Eligibility Requirement
Updated on June 17, 2026

SC EPSCoR

Grants for Applications in Industry and Networking (GAIN)

SC EPSCoR Solicitation Number 06-GA2026

A. Introduction

The goal of the GAIN program is to encourage early career faculty researchers at South Carolina's Comprehensive Research Universities (CRUs) (Clemson University, Medical University of South Carolina, and University of South Carolina-Columbia to compete effectively for research funding to support the U.S. NSF EPSCoR ADAPT in SC (AI-Enabled Devices for the Advancement for Personalized and Transformative Health Care in South Carolina) award.

The vision of ADAPT in SC is to build research capacity at the nexus of Artificial Intelligence (AI), life and social sciences, and bioengineering through fundamental research, education, workforce development, and industry engagement.

Proposals submitted in response to this solicitation can be submitted by single investigators (targeting early-career faculty pursuing high-risk/high-reward research) from South Carolina's three comprehensive research universities (Clemson University, the Medical University of South Carolina, and the University of South Carolina-Columbia).

Clinicians are encouraged to apply as PIs, as the program seeks to build collaborations between clinical practice and AI/engineering research.

B. ADAPT in SC Research Priorities

For the ADAPT in SC project, biomedical devices are broadly defined to include conventional mechanoelectrical apparatus (e.g., X-ray machines, pacemakers) and biomedical digital systems such as computer-based biomedical information analyzing systems and predictive models and tissue-engineered implantable biological constructs. The following are major themes of research in ADAPT in SC. Proposals may be submitted to address any of the following four themes:

Theme 1 - Biomedical AI

Biomedical AI is an emerging interdisciplinary field where innovations sprout new theories, models, and algorithms in AI and data science and in synergistic integration of AI with targeted biomedical devices and their downstream applications in complex biomedical settings. Proposals on this topic will conduct research related to the development of theoretical foundations of biomedical AI, AI-ready data acquisition and preprocessing,

multimodal data fusion technologies, deep learning algorithms, physics-informed ML models, and software tools to facilitate the use of mechanistic and AI models, sometimes with limited amounts of data.

Proposals on this theme may address one or more of the following:

1. Tackle three key research challenges in biomedical AI: small data size; multimodal data; and unannotated data.
2. Develop new data-enrichment methods for given small datasets.
3. Develop techniques for generating AI-ready data.
4. Adapt current post hoc XAI techniques to achieve interpretable and trustworthy outcomes in biomedical devices.
5. Build a comprehensive data-driven modeling framework, integrating physics, mechanistic modeling, and machine learning.
6. Explore new AI methods for biomedical device developments with integrated security measures.
7. Develop new uncertainty quantification methods to test the robustness of the AI tools integrated with the proposed biomedical devices.
8. Apply latent variable space and/or inductive logic programming approaches to data fusion.
9. Create new statistical approaches to analyze transparency and trust in AI modeling.

Theme 2 - XAI-enabled Biomedical Devices for Diagnostic and Planning Applications

Explainability is crucial to rationalizing and cross-checking model outcomes to ensure that the AI-informed decisions made are reliable and trustworthy. The major challenge to implementing AI in biomedical devices is a tradeoff between the explainability and accuracy of the AI models. Highly accurate, complex models like deep neural networks (DNNs) trained by significant amounts of data tend to be less explainable, but explainable algorithms like decision trees usually lead to low accuracy for complex tasks. As an emerging field in trustworthy AI, XAI (Explainable AI) endeavors to find explanations for complex models using ante hoc or post hoc methods. Ante hoc methods address explainability from the beginning, whereas post hoc methods rely on an external explainer of an already trained model. Proposals on this topic will use XAI to improve the explainability of the diagnostic or treatment decisions made from multimodal clinical data to provide insights into important causal factors and to obtain domain experts' trust, high prediction accuracy, and safe, continuous workflows from initial diagnosis to treatment end.

Proposals on this theme may address one or more of the following:

1. Explore the degree to which XAI approaches improve understanding of diagnostic outcomes.
2. Develop strategies for classification of bioimages from small data sets.
3. Use XAI approaches to accommodate multi-modal data (images and biosensor data) in biomedical classification.
4. Develop AI tools to accelerate the identification of biochemical compounds from complex biological samples.
5. Use XAI to assist in decision-making for drug dosage control.

Theme 3 - DL-Imaging Model-Enabled Biomedical Devices for Personalized Prognostic and Treatment Applications

Novel DL (Deep Learning) techniques are needed to actualize high-performance biomedical devices for prognosis and/or treatment. Current devices for these purposes depend on multiple data sources to make the final treatment decision, directly guide the treatment, or implement the treatment. Constructing a model that can effectively integrate multimodal data remains a challenge. Moreover, in many applications, there are limited human samples (e.g., patients) from whom the data can be collected, not to mention the limited number of samples that clinical experts can effectively annotate. Building high-performance DL models from a limited amount of data is critical for the successful development of AI-enabled biomedical devices. Furthermore, the data collected by different investigators, labs, and instruments have an inherent bias. The ability to generalize DL models constructed from limited data sources to many application scenarios determines whether the AI-enabled medical devices can be effectively applied to a general group. Additionally, current clinical practice seeks to leverage big data repositories collected over many years while still tailoring treatment for individual patients. Therefore, developing DL models for medical devices is different from training DL models in general image or text classification, where a large amount of training data is available. The ADAPT in SC will focus on innovation in the DL models and training data processing.

Proposals in this area will conduct fundamental research on creating DL models for AI-enabled biomedical devices for prognosis and/or treatment from limited data. This research thrust aims to advance the field of AI-enabled medical devices for prognosis and/or treatment. The primary outcome of this research thrust will be fundamental knowledge that governs generating high-performance, generalizable DL algorithms from limited data.

Proposals on this theme may address one or more of the following:

1. Improve ML algorithms for unannotated, incomplete, and limited available

biomedical data.

2. Develop novel strategies for integrating multimodal data with imaging data.
3. Explore new methods for integrating clinically relevant data.
4. Translate XAI techniques to address the "black box" issue in DNNs.
5. Implement AI-enabled image analysis and multimodal data fusion into a risk stratification and decision-making tool for prognosis and treatment.

Theme 4 - DT-Enabled Biomedical Devices for Rehabilitation and Therapy

Rehabilitation is an important process for patients to optimize recovery following medical treatment. Today, for a given medical problem, there is a host of rehabilitation procedures and methods. However, determining the best or most suitable rehabilitation method for a given patient is difficult. Likewise, medical treatment of chronic diseases such as diabetes and cancer or rapidly developing ones such as sepsis requires physicians and patients to navigate through a sea of treatment pathways to identify the one suitable for the individual patient. An overarching scientific challenge is developing a system for an individual patient so that various available rehabilitation treatment regimen or active medical treatment pathways can be monitored and analyzed, and the outcome inferenced. The use of AI-enabled digital twins (DTs) can be a viable solution. A DT is a virtual representation of an object or system that spans its lifecycle; it synchronized with the real system in real-time and uses simulation to analyze and forecast the future state, ML, and causal analysis to aid decision-making and design of the patient-specific treatment pathway. An AI-enabled rehabilitation DT would be an ideal platform for clinicians to design an optimal rehabilitation strategy for a specific patient to realize a personalized treatment pathway. For diabetes, cancer, or septic patients, a DT can provide an intelligent assistant for the physician and patient to develop and optimize the treatment pathway dynamically. For the elderly and less serviced communities, DTs would provide additional AI-enabled, user-friendly instructional materials and devices.

DT is a concept derived from the aerospace industry, where aircraft or spacecraft need to be evaluated virtually under potentially challenging or hazardous conditions to determine the need for replacement or reinforcement procedures. This concept perfectly fits the healthcare industry, but a fully functional DT platform in the healthcare industry has yet to be developed. Proposals in this area should address the development of such a platform that can be used for patients in various medical categories and communities.

Proposals on this theme may address one or more of the following:

1. Develop methods for identifying foundational characteristics of a biomedical device to predict outcomes and infer causality.
2. Establish a DT framework consisting of multiple data types and model types (e.g.,

data-driven vs. mechanistic model-driven platform).

3. Identify and implement a digital twin module that optimally addresses the needs of a biomedical device.
4. Implement a developed DT model with a biomedical device for rehabilitation or a specific disease.
5. Create DT-enabled biological cell-based implantable biomedical devices.
6. Establish DT-based multiscale, mechanistic models for biomedical device developments.
7. Develop fundamental theories and technologies for time series modeling and causal analysis.

C. Award Information

Maximum Funding Amount Per Award: $60,000.00. Applicants may request up to an additional $15,000 to support the inclusion of a collaborator whose expertise complements that of the PI. This additional funding is only available under the following conditions:

- If the PI is a clinician, they may collaborate with another faculty member or with an industry collaborator.
- If the PI is not a clinician, they may collaborate with either a clinician or an industry collaborator.

Maximum Award Duration: 18 months

Number of Awards: Depends on quality of proposals and available funds

Anticipated Project Start Date: Projects can start as early as January 4, 2027.

D. Eligibility and Conditions

- The PI must have a faculty appointment at Clemson University, the Medical University of South Carolina, or the University of South Carolina - Columbia.
- The PI must be an early career faculty member in a tenure or tenure-track appointment or in a research faculty appointment. Research faculty must have an appointment as a research assistant professor, research associate professor or research professor. The PI must be within 10 years of completing their terminal degree or formal postgraduate training (e.g., postdoctoral fellowship, residency or fellowship).
- The home institution of the PI will serve as the fiscal agent and will establish either a

sub-award with the collaborator's institution or a consulting agreement with the collaborator.

- Current GAIN and GAIN CRP PIs are not eligible to serve as PI or co-PI on this solicitation unless their awards have ended, and final reports submitted before the submission deadline of this solicitation.
- Former investigators who have defaulted on a SC EPSCoR award (e.g., did not submit final project reports) are not eligible to apply.

E. Deadline

Full Proposals are due by 5:00 PM on August 4, 2026.

F. Proposal Content

The sections below represent the body of the proposal. Failure to submit the required sections will result in the proposal not being accepted or being returned without review. *Note: Where indicated, the number of pages refers to the maximum number of pages allowed and must not be exceeded*.

1. **Proposal Cover (2 Pages)**
   Use the Cover Page form in Appendix A.

2. **Project Summary (1 Page)**
   Proposals must contain an NSF compliant project summary not to exceed one page in length. The Project Summary should be informative for others working in the same or related fields, and understandable to a broad audience within the scientific domain. The Project Summary must include the following three sections:

   Overview. Describe the activity that would result if the proposal were funded. Include a statement of the overarching goal of the project and the intellectual framework that organizes the work. Include the specific objectives, or for hypothesis-driven research, include the central hypothesis and specific aims. Briefly describe the methods to be employed.

   Intellectual Merit. Describe the potential of the proposed activity to advance knowledge, including what is novel or innovative about the proposed approach relative to the current state of the field.

   Broader Impacts. Describe the potential of the proposed activity to benefit society and contribute to the achievement of specific, desired, societal outcomes.

3. Project Description (Not to exceed 10 Pages)

The Project Description should provide a clear statement of the work to be undertaken and must include the scientific and strategic objectives of the proposed work and expected significance, the relationship of this work to the present state of knowledge, the team's relevant prior work and preliminary evidence supporting the feasibility of the proposed approach and methodology. The Project Description section must include at least the following sections (page numbers included should serve as general guidance):

a. Introduction

Use the introductory paragraph to establish the scientific problem being addressed, the gap or unmet need, and a statement of the project's overarching goal. Briefly explain what makes the proposed approach novel relative to the current state of the field and existing approaches, identify the most relevant ADAPT in SC Theme(s), and how this work will position the PI to pursue funding from federal agencies and programs (specify agency and program).

b. Research Framework and Relevance

- State the objectives or hypothesis and aims of the proposed work and their scientific significance to the field.
- Elaborate on how the proposed research and potential outcomes contribute to the goals and Themes of the ADAPT in SC project outlined in Section B. Identify the Theme(s) in Section B above, and one or more of the items in the numbered list under the theme(s) with which the proposed work best identifies.

c. Prior Relevant Research, Qualifications, and Preliminary Data

Use this section to establish the intellectual bases for the proposed work and to demonstrate the relevant qualifications of the PI and any collaborator. Summarize the current state of knowledge in the field, identify the gaps, and the unresolved questions that motivate the research. The team's own work that directly informs the proposed project must be highlighted, including relevant publications or collaborative activities. Proposers must also describe how the expertise of the PI and any collaborator is complementary. Proposers with substantial preliminary data should present key findings that directly support the proposed research. Where preliminary data are limited, a feasibility argument must be provided explaining why the proposed approach is scientifically sound and executable within the 18-month project period.

d. Research Approach and Methodology

This section is the technical core of the proposal and must present a well-justified plan for carrying out the proposed work. The Research Approach and Methodology should focus exclusively on what will be done, how it will be done, and how success will be measured. The Research Approach and Methodology must include the following:

- Research Approach: Describe how the research framework stated in Section b guides the research. Explain the overall design logic of the proposed work and why this approach is most appropriate.
- Methodology: Describe the specific methods, procedures, and activities that will be used to carry out the proposed work. Methods must be specific, well-justified, and clearly linked to the hypothesis, aims, or objectives stated in Section b. Proposers should explain why the chosen methods are the most appropriate and identify any methodological innovations that distinguish this work from existing approaches.
- Measures of Success: Define the specific metrics, benchmarks, or decision points by which the success of each aim or objective will be evaluated. Success criteria must be specific, measurable, and directly tied to the hypothesis, aims, or objectives stated in Section b.
- Role of Collaborator: Describe the specific role of the collaborator in the research and explain why their contribution is integral to the success of the proposed work. The collaborator's responsibilities must be clearly reflected in the methodology and project timeline.
- Project Timeline: Map all major activities to quarters and identify the team members responsible for each. The timeline must be realistic and consistent with the 18-month project period. Use the table below or a similar format.

Activity (name of responsible party)	**Year 1**				**Year 2**	
	Q1	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**

e. Broader Impacts

Proposers must clearly identify the scientific and societal benefits anticipated

from the research outcomes. Specific milestones must be carefully stated to aid in proposal evaluation.

4. **References Cited**

   Reference information is required. Each reference must include the full citation with the name of all authors (in the same sequence in which they appear in the publication), the article and journal title, book title, volume number, page numbers, and year of publication.

5. **Plans to Leverage GAIN Funding (1 Page)**

   The GAIN program is a seed funding program designed to help early-career faculty build the foundation necessary to compete for extramural funding. This section must demonstrate that the PI has a clear and realistic plan for leveraging the outcomes of this award toward a competitive federal funding proposal. Proposers must identify the specific federal agency, program, and funding mechanism being targeted and explain why it is the right fit for the proposed work. Proposers must also describe how the results and data generated through this award will strengthen the competitiveness of the future federal proposal and provide an anticipated submission timeline.

6. **Results from Prior SC EPSCoR Support (1 Page per Award)**

   Note*: If the senior personnel have not received support from SC EPSCoR, this section should include a statement to that effect.* The purpose of this section is to assist reviewers in assessing the quality of prior work conducted with prior SC EPSCoR Program funding. If any senior personnel identified on the proposal has received a SC EPSCoR Program award as a PI since January 1, 2024, the following information must be provided:

   - Title of the project, start date, date completed, and award amount.
   - A summary of the results of the work completed.
   - A list of the research proposals, funding awards, and publications resulting from the SC EPSCoR award.

7. **Biographical Sketch**

   A biographical sketch is required for the PI in NSF format. For more information on NSF format, visit https://new.nsf.gov/funding/senior-personnel-documents#biographical-sketch-0bd. Biographical Sketch must be created and certified in SciENcv (Science Experts Network Curriculum Vitae).

8. **Budget**

   Use the Budget form in Appendix B.

9. **Budget Justification**

   The budget justification must be composed of no more than two pages for each institution and must include the following: an explanation of each budget item, such as personnel, other personnel, fringe benefits, materials and supplies, equipment, domestic travel support, publication costs, other direct costs.

10. **Current and Pending Support**

    All senior personnel must submit Current and Pending Support in NSF format. Current and Pending Support must be created and certified in SciENcv (Science Experts Network Curriculum Vitae). For more information, visit https://new.nsf.gov/funding/senior-personnel-documents#current-and-pending-other-support-5db

11. **Synergistic Activities**

    A one-page Synergistic Activities document is required for all senior personnel in NSF format. For more information on the Synergistic Activity format, visit https://new.nsf.gov/funding/senior- personnel-documents#synergistic-activities-ec2

G. Budget Information

- A maximum of one month of summer salary for the PI is allowed.
- Salary support is allowed for post-docs, graduate and undergraduate student researchers, and other technical support staff.
- Indirect costs and tuition are not allowed.
- Cost-sharing is not required but encouraged.
- Awardees should ensure that the costs claimed are allowable, allocable, and reasonable.

H. Submission Instructions

Submit proposals using: https://scepscor.inforeadv4.com/.

I. Proposal Review Process

Proposals that meet the eligibility requirements and the guidelines of this solicitation will be evaluated by external reviewers (outside South Carolina) based upon the extent to which

they meet specific criteria including but not limited to:

- Intellectual Merit and Broader Impacts.
- Whether the plan for carrying out the proposed activities is well-reasoned, well-organized, and based on a sound rationale, and whether it incorporates a mechanism to assess success.
- Alignment with ADAPT in SC research themes.
- Whether the collaboration is reasonable and builds on the team members' complementary expertise to the benefit of all involved including students.
- Qualifications of the PI (and the collaborator, if any) as they relate to the ability to successfully conduct the proposed activities, and the adequacy of available resources to carry out the proposed activities.
- The likelihood that the research will lead to extramural funding.

J. Award and Reporting Requirements

- All GAIN PIs will be considered part of the ADAPT in SC Project and are expected to participate in ADAPT in SC activities which include attending meetings and contributing to the annual report submitted to the U.S. National Science Foundation (NSF).
- All publications and presentations resulting from the GAIN must include an acknowledgement of SC EPSCoR Program support and a disclaimer: "*Research reported in this [publication, press release, presentation] was supported in part by the U.S. NSF and SC EPSCoR Program under award number (U.S. NSF Award # OIA-2242812 and specific SC EPSCoR grant number). The views, perspective, and content do not necessarily represent the official views of the SC EPSCoR Program nor those of the U.S. NSF.*"
- Awardees are expected to provide required information and documentation to the SC EPSCoR Program staff and External Evaluator as needed. SC EPSCoR Program reserves the right to conduct site visits during the project period for evaluation and reporting purposes.
- Assurance of Responsible Conduct of Research (e.g., CITI Certification) is required for student researchers and postdocs to be submitted to SC EPSCoR Program State Office.
- Brief progress reports are due every three months after the start date of the award. A template will be provided to the PIs.
- The final report will be due 60 days after the end of the award.

K. Contact Information

General inquiries regarding this program should be made to:

Megan Souter, MBA
SC EPSCoR Grants and Contracts Manager
1000 Catawba Street
Columbia, South Carolina
Megan.souter@scra.org