



Lindsay A. Holden

Curriculum Vitae

Education

- 2013–2018 **Ph.D. Biology**, *Portland State University*, Portland, OR, *GPA – 3.97/4.00*.
From: 09/30/2013 To: 06/15/2018 Student ID: 987958530
- 2012–2013 **Prerequisite Coursework**, *Portland Community College*, Beaverton, OR, *GPA – 3.66/4.00*.
From: 09/24/2012 To: 06/14/2013
- 2009–2012 **Prerequisite Coursework**, *Portland State University*, Portland, OR, *GPA – 3.88/4.00*.
From: 09/28/2009 To: 03/23/2012
- 2004–2008 **B.A. Biology**, *Willamette University*, Salem, OR, *GPA – 3.46/4.00*.
From: 08/30/2004 To: 05/16/2008

Certifications

- 2018 **Certificate of Innovation in College Teaching**, *Portland State University*, Portland, OR.

Doctoral Dissertation

- Title Investigating the Role of Genomic Variation in Susceptibility to Environmental Chemicals across Populations
- Advisor Dr. Kim H. Brown
- Committee Drs. Brad Buckley, Suzanne Estes, Deborah Lutterschmidt, and Angela Strecker
- Description No two individuals are identical. This is true at the genetic level and at the physical level. One of the traits that varies between populations is toxicant susceptibility: some individuals are sensitive to the effects of environmental chemical exposure, and others are resistant. This body of work aims to address the impact of genomic copy number variants - large (>1 Kb) duplications or deletions across the genome - on the toxicant-susceptibility phenotype. Herein I have characterized copy number variants across three commonly used laboratory strains of zebrafish and identified mRNA expression phenotypes in the same strains. I found that males and females only have a 14% overlap in differentially expressed mRNA transcripts in support of the growing body of work that shows population-specific phenotypes in zebrafish. Furthermore, I identified two strain-specific response QTL that explain about a third of the variation in the PCB-susceptibility phenotype and tested the response QTL using targeted CRISPR-Cas9 editing of the CNV involved. Overall, this body of work defines CNV and mRNA expression variation across zebrafish strains, identifies causal CNV in the PCB-susceptibility phenotype, and confirms the PCB-susceptibility QTL using targeted genomic editing.

Experience

Research & Laboratory Experience

- 2014–2018 **PhD Candidate**, *PI: Dr. Kim H. Brown*, Portland State University, [From: 01/06/2014 To: 06/15/2018](#).
Dissertation Research: My dissertation aims to identify the effects of copy number variants on population-wide variation in susceptibility to environmental contaminants. *Expected graduation: June 2018*
Soft Tissue Sarcoma: Copy number variants are an important part of cancer initiation and progression. Having deleted tumor suppressor genes or duplicated oncogenes can increase the likelihood of some getting cancer and/or having it progress. Collaborator: Dr. Heather R. Shive, North Carolina State University College of Veterinary Medicine
Canine Genomics: Novel gene discovery in *Canis lupus familiaris* using pseudo *de novo* assembly of next generation sequencing data not aligning to the reference genome. Collaborator: Dr. Hannes Lohi, University of Helsinki, Finland
Skills and techniques: CRISPR-cas9, embryo microinjection, fluorescent microscopy, zebrafish husbandry and breeding, IACUC management, research technician supervision and project management, toxicity assessment of genomic activation, RNA/DNA isolation, RT-qPCR, RNA expression microarrays, two-dye competitive hybridization DNA microarrays, bioinformatics, sequence alignment (FastQC, trimmomatic, Bowtie2) and assembly (MIRA), primary cell culture establishment and maintenance, Sanger sequencing, biostatistics, bioinformatics, R/bioconductor, grant writing, manuscript preparation.
Additional Roles:
Aquatic Facility Manager: Managing a colony of up to 1500 zebrafish (three strains), IACUC protocols, xenobiotic exposures (acute and chronic), husbandry, technician training and management. [From: 01/04/2016 To: 06/15/2018](#)
Microarray Core Services Manager: Managing outside projects from collaborating academic institutions, mechanical maintenance/repair, budget management, ordering, project timelines, aCGH microarrays, mRNA expression arrays, reverse transcription, DNA and RNA extraction, inter-institutional collaboration. [From: 02/27/2017 To: 06/15/2018](#)
- 2016–2017 **Science, Mathematics, and Research for Transformation (SMART) summer intern**, *Health Effects Research Group, Toxicology Directorate*, US Army Public Health Center, Aberdeen Proving Ground, Edgewood, MD, [From: 06/13/2016 To: 08/19/2016](#) and [From: 07/10/2017 To: 09/08/2017](#).
Skills and techniques: Good Lab Practices (GLP), 384-well plate based Ames assay, RNA isolation, RT2 qPCR arrays, custom qPCR array design, cell culture (THP-1, HaCat, BALB/3T3), neutral red uptake (NRU) cytotoxicity assay, dimethyl thiazolyl diphenyl tetrazolium salt (MTT) cytotoxicity viability assay, scientific report writing, dose-response data analysis, lung and liver slice *in-vitro* tissue culture, toxicological data review and interpretation, rat handling/necropsy/cardiac puncture, standard operating procedure (SOP) writing.
- 2013 **Rotational PhD Student**, *PI: Dr. Jeffrey Singer*, Portland State University, [From: 09/30/2013 To: 12/13/2013](#).
While in this lab I worked on two concurrent projects, 1) hyperplastic mammary gland growth in a tissue-specific Cul3 knockout mouse and 2) glutamate receptor regulation and localization at the postsynaptic density via Cul3 recruitment and degradation of scaffolding and adaptor proteins.
Skills and techniques: paraffin sectioning, immunohistochemistry, HEK293 and *E.coli* cell culture, PCR, western blotting, immuno-precipitation, transfection, transformation, cloning.
- 2009-2013 **Research Assistant & Laboratory Manager**, *PI: Dr. Ov D. Slayden*, Department of Reproductive & Developmental Science, Oregon National Primate Research Center, Oregon Health & Science University, [From: 01/09/2009 To: 08/09/2013](#).
As lab manager I supervised 3-6 technicians and coordinated concurrent complex reproductive and physiological research in non-human primates and immunodeficient mice. The lab serves basic and applied roles while researching the etiology and pathophysiology of endometriosis, uterine fibroids, and menorrhagia and testing efficacy of compounds aimed to treat these disorders. We also studied the basic biology of the pregnant and non-pregnant female reproductive tract and developed novel hormonal and non-hormonal contraceptives.
Skills and techniques: mouse surgery (ovariectomy, mouse IP/SC tissue grafting, ear tags, SC hormone implants), non-human primate surgery (SC hormone implants), mouse and non-human primate animal handling (sedate & non-sedated), phlebotomy, IP/SC/IM/orogastric/oral dosing, BSL2 best practices, organ prosection, tissue microdissection, transabdominal ultrasound and image analysis, histology, photomicroscopy, paraffin sectioning, cyrosectioning, immunocytochemistry, *in situ* hybridization, PCR, qPCR, nucleic acid extraction/isolation/purification, statistical analysis (Origin), experimental design, manuscript preparation, grant writing, project and lab management.
- 2004–2008 **Undergraduate Student**, Willamette University, Salem, OR, [From: 08/30/2004 To: 05/16/2008](#).
Senior Capstone: Salmon Mariculture in British Columbia – *Comprehensive literature review*
Independent research: Avoidance Reactions in the Pacific Treefrog, *Pseudacris regilla*, due to Anthropogenic Disturbances of Light, Noise, and Motion – *Fieldwork-based research*

Teaching

- Spring 2018 **BI455/555 Histology Laboratory**, Dr. Radhika Reddy, Portland State University, [From: 04/03/2017](#)
Spring 2017 [To: 06/16/2017](#) and [From: 04/02/2018 To: 06/15/2018](#).
Upper-level Histology class for majors and pre-med students covering the fundamental concepts of the microscopic anatomy of the human body, organ integrity and function as related to the organization of cells and tissues, and normal vs pathologic structure and function of cells and tissues that comprise the organs of the human body. I taught students to identify cells and tissues from glass and virtual histology slides, gave practical exams, created grading keys, re-wrote lab manuals, and held office hours.
Class size: 10-11 students
- Fall 2017 **BI214 Principles of Biology Laboratory - Lead TA**, Dr. Michael Bartlett, Portland State University, [From: 09/25/2017 To: 12/15/2017](#).
General Biology series for science majors focusing on experimental design, cellular and molecular biology, and genetics. I served as the Lead TA, managing 12 other graduate student TAs and acting as the primary TA resource for 569 registered students. As Lead TA I navigated issues around student plagiarism, developed and implemented peer assessment of TA teaching skills, and coordinated the instruction of 25 laboratory sections. As part of my TA duties I taught weekly labs, graded assignments, created quizzes, proctored exams, and held office hours. I participated in weekly lab meetings, suggested corrections to the lab manual, and offered insights for future lab development.
Class size: 20 students
Mean student evaluation score: 4.79/5.00
- Summer 2016 **BUILD EXITO Summer Induction Journal Club**, Dr. Radhika Reddy, Portland State University, [From: 08/29/2016 To: 09/23/2016](#).
Rising Juniors accepted as BUILD EXITO Scholars read and review primary journal articles. I facilitate interpretation, critical review, and discussion of articles chosen by students that directly relate to their individual mentored research experiences.
Class size: 8 students
- Spring 2015 **BI341 Introduction to Genetics Recitation**, Dr. Radhika Reddy, Portland State University, [From: 03/31/2014 To: 06/14/2014](#) and [From: 01/05/2015 To: 03/15/2015](#) and [From: 03/30/2015 To: 06/13/2015](#).
Upper-level genetics class for majors and pre-med students covering Mendelian genetics, gene linkage and mapping, DNA structure and function, molecular genetics, cancer biology, and quantitative genetics. I led students through practice problem sets, graded assignments, proctored exams, and held office hours.
Class size: 14-67 students enrolled per section (3 sections per term)
Mean student evaluation score: 4.57/5.00
- Winter 2014 **BI252 Principles of Biology Laboratory**, Dr. Daniel Ballhorn, Portland State University, [From: 01/06/2014 To: 03/22/2014](#).
General Biology series for science majors focusing on systematics, evolution, and plant structure and function. I taught weekly labs, graded assignments, authored quizzes, proctored exams, and held office hours to meet with students outside of class time. I developed a grading rubric for the final project, actively participated in weekly lab meetings, suggested corrections to the lab manual, and offered insights for future lab development.
Class size: 22-24 students enrolled per section (2 sections per term)
Mean student evaluation score: 4.19/5.00
- Fall 2014 **BI251 Principles of Biology Laboratory**, Dr. Michael Bartlett, Portland State University, [From: 09/30/2013 To: 12/14/2013](#) and [From: 09/29/2014 To: 12/13/2014](#).
General Biology series for science majors focusing on experimental design, cellular and molecular biology, and genetics. As part of my TA duties I taught weekly labs, graded assignments, created quizzes, proctored exams, and held office hours. I participated in weekly lab meetings, suggested corrections to the lab manual, and offered insights for future lab development.
Class size: 10-24 students enrolled per section (2 sections per term)
Mean student evaluation score: 4.16/5.00

Other Competencies

Bioinformatics & Computation: Windows, Mac/Unix, Ubuntu/Linux, Perl, Python, Bash, LaTeX, Git, big data, biostatistics, R, Bioconductor, GalaxyProject, statistical modeling, Word, Excel, PowerPoint, OpenOffice, Adobe Photoshop, Adobe Illustrator.

Curriculum Development: Developed a year-long series aimed at junior and senior Biology majors. The course, *Biology Inquiry*, is an introduction to potential career paths, an overview of current faculty research in the Biology Department, and a practicum for critical reading, writing, and professional development in science. This course will help students develop answers to question such as: Why are you pursuing a degree in biology? What can you do with your passion in biology? There are three overarching aims for this course: 1. Building strong writing and communication skills (Fall term), 2. Refining passion, direction, and presentation (Winter term), and 3. Learning about the PSU Biology department and careers in science (Spring term).

Professional Development

- March 2018 **CRISPR-Cas9 for Toxicologists**, *Society of Toxicology Annual Conference*, San Antonio, TX.
Continuing Education course: The Structure and Function of CRISPR-Cas9 presented by David W. Taylor, University of Texas, Austin, TX; Genome-Wide CRISPR Applications in Toxicology presented by Christopher Vulpe, University of Florida, Gainesville, FL.
- Feb 2018 **Preparing Future Faculty**, *Office of Academic Innovation*, Portland State University, Portland, OR.
Writing Your Teaching Philosophy: An opportunity to reflect on your experience, insights and values; Managing Challenging Students: Classroom Disruptions & Academic Integrity; Teaching Effective Information Research; LGBTQ Issues in the Classroom; Innovation in Education.
- July 2017 **Dose Assessment Boot Camp**, *Toxicology Excellence for Risk Assessment (TERA)*, Army Public Health Center, Aberdeen Proving Ground, Edgewood, MD.
Four day intensive hands-on training in hazard characterization and dose-response assessment focusing on advanced methodology and an overview of understanding and skills.
- June 2017 **Happy R Users Purrr**, *Cascadia R Conference*, Portland, OR.
Workshop led by Charlotte Wickham focused on solving iteration problems using the R package "Purrr" within the tidyverse.
- May 2017 **Big Data to Knowledge Clinical Risk Prediction Workshop**, *Oregon Health & Science University*, Portland, OR.
The Big Data to Knowledge (BD2K) skills course uses synthetic data for cardiovascular risk prediction via exploratory data analysis, machine learning, and predictive modeling. Additional focus on interpretation and communication of the impacts of data analysis.
- March 2016 **Open Insight Series: Data Jamboree**, *Oregon Health & Science University*, Portland, OR.
An Introduction to Collaboration with Git & GitHub presented by Ted Hart, PhD. Hands-on training and workshop about the utility and application of version control using Git and GitHub.
- July 2015 **Summer Institute in Statistical Genetics**, *University of Washington*, Seattle, WA.
- July 2014 20 hours (each) of coursework in: Bayesian Statistics for Genetics, Regression and Analysis of Variance, Quantitative Genetics, QTL Mapping, High-Dimensional Omics Data, Pathway/Network Analysis for Omics Data, Accessing Biomedical Big Data, Gene Expression Profiling, Supervised Methods for Statistical Machine Learning
- October 2014 **reThink Project**, *Portland State University*, Portland, OR.
Provost's Challenge award #186. Pathways to Innovation: Reframing Chemistry and Biology Education at PSU for the 21st Century. Training on new pedagogical techniques (e.g. active learning) in science education.

Honors & Awards

- May 2018 Travel Award, International Zebrafish Society, to present "Targeted CRISPR-Cas9 Editing of Genomic Copy Number Modulates PCB-Susceptibility Phenotype" at the 2018 International Zebrafish Conference **\$250**
- January 2017 Marie Brown Graduate Student Travel Award, Portland State University, to present "Sex and Strain Differences in Hepatic mRNA Expression of Three Genetically Distinct Zebrafish Strains" at the 2017 Society of Toxicology conference **\$400**
- Dec 2016 Graduate Student Travel Award to the Society of Toxicology's 56th Annual Meeting, "Sex and Strain Differences in Hepatic mRNA Expression of Three Genetically Distinct Zebrafish Strains" **\$875**
- August 2016 Student Travel Award to the American College of Toxicology's 37th Annual Meeting, "Variation in *cyp1a* detected in three genetically divergent strains of zebrafish" **\$1000**

- June 2016 Dean's Award for University Service at the Doctoral level, College of Liberal Arts & Sciences, Portland State University
- October 2015 2nd Place, Best Poster contest, Biology Department Alumni Night, Portland State University
- Sept 2015 Leadership Fellow, Student Leader Service Award, Portland State University, **\$900**
- August 2015 Science, Mathematics, and Research for Transformation (SMART) Scholarship-for-Service Program awardee, National Defense Education Program. Sponsoring Facility: US Army Public Health Command, Toxicology Directorate, Health Effects Division, Aberdeen Proving Grounds, Edgewood, MD. Phase I: August 2015 - July 2018, **\$177,070/3 years**
- July 2015 Summer Institute for Statistical Genetics Scholarship, **\$2400**
- June 2015 Larry Ewing Memorial Trainee Travel Fund, Society for the Study of Reproduction **\$200 declined**
- May 2015 Marie Brown Graduate Student Travel Award, Portland State University, **\$400 declined**
- March 2015 Honorable Mention, National Science Foundation Graduate Research Fellowship Program, "Influence of copy number variants on quantitative traits in polluted environments"
- Sept 2014 Leadership Fellow, Student Leader Service Award, Portland State University, **\$900**
- July 2014 Summer Institute for Statistical Genetics Scholarship, **\$2400**
- June 2014 Forbes-Lea Endowed Fund for Student Research, Portland State University, "PCB-Mediated Intraspecific Gene Expression in Zebrafish, *Danio rerio*" **\$792**
- 2006-2008 Willamette University Dean's List
- 2004-2008 Willamette University Alumni Honors Scholarship

Peer-Reviewed Publications (* denotes undergraduate author)

[Link to Google Scholar for Lindsay A. Holden](#)

- in prep* **Holden, L. A.** & Brown, K. H. Targeted CRISPR-Cas9 Editing of Genomic Copy Number Modulates PCB-Susceptibility Phenotype. Journal: Genetics.
- in prep* **Holden, L. A.**, Wilson, C.*, Heineman, Z.*, Dobrinski, K. P., & Brown, K. H. An Interrogation of Conserved Copy Number Variation across Genetically Distinct Strains of Zebrafish. Journal: Zebrafish.
- in review* **Holden, L. A.**, & Brown, K. H. (2018). Response eQTL analysis of low-dose PCB exposure connects genomic copy number variants to susceptibility. Journal: Aquatic Toxicology.
- in review* **Holden, L. A.**, Arumilli, M., Hundi, S., Hytonen, M. K., Salojarvi, J., Brown, K. H., & Lohi, H. (2018). Assembly and Analysis of Unmapped Genome Sequence Reads Reveal Novel Sequence and Variation in Dogs. Journal: Scientific Reports.
- 2018 **Holden, L. A.**, & Brown, K. H. (2018). Baseline mRNA expression differs widely between common laboratory strains of zebrafish. *Scientific Reports*, 8(1), 4780.
- 2017 Hammarlund, E., Thomas, A., Amanna, I. J., **Holden, L. A.**, Slayden, O. D., Park, B., Gao, L., & Slifka, M. K. (2017). Plasma cell survival in the absence of B cell memory. *Nature Communications*, 8(1), 1781.
- 2014 Jensen, J. T., Hanna, C., Yao, S., Micks, E., Edelman, A., **Holden, L.**, & Slayden, O. D. (2014). Blockade of tubal patency following transcervical administration of polidocanol foam: initial studies in rhesus macaques. *Contraception*, 89(6), 540-549.
- 2012 Almeida-Francia, C. C. D., Keator, C. S., Mah, K., **Holden, L.**, Hergert, C., & Slayden, O. D. (2012). Localization and hormonal regulation of endometrial matrix metalloproteinase-26 in the rhesus macaque. *Human reproduction*, 27(6), 1723-1734.
- 2011 Keator, C. S., Mah, K., **Ohm, L.**, & Slayden, O. D. (2011). Estrogen and progesterone regulate expression of the endothelins in the rhesus macaque endometrium. *Human reproduction*, 26(7), 1715-1728.

Invited Presentations and Lectures

- August 2017 "Understanding and exploring variation in the zebrafish model system", Technical Seminar Series, Toxicology Directorate, US Army Public Health Center, Aberdeen Proving Ground, Edgewood, MD.
- May 2017 "Quantitative Genetics", BI427/527 Evolutionary Genetics, Biology Department, College of Liberal Arts and Science, Portland State University, Portland, OR.
- October 2016 "DNA Structure, Replication, and Manipulation in Eukaryotes and Bacteria", BI341 Introduction to Genetics, Biology Department, College of Liberal Arts and Science, Portland State University, Portland, OR.
- October 2016 "Understanding and Exploring Variation in the Zebrafish Model", Better Know a Lab Seminar Series, Biology Investigation & Outreach, Portland State University, Portland, OR.
- June 2016 "Utilizing zebrafish as a model to understand how large-scale genomic variation affects environmental exposure pathways", Technical Seminar Series, Toxicology Directorate, US Army Public Health Center, Aberdeen Proving Ground, Edgewood, MD.
- March 2016 "How can studying dog evolution help us understand human disease?", Biology Department, Portland State University, Portland, OR
- Sept 2015 "TA Preparedness", Biology department, Portland State University, Portland, OR.
- October 2014 "One year & two labs: My rotational travels", Bi598 Graduate Prospectus, Biology Department, Portland State University, Portland, OR.
- June 2014 "Differential effects of environmental toxicants", Woodburn Public Library Summer Lecture Series, Woodburn, OR.
- May 2014 "Rotational ruminations: Beta-tester #2's experience as a first year PhD student." Better Know a Lab Seminar Series, Portland State University, Portland, OR.
- March 2014 "Genetic Variability and Adaptation", Multnomah Education Service District Outdoor School, Portland, OR.

Presented Work (* denotes undergraduate author)

Oral presentations

- August 2017 **Holden L. A.** "Zebrafish To The Rescue: Using Genetic Tools To Understand Toxic Chemical Exposure Risk", Science, Technology, and Innovation Exchange (STIx), Basic Research Office of the Assistant Secretary of Defense for Research & Engineering (ASD(R&E)), Arlington, VA. [Link to video](#)
- Nov 2016 **Holden L. A.** and Brown K. "Variation in *cyp1a* detected in three genetically divergent strains of zebrafish", Two-Minute Poster Competition: Fast fACTs, The American College of Toxicology Annual Meeting, Baltimore, MD.
- October 2016 **Holden L. A.**, and Brown K. "Hepatic mRNA Expression Varies in Three Genetically Distinct Zebrafish Strains" New Technologies in Toxicology and Environmental Health, Pacific Northwest Association of Toxicologists, Society of Toxicology, Corvallis, OR.
- May 2015 **Holden L.**, and Brown K. "Intraspecific Variation in PCB-induced AHR2 and CYP1A mRNA Expression Levels in Adult Zebrafish." 3rd Annual Student Research Symposium, Portland State University, Portland, OR.
- Sept 2014 **Holden L.**, and Brown K. "Effects of PCBs on gene expression, growth, and development." Biology Graduate Student Welcome Weekend, Portland State University, Hoquiam, WA.

Poster presentations

- March 2018 **Holden L. A.** and Brown K. "Toxicogenomic Assessment of Copy Number Variants and Differential Gene Expression Associated With Susceptibility to PCB Exposure", The 57th Annual Society of Toxicology Conference, San Antonio, TX.

- May 2017 **Holden L. A.** and Brown K. "Sex and Strain Differences in Hepatic mRNA Expression of Three Genetically Distinct Zebrafish Strains", 5th Annual Student Research Symposium, Portland State University, Portland, OR.
- March 2017 **Holden L. A.** and Brown K. "Sex and Strain Differences in Hepatic mRNA Expression of Three Genetically Distinct Zebrafish Strains" The 56th Annual Society of Toxicology Conference, Baltimore, MD.
- January 2017 **Holden L. A.** and Brown K. "Uncovering Variation in Zebrafish: mRNA Expression Profiles by Sex and Strain", Plant and Animal Genome Conference, San Diego, CA.
- January 2017 **Holden L. A.**, Arumilli M., Hytonen M.K., Lohi H.T., and Brown K. H. "Novel dog genome content revealed by pseudo-*de novo* assembly of unmapped sequence reads", Plant and Animal Genome Conference, San Diego, CA.
- Nov 2016 **Holden L. A.** and Brown K. "Variation in *cyp1a* detected in three genetically divergent strains of zebrafish" The American College of Toxicology Annual Meeting, Baltimore, MD.
- October 2016 **Holden L. A.**, Arumilli M., Hytonen M.K., Lohi H.T., and Brown K. H. "Novel dog genome content revealed by pseudo-*de novo* assembly of unmapped sequence reads" The American Society of Human Genetics Annual Meeting, Vancouver, BC, Canada.
- July 2016 **Holden L.**, Vu P*, and Brown K. "Intraspecific susceptibility to environmental toxicant PCB 126 mediated by variation in xenobiotic metabolism gene *cyp1a* in zebrafish" The Allied Genetics Conference of the Genetics Society of America, Orlando, FL.
- May 2016 **Holden L.**, Vu P*, and Brown K. "Environmental toxicant susceptibility phenotype mediated by variation in xenobiotic metabolism gene *cyp1a* in zebrafish." 4th Annual Student Research Symposium, Portland State University, Portland, OR.
- Nov 2015 **Holden L.**, and Brown K. "Different strokes for different folks: Gene expression profiles of three strains of zebrafish." Student Research Symposium, Sigma Xi Columbia-Willamette Chapter, Portland, OR.
- October 2015 **Holden L.**, and Brown K. "Different strokes for different folks: Gene expression profiles of three strains of zebrafish." Biology Department Alumni Night, Portland State University, Portland, OR.
- April 2015 **Holden L.**, and Brown K. "Strain-specific Effects of PCB-126 in Zebrafish, *Danio rerio*." Student Research Symposium, Sigma Xi Columbia-Willamette Chapter, Portland, OR.
- October 2014 **Holden L.**, and Brown K. "Strain-specific Effects of PCB-126 in Zebrafish, *Danio rerio*." Biology Department Alumni Night, Portland State University, Portland, OR.
- August 2012 **Holden L.**, Martin LD, and Slayden O. "Surgical Induction of Endometriosis in Rhesus Macaques, *Macaca mulatta*." 45th Annual Meeting of the Society for the Study of Reproduction, State College, PA.
- May 2012 **Ohm LA.**, Hergert CJ, and Slayden OD. "Rhesus Macaques Are Physiologically Relevant Models for Assessing Novel Therapies for Heavy Menstrual Bleeding in Women". Northwest Reproductive Sciences Symposium, Beaverton, OR.
- March 2012 **Ohm LA.**, Hergert CJ, and Slayden OD. "Rhesus Macaques Are Physiologically Relevant Models for Assessing Novel Therapies for Heavy Menstrual Bleeding in Women". 59th Annual Meeting of the Society for Gynecologic Investigation, San Diego, CA.
- May 2010 **Ohm LA.**, Keator CS, Mah K, Rothlein SR, Slayden OD. "Characterization of FOXJ1 Expression in the Rhesus Macaque Oviduct." 12th Annual Northwest Reproductive Sciences Symposium, Spokane, WA.
- October 2009 **Ohm L.**, Shirendeb U, Keator CS, Mah K, Rothlein S, Slayden OD. "Estrogen Stimulates Expression of FOXJ1 in the Rhesus Macaque Fallopian Tube." *Fertility and Sterility*, 92(3), S116. 65th Annual Meeting of the American Society for Reproductive Medicine, Atlanta, GA.

Collaborative Presented Work (* denotes undergraduate author)

- Nov 2017 Arumilli, M, **Holden, LA**, Hytonen, MK, Salojarvi, J, Brown, KH, and Lohi, HT. "Novel dog genome content revealed by pseudo-*de novo* assembly of unmapped sequence reads". Joint European Conference on Computational Biology and International Society for Computational Biology and Bioinformatics Conference, July 21-25, 2017, Prague, Czech Republic. *Poster presentation*.

- Nov 2016 Wilson, CF*, Heineman, ZL*, **Holden, LA**, and Brown, KH. "Evidence of Genetic Variation Across *Itln4* in Zebrafish". Student Research Symposium, Sigma Xi Columbia-Willamette Chapter, November 4, 2016, Portland, OR. *Poster presentation*.
- Nov 2016 Heineman, ZL*, Wilson, CF*, **Holden, LA**, and Brown, KH. "Variation in TRIM Family Gene, *Ftr61*, Across Three Zebrafish Strains". Student Research Symposium, Sigma Xi Columbia-Willamette Chapter, November 4, 2016, Portland, OR. *Poster presentation*. Award for best poster presentation, Biology & Behavioral Sciences, 2nd Place.
- October 2013 Slayden, OD, Kawi, J, Hergert, C, Martin, LD, **Holden, LA**. "Localization of Nerve Fibers in Natural and Induced Endometriosis in Rhesus Macaques (*Macaca mulatta*)". *Fertility and Sterility*, 100(3), S101. Annual Meeting of the American Society for Reproductive Medicine. Boston, MA. *Oral presentation*.
- October 2013 Jensen, JT, Hanna, C, Yao, S, Edelman, A, **Holden, L**, Slayden, O. "Administration of Depomedroxyprogesterone Acetate (DMPA) Augments Tubal Occlusion Following Transcervical Administration of Polidocanol Foam in Baboons." *Fertility and Sterility*, 100(3), S315. Annual Meeting of the American Society for Reproductive Medicine. Boston, MA. *Poster presentation*.
- October 2013 Slayden, OD, **Holden, L**, Hanna, C, Yao, S, Edelman, A, and Jensen, JT. "Immunohistochemical Assessment of Epithelial Integrity Following Intrauterine Administration of Polidocanol Foam in Rhesus Macaques." *Fertility and Sterility*, 100(3), S57. Annual Meeting of the American Society for Reproductive Medicine. Boston, MA. *Oral presentation*.
- August 2012 Hergert C, **Holden L**, and Slayden O. "Expression and Localization of Anti-Angiogenic Factors in the Endometrium of Macaques During Menstruation." 45th Annual Meeting of the Society for the Study of Reproduction. State College, PA. *Poster presentation*.
- August 2011 Francia C, Castro J, Francia L, Komuro J, Martinez F, **Ohm L**, and Slayden O. "Evaluation of the Uterine Tube Epithelium of UChA and UChB Rats (Ethanol Voluntary Consumers) During Estrus Phase." 44th Annual Meeting of the Society for the Study of Reproduction, Portland, OR. *Poster presentation*.
- August 2010 Arosh JA, Lee J, Stephen SD, Banu S, Nithy T, **Ohm L**, and Slayden OD. "Expression and Regulation of Prostaglandin Biosynthetic Enzymes Cox-2 and Pges-1 and Receptors EP1, EP2, EP3, and EP4 in Endometriosis in the Nonhuman Primate." *Biology of Reproduction* 83:168. *Poster presentation*.
- August 2010 Francia C, Keator C, Mah K, **Ohm L**, and Slayden O. "Estrogen action is required for expression of MMP-26 in the secretory phase of the menstrual cycle in rhesus macaques." *Biology of Reproduction* 83:133. *Poster presentation*.
- August 2010 Rothlein S, **Ohm L**, Slayden OD. "Assessment of Daily Menstrual Blood Loss in Rhesus Macaques." *Biology of Reproduction* 83:330. *Poster presentation*.
- May 2010 Almeida-Francia CCD, Keator CS, Mah K, **Ohm L**, Hergert C, Slayden OD. "Hormonal regulation of MMP-26 expression in the rhesus macaque endometrium." 12th Annual Northwest Reproductive Sciences Symposium. Spokane, WA. *Poster presentation*.
- May 2010 Rothlein S, **Ohm L**, Hergert C, Slayden O. "Assessment of Daily Menstrual Blood Loss in Rhesus Macaques." 12th Annual Northwest Reproductive Sciences Symposium. Spokane, WA. *Poster presentation*.
- 2009 Lawson A, Keator CS, Mah K, **Ohm L**, Rothlein S, and Slayden OD. "Cysteine-Rich Secretory Protein 3 (CRISP-3) Is an Estrogen-Regulated Component of Oviductal Fluid in Rhesus Macaques." *Biology of Reproduction* 81:103. *Oral presentation*.

Leadership

- 2018-2020 Early Career Scientist Steering Committee, Genetics Society of America.
- 2017-2018 Lead TA, Certificate for Innovation in College Teaching, College of Liberal Arts & Sciences, Portland State University
- 2017 Lead TA, BI214 Principles of Biology Laboratory, Portland State University
- 2015-2016 President, Biology Investigation and Outreach Graduate Student Club
- 2015-2016 Leadership Fellow, Social Justice cohort, Portland State University

- 2014-2015 Event Coordinator, Biology Investigation and Outreach Graduate Student Club
2014-2015 Leadership Fellow, Community Engagement cohort, Portland State University

Mentorship

- 2017-2018 Jobe Ritchie – Undergraduate volunteer, Brown Lab. Skills: DNA extraction and quantification, microinjection glass needle pulling, embryo preparation for microinjection, stock solution preparation, aquatics facility maintenance, zebrafish husbandry.
- 2016-2017 Zachary Heineman – Undergraduate volunteer, Brown Lab. Project: "Variation in TRIM Family Gene, *Ftr61*, Across Three Zebrafish Strains". Skills: DNA isolation and quantification, qPCR, PCR, stock solution preparation, autoclave, aquatics facility maintenance, zebrafish husbandry.
- 2016-2017 Charles Wilson – Undergraduate volunteer, Brown Lab. Project: "Evidence of Genetic Variation Across *Itln4* in Zebrafish". Skills: DNA isolation and quantification, qPCR, PCR, aquatics facility maintenance, zebrafish husbandry.
- 2016 Juan Sanchez – Undergraduate volunteer, Brown Lab. Skills: DNA extraction, aquatics facility maintenance, zebrafish husbandry.
- 2015-2016 Phan Vu – Undergraduate volunteer, Brown Lab. Project: "CNV validation across Cytochrome P450 1A (*cyp1a*) in three strains of zebrafish". Skills: PCR, stock solution preparation, DNA extraction, aquatics facility maintenance, zebrafish husbandry.
- 2015-2016 Aleksandr Weir – Undergraduate volunteer, Brown Lab. Project: "EE2-induced aneuploidy in male zebrafish gametes". Skills: histology, tissue dissection, sperm isolation, single cell amplification, aquatics facility maintenance, zebrafish husbandry.
- 2014-2016 Zachary Neumann – Undergraduate volunteer, Brown Lab. Project: "PCR walking across five coding regions of the zebrafish genome for CNV confirmation". Skills: reverse transcription, PCR, primer design, aquatics facility maintenance, zebrafish husbandry.
- 2014-2015 Emma Houssein – Undergraduate volunteer, Brown Lab. Skills: aquatics facility maintenance, zebrafish husbandry.
- 2014-2015 Rachel Champaigne – McNair Scholar, Brown Lab. Project: "Variance in Critical Swim Speed in *Danio rerio* (Zebrafish) and Potential Correlation with Mitochondrial Density in Dorsal Muscle Tissue". Skills: aquatics facility maintenance, zebrafish husbandry, swim tunnel operation, tissue dissection.
- 2013 Lacey Royer – Honors Biology undergraduate student, Singer Lab. Project: "Cul3 Ubiquitin Ligase and Ctb73 Protein Interactions". Skills: HEK293 cell culture, genetic transformation, cloning in *E. coli*.
- 2011-2012 Allison Quarles – High school Biology teacher, Slayden Lab. Skills: cryosectioning, paraffin sectioning, hematoxilin & esoin staining, immunohistochemistry, laser capture microdissection.
- 2010 John Beale – High school student, Slayden Lab. Skills: hematoxilin & esoin staining, immunohistochemistry.

Community and Civic Service (Volunteerism)

- 2018-2020 Early Career Scientist Steering Committee, Genetics Society of America.
- 2017 Graduate Student Representative for the College of Liberal Arts & Sciences, Dean of the Office of Graduate Studies Hiring Committee, Portland State University.
- 2017 Judge, ASHG 2017 DNA Day Essay Contest, The American Society of Human Genetics.
- 2017 Volunteer CE attendant, Read-Across: Case Studies, New Techniques, and Guidelines for Practical Application, The Society of Toxicology 56th Annual Conference, Baltimore, MD.
- 2017 Mentor, Undergraduate student networking with graduate students and postdoctoral scholars, The Society of Toxicology 56th Annual Conference, Baltimore, MD.
- 2016 Head Judge, Earth and Environmental Sciences section, Intel Northwest Science Expo, Portland State University, Portland, OR

- 2016 Judge, Portland Public Schools Science Expo, Portland Community College, Portland, OR
- 2016 Graduate student mentor, Creating & Presenting a Research Poster Workshop, Louis Stokes Alliance for Minority Participation (LSAMP), Portland State University
- 2016 Classroom volunteer, Promoting science inquiry in middle school classrooms: Water quality in freshwater habitats, Portland State University and Sherwood Middle School
- 2015 Graduate Student Training: TA Preparedness, Biology Department, Portland State University
- 2015 Moderator, Environmental Science Panel, 3rd Annual Student Research Symposium, Portland State University
- 2015 Science Communication Training: How to Design and Present a Poster, Louis Stokes Alliance for Minority Participation (LSAMP), Portland State University
- 2015 Graduate student liaison, Biology Department STEM Education Faculty Hiring Committee
- 2015 Scholarship Application Review Committee, Portland State University
- 2014 Guest lecturer, Woodburn Public Library Summer Lecture Series, Woodburn, OR
- 2014 Biology Instructor Training, Multnomah Education Service District Outdoor School, Portland, OR
- 2014 Judge, Portland Public Schools Science Expo, Oregon Museum of Science and Industry, Portland, OR
- 2013 Zero Waste team member, Bounty of the County, Dayton, OR
- 2008 Invited panelist, Focus the Nation Student Panel on Climate Change, Willamette University
- 2007-2008 Wildlife rehabilitation specialist, Turtle Ridge Wildlife Center, Salem, OR

Professional Memberships

- AAAS American Association for the Advancement of Science
- ACT American College of Toxicology
- GSA Genetics Society of America
- IZFS International Zebrafish Society
- SETAC Society of Environmental Toxicology and Chemistry
- SOT Society of Toxicology
- Women in Science Portland – *Association for Women in Science (AWIS) affiliate group*