

Markia A. Smith

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EDUCATION:

University of North Carolina Chapel Hill, Chapel Hill, NC

PhD in Pathobiology and Translational Science

Anticipated August 2022

Co-Mentors: Katherine Hoadley, PhD and Melissa Troester, PhD, MPH

Relevant Coursework: Cancer Genomics and Class Discovery, Topics in Statistical Genetics and Genomics

Thesis: Developing methods to study DNA repair in diverse populations

Baylor College of Medicine, Houston, TX

Post-baccalaureate

May 2018

University of Delaware, Newark, DE

Bachelor of Science in Biochemistry

May 2017

Minor: Chinese Studies

RESEARCH INTERESTS:

Cancer; Genomics; Epidemiology; Health disparities; Marginalized populations; Structural determinants of health; AI/ML; Biostatistics; Risk prediction; Methods development; Bioethics; Ethical Legal and Social Implications (ELSI); Community engagement; Cost effectiveness; Research ethics; Mixed methods; Interdisciplinary research

RESEARCH SKILLS:

Mixed methods research; Big data analysis; DNA and RNA sequencing methods; Sequencing technologies; Data pre/postprocessing; Data quality control; Data integration; Statistical Analyses; Population based studies; Clinical data analysis; Data sharing and security; Project management

TECHNICAL SKILLS:

Programming languages: Proficient in R, Python, Linux/Unix shell scripting, Matlab

Design: Familiar with HTML, CSS, Javascript

Programs/Software: Visual Studio, LaTeX, ImageJ, ChemDraw, Pymol, Vector NTI, FlowJo

EXPERIENCE:

Clinical Research Consultant

August 2020-Present

QuantBio LLC

- Execute in-depth literature research, data collection, management and analysis, screened data as requested by client
- Convey complex technical insights and create detailed reports based on research findings to clients
- Attention to detail and ability to manage multiple projects and priorities
- Collaborate with consultant team to ensure client's objectives are met

Graduate Research Assistant

April 2019-Present

Co-Mentor: Katherine Hoadley, PhD

Department of Genetics, UNC Lineberger Comprehensive Cancer Center

Co-Mentor: Melissa Troester, PhD, MPH

Department of Epidemiology, Gillings School of Public Health

- Understanding cancer biology through genomic analyses to study the tumor microenvironment and heterogeneity
- Gain an understanding of interactions between the environment and cancer genomics by integrating genomic data and molecular biology within human studies of cancer pathogenesis and progression
- Determine effects of genomic alterations, and develop/discover genomic determinants of response to therapy

UNC BBSP Spring Research Rotation

February 2019-April 2019

Mentor: Benjamin Vincent, MD

Department of Bioinformatics and Computational Biology, UNC Lineberger Comprehensive Cancer Center

- Validated a linear model for prediction of immunotherapy response in bladder cancer
- Analyzed single cell transcriptome data to explore mechanisms of response versus resistance to therapy

UNC BBSP Winter Rotation

November 2018-February 2019

Mentor: Melissa Troester, PhD, MPH

Department of Epidemiology, Gillings School of Public Health

- Completed pilot study to evaluate of the accuracy of NanoString analysis for bladder cancer molecular subtype identification
- Optimized sample quality control analyses to obtain a better success rate for formalin-fixed paraffin-embedded human breast tumor samples

UNC BBSP Fall Research Rotation

August 2018-November 2018

Mentor: Jen Jen Yeh, MD

Departments of Pharmacology, and Surgery, Lineberger Comprehensive Cancer Center

- Established PDX tissue derived pancreatic ductal carcinoma (PDAC) organoid model representative of the tumor microenvironment
- Characterized PDAC organoids using key epithelial-to-mesenchymal transition markers and gene expression data
- Established two-dimensional cell line derived from organoids
- Established organoids from two-dimensional patient-derived xenograft tissue cell derived cell line

Post-baccalaureate Researcher

June 2017-June 2018

Mentor: Cliona Rooney, PhD

Cell and Gene Therapy, Texas Children's Hospital, Houston, TX

- Generation of broader repertoire Epstein-Barr virus (EBV)-specific T cells for EBV+ lymphomas
- Construction of constitutive cytokine receptor that potentially improves proliferation, survival, and anti-tumor activity of genetically modified T cells during repeated exposure to tumor cells
- Investigation of ways to render CAR-Ts resistant to immune evasion strategies used by tumor cells to grow in an immunocompetent host

Undergraduate Researcher

August 2016-May 2017

Mentor: Audrey Rossi, MS

Center for Disabilities Studies, University of Delaware, Newark, DE

- Administered a statewide survey to individuals with developmental disabilities
- Assessed the outcomes of services provided to individuals with disabilities and their families
- Interpreted data from sources using statistical techniques and provided ongoing reports
- Communicated results with decision makers to inform policies

Undergraduate Researcher

May 2015-May 2017

Mentor: John H. Slater, PhD

Department of Biomedical Engineering, University of Delaware, Newark, DE

- Prepared and presented data at laboratory meetings and departmental gatherings

Project Two: A 3D Model to Study Tumor Dormancy

- Used biomimetic PEG-based hydrogels ranging in stiffness for encapsulation and long-term 3D culture of breast cancer cells
- Investigated cancer cell behavior and disease progression within 3D hydrogel scaffolds

Project One: Creation of hADMSC Line Stably Expressing FRET-based Vinculin Tension Sensor

- Compared efficacy of two nonviral transfection techniques
- Visualized tension across cells using a FRET-based tension sensor
- Maintained immortalized hTERT mesenchymal stem cell line

Summer Intern

June 2016-August 2016

Mentor: Ryan L. Frisch, PhD

DuPont Industrial Biosciences Technology Team, Experimental Station, Wilmington, DE

- Developed new tools for microbial strain and genome engineering using state-of-the-art methodologies
- Reported laboratory progress at departmental meetings
- Gained management and leadership training through professional development seminars
- Participated in departmental and company business meetings, liaised with senior management

Undergraduate Researcher

June 2014-August 2014

Mentor: Colin Thorpe, PhD

Department of Chemistry and Biochemistry, University of Delaware, Newark, DE

- Investigated inhibitors of oxidative protein folding
- Assisted in development of plate reader assay for Riboflavin-Binding Protein (RfBP)
- Developed streamlined purification procedure for apoRfBP for UD teaching labs

- Prepared visual and written report summarizing data analysis and conclusions

PUBLICATIONS

- Damrauer, J.S.*, **Smith, M.A.***, Walter, V., Thennavan, A., Mose, L.E., Selitsky, S.R., and Hoadley, K.A. (2021) Genomic characterization of rare molecular subclasses of hepatocellular carcinoma. *Commun Biol* 4, 1150. <https://doi.org/10.1038/s42003-021-02674-1>
- Damrauer, J.S.*, Roell, K.*, **Smith, M.A.***, Sun, X., Kirk, E.L., Hoadley, K.A., ... Bochner, B., Furberg, H., Troester, M.A., and Pietzak, E. (2021) Identification of a Novel Inflamed Tumor Microenvironment Signature as a Predictive Biomarker of Bacillus Calmette-Guérin Immunotherapy in Non-Muscle-Invasive Bladder Cancer. *Clin Cancer Res.* <https://doi.org/10.1158/1078-0432.CCR-21-0205>
- Gosztyla, M. L., Kwong, L., Murray, N. A., Williams, C. E., Behnke, N., Curry, P., Corbett, K. D., DSouza, K. N., Gala de Pablo, J., Gicobi, J., Javidnia, M., Lotay, N., Prescott, S. M., Quinn, J. P., Rivera, Z., **Smith, M. A.**, Tang, K., Venkat, A., & Yamoah, M. A. (2021). Responses to 10 common criticisms of anti-racism action in STEMM. *PLoS computational biology*, 17(7), e1009141. <https://doi.org/10.1371/journal.pcbi.1009141>
- Martschenko, D.O.*, **Smith, M.A.***. (2021) Genes do not operate in a vacuum, and neither should our research. *Nat Genetics* 53, 255–256. <https://doi.org/10.1038/s41588-021-00802-5>
- Walens, A., Hamilton, A., Smith, M.A., Gao, X., Kirk, E., Hursting, S., Hoadley, K.A., Vaziri, C., Troester, M.A. (2021). Abstract PS19-03: DNA repair imbalance and immune response in breast cancer mortality disparities. *Cancer Res* (2021) 81 (4_Supplement): PS19-03. <https://doi.org/10.1158/1538-7445.SABCS20-PS19-03>.
- Garcia Recio, S., Xia, Y., Hinoue, T., Pascual, T., Hughes, N.M., Chandran, U.R., **Smith, M.A.**, Garrido-Castro, A.C., ... Mardis, E., Laird, P., Hoadley, K.A., Balko, J., and Perou, C.M. Multiplatform Analysis of Primary and Metastatic Breast Tumors from the AURORA US Network finds microenvironment and epigenetics drivers of metastasis. *Accepted Nature* 2022.
- Smith, M.A.**, Van Alsten, S.C., Walens, A., Damrauer, J.S., Vaziri, C., Troester, M.A. and Hoadley, K.A. DNA Damage repair classifier defines distinct groups in hepatocellular carcinoma. *In preparation*.
- Walens, A.*, Van Alsten, S.C.*, Olsson, L.T., **Smith, M.A.** ... Perou, C.M, Hoadley, K.A., Troester, M.A. RNA-based classification of homologous recombination deficiency in racially-diverse patients with breast cancer. *In preparation*.

*Equal contribution

PRESENTATIONS:

- Markia A. Smith**, Sarah C. Van Alsten, Andrea Walens, Jeffrey S. Damrauer, Cyrus Vaziri, Melissa A. Troester, Katherine A. Hoadley. DNA damage repair classifier defines distinct groups in hepatocellular carcinoma. 13th Annual Translational Medicine Symposium. Chapel Hill, NC (2022). *Oral Presentation*.
- Markia A. Smith**, Melissa A. Troester, Katherine A. Hoadley. Mutational signatures classification in Black and non-Black women with breast cancer. 12th Annual Translational Medicine Symposium. Virtual (2021). *Oral Presentation*.
- Markia A. Smith**, Melissa A. Troester, Katherine A. Hoadley. Mutational signature analysis in Black and non-Black women with breast cancer. Komen Annual Breast Cancer Disparities Research Summit. Virtual (2020). *Oral Presentation*.
- Markia A. Smith**, Melissa A. Troester, Katherine A. Hoadley. Mutational signature analysis in Black and non-Black women with breast cancer. UNC Pathology and Laboratory Medicine Annual Research Symposium. Virtual (2020). *Poster Presentation*.
- Markia A. Smith**, Erin L. Kirk, Charles M. Perou, Melissa A. Troester, Katherine A. Hoadley. Extending mutational signature analysis to targeted sequencing panels: A pilot study in FFPE tissues from CBCS. UNC Lineberger Comprehensive Cancer Center Scientific Retreat. Chapel Hill, NC (2019). *Poster Presentation*. **Third Place Poster Session Winner**.
- Markia A. Smith**, Erin L. Kirk, Charles M. Perou, Melissa A. Troester, Katherine A. Hoadley. Extending mutational signature analysis to targeted sequencing panels: A pilot study in FFPE tissues from CBCS. UNC Pathology and Laboratory Medicine Annual Research Symposium. Chapel Hill, NC (2019). *Poster Presentation*.
- Markia A. Smith** and Benjamin Vincent. Discovering determinants of response to PD-1 inhibition in the BBN963 bladder cancer model. UNC Biological and Biomedical Sciences Spring Presentations. Chapel Hill, NC (2019). *Oral Presentation*.

Markia A. Smith, Sandra Zарmer, Yi Xu, Silvia G. Herrera, Ashley B. Morrison, Jen Jen Yeh. Generation and characterization of pancreatic organoids and 2D PDX cultures for cancer analyses. UNC Biological and Biomedical Sciences Fall Rotation Poster Session. Chapel Hill, NC (2018). *Poster Presentation*.

Markia A. Smith, Sandhya Sharma, Rayne Rouce. Third-party Epstein-Barr virus specific T cells (EBVSTs) for EBV+ malignancies. Baylor College of Medicine Research Symposium. Houston, TX (2018). *Oral Presentation*.

Markia A. Smith, Ryan L. Frisch, Arthur L. Kruckeberg, and Celia Payen. New tools for microbial strain and genome engineering using state-of-the-art methodologies. DuPont Industrial Biosciences Summer Research Symposium. Wilmington, DE (2016). *Poster Presentation*.

Markia A. Smith, Hetty Nie, and John H. Slater. Creation of human adipose-derived mesenchymal stem cell line that stably expresses a FRET-based vinculin tension sensor. University of Delaware Undergraduate Research Symposium. Newark, DE (2015). *Poster Presentation*.

Markia A. Smith and Colin Thorpe. Purification and other applications of Riboflavin-binding protein (RfBP). University of Delaware Undergraduate Research Symposium. Newark, DE (2014). *Poster Presentation*.

Markia A. Smith and Tatyana Polenova. Investigations into the structure of HIV-1 pentameric capsid protein assemblies. The American Chemical Society National Meeting. Philadelphia, PA (2012). *Poster Presentation*.

AWARDS AND HONORS:

Susan G. Komen TREND Grant	2021-Present
Program in Translational Medicine T32 Training Grant	2019-2020
Delaware INBRE Summer Scholars Program (DISSP)	2015-2016
Research Experiences to Advance Chemists in Training (REACT) Fellowship	2014

INVITED PRESENTATIONS AND SERVICE TO COMMUNITY AND ADVOCACY GROUPS

Invited Speaker. Opening the gates: a push for inclusion of Black people in genomic medicine. *Gatekeeping Genetics: Towards a More Diverse, Just, and Inclusive Research Enterprise*, American Society of Human Genetics (ASHG) Virtual Meeting, October 22, 2021.

Co-moderator. Invited Session: Gatekeeping Genetics: Towards a More Diverse, Just, and Inclusive Research Enterprise, American Society of Human Genetics (ASHG) Virtual Meeting, October 22, 2021.

Invited participant. *ASHG Diversity Luncheon*, American Society of Human Genetics (ASHG) Virtual Meeting, October 27, 2020.

Thought leader. *Chat with #BlackinGenetics organizer Markia Smith about Systemic Racism in Science*, American Society of Human Genetics (ASHG) Virtual Meeting, October 27, 2020.

Guest lecture. *Race and genetics: using genetics to fight health disparities*. Life Sciences for Middle Grades Teachers, Webinar, October 6, 2020.

COMMITTEE AND ADMINISTRATIVE SERVICE

ClinGen JEDI Advisory Board 2022-Present
NIH Clinical Genome Resource (ClinGen)

- Contribute resources to the genomic knowledge base that will enhance health equity across populations
- Ensure the rigorous and responsible use of diverse population descriptors in clinical genetics and genomics

EDGE Advisory Committee 2020-Present
University of North Carolina at Chapel Hill, Chapel Hill, NC

- Assisted co-PIs and Program Director with guidance, evaluation, and oversaw implementation of the training program

TEACHING/MENTORING EXPERIENCE:

Mentor August 2017-Present

- Served as a mentor to black students interested in STEM, and assisted with post-undergraduate career plans, understanding career options in STEM, and provided financial advice
- Continued support and guidance upon matriculation to professional school, and ensured retention in STEM field of interest

- Peer mentor, BBSP First Year Group Seminar** August 2019-Present
University of North Carolina at Chapel Hill, Chapel Hill, NC
- Facilitated peer-mentor led panel discussions center on topics that important for student success in grad school
 - Helped first year students develop their good presentation skills through vigorous practice talk sessions and advisement
 - Built community through class engagement, attendance at social events, and individual/group meetings
- Teaching Assistant, Pathophysiological Basis of Disease Laboratory II (PATH716L)** January 2020-April 2020
University of North Carolina at Chapel Hill, Chapel Hill, NC
- Aided students in reviewing preserved gross specimens and completing worksheets based on case studies and digital slides
 - Created and proctored quizzes designed to help students recognize basic pathologic processes in major organ systems at the gross and microscopic levels
- Instructor, Duke TIP Scholar Weekend** October 2019
Duke University, Durham, NC
Course Title: Patient Zero: Disease, Public Health, and Infection Control in the 21st Century
- Submitted detailed lesson plan with course description, course objectives, and classroom expectations
 - Introduced basic principles of global public health and special challenges facing public health workers currently
 - Described advances that have increased quality of life and eradicated some diseases
 - Covered causes of newly emerging infections, from antibiotic resistance to zoonosis to novel genetic combinations, and the possible impacts on future disease
 - Focused on analyzing and interpreting scientific literature, and disseminating current scientific advances in the infectious disease field
- Instructor, Duke TIP Scholar Weekend** February 2019
Duke University, Durham, NC
Course Title: The Biology of Cancer
- Submitted detailed lesson plan with course description, course objectives, and classroom expectations
 - Explored molecular and genetic changes that lead to cancer, and introduced research ethics
 - Provided insight into current cancer treatment protocols and advancements for the most prevalent cancer types
 - Taught students the role of oncogenes and tumor suppressor genes in the development of cancer, and supported the advancement of students understanding of human cancer through individual and group research
 - Created and discussed case studies for different types of cancers, including risk factors, symptoms, diagnostic workup, and treatment plans
 - Focused on analyzing and interpreting scientific literature, and disseminating current scientific advances in the cancer field
- Tutor, K-College levels** August 2013-Present
- Provided one-on-one, in-home tutoring, test-prep, and college counseling services to students
 - Focused on customized lessons to fit the students' learning styles, personalities, and other factors
 - Worked closely with students suffering from test anxiety to help class and test performance
 - Gained experience in tutoring students with intellectual disabilities, autism, and ADHD/ADD
- Student Enrichment Coordinator, Upward Bound Math/Science** June 2018-August 2018
Delaware Technical Community College, Wilmington, DE
- Provided services and resources to underrepresented populations to increase college readiness and advance the academic standing of students in math and science courses.
 - Assisted under-served secondary students/program participants in areas such as needs assessment, tutoring coordination, interest inventory, goal identification, etc.
 - Planned and facilitated research-based class that required students to formulate their research into a clear, concise presentation as well as aptly field questions related to their research project
- Teaching Assistant, Quantitative Chemistry (CHEM120)** February 2017-May 2017
Department of Chemistry and Biochemistry, University of Delaware, Newark, DE
- Held weekly office hours to enable students to apply lecture material to problem sets and answered course related questions
- Near Peer Readiness Counselor, Newark High School** August 2016-June 2017
Department of Higher Education Office, Dover, DE

- Served as mentor for high school students and assisted with college and FAFSA applications, understanding college costs and financial aid, career decisions, and budgeting for students
- Developed and delivered presentations on college and career topics to 9-12 graders at high schools in Newark and Wilmington areas, followed by continued support and event coordination for students

Teaching Assistant, Dr. Sharon Watson

August 2014-May 2017

Strategic Management (**BUAD441**), Corporate Strategy (**BUAD890**)

Department of Business Administration, University of Delaware, Newark, DE

- Assisted faculty member with classroom instruction, exams, record keeping and other projects

Teaching Assistant, Intro to Chemical Sciences (CHEM115)

August 2016-December 2016

Department of Chemistry and Biochemistry, University of Delaware, Newark, DE

- Held weekly office hours to enable students to apply lecture material to problem sets and answered course related questions

Tutor Facilitator, Introduction to Biochemistry Course (CHEM342)

January 2016-May 2016

Department of Chemistry and Biochemistry, University of Delaware, Newark, DE

- Facilitated class discussions that provided opportunities to tie theory into students' lives

CAMPUS AND COMMUNITY INVOLVEMENT:

BlackInData, #BlackInDataWeek

November 2020-Present

Co-organizer

- BlackInData aims to provide community and a support system for Black people in data across the Black diaspora, encourage growth in our professional and academic learning paths, and elevate the voices and experiences of Black people working in data fields

BlackInGenetics (BIG), #BlackInGeneticsWeek

August 2020-Present

President, Co-organizer

- BIG is an organization dedicated to amplifying voices and work by Black-identifying geneticists across the U.S. and beyond. (blackingenetics.com)

Building Relationships to Diversify Graduate Education (BRDGE) Alliance

August 2019-Present

Program Coordinator

- Empower and develop underrepresented students in STEM and medicine through peer mentoring, professional development, and outreach initiatives

UNC Birth Partners Program, UNC-CH

May 2019-Present

Birth Doula

- Provide laboring women and their family continuous emotional support, physical comfort measures, an objective viewpoint, and assistance in obtaining information before, during, and postpartum childbirth

PROFESSIONAL AFFILIATIONS:

American Society of Human Genetics

2019-Present

American Association for Cancer Research

2018-Present