



# Big Data Health Science Center

UNIVERSITY OF SOUTH CAROLINA

## 2024-2025 Big Data Health Science Fellow Program Call for Application

**Announcement Release Date: January 18, 2024**

**Application Receipt Date: March 14, 2024 by 5 p.m.**

**Notification of Outcome: All applicants will receive notification by May 1, 2024**

**Earliest Project Start Date: May 16, 2024**

### **Background:**

Supported by NIAID (R25AI164581-04), the USC Big Data Health Science Center (BDHSC) has been implementing a Big Data Health Science Fellow (“Big Data Fellow”) program since 2021. The multiple, massive, and rich Big Data streams in healthcare (e.g., electronic health records, mobile technologies, wearable devices, genomic data) and the emergence of advanced information and computational technologies (e.g., machine learning and artificial intelligence) offer an invaluable opportunity for applying innovative Big Data science research in NIAID focus areas of infectious diseases such as HIV/AIDS and COVID-19. Big Data science has the potential to identify high-risk individuals and communities and prioritize them for early biomedical or public health interventions, predict long-term clinical outcomes and disease progression, and evaluate public health policy impact. Key to addressing these complexities is a critical mass of health researchers with adequate knowledge, competencies, and skills to unlock important answers from Big Data to better understand, treat, and ultimately prevent these diseases and related comorbidities. However, there is a nationwide shortage of talent with such knowledge, competencies, and skills, especially in traditional academic settings. While junior faculty, as part of the generations of digital learners, have the greatest potential to develop their Big Data health science research agenda, many face multiple structural barriers to conducting Big Data science research. Such barriers include a lack of protected time to initiate new interdisciplinary Big Data research, opportunities to participate in funded Big Data research, and adequate mentoring. As part of BDHSC’s professional development mission, the Big Data Fellow program is designed to address these gaps and promote Big Data health science research at USC.

### **Program Goals and Aims:**

The program will recruit around 4 USC junior faculty per year and provide them with salary support (25%) to participate in the training program with the following specific aims:

**Aim 1:** Provide courses for competency and skills development in BDS research. Each trainee will complete 2 formal or informal courses (one per semester) in BDS areas that are appropriate for their background and research interests.

**Aim 2:** Engage trainees in hands-on research and proposal development. Trainees will participate in ongoing NIH-funded Big Data research projects that utilize existing large data sources (e.g., NIH COVID-19 Cohort Collaborative [N3C] Data, NIH All of US data, SC statewide HIV and COVID-19 data, or VA system-wide HIV and COVID-19 data).

**Aim 3:** Provide trainees with rich mentoring experience in BDS research and professional development. Each trainee will be mentored by a team of NIAID-funded investigators who have complementary knowledge and skills from multiple domains (clinical medicine, public health, biostatistics, computing, geospatial science, social media, etc.,) and will engage in contextual mentoring and peer-to-peer mentoring.

### **Program Leadership and Management:**

Program Director: Xiaoming Li, Ph.D., Professor and Endowed Chair, Health Promotion, Education and Behavior, Arnold School of Public Health

Program Co-Director: Jiajia Zhang, Ph.D., Professor and Division Director, Biostatistics and Epidemiology, Arnold School of Public Health

Managing Director: Miranda Nixon, MA, Big Data Health Science Center, USC.

### **Program Mentors:**

The current pool of program mentors includes the following USC faculty (alphabetically):

Majdi Alhasan, Clinical Professor, Chief of the Infectious Diseases Division, SOM-Columbia

Neset Hikmet, Professor in Engineering and Computing.

Jianjun Hu, Associate Professor in Engineering and Computing.

Xiaoming Li, Professor and Endowed Chair in Health Promotion, Education and Behavior

Alain Litwin, Professor and Vice Chair of Internal Medicine, SOM-Greenville.

Melissa Nolan, Associate Professor in Epidemiology

Banky Olatosi, Associate Professor in Health Services Policy & Management

Shan Qiao, Associate Professor in Health Promotion, Education, and Behavior

Homayoun Valafar, Professor and Chair of Research, Computer Science & Engineering; Biomedical Engineering

Qi Wang, Professor, Department of Mathematics

Sharon Weissman, Clinical Professor and Chair for the Department of Medicine, SOM-Columbia.

Jiajia Zhang, Professor and Division Director in Biostatistics

**(Note: additional mentors will be identified and included based on program needs)**

### **Program Benefits and Support:**

The program will provide the following support to Fellow during the training year:

- 1) 25% salary support for one year (subject to NIH salary cap)
- 2) Support for participation in grant writing bootcamp
- 3) Matched with a mentoring team
- 4) Participation in a funded Big Data research project
- 5) Support in NIH grant preparation and submission

### **Program Expectations:**

Upon the accomplishment of the proposed training, each Fellow will be expected to:

- 1) Participate in required curriculum-based training;
- 2) Participate in required professional development training (including grant writing);
- 3) Participate in required training in responsible conduct of research;
- 4) Obtain hands-on mentored research experience on an NIAID-funded project;
- 5) Develop at least one Big Data-related manuscript on HIV or COVID-19 related topics;
- 6) Submit one grant application to NIAID or other appropriate funding source.

### **Eligibility for Fellow Program:**

An individual is eligible to join the R25 program as a fellow if she/he meets the following criteria:

- 1) Full-time assistant professor (on any track) within the first 8 years of her/his faculty appointment;
- 2) Expresses interest in pursuing independent research in the area of Big Data in infectious disease;
- 3) Receives agreement from home department/school for 25% time release of their teaching or clinical service for one year;
- 4) Has not received an extramural grant (except R03 or its equivalent) from NIH or other federal agencies;
- 5) Commits to a one-year formal engagement in the R25 program;
- 6) Commits to submitting a competitive grant application to NIAID or other appropriate funding mechanism by the end of the R25 training period;
- 7) Commits to submitting a publishable manuscript in the area of Big Data infectious disease research by the end of the R25 training period; and
- 8) U.S. citizen or permanent resident (unless strongly justified on the basis of exceptional relevance to NIH).

### **Screening and Selection:**

The selection of fellows will be done by the R25 Program Executive Committee led by Dr. Xiaoming Li. When the Executive Committee receives the application packages, members of the committee will each conduct an initial assessment of the applications and provide numerical rankings (1 to 5, with 5 being the highest) along 4 dimensions: 1) relevance of past training and research experience and personal interest to the mission of NIAID; 2) responsiveness to infectious disease and Big Data; 3) potential to make a significant contribution to the field of infectious disease research; and 4) potential to generate external research funding. The Executive Committee will meet by teleconference and discuss the candidates, potentially modifying their rankings. Preference will be given to those who are not currently participating in another research mentoring program and have prior or current experience developing a grant proposal for external federal funding. The Executive Committee will rank the applications based on the scores and select 4 finalists (and 2 to 4 runners-up) and start the process of two-way matching between potential trainees and prospective mentors.

### **Individualized Mentoring Plan (“Learning Contract”):**

Once a mentor(s) is matched to a trainee, the trainee and her/his mentor will develop an individual development plan through a structured educational learning contract, which will in turn be reviewed and approved by the program directors (PDs). The digitized contract will document: 1) goals and outcomes of the mentorship; 2) specific roles and expectations of each party; 3) anticipated numbers and types (face-to-face/email) of meetings; 4) plans and objectives for submission of a manuscript and extramural grant application; and 5) any additional logistics for the one-year formal mentoring relationship, including joint attendance at the research workshops and other training activities. As mentors and trainees work together, they will regularly review and revise their learning contract to ensure that all goals are met and any mutually agreed upon changes are documented. These contracts are expected to be unique for each trainee, depending on previous professional and research experience. As part of the learning contract, short-term outcome data, such as presentations, didactics/conferences, as well as continued real-time monitoring of their scholarship activities (grant proposals, abstracts, and publications) will be monitored. This formative evaluation process will provide real-time feedback from the trainees to their mentors and the PDs. Based on this feedback, an educational prescription may be developed by the mentor and PDs for a trainee who will focus on strengthening her/his expertise in specific theoretical, methodological, and logistical areas related to Big Data infectious disease research. Trainees will also be asked to assess their overall program experience at the end of the program, including views and experiences, process issues, and program content.

### **Application Procedure:**

All applicants should submit an application package with the following documents (as a single PDF file):

- 1) A letter describing her/his research interests and career objectives. The letter will provide a self-assessment (strengths and weaknesses) of the applicant’s capacity in Big Data health science research and also indicate potential R25 mentor(s) or other USC senior faculty with whom they wish to work;
- 2) An up-to-date curriculum vitae, with names and contact information of 3 professional references;
- 3) A concept paper (max 3 pages) that outlines her/his proposed research. This concept paper can come from an unfunded grant proposal by the applicant or can be a new idea the applicant plans to pursue. It should include: a) Title of the research; b) Background and significance of the research; c) Main objectives of the research; d) Proposed research methods; e) Public health or clinical implications of anticipated findings; and f) plan for securing extramural funding.
- 4) A letter from the home school/department confirming the 25% time release for the applicant to participate in the R25 program as a trainee (with 25% salary & fringe support from the R25 program).

**The application should be submitted via email to Ms. Miranda Nixon ([mc95@mailbox.sc.edu](mailto:mc95@mailbox.sc.edu)) by March 14, 2024. No later application will be considered unless a prior approval for later submission is approved by the Program Directors.**

### **Inquires:**

For questions related to various aspects of the Big Data Fellow program, please contact any of the following individuals:

Xiaoming Li, Ph.D., [xiaoming@mailbox.sc.edu](mailto:xiaoming@mailbox.sc.edu)

Jiajia Zhang, Ph.D., [jzhang@mailbox.sc.edu](mailto:jzhang@mailbox.sc.edu)

Miranda Nixon, MA, [mc95@mailbox.sc.edu](mailto:mc95@mailbox.sc.edu)