

# Cross-Institutional Research Engagement Network (CIREN): Initial Project Goals and Objectives in Support of Training, Mentoring, and Research Facilitation

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## ABSTRACT

The Cross-Institutional Research Engagement Network (CIREN) is a collaborative project between the University of Tennessee, Knoxville (UTK) and Arizona State University (ASU). This project's purpose is to fill critical gaps in the development and retention of cyberinfrastructure (CI) facilitators via training, mentorship, and research engagement. Research engagements include projects at the CI facilitator's local institution, between CIREN partner institutions, and through NSF's ACCESS program. This lightning talk will detail the training curriculum and mentorship activities the project has implemented in its first year as well as plans for its future research engagements. Feedback is welcome from the community with respect to project directions, best practices, and challenges experienced in implementing this or similar programs at academic institutions.

## KEYWORDS

Cyberinfrastructure Facilitator, Training, Mentorship, High-Performance Computing, Machine Learning, Artificial Intelligence

## 1 INTRODUCTION

The Cross-Institutional Research Engagement Network (CIREN) is a collaborative project between the University of Tennessee, Knoxville (UTK) and Arizona State University (ASU) under National Science Foundation (NSF) grants OAC-2230106 and OAC-2230108. This project's purpose is to fill critical gaps in the development and retention of cyberinfrastructure (CI) facilitators via training, mentorship, and research engagement. Through these core activities of training and mentorship, CIREN aims to lower the barriers to the recruitment of CI facilitators and provide pathways to their continued development and retention via engagement in local, regional, and national research projects. CIREN recognizes the collaborative nature of the facilitator/researcher relationship and aims to enable CI facilitators to utilize their unique skills and interests to enable transformative research discoveries. For the purposes of the CIREN grant, a facilitator is an individual collaborating with researchers to enhance their research program, to enable

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discovery, and to produce innovative scientific impact via advanced cyberinfrastructure tools, skills, and technologies [2].

## 2 TRAINING CURRICULUM

New CIREN facilitators are required to complete 256 hours of training and mentorship activities including both synchronous and asynchronous courses, a 6-month mentoring program, a final presentation, and elective courses in high-performance computing, machine learning, and/or artificial intelligence topics. This curriculum can be broken down into six main themes including

- 1) CIREN Training,
- 2) CyberAmbassadors Certification,
- 3) Community,
- 4) Project Management,
- 5) Mentorship Program, and
- 6) Elective Courses.

Table 1 shows each theme with its number of training hours and included topics.

The core material including the "CIREN Training" category is original content created and curated by the project. This material also serves a dual role as recruitment material for new CI Facilitators and Researchers. Other topics such as the "CyberAmbassadors Certification" leverages already existing content created by the CyberAmbassadors project [3]. CIREN includes trained CyberAmbassador Facilitators who deliver and curate this content. All other training content is provided by outside sources including LinkedIn Learning [6], campus HPC centers, and ACCESS [1]. Additionally, the "Elective Courses" in high-performance computing, machine learning, and artificial intelligence is provided by outside sources including Coursera [4], NVIDIA Deep Learning Institute [7], and tutorials provided at professional conferences such as the US-RSE [9], Super Computing [5], and PEARC [8].

## 3 MENTORSHIP PROGRAM

The CIREN mentorship program pairs new CIREN Facilitators with an experienced facilitator/mentor who will work with them on their first CIREN research engagement. This program guides and coaches the facilitator through the collaborative project pipeline including 1) the review of potential projects, 2) project intake interviews, 3) creation of the project work plan, 4) regular check-ins during the project, and 5) project reporting. The mentorship program culminates after the initial project with a final presentation on the project and its results.

**Table 1: CIREN Training and Mentorship Curriculum Themes, Hours, and Topics**

Theme	Hours	Topics
<i>CIREN Training</i>	3	Overview, Project Management, and Continuous Training and Development
<i>CyberAmbassadors Certification</i>	9	Communication, Teamwork, and Leadership
<i>Community</i>	4	Project Intake Interviews, Campus and ACCESS resources
<i>Project Management</i>	3	Project Management Foundations
<i>Mentorship Program</i>	217	Complete a 6-month research engagement with a facilitator mentor and final presentation.
<i>Elective Courses</i>	20	High-performance computing, machine learning, and artificial intelligence
<b>Total</b>	<b>256</b>	

## 4 RESEARCH ENGAGEMENTS

Research engagements include projects at the facilitator's local institution, between CIREN partner institutions, and through NSF's ACCESS program [1]. Engagements are expected to be six months in duration and chosen via a biannual competitive proposal process where facilitators review new research project proposals and choose those that align best with their skills and interests. CIREN project leadership also leverages this proposal process to identify needed skills and incorporates those in the future recruitment and/or continuing development of CIREN facilitators. In alignment with CIREN's focus areas, research engagements in any area of high-performance computing, machine learning, or artificial intelligence are welcome. The ideal research engagement project is oriented towards expanding, enhancing, or otherwise augmenting an existing research program with new capabilities. These capabilities can include new research directions or advance current research goals. Engagements can also include proof-of-concepts or other higher risk pursuits that may not align well within existing research, experience, or funding, but, if successful, could be incorporated into the research program and future grants.

## 5 CIREN FACILITATORS

In addition to new facilitators going through the CIREN mentorship program, CIREN includes more experienced facilitators who engage in research engagements without a mentor. Additionally, these facilitators have opportunities to become mentors for new facilitators in the future. During this project, facilitators are expected to spend 20% of their time in continuing training and development. They spend the remaining 80% of their time on research engagement projects. Their overall project load is about 1 project per 25% of total project effort.

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