National Science Foundation

Future Integrative Scholars in Training (FIST)

Comprehensive Interdisciplinary Training for Undergraduate Students

Behavioral Plasticity Research Institute

"A cross-institutional, cross-disciplinary Biology Integration Institute to comprehensively dissect locust phase polyphenism and use it as a model system to transform the study of phenotypic plasticity."

BPRI Behavioral Plasticity Research Institute

Arizona State University · Baylor College of Medicine · Southern Illinois University Edwardsville · Texas A&M University · Washington University in St. Louis · USDA Agricultural Research Service

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Program Overview

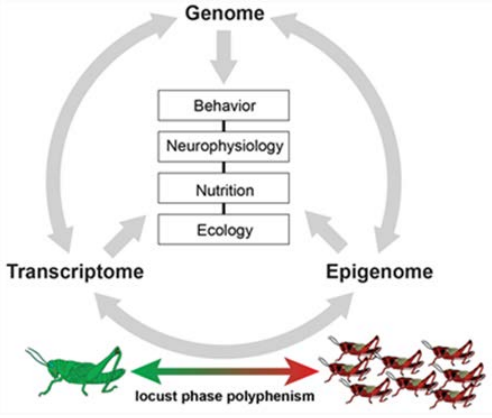
The Behavioral Plasticity Research Institute (BPRI) is a National Science Foundation (NSF) Biology Integration Institute, which is established as a cross-institutional and cross-disciplinary virtual institute to comprehensively dissect locust phase polyphenim and use it as a model system to transform the study of phenotypic plasticity. The BPRI is made of researchers and trainees from six institutions. The Future Integrative Scholars in Training (FIST) is an undergraduate training program that aims to provide interdisciplinary research experience for undergraduates who plan to pursue careers in biological sciences.

Objectives of the FIST Training Program:

- Provide interdisciplinary research training for undergraduate students; upon completion, students will receive a FIST level certificate
- Teach trainees how to develop hypotheses, collect and interpret data, formulate research reports, and present research findings.
- Expose trainees to networking opportunities within the BPRI institutions and the Global Locust Initiative (GLI) network.

Expected Benefits for Trainees

- Paid research for one to two semesters (9-10 hrs/week); alternatively, research credits hours can be earned
- Opportunity to apply for the summer research exchange program
- Interdisciplinary research experience in locust phase polyphenism
- Potential opportunities to co-author journal articles
- Present research results at conferences
- Networking opportunities within BPRI institutions and the GLI network
- Earn a certificate after completing the research experience
- Professional development opportunities and career guidance



Behavioral Plasticity Research Institute Quick Facts

- Supported by the National Science Foundation
- Partnering of five universities and the USDA ARS
- 19 faculty members
- 6 staff members
- 15 BPRI graduate-level trainees
- Studies plasticity of locusts by linking suborganismal processes to the whole organism, populations, and ecosystems, and ultimately to the tree of life.

Research Area of the FIST Program

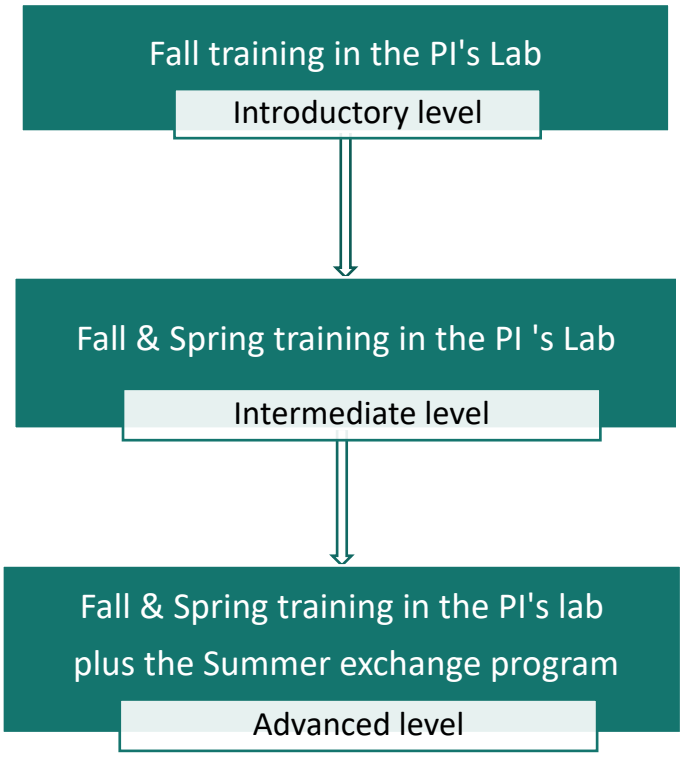
The FIST program provides mentored research training at different levels. Undergraduates will have opportunities to select research themes for training based on their interests and pending availability at their local university. All research activities are centered around locust phase polyphenism. Presently, the BPRI has 10 research areas.

1. Genomics
2. Nutrition
3. Microbiomes
4. Ecology
5. Transcriptomics
6. Genome Editing
7. Evolution
8. Collective Behavior
9. Vision
10. Olfaction

More information about the 10 research areas can find on the BPRI website.

https://behavioralplasticity.org/index.php/research/

There are three certificate levels based on the duration of engagement.



Training Structure

Application Requirements

Who is eligible?

- Undergraduate students enrolled in biological sciences or STEM programs at one of the 5 BPRI partnering universities who can commit 9-10 h/week for 1-3 semesters to research
- Those interested in interdisciplinary training in biology who aim to pursue careers in biological sciences

Students who do not have prior research experience and/or students from underrepresented minorities are highly encouraged to apply for this program

Documents required

- Complete the online application and provide the following information:
  - How the FIST program training will help you achieve your career goals
  - A brief explanation of the BPRI research area that most interests you
- Are you interested in applying for a summer exchange opportunity at another institution? (yes/no)" "If yes, to which institution and why?"
- Most recent resume or CV
- Contact information of two references (including postal addresses, phone numbers, and email addresses)

Application submission

Interested students should submit an application to the BPRI using the following link or QR code.

https://tamuag.az1.qualtrics.com/jfe/form/SV_9ErZIq9HBMcEt1Q

The application deadline is August 9, 2022. Selected candidates will be contacted after two weeks of the application deadline.

Expected starting date: Mid or end of August 2022

For additional information or clarification, please contact the individual PI and/or Dr. Koswatta (the education coordinator). Use the email heading “BPRI-FIST program application [your surname].”

PI labs for Fall and Spring Lab Training

A concise description of available training/ongoing projects is listed below.

Note: A concise description is provided below details more information about research activities can be found at https://behavioralplasticity.org/index.php/research-2/

Name	Institution	Research Activities	The format offered (Credit based/ paid)	In-person or virtual
Spencer Behmer	Texas A&M University	Nutritional Physiology/Ecology	Paid or course credit	In-person
Arianne Cease and Rick Overson (GLI lab)	Arizona State University/ Global Locust Initiative	Locust ecophysiology, including migration, immunology, nutrition, and plant-insect interactions	Paid or course credit	In-person
Herman Dierick	Baylor College of Medicine	Molecular biology	Paid or course credit	In-person
Fabrizio Gabbiani	Baylor College of Medicine	Gene annotation Behavioral experiments Basic electrophysiology	Paid or course credit	In-person
Erez Aiden Lieberman	Baylor College of Medicine	Study locust swarms from a geographic and genomic perspective	Paid or course credit	In-person
Brittany Peterson	Southern Illinois University Edwardsville	Validate the microbiome data of *S. cancellata* using PCR	Paid or completed as senior capstone projects	In-person
Barani Raman	Washington University in St. Louis	Olfactory behavior and processing	TBD	In-person
Hojun Song	Texas A&M University	Functional genetics, behavioral ecology, annotation of plasticity-related genes and functional validation, inheritance of maternal effects	Paid or course credit	In-person
Greg Sword	Texas A&M University	Locust behavior and swarming	Paid or course credit	In-person
Richard Burkett Dwell	Baylor College of Medicine	Gene annotation Behavioral experiments Basic electrophysiology	Paid or course credit	In-person
Maeva Techer (collaborate with Hojun Song)	Texas A&M University	Genotype-Environment interactions, Transcriptomics, Physiology	Paid or course credit	In-person

Summer Exchange Program

FIST students will have the opportunity to apply for a project-based summer exchange program, led by BPRI faculty, staff, postdocs, and/or graduate students. Summer projects can be completed virtually, in person, and collaboratively as a group. Students are encouraged to select the project considering their interests and the lab where the work will be done.

Project List

The following is the tentative project list available as of June 2022. A detailed project list will be distributed to all FIST trainees in March 2023

Project description	Format (virtual, in-person, collaborative)	Supervisor and team members
Project 1 Gene annotation	Virtual can be carried out independently or collaboratively In-person at BCM	Dr. Herman Derick and Dr. Richards Stephen
Project 2 Gene annotation Identification of promoters controlling the gene expression in locust neuron	Virtual or in-person at BCM	Dr. Gabbiani Fabrizio and Dr. Herman Derick

Mentorship Structure

The FIST program provides structured mentoring using multiple mentors. Primary lab mentors will provide core mentoring throughout the training. Other mentors will include:

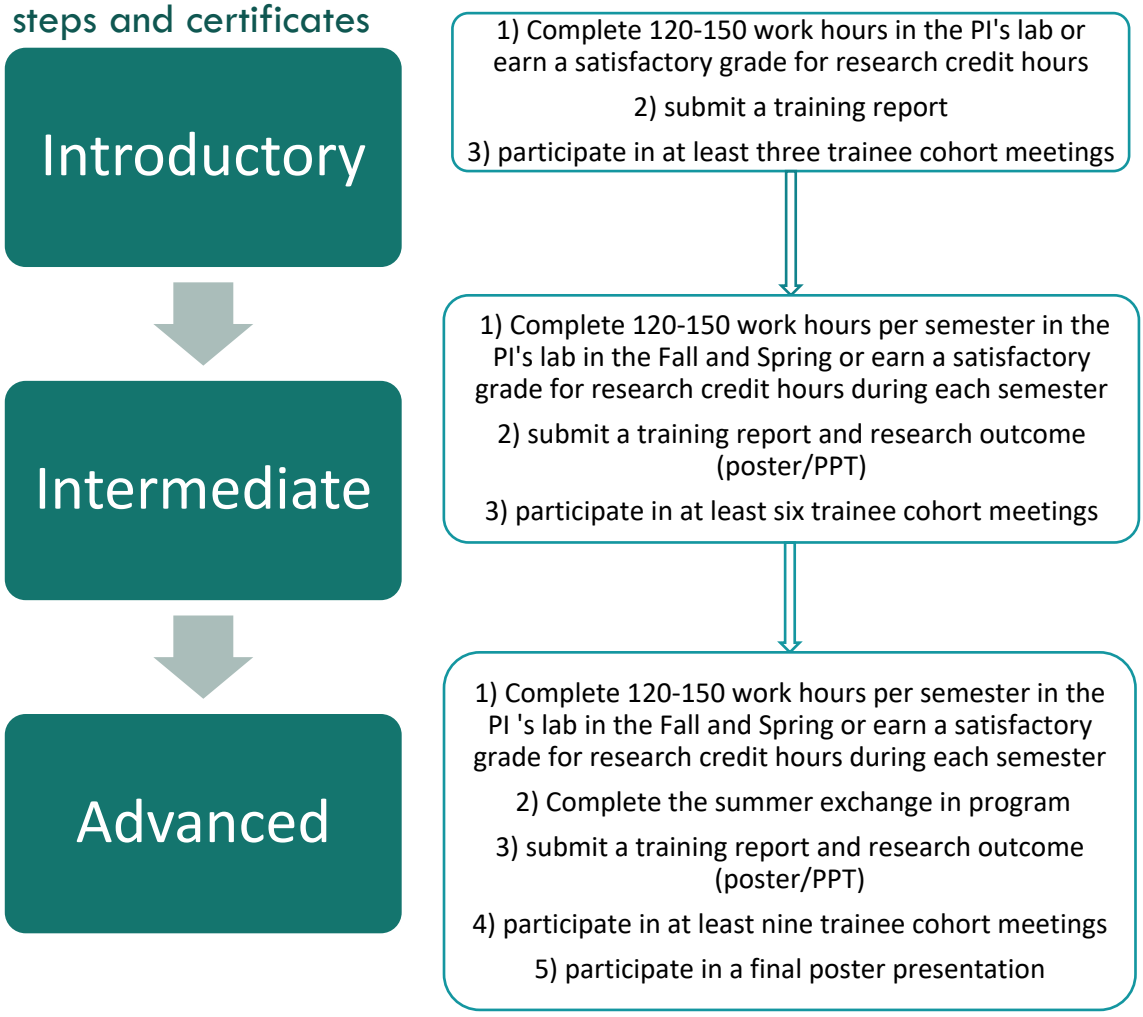
- Postdocs who will assist during the summer program
- Graduate students who will assist with day-to-day operation support in labs
- The BPRI education coordinator who will provide career development advice

Undergraduate trainees will sign a memorandum of understanding (MOU) after being selected for the FIST program. The MOU is a mutual agreement between trainees and the BPRI that explains the expectations of the FIST program. Trainees are required to fill out a goal and planning sheet within one month of joining a BPRI lab. This will allow the BPRI to provide individualized mentoring based on the career interest of the trainee.

Program Requirements

Undergraduate trainees will complete a minimum of 9 hours per week per semester. During the summer, some trainees will participate in full-time training at exchange labs. Trainees will communicate with their primary mentor about the certificate level they aim to achieve and the type of compensation they wish to receive (paid student work or research credit-based).

Program steps and certificates



Communication

To ensure successful training, undergraduates will communicate with the PI, the exchange program PI, the education coordinator, and graduate students. All trainees will attend 1-hour cohort monthly meetings. Each cohort meeting hour is considered part of regular training hours. Undergraduates who are interested in getting a certificate must participate in the trainee cohort meetings.

Traning Report Overview

Program Assessment Surveys

Complete the following survey for program impact assessment

1. Pre-enrollment training survey (5 minutes)
2. Post-enrollment training survey (5 minutes)
3. The onboarding survey after enrolling into intermediate or advanced level programs (15 min)
4. Exit survey after completing the intermediate or advanced level programs (15 min)
5. Exit interview after completing intermediate or advanced level programs (30 minutes - 1 hour). The interview will be conducted by the education coordinator. Responses are used to evaluate the FIST program impact not to evaluate the trainee's performance.

Reports

1. Weekly reports with short descriptions of work (2-3 sentences) and hours completed.
2. Submit a training report following the provided template. We expect the report to explain what you learned during the training. Each lab may implement specific requirements for this report. However, the rubrics provided in the template must be completed to earn the certificate. The final report must be submitted as a PDF file to the education coordinator two weeks after the training ends. The length of the report will vary based on the level of training received (approximately 5 pages, including figures).
3. Students who complete the advanced level certificate must complete the poster presentation. The format will be mutually agreed upon by mentors and students depending on the scope of research.

Contact Information

General information on the FIST program

Dr. Taniya Koswatta: taniya.koswatta@ag.tamu.edu

Institutional specific information

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NSF Disclaimer Note: This material is based upon work supported by the National Science Foundation under Grant No. 2021795. Any opinions, findings, conclusions, or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

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https://behavioralplasticity.org/