Brooke Nichole Wolford

PhD Candidate in Bioinformatics

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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 & Master of Arts, Statistics, Cumulative GPA: 3.86	
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: 3.89	
Aug. 2007-July 2009	**North Carolina School of Science and Mathematics**	Durham, NC
	High School Diploma	

RESEARCH EXPERIENCE

Sept. 2016-Present	**Cristen J. Willer Group**	Ann Arbor, MI
	University of Michigan Medical School	
	Departments of Internal Medicine, Human Genetics, & Computational Medicine & Bioinformatics	
	Graduate Student	
	Statistical methods development to improve genetic discovery and precision medicine approaches with the use of family history information in population biobanks.	
Sept. 2016-Present	**Michael Boehnke Group**	Ann Arbor, MI
	University of Michigan School of Public Health	
	Department of Biostatistics & Center for Statistical Genetics	
	Graduate Student	
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	
	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)	
	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 research experience at North Carolina School of Science and Mathematics and as a summer volunteer.	

PUBLICATIONS

1. Moksnes M, [5 authors], **Wolford BN,** [17 authors], Willer CJ, Brumpton BM, Omland T. Using human genetics to understand the role of cardiac troponin I in the general population. *Nature Communications. Submitted.*
2. Beil A, Hornsby WE, Uhlman WR, Aatre R, Arscott P, **Wolford BN**, McNamara J Willer CJ, Roberts JS. Process and impact of disclosing clinically actionable variants to cardiovascular biobank participants. *Journal of Genetic Counseling. Submitted.*
3. Fan Y*, **Wolford BN***, [17 authors], Willer CJ, Chen YE. *TM6SF2* p.E167K confers a higher risk for type 2 diabetes with a sex-specific effect on glucose metabolism. *Under revision.*
4. Pampana A, [8 authors], **Wolford BN**, [88 authors], Willer CJ, Peloso G. ChrXq23 is associated with lower atherogenic lipid concentrations and favorable cardiometabolic indices. *Nature Medicine. Under consideration.*

5. Klarin D, [3 authors], **Wolford BN**, [48 authors], Tsao PS on behalf of the VA Million Veteran Program. Genetic Architecture of Abdominal Aortic Aneurysm in the Million Veteran Program. *Circulation*. *In press.*
6. Zhou W, [20 authors], **Wolford BN**, [31 authors], Hveem K, Willer CJ. GWAS of thyroid stimulating hormone highlights its pleiotropic effects and genetic association with low thyroid cancer risk. *Nature Communications*. *In press.*
7. Surakka I, [7 authors], **Wolford BN**, [10 authors], Hveem K, Willer CJ. Loss-of-function mutation in the MEPE gene decreases lifetime bone mineral density and increases fracture risk. *Nature Communications*. *In press.*
8. Norton E*, Hornsby WE*, Wu X, **Wolford BN**, Graham S, Willer CJ, Yang B. Aortic Progression and Reintervention in Patients with Pathogenic Variants Following a Thoracic Aortic Dissection. *Journal of Thoracic and Cardiovascular Surgery,* https://doi.org/10.1016/j.jtcvs.2020.01.094.
9. Børte S, [8 authors], **Wolford BN**, [6 authors], Willer CJ, Winsvold B. Mitochondrial genome-wide association study of migraine—the HUNT Study. *Cephalgia,* https://doi.org/10.1177/0333102420906835.
10. **Wolford BN***, Hornsby WE*, [19 authors], Milewicz DM, Willer CJ, Yang B. Clinical implications of identifying pathogenic variants in individuals with thoracic aortic dissection. *Circulation Genomic and Precision Medicine* 12(6): 273-280, https://doi.org/10.1161/CIRCGEN.118.002476.
11. Nielsen JB, [17 authors], **Wolford BN**, [27 authors], Abecasis GR, Hveem K, Wlller CJ. Biobank-driven genomic discovery yields new insight into atrial fibrillation biology. *Nature Genetics* 50:1234–39, 273-280, https://doi.org/10.1038/s41588-018-0171-3.
12. Zhou W, Nielsen JB, Fritsche LG, Dey R, Gabrielsen ME, **Wolford BN**, [10 authors], Abecasis GR, Willer CJ, Lee S. Efficiently controlling for case-control imbalance and sample relatedness in large-scale genetic association studies. *Nature Genetics* 50(9):1335–41, https://doi.org/10.1038/s41588-018-0184-y.
13. **Wolford BN**, Willer CJ, and Surakka I. Electronic health records: the next wave of complex disease genetics. *Human Molecular Genetics*, 27:R14-R21, https://doi.org/10.1093/hmg/ddy081.
14. Taylor DL, Knowles DA, Scott LJ, Ramirez AH, Casale FP, **Wolford BN**, [16 authors], Boehnke M, Birney E, Collins FS. 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.
15. Kycia I, **Wolford BN**, [16 authors], Collins FS, Parker SCJ, Stitzel ML. 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* 102(4):620-635, https://doi.org/10.1016/j.ajhg.2018.02.020.
16. Nielsen JB, [8 authors], **Wolford BN**, [32 authors], Abecasis GR, Hveem K, Willer CJ. Genome-wide study of atrial fibrillation identifies seven risk loci and highlights biological pathways and regulatory elements involved in development. *American Journal of Human Genetics*, 102(1):103-115, https://doi.org/10.1016/j.ajhg.2017.12.003.
17. Roman TS, Cannon ME, Vadlamudi S, Buchokovich ML, **Wolford BN**, [14 authors], Parker SCJ, Stitzel ML, Mohlke K. A type 2 diabetes-associated functional regulatory variant in a pancreatic islet enhancer at the ADCY5 locus. *Diabetes* 66(9):2521-2530, https://doi.org/10.2337/db17-0464.
18. Varshney, A, [7 authors], **Wolford BN**, [12 authors], Collins FS, Parker SCJ, Stitzel ML. Genetic regulatory signatures underlying islet gene expression and type 2 diabetes. *Proceedings of the National Academy of Sciences* 114(9):2301-2306, https://doi.org/10.1073/pnas.1621192114.
19. Scott LJ, Erdos MR, Huyghe JR, Welch RP, Beck AT, **Wolford BN**, [23 authors], Boehnke M, Collins FS, Parker SCJ. The genetic regulatory signature of type 2 diabetes in human skeletal muscle. *Nature Communications* 7, 11764, https://doi.org/10.1038/ncomms11764.
20. Earley EJ and **Wolford BN**. Mechanosensation across and within Drosophila species. *Drosophila Information Services* 2009, 92:119-122.

PRESENTATIONS

Utility of family history informed genetic risk scores for prediction of common complex diseases

1. American Society of Human Genetics Annual Meeting | poster presentation | Houston, TX | October 2019

Clinical implications of identifying pathogenic variants in individuals with thoracic aortic dissection

2. American Society of Human Genetics Annual Meeting | poster presentation | San Diego, CA | October 2018
3. 6th Human Genetics in NYC | poster presentation | New York, NY | October 2018

Using EHR-linked biobanks to study the genetics of cardiometabolic diseases

4. Norwegian University of Science & Technology, Department of Public Health & Nursing | invited seminar | Trondheim, Norway | September 2018

Using genotyped relatives of ungenotyped type 2 diabetes cases as proxy-cases in a cohort based GWAS

5. James V. Neel Lectureship Symposium | poster presentation | Ann Arbor, MI | May 2018
6. Gilbert S. Omenn Lectureship Symposium | poster presentation | Ann Arbor, MI | March 2018
7. American Society of Human Genetics Annual Meeting | platform presentation | Orlando, FL | October 2017

8. Biomedical Statistical Modeling | poster presentation | Ann Arbor, MI | June 2017
9. CSHL Conference on The Biology of Genomes | poster presentation | Cold Spring Harbor, NY | May 2017
10. James V. Neel Lectureship Symposium | poster presentation | Ann Arbor, MI | May 2017
11. NHGRI Research Training & Career Development Annual Meeting | poster presentation | St. Louis, MO | April 2017
Type 2 diabetes genome wide association study by proxy in the Nord-Trøndelag Health Study
12. Dept of Bioinformatics and Computational Biology Retreat | poster presentation | Ann Arbor, MI | October 2016
13. Genome Sciences Training Program New Student Orientation | oral presentation | Ann Arbor, MI | September 2016
Allelic transcriptome signatures identify disease-relevant regulatory architecture in diabetes relevant cell-types
14. James V. Neel Lectureship Symposium | poster presentation | Ann Arbor, MI | May 2016
Allelic transcriptomic and epigenomic signatures in diabetes relevant cell-types
15. Collins Laboratory Quadrennial Review and Site Visit | poster presentation | Bethesda, MD | September 2015
Integrated 3-D epigenomic and transcriptomic analysis of the EndoC-BH1 human pancreatic islet beta cell model
16. CSHL Conference on The Biology of Genomes | poster presentation | Cold Spring Harbor, NY | May 2015
17. NIH Post-baccalaureate Poster Day | poster presentation | Bethesda, MD | April 2015
Allele Specific Expression Quantitative Trait Loci in Muscle RNA-seq
18. NIH Bioinformatics Special Interest Group Lightning Talk | oral presentation | Bethesda, MD | March 2014
Allelic transcription and enhancer signatures in diabetes relevant cells
19. NHGRI Scientific Symposium | poster presentation | Bethesda, MD | December 2014
20. NIH Post-baccalaureate Poster Day | poster presentation | Bethesda, MD | May 2014
21. NIH Bioinformatics Special Interest Group Poster Session | poster presentation | Bethesda, MD | May 2014
Allele Specific Expression Quantitative Trait Loci in Diabetes Relevant Cells
22. NIH Post-baccalaureate Seminar Series | oral presentation | Bethesda, MD | October 2014
Evolutionary development of gain-of-function stripes in Zaprionus indianus
23. Celebration of Undergraduate Research | oral presentation | Chapel Hill, NC | April 2013
24. John K. Koeppe Biology Undergraduate Research Symposium | oral presentation | Chapel Hill, NC | March 2013

HONORS & AWARDS

January 2020	Rackham Predoctoral Fellowship Bioinformatics Graduate Program Nominee
Sept. 2019	Univ. of Michigan Program in Biomedical Sciences 20th Anniversary Graduate Student Award for Excellence in Research, Teaching, Service, and Promotion of Diversity, Equity, and Inclusion
Dec. 2018	Department of Computational Medicine & Bioinformatics Annual Student Service Award
July 2018	Univ. of Michigan OGPS Excellence in Service Award Bioinformatics Graduate Program Nominee
March 2016	Genome Sciences Training Program (NIH T32) Fellow
Sept. 2015	Univ. of Michigan Benard L. Maas Fellowship Award
April 2015	National Science Foundation Graduate Research Fellowship Program Honorable Mention
Dec. 2014	NHGRI Symposium Best Traditional Scientific Poster Award
May 2014	NIH Post-baccalaureate Poster Day Outstanding Poster Award
Fall 2012	Phi Beta Kappa National Honor Society
Spring 2012	Goldwater Scholarship UNC-CH Nominee

GRANTS & FUNDING

July 2019	Univ. of Michigan Endowment for Basic Sciences Excellence in Basic Science Award ($5,000)
2017, 2018, 2019	Rackham Conference Travel Grant ($800)
April 2018	Rackham Professional Development Grant ($400)
April 2018	Univ. of Washington Summer Inst. in Statistical Genetics Registration & Travel Scholarship ($1,400)
April 2016	NSF Graduate Research Fellowship Program Fellow ($138,000, DGE 1256260)
Oct. 2017	Benard L. Maas Professional Development Award ($500)
July 2014	NIH Intramural Sequencing Center Pilot Project ($10,000) Cell-type specific epigenome and transcriptome signatures of alpha and beta cells in rat islets
May 2013	Tom and Elizabeth Long Research Award ($500) “Evolutionary Development of Gain of Function stripes in Zaprionus indianus”
Summer 2012	UNC OUR Summer Undergraduate Research Fellowship ($3,000) “Evolutionary Development of ‘Racing Stripes’ in Zaprionus indianus”
2010-2011	SEANC Statewide Merit Scholarship
2009-2010	SEANC District 17 Merit Scholarship

Spring 2009	Steffee Endowment for Student Research and Creativity ($200) "Behavioral Effects of RNA interference in Drosophila melanogaster"

SCIENTIFIC SERVICE

October 2019	ASHG Platform Session Moderator
2019-2020	Bioinformatics Graduate Program Peer Mentor
Feb. & Oct. 2019	UM Undergraduate Research Opportunity Program (UROP) Panelist
Nov. 2016-May 2020	Girls Who Code at UM DCMB Co-founder & Executive Committee Co-chair
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
Mar. 2016-May 2018	Activities Facilitator & Scouts Assistant at Ann Arbor Hands on Museum
July 2015	Research Group Host for NIH High School Scientific Training and Enrichment Program (HiSTEP)
Aug. 2014-July 2015	Contributor for NHGRI Communication & 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 Undergrad. Research

TEACHING EXPERIENCE

May 2020	Bucyrus, Ohio Public Library Ask A Scientist Virtual Guest
April 2020	Reproducible Data Analysis with R Workshop Instructor's Assistant
March 2020	Michigan Theater, Independent Thinker Film Series, Code: Debugging the Gender Gap Invited Panelist
June-July 2019	Big Data Summer Institute (Summer Institute in Biostatistics program) Graduate Student Instructor
Sept. 2017-May 2020	Girls Who Code at UM DCMB Club Facilitator
July 2019	Girls Who Code at UM DCMB's Data Science Summer Experience in Detroit Facilitator
July 2018, 2019	Summer Bridge Scholars Program, Genetics and Genomics Campus Connection Instructor
May 2019	Genetic Epidemiology (SMED 8020, Norwegian Univ. of Science & Technology) Guest Lecturer
April 2019	Skype A Scientist Speaker
April 2018, '19, '20	Genomics in Epidemiology (EPID 516, University of Michigan) Guest Lecturer
March 2019	Graduate Society of Black Scientists and Engineers Intro to Python Workshop Instructor
March 2019	Python Software Carpentry Workshop Instructor's Assistant
Nov. 2016-Mar. 2019	Females Excelling More in Math, Engineering & the Sciences Semester Capstone Activity Leader
December 2018	South Asheboro Middle School's Biotech Careers Guest Scientist
Fall 2018	Tutor for Molecular Genetics (HUMGEN 541, University of Michigan)
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
March 2018	Forsythe Middle School Young Scientists' Expo Demonstration Leader
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
August 2015	Girl Scout Troop 40004's STEM badge Guest Speaker

LEADERSHIP & COMMUNITY INVOLVEMENT

May 2016-July 2018	UNC General Alumni Association's Ann Arbor Carolina Club Chair	Ann Arbor, MI
May 2016-Nov. 2019	Wesley Foundation at the University of Michigan Community Coordinator (May – Sept. 2016) Loud Lecture Committee Member (April 2016 – November 2019)	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; electronic health record data management
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, Apple and Microsoft Operating Systems

CONTINUING EDUCATION

August 2019	Leena Peltonen School of Human Genomics *Health 2030 Genome Center, Switzerland*
July 2018	23rd Summer Institutes in Statistical Genetics Modules: Adv. Quantitative Genetics, Statistical & Quantitative Genetics of Disease *University of Washington Department of Biostatistics*
Sept.-Dec. 2014	Genetic Counseling Professional Topics Seminar *Foundation for Advanced Education in the Sciences (3 credits)*
Sept. 2014-May 2015	NIH Academy Certificate Program *National Institutes of Health (Certificate of Completion)*
Spring 2014	Current Topics in Genome Analysis *National Human Genome Research Institute Division of Intramural Research*
March 2014	Writing and Publishing a Scientific Paper *National Institutes of Health Office of Intramural Training and Education (Certificate of Training)*
October 2013	Computing for Data Analysis *Coursera partnership with JHU Bloomberg School of Public Health (Statement of Accomplishment)*