

Cole Butler, PhD

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in cbutler112358 🌐 cbutler112358 🎓 Cole D. Butler

Current Position

University of Georgia, Department of Entomology, Postdoctoral Research Associate in the lab of Dr. Bill Snyder 2025 – Present

Education

PhD **North Carolina State University**, Major: Biomathematics; Minors: Statistics; Inter-disciplinary Perspectives on Genes and Genomes 2020 – 2025

- GPA: 4.0/4.0; Genetics and Genomics Scholar
- NSF Graduate Research Fellow, 2022-2025
- Dissertation: The Role of Genetics in Pest Population Control

BS **University of Maine**, Mathematics, *summa cum laude* 2016 – 2020

- GPA: 3.95/4.0; Honors College (highest honors); Dean's List all semesters

Publications

- **Butler, C.**, Dhole, S., Gould, F., and A. Lloyd. Partially functional resistance interferes with gene drive. *In progress*.
- **Butler, C.** and A. Lloyd. Spatial confinement of gene drives: Assessing risk of failure using global sensitivity analysis. *Evol Appl* (in review). Preprint DOI: 10.64898/2026.02.18.706608.
- **Butler, C.**, Ding, J., Baltzegar, J., Brown, Z., Burford Reiskind, M., and M. Reiskind. Socioeconomic predictors of knockdown resistance in *Aedes albopictus* (Diptera: Culicidae). *R Soc Open Sci* (in press). Preprint DOI: 10.1101/2025.07.01.662680.
- Baltzegar, J., **Butler, C.**, Ding, J., Beeson, C., Reed, E., Reiskind, M., and M. Burford Reiskind. Rapid spread of knockdown resistance allele frequencies in a suburban population of *Aedes albopictus*. *Parasit Vectors* (in press). Preprint DOI: 10.1101/2025.06.30.662396.
- **Butler, C.** and A. Lloyd. How population control of pests is modulated by density dependence: The perspective of genetic biocontrol. *J Theor Biol.* 614; 2025.
- Yadav, A., **Butler, C.**, Yamamoto, A., Patil, A., Lloyd, A., and M. Scott. CRISPR-Cas9 based split homing gene-drive targeting *doublesex* for population suppression of the global fruit pest *Drosophila suzukii*. *Proc Natl Acad Sci U S A.* 120(25); 2023. **Received 2023 GGA Paper of the Year Award**
- **Butler, C.** and P. Stechlinski. Modeling opioid abuse: A case study of the opioid crisis in New England. *Bull Math Biol.* 85(6); 2023.
- **Butler, C.**, Cheng, J., Correa, L., Preciado, M., Rios, A., Montalvo, C., and C. Kribs. Comparison of screening for methicillin-resistant *Staphylococcus aureus* (MRSA) at hospital admission and discharge. *Letters in Biomath.* 8(1); 2021.

Invited Talks

- **Butler, C.** “Remote sensing to detect crop damage by an invasive species,” 2026 Biology and Medicine Through Mathematics Conference, Virginia Commonwealth University, in-person talk
- **Butler, C.**, Ding, J., Baltzegar, J., Brown, Z., Burford Reiskind, M., and Reiskind, M. “Socioeconomic Drivers of Knockdown Resistance in the Invasive Tiger Mosquito,” 2025 Genetics and Genomics Academy Retreat, NC State University, in-person talk

- **Butler, C.** "Mathematical modeling and current research on the sweetpotato whitefly (*Bemisia tabaci*)," 2025 Biomathematics Seminar, NC State University, virtual talk
- **Butler, C.** "Modeling insect populations and the next generation of genetic pest control," 2023 Mathematics Colloquium, University of Maine, in-person talk
- **Butler, C.** "The importance of dispersal in gene drive control," presented at the following venues:
 - 2023 Joint Mathematics Meeting, in-person talk;
 - 2023 Biomathematics Seminar, Texas Tech University, virtual talk

Selected Grants and Fellowships

- Co-PI, GGA Seed Grant, 2024, *Evaluating genetic and socio-economic factors affecting insecticide resistance in a population of Aedes albopictus from Wake County, NC* (\$25,000)
- Co-PI, GOHA Seed Grant, 2024, *One Health Implications of Insecticide Resistance in Pathogen Vectors* (\$35,096)
- NSF Graduate Research Fellowship, 2022-2025 (approx. \$138,000)
- CMI Young Scholar, 2021-22
 - Co-PI, *Proof of concept for in vitro influenza immunogenicity screening* (\$9,000)
 - Co-PI, *Mathematical modeling of mechanisms of antimicrobial resistance in Campylobacter species* (\$9,000)
- NC State University Graduate Fellowship 2020-21 (\$4,000)
- NC State University Provost's Doctoral Fellowship 2020-21 (\$28,000)

Research Experience

Modeling pest abundance and crop damage in the Southeastern U.S.

Aug 2025 – Present

- Developed a remote sensing pipeline to detect damage caused by the invasive two-spot leafhopper (*Amrasca biguttula*) in cotton
- Using statistical models to identify predictors of silverleaf whitefly (*Bemisia tabaci*) abundance and investigate how drought modifies trophic interactions

Using mathematical modeling to evaluate drawbacks in genetic biocontrol

Aug 2025 – Present

- Conducted equilibrium and stability analyses to understand how organism life history affects genetic biocontrol efficacy (advised by Dr. Alun Lloyd)
- Analyzed spatial dynamics of gene drive spread and quantified risk of failure under variable conditions (advised by Dr. Alun Lloyd)
- Developed models of gene drive resistance to address overlooked problems in current approaches (collab. w/Drs. Alun Lloyd, Fred Gould, and Sumit Dhole)

Modeling genetic biocontrol of spotted wing Drosophila

Jan 2022 – July 2025

- Developed data-driven mathematical models with molecular biologists to evaluate genetic biocontrol technologies in spotted wing Drosophila (*Drosophila suzukii*) (collab. w/Dr. Max Scott)
- Simulated experimental designs for cage trials and technology development

Identifying socioeconomic predictors of insecticide resistance in mosquitoes

Mar 2023 – July 2025

- Planned and oversaw field collections of the tiger mosquito (*Aedes albopictus*) in Raleigh, NC (collab. w/Drs. Michael Reiskind, Martha Burford Reiskind, Jen Baltzegar, and Zack Brown)
- Used statistical models to analyze associations between insecticide resistance frequency and socioeconomic predictors