

Markia A. Smith

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EDUCATION:

University of North Carolina Chapel Hill, Chapel Hill, NC

PhD in Pathobiology and Translational Science

Anticipated 2021

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

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

Baylor College of Medicine, Houston, TX

Post-baccalaureate

May 2018

Relevant Coursework: Molecular and Cellular Biology, Introduction to Graduate Research, Translational Cancer Biology

University of Delaware, Newark, DE

Bachelor of Science in Biochemistry

May 2017

Minor: Chinese Studies

GPA: 3.30/4.00

Relevant Coursework: Organic Chemistry (Lab), Cancer Biology, Protein Structure and Function, Intermediary Metabolism

Study Abroad in South Africa

Winter 2016

- Completed courses in International Community Health and Global Health and Physical Activity
- Further examined community health initiatives in different cultures

Study Abroad in Rio de Janeiro, Brazil

Winter 2014

- Completed courses in History of Brazil and Anthropology of Tourism in Brazil
- Furthered Portuguese fluency by living with Brazilian host family, speaking solely Portuguese

RESEARCH EXPERIENCE:

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

Intern

June 2012-August 2012

Mentor: Tatyana Polenova, PhD

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

- Synthesized and purified proteins using chromatography methods, gel electrophoresis, and other scientific methods
- Assisted Graduate Student with collecting data on Microtubules and HIV-1 Capsid
- Prepared and presented data at laboratory meetings and local research meetings

AWARDS AND HONORS:

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
Project SEED Summer Research Program	2012

PRESENTATIONS:

Andrea Walens, Alina M. Hamilton, **Markia A. Smith**, Xiaohua Gao, Erin L. Kirk, Stephen D. Hursting, Katherine A. Hoadley, Melissa A. Troester. DNA repair imbalance and immune response in breast cancer mortality disparities. San Antonio Breast Cancer Symposium. Virtual (2020). *Poster 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 Zarmer, 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.*

INVITED PRESENTATIONS AND SERVICE TO COMMUNITY AND ADVOCACY GROUPS

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

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

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

PUBLICATIONS

Kyle Roell, Jeffrey Damrauer, **Markia A. Smith**, Amy Sun, Erin Kirk, Katie Hoadley, Halei Benefield, Matthew Milosky, William Kim, Guido Dalbagni, Hikmat Al-Ahmadie, Andy Olshan, Melissa Troester, Helena Furberg, Bernie Bochner, and Eugene Pietzak. (2020) Integrated analysis of gene expression profiling with targeted exome sequencing in non-muscle invasive bladder cancer: Expanding the clinical utility of molecular profiling for risk stratification and treatment selection. *Submitted August 2020.*

Jeffrey S. Damrauer*, **Markia A. Smith***, Vonn Walter, Aatish Thennavan, Lisle Mose, Sara Selitsky, and Katherine A. Hoadley. (2020) Cholangiocarcinoma-Like Hepatocellular Carcinoma Display Molecular Features of Transdifferentiation. *Submitted August 2020.*

Markia A. Smith*, Jeffrey S. Damrauer*, Katherine A. Hoadley. Integrated analysis of RNA molecular subtypes, CNV subtypes, and patient-level characteristics to characterize basal-like breast cancer outcomes. *In preparation.*

*Equal contribution

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 in order 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:

BlackInGenetics (BIG), #BlackInGeneticsWeek

August 2020-Present

Co-organizer

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

Building Relationships to Diversify Graduate Education (BRDGE) Alliance

August 2019-Present

Co-Founder

- 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

National Association for the Advancement of Colored People (NAACP), UD

August 2015- May 2017

Research Committee Chair (2016), Vice President (2015)

- Employed a variety of methods including research, professional development, and outreach programs to better the minority community

We're First, UD

August 2014- May 2017

Treasurer (2016, 2015), Founder (2014)

- Established valuable networks through promoting resources, fostered relationships through peer mentoring, and provided programmatic initiatives that empowered first generation students

American Society for Biochemistry and Molecular Biology (ASBMB), UD

August 2013-May 2017

Vice President (2016), Public Relations (2015)

- Organized events for students that connected them to research, professional schools post-graduation, and scholarship opportunities

Christiana Hospital

May 2014-December 2016

Volunteer

- Ensured safe, efficient escort of patients to various departments or main lobby for discharge

Friendship House, Inc.

May 2012-December 2014

Volunteer

- Advised homeless guests in finding housing, jobs, and other resources and assisted kitchen director with meal preparation

PROFESSIONAL AFFILIATIONS:

American Society Biochemistry and Molecular Biology, *Graduate Member*

2013-Present

American Society of Gene and Cell Therapy, *Associate Member*

2018-Present

EQUIPMENT/LABORATORY SKILLS:

DNA/extraction/quantification

Cell Culture

Transfection

Gel electrophoresis

Chromatography

Transduction

PCR

Microscopy

Immunohistochemistry

Expression Cloning

Flow Cytometry

NMR Spectroscopy

Computer data analysis

RELATED SKILLS:

Computer: Proficiency in Microsoft Office (Word, PowerPoint, Excel, and Publisher), ImageJ, ChemDraw, Pymol, Vector NTI, FlowJo, R, Linux/Unix, Python, Matlab