

Kylie D. Rock, Ph.D.

Clemson University, Department of Biological Sciences
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[NCBI Bibliography](#)
[Lab Website](#)

Research Interests

I am a toxicologist with diverse training and expertise in both reproductive and ecotoxicology. My lab seeks to identify molecular, cellular, and physiological changes associated with environmentally relevant chemical exposures, prioritizing translational and comparative study designs to (1) conduct high-impact science with relevance to human reproductive health and (2) assess consequences, responses, and actions at the human, animal, and ecosystem interfaces to address environmental health issues.

Education

Doctorate, North Carolina State University

2019

Department: Biological Sciences

Laboratory: Dr. Heather Patisaul

Degree: Toxicology

Dissertation: *Sex-specific Effects of Firemaster[®] 550 on Placenta, Brain Development, and Behavior*

Bachelor of Science, St. Lawrence University

2012

Department: Biology

Laboratory: Dr. Alexander Schreiber and Dr. Marilyn Mayer

Concentration: Biology, minor in Chemistry

Honors Thesis: *Methylmercury Uptake and Distribution in Metamorphosing Xenopus laevis Tadpoles Fed a Swordfish Diet*

Relevant Experience

Assistant Professor, Clemson University

2023 – Present

Department: Biological Sciences

Affiliations: Environmental Toxicology Program, Center for Human Genetics

Postdoctoral Researcher, North Carolina State University

2021 – 2023

Department: Biological Sciences

Laboratory: Dr. Scott Belcher

Affiliations: Center for Environmental and Health Effects of PFAS, Center for Human Health and the Environment

Postdoctoral Researcher, University of Maryland School of Medicine

2019 – 2021

Department: Pharmacology

Laboratory: Dr. Tracy Bale

Affiliations: Center for Epigenetic Research in Child Health and Brain Development

Graduate Research Assistant, North Carolina State University

2014 – 2019

Department: Biological Sciences

Laboratory: Dr. Heather Patisaul

Laboratory Technician, Duke University

2012 – 2014

Department: Nicholas School of the Environment

Laboratory: Dr. Heather Stapleton

Fellowships and Grants

Completed

1F31ES029000-01 (NRSA)

01/22/18 – 08/13/19

Effects of prenatal Firemaster 550 exposure on placental gene expression and serotonergic innervation in the developing forebrain

Source: NIH/NIEHS

Role: PI (Training Fellowship)

Direct Costs: N/A NRSA Pre-Doctoral Fellowship

Active

2017346

1/31/24 – 3/31/24

Does Anthropogenic Contamination of Estuaries Impact Bioaccumulation in Seasonally Resident Versus Transient Elasmobranchs?

Source: Save Our Seas Foundation

Role: PI

Direct Costs: \$10,000

Prisma Health Education and Research Seed Grant

01/01/2025 – 12/31/2025

Unraveling the Impact of Fetal Sex on Expression and Activity of Xenobiotic Transporters at the Blood-Placenta Barrier

Source: PHERI Seed Grant Program

Role: PI

Direct Cost: \$20,000

Pending

K01ES037359

12/01/2025 – 11/31/2028

Effects of Preconception Phthalate Exposure on Implantation and Placentation

Source: NIH/NIEHS

Role: PI

Direct Costs: \$462,933

R35GM162969

12/01/2025 – 11/31/2030

Modulation of ABC Transporters – What's Sex Got To Do With It?

Source: NIH/NIGMS

Role: PI

Direct Costs: \$1,312,420

R21ES037883

07/01/2025 – 06/30/2027

Probing the Direct Effects of Endocrine Disrupting Chemicals on the Vaginal Microenvironment

Source: NIH/NIEHS

Role: Co-I

Direct Costs: \$93,431

ORAU Ralph E. Powe Junior Faculty Enhancement Award

06/01/2025 – 05/31/2026

Evaluating Bioaccumulation and Biomagnification of Pollutants in Dietary Generalist Versus Specialist Elasmobranch Species

Source: ORAU Ralph E. Powe Junior Faculty Enhancement Program

Role: PI

Direct Cost: \$10,000

Honors and Awards

Clemson University NSF Career Academy	2024
Clemson University/Prisma Health NIH Accelerator Program	2023
NIEHS Extramural Paper of the Month (DOI: 10.1021/acs.est.3c01146)	2023
NC State Strengthening the Impact of Research Scholar	2022
2 nd Place Poster Endocrine Disrupting Chemicals – North Carolina Annual Meeting	2022
2 nd Place Poster North Carolina Chapter of the Society of Toxicology	2022
University of Maryland Postdoctoral Professional Development Award	2021
1 st Place Poster Reproductive and Developmental Toxicology Specialty Section Society of Toxicology	2019
3 rd Place Poster Life Sciences Graduate Research Symposium North Carolina State University	2019
North Carolina State University Graduate Student Association Travel Assistance Award	2018
1 st Place Poster Inaugural Endocrine Disrupting Chemicals – North Carolina Annual Meeting	2018
Preparing the Professoriate Fellowship	2017 – 2018
W.M. Keck Center for Behavioral Neuroscience Travel Award	2017
Phi Beta Kappa	2012
Augsbury North Country Scholarship	2008 – 2012
Daniel F. '65 and Ann H. Sullivan St. Lawrence University Summer Research Fellowship	2010

Publications

ORCID ID: 0000-0003-2954-1110

First Author *starting from most recent

1. **Rock KD**, Folts L, Zierden HC, Marx-Rattner R, Leu A, et al. Developmental Transcriptomic Patterns can be Altered by Transgenic Overexpression of Uty. *Scientific Reports*. 2023. doi.org/10.1038/s41598-023-47977-x.
2. **Rock KD**, Polera ME, Guillette TC, McCord J, Dean K, et al. Companion Animals as Sentinels of Per- and Polyfluoroalkyl Substance (PFAS) Exposure and Associated Health Biomarkers in Gray's Creek North Carolina. *Environmental Science and Technology*. 2023. doi.org/10.1021/acs.est.3c01146. **[NIEHS Extramural Paper of the Month]**
3. **Rock KD**, St Armour G, Horman B, Phillips A, Ruis M, et al. Effects of Prenatal Exposure to a Mixture of Organophosphate Flame Retardants on Placental Gene Expression and Serotonergic Innervation in the Developing Forebrain. *Toxicological Sciences*. 2020. doi.org/10.1093/toxsci/kfaa046.
4. **Rock KD**, Gillera SE, Devarasetty P, Horman B, Birnbaum LS, et al. Sex-specific Behavioral Effects of Developmental Exposure to Tetrabromobisphenol A (TBBPA) in Wistar Rats. *Neurotoxicology*. 2019. doi.org/10.1016/j.neuro.2019.09.003.
5. **Rock KD**, Patisaul H. Environmental Mechanisms of Neurodevelopmental Toxicity. *Current Environmental Health Reports*. 2018. doi.org/10.1007/s40572-018-0185-0.
6. **Rock KD**, Horman B, Phillips A, McRitchie S, Watson S, et al. Molecular Effects of Developmental Firemaster® 550 Exposure in Wistar Rat Placenta and Fetal Forebrain. *Endocrine Connections*. 2018. doi.org/10.1530/EC-17-0373. **[NIEHS Extramural Paper of the Month]**
7. **Baldwin KR**, Phillips A, Horman B, Arambula S, Rebuli M, et al. Sex Specific Placental Accumulation and Behavioral Effects of Developmental Firemaster® 550 Exposure in Wistar Rats. *Scientific Reports*. 2017. doi.org/10.1530/EC-17-0373.

Co-Author *starting from most recent

1. Bangma J, Pu S, Robuck A, Boettger J, Guillette T, McCord J, **Rock KD**, et al. Combined Screening and Retroactive Data Mining for Emerging Perfluoroethers in Wildlife and Pets in the Cape Fear Region of North Carolina. *Chemosphere*. 2024. doi.org/10.1016/j.chemosphere.2024.142898.
2. Starnes HM, Jackson TW, **Rock KD**, Belcher SM. Quantitative Cross-Species Comparison of Serum Albumin Binding of Per- and Polyfluoroalkyl Substances from Five Structural Classes. *Toxicological Sciences*. 2024. doi.org/10.1093/toxsci/kfae028.
3. Zierden HC, Marx-Rattner R, **Rock KD**, Montgomery KR, Anastasiadis P, et al. Extracellular Vesicles are Dynamic Regulators of Maternal Glucose Homeostasis During Pregnancy. *Scientific Reports*. 2023. doi.org/10.1038/s41598-023-31425-x.
4. Newell AJ, Kapps VA, Cai Y, Rai MR, St. Armour G, Horman BM, **Rock KD**, et al. Maternal Organophosphate Flame Retardant Exposure Alters the Developing Mesencephalic Dopamine System in Fetal Rat. *Toxicological Sciences*. 2023. doi.org/10.1093/toxsci/kfac137.
5. Belcher SM, Guillette MP, Robb F, **Rock KD**. Comparative Assessment of Blood Mercury in American Alligators (*Alligator mississippiensis*) from Coastal North Carolina and Florida. *Ecotoxicology*. 2022. doi.org/10.1007/s10646-022-02573-z.
6. Starnes HM, **Rock KD**, Jackson TW, Belcher SM. A Critical Review and Meta-Analysis of Impacts of Per- and Polyfluorinated Substances on the Brain and Behavior. *Frontiers in Toxicology*. 2022. doi.org/10.3389/ftox.2022.881584.
7. Jašarević E, Hill EM, Kane PJ, Rutt L, Gyles T, Folts L, **Rock KD**, et al. Colonization at Birth with Human CST IV Cervicovaginal Microbiota Alters Development and Increases Neonatal Mortality in Mice. *Nature Communications*. 2021. doi.org/10.1038/s41467-021-26634-9.
8. Macari S, **Rock KD**, Santos MS, Lima VTM, Szawka RE, et al. Developmental Exposure to the Flame Retardant Mixture Firemaster 550 Compromises Adult Bone Integrity in Male but not Female Rats. *International Journal of Molecular Sciences*. 2020. doi.org/10.3390/ijms21072553.
9. Jackson TW, Bendfeldt GA, Beam KA, **Rock KD**, Belcher SM. Heterozygous mutation of Sonic Hedgehog receptor (Ptch) drives cerebellar overgrowth and sex-specifically alters activity and social behavior in female mice. *Neurotoxicology and Teratology*. 2020. doi.org/10.1016/j.ntt.2020.106866.
10. Arumugasaamy N, **Rock KD**, Kuo C, Bale TL, Fisher JP. Microphysiological Systems of the Placental Barrier. *Advanced Drug Delivery Reviews*. 2020. doi.org/10.1016/j.addr.2020.08.010.
11. Ruis M, **Rock KD**, Hall S, Horman B, Patisaul H, et al. PBDEs Concentrate in the Fetal Portion of the Placenta: Implications for Thyroid Hormone Dysregulation. *Endocrinology*. 2019. doi.org/10.1210/en.2019-00463.
12. Bagley M, Ekelöf M, **Rock KD**, Patisaul H, Muddiman D. IR-MALDESI Mass Spectrometry Imaging of Underivatized Neurotransmitters in Brain Tissue of Rats Exposed to Tetrabromobisphenol A (TBBPA). *Analytical*

and Bioanalytical Chemistry. 2018. doi.org/10.1007/s00216-018-1420-0.

13. Phillips A, Chen A, **Rock KD**, Horman B, Patisaul H, et al. Transplacental and Lactational Transfer of Firemaster® 550 Components in Dosed Wistar Rats. *Toxicological Sciences*. 2016. doi.org/10.1093/toxsci/kfw122.
14. Macaulay L, Chen A, **Rock KD**, Dishaw L, Dong W, et al. Developmental toxicity of the PBDE metabolite 6-OH-BDE-47 in zebrafish and the potential role of thyroid receptor β . *Aquatic Toxicology*. 2015. doi.org/10.1016/j.aquatox.2015.09.007.

Encyclopedia Chapter

1. **Rock KD**, Starnes HM, Belcher SM. Reproductive Toxicology, Female. *Encyclopedia of Toxicology*, 4th Edition, Vol 8, 167 - 202. 2024.

Pending

1. **Rock KD**, Zierden HC, Herb BR, Folts LM, Zhao Q, et al. The Placenta Serves as a Major Barrier to Fetal Corticosterone Exposure and is Susceptible to Cell-Type-Specific Transcriptomic Disruption in Response to Early Prenatal Stress in Mice. *In Review*.
2. **Rock KD**, Bhoothapuri S, Lassiter E, Belcher SM. Variability of Mercury Concentrations Across Species, Brand, and Tissue Type in Processed Commercial Seafood Products. *In Review*. *Corresponding author
3. Afghah M, Powell PC, Boland MC, Walker M, Padgett ZJ, et al. Preconception Phthalate Exposure Alters the Placental Transcriptome and is Associated with Long-term Changes in Offspring Body Weight. *In Preparation*. *Senior author
4. Padgett ZJ, Powell PC, **Rock KD**. A Review of PFAS Contamination and Microbial Dynamics in Estuarine Environments. *In Preparation*. *Senior author
5. Elkins A, Suggs A, **Rock KD**. The Hepato-Ovary Axis: Bidirectional Interactions Between the Liver and Ovary. *In Preparation*. *Senior author

Presentations & Meetings

*Poster presentations not included, but amount to 20 national and international posters presented

Society of Toxicology Annual Meeting Platform Presentation Title: <i>Sexually Dimorphic Placental and Neuroendocrine Responses to Prenatal and Preconception Exposures</i>	2025
University of Florida Lou Guillette Jr. Memorial Symposium Title: <i>Shaping Careers in One Health and EDCs: A Transgenerational Impact</i>	2025
Clemson University Biophysics Seminar Series Title: <i>Blood-Placenta Barrier Permeability: What's Sex Got To Do With It?</i>	2024
Clemson University Center for Human Genetics Advances in Human Genetics Seminar Title: <i>Unraveling the Impact of Fetal Sex on Expression and Activity of Xenobiotic Transporters at the Blood-Placenta Barrier</i>	2024
USEPA Emerging Topics Seminar Title: <i>One Health Case Studies: PFAS, Pine Trees, Pets, and Predators</i>	2022
Gordon Research Conference – Environmental Endocrine Disruptors Title: <i>One Health Case Studies: PFAS, Pine Trees, Pets, and Predators</i>	2022
Society of Toxicology Annual Meeting Platform Presentation Title: <i>PFAS Exposure is Associated with Autoimmunity in the American Alligator</i>	2022
Virtual Placenta-Interface Seminar Series Title: <i>Defining the Molecular Mechanisms by which Stress Alters Placental Function and Fetal Brain Development</i>	2021
Neuroscience Trainee Seminar Series Title: <i>The Placenta: A Novel Target of Sex-specific Neuroendocrine Disruption</i>	2019
Gordon Research Seminar – Environmental Endocrine Disruptors Title: <i>The Placenta: A Potential Target of Neuroendocrine Disruption by the Flame Retardant Mixture Firemaster® 550</i>	2018
The United States Society for Developmental Origins of Health and Disease Title: <i>Sex-Specific Placental Accumulation of Mixture FM550® and Sex-Specific Disruption of the Placental and Fetal Forebrain Transcriptome in the Wistar Rat</i>	2018

North Carolina Museum of Natural Sciences Title: <i>Neurodevelopment: What's the placenta got to do with it?</i>	2018
North Carolina State University Toxicology Program Seminar Title: <i>The Placenta as a Potential Target of Neurotoxicity</i>	2017
North Carolina State University E.M. Keck Center for Behavioral Biology Symposium Title: <i>Firemaster[®] 550, Placenta, Brain and Behavior</i>	2017
Festival of Science Title: <i>Methylmercury Uptake and Distribution in Metamorphosing Xenopus laevis Tadpoles Fed a Swordfish Diet</i>	2012

Teaching & Mentoring Experience

Teaching

Instructor, Cell Biology (BIOL 4610) <i>Clemson University</i> Student Evaluations: 4.30/5.0	2024
Instructor, Senior Seminar: Developmental Origins of Health and Disease (BIOL 4930) <i>Clemson University</i> Student Evaluations: 4.76/5.0	2023
Instructor, Cellular Biology (BIO 414) <i>North Carolina State University</i>	2022
Guest Lecturer, Neurobiology (BIO 488) <i>North Carolina State University</i>	2018
Guest Lecturer, Intro. Cellular and Molecular Biology (BIO 183) <i>North Carolina State University</i>	2018
Instructor, Intro. Cellular and Molecular Biology Lab (BIO 183) <i>North Carolina State University</i>	2016 – 2017
Instructor, General Chemistry Lab (CHEM 103 & 104) <i>St. Lawrence University</i>	2010 – 2011

Mentoring

*Italics indicate current position if known

Graduate Students:

Ansley Elkins,	<i>Ph.D. Student in my lab at Clemson University</i>	2024 – Present
Maryam Afghah, M.S.	<i>Ph.D. Student in my lab at Clemson University</i>	2024 – Present
Melissa Walker	<i>M.S. Student in my lab at Clemson University</i>	2024 – Present
Zachary Padgett	<i>M.S. Student in my lab at Clemson University</i>	2023 – Present
Hannah Starnes, Ph.D.	<i>Senior Toxicologist, ICF Business and Consulting Services</i>	2021 – 2023
Zachary McLean, M.S.	<i>Ph.D. Student, North Carolina State University</i>	2021 – 2023
Nickole Moon, Ph.D.	<i>M.D./Ph.D. Student, University of Colorado Anschutz</i>	2019 – 2021
Kristen Montgomery, Ph.D.	<i>Postdoctoral Researcher, University of Calgary</i>	2019 – 2021
William Marinello, Ph.D.	<i>Postdoctoral Researcher, UNC Chapel Hill</i>	2018 – 2019
Sagi Gillera, Ph.D.	<i>Senior Toxicologist, ICF Business and Consulting Services</i>	2017 – 2019
Thomas Jackson, Ph.D.	<i>Postdoctoral Biologist, US Environmental Protection Agency</i>	2017 – 2019

Post-undergraduate Researchers:

Paige Powell	<i>Lab Technician in my lab at Clemson University</i>	2023 – Present
Mary Boland	<i>Part-time Research Assistant in my lab at Clemson University</i>	2023 – Present

Undergraduate Students:

Romina Dotson	<i>Undergraduate Researcher in my lab at Clemson University</i>	2025 – Present
Matt Heselton	<i>Undergraduate Researcher in my lab at Clemson University</i>	2025 – Present
Elizabeth Mulligan	<i>Undergraduate Researcher in my lab at Clemson University</i>	2024 – Present
Sydney Schinkai	<i>Undergraduate Researcher in my lab at Clemson University</i>	2024 – Present
Chloe Schmidt	<i>Undergraduate Researcher in my lab at Clemson University</i>	2024 – Present
Kylie Artosky	<i>Undergraduate Researcher in my lab at Clemson University</i>	2024 – Present

Kylie Rock, CV

Alexandra Suggs	<i>Undergraduate Researcher in my lab at Clemson University</i>	2024 – Present
Shriya Boothapuri	<i>M.D. Student, Medical University of South Carolina</i>	2022 – 2023
Sydney Wright	<i>DVM Student, Mississippi State University</i>	2022 – 2023
Emmanuel Lassiter	<i>Student, Wake Tech Community College</i>	2022 – 2023
Annabelle Frantz	<i>DPT Student, Duke University</i>	2016 – 2019
Pavan Devarasetty, M.D.	<i>Resident Physician, Duke University Hospital</i>	2016 – 2019
Jamal Moss, M.D.	<i>Family Medicine Resident, University of Pennsylvania</i>	2015 – 2017
Annabelle Rivera, M.S.	<i>Medical Technician, Duke University</i>	2015 – 2017
Meredyth Daniel, D.O.	<i>McLeod Health Cheraw</i>	2015 – 2017
Emily Cox, D.O.	<i>UNC Institute for Healthcare Quality Improvement</i>	2014 – 2015

Service & Engagement

Society & Conference Service

Reproductive and Developmental Toxicology Specialty Section of the Society of Toxicology <i>Junior Councilor</i>	2025 – Present
Southeastern Regional Chapter of the Society of Toxicology <i>President-Elect</i>	2024 – 2025
Reproductive and Developmental Toxicology Specialty Section of the Society of Toxicology <i>Postdoctoral Representative</i>	2023 – 2025
North Carolina Chapter of Society of Toxicology <i>Postdoctoral Representative</i>	2022 – 2024
Gordon Research Conference – Environmental Endocrine Disruptors <i>Program Committee</i>	2019 – 2022
Gordon Research Seminar – Environmental Endocrine Disruptors <i>Chair</i>	2018 – 2022
Triangle Chapter of the Society for Neuroscience <i>Outreach Chair</i>	2018 – 2019

University Service

Tenure Track Assistant Professor Search Committee Department of Biological Sciences and Eukaryotic Pathogen Innovation Center (EPIC)	2024 - Present
Seminar Committee Member Department of Biological Sciences	2024 – Present
Graduate Student Committee Member (<i>6 students not in my lab</i>) Department of Biological Sciences and Environmental Toxicology Program	2024 – Present

Reviewer

Grants:

Early Career Reviewer, Center for Scientific Review, National Institutes of Health	2024 – Present
National Science Foundation Graduate Research Fellowship Program	2023 – Present

Journals (*ad hoc*):

Environmental Health Perspectives, Frontiers in Endocrinology, Frontiers in Toxicology, Critical Reviews in Toxicology, Environmental Science and Pollution Research, Global Ecology and Conservation

Outreach

Clemson Rural Health	2025
Educational Materials – <i>Partnered with the Clemson Rural Health program to create educational pamphlets and videos that can be shared with patients from underserved communities as a resource to learn more about hormones, endocrine disruptors, and health outcomes.</i> *See lab website Outreach page Video Project: https://www.youtube.com/watch?v=Vfeiw5AebGI&t=4s	
Meet the Professor Summer Camp, Littlejohn Community Center Instructor – <i>Designed and executed an interactive laboratory experience for local students aged 5 – 17 to</i>	2024

learn about how chemicals can impact physiology and behavior. *See lab website Outreach page

Brain Awareness Night North Carolina Museum of Natural Sciences 2023
Booth Host – *Designed interactive materials for community members to learn about the diversity of brains and behavior across species.*

Big10 Neuroscience Virtual Seminar Series 2021
Organizer – *Helped to recruit speakers and coordinate seminars.*

Center for Epigenetic Research in Child Health and Brain Development Reading in the Brain 2019 – 2021
Volunteer – *Aided in the execution of a neuroscience educational program with local school kids.*

Brain Awareness Night North Carolina Museum of Natural Sciences 2019
Booth Host – *Designed interactive materials for community members to learn about hormones, endocrine disruptors, brain, and behavior.*

UNC Science Expo 2018
Volunteer – *Aided in executing interactive activities for community members to learn about neuroscience.*

Neuroscience Trivia hosted by Triangle Chapter of Society for Neuroscience 2018
Event Coordinator – *Helped to plan and execute a local trivia event for a regional neuroscience society.*

Professional Memberships

Society of Toxicology

Society of Toxicology: Women in Toxicology

Society of Toxicology: Southeastern Chapter

Society of Toxicology: Reproductive and Developmental Toxicology Specialty Section

Society for Reproductive Investigation

Society of Environmental Toxicology & Chemistry

Carolinas Society of Environmental Toxicology & Chemistry

American Elasmobranch Society