

Technical Assistance Webinar:

Short-Term Research Education Experiences to Attract Talented Students to Biomedical Informatics/Data Science Careers and Enhance Diversity
(R25 - Independent Clinical Trial Not Allowed)

RFA-LM-22-001

NLM Extramural Programs
National Institutes of Health
April 13, 2022

Note: Session will be recorded.



Aims of Session

1. Provide background and overview of RFA-LM-22-001.
2. Respond to general questions that are sent via Q&A during the webinar.

Note: Specific questions unique to your institution should be emailed directly to PO or GM staff listed in the RFA.



Program Objectives

- To support **educational activities** that encourage undergraduates/post-baccalaureate/masters students from diverse backgrounds, including those from groups underrepresented in the biomedical and behavioral sciences, to pursue training and careers in biomedical informatics and data science.
- To **promote diversity** in research training and education programs by developing programs that ultimately support the increased participation and retention of individuals from underrepresented backgrounds as defined in the Notice of NIH's Interest in Diversity, [NOT-OD-20-031](#).
- To **increase the pool** of future research investigators from diverse backgrounds and facilitate the career advancement and/or transition of participants to the next step in their scientific careers.

Background

NIH Research Education Programs (R25) support research educational activities that complement other formal training programs in mission areas of NIH ICs

Overarching goals:

- Complement and/or enhance the training of a workforce to meet the nation's biomedical, behavioral and clinical research needs
- Encourage individuals from diverse backgrounds, including those from groups underrepresented in the biomedical and behavioral sciences, to pursue further studies or careers in research
- Recruit individuals with specific specialty or disciplinary backgrounds to research careers in biomedical, behavioral and clinical sciences; and
- Foster a better understanding of biomedical, behavioral and clinical research and its implications

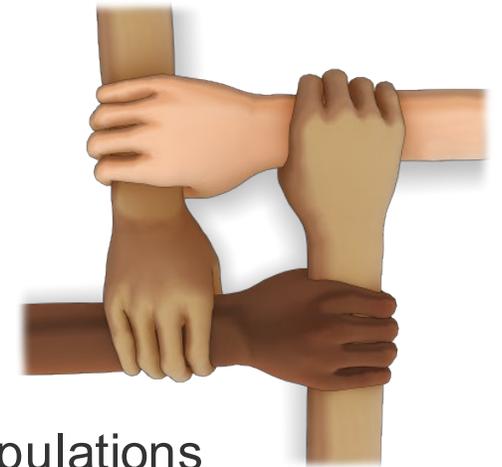
Background

- **NLM Strategic Plan Goal 3:** Build a workforce for data-driven research and health
- R25 program addresses a need in training undergraduates and in developing a pipeline of future scientists interested in biomedical informatics and data science research
- NLM supports innovative research and development in biomedical informatics and data science
 - emphasis on novel methods and approaches to foster data driven discovery in the biomedical and clinical health sciences
- Biomedical informatics and data science draw upon many fields, including mathematics, statistics, information science, computer science and engineering, and social and behavioral sciences.



Diversity

- Research shows that diverse teams working together outperform homogeneous teams
- Scientists and trainees from diverse backgrounds and life experiences bring different perspectives, creativity, and individual enterprise to address complex scientific problems
- Many **benefits** result from a diverse NIH-supported scientific workforce
 - fosters scientific innovation
 - enhances global competitiveness
 - contributes to robust learning environments
 - improves the quality of the research
 - advances the likelihood that underrepresented or health disparity populations participate in, and benefit, from health research
 - advances health equity
 - enhances the public trust



Diversity

- NIH encourages institutions to diversify their student and faculty populations and to enhance the participation of individuals from diverse groups, including those nationally underrepresented in biomedical, clinical, behavioral, and social sciences research, such as racial and ethnic minorities, those from socioeconomically disadvantaged backgrounds, and individuals with disabilities (see [NOT-OD-20-031](#)).
- Although the NIH currently provides multiple opportunities to develop research careers and improve participation for individuals from groups with lower representation in the biomedical and behavioral sciences, reports from the National Science Foundation (NSF) and others, provide strong evidence that diversity remains an ongoing challenge that must be addressed at every level of the educational pipeline.

Program Description

- The R25 research program should provide broad exposure to biomedical informatics and data science research and create a pipeline for future doctoral studies in biomedical informatics and/or data science.
- Fostering collaboration and partnerships across institutions will be important for creating this pipeline.
- Minority-serving institutions and/or IDeA-eligible institutions, when serving as lead applicant, are encouraged to partner with programs at institutions with established biomedical informatics or data science programs and have an established record of NIH funding.
- Institutions with established biomedical informatics or data science programs, when serving as lead applicant, are encouraged to partner with minority-serving institutions or IDeA-eligible institutions.



Research Education Program Plan

- Applicants will be expected to develop a biomedical informatics research education program in which participants will be supported short-term (i.e., 12 weeks during the summer)
- Supports creative educational activities that expose trainees to research related to biomedical informatics and data science, reinforce their intent to graduate, and prepare them for doctoral program admissions
- It is expected that skills development courses/seminars/workshops that introduce trainees to fundamental knowledge in such areas as biomedical, clinical, public health, translational, and consumer health informatics; machine learning, artificial intelligence, health equity, health disparities, and information science will be offered
- Eligible participants consist of undergraduate and master's students who are currently enrolled at an accredited institution of higher learning in the United States.
 - Post-baccalaureate students who are enrolled in an accredited post-bac program may also be considered
 - Undergraduate participants should have already successfully completed one academic year of post-secondary education with completion of at least two academic years preferred



Training Program

- Biomedical informatics and data science draw upon many fields, including mathematics, statistics, information science, computer science and engineering, and social and behavioral sciences
 - **Biomedical informatics** applies theories and processes to study and pursue the effective uses of biomedical data, information, and knowledge for scientific inquiry, problem solving and decision making to improve human health.
 - **Data science** involves quantitative and analytical approaches, processes, and systems that are developed and used to extract knowledge and insights from increasingly large and/or complex datasets
- Research domains may include health care delivery, basic biomedical research, clinical and translational research, precision medicine, public health, biosurveillance, health information management, and related areas.



Training Program

- Courses for skills development should be designed to increase interest in and preparation to enter graduate programs in biomedical informatics and data science or a medical informatics-related field of scientific interest to NLM
- It is expected that academic and curriculum enhancement activities may vary in how they are formalized and integrated; various strategies, rooted in education research, may be utilized.
- These approaches may include, but are not limited to:
 - Core biomedical informatics coursework
 - Collaborative learning experiences and group activities
 - Advisement regarding coursework that students should take to be competitive for graduate school programs
 - Seminars emphasizing scientific reading comprehension, writing, and oral presentation skills
 - Research career seminars to help prepare students for the transition to a doctoral program

Mentorship

- There should be dedicated efforts to provide not only technical expertise, but advice, insight, and professional career skills to students in the program.
- Mentors should be encouraged to work with participants to design individualized development plans (IDPs) that are compatible with participants' needs and experience.
- Dual mentoring is encouraged, with one faculty mentor focused more on scientific mentoring and another on career mentoring, and with mentors at each collaborating institute represented. Additionally, near-peer mentoring is encouraged (e.g., a graduate student who is working with an undergraduate student on a research project).



Mentorship

- Quality mentorship is critical to the recruitment and retention of scientists, including those from underrepresented backgrounds, and program activities to improve the caliber of mentorship is encouraged.
- Mentoring and other educational activities are expected to be conducted at each collaborating institution to maximize the program's impact.
- Programs, in addition to research experiences, are expected to provide students with outstanding mentoring and education in other critical skills such as leadership, scientific writing and presentation skills, training in rigor and reproducibility and time management.



Research Education Program Plan Strategy

Must include the following components:

- Proposed Research Education Program
- Program Director/Principal Investigator
- Program Faculty
- Program Participants
- Institutional Environment and Commitment
- Recruitment Plan to Enhance Diversity
- Plan for Instruction in the Responsible Conduct of Research
- Evaluation Plan
- Dissemination Plan



Research Education Program

- The proposed research education program may complement ongoing research training and education occurring at the applicant institution
 - Must be distinct from those research training and research education programs currently receiving federal support
 - When training programs are ongoing in the same department, the applicant organization should clearly distinguish between the activities in the proposed research education program and the research training supported by the training program.



Program/Application Requirements

- Use an evidence-based approach to justify activities proposed in the research plan.
 - Applicants should review the substantial pedagogical literature concerning predictors of success in research careers and examine additional data/report resources at <https://extramural-diversity.nih.gov/diversity-reports>.
- Address overall goals and specific measurable objectives (including anticipated milestones defined as anticipated intermediate steps toward the objectives) that the institution expects to accomplish in preparing students to enter and complete graduate studies in biomedical informatics and data science research and/or pursue careers in the scientific, medical, ethical, and/or social areas of biomedical informatics and data science research.
- Provide programmatic detail and rationale on the proposed research experiences and courses for skills development and describe how these activities will enrich the research skills and/or competence of participants so that they may further engage in biomedical informatics and data science research.
- Describe how the research education plan will be integrated across the partnering institutions, including plans for coordination and communication between the sites.



Program/Application Requirements

- Discuss any perceived impediments to implementing the proposed activities and alternative strategies to achieve the measurable objectives.
- Provide the number of participants to be supported and concise information on the selection and retention process for the participants in the program, including the criteria related to the students' academic status, participants' research education and training progress, and role of the faculty/personnel involved.
- Demonstrate that participants will have authentic, meaningful research experiences.
 - This exposure to research should occur during the summer at the home institution or the partnering institution.
- Describe the mentoring plan, including the mentoring network and efforts at providing not only technical expertise, but advice, insight, and professional career skills that will advance the broad career goals of the students from diverse backgrounds.
- Describe any activities aimed at improving mentorship.
- Include a timetable for completing planned activities.



Program Director/Principal Investigator

- Provide evidence that the Program Director/Principal Investigator is actively engaged in research and/or teaching in an area related to the mission of NIH, and can organize, administer, monitor, and evaluate the research education program.
 - For programs proposing multiple PDs/PIs, describe the complementary and integrated expertise of the PDs/PIs, their leadership approach, and governance appropriate for the planned project.
- For early-stage investigators, there should be a statement of assurance that their research program and career advancement will not be impacted by duties as PD/PI.
- Describe how the PD(s)/PI(s) will assume responsibility for the overall execution of the Program, including placement of participants in established research groups, and coordination and implementation of developmental education and mentoring activities across participating institutions.
- Describe how the PD(s)/PI(s) will work with program faculty and, if applicable, program coordinator(s) to monitor and evaluate the progress of the individual program elements and the overall functioning of the integrated program.



Program Faculty

- Researchers from diverse backgrounds, including racial and ethnic minorities, persons with disabilities, and women are encouraged to participate as program faculty.
- Faculty should have research expertise and experience relevant to the proposed program and demonstrate a history of, or the potential for, their intended roles.
- Program faculty may also serve as mentors.
- All program faculty must conduct research that is relevant to NLM's scientific mission.
- There should be clear involvement of faculty at both lead and partner institutions, with appropriate faculty coordination across institutions.



Program Participants

- Applications must identify the career levels for which the proposed program is planned.
- Applications must describe the intended participants, and the eligibility criteria and/or specific educational background characteristics
- It is the responsibility of the institutions to establish the selection criteria for the students before they are allowed to participate in the program, and to establish selection criteria that will ensure a highly qualified applicant pool.
- Selection of program supported participants is expected to take into consideration whether the participation would help achieve the overall goals/objectives of the program
- Students from such fields as engineering, mathematics, computer science, physics, chemistry, biology, psychology, sociology, public health and other relevant academic disciplines who have an interest in in biomedical informatics and/or data science should be encouraged to participate



Institutional Environment and Commitment

- Institutions should clearly state how scientific workforce diversity is consistent with its mission and describe efforts the institution has taken to promote a climate of inclusion that will help achieve the aims of the program
- The applicant institution must document the requisite administrative/technical capacity, and support for the management of a collaborative research education and research training project.
 - All collaborative arrangements must be clearly described and agreements included in the application as letters of support.

Applications must:

- Include a description of the potential applicant pool based on the selection criteria established for the proposed program;
- Describe the process for selection of the program-supported participants (examples of accepted indicators include, but are not limited to, previous academic success, practical research experience, written statements that express interest and commitment and letters of recommendations from faculty, research supervisors and/or other community leaders that speak to the applicant's merit and interest in biomedical informatics and data science research)
- Describe the retention strategies and follow-up activities that would ensure students remain engaged and are receiving high quality mentorship and guidance within the program.



Recruitment Plan to Enhance Diversity

- The applicant must provide a recruitment plan to enhance diversity by increasing underrepresented racial and ethnic groups; individuals with disabilities, individuals from disadvantaged backgrounds, and women in biomedical informatics and data science
- Include outreach strategies and activities designed to recruit prospective participants from groups described in the [Notice of NIH's Interest in Diversity](#)
- Describe the specific efforts to be undertaken by the program and how the proposed plan reflects past experiences in recruiting individuals from underrepresented groups
- **Applications lacking a diversity recruitment plan will not be reviewed.**



Plan for Instruction in the Responsible Conduct of Research

- All applications must include a plan to fulfill NIH requirements for instruction in the Responsible Conduct of Research (RCR). The plan must address the five, required instructional components outlined in the NIH policy [NOT-OD-10-019](#)
 - 1) *Format*
 - 2) *Subject Matter*
 - 3) *Faculty Participation*
 - 4) *Duration of Instruction*
 - 5) *Frequency of Instruction*

Applications lacking a plan for instruction in responsible conduct of research will not be reviewed.



Evaluation Plan

- Applications must
 - include a plan for evaluating the activities supported by the award
 - specify baseline metrics (e.g., numbers, educational levels, and demographic characteristics of participants), as well as measures to gauge the short or long-term success of the research education award in achieving its objectives
- Wherever appropriate, applicants are encouraged to obtain feedback from participants to help identify weaknesses and to provide suggestions for improvements
- Overall evaluation plans should include a logic model and include both process and outcome measures



Dissemination Plan

- A specific plan must be provided to disseminate nationally any findings resulting from, or materials developed under, the auspices of the research education program, e.g., sharing course curricula and related materials via web postings, presentations at scientific meetings, workshops.



Program Outcomes

- **Increased admissions** into graduate programs among program participants in research mission areas relevant to NLM
- **Enhanced participation** of individuals from diverse backgrounds in the biomedical informatics research workforce who can bring their unique experiences, perspectives and innovation to addressing human disease and the public's health and/or the ethical or social implications of biomedical informatics research
- Other desired program outcomes include completion of bachelor's degrees, completion of doctoral programs, and achievement of subsequent research funding, such as an NLM individual fellowship or career development awards.



Specific Review Criteria



- **Significance**

- Will the proposed program significantly improve the baseline number of students that enter and, ultimately, complete doctoral programs in biomedical informatics and data science, and/or pursue careers in the scientific, medical, ethical, or social areas of biomedical informatics research?
- Does the proposed program provide compelling evidence of the impact it will have on the enrichment of the research skills and/or competence of participants so they may further engage in biomedical informatics or data science research?

Review



- **Investigator(s)**

- Is the PD/PI(s) actively engaged in research and/or teaching in an area related to the mission of the NLM?
- Is there an adequate description of how the PD/PI(s) will work with program faculty and, if applicable, program coordinator(s) to monitor and evaluate the progress of the individual program elements and the overall functioning of the integrated program?
- Is there compelling evidence that all Program Faculty are conducting research that is relevant to NLM's scientific mission?
- Is there clear involvement of faculty at both lead and partner institutions, with appropriate faculty coordination across institutions?



Review



- **Innovation**

- Does the program use novel methods in reaching out to diverse and underrepresented student populations?
- Does the program use creative methods in mentoring?
- Does the program propose groundbreaking approaches to increase interest in biomedical informatics and data sciences?



Review



- **Approach**

- Do the proposed research experiences and courses for skills development meet the needs of participating students from diverse backgrounds, and are they designed to support their competitiveness for completion of a doctoral degree in a biomedical informatics or data science field?
- Does the program demonstrate that participants will have meaningful research experiences?
- Are the requirements and timetable for completing the planned activities, and the size and caliber of the applicant pool appropriate to achieve the described program goals?
- Is the mentoring plan sufficient to support the scope of this program?
- Are the selection criteria for participants and retention strategies clearly described and appropriate for ensuring that the program meets its goals?

Review



- **Environment**

- Is there compelling evidence of commitment and integration across the collaborating institutions?
- Are adequate plans provided for coordination and communication between the sites?
- Do the institutions or organizations have experience providing educational opportunities to students from diverse backgrounds, including those underrepresented in biomedical research?
- Is there sufficient evidence that the program and its environments are effective, inclusive, safe and supportive?



Additional Review Considerations

Reviewers will consider the following items, but will not give scores for these items, and should not consider them in providing an overall impact score.

Recruitment Plan to Enhance Diversity

- Plans will be rated as **acceptable** or **unacceptable**, and the summary statement will provide the consensus of the review committee.

Training in the Responsible Conduct of Research

- Reviewers will evaluate the adequacy of the proposed RCR training
- Plans will be rated as **acceptable** or **unacceptable**, and the summary statement will provide the consensus of the review committee.



Application Budget

- Budget limit: up to \$125,000 direct costs per year, for up to 5 years
 - Consortium F&A costs are not counted against the direct cost limit when determining if an applicant is in compliance with a direct cost limitation on a solicited application.
- 8% indirect cost rate
- NLM expects to fund ~5 awards in FY2022

Budget – Participants

- Personnel costs for participants
 - Participants may be compensated for participation in the program with sufficient justification. Participant costs must be itemized in the proposed budget.
 - Salary and fringe benefits for participants must be consistent with institutional salary policies for employees in similar positions.
- Travel for participants
 - May request up to \$3,000 for each **non-local** participant for round trip travel to the research experience site, and housing. Must be itemized and justified.
 - Unallowable expenses include: daily commuting costs; foreign travel.



Budget – Other Personnel

- Personnel costs: may request salary and fringe benefits for PD/PI(s), Program Coordinator, & faculty effort directly associated with the grant - **may not exceed 30%** of the total direct costs in each year.
 - Duties and responsibilities for each role must be included in budget justification.
 - If mentoring interactions are considered a regular part of faculty's academic duties, then costs associated with mentoring are **not** allowable costs from grant funds.
 - Limited program-related admin/clerical staff effort may be requested with appropriate justification.
- Other costs, such as consultant costs and evaluation costs, **may not exceed 10%** of the total direct costs in each year.

Key Dates

- Application Receipt: **May 31, 2022**
 - Applications must be submitted electronically.
 - No late applications will be accepted.
- Peer Review: **July 2022**
- Council Review: **August 2022**
- New Awards: **September, 2022**

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Questions

Please submit questions using the Q&A feature.



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