MADISON THOMPSON

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PROFESSIONAL SUMMARY

Researcher focused on using data-driven and community-informed approaches to address public health inequities. Combines technical training in computational and statistical methods with applied experience in policy development, health systems research, and cross-cultural collaboration as a Fulbright UK Summer Institute participant.

EDUCATION

North Carolina State University, Raleigh, NC Expected May 2027
Bachelor of Science, Computer Science
Bachelor of Science, Science, Technology, and Society (Biomedical Concentration)

- GPA: 3.86/4.00
- Minors: Biological Sciences, Genetics, Mathematics
- Honors & Distinctions: Goodnight Scholar, Greenhouse Scholar, Grand Challenges Scholar, Franklin Scholar, Computer Science Ambassador, University Honors Program

King's College London, London, United Kingdom Jun 2025 – Jul 2025
Fulbright UK Summer Institute

- First Class Honours (74%)
- Program: Modern Britain: Institutions, Power, and People
- Completed coursework in comparative political institutions and social policy analysis
- Ongoing engagement with US–UK Fulbright Commission and international network

STEM Early College at NC A&T State University, Greensboro, NC Aug 2019 – May 2023
High School Diploma, AP Research Diploma, Service-Learning Diploma

- GPA: 4.7/4.0 (weighted)
- AP Scholar with Distinction
- Governor's School West Guest Speaker

Relevant Coursework:

Computer Science & Data Science: Data Structures and Algorithms, Automata Grammars, and Computability, Operating Systems, Software Engineering, Introduction to Artificial Intelligence, Introduction to Data Science, Automated Learning & Data Analysis, Machine Learning in Biomedical Research

Science, Technology & Society: Technological Catastrophes, Contemporary Science Technology & Human Values, Rise of Modern Science, Bio-Medical Ethics, Public Policy

Biology & Genetics: Principles of Genetics, Elementary Genetics Lab, Molecular Genetics, Biological Psychology

Mathematics & Statistics: Linear Algebra, Probability & Statistics for Engineers and Scientists, Applied Differential Equations I, Calculus III

Social Sciences & Humanities: Principles of Sociology, Community and Health, Women and Health, Kantian Ethics, Ethics in Computing, Philosophy of Science

RESEARCH INTERESTS

Computational epidemiology, health equity, social determinants of health, policy informatics, interdisciplinary approaches to public health systems, integration of genetic and community data to inform evidence-based health policy

RESEARCH EXPERIENCE

Bioelectricity Lab, NC State University, Raleigh, NC Mar 2025 – Present
Undergraduate Researcher
Principal Investigator: Dr. Mike Sano

- Engineer C and Python firmware for 2–6 kV electroporation hardware with automated waveform generation and fault-tolerant controls
- Integrate programmable gain amplifier (PGA) data acquisition systems with oscilloscopes; implement software safeguards to prevent device and sample damage
- Co-design embedded architecture and comprehensive validation suite; build unit and system tests to ensure reliability under failure modes
- Contribute to development of novel clinical electroporation devices for therapeutic applications
- Hold NC State certification in laboratory animal care; experienced in euthanasia procedures for mice and pigs in compliance with institutional animal protocols

Schnabel Lab, NC State University, Raleigh, NC Aug 2024 – May 2025
Undergraduate Research Assistant
Principal Investigator: Dr. Lauren Schnabel

- Conducted gene expression data analysis using SQL and Python to investigate steroids and biologics for osteoarthritis treatment
- Designed, optimized, and disseminated standardized PCR protocol for gene expression studies utilized across laboratory
- Developed and established protocols for RNA isolation and cell-conditioned media collection, implemented twice weekly in lab operations
- Conceived, implemented, and documented cell-culture studies supporting ongoing gene-expression research
- Co-author on oral presentation awarded **Best Oral Presentation** at NC State Integrative Symposium (January 2025)

Comparative Medicine Institute, Raleigh, NC Jan 2024 – Aug 2024
Summer Interdisciplinary Research Initiative (SIRI) Scholar

- Investigated effects of estrogen and progesterone on anterior cruciate ligament (ACL) tissue in porcine model of pre-pubescent female development

- Designed and implemented SQL database for laboratory data management and analysis
- Led interdisciplinary team discussions integrating computational and biomedical findings to refine experimental design
- Communicated research findings through iterative experimental design enhanced by data analysis using SQL, Python, and AWS
- Ensured reproducibility through documentation of experimental protocols
- Selected for podium presentation; awarded **3rd Place Poster** at CMI Annual Summit (August 2024)

PUBLICATIONS & PRESENTATIONS

Conference Presentations:

Pugliese, B*., Ruiz Rosario, F., **Thompson, M.E.**, Schnabel, L. "Gene Expression of Equine Joint Cells Treated with Alpha-2 Macroglobulin: Preliminary Insights." *Integrative Symposium for NC State Training Grants*, January 2025. **Best Oral Presentation Award.**

Thompson, M.E. Thompson, J., Pugliese, B., Schnabel, L., Fisher, M. "Effect of Hormones on ACL Fibroblast Gene Expression in a Porcine in vitro Model of Pre-Pubescent Female Development." *Comparative Medicine Institute Annual Summit*, August 2024. Podium presentation. **3rd Place Poster Award.** [View Poster]

Conference Abstracts:

Pugliese, B.R., Ruiz Rosario, F.K., **Thompson, M.E.**, Schnabel, L.V. "Alpha2EQ Downregulates Pro-Inflammatory Cytokine, Chemokine, and Metalloproteinase Gene Expression in Cultured Inflamed Synovial Fibroblasts." *American College of Veterinary Surgeons (ACVS) Surgery Summit*, Seattle, WA, October 2025.

Poster Presentations:

Thompson, M.E. "Full-Stack Optimization of a Multi-State Software System to Support Novel Clinical Electroporation Devices." *Grand Challenges Scholars Program Fall Symposium*, September 2025. Poster Presenter & GCSP Member & Alumni Panel Moderator. [View Poster]

Thompson, M.E. "Computational Public Health: Modeling Cancer Inequities and Designing Evidence-Based Policy Interventions." *Grand Challenges Scholars Program Annual Meeting,* February 2026. Poster Presenter. [View Poster]

Invited Talks:

Thompson, M.E. Greenhouse Scholars Annual Inspire, Boulder, CO, August 2025. Student Leadership Panel.

- Selected as one of six student panelists to present on SLCCE's educational equity model and nonprofit leadership

Thompson, M.E. Department of Computer Science Strategic Advisory Board, NC State University, November 2025. Panel discussion.

- Invited to provide undergraduate perspective on departmental strategic planning

SELECTED POLICY & RESEARCH PAPERS

“NC College Access for Cancer Prevention Initiative”
Truman Scholarship Finalist Application, The Harry S. Truman Scholarship Foundation, February 2026
[Full text: madisonthompson.org/research/truman-proposal.pdf]

- Developed evidence-based policy proposal linking educational attainment to cancer prevention in North Carolina, grounded in original LASSO regression analysis of SDOH and cancer outcomes across all 100 NC counties
- Proposed tiered tuition waiver and wraparound support program targeting first-generation students in rural NC counties; projected to prevent 9,331 cancer cases over 18 years and return $377M annually against $308M in program costs
- Demonstrated college graduation provides 4–16x greater protective effect against breast, lung, and colorectal cancer incidence than any other modifiable SDOH variable

"The Ethical Necessity of Rejecting the American Healthcare System"
PHI 325: Bio-Medical Ethics, NC State University, April 2026
[Full text: madisonthompson.org/research/bioethics.pdf]

- Constructed a convergence argument across relational, virtue, deontological, pluralist, liberal egalitarian, and utilitarian frameworks to demonstrate that the American healthcare system is ethically indefensible, not merely imperfect
- Grounded normative analysis in empirical SDOH data, including a 9.9-year life expectancy gap between the most and least advantaged Americans and a 58% cancer mortality disparity between high- and low-income counties
- Engaged primary sources in Gilligan, Noddings, Kant, Ross, Rawls, and Mill alongside secondary works by Mbembe, Roberts, Harding, and Daniels to situate the argument within contemporary bioethical discourse

"Regularized Regression Approaches to Understanding North Carolina Cancer Inequities"
CSC/ST 442: Introduction to Data Science, NC State University, December 2025
[Full text: madisonthompson.org/research/cancer-modeling.pdf]

- Evaluated county-level social determinants of health (SDOH) associations with breast, lung, and colorectal cancer incidence and mortality across 100 NC counties using OLS, Ridge, and LASSO regression models
- Identified educational attainment as consistent protective factor across cancer outcomes; demonstrated that SDOH effects vary substantially between incidence and mortality
- Produced actionable findings for NC public health policymakers regarding cancer prevention and treatment accessibility

"Telehealth Coverage for the Publicly Insured in North Carolina"
PS 310: Public Policy, NC State University, November 2025
[Full text: madisonthompson.org/research/telehealth.pdf]

- Conducted comprehensive policy analysis evaluating three alternative approaches to sustaining telehealth access for Medicaid recipients following expiration of federal COVID-era waivers

- Synthesized epidemiological evidence demonstrating telehealth reduces mortality by up to 56% for patients with chronic conditions in rural populations
- Developed policy recommendation for state-level Medicaid provisions addressing healthcare access for 34% of North Carolinians living in rural counties
- Integrated federalism analysis, stakeholder mapping, and economic impact assessment to inform evidence-based policy design

PROFESSIONAL EXPERIENCE

Triangle Cyber, LLC, Raleigh, NC Jan 2024 – Mar 2024
Cybersecurity Intern

- Contributed to development of AWS-based CyberLab; performed hands-on testing of enterprise security products including CrowdStrike, Splunk, Zeek, and Kali Linux
- Built and configured AWS EC2 instances (Linux, Windows); assessed security posture using AWS SecurityHub
- Developed REST API interface using AWS Cloud9 IDE to extract threat intelligence from CrowdStrike and correlate events with VirusTotal
- Performed vulnerability scans and assessments using CrowdStrike and Kali Linux
- Served as beta tester for CrowdStrike's Charlotte Artificial Intelligence (AI) solution
- Completed AWS Cloud Practitioner certification training

University Honors Program, NC State University, Raleigh, NC Aug 2023 – Jan 2025
Journalist

- Served on first media team re-established post-pandemic; contributed to strategic restructuring of UHP communications
- Developed community-centered marketing initiatives with students and staff
- Produced regular content highlighting UHP values, community, and programming
- Proposed programmatic changes implemented for future UHP cohorts

Private Tutor, Self-Employed, Greensboro, NC May 2019 – Dec 2024

- Designed and implemented customized lesson plans aligned with student, teacher, and parent academic goals
- Maintained support network serving 20+ students across multiple grade levels and subject areas
- Developed and maintained a professional website and brand for tutoring services
- Managed all business operations including finances, marketing, and client relations
- Served as a community leader and role model by attending student events and supporting holistic development

LEADERSHIP & ORGANIZATIONAL EXPERIENCE

Students Leading Collaborative Computing Education, Raleigh, NC Jul 2024 – Present
Co-Founder, Co-President
National 501(c)(3) Nonprofit Organization

- Co-founded and direct operations of nonprofit providing computing education to 450+ under-resourced high school students in first year
- Oversee two chapters across multiple states; manage 64 active members across three committees and one entrepreneurship initiative
- Manage 10+ strategic partnerships with public agencies, schools, and private organizations to expand program reach and secure resources
- Develop sustainable programming model addressing educational equity in computing and technology access

NAE Grand Challenges Scholars Program, Raleigh, NC Jun 2025 – Present
President, NC State University Chapter

- Lead board meetings and collaborate with faculty and campus partners supporting 200+ engineering scholars
- Plan and facilitate academic and professional development events serving 20–200 participants monthly
- Integrate research, interdisciplinary learning, and service initiatives aligned with NAE's Grand Challenges framework
- Advocate for interdisciplinary opportunities addressing global challenges in engineering and society

Greenhouse Scholars, Boulder, CO Aug 2023 – Present
Elected Class Leader (2 terms), Program Ambassador, Application Reviewer (3 terms), Finalist Interview Panelist (2 terms), Lead Video Application Reviewer (1 term)

- Held one of three elected class leader positions representing cohort of 33 scholars
- Developed and lead Financial Literacy and Professional Development programming for under-resourced college students
- Created organizational systems and project management frameworks adopted for future scholar cohorts
- Designed novel strategy of dividing projects into manageable deliverables enabling full cohort contribution
- Represented scholar perspectives in organizational strategic planning
- Interviewed candidates for the program and led discussions on applicant selection

Goodnight Scholars Program, NC State University, Raleigh, NC Aug 2023 – Present
Outreach Ambassador & Peer Mentor

- Deliver formal presentations to hundreds of prospective students and families across NC

- Coordinate outreach events with high schools to ensure eligible students access scholarship resources
- Provide tailored information on scholarship opportunities and college preparation for under-resourced students
- Represent the Goodnight Scholars Program at university events, in digital spaces, and through informational interviews
- Mentor current scholars on academic success, professional development, and leadership

Department of Computer Science, NC State University, Raleigh, NC Jun 2024 – Present
Computer Science Ambassador

- Engage in computer science outreach programs with K-12 students across NC
- Represent the Department of Computer Science at university recruitment and community engagement events
- Selected as a Graduation Marshal for Spring and Fall 2025 commencement ceremonies
- Present and share resources with prospective Computer Science students and families
- Collaborate with peer ambassadors to implement effective outreach programming

ADVOCACY & POLICY ENGAGEMENT

Fulbright Association, Washington, D.C. Mar 2026
Congressional Advocacy Delegate

- Selected to represent the North Carolina Chapter of the Fulbright Association at Fulbright Advocacy Day in Washington, D.C.
- Met with 4 congressional offices across multiple states as part of a coordinated effort of 100+ meetings in a single day
- Advocated for restoring the Fulbright budget to $287.8M and for international education funding and policy priorities
- Represent interests of international exchange scholars and promote value of cross-cultural education programs

COMMUNITY ENGAGEMENT & SERVICE

The Box from Home Project, Greensboro, NC Nov 2017 – Present
Co-Founder, Project Leader, Project Advisor

- Founded initiative in seventh grade to educate youth about homelessness while dismantling harmful stereotypes about unhoused populations
- Organized 6+ collection sites annually, each running 1–2 months, generating donations of toiletries and warm clothing for homeless population in Greensboro, NC
- Scaled project county-wide through strategic partnerships with local businesses, schools, and community organizations
- Coordinated promotions and donation drives with local businesses; managed volunteer groups including community leaders and students
- Shared project goals through interviews with local news outlets including FOX8 "What's Right with Our Schools" feature

- Engaged with youth in public schools to destigmatize unhoused populations through education and dialogue
- Maintained project social media presence and website to expand audience reach and leadership development opportunities
- Provided mentorship to aspiring young leaders; taught current middle and high school students how to establish Box from Home projects in their communities
- Concluded active leadership in 2023; continue to provide support to new project leaders

Community Foundation of Greater Greensboro, Greensboro, NC Sep 2022 – Mar 2023
Teen Grantmaking Council Member

- Served on council of 25 students from throughout Guilford County to allocate $10,000 in grants to youth-led community projects
- Participated in civil discourse to determine equitable fund allocation addressing community needs
- Led grant review process for one community project; promoted application opportunities to youth projects requiring funding
- Engaged in discussions addressing systemic discrimination affecting Greensboro youth

Summerfield Recreation Association, Summerfield, NC Aug 2019 – May 2022
Softball Coach

- Created and executed adaptive game and practice plans for athletes across skill levels
- Fostered kind and inclusive environment enabling young athletes to build confidence and interpersonal skills
- Served as role model for future women in sports; promoted positive relationships with opposing teams
- Efficiently made decisions during high-pressure game situations for overall team benefit

TECHNICAL SKILLS

Programming & Software Development: Python, Java (Spring Boot), C, JavaScript (React, Node.js), SQL, R

Bioinformatics & Laboratory Techniques: Benchling, SnapGene, plasmid design, PCR, gel electrophoresis, cell culture, electroporation, biochemical assays, RNA isolation, animal studies

Hardware & Embedded Systems: Firmware development (C, Python), programmable gain amplifier (PGA) data acquisition, signal generation and testing, PCB design

Data Analysis & Databases: Statistical analysis, experimental design, SQL (PostgreSQL), database management, data visualization, AWS (EC2, Cloud9, QuickSight, SecurityHub)

HONORS & AWARDS

- **Fulbright UK Summer Institute Participant**, US-UK Fulbright Commission, 2025
- **Truman Scholarship Finalist**, The Harry S. Truman Scholarship Foundation, 2026

- **College of Engineering Faculty Senior Scholar,** NC State University, College of Engineering, 2026–2027
- **Richard Porter Award,** Franklin Scholars Program, NC State University, 2025–2026
- **3rd Place Poster & Podium Presentation**, Comparative Medicine Institute Annual Summit, August 2024
- **Goodnight Scholar**, NC State University, 2023–2027
- **Greenhouse Scholar**, Greenhouse Scholars (National), 2023–present
- **Grand Challenges Scholar**, National Academy of Engineering, 2023–2027
- **Franklin Scholar**, NC State University, 2023–2027
- **Semester Dean's List**, NC State University, Fall 2024, Spring 2024, Fall 2025

PROFESSIONAL DEVELOPMENT & CERTIFICATIONS

- **AWS Certified Cloud Practitioner**, Amazon Web Services, 2024
- **Developing Cultural Competence**, NC State University, 2024
- **Leadership Development Program**, NC State University, 2024

MEDIA & RECOGNITION

- Featured in *NC State Pack Points Magazine*: "Becoming the Role Model She Once Needed," November 2025
- Featured in *NC State Computer Science News*: "Madison Thompson Stays Busy," August 2025
- Featured in FOX8 *What's Right with Our Schools*: "Greensboro Teens Seize Moment to Expand Their Project Benefitting Local Homeless Community," November 2020

PROFESSIONAL AFFILIATIONS

- US-UK Fulbright Commission Alumni Network
- Fulbright Association, North Carolina Chapter
- National Academy of Engineering Grand Challenges Scholars Community
- Greenhouse Scholars National Network
- Goodnight Scholars Program Network