Brooke Nichole Wolford

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EDUCATION

Sept. 2015 - Present **University of Michigan** Ann Arbor, MI
Program in Biomedical Sciences, Department of Computational Medicine & Bioinformatics
Doctor of Philosophy, Bioinformatics
Department of Statistics
Master of Arts, Statistics
Cumulative GPA: 3.9

Aug. 2009 - May 2013 **University of North Carolina at Chapel Hill** Chapel Hill, NC
Bachelor of Science, Quantitative Biology
Highest Honors and Highest Distinction, Cumulative GPA: 3.9

Aug. 2007 - July 2009 **North Carolina School of Science and Mathematics** Durham, NC
High School Diploma

RESEARCH EXPERIENCE

May 2015 - Present **Cristen J. Willer Group** Ann Arbor, MI
University of Michigan Medical School
Departments of Internal Medicine, Human Genetics, & Computational Medicine & Bioinformatics
Graduate Student (September 2016 – Present)
Rotation Student (May – August 2016)
Performing a Genome Wide Association Study and using first degree relatives as proxy-cases to identify variants associated with Type 2 Diabetes in cases and controls from 70K individuals in the Norwegian longitudinal HUNT dataset.

Michael Boehnke Group Ann Arbor, MI
University of Michigan School of Public Health
Department of Biostatistics & Center for Statistical Genetics
Graduate Student (September 2016 – Present)
Rotation Student (September 2015 – February 2016)
Continued analyses for the FUSION muscle tissue biopsy project and introductory work with GWAS.

March - April 2016 **David Ginsburg Laboratory** Ann Arbor, MI
University of Michigan, Department of Human Genetics
Life Sciences Institute, Howard Hughes Medical Institute
Rotation student
Used bacteriophage display and high throughput sequencing to explore hemostatic protease biochemistry.

Aug. 2013 - Aug. 2015 **Francis S. Collins Laboratory** Bethesda, MD
National Institutes of Health, National Human Genome Research Institute
Medical Genomics and Metabolic Genetics Branch
Post-baccalaureate Intramural Training Award Program Trainee (August 2013 – July 2015)
Special Volunteer (August 2015 – Present)
Performed integrative analyses to understand genetic, epigenetic, and regulatory variation in Type 2 Diabetes as part of the FUSION project. Computationally studied allelic bias in high-throughput sequencing data using a combination of bash, Perl, and R on a high-performance compute cluster.

June 2008 - May 2013 **Corbin D. Jones Laboratory** Chapel Hill, NC
University of North Carolina at Chapel Hill, Biology Department
Undergraduate Research Assistant (August 2009 - May 2013)
Volunteer Research Assistant (June 2008, Spring 2009, June 2009)
Completed an honors thesis, "Evolutionary Development of Gain-of-Function Stripes in *Z. indianus*." Studied the molecular and genetic basis of adaptive evolution in Drosophila and related species with behavioral assays, phenotypic studies, and molecular analysis. Collaborated with Dr. Jones to perform an RNAi assay on olfactory and gustatory behavior in *D. melanogaster* through a Research Experience course at North Carolina School of Science and Mathematics and as a summer volunteer.

HONORS & AWARDS

December 2018	DCMB Annual Student Service Award	Ann Arbor, MI
July 2018	Bioinformatics Graduate Program Nominee for UM OGPS Excellence in Service Award	Ann Arbor, MI
April 2016	NSF Graduate Research Fellowship Program Fellow	Ann Arbor, MI
March 2016	Genome Sciences Training Program (NIH T32) Fellow	Ann Arbor, MI
Sept. 2015	Benard L. Maas Fellowship Award	Ann Arbor, MI
April 2015	NSF Graduate Research Fellowship Program Honorable Mention	Bethesda, MD
Dec. 2014	NHGRI Symposium Best Traditional Scientific Poster Award	Bethesda, MD
May 2014	NIH Post-baccalaureate Poster Day Outstanding Poster Award	Bethesda, MD
Fall 2012	Phi Beta Kappa National Honor Society	Chapel Hill, NC
Spring 2012	Goldwater Scholarship UNC-CH Nominee	Chapel Hill, NC
2010-2011	SEANC Statewide Merit Scholarship	Chapel Hill, NC
2009-2010	SEANC District 17 Merit Scholarship	Durham, NC

RESEARCH, TRAVEL, and PROFESSIONAL DEVELOPMENT GRANTS

July 2018	**Rackham Conference Travel Grant** ($800)	Ann Arbor, MI
April 2018	**Rackham Professional Development Grant** ($400)	Ann Arbor, MI
April 2018	**SISG at the University of Washington Registration and Travel Scholarship** ($1,400)	Ann Arbor, MI
October 2017	**Benard L. Maas Professional Development Award** ($500)	Ann Arbor, MI
May 2017	**Rackham Conference Travel Grant** ($800)	Ann Arbor, MI
July 2014	**NIH Intramural Sequencing Center Pilot Project** ($10,000)	Bethesda, MD
	"Cell-type specific epigenome and transcriptome signatures of alpha and beta cells in rat islets"	
May 2013	**Tom and Elizabeth Long Research Award** ($500)	Chapel Hill, NC
	"Evolutionary Development of Gain of Function stripes in Zaprionus indianus"	
Summer 2012	**UNC OUR Summer Undergraduate Research Fellowship** ($3,000)	Chapel Hill, NC
	"Evolutionary Development of 'Racing Stripes' in Zaprionus indianus"	
Spring 2009	**Steffee Endowment for Student Research and Creativity** ($200)	Durham, NC
	"Behavioral Effects of RNA interference in Drosophila melanogaster"	

PUBLICATIONS

December 2018	Wolford BN, Hornsby WE, Guo D, Zhou W, Lin M, Farhat L, et al. Clinical implications of identifying pathogenic variants in aortic dissection patients with whole exome sequencing. *Biorxiv.*
September 2018	Nielsen JB, Thorolfsdottir RB, Fritsche LG, Zhou W, Skov MW, Graham SE, et al. Biobank-Driven Genomic Discovery Yields New Insight into Atrial Fibrillation Biology. *Nature Genetics* 50, no. 9: 1234–39, https://doi.org/10.1038/s41588-018-0171-3.
August 2018	Zhou W, Nielsen JB, Fritsche LG, Dey R, Gabrielsen ME, Wolford BN, et al. Efficiently Controlling for Case-Control Imbalance and Sample Relatedness in Large-Scale Genetic Association Studies. *Nature Genetics* 50, no. 9: 1335–41, https://doi.org/10.1038/s41588-018-0184-y.
May 2018	Wolford BN, Willer CJ, and Surakka I. Electronic Health Records: the next wave of complex disease genetics. *Human Molecular Genetics*, Volume 27, Issue R1, R14-R21, doi: 10.1093/hmg/ddy081
April 2018	Taylor DL, Knowles DA, Scott LJ, Ramirez AH, Casale FP, Wolford BN, et al. Interactions between genetic variation and cellular environment in skeletal muscle gene expression. *PLoS ONE* 13(4): e0195788. https://doi.org/10.1371/journal.pone.0195788
April 2018	Kycia I, Wolford BN, Huyghe JR, Fuchsberger C, Vadlamudi S, Kursawe R, et al. A Common Type 2 Diabetes Risk Variant Potentiates Activity of an Evolutionarily Conserved Islet Stretch Enhancer and Increases *C2CD4A* and *C2CD4B* Expression. *American Journal of Human Genetics*, Volume 102, Issue 4, Pages 620-635, https://doi.org/10.1016/j.ajhg.2018.02.020.
December 2017	Nielsen JB, Fritsche LG, Zhou W, Teslovich TM, Holmen OL, Gustafsson S, et al. Genome-wide Study of Atrial Fibrillation Identifies Seven Risk Loci and Highlights Biological Pathways and Regulatory Elements Involved in Development. *The American Journal of Human Genetics*, Volume 102, Issue 1, 4 January 2018, Pages 103-115, https://doi.org/10.1016/j.ajhg.2017.12.003.
June 2017	Roman, TS, Cannon ME, Vadlamudi S, Buchokovich ML, Wolford BN, Welch RP, et al. A Type 2 Diabetes-Associated Functional Regulatory Variant in a Pancreatic Islet Enhancer at the *Adcy5* Locus. *Diabetes* db170464 (2017). doi:10.2337/db17-0464
February 2017	Varshney, A, Scott LK, Welch RP, Erdos MR, Chines PS, Narisu N, et al. Genetic regulatory signatures underlying islet gene expression and type 2 diabetes. *PNAS* 201621192 (2017). doi:10.1073/pnas.1621192114
June 2016	Scott LJ, Erdos MR, Huyghe JR, Welch RP, Beck AT, Wolford BN, et al. The genetic regulatory signature of type 2 diabetes in human skeletal muscle. *Nat Commun* **7,** 11764.
December 2009	Earley EJ and Wolford B. Mechanosensation across and within Drosophila species. *Drosophila Information Services* 2009, 92:119-122.

PRESENTATIONS

October 2018	**Whole exome sequencing improves diagnostic precision in individuals affected with thoracic aortic aneurysm and dissection**	
	6th Human Genetics in NYC Conference (poster presentation)	New York City, NY
	American Society of Human Genetics Annual Meeting (poster presentation)	San Diego, CA
	Using EHR-linked biobanks to study the genetics of cardiometabolic diseases	
September 2018	Department of Public Health and Nursing (invited seminar)	
	Norwegian University of Science and Technology (NTNU)	Trondheim, Norway
	Using genotyped relatives of ungenotyped type 2 diabetes cases as proxy-cases in a cohort based genome wide association study	
May 2018	James V. Neel Lectureship (poster presentation)	Ann Arbor, MI
March 2018	Gilbert S. Omenn Lectureship (poster presentation)	Ann Arbor, MI
October 2017	American Society of Human Genetics Annual Meeting (platform presentation)	Orlando, FL
June 2017	Biomedical Statistical Modeling (poster presentation)	Ann Arbor, MI
May 2017	CSHL Conference on The Biology of Genomes (poster presentation)	Cold Spring Harbor, NY
May 2017	James V. Neel Lectureship (poster presentation)	Ann Arbor, MI
April 2017	NHGRI Research Training & Career Development Annual Meeting (poster presentation)	St. Louis, MO
	Type 2 diabetes genome wide association study by proxy in the Nord Trøndelag Health Study	
Oct. 2016	Dept. of Bioinformatics and Computational Biology Retreat (poster presentation)	Ann Arbor, MI
Sept. 2016	Genome Sciences Training Program New Student Orientation (oral presentation)	Ann Arbor, MI
	Allelic transcriptome signatures identify disease-relevant regulatory architecture in diabetes relevant cell-types	
May 2016	James V. Neel Lectureship (poster presentation)	Ann Arbor, MI
	Allelic transcriptomic and epigenomic signatures in diabetes relevant cell-types	
Sept. 2015	Collins Laboratory Quadrennial Review and Site Visit (poster presentation)	Bethesda, MD
	Integrated 3-D epigenomic and transcriptomic analysis of the EndoC-BH1 human pancreatic islet beta cell model	
April 2015	NIH Post-baccalaureate Poster Day (poster presentation)	Bethesda, MD
May 2015	CSHL Conference on The Biology of Genomes (poster presentation)	Cold Spring Harbor, NY
March 2014	**Allele Specific Expression Quantitative Trait Loci in Muscle RNA-seq**	
	NIH Bioinformatics Special Interest Group Lightning Talk (oral presentation)	Bethesda, MD
	Allelic transcription and enhancer signatures in diabetes relevant cells	
Dec. 2014	NHGRI Scientific Symposium (poster presentation)	Bethesda, MD
May 2014	NIH Post-baccalaureate Poster Day (poster presentation)	Bethesda, MD
May 2014	NIH Bioinformatics Special Interest Group Poster Session (poster presentation)	Bethesda, MD
	Allele Specific Expression Quantitative Trait Loci in Diabetes Relevant Cells	
October 2014	NIH Post-baccalaureate Seminar Series (oral presentation)	Bethesda, MD
	Evolutionary Development of Gain-of-Function Stripes in *Zaprionus indianus*	
April 2013	Celebration of Undergraduate Research (oral presentation)	Chapel Hill, NC
March 2013	John K. Koeppe Biology Undergraduate Research Symposium (oral presentation)	Chapel Hill, NC

TEACHING EXPERIENCE

December 2018	South Asheboro Middle School's Biotech Careers Guest Scientist
Fall 2018	Tutor for Molecular Genetics (HUMGEN 541)
July 2018	Summer Bridge Scholars Program, Genetics and Genomics Campus Connection Instructor
Sept. 2017 - Present	Girls Who Code at UM DCMB Club Facilitator
May 2018	New Hope Elementary School's 2nd grade Guest Scientist and Genetics Lesson Instructor
May 2018	Association of Multicultural Scientists Science Career Day Coding & Robotics Instructor
April 2018	St. Thomas the Apostle Catholic School Science Olympiad Team Field Trip Speaker
April 2018	Michigan DNA Day Ambassador
April 2018	Genomics in Epidemiology (EPID 516) Guest Lecturer
March 2018	Forsythe Middle School Young Scientists' Expo Demonstration Leader
February 2018	FEMMES Winter 2018 Capstone Activity Leader
November 2017	FEMMES Fall 2017 Capstone Activity Leader
2016- 2018	Annual Introductory Genetics & Thoracic Aortic Aneurysm Lecture Genetics to UM CHIP Biobank team
June 2017, July 2018	Michigan Heath Science Pre-College Exposure Academy Graduate Student Instructor
April – June 2017	St. Thomas the Apostle Catholic School Science Olympiad ("Gene-ius" event) Assistant Instructor
March 2017	Liberty Elementary School's 5th grade Guest Scientist and Genetics Lesson Instructor
November 2016	FEMMES Fall 2016 Capstone Activity Leader
August 2015	Girl Scout Troop 40004's STEM badge Guest Speaker

SCIENTIFIC SERVICE

Nov. 2016 - Present	Girls Who Code at UM DCMB Co-founder & Executive Committee Co-chair
April 2018	Engaging Scientists in Policy and Advocacy (ESPA) Ask A Scientist Bar Night Participant
March 2018	Forsythe Middle School Young Scientists' Expo Judge
Jan. 2017 - Dec. 2018	ASHG Trainee Newsletter 'The Nascent Transcript' Contributor
April 2016 - Present	MiSciWriters Contributor
March 2017, 2018	ASHG DNA Day Essay Judge
November 2016	Speaker at Minding the Gap: Gap Year Experiences for STEM Students sponsored by UM WISE
Mar. 2016 - May 2018	Activities Facilitator & Scouts Assistant at Ann Arbor Hands on Museum
November 2015	Females Excelling More in Math, Engineering, and Science (FEMMES) Fall Capstone Volunteer
July 2015	Research Group Host for NIH High School Scientific Training and Enrichment Program (HiSTEP)
Aug. 2014 - July 2015	Contributor for NHGRI Communication and Science Policy Group's *Genome Advance of the Month*
March 2014 - July 2015	Member of Genome Trainee Advisory Committee (GTAC) for NHGRI/NIH
April 2014	Volunteer for NHGRI 'Fun With DNA' during NIH Take Your Child To Work Day
April - Aug. 2014	Volunteer for Smithsonian National Museum of Natural History Genome Zone
Sept. 2012 - May 2013	Summer Undergraduate Research Fellowship Peer Advisor for UNC Office of Undergraduate Research

LEADERSHIP & COMMUNITY INVOLVEMENT

May 2016 – July 2018	**UNC General Alumni Association's Ann Arbor Carolina Club** *Chair*	Ann Arbor, MI
May 2016 - April 2018	**Wesley Foundation at the University of Michigan** *Community Coordinator (May – Sept. 2016)* *Loud Lecture Committee Member (April 2016 –April 2018)*	Ann Arbor, MI
June 2014 - July 2015	**Montgomery Hospice** *Respite and Companionship Visitor*	Rockville, MD
Summer 2010 - 2013	**Quaker Lake Camp** *Health and Safety Director (2010, 2011, 2013)* *Seeds Environmental Education Program Coordinator (2012, 2013)*	Climax, NC
June 2011 - May 2013	**Orange & Chatham County Judicial System** *Guardian ad Litem*	Chapel Hill, NC

SKILLS

Bioinformatics: Perl, Python, R, Bash, C/C++; analysis of RNA-seq, ChIP-seq, ATAC-seq and genotyping data; use of high performance compute cluster; use of internet databases such as UCSC Genome Browser
Molecular biology: DNA extraction, PCR, RT-PCR, restriction digest, Illumina library preparation, bacteriophage display
Laboratory: fruit fly husbandry and behavioral assays, EMS mutagenesis, Scanning Electron Microscopy
Computing: Adobe Photoshop, Adobe Illustrator, Dendroscope, Apple and Microsoft Operating Systems

CONTINUING EDUCATION

July 2018	**23rd Summer Institutes in Statistical Genetics** **Modules: Adv. Quantitative Genetics, Statistical & Quantitative Genetics of Disease** *University of Washington Department of Biostatistics*	Seattle, WA
April 2018	**Jorge Cham Workshop: Communicating Your Research to a General Audience** *University of Michigan*	Ann Arbor, MI
May 2017	**Stand Up for Science: Practical Approaches to Discussing Science that Matters** *University of Michigan Teach-Out via edX*	Ann Arbor, MI
Jan. - May 2015	**Demystifying Medicine** *National Institutes of Health Office of Intramural Research*	Bethesda, MD
Sept. - Dec. 2014	**Genetic Counseling Professional Topics Seminar** *Foundation for Advanced Education in the Sciences* (3 credits)	Bethesda, MD
Sept. 2014 - May 2015	**NIH Academy Certificate Program** *National Institutes of Health*	Bethesda, MD
Summer 2014	**Exploring the World of Big Data with Computational Genomics Journal Club** *National Institutes of Health Office of Intramural Training and Education*	Bethesda, MD
Spring 2014	**Current Topics in Genome Analysis** *National Human Genome Research Institute Division of Intramural Research*	Bethesda, MD
March 2014	**Writing and Publishing a Scientific Paper** *National Institutes of Health Office of Intramural Training and Education* (Certificate of Training)	Bethesda, MD
October 2013	**Computing for Data Analysis** *Coursera partnership with JHU Bloomberg School of Public Health* (Statement of Accomplishment)	Bethesda, MD