Nur M. **Shahir**

Translational Bioinformatician

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Research Interests

- Environment-host-microbe interactions in the context of human health
- Interplay between host's gut microbiota and nervous system
- Multi-omics approaches to human health and/or public health

Education

University of North Carolina at Chapel Hill — *Chapel Hill, NC*

Ph.D. in Bionformatics and Computational Biology — *Aug.2014 - May 2020*

- Advisor(s): Dr. Terry S. Furey, Dr. Shehzad Z. Sheikh
- Committee: Dr. Michael I. Love (chair), Dr. Yufeng Liu, Dr. Ian Carroll

University of Maryland, Baltimore County — *Baltimore, Maryland*

M.S. in Statistics, Track: Biostatistics — *2011 - 2013*

- Advisor: Dr. DoHwan Park
- Capstone: Longitudinal Analysis of Urea Cycle Disorder Patients

Massachusetts Institute of Technology — *Cambridge, MA*

S.B. in Mathematics — *2006 - 2010*

Skills

Programming R, SAS, Python, SQL, C/C++, JAVA, HTML5, LaTeX, bash, QIIME2

Research Experience

Graduate Research Assistant — *University of North Carolina at Chapel Hill*

Advisors: Terrence S. Furey, Shehzad Z. Sheikh — *Winter 2015 - PRESENT*

- Performed exploratory analysis and association studies of the mucosa-adherent microbial populations of the human colon and terminal ileum in Inflammatory Bowel Disease (IBD) and surgical controls
- Developed bioinformatic workflow for microbiome samples for use on the computing clusters, kure and longleaf.
- Applied various bioinformatic tools including: QIIME, DADA2, phyloseq, PICRUSt.
- Presented research at local and national conferences.

Graduate Research Assistant (Research Rotations) — *University of North Carolina at Chapel Hill*

Advisor: Dr. Jonathan Berg; Dr. Alain Laederach — *Summer 2014, Fall 2014*

- Research Areas: Development of an informatics approach for the analysis of human exome sequencing data to augment newborn screening; Computational indentification of RNA splice junctions in SERPINA1, a serine protease inhibitor.

Graduate Research Assistant — *University of Maryland, Baltimore County*

Advisor: Dr. DoHwan Park — *Fall 2013*

- Conducted Capstone research project under the mentorship of Dr. DoHwan Park
- Generated a longitudinal model using data from the Urea Cycle Disorder Consortium

Summer Fellow

Genetics and Molecular Biology Branch, National Human Genome Research Institute

Mentor(s): Dr. Julie Segre, Dr. Sean Conlan

Summer 2012

- Piloted a study on the viral diversity of the human skin through the use of metagenomic datasets acquired from the human microbiome project.
- Assisted with fungal speciation of Malassezia species through bioinformatic tools
- Applied various bioinformatic tools including: Clustal, BioPython, BioPerl, and Bowtie
- Extracted full viral genomes from metagenomic datasets
- Presented research at NHGRI and NIH poster sessions.

Summer Fellow

Medical Genetics Branch, National Human Genome Research Institute

Mentor(s): Dr. Ellen Sidransky, Dr. Nahid Tayebi

Summer 2009

- Worked on defining the association between glucocerebrosidase mutations and Parkinsons disease.
- Learned and applied biological methods: including sequencing, PCR, westerns, RNA and protein extractions.
- Performed statistical analysis on gene expression data via Excel
- Trained incoming fellows in lab protocols
- Presented research at NHGRI and NIH poster sessions

Summer Fellow

Biochemical Pathology Section, National Cancer Institute

Mentor(s): Dr. David D. Roberts, Dr. Michael Pendrak

Summer 2007

- Worked on the development of a modification of a tetracycline-regulating system for developmental regulation in Candida albicans.
- Learned and applied methods in molecular biology and bioinformatics including: PCR, gel electrophoresis, BLAST, ClustalW, DNA purification.
- Trained incoming high school intern in lab protocols.

Publications

Accepted

Shahir NM, Wang JR, Wolber EA, Schaner MS, Frank DN, Ir D, Robertson CE, Chaumont N, Sadiq TS, Koruda MJ, Rehbar R, Nix BD, Newberry RD, Sartor RB, Sheikh SZ, Furey TS

Crohn's Disease Differentially Affects Region Specific Composition and Aerotolerance Profiles of Mucosally-Adherent Bacteria

Inflammatory Bowel Diseases. doi:10.1093/ibd/izaa103. PMID 32469069

Teaching Experience

Course Coach for Initiative Maximizing Student Development (IMSD)

University of North Carolina at Chapel Hill

Class: Introduction to Statistical Modeling

Fall 2016

- Lead tutoring sessions for graduate students in IMSD.
- Created lesson plans and evaluated student performance over the course of a semester.

Teaching Assistant

University of North Carolina at Chapel Hill

Class: Introduction to Statistical Modeling

Fall 2015

- Served as a guest lecturer for the class
- Collaborated on curriculum development.
- Held regular office hours and met with students upon request.
- Graded all written work.

Coding Instructor

University of North Carolina at Chapel Hill

How to Learn to Code - R Programming Language

Summer 2015

- Collaborated on curriculum and pre-test development.
- Lead small group lectures on topics and concepts in R.
- Served as a guest lecturer for main lecture portion of class.

Teaching Assistant — *University of Maryland, Baltimore County*

Classes: Calculus I, Calculus II, Introduction to Mathematical Inference (Grader) — *Spring 2012 - Fall 2013*

- Collaborated on curriculum and exam development.
- Held regular office hours and met with students upon request.
- Served as substitute lecturer.
- Graded all written work, including final exam papers.

Math Coach — *University of Maryland, Baltimore County*

Math Gym — *Fall 2013*

- Assisted with mathematics remediation for undergraduate students.

Honors & Awards

2015 **NIH T32 Fellow,** Bioinformatics and Computational Biology Predoctoral Training Grant — *NIH*

Presentations

External Talks

Crohn's Disease Differentially Affects Intestinal Region Composition and Aerotolerance Profiles of Mucosally-Adherent Bacteria — *Virtual*

Virtual Microbiome Summit — *May. 2020*

IBD differentially affects region specific composition and aerotolerance profiles of mucosal-adherent bacteria — *Virtual*

MIT and UNC Joint Virtual Microbiome Seminar Series — *May. 2020*

University of North Carolina at Chapel Hill

Crohn's Disease and the Intestinal Microbiota — *Chapel Hill, NC*

Genetics Research Colloquium — *Dec. 2016*

Alterations in the Mucosal-Adherent Enteric Microbiota Between CD and nonIBD — *Chapel Hill, NC*

Translational Medicine Closed Door Talks — *Oct. 2016*

A distinct microbiota signature characterizes patients with penetrating Crohn's disease — *Chapel Hill, NC*

Center for Gastrointestinal Biology and Disease — *Oct. 2015*

Analysis of the Composition and Diversity of the Colonic Mucosa Microbiota in Crohn's Disease — *Chapel Hill, NC*

Bioinformatics and Computational Biology Curriculum New Student Talks — *May 2015*

Identification of SERPINA1 Splice Variants from Next-Gen Sequencing Data — *Chapel Hill, NC*

Bioinformatics and Computational Biology Research in Progress Talks — *Oct. 2014*

Posters

University of North Carolina at Chapel Hill

Characterizing the Intestinal Mucosal Landscape in Inflammatory Bowel Disease — *Chapel Hill, NC*

Genetics Department Retreat — *Aug. 2017*

Analysis of the Composition and Diversity of the Colonic Mucosa Microbiota in Crohn's Disease — *Chapel Hill, NC*

Genetics Department Retreat — *Aug. 2016*

Analysis of the Composition and Diversity of the Colonic Mucosa Microbiota in Crohn's Disease

Chapel Hill, NC

Center for Gastrointestinal Biology and Disease Poster Session

Jul. 2015

Analysis of the Composition and Diversity of the Colonic Mucosa Microbiota in Crohn's Disease

Chapel Hill, NC

Information Technology Services Research Computing Symposium

May 2015

External

Analysis of mucosal adherent 16S rRNA reveals altered microbial composition and decreased diversity in patients with Crohns disease

Baltimore, MD

American Society for Human Genetics

Oct 2015

Leadership, Service, & Professional Development

Graduate and Professional Student Federation

University of Chapel Hill at North Carolina

Senator, Elected

Aug. 2017 - Aug. 2019

- Represented department in Graduate and Professional Student Federation (GPSF).
- Assisted in crafting legislation for legislative body of GPSF.

Rigor and Reproducibility Workshop

University of Chapel Hill at North Carolina

Participant

May 2016

- Participated in a three week long, biweekly workshop in rigor and reproducibility in biomedical research.