

David C. Frederick Honors College
2023 Research Hubs
Program Descriptions & Student Application Instructions

The David C. Frederick Honors College is excited to announce a new research opportunity available to FHC students for the 2023 – 2024 academic year – Honors Research Hubs!

Honors Research Hubs are team-based research experiences designed to provide small groups of honors students the opportunity to work on applied research projects throughout the Pitt community. Led by Pitt researchers across disciplines, research hubs allow students to gain experiential credit while working on projects that create new knowledge, inform action, and advance the public good.

Research Hub Structure

Students participating in FHC Research Hubs work on applied projects in the fall and spring semesters led by a Pitt research mentor. While each research hub project is unique, all hubs follow a two-phase structure focused on project training and community building throughout the academic year.

- Phase I – Honors 1510 (3-credits): Once accepted to a hub, students are enrolled in Honors 1510 and receive three Honors experiential credits for completing project requirements (S/NC). Students receive a satisfactory rating by completing all requirements in Phase I and through endorsement from the Research Hub Lead.
- Phase II – Honors 1010 (1-credit): Students have the option to receive one credit of Honors experiential credit for completion of Phase II. Successful completion of Phase II is dependent on a faculty mentor endorsement and one of the following preapproved project outcomes:
 - A [national scholarship application](#)
 - A completed [application for BPhil degree candidacy](#)
 - A manuscript submittal for the [Pittsburgh Undergraduate Review](#)
 - Individualized Outcome – a unique outcome may be approved by the Director of Honors Research Programs and the Research Hub lead.

Student Application Instructions

Due to the limited number of Research Hubs currently available, interested students must complete an online program application. Applications will be reviewed by Research Hub Leads and the Director of Honors Research Programs. Successful applicants are chosen based on eligibility requirements and responses to short essay questions regarding their qualifications and motivations for participating in the research hub program.

Eligibility Requirements:

- 1) Students must be at least in their second year of study
 - a. Students cannot apply if they intend to graduate during the same semester of application (i.e., students must be able to participate for a full academic year)
- 2) Students must currently hold a 3.25 GPA or higher
- 3) Students must be enrolled in an [FHC degree or distinction program](#)

Application Requirements

- 1) Student Major & Minor
- 2) Academic Transcript & GPA
- 3) Preferred Research Hub Pairing (choose from the 2023-24 options on the following page)
- 4) Research Interest Statement:
 - a. One page (Times New Roman, 12-point font, single-space)
 - b. Applicants should discuss their interests in their chosen research hub and what they hope to learn by participating in an FHC Research Hub experience. Students should also discuss the skill sets they feel would help them contribute to their chosen hub.
- 5) Academic Goals Statement:
 - a. One page (Times New Roman, 12-point font, single-space)
 - b. This statement should discuss how the applicant believes participation in a research hub experience will help them meet specific academic goals while in the . Examples of goals could include a draft of a National Scholarship Application, BPhil project proposal, etc.

2023-2024 Research Hub Program Descriptions

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Language and Literacy Research Hub

Research Hub Lead – [Dr. Caitlin Forbes Spear](#)

Capacity: The language and Literacy Research Hub is seeking four to six (4-6) students to participate in one, or both, of the following projects.

Project A: 3Rs in the Classroom Program Implementation Team

The 3Rs (Reading, Racial Equity, Relationships) Initiative is an ecosystem-based program that aims to improve K-3rd grade literacy outcomes, particularly for Black students, in Pittsburgh, Pennsylvania, by integrating key tenets of the science of reading, racial literacy, and collective impact. The 3Rs is one cohort of a larger university-community collaborative (The Pittsburgh Study) working towards the collective goal of promoting child thriving from birth to age eighteen. Within the 3Rs, we focus on shifting adult learning across multiple strands that connect to different parts of children's literacy ecosystems (e.g., community, family, leadership, classroom) using high quality, racially affirming picturebooks within communities of practice to promote more equitable literacy development.

The Classroom Strand of the 3Rs, which began working with teachers in local elementary schools in 2020, focuses specifically on teachers and classroom practices. Our 7 partner schools collectively reach over 1,600 students in grades K – 3. Within these partner schools, the 3Rs Classroom strand facilitates communities of practice, made up of an array of school staff (e.g., teachers, coaches, administrators, teaching assistants) that engage in ongoing learning opportunities over the course of multiple school years. Our communities of practice are made up of both large and small groups at each of our partner schools, and schools commit to at least ten hours of professional development for all their K-3 teachers each year (i.e., large group, required sessions), and then teachers are able to join smaller, bi-weekly Professional Learning Communities to take a deeper dive into the topics explored in the large group (i.e., small group, opt-in sessions). Across communities of practice, we use picturebooks as the anchor for session content, which focuses on specific aspects of equitable and effective literacy instruction.

The 3Rs is situated in the broader work of a large community movement (The Pittsburgh Study) and the university center where its staff are housed (Office of Child Development). They both aim to bring community & academic partners together to advance child health, thriving, and disrupt root causes of racial inequity. The 3Rs Initiative is co-lead by two dynamic leaders (Drs. Moye & Wanless), and a community board. For this project, we are seeking student support for our fourth year of 3Rs in the Classroom programming. The Classroom Strand is lead by Drs. Caitlin Spear and Jennifer Briggs, with implementation, evaluation, and research support from our Project Coordinator Abby Chen, and Evaluation Lead, Dr. Amanda Cross.

Student Eligibility: Students working on this project will receive training in data collection, maintenance, and basic analysis of implementation data. Students will also help support cross-year data management (e.g., compiling session-level data into larger databases) and basic implementation analyses. We can support students in learning most of these skills, but basic skills with excel, SPSS, or other data management programs are a plus. Because students will be asked to attend different 3Rs sessions and support fieldnote collection, comfort with basic qualitative methods is also a plus. Given the nature of our content, we also request that students have a strong commitment to racial equity and openness/readiness to develop their own racial literacy.

Project B: Picturebook Coding Team (pull from CAPLAN, Shifting Power, Article)

We are seeking students to join our Picturebook Coding Team. The Literacy and Learning Division of the Office of Child Development uses picturebooks across most of our work, to support adults in understanding how to help children thrive, with a particular focus on literacy, learning, and identity, and the ways in which these constructs intersect, and are impacted by structural and personal factors in children's learning environments. Although much of our work focuses on how to choose and use books with children, and the relationship-based work that we do with these books in communities of practice, across all of these projects we need good books!

As such, we have developed a measure that we use to carefully select high quality, identity affirming picturebooks. This measure was adapted from a larger tool designed to examine the cultural responsiveness of curricular programs (Bryan-Gooden et al., 2019). Our picturebook measure considers a number of factors, including representation (e.g., who is depicted and how, accuracy and complexity of characters, the ways in which identities are explored), social justice orientation (e.g., centering multiple perspectives, disrupting the status quo, power explorations, opportunities to connect to real life and action), and quality (e.g., authenticity of characters, developmental considerations, artistic presentation, interaction of text and illustrations).

This work is led by Drs. Spear and Briggs of the Literacy and Learning Division at the Office of Child Development, and we currently have a team of volunteers and doctoral students who have been working to test and finalize this measure. We are seeking additional students to help us code a large library of picturebooks. Students will work with our existing team, and receive training and practice on the measure. Once students have reached a level of coding reliability (per training), they will work with the team to code the entire library of picturebooks. We will support reliable coding and meet throughout the academic year.

Student Eligibility: Students working on this project will help the research hub team complete book coding. Students will receive training on the measure, and ongoing reliability checks and supports as we code books, but the end goal is independent, reliable coding. Students should have basic knowledge and comfort using excel and navigating various internet sources to access picturebooks. Students should also have basic interest in childhood development, literacy, and children's literature, but the training will cover basic information on these areas if students are interested in learning more. Given the nature of our content, we also request that students have a strong commitment to racial equity and openness/readiness to develop their own racial and equity literacy.

Carnegie Museum of Natural History Research Hub

Research Hub Leads – [Dr. Rose-Marie Muzika \(CMNH Director of Research\)](#) & [CMNH Research Staff](#)

Capacity: The Carnegie Museum of Natural History is seeking up to five (5) students to work with CMNH researchers on any of the following projects.

Student Eligibility: Most CMNH projects are open to students in any major unless otherwise identified in the project description

Project Descriptions

Anthropology & Archaeology

- **Collection Management: Best Practices in Care, Curation, and Documentation:** Students interested in Museum Collection Management will learn how to care for cultural material in the anthropology collection. With approximately 1.4 million objects, projects will be designed to photograph, describe, organize, and document existing or incoming collections. Students will fully understand the curation procedures that are followed, as well as gain experience with our database.
- **Decolonization of Cultural Collections:** Students interested in Museum Ethics, Cultural and Indigenous Studies, and Social and Environmental Justice will be able to participate in research-based projects to identify and eliminate actively harmful language in our collection spaces and records.
- **Repatriation: Going Above and Beyond Basic Legal Requirements:** Anthropology and Museum Studies students interested in learning more about the Native American Graves Protection and Repatriation Act of 1990 are welcome to join us as we re-examine our collections and prepare to continue consultations with Indigenous communities regarding cultural material in the anthropology collection. Students will digitize and reorganize original documents, research specific site provenience, and help us identify where we can communicate and consult with Indigenous communities to continue our successful repatriation work.
- **Organizing/condensing/cataloging various archives:** The section of Anthropology would welcome students trained in archival methods who could work with us to set up a system of best practices for organizing and cataloging various sets of archival records and documentation.

Botany

- **Trait changes over a century of plant invasion:** Ideal for a biology/evolution/conservation biology-interested student, this project measures herbarium specimens to track shifts in leaf traits across time and space.
- **Re-collection project at Carnegie Museum herbarium to document biodiversity changes:** Ideal for a biology/environmental science/botany-interested student, this project will build upon an ongoing project initiated in 2017 where museum botanists visit sites across Western PA that have been visited by botanists decades to a century ago and compare changes due to species invasions, habitat alteration, and climate change. Student(s) will collect specimens in the field, learn to prepare specimens, and compare to historical specimens in the herbarium.

- **A data exploration of the 550,000 specimens in the Carnegie Museum herbarium:** Ideal for a GIS/mapping/data science-interested student, this project will use the fully databased and increasingly georeferenced data to visualize and summarize the collection.
- **The Lady Franklin Bay Expedition (1881-1884):** Ideal for a history/history of science/humanities student, this project will research the provenance and historical context of a unique collection in the Carnegie Museum herbarium collected during a government-endorsed scientific expedition to the Canadian arctic (the farthest North record at the time). Of the 25 men on the expedition, only six survived as they were stranded in the arctic for three years and controversy remains, including rumors of cannibalism among the crew.

Invertebrate Paleontology

- **The Historical Architecture Building Stones of the University of Pittsburgh Campus Buildings:** The objective is to review the source or provenance of exterior and interior stones used in the construction, i.e., Music Building, c. 1884, Schenley Hotel now William Pitt Union, c. 1898, old Engineering (Thaw) Hall, c. 1910, Cathedral of Learning, c. 1936, and other early 20th century Pitt buildings along Fifth Avenue in Oakland.
- **The Bayet Collection and Paleoclimate Index Fossils:** Using the Bayet Collection database as the foundation for research about key species used as index fossils, a profile of the Earth's past paleoclimates can be charted.
- **The Bayet Lagerstätten Or Exceptional Preservation Fossil Collection:** This project requires a search of the online scientific literature to confirm the taxonomy or current identification of genus and species in the Bayet Collection database.

Invertebrate Zoology

- Exploring host specificity in tropical parasites (fleas of Papua New Guinea).
- Museum-based species discovery: assorted projects in beetle taxonomy (name a new species!).
- The long shadow of colonialism: what can specimen packaging materials tell us about the origins of natural history collections? (Cataloguing and describing "wrappers" from the Lepidoptera long stored in paper.).
- Evaluating the performance of AI-based insect identification tools (quantitative test of Seek/iNat using known and unknown lepidoptera specimens).

Mammals

- **Middle-ear ossicles in living mammals:** Mammals are distinguished from other vertebrates by having three small bones in their middle ear (malleus, incus, and stapes) that transmit sound waves from the tympanic membrane to the inner ear. Although these bones are essential traits of mammals, little is known about the diversity of these ossicles across the class. This project will use CT scan data to visualize middle-ear ossicles across a range of mammals to help understand their evolution and function.
- **Hyoid apparatus in living mammals:** Mammals have a throat "skeleton," the hyoid apparatus, that supports the airways and is attached to the skull base via ligaments and in some instances by bone. Little is known about the diversity of the hyoid apparatus across mammals, which is the first step in understanding the function of this system. This project will use CT scan data to visualize the hyoid apparatus across a range of mammals.

- **Inner ear in living mammals:** Compared with other vertebrates, living mammals hear at a much broader range of frequencies, primarily at the high frequency end of the sound spectrum. The inner ear, made up of the cochlea and semicircular canals, is the organ where sound waves are translated into nerve impulses to the auditory centers of the brain. CT scan data have facilitated study of the inner ear, which is housed deep within a bone in the skull. This project will use CT data to visualize the inner ear across a range of mammals to capture the diversity of form.

Minerals and Earth Sciences

- **Hillman Hall exhibit improvement & development**
 - Hillman Hall fluorescence exhibit & new micromineral exhibit development
 - i. Assist with the development of a new micromineral exhibit. Student will act as an interface with Pitt & CMU microscopy user facilities to develop a rotating exhibition and yearly competition for “best optical and best electron/X-ray microscopy image (materials science/chemistry/biology/physics).”
 - ii. Development of a rotating exhibit featuring the minerals & materials of Pittsburgh. The student and curator will solicit Pittsburgh manufacturers (medical/industrial/private companies) for interesting materials, components, or synthetic objects made here in Pittsburgh
 - iii. Build a new SW-UV optical device to improve the brightness of the spinning fluorescent calcite sphere display.
- **Materials science of ancient pigments; Egyptology & Museum of Art collaborations (Olds, Egyptology, Museum of Art)**
 - Mineralogy, synthesis, and properties of pigments (kohl, faience, Han blue)
 - i. We will work closely with Egyptologists Lisa Haney and Erin Peters, as well as the Museum of Art to study ancient and contemporary pigments. Work will involve sampling and testing pigments to understand their mineralogy using diffraction and spectroscopic techniques to determine how to recreate them or improve conservation techniques, or to gain insights into their ancient manufacture, and understand potential ancient sources of minerals.
- **Crystallography & materials science (Olds, Pitt, Oak Ridge + Argonne + Los Alamos National Labs, NHM of L.A. County)**
 - New mineral descriptions and synthesis of minerals
 - i. Student will learn crystallography, X-ray diffraction and specialized mineral identification techniques while working on new mineral descriptions, including trips for synchrotron experiments at Argonne National Lab.
 - ii. Optimizing removal of Pb from drinking water. Student will perform hydrothermal syntheses and investigate material properties of OH, F, and Cl substituted pyromorphite..

Mollusks

- **Snails in Tippecanoe Drainage Waters, Indiana, Compared Across 100 Years (1920s and 2020s):** We have 1000 samples of freshwater snails from lakes and streams in the Tippecanoe River

watershed, Indiana, collected by Herman Wright in the late 1920s, most still unidentified. A student could help pick and ID the shells in Wright's samples from their choice of lake or stream to compare with modern samples collected either by an Indiana colleague or by field trip to Indiana.

- **When Tornadoes Level Forests, How Are Land Snails Affected?** A tornado in 2012 at Powdermill Nature Reserve leveled trees in 4 patches, all within 3.3 km. Given that different snails favor forests or meadows, we expect changes in snail assemblages when forests become meadows. Preliminary results from 2016 hint at changes in relative frequencies; a student could help pick and ID samples from 2019 to increase sample size.
- **Distributional Changes of Land Snail Species in NE USA:** More than 100,000 museum records of land snail occurrences in 26 states of NE USA representing 130 years can document species changes over time. Then the search for causes can begin, such as climate change, acid rain, etc. Predictive modeling could evaluate whether current populations will be able to tolerate predicted future climates, 20, 50, and 100 years from now.

Museum Studies

- **Museum-Animal History & Ethics of Collecting:**
Appropriate for students interested in human-animal studies and ethical topics from a variety of majors: anthropology, history, history and philosophy of science, museum studies, etc. Projects would involve researching the history of the collection and display of nonhuman animals in natural history contexts--and at CMNH, in particular--and proposing or piloting programming and interventions on these subjects.
- **Natural History Art:**
Suited especially for students in the history of art, studio art, or film and media studies, this project would entail performing research on and developing strategies for the public dissemination of CMNH's Natural History Art (NHA) collection. NHA is a diverse corpus of paintings, sculptures, photographs, prints and drawings reflecting the history of naturalist illustration (primarily in a North American context), as well as the history of the museum.

Vertebrate Paleontology

Digitizing fossils in the Vertebrate Paleontology collection: Students would use Carnegie Museum of Natural History's state-of-the-art 3D surface scanners to make high-resolution digital models of especially important fossils in the Vertebrate Paleontology collection, then post these to one or more open-access repositories in order to make them freely available to the scientific community. Exceptional students would be invited to participate in publishable research projects on selected fossils as well.

Data Science for Social Justice (DS4SJ) Research Hub

Research Hub Lead – [Dr. Sera Linardi](#)

Capacity: The DS4J Research Hub is seeking up to five (5) students to work on the following projects.

Student Eligibility: This hub is open to students in any major.

Project Description:

The Allegheny County Policing Project (ACPP) began in the summer of 2020, amidst the coronavirus pandemic lockdowns and motivated by the Black Lives Matter movement. Hosted by the Center for Analytical Approaches to Social Innovation (CAASI), a group of students, community members, and activists came together to share their experiences and discuss ways to increase police accountability locally. ACPP emerged as a direct result of those conversations.

Police accountability can be linked to police contracts or collective bargaining agreements, which are employment contracts detailing the rights and responsibilities of police officers. In Allegheny County, there are over 100 different police departments serving their respective municipalities, each with their own contract. Accessing the specifics of these contracts empowers both researchers and residents to scrutinize the current language and whether it serves the community appropriately. However, the hyper-fragmented nature of policing in Allegheny County can be overwhelming and confusing for residents to navigate.

ACPP volunteers collected the police contracts of Allegheny County and published them on the ACPP website as a searchable database with keywords that relate these local contracts to the six areas of police accountability identified by the national organization Campaign Zero. In addition, the tool provides an interactive map to display statistics related to Allegheny County's police departments and a guide for navigating the complexity of filing misconduct complaints in Allegheny County. The entire project, from conceptualization, data collection, UX design, to programming was executed entirely by students and community volunteers. ACPP's ongoing engagement with community partners has revealed that the issue of policing is deeply connected to incarceration and human rights. To this end, our participation in local change making is very important and service learning can provide a powerful mechanism for expanding our knowledge of issues in policing. The best way to learn and stay up to date on these issues is to advance the efforts of our community partners by attending events, meetings, and symposiums. This is also a great opportunity to understand the inner workings of local law, courts, and the criminal justice system, which all aim to protect human rights. We are looking for students to :

- attend meetings of the Allegheny County Citizen Review Board, the Allegheny County Jail Oversight Board, Human Rights Legislation Task Force, and other community meetings that may come up
- track information on the topic from city council events, activists, Public Source, and social media
- map the ecosystem of activism, summarize the current state of events, and connect it to research
- gather data on the police citizen complaint process from Allegheny County municipalities, turn unstructured data into structured data as the data is currently poorly documented
- connect the data within ACPP website to these issues and in the process, identify improvements for the website that will make it more useful for residents
- interact with faculty in GSPIA, Law, and Social Work that specialize in related fields

Social Change Research Hub

Research Hub Lead: [Ron Idoko](#)

The Social Change Research Hub (SCRH) is a collaborative initiative between the Center on Race and Social Problems and the Frederick Honors College Social Innovation program. It aims to offer undergraduate honors students the opportunity to engage in equity-centered research, education, and praxis by working with fellow students, faculty, and staff to investigate and develop interventions that promote social change.

Capacity: is seeking four to six (4-6) students to work on the following project.

Student Eligibility: This hub is open to students in any major.

Project Description:

Cultivating Global Narratives, Strategies, and Processes Towards Racial Justice: Instituting a Racial Equity Database to Support the United Nations Permanent Forum on People of African Descent Declaration Process

In partnership with the Permanent Forum on People of African Descent (PFPAD) and the Center on Civil Rights and Racial Justice (CCRRJ), the Center on Race and Social Problems (CRSP) will institute an expansive racial equity data collection and analysis platform to support the development of a vision-rich, globally comprehensive, and process-oriented declaration at the United Nations 2024 fall General Assembly. This initiative will coalesce into a multidisciplinary, global collective of racial equity researchers, educators, and practitioners in advancement of the University's mission to create and leverage knowledge for society's gain.

We are recruiting passionate students to contribute to the initiative by assisting with institutional and qualitative research, organizing material for the data platform, and preparing content for the website. Students will be involved in collecting institutional and interview data, particularly for digitized material, uploading interviews and conducting preliminary coding via qualitative software, providing preliminary analysis of assigned material, inputting material for data mapping, editing website content, and supplying framework development assistance. All students involved will gain valuable hands-on experience in mix-methods research, and professional and organizational development, and expand their professional communication skills through interactions with faculty, staff, students, and community members.

Sustainable Business Research Hub

Research Hub Lead: [Dr. Christopher J. Gassman](#)

The Sustainable Business Research Hub (SBRH) is a collaborative initiative between the Center for Sustainable Business and the Frederick Honors College Social Innovation program. It aims to offer undergraduate honors students the opportunity to engage in sustainable business strategy-centered research, education, and praxis by working with fellow students, faculty, and staff to investigate and develop strategies that galvanize businesses to thrive for all.

Capacity: The SBRH is seeking up to 12 students to participate in the following projects.

Student Eligibility: This hub is open to students in any major.

Project Descriptions:

- **Sustainable Business Storytelling**
 - Work directly with the Center Program Manager and Senior Associate Director to design, build, and test content about our workstreams, events, job opportunities, and more.
- **Sustainable Business Research**
 - Work with Staff to identify advanced sustainability insights across various CSB programs.
- **Sustainable Events**
 - Work with Staff to implement major programming and events with an eye to effectively communicating and improving those implementation decisions compared to business as usual.
- **Environmental, Social, and Governance (ESG) Literacy Research**
 - Work with Staff to identify ESG insights for curriculum and scholarly endeavors.
- **Decarbonize Middle America (DMA) Research**
 - Work with Staff to identify DMA insights for curriculum and scholarly endeavors.
- **Grant Writing**
 - Work with Staff to identify, craft, and submit target grant applications to fund CSB research programs.
- **Sustainable Careers**
 - Work with Pitt Career Centers to cultivate Sustainability Ownership across resources and programs for all fields.
- **Workforce Benchmarking**
 - Assess the workforce demographics of the region so that companies have a baseline to compare themselves against for how representative their teams are of the communities they serve.