty mentor for the Beta Psi Omega biology fraternity, 2018 – present
- Interactive session for Purdue undergraduate Women in Science Programs- 'Crafting the Perfect Hook: How to Effectively Lure Your Audience with Your Elevator Pitch' , 2018 (fall)
- College Teaching Workshop (Building Rapport with Your Students workshop), Center for Instructional Excellence, 2016-2017 (Fall and Spring)
- Teaching Assistant Orientation workshop (Frameworks for Learning), Center for Instructional Excellence, 2016 (Fall) Graduate
- Interactive session for Purdue undergraduate Women in Science Programs- 'Crafting the Perfect Hook: How to Effectively Lure Your Audience with Your Elevator Pitch' , 2016 (fall)
- Instructor for the USA Biology Olympiad team to prepare them for the International competition, 2011- 2013 (summer)
- Led two-day workshop on experimental design and data presentation for HHMI URE students, 2011-2013 (summer)

Faculty and Instructor level

Institutional (Purdue University)

- Co-Director of the CURE-Purdue Program. A faculty professional development program to mentor and support faculty in their design, implementation, and assessment of CURE courses, 2019-present
- Facilitate Biology Education Area teaching and research discussions, Department of Biological Sciences, 2018 – present
- Purdue STEAM (Success through Transformative Education and Active Mentoring), Faculty Fellow, 2015-2019
- One-on-one mentoring of 4 faculty in the Department of Biological Sciences to assist them in the development and implementation of CURE lab courses, 2013-2018
- Featured faculty fellow speaker for IMPACT (Instruction Matters: Purdue Academic Course Transformation) faculty learning community. Once a year describe my biology education research and teaching, 2013- present

- Invited panelist for New to Teaching at Purdue faculty teaching orientation, 2014-2016 (August).
- Led two-day workshop on experimental design, data presentation, and analysis for HHMI teacher scientists (high school biology and AP biology teachers), 2012 (summer)
- Co-organized and leading a monthly Teaching and Learning Brown Bag discussion group for interested faculty in the Dept. of Biological Sciences , 2011-2013

National

- Co-course coordinator for American Society for Microbiology online course: Disciplinary Based Education Research (DBER): Getting Started, 2020 (Spring)
- Director for the American Society of Microbiology online course: Improving Undergraduate Biology Education Based on Research in Science Learning, 2018 (Fall)
- Co-course coordinator for American Society for Microbiology online course: Disciplinary Based Education Research (DBER) Design and Implementation, 2017 (Fall)
- Facilitator for the Biology Scholars Research residency, American Society for Microbiology , 2015-16 (Summers)
- Mentored Michael Kelrick (Professor and Chair of Biology, Truman State University) in learning thematic coding and qualitative data analysis, 2014
- National Academies Scientific Teaching Alliance (NASTA) (facilitator and speaker), Northstar Institute (University of Minnesota), July 7-12, 2013
- Assisted Carlita Favero (Ursinus College) in the redesigning of her Developmental Biology course into a CURE/CASPiE-style course, 2012
- National Academies of Science and Howard Hughes Medical Institute Regional Institute (workshop facilitator and speaker), Pacific Northwest Institute (Evergreen State College), September 7-11th, 2011

Professional Service

Institutional service:

Committees – Departmental

- **2018** STEM Teaching Laboratory biology ad hoc task force
- **2017-2018** Department Head Search committee
- **2016- present** Deputy convener (Biology Education Area)
- **2016- present** Graduate and advanced studies committee
- **2015 – present** Undergraduate recruitment committee
- **2015-2016** Department Head Search committee
- **2012-2014** Undergraduate studies committee
- **2014** Future of the Department committee
- **2013 (spring)** Umbarger Fellowship review panel
- **2013 (spring)** PRF scholarship review panel
- **2013 (spring)** Umbarger Fellowship review panel
- **2013 (spring)** Biology faculty retreat planning committee
- **2012** Biology representative at commencement

Committees- University and Purdue System

2019- present College of Science Faculty Council (Secretary and member)
2017-2018 Executive committee for the Teacher Education Council
2015-2018 Teacher Education Council, Biology representative
2014 (fall) IMPACT assessment and data analyst search committee
2013 (spring) Purdue System Plan - Assessment task force
2013-2014 Integrated STEM Teacher Education cluster hire search committee

National level:

- **2020 -** Grant Review panel for National Science Foundation
- **2019-** Represented CBE-Life Sciences Education on a journal editor's panel at the 13th Annual European Science Education Research Association meeting in Bologna, Italy
- **2019** – Wrote letter of support for the promotion of a lecturer at University of Wisconsin-Madison
- **2018** – Wrote letter of support for the promotion of a lecturer at Case Western Reserve University
- **2018 -** Grant review panel for National Science Foundation
- **2017 – present**- Editorial board Advances in Physiology Education

- **2017-present** – Advisory board for Dr. Jennifer Knight NSF project 'Problem Solving Through Practice: Identifying Common Student Struggles in Solving Complex Biology Problems and Developing Tools to Drive Improvement' https://www.nsf.gov/awardsearch/showAward?AWD_ID=1711348&HistoricalAwards=false
- **2016 –** Wrote letter of support for the promotion of a lecturer at Case Western Reserve University
- **2016 -** Grant review panel for National Science Foundation
- **2015 -** Grant Review panel for National Science Foundation
- **2014-present –** Abstract reviewer for the annual Society for the Advancement of Biology Education Research meeting
- **2013-2018 -**Editorial board Journal of Microbiology and Biology Education
- **2013** Expert validation for assessment project at University of Washington
- **2013-present –** Peer reviewer of research articles submitted to the following journals: CBE-Life Sciences Education, Journal of Microbiology and Biology Education, Advances in Education, CourseSource

Professional Development

Administration and Leadership

- Purdue Insights Forum (2020-2021) – selected to be one of sixteen faculty from across the university to participate in a mentoring program to develop future leaders at Purdue

Membership in professional societies

- Society for the Advancement of Biology Education Research (2012-present)
- International Society of the Learning Sciences (2020-present)
- American Association for the Advancement of Science (2020-present)
- Society for Neuroscience (1997-2004 and 2011-2015)
- Faculty for Undergraduate Neuroscience (2012-present)
- American Society of Microbiology (2017-2019)

Attendance in teaching-related workshops, classes, learning communities:

- Selected to take part in David Morrison's grant writing workshop (with one-on-one mentoring). Developing NSF CAREER grant proposal, 2014 (spring)
- IMPACT (Instruction Matters: Purdue Academic Course Transformation) fellow, Purdue University, 2013-2014
- Teaching for Tomorrow fellow, Purdue University, 2013-2014
- ADVANCE cohort member, Purdue University, 2012-2014
- Biology Scholars Research Residency, 2012-2013 (academic year)
- National Academies of Science and Howard Hughes Medical Institute Summer Institute, Madison Wisconsin, 2011
- Faculty Learning Community for HHMI-funded project. Deviating from the Standard: Integrating Statistical Analysis and Experimental Design into Life Science Education, 2010-2011 (academic year)