Ekaterina Khvatkova
Ekaterina.Khvatkova@advocatehealth.org
Curriculum Vitae

ACADEMIC TITLE

Biostatistician III
Department of Biostatistics and Data Science
Division of Public Health Sciences
Wake Forest University School of Medicine

EDUCATION

5/2022 **Wake Forest University**
Winston Salem, NC
M.S. in Mathematical Statistics, Cum Laude

5/2020 **University of Alabama**
Tuscaloosa, AL
B.S. in Applied Mathematics, Summa Cum Laude
Minors in Liberal Arts (Blount Scholar's Program) and Russian Studies

EMPLOYMENT

Professional Experience

8/2025 – Present **Biostatistician III**, Wake Forest University School of Medicine, Department of Biostatistics and Data Science, Winston Salem, NC

8/2022 – 8/2025 **Biostatistician II**, Wake Forest University School of Medicine, Department of Biostatistics and Data Science, Winston Salem, NC

8/2020 – 6/2022 **Graduate Teaching Assistant**, Wake Forest University, Department of Mathematics and Statistics, Winston Salem, NC

9/2018 – 5/2020 **Mathematics Tutor** (Part Time), Math Technology Learning Center, University of Alabama, Tuscaloosa, AL

RESEARCH

Current Research Involvement

9/2023 – Present **"Intrinsic DNA topology for causal variant identification."**
Methodology research integrating DNA topology with statistical genomics to identify disease-causing variants, reducing false positives in genetic association studies.
Funding Source(s):

- *"Intrinsic DNA topology for causal variant identification*."; Errett Fisher Foundation (PI: Hannah Ainsworth)
- *"Predicting uveitis onset in children with juvenile idiopathic arthritis.";* NIH/NEI Project Number: R01 EY030521 (PI: Carl Langefeld)
- *"Epigenetic Mechanisms That Drive Genetic Risk for Juvenile Arthritis."*; NIH Project Number: 7 R01 AR078785-03 (Internal PI: Hannah Ainsworth; Co-I: Carl Langefeld)
- *"The Ethnic/Racial Variations of Intracerebral Hemorrhage Genetics (ERICH-GENE).";* NIH Project Number: U01 NS069763 (Internal PI: Carl Langefeld)

8/2022 – Present **"Genomic and epidemiologic study of intracerebral hemorrhage."**
Integrated analysis of DTI white matter data, RNA-seq gene expression, genetic, and epigenome-wide DNA methylation data to investigate biological mechanisms underlying intracerebral hemorrhage.

Funding Source(s):

- *"The Ethnic/Racial Variations of Intracerebral Hemorrhage Genetics (ERICH-GENE).";* NIH Project Number: U01 NS069763 (Internal PI: Carl Langefeld)
- *"Recovery of StrokE - Longitudinal Assessment With Neuroimaging (ROSE LAWN)"*; NIH Project Number: R01 NS120493-01 (Internal PI: Carl Langefeld)
- *"Impact of socioeconomic disparity on the methylome of Parkinson's disease patients."*; (Internal PI: Carl Langefeld)

9/2022 – Present **"Epigenetics of methylphenidate effects in children with ADHD."**
Exploring how epigenetic mechanisms influence individual responses to methylphenidate (MPH), a first-line ADHD treatment, addressing the significant variability in patient outcomes that current pharmacogenetic studies have failed to predict.
Funding Source(s):

- *"Epigenetics of methylphenidate effects in children with ADHD."*; Funded by the University of Cincinnati's Center for Pediatric Genomics (PI: Tanya Froehlich; Co-I: Carl Langefeld)

10/2022 – Present **"Multi-ancestral genomic approach to SLE precision medicine."**
Using bioinformatic and systems biology analyses of SLE-associated SNPs to identify shared and ancestry-specific biological pathways influencing SLE risk.
Funding Source(s):

- *"Multi-ancestral genomic approach to SLE precision medicine."*; US Army Medical Research and Development Command Project Number: W81XWH-20-1-0686 (PI: Carl Langefeld)

9/2022 – Present **"Lung organ tissue equivalent platform for modeling chlorine gas toxicology and medical countermeasure efficacy."**
The adaptation of a previously developed microphysiological system, or Organ Tissue Equivalent (OTE) platform for modeling pulmonary toxicity resulting from chlorine gas exposure.
Funding Source(s):

- *"Lung organ tissue equivalent platform for modeling chlorine gas toxicology and medical countermeasure efficacy."*; BARDA Project Number: 75A50119C00058 (PI: Anthony Atala; Co-I(s): Carl Langefeld, Hannah Ainsworth)

HONORS AND AWARDS

4/2020 **Graduate Teaching Assistantship Award**, Wake Forest University
2/2020 **Russian Departmental Honors Award**, University of Alabama
9/2019 **Blount Academic Scholarship Recipient,** University of Alabama
4/2019 **Employee of the Month,** Math Technology Learning Center, University of Alabama
8/2017 **UA Capstone Scholar Scholarship Recipient**, University of Alabama

SPECIALTY CERTIFICATION

9/2023 **CITI Program: Good Clinical Practice for Clinical Trials with Investigational Drugs and Biologics (ICH Focus)** (Expires 9/25/2026)
Credential: https://www.citiprogram.org/verify/?w7daf4c9c-a664-48ee-b17b-3d9f38493741-51744349

8/2022 **CITI Program: Biomedical Investigators** (Expires 7/02/2028)
Credential: https://www.citiprogram.org/verify/?w700f2a20-c641-48b0-b0e2-5a5613dce9a3-69416777

6/2022 **NYU Quantitative Public Health Data Literacy Certificate**, GrassROOTS Community Foundations
Description: Virtual four-week data analysis and visualization training with a focus on public health and social justice

Lead Organizers: Dr. Melody Goodman (NYU School of Global Public Health), Dr. Janice Johnson Dias (John Jay College of Criminal Justice)

ADMINISTRATIVE SERVICE

Departmental Service

1/2023 – Present **HPC Onboarding Training**, Wake Forest University School of Medicine, Department of Biostatistics and Data Science
Description: Development and maintenance of BDS onboarding HPC training materials, featured on the BDS Wikipedia page.

12/2024 – 3/2025 **Student Internship Hiring Committee Member**, Wake Forest University School of Medicine, Department of Biostatistics and Data Science
Description: Developed hiring rubrics and strategies, conducted reviews of written applications (reviewed over 100 applications and read ~40 resumes and cover letters), led a 1-hour scientific communication workshop, co-led weekly intern meetings for 8 weeks, planned a career panel with industry professionals, planned a 1-hour professional development workshop

MENTORING RELATIONSHIPS

Student Mentorships

5/2025 – 7/2025 **Sofia Sindici Forgiarini**
PhD Candidate, Pharmacogenomics, University of Trieste, Italy
Position: **Statistical Genetics Summer Internship Mentor** (PIs: Carl Langefeld, Timothy Howard), Department of Biostatistics and Data Science, Wake Forest University School of Medicine, USA
Project: "Personalization of therapy with methotrexate in juvenile idiopathic arthritis."
Description: Coordinated with administrative and IT departments to facilitate new hire setup and integration; developed tailored training materials to accommodate varying levels of statistical proficiency; facilitated new hire onboarding to high-performance computing (HPC) systems; provided regular updates to PIs on new hire's development and achievements.

5/2024 – 7/2024 **Benjamin Vye**
Undergraduate Student, Biostatistics, UNC Chapel Hill, USA
Position: **Statistical Genetics Summer Internship Mentor** (PI: Hannah Ainsworth), Department of Biostatistics and Data Science, Wake Forest University School of Medicine, USA
Project: "Enrichment in DNA shape disruption between topologically associating domains (TADs) and TAD boundaries."
Description: Provided career guidance and offered constructive feedback on his final presentation.

CONFERENCES, WORKSHOPS, POSTERS AND PRESENTATIONS

Presentations

8/2025 **BDS Staff Brown Bag Talk**, Department of Biostatistics and Data Science, Wake Forest University School of Medicine, Winston Salem, NC
Title: "Intrinsic DNA topology for causal variant identification."

6/2025 **Internship Workshops**, Department of Biostatistics and Data Science, Wake Forest University School of Medicine, Winston Salem, NC
Title: "Brief guide to effective scientific communication."

Poster Presentations

10/2025 **(*Upcoming*) WFUSM PHS Staff Science Day**, Division of Public Health Sciences, Wake Forest School of Medicine, Winston Salem, NC
Title: "Mathematical derivation of a DNA topology-based disruption metric: modeling the structural consequence of genetic variants."
Authors: **Ekaterina S. Khvatkova**, Carl D. Langefeld, Hannah C. Ainsworth

Contributed Posters

2/2026 **(*Upcoming*) International Stroke Conference**, New Orleans, LA
Title: "Stroke literacy and loss to follow-up in a secondary prevention cohort of intracerebral hemorrhage survivors."
Authors: Evy M. Reinders, Ayneisha Tinoble, Meara Maulik, Jasper R. Senff, Monica Ayala-Rivera, Setareh Akhavan, George Usmanov, **Ekaterina S. Khvatkova**, Guido J. Falcone, Matthew Bevers, Amar Dhand, Daniel Daneshvar, Adam de Havenon, Kazuma Nakagawa, Gunjan Parikh, Lesli Skolarus, Antonio Moya, Hannah Breit, Anjail Sharrief, Kevin N. Sheth, Christopher D. Anderson, Carl D. Langefeld, Jonathan Rosand, Sanjula D. Singh, Amytis Towfighi

10/2025 **(*Upcoming)* American College of Rheumatology Meeting**, Chicago, IL
Title: "Computational and laboratory identification of risk-driving alleles on juvenile idiopathic arthritis (JIA)-associated haplotypes."
Authors: Adam Y. He, Hannah C. Ainsworth, Kaiyu Jiang, **Ekaterina S. Khvatkova**, Yanmin Chen, Carl D. Langefeld, Charles G. Danko, and James N. Jarvis

4/2025 **Pediatric Academic Societies Meeting**, Honolulu, HI
Title: "Computational and laboratory identification of risk-driving alleles on juvenile idiopathic arthritis (JIA)-associated haplotypes."
Authors: Adam Y. He, Hannah C. Ainsworth, Kaiyu Jiang, Yanmin Chen, **Ekaterina S. Khvatkova**, Carl D. Langefeld, Charles G. Danko, and James N. Jarvis

3/2024 **Translational and Learning Health Systems Research Showcase**, Wake Forest University School of Medicine, Winston Salem, NC
Title: "Causal variant identification using intrinsic DNA topology: Assessing the structural consequence of genetic variants on transcription factor binding."
Authors: Hannah C. Ainsworth, **Ekaterina S. Khvatkova**, Miranda C. Marion, Carl D. Langefeld

Conferences Attended

8/2024 **Posit 2024 Workshop and Conference**, Seattle, WA
Workshop Attended: "R in Production".
Received training on best practices and modern approaches for robust and reproducible R programming and pipelines.

Staff Mentorships

4/2025 – 6/2025 **Achintya Varma**, Biostatistician II
Position: **Staff Onboarding Mentor**, Wake Forest University School of Medicine, Department of Biostatistics and Data Science
Description: Planned welcome lunch (~20 attendees), supported HPC onboarding, and held weekly acclimation meetings

1/2023 – 3/2023 **Jae Yong**, Biostatistician III
Position: **Staff Onboarding Mentor** (Co-Mentor: Amy Zinnia), Wake Forest University School of Medicine, Department of Biostatistics and Data Science
Description: Supported HPC onboarding, held weekly acclimation meetings.

COMMUNITY ACTIVITIES AND SERVICE

3/2023 **Blount Alumni Panel**
Invited Speaker, Virtual
Description: Participated in a one-hour alumni panel, offering career insights to undergraduate liberal arts students alongside three fellow alumni.

RELEVANT TEACHING EXPERIENCE

4/2022 – 6/2022 **Math Teacher Aid,** Reynolds High School, Winston Salem, NC
- Helped lead the early-stage planning and implementation of WFU math teaching assistance program at Reynolds High School to prepare local math class without a permanent teacher for their statewide end-of-course exam

8/2020 – 7/2022 **Graduate Teaching Assistant,** WFU Math and Statistics Department
- **Calculus II:** Fall 2020, Spring 2021, Fall 2022, Spring 2022; Weekly grading (~50 students a semester), and leading group study sessions (~2-15 students per session), one-on-one weekly tutoring sessions (~4 students a semester)
- **Calculus III:** Summer I 2021, Summer II 2021, Summer I 2022; Weekly grading and leading study sessions (~15 students)
- **Intro Statistics:** Summer I 2021, Summer II 2021; Weekly grading and leading study sessions (~15 students)

8/2018 – 5/2020 **Math Tutor,** University of Alabama, Tuscaloosa, AL
- Taught topics to students and helped students work through in-class problem sets alongside instructors, GTAs, and other undergraduate tutors in several **computer-assisted classrooms** for **introductory-level algebra, precalculus algebra, precalculus, and business calculus** (classes ranging from ~40-250 students)
- Proctored online tests and final exams for computer-assisted and traditional mathematics courses in online testing center (~400 students per time block)
- Tutored in open study sessions for **Precalculus, Calculus I, II, III, and Differential Equations I** courses alongside instructors, GTAs, and other undergraduate tutors

PROFESSIONAL MEMBERSHIPS AND SERVICE

7/2022 – 7/2023 **Blount Alumni Fellows**, University of Alabama
Member of the Student Relations and Recruitment Committee

10/2020 – 10/2022 **American Mathematical Society**
Wake Forest University, Member

5/2020 – 5/2022 **Pi Mu Epsilon**
University of Alabama, Member
Wake Forest University, Member

8/2018 – 5/2020 **Association for Women in Mathematics**
Wake Forest University, **Secretary** (8/2021 – 12/2021)
Description (Secretarial Position): Writing and designing monthly newsletter using MailChimp, graphical design of event flyers, organizing social and professional developmental programs
Awards: AWM National Student Chapter Award for Professional Development (Presented at Mathfest Conference in 2022)
Wake Forest University, Member
University of Alabama, Member

SKILLS

Languages:
English: Native Fluency
Russian: CEFR B2-Level (Reading and Writing); CEFR B1-Level (Listening)
French: CEFR B1-Level (Reading and Writing)
Programming Languages:
R Language, Bash, SAS, LaTeX, Quarto/RMarkdown, Python, MATLAB, C Language
High Performance Computing:
PuTTY, XMing/XQuartz, SLURM job scripting
Version Control:
Git, GitHub Actions, usethis (R package)
Applications and UIs:
VSCode, Positron, RStudio, MATLAB, Microsoft Excel, Mathematica
Statistical Genetics Analysis Pipelines:
methylKit, methrix, METAL, ChAMP
Statistical Genetics Software and Databases:
UCSC Genome Browser, UCSC Table Browser, JASPAR, ReMap, bedtools, AlphaFold Web Database, PDBe, GTeX Database, String, Cytoscape/MCode Clustering, Reactome
Operating Systems:
MacOS, Linux (Ubuntu), Windows 10

MATHEMATICAL AND SCIENTIFIC COURSEWORK

Mathematics – Mathematical Biology (G), Intro to Modern Mathematical Epidemiology (G), Boundary Value Problems (U), Differential Equations II (U), Numerical Linear Algebra (U), Complex Calculus (U), Theory of Probability (U), Discrete Mathematics (U)
Statistics – Applied Bayesian Statistics (G), Bayesian Analysis (G), Generalized Linear Models (G), Linear Models (G), Intro to Statistical Learning (G), Multivariate Statistics (G), Probability (G), Stochastic Processes and Applications (G), Statistical Inference (G), Advanced Statistical Inference (G)

*G=Graduate Level Course
*U=Upper Division Undergraduate Course

REFERENCES

Carl D. Langefeld, PhD
Wake Forest University School of Medicine
Division of Public Health Sciences
Department of Biostatistics and Data Science
Carl.Langefeld@advocatehealth.org

Hannah C. Ainsworth PhD
Wake Forest University School of Medicine
Division of Public Health Sciences
Department of Biostatistics and Data Science
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