2027 NSF NHERI STRONG-R Research Experiences for Undergraduates (REU) Application

We are excited to provide research opportunities for undergraduate students at three computational facilities during a 10-week summer research program, June 14 - August 20, 2027.

The National Science Foundation (NSF) Natural Hazards Engineering Research Infrastructure (NHERI) STRONG-R Research Experiences for Undergraduates (REU) Summer Program is dedicated to providing undergraduate college students with computational research experience in multi-hazard (**earthquake, wind, coastal and inland flooding**) engineering, **post-event reconnaissance, cyberinfrastructure, simulation, data management, and social science research. S**tudents will be embedded within active research teams and paired with both a faculty advisor and a graduate student mentor and receive further mentoring from an engineering educator and panel of natural hazard interdisciplinary mentors. For more information about the NSF NHERI STRONG-R REU program, please see the REU page at **designsafe-ci.org/learning-center/reu/** or contact Robin Nelson at **robin.nelson@utsa.edu**.

The completed application and two letters of recommendation are due **February 7, 2027, at 11:59 p.m. Pacific Time**. Decision notifications will be sent by the beginning of April to the email address provided in the application. ***Important:*** It is the responsibility of each applicant to inform both recommenders about the submission deadline and ask them to complete their letter of recommendation by the deadline of **February 7, 2027, at 11:59 p.m. Pacific Time**. Incomplete applications will not be accepted.

Applicant Information
Over the next few screens please provide the required information to complete your application. Please note that your application will automatically save, and you may revisit it until **February 7, 2027, at 11:59 pm PT.**

Please contact Robin Nelson (robin.nelson@utsa.edu) if you have any questions or issues during the application process. She is happy to help! Good luck!!

Before you can move ahead with your application, please acknowledge our Artificial Intelligence (AI) policy.

○ I agree to not use Artificial Intelligence (AI) to generate content for my NHERI STRONG-R REU Summer Program application. I understand that using AI to generate application content may result in the removal of my application for consideration for the 2027 program.

Legal first name

_____

Preferred first name

_____

Middle name (if applicable)

_____

Last name

_____

Address (street number, name, apartment, or suite number)

_____

City

_____

State

_____

Zip code

_____

University email address

_____

Personal email address

_____

LinkedIn social media address

_____

Preferred phone number

_____

If this is a mobile number capable of receiving text messages, you can elect to receive messages from the REU program.

- ○ Receive text messages from REU.
- ○ Do not receive text messages from REU.

Date of birth (MM/DD/YYYY)

_____

United States citizenship

*** Please note that only US Citizens and Permanent Residents are eligible to receive funding from the National Science Foundation. (See **www.nsf.gov/crssprgm/reu/** for more information.)

- ○ Citizen
- ○ Permanent resident
- ○ Neither citizen nor a permanent resident

United States Military Service
Have you ever served on active duty in any branch of the United States military?

- ○ Yes
- ○ No
- ○ I do not wish to provide this information.

Under what conditions were you discharged?

- ○ Honorable discharge
- ○ Dishonorable discharge
- ○ Unknown
- ○ I do not wish to provide this information.

Higher Education
Expected primary major. All majors are welcome!

- ○ Civil Engineering
- ○ Structural Engineering
- ○ Environmental Engineering
- ○ Mechanical Engineering
- ○ Other Engineering
- ○ Architecture
- ○ Computer Science
- ○ Physics
- ○ Mathematics
- ○ Geology
- ○ Sociology
- ○ Environmental Studies
- ○ Geography
- ○ Social Science (Please specify the social science major in the box below.)

_____

- ○ Other (Please specify in the box below.)

_____

Expected minor or second major. All majors are welcome!

- ○ Civil Engineering
- ○ Structural Engineering
- ○ Environmental Engineering
- ○ Mechanical Engineering
- ○ Other Engineering
- ○ Architecture
- ○ Computer Science
- ○ Physics
- ○ Mathematics
- ○ Geology
- ○ Sociology
- ○ Environmental Studies
- ○ Geography
- ○ Social Science (Please specify in the box below.)

_____

- ○ Other (Please specify in the box below.)

_____

- ○ No minor or second major.

When is your expected graduation date? Please use the MM/DD/YYYY format.

_____

What will be your class rank in fall 2027?

- ○ Freshman (0-29 hours/credits)
- ○ Sophomore (30-59 hours/credits)
- ○ Juniors (60-89 hours/credits)
- ○ Senior (90+ hours/credits)

Higher education institution currently enrolled in and attending

_____

Other higher education institutions (colleges) attended

_____

Overall GPA (On a 4.0 scale)

_____

Total university course credits earned to date

_____

Credits earned by quarter or semester

- ○ Quarter
- ○ Semester

Spring 2027 semester ***end*** date (MM/DD/YYYY).

_____

Fall 2027 semester ***start*** date (MM/DD/YYYY).

_____

Recommender

All applicants must secure a commitment from two individuals who know your academic abilities and work ethic to provide letters of recommendation. *At least one recommender must be a college/university faculty member.* You may also include a letter of recommendation from your academic advisor, who may or may not be a professor. Please complete the information below for two individuals who will each need to provide a letter of recommendation and complete the **recommendation form**. After submitting this application, be sure that each recommender submits their letter of recommendation electronically by the required deadline: **February 7, 2027, at 11:59 p.m. Pacific Time**. Applicants are responsible for following up with their recommender to ensure the recommendation form is submitted by the deadline. Unfortunately, incomplete applications cannot be accepted.

First recommender's name

_____

First recommender's phone number

_____

First recommender's email address

_____

Please describe how you know your first recommender.

_____

Second recommender's name

_____

Second recommender's phone number

_____

Second recommender's email address

_____

Please describe how you know your second recommender.

_____

Special Accommodations
The questions in this section are meant to help sites better understand and prepare for a participant's special accommodations for vision, hearing, mobility, lifting, and concentrating. If you are willing to answer these questions, please select "I wish to provide this information." Otherwise, please select, "I do not wish to provide this information," and you will be directed beyond this section.

- ○ I wish to provide this information.
- ○ I do not wish to provide this information.

I can see words or letters in ordinary 10 pt. font print (with glasses/contact lenses if you usually wear them).

- ○ Yes
- ○ Moderately
- ○ Slightly
- ○ Barely
- ○ Unable to do

I can hear what is normally said in a conversation with another person (with a hearing aid, if you usually ear one)?

- ○ Yes
- ○ Moderately
- ○ Slightly
- ○ Barely
- ○ Unable to do

I can walk or use stairs without human or mechanical assistance.

- ○ Yes
- ○ Moderately
- ○ Slightly
- ○ Barely
- ○ Unable to do

I can lift or carry something as heavy as 10 pounds, such as a bag of groceries.

- ○ Yes
- ○ Moderately
- ○ Slightly
- ○ Barely
- ○ Unable to do

I have difficulty concentrating, remembering, or making decisions because of a physical, mental, or emotional condition.

- ○ Yes
- ○ Moderately
- ○ Slightly
- ○ Barely
- ○ Unable to do
- ○ Not applicable

Time Commitment

The NHERI STRONG-R REU Summer Program is a full-time commitment (40 hours per week) for ten weeks. We ask that all applicants commit to working Monday through Friday, 8:00 am - 5:00 pm, at their assigned site. The program will also host a culminating symposium on August 18-20, 2027, which all selected participants must attend in-person. If you have any scheduling conflicts, please email Dr. Robin Nelson to discuss (robin.nelson@utsa.edu). Please agree to the following statements by clicking the radio button to the left of each.

- [ ] I commit to participating in all REU research and work events from 8 am - 5 pm from June 14 - August 20, 2027, if selected.

- [ ] I committed to participating in the NHERI STRONG-R REU Symposium, August 18-20, 2027, if selected.

- [ ] I will discuss any scheduling conflicts with Dr. Robin Nelson (robin.nelson@utsa.edu) before applications are due on February 21, 2027.

Site Descriptions

The NHERI STRONG-R REU Summer Program takes place at three different university sites. After carefully reviewing the NSF NHERI site descriptions over the next few screens, please rank the sites. Your first choice represents the site where you would like to participate the most and the third choice represents a site where you would be willing to participate.

Things you should consider when ranking the sites:

1. What are your natural hazard research interests (type of natural hazard)?
2. What are your research method interests (type of research method)?
3. Are you interested in engineering, social science, or both?

University of California, Berkeley – Computational Modeling and Simulation Center (NHERI SimCenter)

Are you interested in software that helps scientists understand how earthquakes, tsunamis, and hurricanes affect cities, helps engineers design better buildings and bridges, and helps cities plan for natural hazards? The *SimCenter* is looking for multi-disciplinary teams of students (CS, civil engineers, urban planners, and social scientists) to participate in the development, testing, and demonstration of our software. Join us in Berkeley, CA, this summer, and apply your programming skills (we're here to help you if needed) to work on an exciting, individualized project. While in the Bay Area, you'll be working with experts in software development, modeling, and machine learning to expand the computational tools and educational resources required to mitigate the effects of natural hazards on the built environment.

The *SimCenter* develops software and advances computer simulation as part of the NHERI program. We're writing new code to streamline and enhance simulation capabilities that integrate existing applications to move beyond loading scenarios of an individual building to enable the simulation of entire regions to multiple natural hazards. *SimCenter* software also addresses community risk by estimating the damage sustained by these structures and the cost and time required for repair. Ultimately, the *SimCenter* software framework will enable engineers, and students like you, to develop better models that account for uncertainty quantification and learn about the societal impacts that windstorms, earthquakes, and tsunamis pose to our cities. To realize this vision of simulation-enabled engineering, the *SimCenter* is also

creating educational modules to teach students modeling techniques and simulation skills; these educational tools will help prepare students for research and professional practice.
The *SimCenter* hosts summer interns who are interested in conducting simulation-based research. Examples of past REU projects:

- Integration of Structural Damage and Loss Data with Social Vulnerability Measures for Earthquake Hazards in the Bay Area
- Probabilistic Assessment of Earthquake Damage to a Potable Water Network in Shelby County, Tennessee
- Assessing Impacts of Traffic Network Damage from Earthquakes Using an Open Traffic Model
- A Stochastic Ground Motion Simulation Model Developed for Shallow Crustal Earthquakes Evaluated in a Subduction Zone Setting
- Regional Hazard Simulation Workflow Adaption
- Automated Model Validation of the SimCenter Regional Earthquake Workflow
- Regional Earthquake Simulation in Charleston County, South Carolina
- Evaluating Policies by Simulating Large-Scale Regional Seismic Response
- Influence of Different Building Damage Prediction Models on Regional-scale Seismic Risk Estimates
- Deep learning-based estimation of peak wind pressures on buildings from short-duration measurements
- Adaption of the PBEE Framework: A building block for community resilience models

UC Berkeley invites you to participate in *SimCenter's* efforts to advance simulation software for engineering applications with the goal of mitigating the effects of natural hazards on the built environment. Be part of this summer's team to evaluate and improve models that assess the economic impact of earthquake, wind, or water damage.

Visit https://simcenter.designsafe-ci.org for more information.

The University of Texas at Austin - NHERI Cyberinfrastructure and Data Management with TACC
DesignSafe-ci.org provides a comprehensive environment for experimental, theoretical, and computational engineering and science, providing a place not only to steward data from its creation through the archive but also the workspace to understand, analyze, collaborate, and publish that data.

The *DesignSafe* vision is an integral part of research and discovery, providing researchers access to cloud-based tools that support their work to analyze, visualize, and integrate diverse data types. *DesignSafe* provides a flexible data repository with straightforward mechanisms for data/metadata upload and enables the next generation of research discovery through a cloud-based interface that allows data analysis and visualization tools to work directly on data stored

in the data repository. These functionalities allow researchers to use the cyberinfrastructure to interact with their data in the cloud, bypassing time-consuming downloads/uploads. Software encompasses both data analytics and visualization tools (e.g., MATLAB, ParaView) as well as computational simulation tools (e.g., OpenSees, ABAQUS, ADCIRC, OpenFOAM).

Students joining the *DesignSafe* team this summer will work at the intersection of natural hazard engineering and advanced computational methods at the Texas Advanced Computing Center (TACC) of The University of Texas (physical REU site). The program will focus on developing and applying cutting-edge techniques such as Large Language Models (LLMs), digital twins, and machine learning-based surrogate simulators to address critical challenges in natural hazard prediction and mitigation. For instance, recent work by undergraduate researchers has explored the use of real-time simulators with mixed-reality environments. Such projects demonstrate the potential of integrating AI and computational methods with traditional engineering approaches to create more accurate, real-time simulations of natural hazards. Students will receive training on some of the most advanced technologies in high-performance computing, cloud-based data analytics, and visualization.

Visit the **designsafe-ci.org/community/cyberinfrastructure/** page for more information.

University of Washington - Rapid Response Research Facility (RAPID) The NSF-sponsored UW RAPID Facility provides researchers with the equipment, software, and support services needed to collect, process, and analyze perishable data from natural hazards such as earthquakes, hurricanes, tsunamis, landslides, and wildfires. Facility equipment includes laser scanners (i.e., lidar), surveying equipment, health exposure measurement devices, street view imaging systems, uncrewed aerial vehicles ("drones") with digital cameras and/or lidar units, accelerometers, and seismometers for ground investigation, as well as software (e.g., Leica and Maptek geomatics software, Pix4D) to support data processing. Data collected and processed using RAPID equipment and software enable characterization of ground failure and civil infrastructure performance under natural hazard loads, evaluation of the effectiveness of current and previous design methodologies and understanding of socio-economic and public health impacts of natural disasters.

Students who join the RAPID facility for the summer will participate in the following activities:

- Working with a specific field data set collected by the student, RAPID staff and/or others use these data to advance understanding of infrastructure response to natural hazard events, public health impacts and how post-event data can effectively be used to advance natural hazards engineering.
- Further development of data processing protocols for RAPID users. REUs will learn how to use data processing software and then analyze and assess data products produced using RAPID instrumentation.
- Ultimately, REUs will contribute to the documented data processing workflows to enable RAPID users to produce high-quality datasets for specific use-case scenarios. Working with RAPID staff, REUs will learn how to use RAPID equipment, investigate equipment settings and features, process data using appropriate software, and update user guides that document best practices for equipment use and data processing.
- REUs will join RAPID facility faculty and staff in hosting the facility's annual four-day user training workshop, which will be held on the UW campus in July. This workshop attracts faculty from across the US. REUs will participate in training activities and support workshop operations.

Visit rapid.designsafe-ci.org for more information on the RAPID program.

Page Break

Site Ranking

Things you should consider when ranking the sites:

- What are your natural hazard research interests (earthquakes, tsunamis, storm surge, hurricane or other windstorm, etc.)?
- What are your research method interests (physical modeling, computational/simulation, hybrid simulation, survey, etc.)?
- Are you interested in engineering, social science, or some combination of both?

Please select a ***first, second, and third*** choice for REU sites. This will rank your interest in sites from first choice (I would really like to attend the REU program here.) to third choice (I can complete my REU program here.). **Please remember, y*ou must be able to complete the entire 10-week program in person at the site.***

First Choice

- ○ University of California - Berkeley, SimCenter
- ○ University of Texas - Austin, DesignSafe with TACC
- ○ University of Washington, RAPID Facility

Second Choice

- ○ University of California - Berkeley, SimCenter
- ○ University of Texas - Austin, DesignSafe with TACC
- ○ University of Washington, RAPID Facility

Third Choice

- ○ University of California - Berkeley, SimCenter
- ○ University of Texas - Austin, DesignSafe with TACC
- ○ University of Washington, RAPID Facility

Please explain why you ranked the sites as you did. Specifically, how would participating in an REU program at a specific site benefit you overall? In your answer, please include how the research or methods conducted at the site align with your overall academic, research, and career interests.

Coursework and Skills

This section asks for you to provide insight into the courses you have taken, the areas of study covered in these courses, and the skills you possess. It also asks you to reflect on the skills you would like to develop if you are accepted into the REU program.

Engineering, Math, Computer Science & Social Science Coursework
Because NHERI focuses on natural hazards research that includes engineering, social science, and interdisciplinary aspects, please provide a list of *all* the engineering, math, computer science, and social science courses you have completed or plan to complete by June 2027 in the box below. Also, indicate all the areas of study these courses have covered.

Select *all* the engineering, math, and computer science coursework you have already completed from the list below.

- [ ] Statics
- [ ] Dynamics
- [ ] Fluid Dynamics
- [ ] Linear Algebra
- [ ] Mechanics of Materials/ Solid Mechanics
- [ ] Soil Mechanics
- [ ] Statistics
- [ ] Structural Analysis
- [ ] Wind Engineering
- [ ] None of the above

Select *all* the social science coursework you have already completed from the list below.

- [ ] Introduction to Psychology, Sociology, Political Science, or other related introductory courses
- [ ] Social Science Theory
- [ ] Social Science Research Design
- [ ] Quantitative Research Methods
- [ ] Qualitative Research Methods
- [ ] Evaluation Research
- [ ] Social Psychology
- [ ] Social Science Study of the Family
- [ ] Health and Health Care
- [ ] Race, Class, and Gender Studies
- [ ] Religion and Culture
- [ ] Sociology of Disasters or Equivalent
- [ ] Environment or Environmental Justice
- [ ] Demography and Community Trends
- [ ] Social Stratification
- [ ] Ethnic and Race Relations
- [ ] Other (Please specific in the box below.)

_____

☐ None of the above

Special Skills & Proficiencies

Please select *all* the skills you have experience with, including computer programming languages, foreign languages, or other special skills you possess. You can list other skills and proficiencies or provide additional information about your coding, foreign language, statistics, software, and research design experiences in the next question.

- [ ] AutoCAD, SolidWorks, REVIT, etc. (i.e., engineering drawing experience)
- [ ] C++
- [ ] Coding experience (Use the Other Special Skills and Proficiencies field below to specify your coding experience.)
- [ ] Excel
- [ ] Fortran
- [ ] Instrumentation
- [ ] Laboratory experience
- [ ] MATLAB
- [ ] Python
- [ ] Statistics and research design experience (Use the Other Special Skills & Proficiencies field below to specify the statistics or design software you used.)
- [ ] Interpersonal communication skills
- [ ] Cross-cultural communication skills
- [ ] Hazards or disaster specific knowledge via coursework or fieldwork experience
- [ ] None of the above

Other Special Skills and Proficiencies

Use the field below to elaborate on any additional skills or experience, including any coding experience and foreign languages spoken. Please also include social science software experience (i.e., Stata, SPSS, Atlas.ti, Nvivo, Dedoose, etc.).

***Desired* Special Skills & Proficiencies**

Please select *all* the skills, computing proficiencies, or other special proficiencies you ***wish to obtain*** through the summer research program. Use the provided area after the list for any additional skills you desire to gain from the program not listed.

- ☐ AutoCAD, SolidWorks, REVIT, etc. (i.e., engineering drawing experience)
- ☐ C++
- ☐ Coding experience (Use the Other Special Skills and Proficiencies field below to specify your coding experience.)
- ☐ Excel
- ☐ Fortran
- ☐ Instrumentation
- ☐ Laboratory experience
- ☐ MATLAB
- ☐ Python
- ☐ Statistics and research design experience (Use the Other Special Skills & Proficiencies field below to specify the statistics or design software you used.)
- ☐ Interpersonal communication skills
- ☐ Cross-cultural communication skills
- ☐ Hazards or disaster specific knowledge via coursework or fieldwork experience
- ☐ None of the above

Other Desired Special Skills and Proficiencies
Use the field below to elaborate on any additional skills or experience, including any coding, social science software (i.e., Stata, SPSS, Atlas.ti, Nvivo, Dedoose, etc.), or foreign languages spoken.

_____

Essay Questions
The next three questions are essay questions that give you a chance to differentiate yourself from other applicants through your unique experiences.

*Please remember, NSF NHERI REU does not permit the use of Artificial Intelligence (AI) to generate content for NHERI REU Summer Program applications. Any use of AI to generate application content may result in the removal of your application for consideration for the 2027 NHERI REU Summer Program.

Academic and Career Goals
Please provide a brief statement (500 words or less) describing your academic and career goals and how your NHERI REU experience might benefit these goals. Why is this work important to you?

_____

Education and Work Experience

Briefly describe (300 words or less) how your skills, education, and work experience to date have prepared you to intern in an engineering laboratory or interdisciplinary research facility.

_____

Extracurricular Activities Briefly describe (300 words or less) what you do outside of school. Include any volunteer work, work for pay, extracurricular activities/clubs, or other groups/organizations in which you are a member or leader.

_____

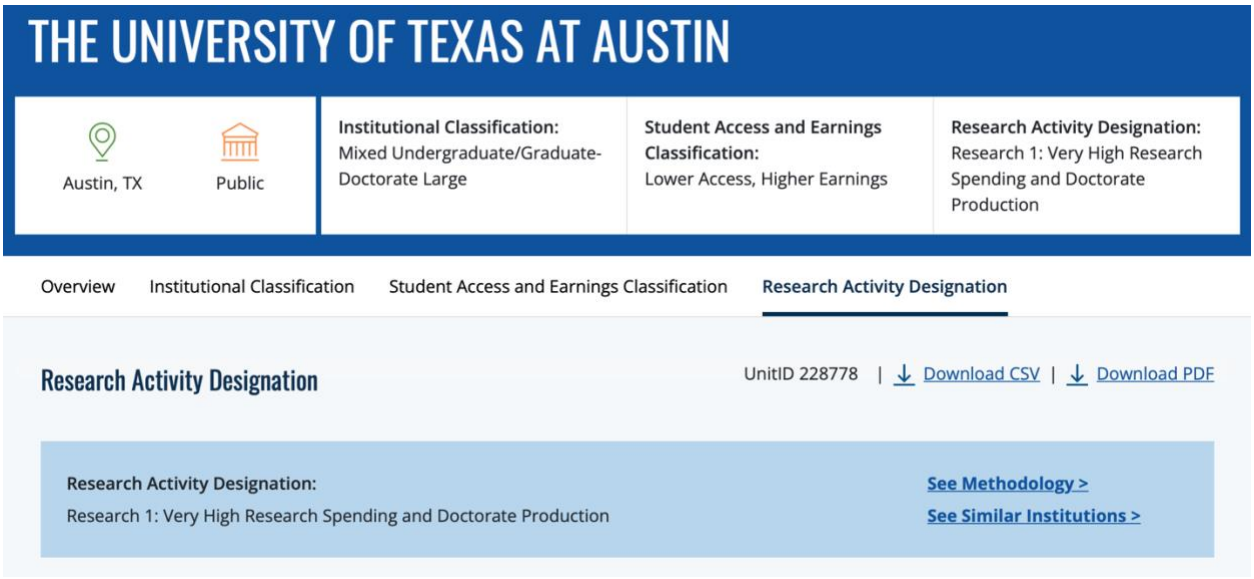
Undergraduate Research Experience

Have you participated in an REU program or other formal undergraduate research experience outside of the classroom?

- ○ Yes
- ○ No

University's Research Classification or Carnegie Classifications
If you are unsure, please look up your university's Carnegie Classification by typing the city in which your university is
located: **https://carnegieclassifications.acenet.edu/lookup/lookup.php.**
Please look at the **Research Activity Designation** to determine the category of your university.

Below is an example:



Please look at the Research classification to determine the category of your university.

- ○ Research 1: Very high research spending and doctorate production
- ○ Research 2: High research spending and doctorate production
- ○ Research Colleges and Universities
- ○ Other
- ○ Don't know or unsure

How did you hear about the NHERI STRONG-R REU program? (Please select all that apply.)

- [ ] Faculty member
- [ ] DesignSafe website
- [ ] Previous REU student
- [ ] Conference
- [ ] Social Media
- [ ] Other (Please specify in the space below.)

_____

Additional Materials
You may attach a file with additional materials for the REU selection committee's consideration, such as academic transcripts or research papers. You may only attach one file. If you have multiple files, please combine them first into a ZIP archive. **Please name the file, yourfirst_yourlast name.** Then drag and drop your file in the space below or click "Choose File" to upload the ZIP archive or single file.

Background Information
The demographics section will help the REU program learn more about applicants but is not used in the selection process. Please fill out the information to the best of your ability and level of comfort. Please select the category or categories to which you most closely identify.

Gender

_____

Preferred pronouns

_____

Race/Ethnicity (Please select all that apply.)

- [ ] American Indian or Alaska Native
- [ ] Asian or Asian American
- [ ] Black or African American
- [ ] Hispanic or Latinx
- [ ] Middle Eastern or North African
- [ ] Native Hawaiian or Other Pacific Islander
- [ ] White or Caucasian
- [ ] None of the above/ Do not wish to answer

Native Language (first language you learned to speak)

_____

Household income

- ○ Less than $20,000
- ○ $20,000 to $39,999
- ○ $40,000 to $59,999
- ○ $60,000 to $79,999
- ○ $80,000 to $99,999
- ○ $100,000 to $149,999
- ○ $150,000 to $199,999
- ○ $200,000 or more
- ○ Unknown/ Do not wish to answer

Household Size (number of people living in the household including applicant)

_____

First-Generation in your family to attend 4-year university.

- ○ Yes
- ○ No
- ○ Unsure

First Parent or Guardian's Relationship

- ○ Mother
- ○ Father
- ○ Stepmother
- ○ Stepfather
- ○ Guardian
- ○ No parent or guardian
- ○ Another adult

First parent or guardian's highest education level

- ○ Graduate or professional degree
- ○ Bachelor's or four-year degree
- ○ Associate or two-year degree
- ○ Some college credit without degree attainment
- ○ High school diploma or GED
- ○ Some high school, no diploma
- ○ No high school
- ○ Unknown or not applicable

Second Parent or Guardian's Relationship

- ○ Mother
- ○ Father
- ○ Stepmother
- ○ Stepfather
- ○ Guardian
- ○ No parent or guardian
- ○ Another adult

Second parent or guardian's highest education level

- ○ Graduate or professional degree
- ○ Bachelor's or four-year degree
- ○ Associate or two-year degree
- ○ Some college credit without degree attainment
- ○ High school diploma or GED
- ○ Some high school, no diploma
- ○ No high school
- ○ Unknown or not applicable

Siblings Highest Education Level Do you have any siblings? If so, what is the highest level of education among your siblings?

- ○ Graduate or professional degree
- ○ Bachelor's or four-year degree
- ○ Associate or two-year degree
- ○ Some college credit without degree attainment
- ○ High school diploma or GED
- ○ Some high school, no diploma
- ○ No high school
- ○ Unknown or not applicable

Applicants Highest Planned Education Level What is the highest level of education you plan to receive?

- ○ Graduate or professional degree
- ○ Bachelor's or four-year degree
- ○ Associate or two-year degree
- ○ Some college

If you are you ready to submit your NHERI REU Application, please click the next arrow. *If you want to review your application, please click the back button to return to the previous pages of the application.

End of Block: Default Question Block