

# ELANA R. ELKIN

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## EDUCATION

- Doctor of Philosophy, Toxicology** May 2019  
University of Michigan School of Public Health, Ann Arbor, MI  
Thesis: Placental cell responses to trichloroethylene metabolite *S*-(1, 2-dichlorovinyl)-L-cysteine exposure
- Master of Public Health, Environmental Health Sciences-Toxicology** May 2015  
University of Michigan School of Public Health, Ann Arbor, MI
- Bachelor of Arts, Interdisciplinary Studies in Social Science** August 2006  
Michigan State University, East Lansing, MI
- Non-degree Coursework in Natural Sciences** Winter 2008-Summer 2011  
Eastern Michigan University, Ypsilanti, MI  
Washtenaw Community College, Ann Arbor, MI
- Placenta Workshop** (60-hour workshop on placental biology) July 2016  
Queens College, Kingston, Ontario, Canada

## RESEARCH EXPERIENCE

- Assistant Professor of Environmental Health** Aug 2022-Present  
Division of Environmental Health, School of Public Health  
San Diego State University, San Diego, CA
- Evaluating toxicological responses in placental tissues.
  - Critically interprets scientific literature.
  - Trains and mentors graduate and undergraduate researchers.
  - Collaborates with faculty, staff and fellow graduate students across research disciplines.
  - Communicates research findings at seminars and conferences to both general and scientific audiences.
  - Publishes research findings and literature reviews in peer-reviewed scientific journals
- Postdoctoral Research Fellow** June 2019-Aug 2022  
Mentors: Dr. Kelly Bakulski, Department of Epidemiology and  
Dr. Rita Loch-Caruso, Department of Environmental Health Sciences  
University of Michigan School of Public Health, Ann Arbor, MI
- Processes and analyzes genetic and epigenetic datasets from animal experiments evaluating toxicological responses in placental tissues.
  - Critically interprets scientific literature.
  - Trains and mentors graduate and undergraduate researchers.
  - Collaborates with faculty, staff and fellow graduate students across research disciplines.
  - Communicates research findings at seminars and conferences to both general and scientific audiences.
  - Publishes research findings and literature reviews in peer-reviewed scientific journals
- Predocctoral Student Researcher** July 2015-May 2019  
Mentor: Dr. Rita Loch-Caruso, Department of Environmental Health Sciences  
University of Michigan School of Public Health, Ann Arbor, MI
- Designed and executed laboratory-based cellular and molecular biology experiments evaluating toxicological responses in human placental cells and tissues.
  - Trained and mentored undergraduate researchers.
  - Collaborates with faculty, staff and fellow graduate students across research disciplines.

- Communicated research findings at seminars and conferences to both general and scientific audiences.

**Research Scientist**

Jul 2019-Jan 2020

Cradle Genomics, Inc. Detroit, Michigan

- Working for a small company, contributed to development of novel non-invasive prenatal testing methods (NIPT).
- Researched strategies for optimizing fixation and preservation of intact cells in cervical samples.
- Researched methods for achieving single-cell suspensions in highly heterogeneous cervical samples.
- Planned and conducted laboratory-based experiments related to preserving morphological and nucleic acid integrity of cells obtained from cervical swabs.
- Performed data analysis and documents experimental results in technical reports.
- Presented experimental designs, data and overall progress to research and development team.
- Authored and contributed to production of research protocols and clinical SOPs.

**Laboratory Research Intern**

May 2014-July 2014

Mentors: Dr. Marie O’Neill and Dr. Felipe Vadillo-Ortega, Air Pollution Research Group,  
University of Michigan School of Public Health, Ann Arbor, MI  
National Institute of Medical Genomics, Mexico City, Mexico

- Processed and analyzed human cell line samples exposed to air pollution particles
- Adapted a laboratory protocol in English and Spanish language
- Attended weekly clinical research seminars in Spanish
- Learned about air pollution monitoring systems

**Laboratory Technician**

June 2013-Aug 2015

Dr. Shawn Xu Laboratory, Molecular & Integrative Physiology  
University of Michigan Life Sciences Institute, Ann Arbor, MI

- Prepared *C. elegans* growth media plates for use in neuroscience research.
- Ordered/stocked laboratory supplies and prepared reagents for general laboratory use.
- Maintained database of cryogenic research vials.

**TEACHING AND MENTORING EXPERIENCE**

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**Assistant Professor of Environmental Health**

Aug 2022-Present

Division of Environmental Health, School of Public Health  
San Diego State University, San Diego, CA

- Teach graduate level environmental health courses
- Trains and mentors graduate and undergraduate researchers.

**Graduate Student Instructor**

Sept 2017-Dec 2017

***Undergraduate Course: PUBHLTH 370: Public Health Biology and Pathophysiology***

Undergraduate Program in Public Health, University of Michigan, Ann Arbor, MI

- Provided lectures for occasional classes and led review sessions
- Assisted in the preparation of exams and quizzes, including drafting questions
- Graded exams, quizzes and papers
- Held weekly office hours and tutored students one-on-one

**Graduate Student Instructor**

Jan 2015-May 2015

### **Undergraduate Course: ENV 310: Toxicology: Environmental Chemicals and Disease**

Program in the Environment, University of Michigan, Ann Arbor, MI

- Assisted in developing class assignments for new undergraduate class
- Provided lectures for occasional classes and led review sessions
- Assisted in the preparation of exams and quizzes, including drafting questions
- Graded exams, quizzes and papers
- Held weekly office hours and tutored students one-on-one

### **Graduate Student Mentor**

Fall 2015 -Present

Loch-Caruso Lab, Department of Environmental Health Sciences

- Mentored undergraduate and graduate students
- Guided students in learning experimental design and laboratory techniques
- Advised the students in preparation and presentation of research findings

### **Biology Resource Room Tutor**

July 2011- Dec 2014

Washtenaw Community College, Ann Arbor, MI

- Tutored students in all biology courses at a community college including: general biology, human biology, anatomy and physiology, microbiology, genetics, and pathophysiology
- Worked with diverse ethnic, racial and age groups
- Lead study groups for biology courses
- Created and implement ipad-assisted tutoring methods in biology resource room

### **PEER-REVIEWED PUBLICATIONS**

1. **Elkin, E.R.**, Su, A.L., Kilburn, B.A., Armant, D.R., Loch-Caruso, R. 2022. Toxicity screenings of selected trichloroethylene and perchloroethylene metabolites in three in vitro placental models. *Repro Tox.* 109: 109-120. PubMed PMID: [35304307](#); PubMed Central PMCID: 9107309
2. Su, A.L., Harris, S.M., **Elkin, E.R.**, Karnovsky, A., Colacino, J.A., Loch-Caruso, R. 2022. Trichloroethylene modifies energy metabolites in the amniotic fluid of timed-pregnant Wistar rats. *Repro Tox.* 109: 80-92. PubMed PMID: [35301063](#); PubMed Central PMCID: PMC9000924
3. **Elkin, E.R.**, Bakulski, K.M., Colacino, J.A., Bridges, D., Kilburn, B.A., Armant, D.R., Loch-Caruso, R. 2021. Transcriptional profiling of the response to the trichloroethylene metabolite S-(1,2-dichlorovinyl)-L-cysteine revealed activation of the eIF2 $\alpha$ /ATF4 integrated stress response in two in vitro placental models. *Arch Toxicol* 95(5):1595-1619. PubMed PMID: [33725128](#) ; PubMed Central PMCID: PMC7961173.
4. **Elkin E.R.**, Bridges D., Harris, S.M., Loch-Caruso R. 2020. Exposure to Trichloroethylene Metabolite S-(1,2-Dichlorovinyl)-L-cysteine Causes Compensatory Changes to Macronutrient Utilization and Energy Metabolism in Placental HTR-8/SVneo Cells. *Chem Res Toxicol* 33:1339-1355. PubMed PMID: [31951115](#); PubMed Central PMCID: PMC7299793. **ACS Editors' Choice®.**
5. **Elkin E.R.**, Harris, S.M., Su A.L., Lash, L.H., Loch-Caruso, R. 2020. Placenta as a target organ for trichloroethylene toxicity. *Environ Sci: Processes Impacts* 22: 472-486. PubMed PMID: [32022077](#); PubMed Central PMCID: PMC7103546.
6. **Elkin, E.R.**, Bridges, D., Loch-Caruso, R. 2019. The trichloroethylene metabolite S-(1,2-dichlorovinyl)-L-cysteine induces progressive mitochondrial dysfunction in HTR-8/SVneo trophoblasts. *Toxicology*: 152283. PubMed PMID: [31476333](#); PubMed Central PMCID: PMC6943978.
7. **Elkin E.R.**, Harris S.M., Loch-Caruso R. 2018. Trichloroethylene metabolite S-(1,2-dichlorovinyl)-L-cysteine induces lipid peroxidation-associated apoptosis via the intrinsic and extrinsic apoptosis

- pathways in a first-trimester placental cell line. *Toxicol Appl Pharmacol* 338:30-42. PubMed PMID: [29129777](#); PubMed Central PMCID: PMC574109.
8. **Elkin E.R.**, O'Neill M.S. 2017. Trends in environmental tobacco smoke (ETS) exposure and preterm birth: Use of smoking bans and direct ETS exposure assessments in study designs. *Chem Res Toxicol* 30:1376-1383. PubMed PMID: [28602080](#); PubMed Central PMCID: PMC5536243.
  9. Park, H., **Elkin E.R.**, Castillo-Castrejon, M., Loch-Caruso, R. 2020. Brominated diphenyl ether-47 differentially regulates cellular migration and invasion in a human first trimester trophoblast cell line. *Reprod Toxicol* 93: 191-198. PubMed PMID: [32142752](#); PubMed Central PMCID: PMC7254746.
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10. Campbell, K.A., Colacino, J.A., Puttabyatappam, M., Dou, J.F., **Elkin, E.R.**, Hammoud, S.S., Domino, S.E., Dolinoy, D.C., Goodrich, J.M., Loch-Caruso, R., Padmanabhan, V., Bakulski, K.M. 2022. Placental gene expression-based cell type deconvolution: Cell proportions drive preeclampsia gene expression differences. *Nat Commun. Under review*
  11. Harris, S.M., Su, A.L., Dou, J.F., Loch-Caruso, R., **Elkin, E.R.**, Bakulski, K.M. 2020. Placental cell conditioned media modifies hemopoietic stem cell transcriptome In Vitro. *Front Cell Dev Biol. Under review*
  12. **Elkin E.R.**, Higgins, C., Aung, M.T., Bakulski, K.M. 2022. Metals exposures and epigenetics: Current evidence and future directions. *Curr Environ Health Rep. Under Review.*
  13. **Elkin, E.R.**, Su, A.L., Dou, J.F., Colacino, J.A., Bridges, D., Padmanabhan, V., Harris, S.M., Boldenow, E., Loch-Caruso, R., Bakulski, K.M. 2022. Sexually concordant and dimorphic transcriptional responses to maternal trichloroethylene and/or N-acetyl cysteine exposure in Wistar rat placental tissue. *Arch Toxicol. Under Review.*

## **CONFERENCE PRESENTATIONS**

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### **Poster Presentations**

Elkin, E.R. and Loch-Caruso, R. Effects of the trichloroethylene metabolite S-(1, 2-dichlorovinyl)-L-cysteine on mitochondrial function in human cytotrophoblasts. Poster presentation selected from abstract submission.

- a. International Congress of Toxicology and Mexican Congress of Toxicology (ICT2016), Merida, Mexico, October 2016.
- b. NIEHS Environmental Health Science Festival and Superfund Research Program Annual Meeting, Durham, North Carolina, December 2016. **First Place Winner, Student Poster Award (from over 80 posters)**

Elkin, E.R. and Loch-Caruso, R. Effects of the trichloroethylene metabolite S-(1, 2-dichlorovinyl)-L-cysteine on programmed cell death in placental cells. Poster presentation selected from abstract submission selected from abstract submission.

- a. Society of Toxicology 56<sup>th</sup> Annual Meeting, Baltimore, Maryland, March 2017.
- b. International Federation of Placental Associations Annual Meeting (IFPA2017). Manchester, United Kingdom, August 2017.
- c. Superfund Research Program Annual Meeting, Philadelphia, Pennsylvania. December 2017. **Finalist, Student Poster Award Competition (from over 80 posters)**
- d. Michigan Alliance for Reproductive Technologies and Science Conference. Grand Rapids, Michigan. May 2018.

Elkin, E.R., and Loch-Caruso, R. Effects of the trichloroethylene metabolite S-(1,2-dichlorovinyl)-L-cysteine on extravillous trophoblast invasion. Poster presentation selected from abstract submission.

- a. Society of Toxicology 57<sup>th</sup> Annual Meeting, San Antonio, Texas, March 2018.

Elkin, E.R., Bridges, D. and Loch-Caruso, R. Exposure to the trichloroethylene metabolite S-(1,2-dichlorovinyl)-L-cysteine causes an early energy metabolic shift followed mitochondrial dysfunction in a first-trimester extravillous trophoblast cell line. Poster presentation selected from abstract submission.

- a. Superfund Research Program Annual Meeting, Sacramento, California, November 2018.
- b. Society of Toxicology 58<sup>th</sup> Annual Meeting, Baltimore, Maryland, March 2019.

**Finalist, Carl C. Smith Student Mechanisms Award**

Elkin, E.R., Bakulski, K.M., Colacino, J.A., Bridges, D., Kilburn, B.A., Armant, D.R., Loch-Caruso, R. Transcriptional profiling of the response to the trichloroethylene metabolite S-(1,2-dichlorovinyl)-L-cysteine revealed activation of the eIF2 $\alpha$ /ATF4 integrated stress response in two *in vitro* placental models. Poster presentation selected from abstract submission.

- a. 10<sup>th</sup> Annual Michigan Alliance for Reproductive Technologies and Sciences (MARTS) Meeting, East Lansing, Michigan, May 31, 2019.
- b. Society of Toxicology Michigan Regional Chapter Annual Meeting, Ann Arbor, Michigan, October 18, 2019. **Third Place, Student/Postdoc Poster Award Competition**
- c. 59<sup>th</sup> Society of Toxicology Annual Meeting. Orlando, Florida, March 23, 2021. (Virtual due to Covid-19). **First Place, Postdoc Poster Award Competition**

Elkin, E.R., Su, A.L., Dou, J.F., Colacino, J.A., Loch-Caruso, R., Bakulski, K.M. Sex-specific transcriptional responses to maternal trichloroethylene and/or N-acetyl cysteine exposure in Wistar rat placental tissue. Poster presentation selected from abstract submission.

- a. Superfund Research Annual Meeting. College Station, Texas, December 14, 2020. (Virtual due to Covid-19).

Elkin, E.R., Campbell, K.A., Padmanabhan, V., Loch-Caruso, R., Bakulski, K.M. Placental cell type proportions are sexual dimorphic in early but not late pregnancy in humans and mid pregnancy in rats.

- a. 12<sup>th</sup> Annual Michigan Alliance for Reproductive Technologies and Sciences (MARTS) Meeting, Ann Arbor, Michigan, October 7, 2021.

**Platform Presentations**

Elkin, E., Loch-Caruso, R. Effects of the trichloroethylene metabolite S-(1,2-dichlorovinyl)-L-cysteine on mitochondrial function in human cytotrophoblasts. Presented at the Fall Meeting of the Michigan Society of Toxicology in East Lansing, Michigan, October 21, 2016. Selected to give invited presentation based on abstract submission.

Elkin, E., Loch-Caruso, R. The tiniest victims: The effects of trichloroethylene on early pregnancy placental development. Presented to the California Department of Public Health Environmental Health Investigations Branch in Richmond, California, June 8, 2017. Invited to present by section chief Dr. Gabriele Windgasse.

Elkin, E., Loch-Caruso, R. Profiling DCVC-induced differential gene expression in HTR-8/SVneo placental cells. Presented at the Fall Meeting of the Michigan Society of Toxicology in Ann Arbor, Michigan, October 19, 2019. Selected to give invited presentation based on abstract submission.

Karen Wetterhahn Memorial Lecture. Placental Cell Responses to Trichloroethylene Metabolite S-(1,2-Dichlorovinyl)-L-Cysteine. Presented at the Superfund Research Meeting in Seattle

Washington, November 19, 2019. Selected to receive 2019 Wetterhahn Memorial Award and deliver lecture.

Elkin, E.R., Bakulski, K.M., Colacino, J.A., Bridges, D., Kilburn, B.A., Armant, R.D., and Loch-Carusio, R. Transcriptional Profiling of the Trichloroethylene Metabolite S-(1,2-Dichlorovinyl)-L-Cysteine Revealed Activation of the EIF2 $\alpha$ /ATF4- Integrated Stress Response in the HTR-8/SVneo Trophoblast Cell Line. Presented at the Society of Toxicity 59<sup>th</sup> Annual Meeting in Anaheim, California, March 17, 2020. Selected to give invited presentation based on abstract submission. Canceled due to COVID-19.

Elkin, E.R., Su, A.L., Kilburn, B.A., Armant, D.R., Loch-Carusio, R. Toxicity screenings of selected trichloroethylene and perchloroethylene metabolites in three in vitro placental models. Presented at the Society of Toxicity 61<sup>st</sup> Annual Meeting in San Diego, California, March 28, 2022. Selected to give invited presentation based on abstract submission.

### **Webinars**

Elkin, E.R. and Loch-Carusio, R. Effects of the trichloroethylene metabolite S-(1, 2-dichlorovinyl)-L-cysteine on mitochondrial function in human cytotrophoblasts. Presented in the Superfund Research Program (SRP) Annual Meeting Poster Winners Webinar Series, Session II: Health Sciences Poster Winners on March 27, 2017.

[https://www.niehs.nih.gov/research/supported/centers/srp/training/poster\\_winners/webinar/index.cfm](https://www.niehs.nih.gov/research/supported/centers/srp/training/poster_winners/webinar/index.cfm)

## **OTHER PROFESSIONAL EXPERIENCE**

### **Administrative Assistant**

Dec 2007-Aug 2008

Wolverine Temporary Staffing Services, University of Michigan, Ann Arbor, MI

- Greeted students; performed general receptionist duties
- Responded to general telephone and e-mail inquiries
- Responsible for maintaining general office needs such as office supplies
- Sorted and delivered office mail
- Scheduled appointments
- Performed data entry

### **Shift Manager**

May 2003-Dec 2005

McDonald's Corporation, Ann Arbor, MI

- Delivered high-quality, accurate, and swift service to guests
- Addressed guest and employee concerns in person and over the phone; improved problem-solving skills and conflict resolution
- Developed leadership skills through supervising employees and overseeing restaurant activity
- Trained employees and tracked professional development progress
- Led team of employees to accomplish sales quota, service speed, and service quality goals
- Closed restaurant, counted cash drawers, and prepared bank deposits

## **VOLUNTEER SERVICE & ACTIVITIES**

### **Student Participant**

March 2016

Public Health in Action Spring Break Deployment, Texas Project

- 8-week seminar culminating in week-long practice-based community public health project
- Administered health surveys to college students and entered data as part of data collection for a health impact assessment in Hidalgo County, Texas
- Blog posts from public health practice experience found here:

<https://umsphfrontlines.wordpress.com/2016/03/08/building-bridges-tearing-down-fences-lessons-from-the-front-lines/>

<https://umsphfrontlines.wordpress.com/2016/03/04/more-than-meets-the-birds-eye-in-texas/>

**Student Volunteer Participant**

Spring 2017-Spring 2019

Public Health Action Support Team (PHAST)

Office of Public Health Practice, University of Michigan School of Public Health

- Participated in bottle water distribution in Flint, Michigan

**Volunteer Tutor**

Fall 2016-Spring 2017

Community Action Network (community non-profit)

Health Professionals Service Learning Course

- Tutored elementary school students in reading and math

**Volunteer Member**

Jan 2016-Dec 2018

Washtenaw County Community Emergency Response Team (CERT)

- Completed twenty-hour FEMA CERT training and disaster simulation
- Trained volunteer member of Washtenaw County CERT team

**Planning Committee Member**

Jan 2018

23rd Annual Environmental Health Symposium: “Environmental Exposures and Endocrine Disruption”

Department of Environmental Health Sciences, University of Michigan School of Public Health

- Planned symposium with committee
- Managed registration and abstract books

**Planning Committee Chair**

March 2017

22nd Annual Environmental Health Symposium: “Scientific Outreach: Community Engagement and Environmental Justice”

Department of Environmental Health Sciences, University of Michigan School of Public Health

- Managed overall planning process for symposium
- Delegated tasks to committee members

**Speaker Host, Planning Committee Member**

Jan 2016

21st Annual Environmental Health Symposium: “Microbiome and the Environment”

Department of Environmental Health Sciences, University of Michigan School of Public Health

- Planned symposium with committee
- Attended planning meetings
- Recruited and hosted symposium speaker

**Hospital Volunteer**

Jan 2009-Aug 2009 & Sept 2010-Dec 2011

Physical Therapy Wound Care Clinic, University of Michigan Hospital, Ann Arbor, MI

- Prepared patient exam areas before and after appointments
- Assisted patients in transferring in and out of exam beds
- Set up medical supplies and sterile fields for patient appointments
- Greeted patients prior to scheduled appointments

**Volunteer Shelter & Help Line Assistant**

February 2008-February 2009

SafeHouse Center, Ann Arbor, MI

- Completed forty-hour crisis intervention, counseling and advocacy training seminar
- Counseled people social problems (domestic violence and suicide) on 24-hour helpline

- Performed “intake” process on incoming domestic violence shelter residents
- Assisted social advocacy staff in work on behalf of SafeHouse service participants
- Performed office duties including filing, copying and data entry

## **AWARDS**

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- Recipient, Postdoc Award** Mar 2021
- Reproductive and Developmental Toxicology Specialty Section, Society of Toxicology
- Recipient, Edward W. Carney Trainee Award** Mar 2020
- Reproductive and Developmental Toxicology Specialty Section, Society of Toxicology
- Recipient, Karen Wetterhahn Memorial Award** Nov 2019
- National Institute of Environmental Health Sciences (NIEHS) Superfund Research Program
- Recipient, Vera W. Hudson and Elizabeth K. Weisburger Scholarship Student Award** March 2019
- Women in Toxicology Specialty Section, Society of Toxicology
- First Place Winner, Student Poster Award** Dec 2016
- National Institute of Environmental Health Sciences (NIEHS) Superfund Research Program Annual Meeting
- Recipient, Individual Development Plan Annual Travel Award** 2016 and 2017
- Puerto Rico Testsite for Exploring Contamination Threats (PROTECT) Superfund Research Program Center
- Finalist, 2019 Carl C. Smith Student Mechanisms Award** Nov 2018
- Mechanisms Specialty Section, Society of Toxicology
- Recipient, Individual Development Plan Annual Travel Award** 2016 and 2017
- Puerto Rico Testsite for Exploring Contamination Threats (PROTECT) Superfund Research Program Center
- Recipient, Dean’s Scholarship** 2013- 2015
- University of Michigan School of Public Health
- Recipient, Washtenaw Community College Foundation Scholarship** Fall 2009-Summer 2011
- Washtenaw Community College
- Recipient, Board of Trustees Scholarship Award** Summer 2006
- Michigan State University

## **MEMBERSHIPS**

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- Graduate Student Member** Fall 2014-Present
- Society of Toxicology
- Member, Phi Beta Kappa Society** Spring 2006
- Michigan State University
- Member, Golden Key International Honour Society** Fall 2005
- Michigan State University

## **GRANTS**

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NIH/NIDDK Developmental Origins of Metabolic Disorders Pediatric Endocrinology Training Program T32 DK071212 (Vazquez and Padmanabhan, Co-PIs)

- This program aims to train future leaders in developmental origins of metabolic disorders with an emphasis on disorders of glucose metabolism, neurobiology of eating behavior, and brain reward systems, and the impact of environmental endocrine disrupting chemicals and stress on metabolism.



- Role: Postdoctoral trainee (04/01/20-04/30/22)

NIH/NIEHS Environmental Toxicology and Epidemiology Pre/Post-Doctoral Research Training  
T32 ES007062-33 (Loch-Caruso, PI)

- This program aims to train future leaders in environmental health sciences by providing training that bridges environmental mechanistic toxicology and molecular epidemiology.
- Role: Predoctoral trainee (09/01/15-8/31/17)

NIH/NIEHS PROTECT Superfund Research Program Center P42 ES017198. (Alshawabkeh, Center PI; Loch-Caruso, Project #2 PI). Toxicant Activation of Pathways of Preterm Birth in Gestational Tissue (Project 2).

- Role: Predoctoral trainee (09/01/15-5/25/19); Postdoctoral trainee (6/1/19-Present)

NIH/NIEHS Environmental Health Sciences Core Center: Michigan Lifestage Environmental Exposures and Disease (M-LEED) Emerging Field Targeted pilot project (Loch-Caruso, PI)

- The Pilot Project Program provides limited, short-term funding to encourage innovation, creativity, and multidisciplinary collaborations, to attract new scientists to the center, and to address gaps in our knowledge about lifestage vulnerability to environmental exposures.
- Role: Author of grant and completed laboratory work (12/15/18-3/31/19 and 11/15/29-3/31/20)

University of Michigan Rackham Graduate Student Research Grant: Candidate (Elkin)

- This grant is designed to support Rackham graduate students and is intended to defray costs of conducting clearly defined research projects that advance progress toward their degree.
- Role: Recipient (2017)

University of Michigan Rackham Graduate Student Research Grant: Pre-candidate (Elkin)

- This grant is designed to support Rackham graduate students and is intended to defray costs of conducting clearly defined research projects that advance progress toward their degree.
- Role: Recipient (2016)

Rackham Conference Travel Grant (Elkin)

- This grant is intended to provide opportunities for Rackham graduate students to become familiar with, and participate in the life of, their academic professions.
- Role: Recipient (2016 & 2017)