Principal Investigator(s)

Name: Fred L. Gould  
Role in Project: Principal Investigator

Co-Principal Investigator(s) or Trainee/Associate Advisor(s)

Name: Andrew R. Binder  
Role in Project: Co-Principal Investigator

Name: Matthew M. Booker  
Role in Project: Trainee/Associate Advisor

Name: Zachary S. Brown  
Role in Project: Trainee/Associate Advisor

Name: Hannah J. Burrack  
Role in Project: Trainee/Associate Advisor

Name: Yasmin J. Cardoza  
Role in Project: Trainee/Associate Advisor

Name: Jason A. Delborne  
Role in Project: Trainee/Associate Advisor

Name: John R. Godwin  
Role in Project: Trainee/Associate Advisor

Name: Kevin Gross  
Role in Project: Trainee/Associate Advisor

Name: Nick Haddad  
Role in Project: Co-Principal Investigator

Name: Nora Haenn  
Role in Project: Co-Principal Investigator

Name: William C. Kimler  
Role in Project: Trainee/Associate Advisor

Name: William Kinsella  
Role in Project: Co-Principal Investigator

Name: Jennifer Kuzma  
Role in Project: Trainee/Associate Advisor

Name: Alun Lloyd  
Role in Project: Co-Principal Investigator

Name: Marce D. Lorenzen  
Role in Project: Trainee/Associate Advisor

Name: Lisa McGraw  
Role in Project: Trainee/Associate Advisor
Name: Carolyn R. Miller  
**Project Years Active:** 2013-2014, 2014-2015, 2015-2016  
**Role in Project:** Trainee/Associate Advisor

Name: Melinda S. Morrill  
**Project Years Active:** 2012-2013, 2013-2014, 2014-2015, 2015-2016  
**Role in Project:** Trainee/Associate Advisor

Name: Nils Peterson  
**Role in Project:** Trainee/Associate Advisor

Name: Mitch A. Renkow  
**Role in Project:** Trainee/Associate Advisor

Name: Mark D. Robinson  
**Project Years Active:** 2013-2014  
**Role in Project:** Trainee/Associate Advisor

Name: Max J. Scott  
**Role in Project:** Trainee/Associate Advisor

Name: Walter N. Thurman  
**Role in Project:** Trainee/Associate Advisor

**Trainees**

Name: Timothy D. Antonelli  
**Total number of months funded:** 24  
**Project Years Active:**  
- 2012-2013 Project Year - Trainee supported for 11 months  
- 2013-2014 Project Year - Trainee supported for 12 months  
- 2014-2015 Project Year - Trainee supported for 1 months  
- 2015-2016 Project Year - Trainee supported for 0 months

Name: Gregory A. Backus  
**Total number of months funded:** 24  
**Project Years Active:**  
- 2013-2014 Project Year - Trainee supported for 11 months  
- 2014-2015 Project Year - Trainee supported for 12 months  
- 2015-2016 Project Year - Trainee supported for 1 months  
- 2016-2017 Project Year - Trainee supported for 0 months

Name: Jennifer F. Baltzegar  
**Total number of months funded:** 36  
**Project Years Active:**  
- 2014-2015 Project Year - Trainee supported for 12 months  
- 2015-2016 Project Year - Trainee supported for 12 months  
- 2016-2017 Project Year - Trainee supported for 12 months  
- 2017-2018 Project Year - Trainee supported for 0 months

Name: Jessica C. Barnes  
**Total number of months funded:** 36  
**Project Years Active:**  
- 2014-2015 Project Year - Trainee supported for 12 months  
- 2015-2016 Project Year - Trainee supported for 12 months  
- 2016-2017 Project Year - Trainee supported for 0 months  
- 2017-2018 Project Year - Trainee supported for 0 months

Name: Sarah K. Barnhill-Dilling  
**Total number of months funded:** 12  
**Project Years Active:**  
- 2014-2015 Project Year - Trainee supported for 0 months  
- 2015-2016 Project Year - Trainee supported for 0 months  
- 2016-2017 Project Year - Trainee supported for 12 months  
- 2017-2018 Project Year - Trainee supported for 0 months

Name: Johanna E. Elsensohn  
**Total number of months funded:** 36  
**Project Years Active:**  
- 2014-2015 Project Year - Trainee supported for 12 months  
- 2015-2016 Project Year - Trainee supported for 12 months  
- 2016-2017 Project Year - Trainee supported for 0 months  
- 2017-2018 Project Year - Trainee supported for 0 months

Name: Nicole E. Gutzmann  
**Total number of months funded:** 36  
**Project Years Active:**  
- 2014-2015 Project Year - Trainee supported for 12 months  
- 2015-2016 Project Year - Trainee supported for 12 months  
- 2016-2017 Project Year - Trainee supported for 0 months  
- 2017-2018 Project Year - Trainee supported for 0 months
2015-2016 Project Year - Trainee supported for 12 months
2016-2017 Project Year - Trainee supported for 12 months
2017-2018 Project Year - Trainee supported for 0 months

Name: Molly S. Hartzog
Total number of months funded: 36
Project Years Active:
2012-2013 Project Year - Trainee supported for 11 months
2013-2014 Project Year - Trainee supported for 12 months
2014-2015 Project Year - Trainee supported for 12 months
2015-2016 Project Year - Trainee supported for 1 months

Name: Michael S. Jones
Total number of months funded: 36
Project Years Active:
2014-2015 Project Year - Trainee supported for 12 months
2015-2016 Project Year - Trainee supported for 12 months
2016-2017 Project Year - Trainee supported for 12 months
2017-2018 Project Year - Trainee supported for 0 months

Name: Sheron N. King
Total number of months funded: 24
Project Years Active:
2014-2015 Project Year - Trainee supported for 12 months
2015-2016 Project Year - Trainee supported for 12 months

Name: William A. Klobasa
Total number of months funded: 18
Project Years Active:
2012-2013 Project Year - Trainee supported for 11 months
2013-2014 Project Year - Trainee supported for 7 months

Name: Caroline Leitschuh
Total number of months funded: 38
Project Years Active:
2013-2014 Project Year - Trainee supported for 11 months
2014-2015 Project Year - Trainee supported for 12 months
2015-2016 Project Year - Trainee supported for 12 months
2016-2017 Project Year - Trainee supported for 3 months
2017-2018 Project Year - Trainee supported for 0 months

Name: Andrew C. Ludvik
Total number of months funded: 13
Project Years Active:
2013-2014 Project Year - Trainee supported for 11 months
2014-2015 Project Year - Trainee supported for 2 months

Name: Elizabeth A. Pitts
Total number of months funded: 38
Project Years Active:
2013-2014 Project Year - Trainee supported for 11 months
2014-2015 Project Year - Trainee supported for 12 months
2015-2016 Project Year - Trainee supported for 12 months
2016-2017 Project Year - Trainee supported for 3 months
2017-2018 Project Year - Trainee supported for 0 months

Name: John P. Roberts
Total number of months funded: 11
Project Years Active:
2015-2016 Project Year - Trainee supported for 0 months
2016-2017 Project Year - Trainee supported for 11 months
2017-2018 Project Year - Trainee supported for 0 months

Name: Megan E. Serr
Total number of months funded: 38
Project Years Active:
2013-2014 Project Year - Trainee supported for 11 months
2014-2015 Project Year - Trainee supported for 12 months
2015-2016 Project Year - Trainee supported for 12 months
2016-2017 Project Year - Trainee supported for 3 months
2017-2018 Project Year - Trainee supported for 0 months

Name: Jayce Sudweeks
Total number of months funded: 36
Project Years Active:
2014-2015 Project Year - Trainee supported for 12 months
2015-2016 Project Year - Trainee supported for 12 months
2016-2017 Project Year - Trainee supported for 12 months
2017-2018 Project Year - Trainee supported for 0 months

Name: Rene X. Valdez
Total number of months funded: 27
Project Years Active:
2013-2014 Project Year - Trainee supported for 11 months
Name: Michael R. Vella
Total number of months funded: 22
Project Years Active:
2015-2016 Project Year - Trainee supported for 0 months
2016-2017 Project Year - Trainee supported for 10 months
2017-2018 Project Year - Trainee supported for 12 months

Name: Amanda C. Walsh
Total number of months funded: 24
Project Years Active:
2012-2013 Project Year - Trainee supported for 11 months
2013-2014 Project Year - Trainee supported for 12 months
2014-2015 Project Year - Trainee supported for 0 months
2015-2016 Project Year - Trainee supported for 0 months

Name: Sophia H. Webster
Total number of months funded: 36
Project Years Active:
2012-2013 Project Year - Trainee supported for 11 months
2013-2014 Project Year - Trainee supported for 12 months
2014-2015 Project Year - Trainee supported for 12 months
2015-2016 Project Year - Trainee supported for 1 months
2016-2017 Project Year - Trainee supported for 0 months
2017-2018 Project Year - Trainee supported for 0 months

Name: Gabriel L. Zilnik
Total number of months funded: 36
Project Years Active:
2012-2013 Project Year - Trainee supported for 11 months
2013-2014 Project Year - Trainee supported for 12 months
2014-2015 Project Year - Trainee supported for 12 months
2015-2016 Project Year - Trainee supported for 1 months
2016-2017 Project Year - Trainee supported for 0 months
2017-2018 Project Year - Trainee supported for 0 months

Associates
Name: Maria E. Adonay
Project Years Active: 2015-2016, 2016-2017, 2017-2018

Name: Alonzo Alexander
Project Years Active: 2016-2017, 2017-2018

Name: Arun Babu

Name: Brandon Baker
Project Years Active: 2017-2018

Name: Sarah A. Cash

Name: Zachery DeVries

Name: Rebecca M. Edman

Name: Dalton George
Project Years Active: 2017-2018

Name: Marie Gibbons
Project Years Active: 2016-2017, 2017-2018

Name: Meredith Hawley
Project Years Active: 2016-2017, 2017-2018

Name: Brian Hollingsworth
Project Years Active: 2016-2017, 2017-2018

Name: Eli Hornstein
Project Years Active: 2017-2018

Name: Dona Kanavy

Name: Rosemary Keane
Name: Ashley R. Kelly

Name: Meggan Kittle Autry

Name: Vassili Kouprianov
**Project Years Active:** 2016-2017, 2017-2018

Name: Arina Loghin

Name: Kate Maddalena

Name: Tina Ndoh
**Project Years Active:** 2014-2015, 2015-2016, 2016-2017, 2017-2018

Name: Steven Reyna
**Project Years Active:** 2016-2017, 2017-2018

Name: Michael A. Robert

Name: Stacy Roberts

Name: Hyeongyul Roh
**Project Years Active:** 2016-2017, 2017-2018

Name: Lauren Roland
**Project Years Active:** 2014-2015, 2015-2016, 2016-2017, 2017-2018

Name: Julian Sass
**Project Years Active:** 2016-2017, 2017-2018

Name: Jeremy Slone
**Project Years Active:** 2016-2017, 2017-2018

Name: Katherine Swoboda-Bhattarai
**Project Years Active:** 2014-2015, 2015-2016, 2016-2017, 2017-2018

Name: Brittany White
**Project Years Active:** 2016-2017, 2017-2018

Name: Megan Williamson
**Project Years Active:** 2016-2017, 2017-2018

**Accomplishments and Contributions of the IGERT**

**Interdisciplinary Research Achievements**

**First Achievement:** IGERT-associated faculty John Godwin, Chase Beisel, Alun Lloyd, Max Scott, Jason Delborne, and Jennifer Kuzma received a $3.2 million funding award from the Defense Advanced Research Projects Agency (DARPA). The project, "Restoring Ecosystems and Biodiversity through Development of Safe and Effective Gene Drive Technologies" is part of DARPA's Safe Genes program. This 2-year attempt to develop and test a gene drive system that would reduce populations of invasive mice on islands to help conserve threatened seabird populations is renewable for an additional $3.2 million in funding. Reversibility of the gene drive construct is also an important part of the work. The grant is a direct product of preliminary findings, interdepartmental, intercollegiate, and international collaborations made possible by the NCSU IGERT program community. Caroline Leitschuh and Megan Serr (both Cohort 2) are working to bring these female-lethal gene drive systems from the lab and testing arenas to the wild.

**Second Achievement:** IGERT faculty Jason Delborne and Zack Brown, Mike Jones (Cohort 3), and Paul Mitchell (UW-Madison) were awarded $100,000 from the US Dept. of Agriculture (USDA) - National Institute of Food and Agriculture. This project, "Assessing Public Perceptions of Gene Drives for Invasive Species and Pest Control", runs July 2017 - June 2018. Trainee Mike Jones presented their preliminary findings at our weekly Colloquium this January. They found that a majority of the U.S. public supports gene drive use for non-native agricultural pest species with controls to limit how far the drive can spread. Over 70% of respondents sought additional information on 'possible risks' of drives and overwhelmingly ranked health and ecological uncertainties as top priorities to resolve. Likely applications of limited drives may receive majority support, but market risk for alternative production systems and a prioritization of resolving challenging questions of ecological risk may set a high bar for acceptance.

**Third Achievement:** Jessica Barnes (Cohort 3), Katie Barnhill-Dilling (1 Year Fellow), Dr. Elizabeth Pitts (Cohort 2, Pitt), and IGERT faculty member Jason Delborne have collaborated across traditional departmental boundaries to write “Genetic Engineering,” in the Cambridge Handbook of Science, Technology, and Society. An invited contribution spearheaded by the three IGERT fellows, this chapter details how genetic engineering disrupts taken-for-granted distinctions between nature and culture, between human and nonhuman, and between the production of knowledge and the production of commercially viable products. They highlight
Education Achievements

First Achievement: Our Colloquium has continued meeting weekly for the full duration of the 2017-2018 academic year. Our colloquia involve faculty, staff, students and postdocs from 4 different colleges at NCSU encompassing numerous disciplinary distinctions. In response to a changing political and social climate, this year we focused our collective attentions on the perception and situation of genetically modification technologies in the US and beyond. Understanding the impact of doing GM research on the world as well as the researcher themselves and being able to communicate with a wide variety of stakeholders to facilitate said research are critical skills for our students and tools that make them uniquely competitive as they head towards graduation and a hostile job market. Speakers such as Sarah Evanega, Steven Druker, Dan Charles, and David Hawthorne forced our IGERT community to really evaluate deeply held internal and institutional beliefs and their impacts on presenting advancing technologies.

Second Achievement: This year we added another course, GES Discussion, in order to provide our graduate fellows and associates with additional time dedicated to the digestion of the ideas presented by our Colloquium speakers. The Discussion course is headed up by IGERT faculty member Jason Delborne and meets weekly. The enrolled students nominate papers to read and analyze that build on the topics introduced by that week's Colloquium speaker. All Colloquium members are invited to attend, faculty included, though the course is primarily devoted to the intellectual development of our graduate trainees. In our pilot semester, we have a core of eight students who attend regularly with more coming depending on the topic. They represent six different departments among four different colleges. The feedback from our participants has been overwhelmingly positive and we are undertaking the process of making both this course and the Colloquium course permanent offerings in the N.C. State University course catalog.

Third Achievement: This year has seen our community grow by leaps and bounds as we look forward to maintaining our program beyond the cessation of IGERT funding. In order to sustain our GES course offerings and graduate minor, we have begun construction of an undergraduate pipeline by partnering with the Honors College at N.C. State University (See Barriers to Implementation). We've opened our weekly Colloquium to these advanced undergraduates and their participation has greatly enriched our community. The benefit to our graduate students has also been significant as they are gaining valuable insight in to interacting with their future student demographic as they progress from PhD candidate to professor. Though many of our trainees have TA experience within their own departments, our program allows them to interact with undergraduates from a wide variety of backgrounds and majors, which adds another dimension to their already significantly developed scientific communication skill set.

Trainee Achievements

First Achievement: Jennifer Baltzegar (Cohort 3, Genetics) won 1st place in the research poster competition at the Entomological Society of America’s 2017 Annual Meeting. Her experience in the IGERT program has allowed her to gain a deeper understanding of emerging genetic strategies to control pest populations in a biological, social, and regulatory framework. Currently, she focuses on elucidating the fine-scale population structure and the evolution of insecticide resistance in Aedes aegypti, the Yellow Fever Mosquito, to facilitate mathematical modeling of new control methods. Her poster “Temporal and spatial patterns of knockdown resistance in Aedes aegypti in Iquitos, Peru” detailed the international component of her research. This study explores the evolution of two SNPs (single nucleotide polymorphisms, F1534C and V1016I, that have been shown to be important in Central and South America) across a 17-year period in Iquitos, Peru, which includes all years of pyrethroid insecticide use in the city.

Second Achievement: Jessica Barnes (Cohort 3, FER) won 1st place in the poster contest at the American Chestnut Foundation’s 2017 Annual Meeting. Her poster “Anticipating the biogeography of blight-resistant American chestnut” details significant shifts in climatically-suitable habitat for these organisms across the United States and Canada. Efforts to restore these trees focus on the introgression of blight-resistance through both backcross-breeding and biotechnology, but while these approaches may allow the trees to co-exist with the fungus, ecologists have raised fitness concerns about contemporary and future climatic conditions within their historical environments. This project used species distribution modeling (SDM) to understand the climate requirements of American chestnut and predict the availability of future suitable habitat, highlighting the importance of long-term perspective for species reintroductions as the organisms may be best adapted for conditions outside of their historical range.

Third Achievement: Sophia Webster (Cohort 1, Entomology) won first place for her poster presentation at N.C. State's Graduate Student Research Symposium, held March 2018. More than 200 poster presentations were judged by faculty. The goals of the symposium were to showcase the outstanding quality and diversity of graduate-level research at NC State, in addition to providing students with the opportunity to practice and enhance their communication
skills with those outside of their discipline. Sophia presented "Gene Drive in the Zika Mosquito Aedes aegypti", detailing her work creating a gene drive system, that when coupled with an anti-viral gene, can be used to reduce disease incidence through mosquito population replacement. She has successfully established an initial killer-rescue gene drive system in Aedes aegypti as well as Drosophila melanogaster and is beginning laboratory cage experiments to test the efficacy of the system to drive the desired genes through a population.

International Opportunities: Achievements

Research/Educational Achievement 1: Due to IGERT support, Megan Serr (Cohort 2) was able to attend the 2017 Island Invasives Conference in Dundee, Scotland, from July 7-15, to gain insight into the conservation gains made by performing invasive species eradications on islands. The conference had a global representation of professionals who practice the removal of invasive alien species on islands and have first hand knowledge of the skills and management that go into such operations. Megan not only presented her work assessing the reproductive competitiveness between wild and laboratory mice, she was the first speaker to discuss the novel idea of using gene drives for conservation. She was also able to make valuable international connections for future collaborations with individuals who also work on mate-choice in mice as well as gene drives, namely Anna Lindholm (University of Zurich), James Russell (University of Auckland), and Tim Harvey Samuel (The Pirbright Institute).

Research/Educational Achievement 2: Mike Jones and Jennifer Baltzegar (both Cohort 3) produced promising preliminary research data from their Summer 2016 trip to Mexico. According to Mike's analysis, maize weevil activity reduces quantity (and quality) of the crop for consumption and sale, increases protection expenses and forces early stock liquidation. In the study areas within Oaxaca and Chiapas, small producers growing many varieties predominate, with median maize production of 958kg. Six months post-harvest, the average farmer still has 46% of production in storage and 75% of those who store maize used protectants like phosphine tablets or 'pastillas', hermetic silos, or malathion powder. Mean annual expenses on protectants are $4-5 USD, while full economic loss valuation was not possible from the study design. Small farmers store longer and likely face (proportionally) greater MW impacts than large farmers, who report that post-harvest loan obligations mitigate MW risk by forcing them to sell earlier. (See below).

Research/Educational Achievement 3: Over the past year, Jennifer Baltzegar (Cohort 3, see above) has produced a genetic linkage map for the maize weevil, Sitophilus zeamais. This map contains 1,121 SNP markers and is 1,421.6 cM in length. It also contains 11 linkage groups, which correspond to the 10 autosomes and 1 X chromosome. She has performed a ddRadSeq analysis on 4 of the populations sampled in Mexico. One high elevation and one low elevation site from each state visited (Oaxaca and Chiapas). These preliminary results indicate that there is moderate population genetic differentiation between sampled sites. In addition, pairwise genetic differentiation increases with increasing distance between sample sites. Moving forward, Jen and Mike (see above) will combine the economic context of maize production, storage, and trade movement with data on population genetics to make statements about how human-mediated processes may impact the genetic diversity of this key pest in a planned journal publication.

Outreach Activities

Title: "Can Scientists Convince the Public to Accept CRISPR and Gene Drives?" Article
Media Outlet/Organization: Scientific American
Activity Date: 10/17/2017
Description: IGERT faculty mentor Dr. Jason Delborne was quoted in this media article: https://www.scientificamerican.com/message-control

Title: "Clinical Trials for Disease Vectors" Talk
Media Outlet/Organization: National Institutes of Health
Activity Date: 05/07/2018
Description: IGERT Co-PI Dr. Fred Gould gave a talk at the NIH-NIAD meeting on clinical trials for disease vectors.

Title: "Communicating Conservation: Aiming for Consensus on the Use of New Conservation Technologies" Blog Post
Media Outlet/Organization: Switzer Foundation Grant Programs
Activity Date: 11/16/2017
Description: IGERT faculty mentor Dr. Jason Delborne contributed to this blog post, https://www.switzerfoundation.org/network-innovation-proposal/communicating-conservation-aiming-consensus-use-new-conservation

Title: "Could Genetic Engineering Save the Galapagos?" Article
Media Outlet/Organization: Scientific American
Activity Date: 11/01/2017
Description: IGERT faculty mentors Drs. Jason Delborne, Jennifer Kuzma, Fred Gould & John Godwin were profiled in this article, https://www.scientificamerican.com/article/could-genetic-engineering-save-the-gal-aacuote-pagos/
Title: "Emerging Plant Disease Threaten Food Security: The Need for Biosurveillance" Talk
Media Outlet/Organization: NASA Goddard Space Flight Center
Activity Date: 12/18/2017
Description: IGERT associate faculty Dr. Jean Ristaino gave this talk to a public audience at the NASA Center.

Title: "Facing our Future" Article
Media Outlet/Organization: North Carolina State University College of Agriculture and Life Sciences Alumni Magazine
Activity Date: 10/25/2017
Description: Trainees Johanna Elsensohn & Mike Jones were the 2 grad students, out of 50 nominated, selected for a roundtable discussion with the CALS Dean. She was quoted in this article: https://cals.ncsu.edu/news/the-deans-round-table-facing-the-future/

Title: "Food Evolution" Screening and Panel Discussion: Meredith College
Media Outlet/Organization: Meredith College
Activity Date: 03/22/2018
Description: IGERT Co-PI Dr. Fred Gould participated in the screening of and following panel on the film "Food Evolution" at Meredith College.

Title: "Food Evolution" Screening and Panel Discussion: The Carolina Theater
Media Outlet/Organization: The Carolina Theater
Activity Date: 10/05/2017
Description: IGERT Co-PI Dr. Fred Gould participated in a panel along with the film's director following a public screening of "Food Evolution" at The Carolina Theater in downtown Raleigh, NC.

Title: "Gene Drives are too Risky for Field Trials, Scientists Say" Article
Media Outlet/Organization: New York Times
Activity Date: 11/16/2017
Description: IGERT faculty mentor Dr. Jason Delborne was quoted in this article, https://www.nytimes.com/2017/11/16/science/gene-drives-crispr.html

Title: "Genetically Engineering the Natural World, it Turns Out, Could Be a Disaster" Article
Media Outlet/Organization: Gizmodo
Activity Date: 11/16/2017
Description: IGERT faculty mentor Dr. Jason Delborne was quoted in this article, https://gizmodo.com/genetically-engineering-the-natural-world-it-turns-out-1820493131

Title: "How Genetically Modified Mice Could One Day Save Island Birds" Article
Media Outlet/Organization: Audubon Magazine
Activity Date: 07/11/2017
Description: IGERT faculty Drs. Fred Gould & Jennifer Kuzma are quoted in this article, which tells the story of how IGERT faculty Dr. John Godwin & trainee Megan Serr became part of the GBIRD (Genetic Biocontrol of Invasive Rodents) partnership.

Title: "Is This Tomato Engineered? Inside the Coming Battle Over Gene-Edited Food" Article
Media Outlet/Organization: The Wall Street Journal
Activity Date: 04/15/2018
Description: IGERT faculty mentor Dr. Jennifer Kuzma was quoted in this article, https://www.wsj.com/articles/is-this-tomato-engineered-inside-the-coming-battle-over-gene-edited-food-1523814992

Title: "La Subida y Caida de un Alimento Industrial" Talk
Media Outlet/Organization: National Institute of Ecology (INECOL)
Activity Date: 08/02/2017
Description: IGERT faculty mentor Dr. Matthew Booker gave this invited talk in Coatepec, Mexico.

Title: "Late Blight and other emerging disease of potato" Talk
Media Outlet/Organization: NC Potato Growers Association
Activity Date: 12/14/2017
Description: IGERT associate faculty Dr. Jean Ristaino gave this talk at the NC Potato Growers meeting in Elizabeth City, NC.

Title: "New Model Warns about CRISPR Gene Drives in the Wild" Article
Media Outlet/Organization: Quanta Magazine
Activity Date: 11/16/2017
Description: IGERT faculty mentor Dr. Jason Delborne was quoted in this article, https://www.quantamagazine.org/new-model-warns-about-crispr-gene-drives-in-the-wild-20171116/

Title: "Playing God: are we prepared to use gene drive technology?" Article
Media Outlet/Organization: The Western Producer
Activity Date: 12/14/2017
Description: IGERT trainee Johanna Elsesohn was quoted in this article: https://www.producer.com/2017/12/playing-god-prepared-use-gene-drive-technology/

Title: "Process of Elimination" Article
Media Outlet/Organization: Wired
Activity Date: 02/20/2018
Description: IGERT Co-PI Dr. Fred Gould was quoted in this article, https://www.wired.com/story/crispr-eradicate-invasive-species/
Title: "QnAs with Rodolphe Barrangou" Article  
Media Outlet/Organization: Proceedings of the National Academy of Sciences USA  
Activity Date: 07/03/2017  
Description: IGERT associate faculty, Rodolphe Barrangou was interviewed by science writer, Prashant Nair about his work on CRISPR-Cas systems for volume 114, issue 28, pp. 7183-7184. DOI: 10.1073/pnas.1710348114

Title: "Scientist to the Senators" Article  
Media Outlet/Organization: North Carolina State University College of Agriculture and Life Sciences News Bulletin  
Activity Date: 12/19/2017  
Description: IGERT trainee Johanna Elsensohn was featured and quoted in this article: https://cals.ncsu.edu/news/scientist-to-the-senators-ph-d-student-johanna-elsensohn/

Title: "Synthetic species made to shun sex with wild organisms" Article  
Media Outlet/Organization: Nature Magazine  
Activity Date: 01/16/2018  
Description: IGERT Co-PI Dr. Fred Gould was quoted in this article on gene editing, https://www.nature.com/articles/d41586-018-00625-1

Title: "The Rise of Aquaculture & Resurgence of the Oyster Industry in the Southeast" Talk  
Media Outlet/Organization: Terra Vita Festival  
Activity Date: 10/20/2017  
Description: IGERT faculty mentor Dr. Matthew Booker gave a talk for a public audience at a festival that brings together top chefs, brewers, educators, & industry luminaries from across the Southeast to celebrate culinary excellence and sustainability in food.

Title: "The State of Diversity in Government and Public Service" Talk  
Media Outlet/Organization: Public Administration and Policy School of Public & International Affairs, University of Georgia  
Activity Date: 11/02/2017  
Description: IGERT associate faculty Dr. Jade Berry-James was invited to speak about "The State of Diversity in Government and Public Service" at the Public Administration and Policy School of Public & International Affairs at the University of Georgia.

Title: "Tracking evolutionary relationships of the Irish famine pathogen Phytophthora infestans" Talk  
Media Outlet/Organization: North Carolina Museum of Natural Sciences  
Activity Date: 09/16/2017  
Description: IGERT associate faculty Dr. Jean Ristaino gave this talk to a public audience as part of the TRICEM Showcase in Raleigh, NC.

Title: "Tracking worldwide migrations, evolutionary relationships and reemergence of Phytophthora infestans: A threat" Talk  
Media Outlet/Organization: Global Food Security International Potato Center  
Activity Date: 11/13/2017  
Description: IGERT associate faculty Dr. Jean Ristaino gave this talk to a public audience in Lima, Peru.

Title: "Trump's agriculture department reverses course on biotech rules" Article  
Media Outlet/Organization: Science Magazine  
Activity Date: 11/06/2017  

Title: "USDA scraps overhaul of GMO and gene edited crop regulations that biotech advocates viewed as 'unscientific'” Blog Post  
Media Outlet/Organization: Genetic Literacy Project Blog  
Activity Date: 11/17/2017  
Description: IGERT faculty mentor Dr. Jennifer Kuzma was quoted in this blog post by Paul McDivitt; https://geneticliteracyproject.org/2017/11/07/usda-scraps-proposed-overhaul-gmo-gene-edited-crop-regulations-biotech-advocates-viewed-unscientific/

Title: 4-H Statewide Competition  
Media Outlet/Organization: NC State Fair  
Activity Date: 10/22/2017  
Description: IGERT trainee Johanna Elsensohn volunteered as a judge for 4-H Statewide Competition held during the North Carolina State Fair held Raleigh, NC.

Title: AGES: The Untold Story of GMO Pioneers Event  
Media Outlet/Organization: Genetic Engineering and Society Center  
Activity Date: 09/26/2017  
Description: IGERT faculty Drs. Matthew Booker, Jean Ristaino, Fred Gould & Jennifer Kuzma participated in this event for the public unveiling of the GES Center's, with NC State Libraries & History Dept., oral history Archive of Agricultural Genetic Engineering.

Title: BioLunch Seminar Series Coordination  
Media Outlet/Organization: North Carolina State University  
Activity Date: 08/31/2017  
Description: IGERT trainee, Nicole Gutzmann, served as Coordinator for the NC State University BioLunch Seminar Series from January 2016 - August 2017. She wrote a grant to get the 2017 series funded, managed meetings & poster sessions, & trained replacements.

Title: BugFest  
Media Outlet/Organization: North Carolina Museum of Natural Sciences  
Activity Date: 09/16/2017  
Description: IGERT trainee Johanna Elsensohn volunteered at Raleigh's annual BugFest. Many of our faculty and fellows attended along with over 35,000 members of the public who come annually to interact with entomologists and other scientists.
Title: CAALS 3D Program  
Media Outlet/Organization: North Carolina State University  
Activity Date: 07/26/2017  
Description: Trainee Jennifer Baltzegar volunteered for NCSU's Creating Awareness of Agriculture and Life Sciences Disciplines, Degree Programs, and Discoveries (CAALS-3D) Summer Research Experience, a week-long summer program for minority high school students.

Title: CEFS Summer Internship  
Media Outlet/Organization: North Carolina State University  
Activity Date: 06/07/2017  
Description: IGERT trainee Johanna Elsensohn (Cohort 3) volunteered during the Summer Internship Program for undergraduates, which ran from Wednesday, June 7 until Wednesday, July 26, 2017 and was based at the CEFS’ 2000-acre Field Research and Outreach Facility.

Title: Communication, Engagement, and Biotechnology Workshop  
Media Outlet/Organization: US-China Agricultural Biotechnology Safety Administration  
Activity Date: 10/04/2017  
Description: IGERT faculty mentor Dr. Jason Delborne organized this workshop on NC State's campus.

Title: Cultivating Cultures of Ethics Focus Group Moderation  
Media Outlet/Organization: Genetic Engineering and Society Center  
Activity Date: 06/06/2017  
Description: IGERT trainees Jennifer Baltzegar (cohort 3) and Sophia Webster (cohort 1) co-moderated focus groups with stakeholders from outside of NCSU on ethics in STEM and responsible innovation to discuss what those topics meant to them.

Title: Eclipse Day  
Media Outlet/Organization: North Carolina State University  
Activity Date: 08/21/2017  
Description: IGERT trainee Caroline Leitschuh (cohort 2) participated in NCSU's College of Sciences' Eclipse day during which she helped attendees safely view the eclipse and execute citizen science experiments tracking changes in weather and animal behavior.

Title: Emory University Forum: Community Engagement  
Media Outlet/Organization: Emory University  
Activity Date: 02/23/2018  
Description: IGERT Co-PI Dr. Fred Gould participated in Emory University's Forum on Community Engagement.

Title: Emory University Forum: Genetic Pest Management  
Media Outlet/Organization: Emory University  
Activity Date: 02/24/2018  
Description: IGERT Co-PI Dr. Fred Gould participated in Emory University's Seminar on Genetic Pest Management.

Title: Engineering Resilience Workshop  
Media Outlet/Organization: CSIRO (Australia) and Revive and Restore  
Activity Date: 09/11/2017  
Description: IGERT faculty mentor Dr. Jason Delborne participated in this workshop by invitation as a member of the Stakeholder Engagement Working Group to aimed at identifying synthetic biology solutions to conservation problems caused by environmental change.

Title: Farm to Fork Festival  
Media Outlet/Organization: Center for Environmental Farming Systems  
Activity Date: 06/02/2017  
Description: IGERT trainee Johanna Elsensohn volunteered at the 2017 Farm to Fork Festival in Pittsboro, NC, hosted by the Center for Environmental Farming System, which is focused on raising money to fund farmer apprentices and internships.

Title: Gates Foundation Meeting Moderation  
Media Outlet/Organization: Gates Foundation  
Activity Date: 07/12/2017  
Description: IGERT Co-PI Dr. Fred Gould was the meeting moderator on strategies for testing gene drives in Africa for malaria control at the Gates Foundation Meeting.

Title: Genetic Pest Management Seminar: Iowa State University  
Media Outlet/Organization: Iowa State University  
Activity Date: 04/03/2018  
Description: IGERT Co-PI Dr. Fred Gould gave a seminar on Genetic Pest Management at Iowa State University.

Title: Genetic Pest Management Seminar: University of Idaho  
Media Outlet/Organization: University of Idaho  
Activity Date: 09/19/2017  
Description: IGERT Co-PI Dr. Fred Gould gave a seminar on Genetic Pest Management at the University of Idaho.

Title: Genetic Pest Management Seminar: University of North Carolina at Charlotte  
Media Outlet/Organization: University of North Carolina (UNC) at Charlotte  
Activity Date: 03/23/2018  
Description: IGERT Co-PI Dr. Fred Gould gave a seminar on Genetic Pest Management at UNC Charlotte.
Title: Interdisciplinary Research Talk: North Carolina State University  
Media Outlet/Organization: North Carolina State University  
Activity Date: 04/25/2018  
Description: IGERT Co-PI Dr. Fred Gould gave a presentation on interdisciplinary research to undergraduates at the College of Humanities and Social Sciences at North Carolina State University.

Title: International Academies Meeting Talk  
Media Outlet/Organization: International Academies  
Activity Date: 10/11/2017  
Description: IGERT Co-PI Dr. Fred Gould gave a talk at the International Academies meeting on biosecurity in Hanover, Germany.

Title: Math & Science Night: Washington GT Elementary  
Media Outlet/Organization: Washington GT Elementary School  
Activity Date: 01/25/2018  
Description: IGERT trainee Johanna Elsensohn volunteered at the Math and Science Night at Washington GT Elementary School in Raleigh, NC.

Title: NASEM Sackler Colloquium - Gene Drives: From Species Eradication to Species Preservation  
Media Outlet/Organization: National Academies of Sciences, Engineering & Medicine  
Activity Date: 11/17/2017  

Title: NCSU High School Student Shadow Day  
Media Outlet/Organization: North Carolina State University  
Activity Date: 07/19/2017  
Description: IGERT trainee Jennifer Baltzegar (Cohort 3) volunteered for NC State University's High School Student Shadow Day and shared her graduate school experience with high school seniors from around the state.

Title: New Frontiers: The Story Collider  
Media Outlet/Organization: The Story Collider  
Activity Date: 06/26/2017  
Description: IGERT trainee Caroline Leitschuh (Cohort 2) participated in The Story Collider's show about New Frontiers at Motorco Music Hall in Durham, NC. This show is a place for scientists to share their true, personal science stories to the general public.

Title: Packapalooza  
Media Outlet/Organization: North Carolina State University  
Activity Date: 08/19/2017  
Description: IGERT trainee Johanna Elsensohn volunteered at Packapalooza, an all-day block party and street festival capping off Wolfpack Welcome Week at the start of the academic year at NCSU, featuring 326 vendor booths & 60 sponsoring organizations.

Title: Public Forum on GE Crops  
Media Outlet/Organization: University of Idaho and University of Washington  
Activity Date: 09/18/2017  
Description: IGERT Co-PI Dr. Fred Gould participated in a public forum on GE crops with representatives from both of these universities.

Title: Science Cafe: CRISPR and the Ethics of Editing Genes  
Media Outlet/Organization: North Carolina Museum of Natural Sciences  
Activity Date: 09/28/2017  
Description: In an event co-coordinated by trainee Caroline Leitschuh, IGERT faculty mentors Drs. Jason Delborne and John Godwin spoke to the public about CRISPR and other advanced gene-editing tools regarding the elimination of invasive pest species.

Title: Science Seminar: Genetically Engineered Mosquitoes  
Media Outlet/Organization: Durham Technical Community College  
Activity Date: 10/18/2017  
Description: IGERT trainee Sophia Webster (Cohort 1) was invited to give a talk describing the use of genetically engineered mosquitoes to prevent the transmission of diseases such as Zika at Durham Technical Community College.

Title: SciLine Briefing: Gene Drives  
Media Outlet/Organization: SciLine  
Activity Date: 04/25/2018  
Description: IGERT faculty mentor Dr. Jennifer Kuzma participated in SciLine's first Media Briefing on Gene Drives; https://www.sciline.org/media-briefings-blog/gene-drives

Title: Talking about Gene Drive: Communications Workshop  
Media Outlet/Organization: Foundation for the National Institutes of Health  
Activity Date: 11/04/2017  
Description: IGERT faculty mentor Dr. Jason Delborne participated in this workshop at which attendants discussed how gene drive technology is being described in the media and ways to work together to enhance related communication and clarify public perception.

Title: University of Arizona Seminar: Genetic Pest Management  
Media Outlet/Organization: University of Arizona  
Activity Date: 03/16/2018  
Description: IGERT Co-PI Dr. Fred Gould participated in the University of Arizona's Seminar on Genetic Pest Management.
Publications, Presentations, and Patents

**Journal Articles in Refereed Publications**

5a. Journal Articles in Refereed Publications


Journal Articles in Non-Refereed Publications

5b. Journal Articles in Non-Refereed Publication


Books

5c. Books


Book Chapters

5d. Book Chapters


Conference Publications

5g. Conference Publications


Conference Presentations


Berry-James, R. M. (2017, October). The Skills and Resources Needed to be Effective MPA and PhD Directors. Panelist presenter at the 2017 NASPAA Annual Conference, Washington, DC.


Lorenzen, M.D. (2017, November). Genome editing in beetles: Lessons learned from the red flour beetle. Oral presentation at the Entomological Society of America Conference Workshop, Denver, CO.


**Partnerships/Collaborations**

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<thead>
<tr>
<th>Academic Partner 1</th>
<th>Active Status</th>
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<table>
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<tr>
<th>Partner Name</th>
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<tbody>
<tr>
<td>University of Adelaide</td>
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**Type of partner**

<table>
<thead>
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<th>Ph.D.-granting institution</th>
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<th>Foreign-based institution</th>
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**Funding arrangement for this partner**
Partner provides funding to the IGERT project for research, curriculum, or other project activities, but not directly for trainees.

Other: A joint grant from both universities that awarded $10,000 to research teams at each institution.

### Activities for this partner/institution

**Facilities:** IGERT trainees or faculty use a partner organization's facilities for project activities.

**Collaborative Research/Teaching:** Partner organization's personnel work with IGERT project staff on collaborative research/teaching.

**Personnel Exchange:** IGERT Trainees, faculty and/or partner organization personnel use each other's facilities or work at each other's sites on an ad hoc or as-needed basis.

#### Activities for this partner/institution

### Academic Partner 2

**Active Status**

Yes

**Partner Name**

North Carolina A&T University

**Type of partner**

Ph.D.-granting institution

Minority-serving institution

**Funding arrangement for this partner**

Other: Potentially funded by separate NSF NRT grant

### Activities for this partner/institution

**Collaborative Research/Teaching:** Partner organization's personnel work with IGERT project staff on collaborative research/teaching.

**Personnel Exchange:** IGERT Trainees, faculty and/or partner organization personnel use each other's facilities or work at each other's sites on an ad hoc or as-needed basis.

### Activities for this partner/institution

Our newly submitted NSF NRT proposal, FEW: Agricultural Biotechnology in Our Evolving Food, Energy & Water Systems (AgBioFEWS), is a cornerstone of our collaboration with NC A&T. AgBioFEWS CoPIs are creating cooperative education projects with two HBCUs in North Carolina. One of them, North Carolina A&T University in Greensboro, recently received an NRT grant titled "Improving Strategies for Hunger Relief and Food Security through Computational Data Science." The focus of that program, like ours, is Eastern North Carolina. Most of the NC A&T students will be getting Masters degrees and they are required to do internships. We are arranging for them to do internships at NC State with AgBioFEWS faculty members. These students will be pre-adapted to enter our AgBioFEWS PhD program.

### Academic Partner 3

**Active Status**

Yes

**Partner Name**

Fayetteville State University

**Type of partner**

Ph.D.-granting institution

Minority-serving institution

**Funding arrangement for this partner**

Other: Potentially funded by separate NSF NRT grant

### Activities for this partner/institution

**Collaborative Research/Teaching:** Partner organization's personnel work with IGERT project staff on collaborative research/teaching.

**Personnel Exchange:** IGERT Trainees, faculty and/or partner organization personnel use each other's facilities or work at each other's sites on an ad hoc or as-needed basis.

### Activities for this partner/institution

Our newly submitted NSF NRT proposal, FEW: Agricultural Biotechnology in Our Evolving Food, Energy & Water Systems (AgBioFEWS), is a cornerstone of our collaboration with Fayetteville State University. The University of North Carolina at Fayetteville is a HBCU with a large contingent of military or post-military students. Dr. Lieceng Zhu recently received an NSF-HCUP-NIA project titled "Mechanisms of Heat-Induced Loss of Host Plant Resistance to Insects." We are making arrangements for some of her students to come to NC State this summer and the following summer to work in molecular biology labs and to have discussions with some of the AgBioFEWS proposal faculty in the natural and social sciences. We expect this to set up a pipeline into the AgBioFEWS and other NC State graduate programs.

### Academic Partner 4

**Active Status**

Yes

**Partner Name**

University of Wisconsin-Madison

**Type of partner**
Academic Partner 5
Active Status
Yes
Partner Name
Center for Native Peoples and the Environment, SUNY-ESF
Type of partner
Ph.D.-granting institution
Minority-serving institution
Funding arrangement for this partner
Other: A collaborative award from NSF to support research by students and faculty
Activities for this partner/institution
Collaborative Research/Teaching: Partner organization's personnel work with IGERT project staff on collaborative research/teaching.
Personnel Exchange: IGERT Trainees, faculty and/or partner organization personnel use each other's facilities or work at each other's sites on an ad hoc or as-needed basis.

Government Partner 1
Active Status
Yes
Partner Name
U.S. Naval Medical Research Unit - 6 Peru (NAMRU-6)
Type of government agency
U.S. Federal laboratory or research facility
Funding arrangement for this partner
Other: A separate NIH funded project on Dengue provides a CRADA contract to partner for the purposes of providing services or support of IGERT research related to the NIH project
Activities for this partner/institution
Facilities: IGERT trainees or faculty use a partner organization's facilities for project activities.
Collaborative Research/Teaching: Partner organization's personnel work with IGERT project staff on collaborative research/teaching.
Personnel Exchange: IGERT Trainees, faculty and/or partner organization personnel use each other's facilities or work at each other's sites on an ad hoc or as-needed basis.

Activities for this partner/institution
We have a joint research project in Iquitos Peru on Dengue epidemiology and potential for use of transgenic mosquitoes. This team was recently awarded a new NIH grant to continue their work on Aedes aegypti mosquitoes. Based in large part on trainee Jennifer Baltzegar's (Cohort 3) dissertation work, this grant, with total funding of $1.6 million, will be vital for continued project development. Their grant was in the top 6 percentile of proposals received. Jen's cornerstone study explores the evolution of two single nucleotide polymorphisms (SNPs), F1534C and V1016I, across an 18-year period in Iquitos, Peru, which includes all years of pyrethroid use in the city. Her results present an intriguing dynamic between resistant haplotypes that improves understanding of insecticide resistance evolution. The new grant will allow for more in-depth exploration into pyrethroid resistance evolution and hypotheses about the efficacy of new gene drive strategies for mosquito suppression.
Active Status
No

Partner Name
Centro Regional de Investigación en Salud Pública, INSP, Mex

Type of government agency
Foreign institution or foreign government/agency : Mexico

Funding arrangement for this partner
No funding/direct financial interaction is involved in this partnership.

Activities for this partner/institution

Facilities: IGERT trainees or faculty use a partner organization's facilities for project activities.

Collaborative Research/Teaching: Partner organization's personnel work with IGERT project staff on collaborative research/teaching.

Personnel Exchange: IGERT Trainees, faculty and/or partner organization personnel use each other's facilities or work at each other's sites on an ad hoc or as-needed basis.

Government Partner 3

Active Status
Yes

Partner Name
CSIRO Commonwealth Scientific and Industrial Research Organization Australia

Type of government agency
Foreign institution or foreign government/agency : Australia

Funding arrangement for this partner
Other : In development

Activities for this partner/institution

Facilities: IGERT trainees or faculty use a partner organization's facilities for project activities.

Collaborative Research/Teaching: Partner organization's personnel work with IGERT project staff on collaborative research/teaching.

Personnel Exchange: IGERT Trainees, faculty and/or partner organization personnel use each other's facilities or work at each other's sites on an ad hoc or as-needed basis.

Activities for this partner/institution
This collaboration is focus on the mouse island eradication project. CSIRO personnel are involved at different levels but mostly in terms of risk analysis and regulatory pathway assessment. Keith Hayes with CSIRO is undertaking a formal quantitative risk assessment for gene drive mice that arose in part out of collaborations the IGERT program contributed to, specifically the preliminary data gathered by Dr. John Godwin and trainees Megan Serr and Caroline Leitschuh (both Cohort 2). Keith and team at the Commonwealth Scientific and Industrial Research Organization in Australia are focused on the use of a genetically-modified, sex-biasing gene drive mouse to reduce invasive mouse populations on islands where they threaten diversity. This will include input from experts at the molecular/cellular, population/community, and ecosystem levels with input from experts in these fields including participating faculty from the IGERT program.

Other Partner 1

Active Status
Yes

Partner Name
CIMMYT - International Maize and Wheat Improvement Center

Funding arrangement for this partner
No funding/direct financial interaction is involved in this partnership.

Activities for this partner/institution

Facilities: IGERT trainees or faculty use a partner organization's facilities for project activities.

Collaborative Research/Teaching: Partner organization's personnel work with IGERT project staff on collaborative research/teaching.

Personnel Exchange: IGERT Trainees, faculty and/or partner organization personnel use each other's facilities or work at each other's sites on an ad hoc or as-needed basis.

Activities for this partner/institution
Two of our fellows from Cohort 3, Jennifer Baltzegar & Mike Jones, were assisted by CIMMYT during their field work in Mexico in 2016. They spent 3 weeks in Mexico gathering economic and biological data from local farms in pre-selected field sites. Martha Willcox (CIMMYT) assisted them with site selection locales and provided logistical support in country. They have completed most of the analyses of the data gathered during that trip (see International Opportunities - Research/Educational Achievements). Moving forward, they will combine the economic context of maize production, storage, and trade movement with data on population genetics to make statements about how human-mediated processes may impact the genetic diversity of maize weevils. This information will be compiled in a joint publication with CIMMYT with planned submission to The Journal of Stored Products Research.
Other Partner 2
Active Status
Yes
Partner Name
UN FAO Food and Agriculture Organization
Funding arrangement for this partner
No funding/direct financial interaction is involved in this partnership.
Activities for this partner/institution
Collaborative Research/Teaching: Partner organization's personnel work with IGERT project staff on collaborative research/teaching.
Personnel Exchange: IGERT Trainees, faculty and/or partner organization personnel use each other's facilities or work at each other's sites on an ad hoc or as-needed basis.
Internships: IGERT Trainees or faculty work in a partner's facilities specifically as interns.
Co-PI Dr. Fred Gould presented "Prospects for the use of transgenic maize in the management of fall armyworm in Africa" at the Entomology 2017 Annual Meeting in Denver, CO, in November, on the prospects of using GMO technology to help alleviate the issue of crop pests in Africa. The Fall Armyworm which is a major pest of corn in the western hemisphere has become an invasive pest in Africa in the past few years. Some groups are calling for use of Bt corn as a solution. This "Late-Breaking Symposium: Fall Armyworm in Africa: Status, Management Challenges, and Potential for Further Spread" was organized by Allan Hruska, the UN-FAO Program Officer in Panama, and is just the latest collaboration between the two in a relationship that spans nearly 30 years.

Other Partner 3
Active Status
Yes
Partner Name
OECD France
Funding arrangement for this partner
Partner provides funding to the IGERT project for research, curriculum, or other project activities, but not directly for trainees.
Activities for this partner/institution
Collaborative Research/Teaching: Partner organization's personnel work with IGERT project staff on collaborative research/teaching.
In October of 2016, the GES Center hosted scholars from all over the world for a workshop entitled "Environmental Release of Engineered Pests: Building an International Governance Framework". Co-hosted with OECD, this workshop brought individuals from 5 different continents together to discuss the problems facing regulation of emerging technologies. The 2-day invite-only workshop focused on practical solutions to address the international dimension of GPM regulation. With many countries evaluating gene drives for solving some of their most vexing agricultural and public health challenges, the time was ripe to discuss common governance principles for regulatory authorities to consider, with an eye towards harmonizing eventual regulatory structures. There are now 8 Conference Proceedings papers are being published by individuals whose collaborations were formed at that workshop.