

# SCIENCE JUSTICE TRAINING PROGRAM

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## PROGRAM and PROJECT GUIDELINES & CERTIFICATE TIMELINE

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The Science & Justice Training Program (SJTP) aims to train a new generation of scholars who can reach across the natural and social sciences, humanities and the arts to address some of the world's most pressing problems.

Biomedical innovation, species extinction, toxic ecologies, healthcare reform, and many other contemporary matters of concern provoke questions that traverse multiple intellectual, institutional and social worlds. These increasingly complex challenges at the intersection of science, technology, and society, requires new approaches to teaching and research that draw on the expertise and creativity of people with diverse skills and knowledge. In 2010, with a grant from the National Science Foundation, the SJRC launched the [Science & Justice Training Program](#) (SJTP) to meet these 21<sup>st</sup> century challenges and integrate concerns about justice and sustainability into the training of the next generation of scientists and engineers, humanist and social scientists, and artists.

This document introduces the Science & Justice Training Program and lays out the timeline, requirements for completion, application process and program guidelines.

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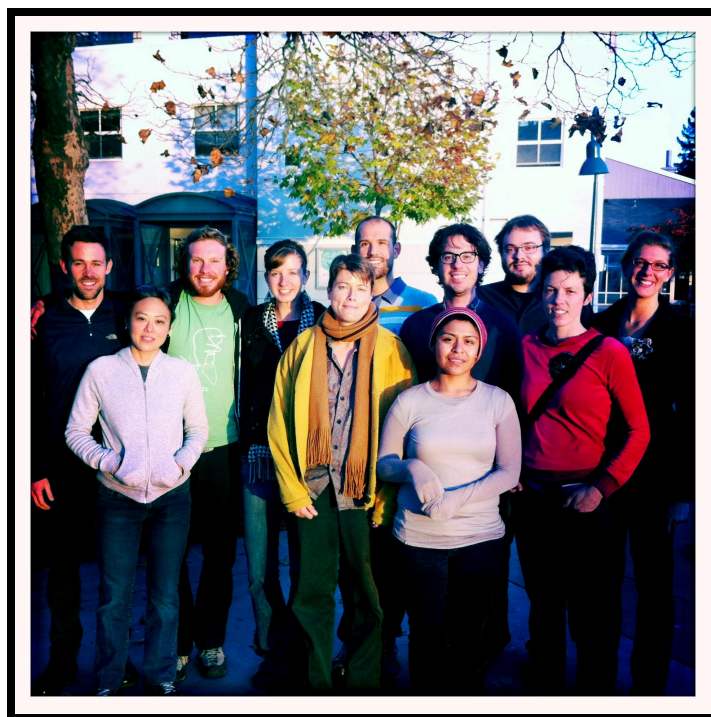
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*(SJRC Founding Director Jenny Reardon with 2011 SJTP cohort.)*

# SCIENCE & JUSTICE TRAINING PROGRAM

## CURRICULUM and TRAINING

Many of today's most important challenges require collaboration across historic divides between natural and social sciences, arts and engineering, the academy and activism, and so on. Living on the planet with clean water, food and means for a good life requires forging novel enactments of justice along with expanded conceptions of knowledge and evidence. Forging livable and just relations among humans and non-humans are not just matters for legal experts, but are socioecological and biopolitical accomplishments. Deciding what property is and its future on a planet where ownership is the domain of the few proceeds not just in courtrooms, but in laboratories.

The SJTP course draws together masters, early career PhD students and faculty from across all five campus divisions to teach how to collectively address the moments where questions of science meet questions of justice. Our teaching techniques model collaborative conversations and often feature modules co-led by SJRC faculty affiliates, visiting scholars and guest lectures. We not only teach why it's important to collaboratively ask questions, but also propose when and how to ask these questions. We have found that early stage graduate students have the curiosity, imagination, and flexibility to incorporate new methods into their research projects and generate novel approaches to scientific challenges.

### The Introductory Course: *Science & Justice: Experiments in Collaboration*

Students enroll in the [\*Science & Justice: Experiments in Collaboration\*](#) graduate seminar, the Training Program's introductory course, where they identify topics of concern, usually represented as a specific object or technical problem (eg: melting ice, HIV, Genetically Modified Rice, krill, solar panels, militarization, drones, declining populations of pollinator bees, big data, etc.). The seminar is offered every other year in Winter quarter and is cross-listed in Biomolecular Engineering, Feminist Studies, Critical Race and Ethnic Studies, and Sociology (as 268A).

#### *Course Description*

Many of today's most important challenges require co-laboration across historic divides—between natural and social sciences, arts and engineering, the academy and activism, and so on. Living on the planet with clean water, food and means for a good life requires forging novel enactments of justice along with expanded conceptions of knowledge and evidence. Forging livable and just relations among humans and non-humans are not just matters for legal experts, but are socioecological and biopolitical accomplishments. Deciding what property is and its future on a planet where ownership is the domain of the few proceeds not just in courtrooms, but in laboratories. This class offers a unique opportunity for graduate students from engineering, natural and social sciences, humanities and the arts to learn to labor together to understand and address these and other critical issues.

After two introductory weeks in which you will begin to learn to carefully examine widely held assumptions about 'science,' 'society,' 'nature,' 'technology,' 'culture' and their interrelationships, the course proceeds through problem-based inquiry at the junction of science and justice. A series of classes will model co-laborative

conversations that pair a science and engineering scholar with a scholar from the social sciences, humanities and arts. Topics often include racial justice and genomics, queer ecology, artificial intelligence and algorithms. Throughout, you will work with fellow students to imagine a possible co-laboration that might begin to engage your own research questions.

## Recommended Readings

- Reardon, J., Metcalf, J., Kenney, M., & Barad, K. 2015. “[Science & Justice: The Trouble and The Promise.](#)” *Catalyst: Feminism, Theory, Technoscience*, 1(1), 1-48.
- Science and Justice Research Center Collaborations Group. 2013. “[Experiments in Collaboration: Interdisciplinary Graduate Education in Science and Justice.](#)” *PLoS Biology* 11[7]: 1-5.

## Training Through Individual Studies

After successfully completing the winter seminar, graduate students are invited to apply to the Training Program where, as Fellows, they are officially welcomed to the Science & Justice Community, and receive continuing mentorship from a Science & Justice affiliated faculty appointed to the role of Director of Teaching to further design and develop a collaborative research project specific to an area of their research to implement and complete by the end of the following spring quarter. Science & Justice Fellows are welcome to troubleshoot and strategize emerging issues within Fellow research with the Director of Teaching and the SJRC Manager. OPTIONAL: Science & Justice Training Program Fellows are welcome to enroll in Independent Study units.

## CERTIFICATE TIMELINE

### Winter

- Enroll in and successfully complete the *Science & Justice: Experiments in Collaboration* (BME/FMST/CRES SOCY 268A); receive permission code from instructor.
- Attend and participate in S&J Working Group meetings and SJRC Happenings.

### Spring

- Complete the [Training Program Application](#).
- Submit a CV and project proposal to [scijust@ucsc.edu](mailto:scijust@ucsc.edu).
- Receive notification of participation in the SJTP.
- Receive and respond to feedback of proposal revisions.
- Optional: Enroll in Independent Study units and meet every other week; units are coordinated by faculty home departments.
- As needed: apply for IRB approval.
- Start implementing the collaborative research project.
- Attend and participate in S&J Working Group meetings and SJRC Happenings.
- If funds are made available, apply to the Call for Summer Fellowship Funding ([example](#)).

### Summer

- Implement collaborative research project.

## Fall - Spring

- Implement and complete collaborative research project.
- Optional: Enroll in Independent Study units and meet every other week; units are coordinated by faculty home departments.
- Attend and participate in S&J Working Group meetings and SJRC Happenings
- Attend and participate in a 2-day Op-ed workshop; if interest is expressed.
- Attend and participate in a culminating event to share outcomes of the collaborative research project + Certificate Reception.

*(Co-Founder of the SJTP Karen Barad and  
Founding Director Jenny Reardon  
with SJTP Fellows and Gene Felice's Oceanic Scales Project,  
2014 SJTP Certificate Reception)*



## CERTIFICATE REQUIREMENTS

Upon successful completion of all requirements, graduate fellows will receive a notation on their official university transcripts and a certificate of completion recognized by the UC Santa Cruz Academic Senate and Graduate Division. Students have until the end of the following spring quarter to complete the following requirements.

### Enrollment

Students must be currently enrolled at UC Santa Cruz. Enroll in and pass the course *Science & Justice: Experiments in Collaboration* (BME/FMST/CRES/SOCY 268A), with a letter grade of B or higher or S if enrolled as 'S/US'.

### Participation

Attend and participate in 6 Science & Justice Working Group meetings or approved co-sponsored events. SJRC hosts or co-sponsors 12-15 events per year; events attended during the term the graduate seminar is offered will be counted. Sign-in sheets serve as attendance records at each event if Center staff are not in attendance.

**Consider volunteering to be a Critical Listener!** Science & Justice practices an experimental method for curating dialogues called "critical listening." Critical listening is a methodological tool to open up a space for reflective conversation across multiple events. The practice of critical listening will identify and develop key questions, critiques, and concerns providing a way to reflexively link those reflections into future projects and discussions. Critical Listeners pay attention to the conversation, focusing especially on aspects that may go unreported in a transcription to help produce a publicly available analysis of the event. Find more in the [critical listener guide](#).

## Collaborative Research Project: Design, Implementation, Documenting and Reporting

SJTP research projects and events contribute to the Science & Justice mission of creating civic spaces where critical justice issues at the interface of science, technology and society might be explored and discussed. Fellows are expected to help foster collaboration and teamwork among disciplines. SJTP projects and events should also aim to help inform Fellow masters or dissertation research. Organizing and running collaborative projects and events trains students how to communicate their questions to non-specialist audiences and gives them the rare space to explore the common desire to build more just, sustainable, and locally relevant technologies and research practices.

Projects may receive continued support depending on interest and resources needed (refer to [SJRC Projects](#)).

Proposals should:

- be interdisciplinary and cross-divisionally designed, ie: involve at least one graduate student from the Sciences Division (PBSci) or Baskin School of Engineering (BSOE) and at least one graduate student from another division (Arts, Humanities or Social Sciences).
- NOT include more than three student organizers.
- include a clear research question seeking to help inform: what science do we want and need in the world?
- include a clear scope of the project's components and work, a short literature review, an outline of research processes, methods\* and timeframe to design, develop, implement and present findings by the end of the following spring quarter.
  - \*Fellows will identify and work with a Critical Listener to help produce a publicly available analysis of their project or curated dialogue within two weeks of the event or project culmination. This analysis can be worked into a piece for wider publication by either the SJTP Fellow or the Science & Justice Research Center (Collaborations Group).
  - \*As appropriate to the project or event, Fellows will create and implement a publicity plan (refer to the [SJRC practice of Raising the Public Platform](#)).
- introduce confirmed and potential participants and plans to include them to the project's design, implementation, and reporting stages.
- state the broader impacts of the project and who the outcomes of the project would be of interest to.
- justify any Center resources or funding needed to support the project.

Projects may include:

- applying for IRB; projects requiring IRB approval will need to identify the most relevant UCSC faculty mentor to oversee the project.
- conducting interviews, leading ethnographic and observational data collection, transcription and analysis of data, creating infographics, outreach materials, and reports based on findings;
- organizing reading groups, curated tours, field trips or site visits, film series, workshops, public events and conferences on topics of collective concern.
- Public writing (ie: developing blog posts) that shares research findings on campus and to the broader public.
- generating writing pieces to be published in peer-reviewed journals.
- software development, policy analysis, public education and outreach projects, institution-building, science-themed media production, etc.



## Project Ideas

- Propose a new area of scientific inquiry. Write a proposal to seed its funding.
- Organize a science and justice wiki-hack-a-thon.
- Curate and host a reading group and blog about it (what to read, with who, why).
- Curate a field trip and document (live tweet, video, audio, etc) the tour.
- Create a prototype map (ie: [“Stratified Health”](#) credit: SJRC undergraduate Emily Caramelli).
- Write a children’s book (ie: [Looking for Marla](#)).
- Write a play, produce a documentary film, photo essay, or art project that explores and helps to create the joining of science and justice.
- Develop a 1-2 hour training module, centering on science and justice pedagogy, to integrate into the curriculum (graduate or undergraduate) of the Fellow’s home department/discipline.

## Select Project Examples

Ian Carbone (Physics) and Derek Padilla (Physics) worked in a laboratory to develop solar green-house technology for use in large-scale industrial agriculture. Their SJTP project explored possibilities for developing the technology concurrently for small-scale organic farms in the Salinas Valley. Using social science methods gained through their SJTP training, Carbone and Padilla discovered that many small-scale farmers were not interested in engaging with advanced technologies. They then pursued opportunities for adapting the project for art and technology education programming in local schools.

Elaine Gan (Digital Arts and New Media) used her experience in the program to create art installations that illustrate the historical and ecological relationships of rice agriculture. She aimed to show how long-standing agricultural practices have been harmed by high-tech market-driven solutions. The purpose of the installation was to incite the public to visualize more sustainable ways of growing rice.

Gene Felice (Digital Arts and New Media) used his experience in the program to create the [Oceanic Scales](#) art installation where visitors explored their role in maintaining a stable ocean ecology through a multi-sensory, interactive art and science puzzle inspired by the microorganisms of the sea. Oceanic Scales explored the visualization and contextualization of ocean sensor data into a creative digital output, streamed from the MBARI Elkhorn Slough sensor array API located in the Monterey bay on the California central coast. The exhibit gave visitors the ability to experience the work either passively or actively. They could absorb its multi-sensory interpretation of ocean data as complex patterns of light and sound, or they can decide to become an active agent of change, trying out various trial and error scenarios by adjusting temperature, PH and nitrogen levels within the automated gaming system. Instability may lead to a system crash; harmony and grace can be achieved through perceived stability, patience and new understanding of how humans impact the environment at local and global scales. The physical structure was ecologically minded, built with local bamboo plywood and pine resin, corn plastic 3D printed forms, recycled cardboard, natural latex rubber, solar power and a living component of native plant species.

In her PhD research Kate Richerson (Ecology and Evolutionary Biology) created mathematical models of fishery conservation. In the SJTP Richerson designed a project to address the lack of ecological data about subsistence

fishing in an area of Sierra Leone. Using interview methods, Richerson learned in the seminar she was able to better identify the challenges of creating localized knowledge about fishing stocks necessary to establish an accurate picture of the ecological condition of these fisheries. Her future efforts have been well-served by her newly found understanding of locals' hesitation to share knowledge with researchers from distant institutions.

## Select Event Examples

*De-Extinction: Building Future Worlds with Extinct Organisms?*, a half-day symposium, sought to extend conversations about de-extinction to questions about justice. Organizers Lizzy Hare (Anthropology) and Tracy Ballinger (Bioinformatics) asked invited speakers to consider the question: What kind of future world(s) do we want to make, and what role, if any, should engineered species have in it? The first panel, "*Conservation and Biotechnology: For Whose Good?*" explored the role of biotechnology in conservation efforts and the second panel, "*Science, Media and Spectacle: How Does Media Support, Threaten, or Change the De-extinction Agenda?*" explored the powerful imaginaries of de-extinction that have animated the public conversation placing media as a spectacle being central to de-extinction. The symposium discussed scientific practice, policy and funding; by exploring what we should expect as biotechnology is brought to bear on conservation problems, and how these disciplines' visions of a more just future for humans, nonhuman species, and ecosystems might converge or diverge. Refer to the [rapporteur report](#) and [campus news article](#).

"*No Really, What Percentage are You?*" *Race, Identity & Genetic Ancestry Testing*, a half-day event was organized by Science & Justice Training Program Fellows Jon Akutagawa (Biomolecular Engineering), Dennis Browe (Sociology), Maggie Edge (Literature), Dorothy R. Santos (Film & Digital Media) and Caroline Spurgin (Education) with undergraduate Diana Sernas (Mathematics) at the Museum of Art and History in downtown Santa Cruz. In a *chain reaction* format (a semi-structured conversation through a chain of questions and dyads), invited panelists discussed questions of racial justice and identity raised by the rise of Direct to Consumer genetic testing. In addition to the experimental conversational format, various activities employing science and art filled the museum's lobby and atrium, including an art installation. Large educational posters about genetic ancestry testing hung from the ceiling, a curated playlist looped genetic ancestry testing videos, and art-making stations lined the atrium. Refer to the [rapporteur report](#).

## Event Guidelines

To develop and organize a collaborative dialogue on topics of collective concern to be hosted by the Science & Justice Working Group, Fellows work closely with Center faculty and staff; while learning how to professionally organize and operate within center and campus policy and procedures.

### Event Planning & Conceptualization

The Science & Justice Research Center hosts various types of events catering to multiple programs and initiatives. Selected event proposals receive appropriate funding and will present their event as part of the Science & Justice Working Group event series. Students are encouraged to connect events to an [SJRC Area of Inquiry](#). The [SJRC Handbook on Event Planning](#) describes how to organize and conceptualize both informal gatherings and formal events. The Center has prepared checklists for all stages of event planning. Follow the [SJRC Guide for Proposing Events](#). Once the proposal is approved, utilize the [SJRC Event Host Planning Checklist](#).

**Students organizing events will attend at least one group mentoring meeting per term until their event is produced.** This will include all students involved in the collaborative event with Center staff and faculty mentors to a) workshop key research topics to address in the event to further develop the agenda and intent, b) brainstorm possible SJRC Affiliates to invite as participants and solicit for campus co-sponsors, and c) to discuss all event and participant logistical items. More frequent meetings may be needed depending on the complexity of the event. Keep Center staff and faculty mentors apprised of all event plans.

### Rapporteur Report

With the help of a Critical Listener, Fellows will produce a publicly available analysis of their project or curated dialogue within two weeks of the event or project culmination.