

**Julia E. Rager, Ph.D.**

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**Education**

<b>Post-Doctoral Associate</b>	<i>U.S. Environmental Protection Agency, ORISE Fellow</i> National Exposure Research Laboratory Mentor: Jon Sobus	<b>2014-2015</b>
<b>Ph.D.</b>	<i>University of North Carolina (UNC) at Chapel Hill</i> Degree: Environmental Sciences and Engineering Focus in Toxicology Mentor: Rebecca Fry	<b>2013</b>
<b>M.S.E.E.</b>	<i>University of North Carolina (UNC) at Chapel Hill</i> Degree: Environmental Sciences and Engineering Focus in Toxicology and Environmental Engineering Mentor: Rebecca Fry	<b>2010</b>
<b>B.S.</b>	<i>University of Texas (UT) at Austin</i> Degree: Civil and Environmental Engineering Pre-Medicine High Honors, Magna Cum Laude	<b>2008</b>

**Professional Experiences**

Assistant Professor, Institute for Environmental Health Solutions Scientist III	UNC ToxStrategies	2018-present 2015-2018
Post-Doctoral Associate	U.S. EPA	2014-2015
Post-Doctoral Associate	UNC	2013-2014
Graduate Research Assistant	UNC	2009-2013
Undergraduate Research Assistant	UT	2007-2008

**Other Professional Experiences**

Assistant Professor, Department of Environmental Sciences and Engineering	UNC	2018-present
Assistant Professor, Curriculum in Toxicology	UNC	2018-present

**Honors and Awards**

- Best Paper for Advancing Chemical Regulatory and Safety Evaluation, Society of Toxicology 2019
- Best Paper for Advancing the Science of Risk Assessment, Society of Toxicology 2018
- Risk Assessment Specialty Section Top 10 Abstracts, Society of Toxicology 2016, 2017
- Junior Investigator Award, Lung Cellular and Molecular Physiology 2014  
American Journal of Physiology

- Syngenta Fellowship in Human Health Applications of New Technologies Society of Toxicology 2013
- Best Regional Chapter Poster Award, NC Society of Toxicology 2013
- Graduate Student Fellowship – Novartis Award, Society of Toxicology 2012
- Outstanding Scholarship and Professional Promise in Environmental Engineering George C. Bunker Award, UNC 2011
- Best Student Presentation, Society of Toxicology Mixtures Specialty Section 2011
- Magna Cum Laude and High Honors in Engineering, University of Texas 2008

### Scientific Membership

- The Toxicology Forum (ToxForum) 2017-present
- Environmental Mutagenesis and Genomics Society (EMGS) 2016-present
- Society of Toxicology (SOT) 2011-present

### Bibliography

#### Peer-Reviewed Publications (46 Published or *In Press*; ++ Indicates Senior Author):

1. Gomez JL, Chen A, Diaz MP, Zirn N, Gupta A, Britto C, Sauler M, Yan X, Stewart E, Santerian K, Grant N, Liu Q, Fry R, **Rager J**, Cohn L, Alexis N, Chupp GL. A Network of Sputum MicroRNAs is Associated with Neutrophilic Airway Inflammation in Asthma. *Am J Respir Crit Care Med*. 2020 Apr 7. doi: 10.1164/rccm.201912-2360OC. [Epub ahead of print].
2. Zavala J, Freedman A, Jaspers I, Wambaugh JF, Higuchi M, **Rager JE++**. New Approach Methods to Evaluate Health Risks of Air Pollutants: Critical Design Criteria for In Vitro Exposure Testing. *Int J Environ Res Public Health*. 2020 Mar 23;17(6).
3. **Rager JE**, Bangma J, Carberry C, Chao A, Grossman J, Lu K, Manuck TA, Sobus JR, Szilagyi J, Fry RC. Review of the environmental prenatal exposome and its relationship to maternal and fetal health. *Reprod Toxicol*. 2020 Feb 12. pii: S0890-6238(20)30017-4. doi: 10.1016/j.reprotox.2020.02.004. [Epub ahead of print].
4. Chappell GA, **Rager JE**, Wolf J, Babic M, LeBlanc KJ, Ring CL, Harris MA, Thompson CM. Comparison of Gene Expression Responses in the Small Intestine of Mice Following Exposure to 3 Carcinogens Using the S1500+ Gene Set Informs a Potential Common Adverse Outcome Pathway. *Toxicol Pathol*. 2019 Oct; 47(7):851-864.
5. Fry RC, Bangma J, Szilagyi J, **Rager JE++**. Developing novel *in vitro* methods for the risk assessment of developmental and placental toxicants in the environment. *Toxicol Appl Pharmacol*. 2019 Sep 1;378:114635.
6. **Rager JE**, Carberry C, Fry RC. Use of genome editing tools in environmental health research. *Current Opinion in Toxicology*. 2019 Dec;18:13-17.
7. Wikoff D, **Rager JE**, Chappell GA, Fitch S, Haws L, Borghoff S. A framework for systematic evaluation and quantitative integration of mechanistic data in assessments of potential human carcinogens. *Toxicol Sci*. 2019 Feb 1;167(2):322-335.
8. **Rager JE**, Suh M, Chappell GA, Thompson CM, Proctor DM. Review of Transcriptomic Responses to Hexavalent Chromium Exposure in Lung Cells Supports a Role of Epigenetic Mediators in Carcinogenesis. *Toxicol Lett*. 2019 Jan 25. pii: S0378-4274(19)30012-8.
9. Klaren WD, Ring C, Thompson CM, Borghoff S, Harris MA, Sipes NS, Hsieh J, Auerbach SS, **Rager JE++**. Identifying attributes that influence in vitro-to-in vivo concordance by comparing in vitro Tox21 bioactivity versus in vivo DrugMatrix transcriptomic responses across 130 chemicals. *Toxicol Sci*. 2019 Jan 1; 167(1):157-171.
10. Wikoff DS, Thompson C, **Rager J**, Chappell G, Fitch S, Doepker C. Benefit-risk analysis for foods (BRAFO): Evaluation of exposure to dietary nitrates. *Food and Chemical Toxicol*. 2018 Oct; 120:709-723.

11. Borghoff S, Fitch S, **Rager JE**, Huggett D. A hypothesis-driven weight-of-evidence analysis to evaluate potential endocrine activity of perfluorohexanoic acid. *Regul Toxicol Pharmacol*. 2018 Nov; 99:168-181.
12. Sobus JR, Wambaugh JF, Isaacs KK, Williams AJ, McEachran AD, Richard AM, Grulke CM, Ulrich EM, **Rager JE**, Strynar MJ, Newton SR. Integrating tools for non-targeted analysis research and chemical safety evaluations at the US EPA. *J Expo Sci Environ Epidemiol*. 2018 Sep;28(5):411-426.
13. Suh M, Proctor D, Chappell G, **Rager J**, Thompson C, Borghoff S, Finch L, Ellis-Hutchings R, Wiench K. A review of the genotoxic, mutagenic, and carcinogenic potentials of several lower acrylates. *Toxicology*. 2018 Jun 1;402-403:50-67.
14. Thompson CM, Kirman CR, Hays SM, Suh M, Harvey SE, Proctor DM, **Rager JE**, Haws LC, Harris MA. Integration of mechanistic and pharmacokinetic information to derive oral reference dose and margin-of-exposure values for hexavalent chromium. *J Appl Toxicol*. 2018 Mar; 38(3):351-365.
15. **Rager JE**, Auerbach SS, Chappell GA, Martin E, Thompson CM, Fry RC. Benchmark Dose Modeling Estimates of the Concentrations of Inorganic Arsenic That Induce Changes to the Neonatal Transcriptome, Proteome, and Epigenome in a Pregnancy Cohort. *Chem Res Toxicol*. 2017 Oct 16;30(10):1911-1920.
16. Chappell GA, **Rager JE**<sup>++</sup>. Epigenetics in chemical-induced genotoxic carcinogenesis. *Current Opinion in Toxicology*. 2017 Oct;6:10-17.
17. **Rager JE**, Ring CL, Fry RC, Suh M, Proctor DM, Haws LC, Harris MA, Thompson CM. High-throughput screening data interpretation in the context of in vivo transcriptomic responses to oral Cr(VI) exposure. *Toxicol Sci*. 2017 Jul 1. 158(1):199-212.
18. Thompson CM, **Rager JE**, Suh M, Ring CL, Proctor DM, Haws LC, Fry RC, Harris MA. Transcriptomic Responses in the Oral Cavity of F344 Rats and B6C3F1 Mice Following Exposure to Cr(VI): Implications for Risk Assessment. *Environ Mol Mutagen*. 2016 Dec;57(9):706-716.
19. Thompson CM, Bichteler A, **Rager JE**, Suh M, Proctor DM, Haws LC, Harris MA. Comparison of in vivo genotoxic and carcinogenic potency to augment mode of action analysis: case study with hexavalent chromium. *Mutat Res Genet Toxicol Environ Mutagen*. 2016 Apr;800-801:28-34.
20. Wikoff DS, **Rager JE**, Haws LC, Borghoff SJ. A high dose mode of action for Tetrabromobisphenol A-induced uterine adenocarcinomas in Wistar Han rats: a critical evaluation of key events in an adverse outcome pathway framework. *Regul Toxicol Pharmacol*. 2016 Jun;77:143-59.
21. **Rager JE**, Strynar MJ, Liang S, McMahan RL, Richard AM, Grulke CM, Wambaugh JF, Isaacs KK, Judson R, Williams AJ, Sobus JR. Linking high resolution mass spectrometry data with exposure and toxicity forecasts to advance high-throughput environmental monitoring. *Environ Int*. 2016 Mar;88:269-80.
22. Cook KD, Shpargel KB, Starmer J, Whitfield-Larry F, Conley B, Allard DE, **Rager JE**, Fry RC, Davenport ML, Magnuson T, Whitmire JK, Su MA. T Follicular Helper Cell-Dependent Clearance of a Persistent Virus Infection Requires T Cell Expression of the Histone Demethylase UTX. *Immunity*. 2015 Oct 20;43(4):703-14.
23. **Rager JE**, Tilley SK, Tulenko SE, Smeester L, Ray PD, Yosim A, Currier JM, Ishida MC, González-Horta Mdel C, Sánchez-Ramírez B, Ballinas-Casarrubias L, Gutiérrez-Torres DS, Drobná Z, Del Razo LM, García-Vargas GG, Kim WY, Zhou YH, Wright FA, Stýblo M, Fry RC. Identification of novel gene targets and putative regulators of arsenic-associated DNA methylation in human urothelial cells and bladder cancer. *Chem Res Toxicol*. 2015 Jun 15;28(6):1144-55.
24. Martin E, González-Horta C, **Rager J**, Bailey KA, Sánchez-Ramírez B, Ballinas-Casarrubias L, Ishida MC, Gutiérrez-Torres DS, Hernández Cerón R, Viniestra Morales D, Baeza Terrazas FA, Saunders RJ, Drobná Z, Mendez MA, Buse JB, Loomis D, Jia W, García-Vargas GG, Del Razo LM, Stýblo M, Fry R. Metabolomic characteristics of arsenic-associated diabetes in a prospective cohort in Chihuahua, Mexico. *Toxicol Sci*. 2015 Apr;144(2):338-46.
25. Rojas D, **Rager JE**, Smeester L, Bailey KA, Drobná Z, Rubio-Andrade M, Stýblo M, García-Vargas G, Fry RC. Prenatal arsenic exposure and the epigenome: Identifying sites of 5-methyl cytosine alterations that predict functional changes in gene expression in newborn cord blood and subsequent birth outcomes. *Toxicol Sci*. 2015 Jan;143(1):97-106.

26. **Rager JE**, Yosim A, Fry RC. Prenatal exposure to arsenic and cadmium impacts infectious disease-related genes within the glucocorticoid receptor signal transduction pathway. *Int J Mol Sci*. 2014 Dec 3;15(12):22374-91.
27. Fry RC, **Rager JE**, Bauer RN, Sebastian E, Peden DB, Jaspers I, Alexis NE. Air toxics and epigenetic effects: Ozone altered microRNAs in the sputum of human subjects. *Am J Physiol Lung Cell Mol Physiol*. 2014 Jun 15;306(12):L1129-37.
28. Bailey KA, Laine J, **Rager JE**, Sebastian E, Olshan A, Smeester L, Drobná Z, Styblo M, Rubio-Andrade M, García-Vargas G, Fry RC. Prenatal arsenic exposure and shifts in the newborn proteome: Interindividual differences in tumor necrosis factor (TNF)-responsive signaling. *Toxicol Sci*. 2014 Jun;139(2):328-37.
29. **Rager JE**, Bailey KA, Smeester L, Miller SK, Parker JS, Laine JE, Drobná Z, Currier J, Douillet C, Olshan AF, Rubio-Andrade M, Stýblo M, García-Vargas G, Fry RC. Prenatal arsenic exposure and the epigenome: Altered microRNAs associated with innate and adaptive immune signaling in newborn cord blood. *Environ Mol Mutagen*. 2014 Apr;55(3):196-208.
30. **Rager JE**, Moeller BC, Miller SK, Kracko D, Doyle-Eisele M, Swenberg JA, Fry RC. Formaldehyde-associated changes in microRNAs: tissue and temporal specificity in the rat nose, white blood cells, and bone marrow. *Toxicol Sci*. 2014 Mar;138(1):36-46.
31. Sanders AP, Smeester L, Rojas D, Debusscher T, Wu MC, Wright FA, Zhou YH, Laine JE, **Rager JE**, Swamy GK, Ashley-Koch A, Lynn Miranda M, Fry RC. Cadmium exposure and the epigenome: Exposure-associated patterns of DNA methylation in leukocytes from mother-baby pairs. *Epigenetics*. 2014 Feb 1;9(2):212-21.
32. **Rager JE**, Bauer R, Muller LL, Smeester L, Carson JL, Brighton LE, Fry RC, Jaspers I. DNA methylation in nasal epithelial cells from smokers: identification of ULBP3-related effects. *Am J Physiol Lung Cell Mol Physiol*. 2013 Sep;305(6):L432-8.
33. **Rager JE**, Moeller BC, Doyle-Eisele M, Kracko D, Swenberg JA, Fry RC. Formaldehyde and epigenetic alterations: microRNA changes in the nasal epithelium of nonhuman primates. *Environ Health Perspect*. 2013 Mar;121(3):339-44.
34. Ahir B, Sanders AP, **Rager JE**, Fry RC. Systems biology and birth defects prevention: blockade of the glucocorticoid receptor prevents arsenic-induced birth defects. *Environ Health Perspect*. 2013 Mar;121(3):332-8.
35. Swenberg JA, Moeller BC, Lu K, **Rager JE**, Fry RC, Starr TB. Formaldehyde carcinogenicity research: 30 years and counting for mode of action, epidemiology, and cancer risk assessment. *Toxicol Pathol*. 2013 Feb;41(2):181-9.
36. Bailey KA, Wu MC, Ward WO, Smeester L, **Rager JE**, García-Vargas G, Del Razo LM, Drobná Z, Stýblo M, Fry RC. Arsenic and the epigenome: Interindividual differences in arsenic metabolism related to distinct patterns of DNA methylation. *J Biochem Mol Toxicol*. 2013 Feb;27(2):106-15.
37. Tsang V, Fry RC, Niculescu MD, **Rager JE**, Saunders J, Paul DS, Zeisel SH, Waalkes MP, Stýblo M, Drobná Z. The epigenetic effects of a high prenatal folate intake in male mouse fetuses exposed in utero to arsenic. *Toxicol Appl Pharmacol*. 2012 Nov 1;264(3):439-50.
38. Bauer RN, Brighton LE, Mueller L, Xiang Z, **Rager JE**, Fry RC, Peden DB, Jaspers I. Influenza enhances caspase-1 in bronchial epithelial cells from asthmatic volunteers and is associated with pathogenesis. *J Allergy Clin Immunol*. 2012 Oct;130(4):958-967.e14.
39. Fry RC, **Rager JE**, Zhou H, Zou B, Brickey JW, Ting J, Lay JC, Peden DB, Alexis NE. Individuals with increased inflammatory response to ozone demonstrate muted signaling of immune cell trafficking pathways. *Respir Res*. 2012 Oct 3;13(1):89.
40. **Rager JE**, Fry RC. The aryl hydrocarbon receptor pathway: a key component of the microRNA-mediated AML signalosome. *Int. J. Environ. Res. Public Health*. 2012 May;9:1939-53.
41. Hernandez M, Brickey WJ, Alexis NE, Fry RC, **Rager JE**, Zhou B, Ting JP, Zhou H, Peden DB. Airway cells from atopic asthmatic patients exposed to ozone display an enhanced innate immune gene profile. *J Allergy Clin Immunol*. 2012 Jan;129(1):259-61.e1-2.

42. **Rager JE**, Lichtveld K, Ebersviller S, Smeester L, Jaspers I, Sexton KG, Fry RC. A toxicogenomic comparison of primary and photochemically altered air pollutant mixtures. *Environ Health Perspect*. 2011 Nov;119(11):1583- 9.
43. Sheh A, Ge Z, Parry NM, Muthupalani S, **Rager JE**, Raczynski AR, Mobley MW, McCabe AF, Fry RC, Wang TC, Fox JG. 17 $\beta$ -estradiol and tamoxifen prevent gastric cancer by modulating leukocyte recruitment and oncogenic pathways in Helicobacter pylori-infected INS-GAS male mice. *Cancer Prev Res (Phila)*. 2011 Sep;4(9):1426-35.
44. Benton MA, **Rager JE**, Smeester L, Fry RC. Comparative genomic analyses identify common molecular pathways modulated upon exposure to low doses of arsenic and cadmium. *BMC Genomics*. 2011 Apr 1;12:173.
45. **Rager JE**, Smeester L, Jaspers I, Sexton KG, Fry RC. Epigenetic changes induced by air toxics: formaldehyde exposure alters miRNA expression profiles in human lung cells. *Environ Health Perspect*. 2011 Apr;119(4):494-500.
46. Smeester L, **Rager JE**, Bailey KA, Guan X, Smith N, García-Vargas G, Del Razo LM, Drobná Z, Kelkar H, Stýblo M, Fry RC. Epigenetic changes in individuals with arsenicosis. *Chem Res Toxicol*. 2011 Feb 18;24(2):165-7.

### Book Chapters (2 Total; ++ Indicates Senior Author):

1. **Rager JE**++. The Role of Apoptosis-associated Pathways as Responders to Contaminants and in Disease Progression. In: *Systems Biology in Environmental Health and Toxicology: From the Genome to the Epigenome*, (pp. 187-203). Book chapter. Academic Press, Elsevier. Editor: McLaughlin MM. 2015.
2. **Rager JE**, Fry RC. Systems Biology and Environmental Exposures. In: *Network biology: Theories, Methods and Applications*, (pp. 81-130) Book chapter. Nova Publishers. Editor: Zhang WJ. 2013.

### Chairperson of Conference Sessions (4 Total):

1. Chair of: ‘*Integrated omic approaches to toxicity assessments*’. Society of Toxicology 58<sup>th</sup> Annual Meeting and ToxExpo. Baltimore, MA. Mar 12, 2019. Co-chair: Scott Auerbach (NTP).
2. Co-chair of: ‘*Applying systems biology approaches to understand the joint action of chemical and nonchemical stressors*’. Society of Toxicology 58<sup>th</sup> Annual Meeting and ToxExpo. Baltimore, MA. Mar 11, 2019. Chair: Cynthia Rider (NTP).
3. Chair of: ‘*From assay to assessment: incorporating high throughput strategies into health and safety evaluations*’. Toxicology Forum 41<sup>st</sup> Annual Winter Meeting, Washington DC. Feb 7, 2017. Co-chairs: Cynthia Rider (NTP) and Reza Rasoulpour (Dow AgroSciences).
4. Co-chair of: ‘*Applied genetic toxicology*’. Environmental Mutagenesis and Genomics Society 47<sup>th</sup> Annual Meeting, Kansas City, KA. Sept 26, 2016. Chair: Nan Mei (FDA).

### Oral Presentations/Abstracts:

#### Invited Speaker Presentations (19 Total)

1. *HESI eSTAR Carcinogenomics Project Data Compilation Update*. The Health and Environmental Sciences Institute Annual Meeting. Washington, DC. Oct 29, 2019.
2. *The placental exposome: a driver of epigenetic regulation and preeclampsia*. The North Carolina Society of Toxicology Annual Meeting. Durham, NC. Oct 7, 2019.
3. *Too many chemicals, too little time: Approaches to modernize risk assessment*. The Environmental Sciences and Engineering Seminar Series, The University of North Carolina, Chapel Hill, NC. Aug 28, 2019.
4. *Links between arsenic-associated DNA methylation and bladder cancer*. The Society of Toxicology 58<sup>th</sup> Annual Meeting and ToxExpo. Baltimore, MA. Mar 14, 2019.
5. *Setting the stage: understanding biological pathways across toxicological tools*. The Society of Toxicology 58<sup>th</sup> Annual Meeting and ToxExpo. Baltimore, MA. Mar 11, 2019.

6. *Advances in toxicological tools to understand pathways involved in exposure-induced disease*. UNC Curriculum of Toxicology Seminar Series, Chapel Hill, NC. Mar 4, 2019.
7. *Integrating in vitro and non-targeted analyses into human health risk assessments*. The Long-Range Research Initiative Annual Meeting, Research Triangle Park, NC. Oct 4, 2018.
8. *How can we use 21<sup>st</sup> century exposure science and toxicology to improve global public health?* The Institute for Environmental Health Solutions Seminar, University of North Carolina, Chapel Hill, NC. May 2, 2018.
9. *Connecting the genomic, epigenome, and exposome to evaluate the impact of environmental exposures*. Department of Environmental and Molecular Toxicology Seminar Series, Oregon State University, Corvallis, OR. Aug 9, 2017.
10. *Innovative screening methods to identify chemical exposure signatures and linkages to toxicity: case study with house dust*. Society of Toxicology 56<sup>th</sup> Annual Meeting and ToxExpo. Baltimore, MA. Mar 13, 2017.
11. *Integration of high content and high throughput screening predictions to inform ongoing metals risk assessments*. The Toxicology Forum 41<sup>st</sup> Annual Winter Meeting, Washington DC. Feb 7, 2017.
12. *Integration of high content and high throughput screening data to inform hexavalent chromium mode of action*. Environmental Mutagenesis and Genomics Society 47<sup>th</sup> Annual Meeting, Kansas City, KA. Sept 26, 2016.
13. *A non-targeted method to screen for emerging contaminants in dust*. The Association of Public Health Laboratories Webinar Series, Research Triangle Park, NC. May 6, 2015.
14. *Epigenetic effects of formaldehyde exposure*. The National Toxicology Program, Research Triangle Park, NC. Apr 25, 2014.
15. *Systems biology: unraveling transcriptional responses to environmental mixtures*. The Toxicology and Risk Assessment Conference, West Chester, OH. Apr 9, 2014.
16. *Formaldehyde-induced changes in microRNA signaling and links to DNA damage*. Syngenta. Greensboro, NC. Apr 16, 2013.
17. *Epigenetic effects of formaldehyde exposure*. The Lovelace Research Institute, Albuquerque, NM. Mar 21, 2014.
18. *Formaldehyde: big effects from small molecules*. The Environmental Sciences and Engineering Seminar Series, The University of North Carolina, Chapel Hill, NC. Sept 5, 2012.
19. *Epigenetic effects of formaldehyde exposure*. The Society of Toxicology 51<sup>st</sup> Annual Meeting and ToxExpo, San Francisco, CA. Mar 14, 2012.

#### Poster Presentations (16 Total First or Senior<sup>++</sup> Authorship)

1. Carberry C, Szilagyi J, Chao A, Grossman J, Lu K, Boggess K, Sobus J, Fry RC, **Rager JE<sup>++</sup>**. Integrated Genomic, Epigenomic, and Exposomic Analysis of Placentas from Preeclamptic Patients Identifies Links to Acetaminophen and Altered Apoptosis Signaling. North Carolina Society of Toxicology (NC SOT) Annual Meeting, Oct 7, 2019. Durham, NC.
2. Klaren WD, Ring C, Thompson CM, Borghoff S, Harris MA, Sipes NS, Hsieh J, Auerbach SS, **Rager JE<sup>++</sup>**. Identifying Attributes that Influence In Vitro-to-In Vivo Concordance by Comparing In Vitro Tox21 Bioactivity versus In Vivo DrugMatrix Transcriptomic Responses across 130 Chemicals. Society of Toxicology (SOT) 57<sup>th</sup> Annual Meeting and ToxExpo, Mar 13, 2018. San Antonio, TX.
3. **Rager JE**, Chappell G, Wikoff D, Borghoff S, Thompson CT. Epigenetic Trends in Responses to Chemical Exposures and Relationships to Disease: A Review on Directional Consistencies. Environmental Mutagenesis and Genomics Society (EMGS) 48<sup>th</sup> Annual Meeting, Sept 10, 2017. Raleigh, NC.
4. **Rager JE**, Thompson CM, Auerbach S, Fry RC. Integrating Genomic and Epigenomic Data into Risk Assessment Applications through Dose Response Modeling: Case Study with Prenatal Arsenic Exposure. Environmental Mutagenesis and Genomics Society (EMGS) 47<sup>th</sup> Annual Meeting, Sept 25, 2016. Kansas City, KA.
5. **Rager JE**, Strynar MJ, Liang S, McMahan RL, Richard AM, Grulke CM, Wambaugh JF, Isaacs KK, Judson R, Williams AJ, Sobus JR. Linking High Resolution Mass Spectrometry Data with Exposure and Toxicity Forecasts to Advance High-Throughput Environmental Monitoring. Society of Toxicology (SOT) 55<sup>th</sup> Annual Meeting and ToxExpo, Mar 17, 2016. New Orleans, LA.
6. **Rager JE**, Strynar MJ, Liang S, McMahan RL, Richard AM, Grulke CM, Wambaugh JF, Isaacs KK, Judson R, Williams AJ, Sobus JR. Linking High Resolution Mass Spectrometry Data with Exposure and Toxicity Forecasts

to Advance High-Throughput Environmental Monitoring. FutureTox III: Bridges for Translation Meeting, Nov 20, 2015. Washington, DC.

7. **Rager JE**, Tilley SK, Tulenko SE, Smeester L, Ray PD, Yosim A, Currier JM, Ishida MC, González-Horta Mdel C, Sánchez-Ramírez B, Ballinas-Casarrubias L, Gutiérrez-Torres DS, Drobná Z, Del Razo LM, García-Vargas GG, Kim WY, Zhou YH, Wright FA, Stýblo M, Fry RC. Identification of Novel Gene Targets and Putative Regulators of Arsenic-Associated DNA Methylation in Human Urothelial Cells and Bladder Cancer. Society of Toxicology (SOT) 54<sup>th</sup> Annual Meeting and ToxExpo, Mar 25, 2015. San Diego, CA.
8. **Rager JE**, Bailey KA, Smeester L, Miller SK, Parker JS, Laine JE, Drobná Z, Currier J, Douillet C, Olshan AF, Rubio-Andrade M, Stýblo M, García-Vargas G, Fry RC. Prenatal Arsenic Exposure and the Epigenome: Altered MicroRNAs Associated with Innate and Adaptive Immune Signaling in Newborn Cord Blood. Society of Toxicology (SOT) 53<sup>rd</sup> Annual Meeting and ToxExpo, Mar 25, 2014. Phoenix, AZ.
9. **Rager JE**, Moeller BC, Doyle-Eisele M, Kracko D, Swenberg JA, Fry RC. Formaldehyde-Induced Changes in MicroRNA Signaling. Visiting Pulmonary Scholar Symposium, May 8, 2013. Chapel Hill, NC.
10. **Rager JE**, Moeller BC, Doyle-Eisele M, Kracko D, Swenberg JA, Fry RC. Formaldehyde-Induced Changes in MicroRNA Signaling. Society of Toxicology (SOT) 52<sup>nd</sup> Annual Meeting and ToxExpo, Mar 12, 2013. San Antonio, TX.
11. **Rager JE**, Moeller BC, Doyle-Eisele M, Kracko D, Swenberg JA, Fry RC. Formaldehyde-Induced Changes in MicroRNA Signaling. North Carolina Society of Toxicology (NC SOT) Annual Meeting, Feb 21, 2013. Research Triangle Park, NC.
12. **Rager JE**, Smeester L, Jaspers I, Sexton KG, Fry RC. Epigenetic Effects of Formaldehyde Exposure. Visiting Pulmonary Scholar Symposium, May 2, 2012. Chapel Hill, NC.
13. **Rager JE**, Lichtveld K, Ebersviller S, Smeester L, Jaspers I, Sexton KG, Fry RC. A Toxicogenomic Comparison of Primary and Photochemically Altered Air Pollutant Mixtures. International Toxicology of Mixtures Conference, Oct 21, 2011. Arlington, VA.
14. **Rager JE**, Lichtveld K, Ebersviller S, Smeester L, Jaspers I, Sexton KG, Fry RC. A Toxicogenomic Comparison of Primary and Photochemically Altered Air Pollutant Mixtures. Visiting Pulmonary Scholar Symposium, Apr 27, 2011. Chapel Hill, NC.
15. **Rager JE**, Lichtveld K, Ebersviller S, Smeester L, Jaspers I, Sexton KG, Fry RC. A Toxicogenomic Comparison of Primary and Photochemically Altered Air Pollutant Mixtures. Society of Toxicology (SOT) 50<sup>th</sup> Annual Meeting and ToxExpo, Mar 8, 2011. Washington, DC.
16. **Rager JE**, Smeester L, Jaspers I, Sexton KG, Fry RC. Epigenetic Changes Induced by Air Toxics: Formaldehyde Exposure Alters MicroRNA Expression Profiles in Human Lung Cells. Environmental Mutagen Society (EMS) 41<sup>st</sup> Annual Meeting. Oct 25, 2010. Fort Worth, TX.

### Teaching Activities

- |   |                      |                              |
|---|----------------------|------------------------------|
| <b>Course Director</b>  | <b>ENVR 500, UNC</b> | <b>Fall, 2019- present</b>   |
| Title: “ <b>Environmental Processes, Exposure, and Human Health Risk Assessment.</b> ” Course instructors: Julia Rager, Orlando Coronell, and Jason Surratt. Role in course: Course director.               |                      |                              |
| <b>Guest Lecturer</b>   | <b>BIO 592, NCSU</b> | <b>Spring, 2019- present</b> |
| Title: “ <b>Computational Environmental Sciences and Toxicology.</b> ” Course instructors: David Reif, Fred Wright, Denis Fourches, and Yi-Hui Zhou. Role in course: Guest lecturer on topic of exposomics. |                      |                              |
| <b>Guest Lecturer</b>   | <b>EPID 742, UNC</b> | <b>Spring, 2019- present</b> |
| Title: “ <b>Biomarkers in Population-Based Research.</b> ” Course instructor: Stephanie Engel. Role in course: Guest lecturer on topic of microRNAs as biomarkers of exposure and effect.                   |                      |                              |
| <b>Guest Lecturer</b>   | <b>ENVR 430, UNC</b> | <b>Fall, 2019- present</b>   |
| Title: “ <b>Health Effects of Environmental Agents.</b> ” Course instructors: Kun Lu and Louise Ball. Role in course: Guest lecturer on topic of epigenetics.   |                      |                              |

**Guest Lecturer** **ENVR 442-001, UNC** **Fall, 2018- present**  
 Title: “**Molecular and Biochemical Toxicology.**” Course instructors: Ilona Jaspers and Rebecca Fry. Role in course: Guest lecturer for two classes on topics of computational toxicology and risk assessment.

**Guest Lecturer** **ENVR 630-001, UNC** **Fall, 2011-present**  
 Title: “**Systems Biology in Environmental Health.**” Course instructor: Rebecca Fry. Role in course: Guest lecturer for two classes on topics of computational toxicology and benchmark dose-response modeling.

### Contracts and Grant Support

#### Select Pending Grant Support:

- National Institutes of Health (NIH) (Rager/Jaspers) 04/01/2020-03/31/2022  
 Total Amount: **\$417,518**  
 Integrative chemical-biological profiling to determine primary drivers of wildfire smoke-induced toxicity  
**Role: Contact Principal Investigator (MPI)**

#### Active Grant Support:

- National Institutes of Health (NIH) (Fry) 02/20/2020-01/31/2024  
 Total Amount: **\$12,240,000**  
 The UNC Chapel Hill Superfund Research Program (UNC-SRP)  
**Role: Co-Investigator in Cores 3 and 5**
- CEHS Pilot Projects Program (Rager) 04/01/2019-03/31/2020  
 Total Amount: **\$50,000**  
 The placental exposome: a driver of epigenetic regulation and preeclampsia  
**Role: Principal Investigator**
- IEHS Cancer Survivors Award (Rager/Nichols) 05/01/2019-04/30/2020  
 Total Amount: **\$25,000**  
 Endocrine disrupting chemicals in the household environment: Implications for breast cancer survivors  
**Role: Contact Principal Investigator (MPI)**
- National Institutes of Health (NIH) (Dunson/Herring) 03/01/2018–02/28/2022  
 Total Amount: **\$432,553**  
 Structured nonparametric methods for mixtures of exposures  
**Role: Co-Investigator**
- ICCA Long-Range Research Initiative (LRI) (Rager) 01/01/2018–12/31/2019  
 Total Amount: **\$120,000**  
 Predicting pathway alterations involved in in vivo toxicity responses using in vitro Tox21 bioactivity  
**Role: Principal Investigator**

#### Select Prior Contract Support:

- American Beverage Association (ABA) (Borghoff/Rager) 01/01/2017-12/31/2017  
 Total Amount: **\$140,000**  
 Elucidating mode of action underlying 4-methylimidazole-induced lung cancer  
**Role: Co-Principal Investigator**
- American Chemistry Council (Thompson/Rager) 01/01/2016–12/31/2019  
 Total Amount: **\$300,000**  
 Assess high-throughput screening data and transcriptomic responses to hexavalent chromium in dose-response and risk assessment applications  
**Role: Co-Principal Investigator**



- American Petroleum Institute (API) (Thompson/**Rager**) 06/01/2015–12/31/2019  
Total Amount: **\$60,000**  
Evaluating the applicability of computational toxicology models for oil and gas substances (UVCBs)  
**Role: Co-Principal Investigator**

**Prior Grant Support:**

- SOT Research Fellowship (**Rager/Fry**) 03/01/2013–02/29/2014  
Total Amount: **\$20,000**  
Formaldehyde-responsive microRNAs and links to DNA damage response  
**Role: Postdoctoral Investigator**
- SOT Research Fellowship (**Rager/Fry**) 03/01/2012–02/29/2013  
Total Amount: **\$15,000**  
Epigenetic effects of formaldehyde exposure  
**Role: Graduate Student Research Investigator**

**Summary of Graduate Advising/Mentoring****Current Primary Advisor Positions**

Current ESE Undergraduate Honors Student Supervision-Primary Advisor (2 B.S.P.H):

1. **Alexis Payton (B.S.P.H)** **2019-present**  
Primary advisor. Department: Environmental Sciences and Engineering, Gillings School of Global Public Health, North Carolina, UNC. Thesis title: *Placental genomic and epigenomic signatures regulating infant birth weight highlight mechanisms involved in collagen and growth hormone signaling.*
2. **Celeste Carberry (B.S.P.H)** **2018-present**  
Primary advisor. Department: Environmental Sciences and Engineering, Gillings School of Global Public Health, North Carolina, UNC. Thesis title: *Non-targeted analysis of placentas from preeclamptic patients identifies links to acetaminophen and molecular alterations relevant to cell death.*

**Current Committee Member Positions**

Current ESE Graduate Student Supervision-Committee Member (7 Ph.D):

1. **Liang Chi (Ph.D)** **2019-present**  
Member of supervisory committee. Department: Environmental Sciences and Engineering, Gillings School of Global Public Health, North Carolina, UNC. Advisor: Kun Lu.
2. **Lauren Eaves (Ph.D)** **2019-present**  
Member of supervisory committee. Department: Environmental Sciences and Engineering, Gillings School of Global Public Health, North Carolina, UNC. Advisor: Rebecca Fry.
3. **Kennedy Holt (Ph.D)** **2019-present**  
Member of supervisory committee. Department: Environmental Sciences and Engineering, Gillings School of Global Public Health, North Carolina, UNC. Advisor: Jackie MacDonald Gibson.
4. **Yunjia Lai (Ph.D)** **2019-present**  
Member of supervisory committee. Department: Environmental Sciences and Engineering, Gillings School of Global Public Health, North Carolina, UNC. Advisor: Kun Lu.
5. **Haley Elizabeth Plaas (Ph.D)** **2019-present**  
Member of supervisory committee. Department: Environmental Sciences and Engineering, Gillings School of Global Public Health, North Carolina, UNC. Advisor: Hans Paerl.
6. **Risa Sayre (Ph.D)** **2018-present**

Member of supervisory committee. Department: Environmental Sciences and Engineering, Gillings School of Global Public Health, North Carolina, UNC. Advisor: Marc Serre.

7. **Jelijah Clark (Ph.D)**

**2018-present**

Member of supervisory committee. Department: Environmental Sciences and Engineering, Gillings School of Global Public Health, North Carolina, UNC. Advisor: Rebecca Fry.

Current ESE Undergraduate Student Supervision-Committee Member (1 B.S.P.H.):

1. **Kirsi Oldenburg (B.S.P.H.)**

**2019-present**

Member of supervisory committee. Department: Environmental Sciences and Engineering, Gillings School of Global Public Health, North Carolina, UNC. Advisor: Rebecca Fry.

### Former Committee Member Positions

Former ESE Graduate Student Supervision-Committee Member (1 M.S.P.H.):

1. **Caroline Reed (M.S.P.H)**

**2018-2019**

Member of supervisory committee. Department: Environmental Sciences and Engineering, Gillings School of Global Public Health, North Carolina, UNC. Thesis title: *Toxic and essential metals accumulation in the placenta and fetal membrane: an examination in relation to preterm birth risk in a North Carolina cohort*. Advisor: Rebecca Fry.

### Former Mentoring

Former Visiting Scholar (1 Ph.D):

1. **Yvonne Chang (Ph.D)**

**2019**

Mentor on the SOT Colgate-Palmolive Fellowship Award to support funds to travel and train in my laboratory. Advisor: Susan Tilton (OSU).

Former Internship Supervision-Primary Mentor (1 Intern):

1. **William Klaren (Ph.D.)**

**2017**

Primary mentor. Company: ToxStrategies, Inc. Austin, TX.  
Next position: Toxicologist at SC Johnson.

### Professional Development

*Trained Mentor Certification*

Spring 2019

Received formal mentoring training through participation in the UNC BBSP Faculty Mentoring Workshop Series

### Professional Service

To Discipline:

*Committee Member:*

- SOT Developing Member Leadership & Communication Skill Task Force 2019-present
- EMGS/ICEM Computational Toxicology and Bioinformatics Programming Committee 2019-present
- National Toxicology Program Botanical Safety Consortium 2019-present
- HESI eSTAR Carcinogenomics Committee; Co-Chair of Data Compilation Team 2018-present
- Society of Toxicology (SOT) Continuing Education Committee 2018-present
- Toxicology Forum (ToxForum) Programming Committee 2017-2018

*Editorial Board Member:*

- Toxicological Sciences 2020-present
- Frontiers in Toxicology: Computational Toxicology and Informatics 2019-present
- Frontiers in Big Data: Medicine and Public Health 2018-present

*Invited Reviewer:*

- Biomarkers 2019-present
- Current Opinion in Toxicology 2019-present
- Regulatory Toxicology and Pharmacology 2019-present
- BioData Mining 2018-present
- Environmental Health Perspectives 2018-present
- Environment International 2018-present
- Environmental Science and Technology 2018-present
- Epigenetics 2018-present
- Frontiers in Big Data: Medicine and Public Health 2018-present
- Toxicological Sciences 2018-present
- Toxicology Research 2017-present
- Food and Chemical Toxicology 2016-present
- Science of the Total Environment 2016-present
- American Journal of Respiratory Cell and Molecular Biology 2014-present
- Future Medicine 2014-present
- Genomics, Proteomics, & Bioinformatics 2012-present

*Member/leadership roles within scientific societies:*

- Co-Chair of Data Compilation Team for HESI eSTAR Carcinogenomics Committee 2018-present
- Continuing Education Committee, SOT 2018-present
- Senior Councilor, SOT Mixtures Specialty Section 2017-2018
- Junior Councilor, SOT Mixtures Specialty Section 2016-2017
- Postdoctoral Representative, SOT Mixtures Specialty Section 2015-2016
- Student Representative, SOT Mixtures Specialty Section 2012-2014
- Graduate Student Leadership Committee, SOT 2012-2014

*Other scientific community services:*

- NIEHS Biomedical Career Symposium Speaker and Training Mentor 2017, 2019
- SOT Graduate Student Training Mentor for Multiple Specialty Sections 2016-present

Internal Service to the UNC School of Public Health (SPH)

1. *Member, Centennial Committee* 2018-present  
Serve as a member of the ESE centennial celebration committee
2. *Member, Graduate Faculty* 2018-present  
Serve as member of the UNC graduate faculty to mentor and serve on student M.S. and Ph.D. committees