Genetic Engineering & Society Minor Fellowship

GES CENTER
NC STATE

Apply now for the Fall 2024 GES Minor. Deadline 3/15

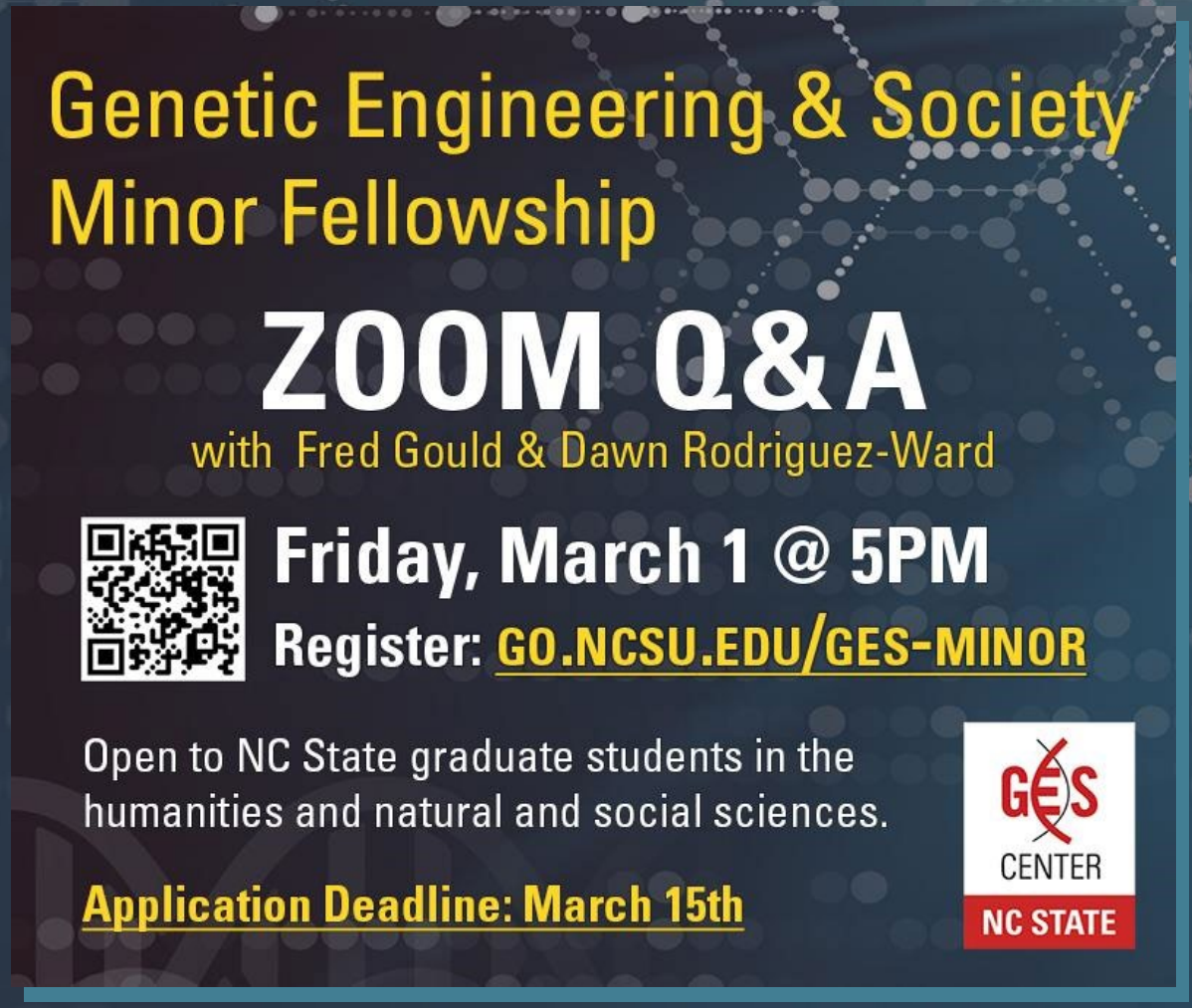
Open to NC State graduate students in the humanities and natural and social sciences. Includes $17K stipend + in-state tution & fees!

GO.NCSU.EDU/GES-MINOR

Zoom Q&A Session Agenda

- About the GES Center
- About the GES Graduate Minor
- Why become a fellow and benefits of the fellowship
- Meet our past students
- Recruitment process & dates
- Sequence of program activities
- Online application
- Q&A via chat box or live video*

*Please start leaving your messages in the chat box so we can begin to answer them



About the GES Center

Integrating scientific knowledge and diverse public values in shaping the futures of biotechnology

- Positioned at the nexus of science and technology, the social sciences and humanities
- Experts in the technical, ethical, and societal dimensions of biotechnology

Faculty Affiliates: Search our directory of 60+ affiliates by name or expertise at go.ncsu.edu/ges-faculty

GES Executive Committee

JENNIFER KUZMA
- School of Public and International Affairs, CHASS

FRED GOULD
- Entomology & Plant Pathology, CALS

CO-DIRECTORS (2013)

SHARON STAUFFER
CENTER PROGRAM MANAGER (2013)
- Financials, Administrative, and Planning

JASON DELBORNE
CLUSTER FACULTY (2013)
- Forestry and Environmental Resources, CNR

ZACK BROWN
CLUSTER FACULTY (2014)
- Agricultural and Resource Economics, CALS

PATTI MULLIGAN
COMMUNICATIONS DIRECTOR (2017)
- Web Content, Reports & Publications, and Projects

DAWN RODRIGUEZ-WARD
PROGRAM COORDINATOR (2018)
- AgBioFEWS Graduate Program, GES Colloquium, and DEI

KHARA GRIEGER
FACULTY MEMBER (2020)
- STEPS, Environmental Health & Risk Assessment, AEC

KATIE BARNHILL
SR. RESEARCH SCHOLAR (2021)
- Governance, Stakeholder Engagement, and Environmental Justice

MARTHA BURFORD REISKIND
FACULTY MEMBER (2023)
- Genetics & Genomics Scholars Director, BioSci

DAVID ANDOW
FACULTY MEMBER (2023)
- Department Head, Applied Ecology

Interdisciplinary Graduate Education

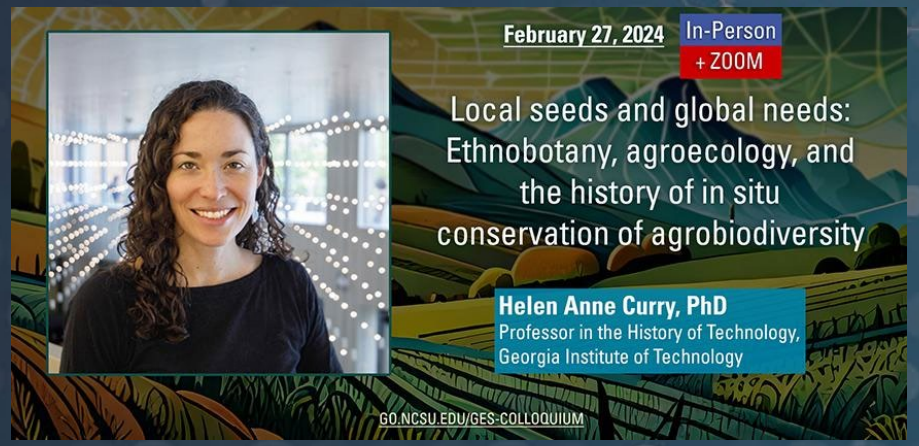
AgBioFEWS (2018-2024) is a National Science Foundation funded graduate research training program offering PhD candidates across multidisciplinary fields of study the opportunity to examine the **science, policy, and public engagement** aspects and impacts of **Agricultural Biotechnology on Food, Energy, and Water**.

› Info at go.ncsu.edu/agbiofews

Weekly GES Colloquium

The GES Center hosts a **weekly colloquium** that brings in local, national and international speakers from a wide range of opinions, perspectives, and disciplines.

› Tune-in weekly at go.ncsu.edu/ges-colloq-zoom



Scholarly Publications

Our faculty have authored hundreds of publications, lead or served on multiple National Academies of Sciences reports, and published several special journal issues. In May 2018, our paper Wicked Evolution was the cover article in *Science*. Articles at go.ncsu.edu/ges-pubs

NSF-Funded Graduate Programs

Agricultural Biotechnology in Our Evolving Food, Energy, & Water Systems (AgBioFEWS)

- 2018-2024: $3M grant serving 34 interdisciplinary PhD fellows in 16 programs & 4 Colleges (CALS, CHASS, CNR, COS).
- **Gould** serves as PI
- **Kuzma, Delborne, Sederoff,** and **Brown** as Co-PI's

AgBio FEWS

NC STATE UNIVERSITY

Integrative Graduate Education & Research Traineeship (IGERT)

- 2012-2017: Trained 23 graduate student in interdisciplinary approaches to Genetic Pest Management. Learn more at research.ncsu.edu/ges/igert

IGERT

Integrative Graduate Education and Research Traineeship

GES Center Research Areas

Examples of emerging technologies and their implications

- **Gene Drives** allow us to change the genetic makeup of an entire population of organisms, including pests and disease vectors. **Concerns** around the unintended consequences of manipulating entire populations of organisms, including the potential for ecological disruptions.
- **Microbiome Engineering** involves manipulating the microorganisms that live in and on the human body, or in natural or built environments, for example, to improve health. It could lead to new treatments for conditions such as obesity, diabetes, and autoimmune diseases. **Concerns** include safety issues or unintended consequences, including the potential for antibiotic resistance.
- **Gene Editing using CRISPR/Cas** allows researchers to precisely and easily modify DNA sequences. This technology has endless possible applications, e.g., to cure diseases, enhance physical and mental abilities, and even create new organisms. **Concerns** include the ethics of gene editing in humans, animals, and plants, particularly for non-medical purposes.

Overall, these emerging trends seem certain to have significant impacts on human health, the environment, and society. Interdisciplinary collaboration and communication are and will continue to be crucial in developing regulatory frameworks that balance innovation with safety and ethical considerations.

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Collaborations: NC State University

- Genetics and Genomics Academy (GGA)
- Science and Technologies for Phosphorus Sustainability (STEPS)
- Center for Human Health and the Environment (CHHE)
- Center of Excellence for Reg Science in Ag (CERSA)
- N.C. Plant Sciences Initiative (PSI)
- Science, Technology & Society Program (STS)
- Cooperative Extension
- Office of University Interdisciplinary Programs (OUIP)
- DEI Collaborative Group (OIED)
- NC State Libraries
- Global One Health Academy
- Biotechnology Program (BIT)

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Collaborations: Other Universities

Collaborations: National & International

GES CENTER

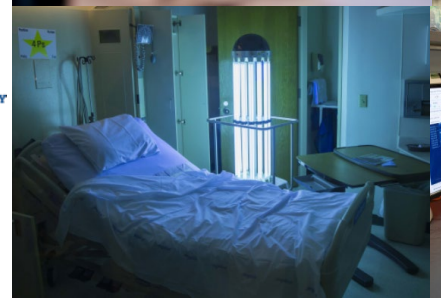
Driving Responsible Innovation in NSF Centers

NSF Engineering Research Center for Precision Microbiome Engineering

PreMiEr Precision Microbiome Engineering

PreMiEr's vision is to develop an integrated framework that enables the bioinformed design of **smart and healthy built environments** while also broadly advancing **microbiome engineering technologies**

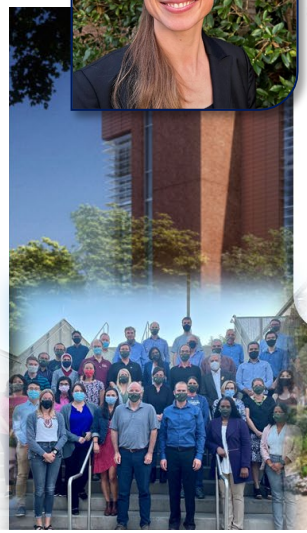
Duke
NC STATE UNIVERSITY
THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL
NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIVERSITY
UNIVERSITY OF NORTH CAROLINA CHARLOTTE



- $26M, NSF-funded Center on Microbiome Engineering
- **Kuzma** serves as Associate Director and Lead of Societal and Ethical Implications (SEI)

STEPS

Science and Technologies for Phosphorus Sustainability



- $25M, NSF-funded Center on Phosphorus Sustainability
- **Grieger** serves as Co-PI & Co-Director of Knowledge Transfer

About the GES Graduate Minor

Examines the technological, societal and ecological issues surrounding the development and potential use of genetically engineered organisms.

Open to graduate students in the Humanities, Social and Natural Sciences.

Requirements:

- 9 credit hours from list of approved courses

Why become a GES Minor Fellow?

- Interdisciplinary knowledge
- Cross–discipline respect and team cohesion
- Critical thinking, reading and evaluation skills
- Experience engaging with diverse publics
- Access to 60+ GES Center affiliated faculty
- $17,000/ stipend for Fall 2024 semester + tuition + fees

GES CENTER

Affiliated faculty

Fred Gould

Entomology and Plant Pathology, Genetic Engineering and Society Center

Zachary Brown

Agricultural and Resource Economics

Kristen Landreville

Genetic Engineering and Society Center, NSF PreMiEr ERC

Christopher Cummings


Veljko Dubljevic

Philosophy and Religious Studies, Science Technology and Society

Jean Goodwin

Communication

Karey Harwood

Philosophy and Religious Studies, Women's and Gender Studies in Interdisciplinary Studies

Daniela Jones

Biological and Agricultural Engineering

Ramon Leon

Crop and Soil Sciences

Darby Orcutt

Collections and Research Strategy

Roderick "Rod" Rejesus

Agricultural and Resource Economics

Max Scott

Entomology and Plant Pathology

Martha Burford Reiskind

Biological Sciences; Genetics & Genomics Academy

Patti Mulligan

Genetic Engineering and Society Center

Jonathan Allen

Food, Bioprocessing and Nutrition Science

Rob Dunn

Applied Ecology

Jean Gross

Statistics

Jim Holland

Crop and Soil Sciences

Gail Jones

STEM Education

Alun Lloyd

Mathematics

Heather Patisaul

Center for Human Health and the Environment

Rubén Rellán-Álvarez

Molecular and Structural Biochemistry

Heike Sederoff

Plant and Microbial Biology

Jennifer Kuzma

School of Public and International Affairs, Genetic Engineering and Society Center

Jose Alonso

Plant and Microbial Biology

Amy Grunden

Plant and Microbial Biology

Robert Kelly

Chemical and Biomolecular Engineering, Biotechnology Program

Marce Lorenzen

Entomology and Plant Pathology

Bob Patterson

Crop and Soil Sciences

Dominic Reisig

Entomology and Plant Pathology

Megan Serr

Biological Sciences

David Andow

Department of Applied Ecology

Jason Delborne

Forestry and Environmental Resources

Dawn Rodriguez-Ward

Genetic Engineering and Society Center

Keith Edmisten

Crop and Soil Sciences

Nora Haenn

Sociology and Anthropology

Shuijin Hu

Entomology and Plant Pathology

William Kimler

History

Ashton Merck

Applied Ecology

Jorge Piedrahita

Molecular Biomedical Sciences, Comparative Medicine Institute

Jean Ristaino

Entomology and Plant Pathology

Rosangela (Ross) Sozzani

Plant and Microbial Biology

Katie Barnhill

Genetic Engineering and Society Center

Khara Grieger

Applied Ecology

Sharon Stauffer

Genetic Engineering and Society Center

Jennifer "Jen" Baltzegar

Genetic Engineering and Society Center

John Godwin

Biological Sciences

Carlos Iglesias

Horticultural Science

Who are we looking for?

- We welcome students from diverse disciplinary backgrounds and perspectives.
- We are interested in elevating the level of public discussions on topics surrounding the use and implementation of biotechnology, not simply to be for or against biotechnology.

NC STATE

ZOOM

Genetic Engineering and Society Colloquium
Tuesday, 1/17/2023 at 12 PM via Zoom

GES CENTER

Has the UN Biodiversity Convention been a force for 'good' or 'evil' in how biotech crops are regulated globally?

AgBioFEWS Graduate Fellows
Modesta Nnedinso Abugu, Joseph Opoku Gakpo, Nick Loschin, and Asa Budnick

GO.NCSU.EDU/GES-COLLOQUIUM

NC STATE

GES Colloquium, April 12, 2022

GES CENTER

Developing a Research Agenda for Crops Bioengineered for Climate Change Mitigation

Presented by AgBioFEWS Cohort 2

GO.NCSU.EDU/GES-COLLOQUIUM

NC STATE

GES Colloquium, August 24, 2021

GES CENTER

Perspectives of Eastern North Carolina farmers and the impact of biotechnology

Presented by AgBioFEWS Cohort 2

GO.NCSU.EDU/GES-COLLOQUIUM

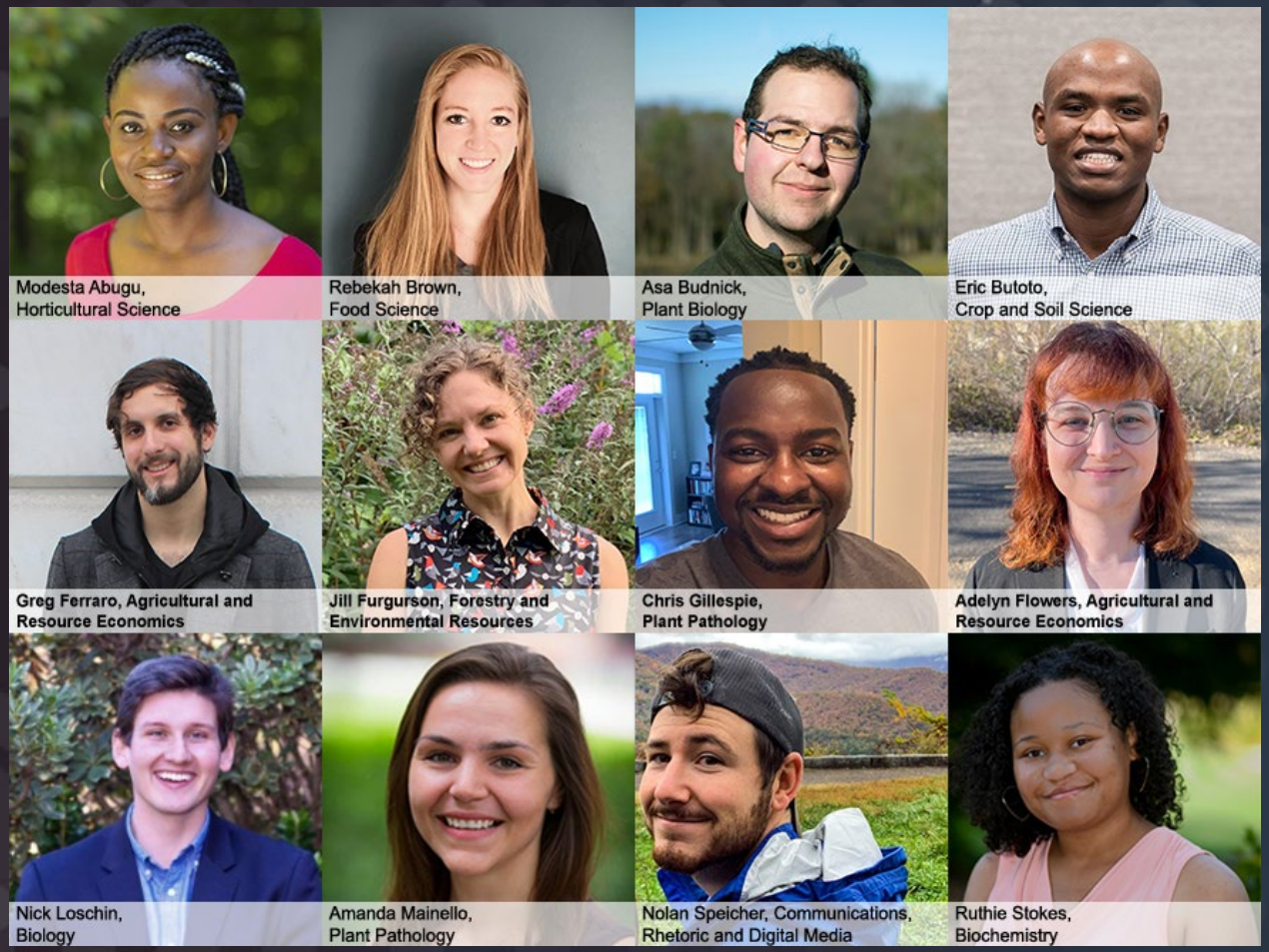
Meet our Interdisciplinary Student Cohorts

2019 Cohort

2020 Cohort

Meet our students, cont.

2022 Cohort



2024 GES Minor Cohort

Your photo here

GES Minor Required Courses & Activities

Total for Minor: 9 credits

Year 1

Living & Learning in Farming Communities
(Summer 2024 – *optional but recommended*)

GES/COM 508: Emerging Technologies, Science Communication, and Public Engagement (Fall 2024) 3 credits

GES 591: GES Colloquium weekly seminar
(Fall 2024 & Spring 2025) 1–2 credits

Additional Approved Courses

***Additional courses may be substituted at the Co–Directors' discretion.**

ANT 550 – Culture, Ecology, & Sustainable Living
BIT 510 – Manipulation of Recombinant DNA
BIT 574 – Plant Genetic Engineering
CBS 561– Principles of Collab. & Team Science
COM 538 – Risk Communication
COM 561 – Human Communication Theory
COM 568 – Public Communication of Research
CS 518 – Intro to Regulatory Science in Agriculture
ECG 549 – Economic Development
ECG 515/ FOR 515 – Envt. & Resource Policy
ENG 515 – Rhetoric of Science and Technology
FW 511 – Human Dimensions of Wildlife Mgmt.
FW 595 – Genetics in Wildlife Management
GN 735 – Genomic Science
HI 540 – Topics in Environmental History
HI 581 – History of the Life Sciences
HI 585 – History of American Technology
NR 571 – Current Issues in Natural Resource Policy
REL 571 – Darwinism & Christianity
PA 550 – Environmental Policy
PA 552 – Science & Technology Policy
PHI 575 – Ethical Theory
PSC 520– Fundamentals of Citizen Science
PSY 757 – Innovation and Technology
SOC 762 – Sociology of Food Systems
ST 590 A,C – Bioinformatics I/II

Recruitment Process & Dates

- **March 15:** Application due for preferred consideration
- ~Selection Committee reviews applications~
- **April 1:** Notification for fellowship award
- **April 15:** Signed contract due

Online Application: Due 3/15/2024

- Open to national and international students already enrolled in a Masters or PhD Program at NC State
- There is also the option to '**Save and Continue'** which will generate a unique link that you may return to within 30 days.
- There is no fee to complete the application form.
- 1 page "Why are you applying to join the program?"
- 1 page Reference Letter from advisor

THANK YOU! QUESTIONS?

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Dawn Rodriguez-Ward
dtward2@ncsu.edu