

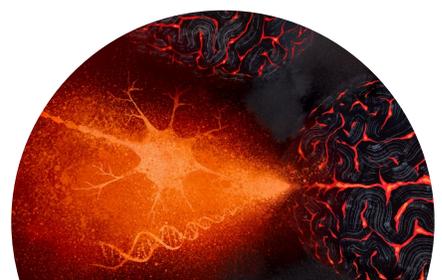
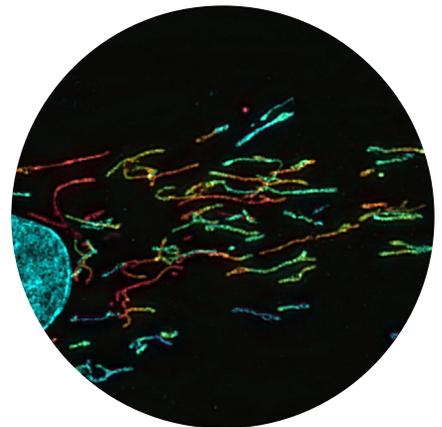
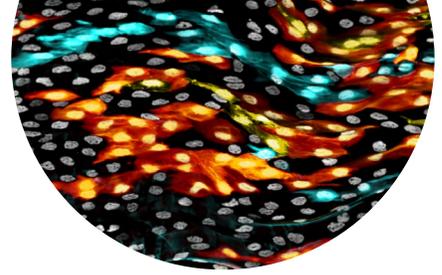
# Gilliam Fellowships

*for Advanced Study*

## 2022 Program Announcement

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<b>Nomination Opens</b> August 18, 2021	<b>Nomination Deadline</b> September 16, 2021
<b>Eligibility Opens</b> September 23, 2021	<b>Eligibility Deadline</b> October 13, 2021
<b>Application Opens</b> October 27, 2021	<b>Application Deadline</b> December 9, 2021
<b>Award Notification</b> June 2022	
<b>Fellowship Term Begins</b> September 1, 2022	



## Howard Hughes Medical Institute

[www.hhmi.org](http://www.hhmi.org)

*The Howard Hughes Medical Institute (HHMI) plays a powerful role in advancing scientific research and education in the United States. HHMI's program in biomedical research rests on the conviction that scientists of exceptional potential, commitment, and imagination will make fundamental discoveries for the betterment of human health if they receive the resources, time, and freedom to pursue challenging questions.*

*The Institute's science education programs support initiatives with the power to transform education in the life sciences for all students, especially those who belong to groups currently underrepresented in science. Each of the initiatives in the HHMI portfolio of science education programs is grounded in our conviction that excellence in science depends on the continued development of a diverse population of scientists and students, and that the responsibility for creating an inclusive learning environment rests primarily on the faculty and administrators of the educational institution.*

## The James H. Gilliam, Jr. Fellowships for Advanced Study

[www.hhmi.org/gilliam](http://www.hhmi.org/gilliam)

*The Gilliam Fellowships for Advanced Study was created in 2004 in honor of the late James H. Gilliam, Jr., a charter Trustee of HHMI and chair of its Audit and Compensation Committee. Mr. Gilliam was a respected business and civic leader who spent his life nurturing excellence and diversity in science and education. The goals of the Gilliam program are to ensure that persons from populations historically excluded from and underrepresented in science are prepared to assume leadership roles in science, including as college and university faculty, and to foster the development of a healthy and inclusive academic scientific ecosystem. The program awards grants to pairs of dissertation advisers and their graduate students, and encourages the grantee institution and the adviser to hold themselves accountable for creating an environment that advances diversity and inclusion.*

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## Eligibility

HHMI's Gilliam Fellowships for Advanced Study is open to eligible pairs comprising thesis advisers and PhD students ("adviser-student pairs"). **Application for the Gilliam award is by invitation only.**

- » Adviser-student pairs from eligible disciplines<sup>1</sup> must be nominated by the HHMI-designated nominator.
- » Prospective fellows must be (i) U.S. citizens, U.S. permanent residents, undocumented childhood arrivals, or undocumented individuals who have been granted temporary permission to stay in the US (DACA)<sup>2</sup>, and (ii) from populations excluded from and underrepresented in science<sup>3</sup> because of ethnicity, race, or disability status, or Alumni of the HHMI EXROP program, and (iii) at the appropriate stage of their PhD training.

Nominations should be of students who (i) are in their second or third year of a PhD program, (ii) and/or have at least two full years of study remaining, and (iii) have or will advance to candidacy by September 1, 2022.

Students who are enrolled in or affiliated with a funded MD/PhD or other dual-degree program are not eligible (e.g., MSTP or institutionally funded program).

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1. *The adviser-student pairs must be studying scientific problems in biomedical sciences, life sciences, and biological questions in related disciplines. This includes basic research on a variety of biological systems and at all scales including at the molecular, cellular, organismal, and ecological levels. This initiative does not support social science research.*
  2. <https://www.uscis.gov/archive/consideration-deferred-action-childhood-arrivals-daca#guidelines>
  3. *Populations excluded from and underrepresented in science: For the purpose of this initiative, we define excluded groups to be persons who identify as Black or African American, Latinx or Hispanic American, American Indian, Native Hawaiian, Alaska Native, and from groups indigenous to the Pacific Island territories of the United States. Persons with disabilities—defined as those with a physical or mental impairment that substantially limits one or more major life activity—are also significantly underrepresented in U.S. science. International students are not eligible.*

## Fellowship Term

The Gilliam Fellowships for Advanced Study will support students for up to three years of their dissertation research, typically in years 3-5 of their PhD studies. The term of the fellowship is for up to three consecutive years unless a deferment or leave of absence is granted by the fellowship institution and approved by HHMI. Advisers and Fellows are expected to participate fully in HHMI programming even if they defer activation of the award.

## Conditions of Appointment

Recipients of HHMI's Gilliam Fellowships for Advanced Study may begin the fellowship no earlier than **September 1, 2022**. Gilliam Fellows are required to be enrolled in a program leading to a PhD or equivalent degree in eligible disciplines.

### ADVISER-SPECIFIC CONDITIONS

The dissertation adviser plays a key role in the development of a more inclusive academic scientific environment.

As part of the Gilliam award, all advisers engage in a year-long, culturally responsive mentorship skills development course. The adviser is required to participate in all activities, including monthly online interactive webinars October 2022-March 2023 and two in-person workshops—the first will be in spring 2023, and the second will be in conjunction with the Gilliam Fellows annual meeting in the fall of 2023.

The mentor development activities will be arranged and paid for by HHMI.

The Gilliam award includes an annual diversity and inclusion allowance which is intended to enable the adviser to address challenges to diversity and inclusion at the graduate level. Through the development of their diversity and inclusion project, the adviser may leverage their influence and implement activities that will foster a healthy scientific academic ecosystem.

## FELLOW-SPECIFIC CONDITIONS

Current Fellows are required to participate in the Gilliam Annual Meeting, Gilliam Leadership Training course, and one HHMI Science Meeting per academic year, where there will be Gilliam-specific discussion sessions. Travel and meeting accommodations for the Fellow activities will be arranged and paid for by HHMI.

## RESEARCH AND BEHAVIORAL CONDUCT CONDITIONS

Activities associated with this grant must be conducted in a responsible manner. The Fellow and the thesis adviser(s), and all other persons supported by the grant will be expected to conduct activities according to the highest scientific and ethical standards and in compliance with all applicable government laws and regulations and Grantee Institution policies, and the Institute's policies, including those regarding creating an inclusive and respectful workplace, protection of human research subjects, humane care and use of laboratory animals, and laboratory safety. This extends to activities away from campus, including, for example, participation at meetings and workshops.

*At each stage of this competition—including the nomination, the application, and the acceptance of the award and Terms and Conditions—the institution and the principals of the application/award will be required to certify, to the best of their knowledge, that there is no formal complaint or finding of misconduct by any of the principals being nominated, applying, or to be awarded the grant.*

## The Award

Beginning in the 2022–2023 fellowship year, the total amount awarded will be \$53,000 per year for up to three years. The grant will be paid to the institution, which in turn, will disburse funds to the adviser and Fellow.

1. The annual Fellow's stipend is \$36,000.
2. In addition to the stipend, a \$4,000 Fellow's discretionary allowance is provided to support the Fellow's professional development, such as attending scientific meetings, workshops, or courses. The discretionary allowance can be used to pay for health insurance, non-elective medical, dental, and vision care costs, and for expenses associated with mental health services. Up to \$1,000 of the discretionary allowance annually may be used to overcome food or housing insecurity.
3. HHMI also provides an annual institutional allowance of \$10,000 in lieu of tuition and other fees (including university-sponsored health insurance premiums/coverage). If the cost of tuition and fees exceeds \$10,000, the institution must agree to cover or waive any amount greater than \$10,000.
4. The remaining funds of the HHMI award (at least \$3,000 per year) are designated as a diversity and inclusion activities allowance. The allowance is to be used by the adviser to support activities aimed at addressing challenges to diversity and inclusion at the graduate level in the adviser's department, the Fellow's graduate program, and/or the Grantee Institution. The adviser and not the Fellow is responsible for managing the activities and administering these funds; the Fellow should not be expected to plan or carry out the activities. The diversity and inclusion activities allowance may not be used to pay salaries, pre-college and undergraduate student research stipends, student outreach or student recruitment activities.

## Evaluation and Selection

Each Gilliam application will be evaluated for the (1) commitment and/or demonstrated ability of the institution and the thesis adviser to develop scientists, especially doctoral students from populations historically excluded from and underrepresented in science; (2) demonstrated commitment by the institution and thesis adviser to create a healthy and inclusive academic scientific ecosystem for all members (e.g., graduate students, postdocs, early career faculty); and (3) the candidate's promise as a scientific investigator and leader in the scientific community, including as a college or university faculty member. Application materials will be assessed by a panel of scientists and scientist educators selected by HHMI.

## Application Process

### NOMINATION

All applicants must be nominated, including EXROP alumni (see Nomination of EXROP Alumni below). HHMI designates the nominator and the number of slots allotted to each institution.

The nomination initiates the application process. Notifications will be sent to the nominator by late summer. The notification will include the number of slots and a link to an online form to submit the contact information for the adviser-student pairs that will be nominated. The nominator will be asked to submit additional information after the eligibility phase of the application process (see Eligibility Confirmation and Application sections below).

*PLEASE NOTE: As part of the nomination process, the nominator must certify to the best of their knowledge, that there is no formal complaint or finding of misconduct by any of the principals being nominated, applying, or to be awarded the grant.*

### NOMINATION OF EXROP ALUMNI

#### *Information for the Nominator*

EXROP alumni must be nominated by the HHMI-designated nominator at their institution. EXROP alumni do not count against the total number of nominations allocated to the invited institution. HHMI staff will let the nominator know if they will receive additional slots to nominate EXROP alumni.

#### *Information for EXROP Alumni*

EXROP alumni are queried via an "intent to apply" survey released in late summer. Alumni that have expressed an interest in applying will receive instructions from HHMI staff.

*PLEASE NOTE: EXROP alumni are contacted using the last email address on record with HHMI. Alumni can update their contact information by emailing [gilliam@hhmi.org](mailto:gilliam@hhmi.org).*

## Eligibility Confirmation

In late-September, log-in information to HHMI's online competition system (Pathway) will be provided to the adviser. The adviser will: (1) serve as the primary applicant; and (2) provide information to confirm how the student fits the eligibility criteria.

## Application

If eligibility is met, HHMI will send the adviser information to access the application form in Pathway. The adviser is responsible for adding to the application the names of the student and the nominator. Once the student gains access to the system, they will be responsible for adding the name and contact information of a previous research adviser who will provide an additional letter of support.

Detailed information is available on the Pathway application form. Applicants are encouraged to log on to the system as soon as they have access in order to review the prompts. Materials submitted by the nominator, adviser, student, and previous research adviser will be critical elements in the evaluation of the application.

### FROM THE NOMINATOR

To better understand the institution's efforts to foster a more inclusive academic scientific ecosystem for all members, including scientists and trainees from populations historically excluded from and underrepresented in science, the nominator will provide:

- » Program- or institution-level doctoral enrollment and degree attainment data and a narrative on how the data relate to the institution's commitment to advance diversity and inclusion in science and create a healthy academic scientific ecosystem for all constituencies, including graduate students, postdocs, and early career faculty;
- » A letter that provides evidence that the thesis adviser has the interest, demonstrated ability, and commitment to (1) successfully develop the talents of graduate students, including those from populations historically excluded from and underrepresented in science; and (2) facilitate change to foster a more inclusive academic scientific environment;
- » An explanation of how and why each adviser-student pair was selected for nomination;
- » Evidence that the graduate program values career and professional development in the sciences; and

- » An explanation of how past Gilliam awards have impacted the quality of the graduate program and helped foster a more inclusive environment (if the institution has had Gilliam Fellows), or how the Gilliam award will help to improve the quality of the graduate program and create an inclusive environment (if the institution has not yet had a Fellow).

*PLEASE NOTE: As part of the application process, the nominator must certify to the best of their knowledge, that there is no formal complaint or finding of misconduct by any of the principals being nominated, applying, or to be awarded the grant.*

### FROM THE THESIS ADVISER

To learn about how the adviser will support the student applicant and other doctoral students in their academic and career trajectory, and to ascertain the adviser's demonstrated commitment to help create an inclusive academic scientific environment, the thesis adviser will be asked to provide:

- » A biosketch that includes applicant information, contributions to science, adviser-authored publications relevant to the student's research project, a trainee record, and trainee career outcomes;
- » A list of current and pending research support, including the support that will fund the student's project for the duration of their degree program;
- » A letter of support for the student that details evidence of their:
  - Promise as a scientific investigator;
  - Potential for leadership in science, including but not limited to academic science;

- » A mentoring plan that:
  - Is tailored to the student applicant, and includes a discussion of strengths, and areas to be further developed;
  - Reflects on the importance of diversity and inclusion in science and the adviser's role in helping to foster a healthy academic scientific ecosystem for all constituencies (e.g., students, postdocs, early career faculty);
  - Includes a description of the mental health/well-being resources on campus;
  - Includes a conflict resolution strategy; and
  - Includes a narrative on what the adviser hopes to get out of the HHMI mentorship training, and how they will assess the effectiveness of the training.
- » Departmental doctoral enrollment and degree attainment data and a narrative on how the data could inform the department's efforts to advance diversity and inclusion in graduate science education; and
- » A description of challenges to diversity and inclusion in graduate STEM education at the institution and how the adviser's diversity and inclusion award will be used to address the challenges.

*PLEASE NOTE: As part of the application process, the adviser must certify to the best of their knowledge, that there is no formal complaint or finding of misconduct by any of the principals being nominated, applying, or to be awarded the grant.*

## FROM THE PROSPECTIVE FELLOW

To get a sense of the student's potential for leadership in science, including but not limited to academic science, the prospective Fellow will be asked to provide:

- » Applicant information, including educational history; transcripts are not requested;
- » A list of publications authored or co-authored by the applicant, including a brief annotation that describes findings and the student's contributions to the published research;
- » A dissertation research plan that can be understood by a scientist that is a non-expert in the field, with relevant literature cited;
- » A career statement that describes the applicant's professional and personal goals;
- » A leadership statement that describes the applicant's leadership approach and how the approach guides the science they do;
- » A description of the mental health/well-being resources available to the student on campus; and
- » A conflict resolution strategy.

The prospective Fellow is also tasked with adding a previous research adviser to the application and ensuring the letter of support is submitted directly by the previous research adviser. The letter should provide evidence of the student applicant's:

- Promise as a scientific investigator;
- Potential for leadership in science, including but not limited to academic science.

*PLEASE NOTE: As part of the application process, the prospective Fellow must certify to the best of their knowledge, that there is no formal complaint or finding of misconduct by any of the principals being nominated, applying, or to be awarded the grant.*

# Deadlines

## **NOMINATION**

**September 16, 2021**

2 p.m. (Eastern Standard Time)

## **ELIGIBILITY**

**October 13, 2021**

## **APPLICATION MATERIALS**

*(from the nominator, adviser, and student)*

**December 9, 2021**

2 p.m. (Eastern Standard Time)

## **EXTERNAL LETTER OF SUPPORT**

*(from the student's previous research adviser)*

**December 9, 2021**

2 p.m. (Eastern Standard Time)

*All eligibility, application materials and the previous research adviser's letter of support must be submitted via HHMI's online application system (HHMI Pathway) by the above deadlines.*

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## **For more information**

[www.hhmi.org/gilliam](http://www.hhmi.org/gilliam)

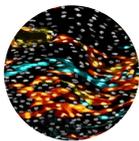
All inquiries and other correspondence regarding HHMI's Gilliam Fellowships for Advanced Study should be directed to:

Gilliam Fellowships for Advanced Study  
Department of Science Education  
Howard Hughes Medical Institute  
4000 Jones Bridge Road  
Chevy Chase, MD 20815-6789

Email: [gilliam@hhmi.org](mailto:gilliam@hhmi.org)

*This announcement sets forth basic program information. All awardees are subject to the provisions outlined in the Terms and Conditions.*

## Cover Image Captions



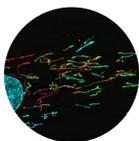
A single layer of endothelial cells lines the inner surface of all blood vessels, forming a semi-permeable barrier that separates the circulating blood from the surrounding tissue. As a consequence of facing the circulation, endothelial cells can sense and adapt to a myriad of physical forces including shear stress, pulsatile activity, and tensional load. Present from the onset of development and through the life of the organism, these physical forces impact gene expression and cellular functions, including cell division. In fact, how can mitosis occur in the context of these challenging environmental conditions? How do blood vessels grow in length and width while exposed to blood flow? This whole-mount, en face image, taken from the aorta of a transgenic mouse where the endothelial cells are genetically labeled with either Cerulean, mCherry, or mOrange (“Rainbow”) for lineage tracing, highlights that endothelial cells proliferate in a linear fashion, in the direction of blood flow (Cerulean cells). Endothelial nuclei are labeled with ERG (white).

*(Courtesy of Gloria Hernandez, HHMI Gilliam Fellow, UCLA. Mentor: Luisa Iruela-Arispe, PhD, Northwestern University, Feinberg School of Medicine)*



*Stentor coeruleus* is a unicellular model organism well suited for studying organelle scaling because of its gigantic size and amazing ability to regenerate proportionate structures with cell size. Depicted here is immunofluorescent staining of acetylated tubulin in *Stentor coeruleus*. It has long been recognized that organelle size depends on cell size, such that larger cells have larger organelles. How cells achieve organelle scaling is a fundamental unanswered question in cell and developmental biology. Over a century ago E.G. Conklin and T.H. Morgan observed that organelles size scales proportionately with cytoplasmic volume. Though progress has been made in understanding how cytoplasmic volume intrinsically controls organelle size, far less is known about how cells control organelle number in organelles that exist in multiple copies. Specifically, it remains unclear how cells regulate the apportionment of a limited precursor during the assembly of multiple organelles from a limited shared cytoplasmic pool of material. Our goal is to use the unique model system, *Stentor coeruleus*, to ask how this giant single celled organism assembles the correct number of primary and secondary subunits to proportionately scale the length of its feeding organelle, the membranellar band, during regeneration.

*(Courtesy of Ulises Diaz, HHMI Gilliam Fellow, University of California, San Francisco. Mentor: Wallace Marshall, PhD)*



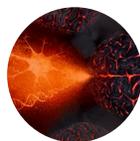
Encephalopathy due to mitochondrial and peroxisomal elongation (EMPF) is a devastating neurodevelopmental disease with no effective treatment. This project investigates the mechanism of EMPF by exploring the role of mitochondrial dynamics in early brain development using patient-derived induced pluripotent stem cells (iPSCs) and cerebral brain organoids. Through these efforts, we hope to uncover novel mechanisms of metabolic signaling in human brain development that may lead to potential therapeutic targets. Here, we show patient-derived fibroblasts stained for mitochondria (rainbow color-coded by Z) and cell nuclei stained with DAPI (cyan).

*(Courtesy of Gabriella Robertson, HHMI Gilliam Fellow, Vanderbilt University. Mentor: Vivian Gama, PhD)*



The Colorado potato beetle (CPB), *Leptinotarsa decemlineata*, is a devastating pest of potato crops in North America, Europe, and Asia. The beetle has a remarkable ability to evolve resistance to insecticides; so that it is now resistant to over 55 different classes of insecticides. The beetle’s ability to evolve resistance causes millions of dollars in damage to the potato industry. We study CPB to understand the drivers behind rapid evolution to insecticides and other common agricultural stressors. Specifically, we are taking a novel approach to assess how epigenetic mechanisms such as DNA methylation respond to stress and how these changes translate into differential expression of genes among beetles that are resistant or susceptible to insecticides. Understanding the mechanisms underlying stress tolerance in insect pests is important for not only pest management but for establishing foundational knowledge on the evolutionary capacity of insect pests. Our long-term goal is to improve sustainable pest management practices by bridging evolutionary and genomic tools to understand how insect pests adapt to concurrent stressors in agroecosystems.

*(Courtesy of Erika Bueno, HHMI Gilliam Fellow, University of Vermont. Mentor: Yolanda Chen, PhD)*



Brain disorders such as Schizophrenia are among the most burdensome disorders worldwide. However, treatment options are narrow due to our limited understanding of their genetic underpinnings and neurobiological mechanisms. Genome-wide association studies (GWAS), a technique that allows comparison between genetic sequences of individuals with a particular trait versus controls subjects, have revolutionized our understanding of the genetic architecture, and we now have hundreds of genomic regions that are associated with a person’s risk of developing a disorder. However, understanding the functional impact of those genetic variants remains a challenge because most of the variants are located in regions of the genome that do not make proteins and thus, their specific roles are not clearly defined. Prior research has suggested that while non-coding variants might not directly encode protein themselves, they can interact with and regulate gene expression. In this work, we developed H-MAGMA, a computational tool that leverages chromatin interaction map in tissues or cells to detect target genes of non-coding variants associated with GWAS findings. Our application of H-MAGMA to 9 brain disorders identified novel genes associated with each disorder. Depicted in the image is the human brain with magma erupting from its core to represent H-MAGMA.

*(Courtesy of Nancy Sey, HHMI Gilliam Fellow, University of North Carolina at Chapel Hill School of Medicine. Mentors: Hyejung Won, PhD and Joyce Besheer, PhD. Image credit: Erica Deoudes)*