GENETICS ENGINEERING AND SOCIETY CENTER

ANNUAL REPORT: 2017-18

CENTER CO-DIRECTORS

Jennifer Kuzma, Ph.D.
Goodnight-NCGSK Foundation
Distinguished Professor
School of Public and International Affairs

Fred Gould, Ph.D.
University Distinguished Professor,
Entomology and Plant Pathology

Integrating scientific knowledge & public values in shaping the futures of biotechnology

Prepared by: Patti H. Mulligan, August 24, 2018
Available online at go.ncsu.edu/2017-18-ges-annual-report

research.ncsu.edu/ges
@GESCenterNCSU
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THE GENETIC ENGINEERING AND SOCIETY CENTER

MISSION STATEMENT
The Genetic Engineering and Society (GES) Center generates knowledge and fosters inclusive dialogue regarding current and future technologies in genetic engineering. We represent diverse disciplines and perspectives and strive to connect with government, industry, and interested publics. Our focus on education, research and engagement enables us to evaluate emerging tools, products, and policies in the growing field of genetic engineering and synthetic biology. The Center serves to improve relationships and learning across disciplines, experts, and stakeholders in order to better inform the future(s) of GE research, development and governance. A multi-disciplinary team of faculty, industry, government, advocacy groups, other NGOS and interested public engage with The Center.

VISION STATEMENT
The Genetic Engineering and Society (GES) Center serves an important function at the nexus of science and technology, the social sciences, and humanities. It brings scholarship, dialogue, and engagement to bear on contentious issues associated with the development, use and deployment of genetically engineered organisms (GEOs) in society. Recognizing the need for broader interactions of academic scholars with citizens, policy makers and other stakeholders, the GES Center strives to serve as a balanced and trusted place for engagement, research, and analysis. This approach brings the skills and activities of academe to bear on the needs of external communities, and in turn, informs scholarly work with the experiences and skills of those communities.

The Center embraces this approach and focuses on translational research and dialogue to bridge academe with other sectors involved in genetic engineering development and governance. The GES Center embodies the University’s land grant mission to serve the state, its people, the nation and the world. The GES Center has taken a national and international lead in using research methods and engagement approaches to examine and better understand the technical, ethical, and societal dimensions of genetic engineering and synthetic biology.

At the same time as it reaches out beyond the bounds of the university, the GES Center also looks inward to enhance interdisciplinary teaching and research at NC State where genetic engineering is a focus or can serve as an example to inform broader challenges in inter-disciplinarity or questions at the nexus of technology and society. NC State has a goal to be an international leader in multi-disciplinary and interdisciplinary research, and the work of the GES Center is helping the university reach that goal.
HIGHLIGHTED RESEARCH

The History Project: Archive of Agricultural Genetic Engineering and Society

Together with the NC State Libraries Special Collections and Department of History, GES is creating a video archive of oral histories to document for posterity the memories and papers of the pioneers of genetic engineering. In this process we are interviewing individuals from the first generation of researchers and regulators, many of whom are still actively working in their fields. During FY2018, we conducted interviews with six new individuals – two of whom also gave public talks and spoke at Colloquium – bringing the total number of archive videos up to 23. In addition, we produced a 15-minute introductory compilation video with segments from six of the interviews, narrated by project Co-PI, Matthew Booker. This video (link) was featured at the AGES: Untold Stories of GMO Pioneers roll-out event, held on September 26, 2017.

Publication of Journal of Responsible Innovation Special Issue: Roadmap to Gene Drives: Research and Governance Needs in Social, Political, and Ecological Context

The Genetic Engineering and Society Center hosted a workshop in February of 2016, supported in part by the National Science Foundation, entitled "A Roadmap to Gene Drives: A Deliberative Workshop to Develop Frameworks for Research and Governance." In order to examine core governance issues and research needs in an anticipatory way, this 3-day workshop brought together over 70 subject matter experts from diverse fields in ten different countries in Europe, Australia, and North and South America. We then invited them to submit papers for a special issue of the Journal of Responsible Innovation. In total, thirteen peer-reviewed papers are included in the special Gene Drive issue of the Journal, published December 2017-January 2018. The articles have received over 10,000 views and have been cross-referenced nine times in the seven months since publication. The editorial team included three GES faculty member and two GES PhD students, with contributions from another four faculty members and ten PhD students.


In October 2016, a two-day meeting of 65 academic, government and industry professionals was held at North Carolina State University for one of the first organized discussions about the international governance of gene drives: potentially powerful new technologies that can be used for the control of pests, invasive species and disease vectors. As in the previous workshop, speakers came from North and South America, Europe, Asia, and Australia. Additionally, there was representation from Africa where malaria-vectoring mosquitoes are targets for gene drive strategies. Because the focus of this workshop was specifically on building a governance framework, many of the speakers and participants were from regulatory agencies. Beyond the talks, this workshop included breakout sessions aimed at getting at the issues preventing development of international frameworks. Following up on the meeting, participants produced a special issue in BMC Proceedings (published July 2018) with seven peer-reviewed, open-access articles and a summary by the three editors, two of whom are from GES. One major sign of the success of the meeting was that it resulted in individuals with very different perspectives working together on co-authored papers that provided new insights.
Restoring Biotechnology’s Moral Fiber? Genetically Modified American Chestnut Trees, Responsible Innovation, and Environmental Justice

This project focuses on the research and development of the genetically modified (GM) American chestnut tree, potentially the first GMO to be released in the U.S. that is meant to persist and spread in wild environments. Our research has four core areas: 1) investigating the ways in which scientists associated with this project are practicing responsible innovation; 2) exploring the potential for Native American communities to engage with this technology and its governance, given that the historical range of the American chestnut includes tribal lands; 3) studying the relationship between policy frameworks and NGO narratives about the GM American chestnut; and 4) strategizing and designing methods to engage broader publics in the governance of the GM American chestnut. In April 2018, our research team convened a workshop of nearly 30 stakeholders - from multiple sectors and with diverse points of view - to learn about and formulate plans for engaging broader publics in the governance of the GM American chestnut tree. In addition, two PhD students - both of whom were supported by the GES IGERT and the chestnut project - defended their dissertations in spring 2018.

Assessing Public Perceptions of Gene Drives for Invasive Species and Pest Control

Using funds from an approximately $100 thousand grant from the USDA Exploratory Research Program, we conducted three focus group discussions around North Carolina and conducted a statistically representative nationwide survey, to assess the public’s initial perceptions about using gene drives for agricultural pest control. We have prepared two manuscripts based on our analysis, one of which will likely constitute the first statistically valid analysis of public attitudes towards using these technologies in agriculture and the other the first study of consumers' willingness to pay for food produced using gene drives.

Improving Robustness of a Tactical Model of Aedes/Dengue Dynamics

Using funds from an approximately $100 thousand grant from the USDA Exploratory Research Program, we conducted three focus group discussions around North Carolina and conducted a statistically representative nationwide survey, to assess the public’s initial perceptions about using gene drives for agricultural pest control. We have prepared two manuscripts based on our analysis, one of which will likely constitute the first statistically valid analysis of public attitudes towards using these technologies in agriculture and the other the first study of consumers' willingness to pay for food produced using gene drives.
United Nations Convention on Biological Diversity

GES Senior Research Scholar Dr. Todd Kuiken was appointed to the United Nations Convention on Biological Diversity’s Ad Hoc Technical Expert Group (AHTEG) on synthetic biology. The AHTEG met in December 2017 and produced a report and recommendations on the basis of its deliberations to facilitate future discussions and actions on synthetic biology under the Convention for consideration by the Subsidiary Body on Scientific, Technical and Technical Advice.

Along with a multi-disciplinary team of independent researchers, GES Senior Research Scholar Dr. Todd Kuiken was also commissioned by the United Nations International Treaty on Plant Genetic Resources for Food and Agriculture to study the technological change induced by synthetic biology and how it enables the manufacturing, manipulation and use of genomic information in digitized forms. The study examined how new technological trajectories might affect the International Treaty. The report was presented at the Seventh Session of the Governing Body of the International Treaty in Rwanda on October 28, 2017.

Comparing Meanings of Responsible Innovation in Biotechnology Communities

This NSF Cultivating Cultures of Ethics training and research grant entered its last year in 2017-2018. This grant includes faculty from three colleges (CALS, CHASS, CNR) and the Graduate School. In total, 120 people from different stakeholder groups involved in biotechnology in the Research Triangle took part in focus groups and surveys which were designed to explore “bottom-up” meanings of responsible innovation and how they relate to coalitions and/or values of individuals. We developed a new training model for students in engaged scholarship, moderating conversations, ethics, and Responsible Innovation, with specific attention to emerging biotechnologies. GES partnered with the Initiative for Maximizing Student Diversity and included a training course for 20 PhD students, 10 of whom came from this program. These included Latinx students, African American students LGBTQ+ students, and other under-represented (UR) groups. These students went through the training course and interacted with biotechnology stakeholders through moderating focus groups. The formal evaluations of the course and overall experience were very positive, and students felt like it increased their skills in moderating difficult conversations, interacting with stakeholders, and abilities to examine the ethics of their own research. The project culminated in a workshop in March, 2018 (see below) to share the training model with national scholars and practitioners of ethics education, and the NSF program officer was in attendance. One peer reviewed paper on the training model was published in 2017, and two on the research results are in preparation as part of the thesis of a PA UR doctoral student.

Establishing a Common Set of Safety Standards Across DIYBio

Funded by the Open Philanthropy Project, this project is exploring the rapidly expanding DIYbio community by visiting multiple community biotech labs in the United States and abroad in order to qualify the state of DIYbio in terms of capabilities, trends, and needs in relation to biosafety and biosecurity. The project plans to explore the broader biosecurity concerns in relation to potential threats, current relationships with biosecurity professionals and identify trends/needs of the community.


From Abstract: In October 2016, a two-day meeting of 65 academic, government and industry professionals was held at NC State for early-stage discussions about the international governance of gene drives, potentially powerful new technologies that can be used for the control of pests, invasive species and disease vectors.

Presenters at the meeting prepared seven manuscripts elaborating on the ideas raised. This BMC Proceedings issue presents the collection of these peer-reviewed manuscripts.

Wicked evolution: Can we address the sociobiological dilemma of pesticide resistance?


From abstract: Current evidence suggests that insect and weed evolution may outstrip our ability to replace outmoded chemicals and other control mechanisms. To avoid this outcome, we must address the mix of ecological, genetic, economic, and sociopolitical factors that prevent implementation of sustainable pest management practices. We offer an ambitious proposition.

Special Issue: Roadmap to Gene Drives: Research and Governance Needs in Social, Political, and Ecological Context.


In order to examine core governance issues and research needs in an anticipatory way, the GES Center hosted a 3-day workshop that brought together over 70 subject matter experts from academia, business, government, and non-profit organizations from 10 different countries. In total, 13 peer reviewed papers are included in the special Gene Drive issue of the Journal. The editorial team included three NC State faculty and two GES PhD students.
CORE FACULTY PUBLICATIONS — LINKS TO PAPERS HERE


**AFFILIATED FACULTY PUBLICATIONS**


EDUCATIONAL IMPACT

GES Course # & Title | Semester(s) | Faculty
--- | --- | ---
GES 591-001 Colloquium | Fall & Spring | Jason Delborne
GES 591-002 Colloquium Discussion Section | Spring 2018 | Jason Delborne
NR 460/ NR 560: Renewable Natural Resource Management and Policy | Fall 2017 | Todd Kuiken
ECG 716: Environmental and Resource Economics II | Fall 2017 | Zachary Brown (with Paul Fackler)

GES Colloquium

Dates are linked to colloquium videos (except for those marked private by speakers). For current Colloquium schedule, [click here](#).

**Fall 2017**

<table>
<thead>
<tr>
<th>Date</th>
<th>Speaker(s)</th>
<th>Title</th>
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<tbody>
<tr>
<td>8/22/2017</td>
<td>Todd Kuiken, GES Center</td>
<td>SynBio &amp; the U.N. Convention on Biological Diversity</td>
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<tr>
<td>8/29/2017</td>
<td>Sumit Dhole, Michael Vella, GES PhD Students</td>
<td>Population Genetics of Gene Drives</td>
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<tr>
<td>9/5/2017</td>
<td>Dr. Makiko Matsuo &amp; Dr. Masashi Tachikawa, University of Tokyo</td>
<td>Gene Editing and Agriculture in Japan</td>
</tr>
<tr>
<td>9/12/2017</td>
<td>Jayce Sudweeks, GES PhD Student</td>
<td>Examining the Policy Narratives Surrounding the Release of GM Mosquitoes</td>
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<tr>
<td>9/26/2017</td>
<td>Dan Charles, NPR Correspondent</td>
<td>Genetic Engineering &amp; Journalism</td>
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<tr>
<td>10/3/2017</td>
<td>David Berube, PCOST, NC State</td>
<td>ZIKA</td>
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<td>10/10/2017</td>
<td>Steven Druker, Alliance for Bio-Integrity</td>
<td>Genetic Engineering and the Chronic Misrepresentation of Facts</td>
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<td>10/17/2017</td>
<td>Keith Edmisten, NCSU Extension</td>
<td>The Adoption of Biotech in Cotton Production</td>
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<td>10/24/2017</td>
<td>Rene Valdez, GES PhD Student</td>
<td>Perceptions of De-extinction Among Experts and the News</td>
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<tr>
<td>10/31/2017</td>
<td>Tom Wedegaertner, Cotton, Inc.</td>
<td>Ultra-Low Gossypol Cottonseed</td>
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<td>11/7/2017</td>
<td>Eli Hornstein, GES PhD Student</td>
<td>Re-Engineering A Lost Symbiosis</td>
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<tr>
<td>11/14/2017</td>
<td>Sarah Evanega, Cornell Alliance for Science</td>
<td>Empowering Champions, Embracing Advocacy</td>
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### GES Colloquium, Cont.

#### Spring 2018

<table>
<thead>
<tr>
<th>Date</th>
<th>Speaker/Title</th>
<th>Presentation Title</th>
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<tbody>
<tr>
<td>1/9/2018</td>
<td>GES Faculty and Students</td>
<td>Spring 2018 GES Colloquium Intro</td>
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<tr>
<td>1/16/2018</td>
<td>Mike Jones, GES PhD Student</td>
<td>Surveying U.S. Public Opinion on Gene Drives for Agricultural Pests</td>
</tr>
<tr>
<td>1/23/2018</td>
<td>Magda Stawkowski, Anthropology Postdoc, NC State</td>
<td>Mutant Biologies: Survival and Health Strategies at Kazakhstan’s Semipalatinsk Nuclear Test Site</td>
</tr>
<tr>
<td>1/30/2018</td>
<td>Larisa Rudenko, FDA/MIT</td>
<td>Goldilocks and the Regulatory Bears</td>
</tr>
<tr>
<td>2/6/2018</td>
<td>Adam Kokotovich, GES Postdoc</td>
<td>Wild Rice, Genetic Engineering, &amp; the Ojibwe: The Science of Responsible &quot;Non-innovation&quot;</td>
</tr>
<tr>
<td>2/13/2018</td>
<td>Caroline Ridley, EPA Ecologist</td>
<td>Gene Drive Organisms: An Ecological Risk Problem</td>
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<tr>
<td>2/20/2018</td>
<td>Royden Saah, Island Conservation</td>
<td>GBIRd Program Update</td>
</tr>
<tr>
<td>2/27/2018</td>
<td>Megan Serr, GES PhD Student</td>
<td>Male House Mouse Competition in Semi-Natural Environments</td>
</tr>
<tr>
<td>3/13/2018</td>
<td>Nora Haenn, Anthropology, NC State</td>
<td>Multiple Roles to Affect Change: Lobbyists, Thought Leaders, Public Intellectuals, and Others</td>
</tr>
<tr>
<td>3/20/2018</td>
<td>David Hawthorne, SESYNC/University of Maryland</td>
<td>Socio-Environmental Synthesis: Opportunities for Advancement of Genetic Technologies?</td>
</tr>
<tr>
<td>3/27/2018</td>
<td>Katie Barnhill-Dilling, GES PhD Student</td>
<td>Surprise, Ethics, and More Surprise: Collaborative Research, Indigenous Communities, &amp; the Transgenic American Chestnut</td>
</tr>
<tr>
<td>4/3/2018</td>
<td>Elliot Montgomery, Parsons School of Design</td>
<td>Futures Studies and Speculative Design</td>
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<td>4/10/2018</td>
<td>Jesse Tack, Kansas State University</td>
<td>The Interconnected Impacts of GE and Weather on Corn Yields</td>
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<tr>
<td>4/17/2018</td>
<td>Bruce Tabashnik, University of Arizona</td>
<td>Challenges of Trying to Be an Honest Broker on Insect Resistance to GE Crops</td>
</tr>
<tr>
<td>4/24/2018</td>
<td>Andy Newhouse, PhD Student, SUNY Environmental Science &amp; Forestry</td>
<td>Transgenic American Chestnuts for Potential Forest Restoration: Scientific Successes, Regulatory Challenges</td>
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</tbody>
</table>

GES PhD student Mike Jones presenting on Gene Drive Survey research, January 16, 2018
WORKSHOPS AND EVENTS

Symposium on Forging Integrated Expertise in Graduate Education, Talley Student Union, Raleigh, NC. 4-5 June 2018

Workshop: Engaged Scholarship for Ethics and Responsible Innovation, Hunt Library, Raleigh, NC. 14-15 March 2018

Group discussion with Michael Specter of The New Yorker, Hunt Library, Raleigh, NC. 22 February 2018

Public Lecture: Larisa Rudenko, MIT Visiting Scholar: "Tales from the Biotech Trenches". 30 January 2018

GES Faculty Mixer. 11 January 2018


Public Lecture: Steven Druker, Alliance for Bio-Integrity: "How the Health Risks of GMOs Have Been Systematically Misrepresented: An Assessment from the Perspectives of Both Biological Science and Computer Science," NC State. 9 October 2017

GES Center Workshop for US-China Agricultural Biotechnology program: "Communication, Engagement and Biotechnology," NC State. 4-6 October 2017

AGES: The Untold Stories of GMO Pioneers, with keynote speaker Dan Charles. Hunt Library, Raleigh, NC. 26 September 2017

Capstone Symposium - Chancellor Woodson introducing Congressman David Price, June 5, 2018

CCE-STEM Workshop – Poster session, March 14, 2018

AGES Event with Dan Charles and panel, September 26, 2017
GES IN THE MEDIA

GES Faculty are frequently called upon by high profile media organizations, such as The New York Times, Science, Scientific American, and Wall Street Journal to discuss and give context to biotech stories and research.

Fred Gould: Featured in NC State News podcast “Pesticide Resistance Arms Race” by Tracey Peake, 29 June 2018

Jennifer Kuzma: Quoted in High Country News article, "GMO grass is creeping across Oregon." 25 June 2018

Jennifer Kuzma: Quoted in Science article "Trump’s plan to reshuffle government strikes familiar notes." June 21, 2018

Jennifer Kuzma: Quoted in “Weeds Are Winning in the War against Herbicide Resistance” by Brooke Borel in Scientific American, June 18 2018

Fred Gould, Zachary Brown, and Jennifer Kuzma publish review in Science, "Wicked evolution: Can we address the sociobiological dilemma of pesticide resistance?" May 18, 2018

Fred Gould, Zachary Brown, and Jennifer Kuzma profiled in NC State News article "What Happens If We Run Out? Pesticide Resistance Needs Attention, Large-Scale Study" by Mick Kulikowski, May 17, 2018

Todd Kuiken: Research discussed in article "As lab-grown meat advances, U.S. lawmakers call for regulation" by Kelly Servick in Science. 10 May 2018

Jennifer Kuzma: Recognized by Provost for dedication to teaching, research and engagement during the 2018 Celebration of Faculty Excellence. 1 May 2018

Jennifer Kuzma: Gene drives and responsible innovation. AAAS Sciline Gene Drives media briefing for journalists. Sciline.org. 25 April 2018

Jennifer Kuzma: Quoted in Wall Street Journal. Is This Tomato Engineered? Inside the Coming Battle Over Gene-Edited Food. (also, Podcast on WSJ site to accompany article). 15 April 2018


Todd Kuiken: Profiled in article "Future Job: Freelance Biohackers" on Crisprcas12a.com. 5 April 2018


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<thead>
<tr>
<th>Name</th>
<th>Source</th>
<th>Date</th>
</tr>
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<tbody>
<tr>
<td>Todd Kuiken</td>
<td>Quoted in <em>Would DNA Be Able To Altering Save Imperiled Species?</em> on ScienceCodes.com.</td>
<td>8 March 2018</td>
</tr>
<tr>
<td>Todd Kuiken</td>
<td>Mentioned in article &quot;Could WA be the genetic testing ground for ‘synthetic mice’ to end mice?&quot; in <em>The Sydney Morning Herald</em>.</td>
<td>24 February 2018</td>
</tr>
<tr>
<td>Jennifer Kuzma</td>
<td>Mentioned in <em>Science</em> article on AAAS Elections results. Vol. 359: 406.</td>
<td>26 January 2018</td>
</tr>
<tr>
<td>Special issue of <em>Journal of Responsible Innovation</em> edited by GES faculty and students, Roadmap to Gene Drives: Research and Governance Needs in Social, Political, and Ecological Content, published.</td>
<td>24 January 2018</td>
<td></td>
</tr>
<tr>
<td>Fred Gould</td>
<td>Quoted in <em>Nature</em> article &quot;Synthetic species made to shun sex with wild organisms,&quot; by Ewen Callaway,</td>
<td>15 January 2018</td>
</tr>
<tr>
<td>Jennifer Kuzma</td>
<td>Interviewed on Institute for Emerging Issues First in Future podcast.</td>
<td>15 December 2017</td>
</tr>
<tr>
<td>Todd Kuiken</td>
<td>Profiled in <em>Science</em> article &quot;Is there really a covert manipulation of U.N. discussions about regulating gene drives?&quot;.</td>
<td>11 December 2017</td>
</tr>
<tr>
<td>Todd Kuiken</td>
<td>Profiled in Phys.org article &quot;Genetic tool that can doom a species under UN review&quot;.</td>
<td>5 December 2017</td>
</tr>
<tr>
<td>Todd Kuiken</td>
<td>Interviewed on WUNC’s The State of Things.</td>
<td>28 November 2017</td>
</tr>
<tr>
<td>GES Student, Johanna Elsensohn</td>
<td>Profiled in CALS News article &quot;Scientist to the Senators: Ph.D. Student Johanna Elsensohn&quot;.</td>
<td>21 November 2017</td>
</tr>
<tr>
<td>Jason Delborne</td>
<td>Quoted in <em>New York Times</em> article &quot;Gene Drives’ Are Too Risky for Field Trials, Scientists Say&quot;.</td>
<td>16 November 2017</td>
</tr>
<tr>
<td>Jason Delborne</td>
<td>Quoted in <em>Quanta</em> article &quot;New Model Warns About CRISPR Gene Drives in the Wild&quot;.</td>
<td>16 November 2017</td>
</tr>
<tr>
<td>Jason Delborne</td>
<td>Quoted in <em>Gizmodo</em> article &quot;Genetically Engineering the Natural World, it Turns Out, Could Be a Disaster&quot;.</td>
<td>16 November 2017</td>
</tr>
<tr>
<td>GES Student, Mike Jones</td>
<td>Profiled in CALS News article &quot;Student Spotlight: Mike Jones and the Economics of Cutting-Edge Ag Technology&quot;.</td>
<td>14 November 2017</td>
</tr>
<tr>
<td>Jennifer Kuzma</td>
<td>GES blog post &quot;Politics ‘Trumps’ Science in the Regulation of Genetically Engineered Crops&quot;.</td>
<td>7 November 2017</td>
</tr>
<tr>
<td>Jennifer Kuzma</td>
<td>Quoted in Genetic Literacy Project article &quot;USDA scraps overhaul of GMO and gene edited crop regulations that biotech advocates viewed as ‘unscientific’&quot;.</td>
<td>7 November 2017</td>
</tr>
</tbody>
</table>
Jennifer Kuzma: Quoted in *Science* article "Trump’s agriculture department reverses course on biotech rules". 6 November 2017

GES faculty Fred Gould, Jennifer Kuzma and Jason Delborne: Profiled in *Scientific American* article "Could Genetic Engineering Save the Galápagos?" by Stephen S. Hall, 1 November 2017

GES project “Art’s Work in the Age of Biotechnology: Shaping Our Genetic Future(s)” profiled on CALS News. 25 October 2017

Fred Gould: Quoted in *The Scientist* article "GM Mosquitoes Closer to Release in U.S.", 13 October 2017

Jennifer Kuzma and Jason Delborne: Quoted in *Scientific American* article "Can Scientists Convince the Public to Accept CRISPR and Gene Drives?" 1 October 2017

Fred Gould: Quoted in *Science* article "The microbes in a mosquito’s gut may help fight malaria". 28 September 2017

Press Release: Todd Kuiken receives $700K gift from Open Philanthropy Project for DIYbio. 22 September 2017

Fred Gould: Quoted in *The Atlantic* - "Genetically Modified Moths Come to New York". 8 September 2017


Jennifer Kuzma: Interviewed by HBO Vice News on field trials of gene drive diamondback moths. 10 August 2017

Press release: GES faculty receive $3.2M DARPA grant for Safe Genes project. 3 August 2017

Todd Kuiken: Quoted in *Nature* article "US defense agencies grapple with gene drives" 21 July 2017

GES student Megan Serr: Quoted in Yale Environment 360 article "Should Genetic Engineering Be Used as a Tool for Conservation?" 20 July 2017

Jennifer Kuzma and Fred Gould: Profiled in *Audubon* article "How Genetically Modified Mice Could One Day Save Island Birds" by Brooke Borel. 11 July 2017
**FACULTY PRESENTATIONS**

Todd Kuiken speaks on "Genome Editing and Security: Governance of Non-Traditional Research Communities" on National Academies of Sciences webinar. 25 June 2018

Fred Gould: Speaker on "Rewriting Life: The Promise and Peril of Editing Your DNA" moderated by Leslie Stahl (CBS Anchor) at World Science Festival, New York, NY. 31 May 2018

Jason Delborne: "Engaging Stakeholders, Policymakers and Publics." Center for Integrated Fungal Research, Centennial Campus, Raleigh, NC. 22 May 2018

Todd Kuiken: "The Challenges of Synthetic Biology and Digital Sequence Information for the Principles and Structures of the International Treaty for Plant Genetic Resources for Food and Agriculture" at Governance of Emerging Technologies and Science: Law, Policy and Ethics (GETS) Conference, invited speaker and guest on live podcast, Pheonix, AZ. 15 May 2018

Todd Kuiken: DIYBio site visit, Denver Biolabs, Denver, CO. 13-14 May 2018

Jennifer Kuzma: Challenges of national and global risk governance of gene drives. Invited talk for Public Health Agency of Canada, Center for Biosecurity. Ottawa, ON, Canada. 10 May 2018

Fred Gould: NIH meeting, on clinical trials for vector-borne diseases Washington, DC. 7-8 May 2018

Fred Gould: Attended NASEM meeting, Washington, DC. 30 April 2018

Fred Gould: Stony Brook meeting. 27 April 2018

Jason Delborne: Organized GM Chestnut Meeting held at Talley Student Union, Raleigh, NC. 25-26 April 2018

Jennifer Kuzma: “Anticipatory Governance for GMOs”. Invited presentation for Environment and Health Canada managers and staff. Ottawa, ON Canada. 13 April 2018

Todd Kuiken: Biosafety in a World Without Walls, event co-organized by the Synthetic Biology SRI and Centre for the Study of Existential Risk, Cambridge, England. 11 April 2018

Todd Kuiken: DIYBio site visit, Cambridge, England. 11 April 2018

Todd Kuiken: Speaker at Oxford. 6 April 2018

Todd Kuiken: DIYBio site visit, New York, NC. 6-8 April 2018

Fred Gould: Iowa State University seminar. 2 April 2018

Fred Gould: UNC Charlotte seminar, Charlotte, NC. 23 March 2018
Fred Gould: Panel discussion at film screening of Food Evolution at Meredith College, Raleigh, NC. 22 March 2018


Jason Delborne: Presentation on GBIRd project with John Godwin to NCSU undergraduate biology club. 20 March 2018

Jason Delborne: Led discussion on Responsible Innovation in the content of Mary Shelley’s Frankenstein, NCSU Libraries Read Smart Series, Cameron Village Library, Raleigh, NC. 14 March 2018

Fred Gould: University of Arizona seminars. 14 March 2018

Todd Kuiken: Speaking at Rise of the New Bio-Citizen Workshop at The Wilson Center, Washington, DC. 12-13 March 2018


Jason Delborne: Led discussion on Stakeholders, Policymakers and the Public: Opportunities for Faculty Engagement” for Research Leadership Academy, Talley Student Union, Raleigh, NC. 28 February 2018

Todd Kuiken: Speaker on “Biosafety in a World Without Borders” at Boston Open Science Laboratory, Somerville, MA. 28 February 2018


Adam Kokotovich (GES postdoc): Speaking on panel "Editing Our Evolution: Rewriting the Human Genome," at Museum of Life + Science, Durham, NC. 23 February 2018

Jennifer Kuzma: Presents “Risk Assessment and Governance of Synthetic Biology: State of Practice in the United States” at AAAS Annual Meeting, Austin, TX. 18 February 2018

Todd Kuiken: Speaking at CaBSA on "Biosafety in a World Without Walls," Carolinas Biological Safety Association, The Bayer Bee Center, RTP, NC. 8 February 2018


Jason Delborne: Workshop "The end of synthetic biology?" University of Edinburgh, Scotland. 14-15 December 2017
Jennifer Kuzma: Presents "High Risk Scenarios of Gene Drives in Ecosystems" at Global Catastrophic Risk Institute annual meeting, Arlington, VA. 12 December 2017

Jennifer Kuzma: Speaks at the International Conference on CRISPR Technologies, Raleigh, NC. 5 December 2017

Todd Kuiken: Participated in UN Convention on Biological Diversity Ad hoc technical experts group meeting, Montreal, CA. 5-8 December 2017

Jason Delborne: Committee meeting of NASEM committee on the potential for biotechnology to improve forest health. Washington, DC. 1-2 December 2017.

Jennifer Kuzma: Panelist at Canada 150 Conference on Innovation and Globalization: Domestic and International Challenges for the Coming Decade, Ottawa, CA. 29 November - 1 December 2017

Todd Kuiken: Speaker at "PRIMSA Stakeholder Dialogue: Setting the agenda of RRI in Industry - focusing on nano/synthetic biology technologies" meeting in Berlin, Germany (board member). 20 November 2017

Jennifer Kuzma: Speaks at Managing Environmental Risks: Markets, Regulation, and Adaptive Learning at Kenan Institute for Ethics, Duke University, Durham, NC. 17-18 November 2017

Fred Gould: Presentation "Prospects for the use of transgenic maize in the management of fall armyworm in Africa" at Entomological Society of America annual meeting. 17 November 2017


Jason Delborne: "Regulation of Emerging Technologies." University of California, Berkeley [remote participation] 17 November 217


Jason Delborne: Annual GBIRd/NCSU Safe Genes Project Meeting, Washington, DC. 5-6 November 2017

Jason Delborne: "Talking About Gene Drive: Communications Workshop" Baltimore, MD. 4 November 2017

Jason Delborne: DARPA Safe Genes LEEDR Semi-Annual Update, Washington, DC, DARPA Headquarters


Fred Gould: Speaks on "Resistance in Plants and the Public" at NCBiotech Roundtable: Gene Editing in Ag Biotech, RTP, NC. 24 October 2017
Jason Delborne speaks on "Public Engagement: Rationales, Methods, and Intended Outcomes" at International Workshop Assessing Security Implications of Genome Editing Technology, Hanover, Germany. 13 October 2017

Todd Kuiken speaks on "Potential security concerns arising from gene drive applications" at Int’l Workshop Assessing Security Implications of Genome Editing Technology, Hanover, Germany. 12 October 2017

Fred Gould speaks on "Gene Drives: From Species Eradication to Species Preservation" at Int’l Workshop Assessing Security Implications of Genome Editing Technology, Hanover, Germany. 11 October 2017

Todd Kuiken: “Can DNA Editing Save Species?” Panel at Society of Environmental Journalists Rivers of Change conference, Pittsburgh, PA. 6 October 2018

Fred Gould speaks at NC Biotech Film premiere of film "Food Evolution". 5 October 2017

Jason Delborne & John Godwin: Talk at NC Museum of History Science Café “CRISPR and the Ethics of Editing Genes” Raleigh, NC. 28 September 2017

Zack Brown: Presents two papers at BIOECON Conference at Tilburg University in the Netherlands. 21 September 2017

Fred Gould: Speaks at University of Idaho event “What’s For Dinner?: A Guide to Understanding GMOs” Moscow, ID. 18 September 2017

Jason Delborne: Participates in CSIRO "Engineering Resilience" workshop, Heron Island, Great Barrier Reef, Australia. 11-15 September 2017

Zack Brown: Presents at National Socio-Environmental Synthesis Center "Living with Resistance" workshop. 5-8 September 2017

Todd Kuiken: Presenting to FBI on DIYbio, Washington, DC. 7-8 September 2017

Jason Delborne: Presents "Envisioning responsible innovation in biotechnology for conservation: Engagement, GM chestnut trees, and gene drive mice" at Meeting of the Society for the Social Studies of Science, Boston, MA. 31 August 2017

Jennifer Kuzma: Presents "Genetically engineered animals, risk and regulations" at Meeting of the Society for the Social Studies of Science, Boston, MA. 30 August 2017

Jennifer Kuzma: Moderates panel "Whether and How: Who determines the future of CRISPR?" at CRISPRcon, University of CA, Berkeley. 17 August 2017
Core faculty service activities at NC State University, nationally, and internationally.

Jason Delborne, Todd Kuiken: IUCN SynBio Task Force. 13 Apr. 2018

Jennifer Kuzma: Begins Fulbright Canada Research Chair in Science Policy at the University of Ottawa 1 Feb – 4 Jun. 2018

Jennifer Kuzma: Elected officer of the AAAS Section X on Societal Implications of Science & Engineering. 26 Jan. 2018

Fred Gould: Conference committee of the International Conference on CRISPR Technologies, Raleigh, NC. 5 Dec. 2017

Todd Kuiken: Served on UN Convention on Biological Diversity Ad hoc technical experts group. 5-8 Dec. 2017


Todd Kuiken: Served as judge at iGEM 2017 Giant Jamboree. 9-14 Nov. 2017

Jason Delborne: Appointed to NASEM Potential for Biotechnology to Address Forest Health study committee. Oct. 2017


Jennifer Kuzma: NC State Faculty Senate (2016 to present, elected for 2nd term)

Jennifer Kuzma: NCSU University Watauga Medal Selection Committee (2017-2018)

Jennifer Kuzma: NC State Plant Sciences Initiative Education and Communication Task Force 2017

Jennifer Kuzma: NC State Center for Excellence in Regulatory Science planning committee 2017-2018

Fred Gould: NASEM Board on Agriculture and Natural Resources (2016-Present)

Fred Gould: NASEM TNG—to increase representation of younger members and members from underrepresented groups.


Jason Delborne: Engineering Biology Research consortium, Academic Research Member (2018-Present)

Jason Delborne: National Academies of Sciences, Engineering and Medicine, Ad-Hoc Committee on the Potential for Biotechnology to Address Forest Health, Division on Earth and Life Sciences (2017-Present)

Jason Delborne: Review Panel, National Science Foundation, Division of Social & Economic Sciences (2017-Present)

Jason Delborne: NCSU Post-Tenure Review Committee, Dept. of Forestry & Environmental Resources (2016–Present)

Jason Delborne: NCSU Leadership in Public Science Committee, Chancellor’s Faculty Excellence Program (2015-Present)
Jason Delborne: Editorial Board, Science Communication (2015-Present)

Jason Delborne: NCSU University Standing Committee on Evaluation of Teaching (2015 – Present)

Jason Delborne: Editorial Board (charter member), Engaging Science, Technology, and Society; Society for Social Studies of Science’s open-access journal (estsjournal.org) (2014–Present)

Jason Delborne: Faculty Facilitator and Mentor, “Policy, Science, Technology and Society (POSTS) Scholars Program, funded by the National Science Foundation to “increase diversity in science and technology studies and science policy fields,” coordinated through Arizona State University’s Center for Nanotechnology in Society. Program includes campus mentoring during the academic year and three weeks of summer workshops in Washington, DC. (2014 – Present)

Jason Delborne: NCSU Science, Technology, and Society Advisory Committee (2014 – Present)

Jason Delborne: NCSU Executive Committee, Genetic Engineering and Society Center (2014 – Present)

Jason Delborne: NCSU Executive Committee, IGERT Fellowship program in Genetic Engineering and Society (2013 – Present)

Jason Delborne: NCSU Co-Director, Genetic Engineering and Society Minor Program (2013 – Present)

Jason Delborne: NCSU Teaching Peer Review Committee, Dept. of Forestry and Environmental Resources (2013 – Present)

Fred Gould: NCSU Chair of Genetics and Genomics Initiative Executive Committee (2018 – Present)


Fred Gould: NCSU Plant Science Initiative Governance Steering Committee (2017 – Present)

Fred Gould: NCSU Chari DEPP Work Climate Survey Committee (2017-2018)

Fred Gould: Member of Gates Foundation Target Malaria external Ethics Committee (2016-present)
AFFILIATED FACULTY

RESEARCH LEADERS
Jennifer Kuzma
Fred Gould
Todd Kuiken
Jason Delborne
Zachary Brown

AFFILIATED FACULTY & VISITING SCHOLARS
Robert Anholt
Erin Banks
Rodolphe Barrangou
Chase Beisel
Jade Berry-James
David Berube
Andy Binder
Matthew Booker
Hannah Burrack
Jose Cisneros
Rick Davis
Veljko Dubljevic
Rob Dunn
Rebecca Dunning
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Margery Overton
Alan Rebar
Mary Watzin
CENTER STAFF

CO-DIRECTORS
Jennifer Kuzma | Distinguished Professor, Public and International Affairs, jkuzma@ncsu.edu
Fred Gould | University Distinguished Professor, Entomology and Plant Pathology, fred.gould@ncsu.edu

EXECUTIVE COMMITTEE
Zack Brown | Assistant Professor, Agriculture and Resource Economics, zack.brown@ncsu.edu
Jason Delborne | Associate Professor, STS, Forestry & Environmental Resources, jadelbor@ncsu.edu

STAFF
Todd Kuiken | Senior Research Scholar, tkuiken@ncsu.edu
Patti Mulligan | Communications Director, patti.mulligan@ncsu.edu
Sharon Stauffer | Program Manager, sastauff@ncsu.edu

CONTACT INFORMATION
Telephone: 919-515-2596
Email: gesocietycenter@ncsu.edu

ONLINE
Website: research.ncsu.edu/ges
Twitter: @GESCenterNCSU

LOCATION
Mailing Address
GES Center, NC State University
Campus Box 7565
Raleigh, NC 27695-7565

Physical Address
James B Hunt, Jr. Library
Centennial Campus
1070 Partners Way, 5th floor
Raleigh, NC 27607