

# JOSHUA D. GREENLEE



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- Translationally-focused biomedical engineer with a strong background utilizing in vitro cancer models, orthotopic animal models, and patient-derived biospecimens to understand mechanisms of cancer metastasis and design novel drug delivery strategies
- Experienced scientific communicator, both oral and written, with the ability to communicate scientific discoveries to audiences from diverse backgrounds, resulting in 12 presentations (4 podium) at regional and national conferences and >8 peer-reviewed scientific publications
- Strong leadership and collaborative skills, from serving as a mentor to >200 undergraduate researchers through the SyBBURE Searle Undergraduate Research Program, to organizing research collaborations with key opinion leaders and physicians at Vanderbilt University Medical Center and Donald Guthrie Foundation for Research and Education

## EDUCATION

### Doctor of Philosophy - PhD

Biomedical Engineering

GPA: 3.89

Vanderbilt University, Nashville, TN

2017 - Present

### Bachelor of Science - BS

Chemical Engineering - Minor in Chemistry

GPA: 3.98 | *Summa Cum Laude*

Ohio University, Athens, OH

2013 - 2017

## RESEARCH EXPERIENCE

### Dr. Michael King Laboratory

Graduate Research Fellow | PhD Candidate

Biomedical Engineering, Vanderbilt University

2017 - Present

Thesis Title: "Trail Therapy for Exploiting Mechanisms of Drug Resistance and Metastasis in Advanced Colorectal Cancer"

- Managed multiple research projects resulting in three first-author publications
- Led in the innovation and product development of the liposomal delivery of anti-cancer moieties to metastatic cancers, resulting in nanoparticles that eradicated ~60% of circulating tumor cells in cancer patient blood
- Organized clinical collaborations, designed institutional review board protocols, and wrote patient consent documentation resulting in the opportunity to evaluate nanoparticle efficacy in patient-derived biospecimens
- Discovered a novel mechanism where chemoresistant cancer cells become more sensitive to cancer-targeted proteins, resulting in a high-impact, 30-page publication in the acclaimed journal *eLife*
- Communicated complex scientific findings by publishing three review manuscripts, including one in the top academic cancer journal, *Cancer Research*, which has been cited over 48 times
- Mentored two undergraduate researchers who contributed to multiple publications and gained research experience that propelled them to be admitted into top medical schools

### Dr. Doug Goetz Laboratory

Undergraduate Research Assistant

Chemical and Biomolecular Engineering, Ohio University

2015 - 2017

- Contributed as an integral member of a drug repurposing team that studied the inhibition of proinflammatory cytokines in ovarian cancer through a methimazole derivative, resulting in the publishing of a graduate student's thesis and a first-place poster award at the Ohio University Student Research Exposition

### Institute for Sustainable Energy and the Environment

Undergraduate Research Assistant

Ohio University

2014 - 2015

- Collaborated in the design of engineering systems for the desalination of fracking wastewater and repurposing of coal byproducts, and wrote detailed standard operating procedures (SOP) and experimental protocols to ensure user safety

## INDUSTRY EXPERIENCE

### Eastman Chemical Company

Chemical Engineering Intern | Innovation and Technology Division

Kingsport, TN

2016

- Assessed marketability of cellulose esters for new product applications through knowledge of industry trends and integrated findings into weighted decision matrices
- Coordinated and led cross continental meetings with Eastman marketing teams in Tennessee, Shanghai, and Singapore to pitch new product ideas from polymer properties

## LEADERSHIP AND TEACHING EXPERIENCE

### The SyBBURE Searle Undergraduate Research Program

Student Scientific Advisor

Nashville, TN

2018 - Present

- Demonstrated strong leadership and communication skills by incubating and inspiring the next generation of innovators through research, design, and community, resulting in >200 mentored students over 5 years and a published "Undergraduate Research Guide"
- Led and organized weekly subgroup and Think Tank meetings with undergraduate students to provide advice on research and professional topics

### Vanderbilt University

Teaching Assistant

Nashville, TN

2017 - 2022

Graduate Student Association (BME) Social Chair

2017 - 2019

- Organized monthly social events with fellow biomedical graduate students to foster department networking

### Ohio University

Russ College of Engineering Ambassador

Athens, OH

2016 - 2017

- Cultivated relationships with prospective engineering students as one of 2 ChE department representatives

Tau Beta Pi National Engineering Honor Society - Activities Chair Officer

2015 - 2017

Athens County Young Life Leader

2013 - 2017

## SELECTED PEER-REVIEWED PUBLICATIONS (5 of 8)

- Greenlee JD., et al. Oxaliplatin resistance in colorectal cancer enhances TRAIL sensitivity via death receptor 4 upregulation and lipid raft localization. *eLife* 10, e67750 (2021).
- Greenlee JD., Subramanian T., Liu K. & King MR. Rafting Down the Metastatic Cascade: The Role of Lipid Rafts in Cancer Metastasis, Cell Death, and Clinical Outcomes. *Cancer Res* 81, 5-17 (2021).
- Greenlee, JD., Liu, K., Lopez-Cavestany, M. & King, M. R. Piezo1 Mechano-Activation Is Augmented by Resveratrol and Differs between Colorectal Cancer Cells of Primary and Metastatic Origin. *Molecules* 27, 5430 (2022).
- Greenlee, JD., & King, MR. A Syngeneic MC38 Orthotopic Mouse Model of Colorectal Cancer Metastasis. *Biology Methods and Protocols* 7, bpac024, (2022).
- Greenlee JD., & King, MR. Engineered fluidic systems to understand lymphatic cancer metastasis. *Biomicrofluidics* 14, 011502 (2020).

## SELECTED CONFERENCE PRESENTATIONS (3 of 12)

- Greenlee JD., Liu K., King MR., "Metastatic Colorectal Cancer Cells Show Increased Resistance to Fluid Shear Stress-Induced Apoptosis". Biomedical Engineering Society; October 2021; Orlando, FL. **Podium**
- Greenlee JD., Ortiz-Otero N., Subramanian T., Liu K. & King MR, "TRAILing chemoresistance: Oxaliplatin resistance sensitizes colorectal cancer to TRAIL via death receptor localization." American Association for Cancer Research; April 2020. **\*Late breaking abstract\***
- Greenlee JD., Zhang Z., Yu F., Lui D., King MR. "TRAIL-Conjugated Liposomes to Kill Chemoresistant Cancer Cells in the Lymph Nodes". Society for Biomaterials; April 2018; Atlanta, GA. **\*Awarded 2nd Place Immune Engineering SIG\***

## HONORS AND AWARDS

- National Science Foundation Graduate Research Fellowship (NSF-GRFP) Awardee 2018
- Thomas R. Harris Graduate Fellowship 2017
- National Science Foundation Graduate Research Fellowship - Honorable Mention 2017
- American Chemical Society (ACS) Society of Chemical Industry (SCI) Scholar 2016
- Chemical and Biomolecular Engineering Keith Russ Outstanding Junior Award 2016
- Appalachian Cohort for Engineering Scholar 2013
- Alexander High School Valedictorian 2013

## SKILLS AND QUALIFICATIONS

Experimental Techniques - mammalian cell culture, flow cytometry, FACS, ELISA, siRNA transfection, CRISPR/Cas9 knockout, western blot, qRT-PCR

Primary Samples - liquid biopsy/blood sample processing, circulating tumor cell isolation and analysis, tumor digestion, isolation of macrophages, T cells and NK cells from blood and tissue samples

Microfabrication - liposome synthesis (extrusion and protein conjugation), photolithography, chemical and ion etching

Imaging - brightfield, fluorescence, and confocal microscopy, scanning electron microscopy (SEM)

Mouse work - survival surgery, injections (SC and IP), bioluminescence imaging (IVIS), necropsy

Software - MATLAB, ImageJ, GraphPad Prism, ChemCAD, Microsoft Office

Transferable Skills - project management, collaboration, scientific communication, mentorship, knowledge of industry trends, commercial acumen, lab organization, interpersonal skills, good laboratory practice (GLP)