

# COURTNEY G. WOODS

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## Lecturer

Department of Environmental Sciences and Engineering  
Gillings Global School of Public Health  
University of North Carolina at Chapel Hill

## EDUCATION

- Ph.D. Environmental Sciences and Engineering, minor in Toxicology 2007  
University of North Carolina at Chapel Hill  
Advisor: Ivan Rusyn MD, PhD  
Dissertation Title: Role of Nuclear-Receptor Independent Pathways in the Mechanism  
of Action of Peroxisome Proliferators
- M.S. Chemical Engineering 2003  
Georgia Institute of Technology  
Advisor: John D Muzzy, PhD  
Thesis Title: Role of nano-articles on crystalline orientation in polypropylene/clay  
nanocomposite films
- B.S. Chemical Engineering, minor in Materials Science & Engineering 2001  
University of Tennessee-Knoxville

## PROFESSIONAL EXPERIENCE

- Lecturer, Dept. of Environmental Sciences and Engineering, UNC- Chapel Hill 2012-Present  
Research Investigator, Division of Computational Biology, The Hamner Institutes 2009-2011  
Visiting Postdoctoral Fellow, Division of Computational Biology, The Hamner Institutes 2007 - 2009  
Postdoctoral Fellow, Toxicology and Envr. Sciences, ExxonMobil Biomedical Sciences 2007 – 2009  
Visiting Graduate Research Assistant, Nat'l Inst. of Envr. Health Sciences (NIEHS) 2003-2006

## HONORS AND AWARDS

- UNC Explorations in Global Health (\$1500) 2016  
UNC Global Partnerships Award (\$1000) 2015  
Newton Underwood Award for Excellence in Teaching (nominated by UNC ESE students) 2015  
Fogarty Global Health Fellow 2014-2015  
Fulbright Fellow 2014-2015  
Faculty Research Int'l Travel Award, UNC Institute for the Study of the Americas 2013  
Future Faculty Fellowship Program, UNC Center for Faculty Excellence 2012  
FASEB Postdoctoral Professional Development and Enrichment Award 2008  
NIEHS Toxicogenomics Research Consortium Meeting Best Poster Award 2004  
Minority Trainee Research Forum Travel Award 2004  
NSF-Sponsored Alliances for Graduate Education and the Professoriate (AGEP) Fellowship 2003  
Georgia Tech School of Chemical Engineering Most Outstanding Teaching Assistant 2003  
University of Tennessee Honors Program (with Honors Thesis) 1997-2001  
Completed a 5-year Engineering B.S. & Co-op Program in 4 years 1997-2001

**PUBLICATIONS****Book Chapters**

Zhang Q, Bhattacharya S, Woods CG, Andersen ME. Ultrasensitive Response Motifs in Biochemical Networks. In :Krishnan, K., K., Andersen, M.E. (eds) Quantitative Modeling in Toxicology. 1st ed. John Wiley & Sons, Ltd.. 2010.

**Refereed Articles**

McMullen PD, Bhattacharya S, Woods CG, Sun B, Ross, SM, Miller ME, McBride M, LeCluyse, EL, Clewell RA, Andersen, ME. A map of the PPAR $\alpha$  transcription regulatory network for primary human hepatocytes. *Chemico-Biological Interactions*. 2014. 209:14-24.

Fu J, Zhang Q, Woods CG, Zheng H, Yang B, Qu W, Andersen ME, Pi J. Divergent Effects of Sulforaphane on Basal and Glucose-Stimulated Insulin Secretion in  $\beta$ -cells: Role of Reactive Oxygen Species and Induction of Endogenous Antioxidants. *Pharm Res*. 2013. 30(9):2248-59.

Xue P, Hou Y, Chen Y, Yang B, Fu J, Zheng H, Yarborough K, Woods CG, Liu D, Yamamoto M, Zhang Q, Andersen ME, Pi J. Adipose deficiency of Nrf2 in ob/ob mice results in sever metabolic syndrome. *Diabetes*. 2013 Mar;62(3):845-54.

Hou Y, Xue P, Woods CG, Wang X, Fu J, Yarborough , Qu W, Zhang Q, Andersen ME, Pi J. Association between arsenic suppression of adipogenesis and induction of CHOP10 via the endoplasmic reticulum stress response. *Environ Health Perspect*. 2013 Feb; 121 (2): 237-43.

Bhattacharya S, Shod LK, Zhang Q, Woods CG, Howell BA, Siler SQ, Woodhead JL, Yang Y, McCullen P, Watkins PB, Andersen ME. Modeling drug- and chemical- induced hepatotoxicity with systems biology approaches. *Front Physiol*.2013;3:462.

Yang B, Fu J, Zheng H, Xue P, Yarborough K, Woods CG, Hou Y, Zhang Q, Andersen ME, Pi J. Deficiency in the nuclear factor E2-related factor 2 renders pancreatic  $\beta$ -cells vulnerable to arsenic-induced cell damage. *Toxicol Appl Pharmacol*. 2012 Nov 1;264(3):315-23.

Zhan L, Zhang H, Zhang Q, Woods CG, Chen Y, Xue P, Dong J, Tokar EJ, Xu Y, Hou Y, Fu J, Yarborough K, Wang A, Qu W, Waalkes MP, Andersen ME, Pi J. Regulatory role of KEAP1 and NRF2 in PPAR $\gamma$  expression and chemoresistance in human non-small-cell lung carcinoma cells. *Free Radic Biol Med*. 2012 Aug 15;53(4):758-68.

Zhao R, Hou Y, Zhang Q, Woods CG, Xue P, Fu J, Yarborough K, Guan D, Andersen ME, Pi J. Cross-regulations among NRFs and KEAP1 and effects of their silencing on arsenic-induced antioxidant response and cytotoxicity in human keratinocytes. *Environ Health Perspect*. 2012 Apr;120(4):583-9.

Hou Y, Xue P, Bai Y, Liu D, Woods CG, Yarborough K, Fu J, Zhang Q, Sun G, Collins S, Chan JY, Yamamoto M, Andersen ME, Pi J. Nuclear factor erythroid-derived factor 2-related factor 2 regulates transcription of CCAAT/enhancer-binding protein  $\beta$  during adipogenesis. *Free Radic Biol Med*. 2012 Jan 15;52(2):462-72.

Xue P, Hou Y, Zhang Q, Woods CG, Yarborough K, Liu H, Sun G, Andersen ME, Pi J. Prolonged inorganic arsenite exposure suppresses insulin-stimulated AKT S473 phosphorylation and glucose uptake in 3T3-L1 adipocytes: involvement of the adaptive antioxidant response. *Biochem Biophys Res Commun*. 2011 Apr 8;407(2):360-5.

Zhao R, Hou Y, Xue P, Woods CG, Fu J, Feng B, Guan D, Sun G, Chan JY, Waalkes MP, Andersen ME, Pi J. Long isoforms of NRF1 contribute to arsenic-induced antioxidant response in human keratinocytes. *Environ Health Perspect*. 2011 Jan;119(1):56-62.

Fu J, Woods CG, Yehuda-Shnaidman E, Zhang Q, Wong V, Collins S, Sun G, Andersen ME, Pi J. Low-level arsenic impairs glucose-stimulated insulin secretion in pancreatic beta cells: involvement of cellular adaptive response to oxidative stress. *Environ Health Perspect*. 2010 Jun;118(6):864-70.

Zhang Q, Pi J, Woods CG, Andersen ME. A systems biology perspective on Nrf2-mediated antioxidant response. *Toxicol Appl Pharmacol*. 2010 Apr 1;244(1):84-97.

Pi J, Zhang Q, Fu J, Woods CG, Hou Y, Corkey BE, Collins S, Andersen ME. ROS signaling, oxidative stress and Nrf2 in pancreatic beta-cell function. *Toxicol Appl Pharmacol*. 2010 Apr 1;244(1):77-83.

Woods CG, Fu J, Xue P, Hou Y, Pluta, LJ, Yang L, Zhang Q, Thomas RS, Andersen ME, Pi J. Dose-dependent transitions in Nrf2-mediated adaptive response and related stress responses to hypochlorous acid in mouse macrophages (2009). *Toxicol Appl Pharm* 238(1):27-36.

Zhang Q, Pi J, Woods CG, Andersen ME. Phase I and II cross-induction of xenobiotic metabolizing enzymes: a feedforward control mechanism for potential hormetic responses (2009). *Toxicol Appl Pharm* 237 (3)345–356.

Ross PK, Woods CG, Bradford BU, Koysk O, Gatti DM, Cunningham ML, Rusyn I. Time course comparison of xenobiotic activators of CAR and PPAR $\alpha$  in mouse liver (2009). *Toxicol Appl Pharm* .235(2):199-207.

Zhang Q, Pi J, Woods CG, Jarabek AM, Clewell HJ, Andersen ME. Hormesis and adaptive cellular control systems (2008). *Dose Response*. 6(2) 196-208.

Pi J, Zhang Q, Woods CG, Wong V, Collins S, Andersen ME. Activation of Nrf2-mediated oxidative stress response in macrophages by hypochlorous acid (2008). *Toxicol Appl Pharm*.226(3) 236-43.

Woods CG, Kosyk O, Bradford BU, Ross PK, Quo P, Ibrahim JG, Cunningham ML, Rusyn I. Time-course investigation of PPAR $\alpha$ - and Kupffer cell-dependent effects of WY-14,643 in mouse liver using microarray gene expression (2007). *Toxicol Appl Pharm* .225(3) 267-77.

Beyer RP, Fry RC, Lasarev MR, McConnachie LA, Meira LB, Palmer VS, Powell CL, Ross PK, Bammler, TK, Bradford BU, Cranson AB, Cunningham ML, Fannin RD, Higgins GM, Hurban P, Kayton RJ, Kerr KF, Kosyk O, Lobenhofer EK, Sieber SO, Vliet PA, Weis BK, Wolfinger R, Woods CG, Freedman JH, Linney E, Kaufmann WK, Kavanagh TJ, Paules RS, Rusyn I, Samson LD, Spencer PS, Suk W, Tennant RJ, Zarbl H; Members of the Toxicogenomics Research Consortium Multi-Center Study of Acetaminophen Hepatotoxicity Reveals the Importance of Biological Endpoints in Genomic Analyses (2007). *Toxicol Sci*. 99(1):326-37.

Porgribny IP, Tryndyak VP, Woods CG, Wiit SE, Rusyn I. Epigenetic effects of the continuous exposure to peroxisome proliferator WY-14,643 in mouse liver are dependent upon Peroxisome Proliferator Activated Receptor alpha (2007). *Mutat. Res.* 625(1-2):62-71

Woods CG, Burns AM, Bradford BU, Ross PK, Kosyk O, Swenberg JA, Cunningham ML, Holland, SM, Rusyn I. WY-14,643-induced cell proliferation and oxidative stress in mouse liver are independent of NADPH oxidase (2007). *Toxicol. Sci.* 98(2):366-74.

Woods CG, Vanden Heuval JP, Rusyn I. Genomic Profiling in Nuclear Receptor- Mediated Toxicity. (2007). *Toxicol Pathol.* 35(4):474-94.

Woods CG, Burns AM, Maki A, Bradford BU, Cunningham ML, Connor MD, Kadiiska MB, Mason, RP, Peters JP, Rusyn I. Sustained formation of alpha-(4-pyridyl-1-oxide)-N-tert-butyl nitron radical adducts in mouse liver by peroxisome proliferators is dependent upon peroxisome proliferator activated receptor-alpha, but not NADPH oxidase (2007). *Free Radic Biol Med.* 42(3):335-42.

Kono H, Woods CG, Maki A, Connor H, Mason R, Rusyn I, Fujii H. Electron spin resonance and spin trapping technique provide direct evidence that edaravone prevents acute ischemia-reperfusion injury of the liver by limiting free radical-mediated tissue damage (2006). *Free Radic Res.* 40(6):579-88.

### ***Non-referred Articles***

Woods, CG, Muzzy, JD. Role of nanoparticles on crystalline orientation in polypropylene/clay nanocomposite films (2003). Society of Plastics Engineers Annual Technical Conference. 2: 2205-09.

### **KEY REFEREED ABSTRACTS** *Contributions to over 30 conference abstracts*

Establishing Equitable Partnerships in Community-based Environmental Justice Research, International Society of Environmental Epidemiology 27<sup>th</sup> Annual Conference, São Paulo, Brazil (2015); *Symposium Chair*

Constructing a PPAR $\alpha$ -mediated Transcriptional Network in Primary Human and Rat Hepatocytes. Society of Toxicology 50<sup>th</sup> Annual Meeting, Washington, DC (2011)

Organizing a PPAR $\alpha$ - mediated Transcriptional Network in Primary Hepatocytes. Keystone Symposium on Nuclear Receptors: Signaling, Gene Regulation and Cancer, Keystone, CO (2010).

Regulatory role of kinase signaling in Nrf2-mediated antioxidant response. The European Nutrigenomics Organisation Meeting, Montecatini Terme, Italy (2009)

Toxicogenomic analysis of cardiovascular effects of diesel engine exhaust in ApoE $^{-/-}$  mice. Society of Toxicology 48<sup>th</sup> Annual Meeting, Baltimore, MD (2009)

Regulatory mechanis of Nrf2 activation by hypochlorous acid and concomitant activation of inflammatory pathways. Society of Toxicology 47<sup>th</sup> Annual Meeting, Seattle, WA (2008).

Role of nuclear receptor-independent mechanisms in long-term effects of nongenotoxic hepatocarcinogens. Conference on Current and Future Challenges in Envr. Health, Toxc., and Food Safety in Eastern and Central Europe, Kiev, Ukraine (2006).

Toxicogenomic analysis of nuclear receptor-mediated and nuclear receptor-independent responses to peroxisome proliferators. Society of Toxicology 45<sup>th</sup> Annual Meeting, New Orleans, NC (2005).

## GRANTS & FUNDING

### *Active*

UJMT Fogarty Global Health Program Woods (PI) 2014-2017  
Uncovering Petrogenic Pollutants in Brazil by Air Monitoring and Health Impact Assessment  
 (UPPBAHIA)  
 Direct Costs: \$76,510

This study assess particulate and gas phase air pollutants associated with petroleum refining and related industries in Bahia, Brazil. Secondary data on mortality and health outcomes from Brazil's health database DATASUS will be used to conduct an ecological assessment of geospatial distribution of cardiopulmonary disease and birth outcomes. Finally other potential stressors impacting the surrounding communities (environmental, work-related and psychosocial) will be identified and a qualitative assessment of their potential health impacts will be conducted.

Fulbright Commission Woods (PI) 2014-2015  
 Fulbright-Brazil Scientific Mobility  
 Total Direct Cost: \$27,250

The aim of this project is to assess the reliability of low-cost passive diffusion air samplers for detecting gas phase air pollutants associated with petroleum refining. The humid, tropical climates with seaspray.

UNC Center for Faculty Excellence Woods 2014  
 Support for a Graduate Teaching Fellow to support ENVR 600  
 Total Direct Cost: \$5000

### *Prior*

UNC Center for Faculty Excellence Woods (PI) 2013  
 CFE 100+ Initiative: Engaging Students in Large Classes  
 Total Direct Cost: \$5000

The goal of this teaching grant is to harmonize the content of the online and face-to-face course on Environment Health, which annually enrolls over 500 students in the UNC School of Public Health. The course redesign will implement video lectures, interviews with public health practioners (with podcast subscription) and and studio discussions, in which groups of 25 or fewer students will engage in focused discussions that are facilitated by teaching assistants.

NIEHS ( F31 ES013342) Woods (PI) 2004-2007  
 Peroxisome Proliferator-Induced DNA Damage and Repair  
 Total Direct Cost: \$93,945

The goal of this individual predoctoral NRSA project was to identify the cellular sources of oxidants in liver that are produced following exposure to peroxisome proliferators, a class of nongenotoxic rodent carcinogens. Additionally, the research project would elucidate the role that source-specific oxidants played in acute and chronic liver pathology.

## MENTORING AND TEACHING

### *Thesis Advisor*

Lívia Gonçalves (co-advisor) MS, PPGSAT (UFBa) Spring 2016

### *Committee Member*

Zahra Al Hamdani	PhD, ENVR (UNC)	Spring 2017
Chelsea Fizer	MS, ENVR (UNC)	Spring 2016
Wendel Viana	MS, PPGSAT (UFBa)	Spring 2015
Juliana Muller	MS, PPGSAT (UFBa)	Spring 2015
Dan Rosenbaum	MS, ENVR (UNC)	Spring 2014
Jennifer Casanova	MSPH, ENVR (UNC)	Spring 2013

### *Instructor*

UNC ENVR 600	Intro to Environmental Health	Fall 2013, 2014, 2015 & Spring 2013, 2014, 2015
UNC ENVR 890	Global Environmental Health Inequities	Fall 2013, 2014, Spring 2016
UFBa PPGSAT 800	Special Topics in Epidemiology: Global Perspectives on Environmental Health Inequities (co-instructor)	Spring 2015
The Hamner	Systems Biology & Dose Response Modeling Course (co-instructor)	Fall 2008

### *Guest Lecturer*

UFBa PPGSAT	Department Seminar Series	Summer 2014
UNC PUBH 756	Understanding & Addressing Health Disparities in the US	Spring 2014
UNC ENVR 442	Biochemical Toxicology	Fall 2010

### *Pedagogy Training*

Workshops at UNC Center for Faculty Excellence	2012-2013
eQuality Essentials (8 wk course for online instructors)	
Evaluating Student Learning in Large Classrooms	
Flipping the Classroom	
Lesson Planning	
Creating Dynamic Syllabi	
Creating Effective Assignments	
Course Development Institute on Service Learning	
Redesigning and Planning Your Next Course	
Future Faculty Fellowship Program (week-long training program)	2012
Institute for Teaching and Mentoring, Southern Regional Education Board	2003, 2007

## SERVICE

### *University*

Member, UNC Committee for Women and Minority Student Recruitment & Retention 2006

### *School of Public Health*

Curriculum Vitae	Courtney Woods
Advisory Board Member, ECHO Health Disparities Certificate Program	2013-Present
Co-advisor, GlobeMED Student group	2013-Present
Member, Advisory Committee for Summer Fellowship Programs	2012-Present
<b><i>Environmental Sciences and Engineering Department</i></b>	
Member, ESE Academic Program Committee	2012-Present
Member, Research Faculty Search Committee	2012
<b><i>Scientific Community and Professional Organizations</i></b>	
Review Editor, Frontiers in Toxicogenomics	2011-Present
Ad hoc Reviewer	
Toxicology and Applied Pharmacology Journal	
Oxidative Medicine and Cellular Longevity	
Drug and Chemical Toxicology Journal	
Toxicological Sciences Journal	
Postdoc Representative, Mechanisms Specialty Section, Society of Toxicology	2008-2009
President, PostDocs and Graduate Students (PDoGS) Organization, Hamner Institutes	2008-2009
<b>PROFESSIONAL ORGANIZATIONS</b>	
Society of Toxicology (SOT)	2004-Present
International Society of Environmental Epidemiology (ISEE)	2014-Present
Society of Risk Analysis (SRA)	2016-Present
<b>LANGUAGES</b>	
English: native language	
Portuguese: intermediate (speaking, reading, writing, comprehension)	