



IMPACT OF A CYBERINFRASTRUCTURE FELLOWSHIP PROGRAM FOR UNDERGRADUATES

ANGELA P. MURILLO¹, DON BROWER², NICOLE VIRDONE³, SAJITH SASIDHARAN⁴, SAROWAR HOSSAIN¹, JAYA BHARTI¹, & EWA DEELMAN³

¹Indiana University-Indianapolis, Luddy School of Informatics, Computing, and Engineering, ²University of Notre Dame, Center for Research Computing,

³University of Southern California, Information Science Institutes, ⁴University of North Carolina, RENCI



WHAT IS NSF CI COMPASS?

CI Compass is a U.S. National Science Foundation Cyberinfrastructure (CI) Center of Excellence

Provides expertise and active support to CI practitioners at NSF Major/Mid-scale Facilities (MFs) to accelerate the data lifecycle (DLC) and ensure the integrity and effectiveness of the CI upon which research and discovery depend.



Photo: IceCube Collaboration

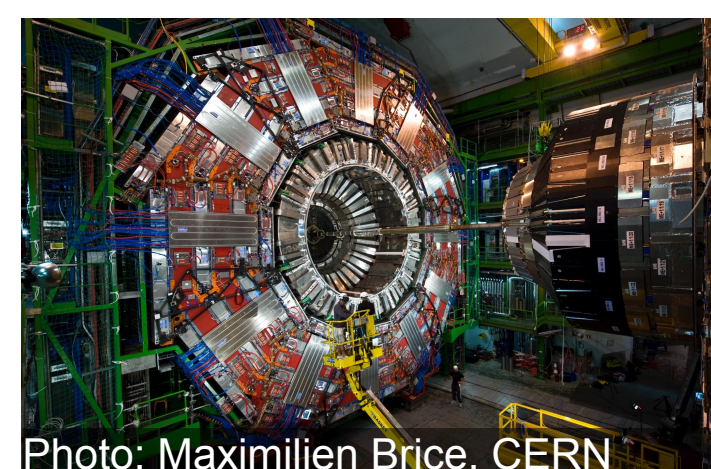


Photo: Maximilien Brice, CERN

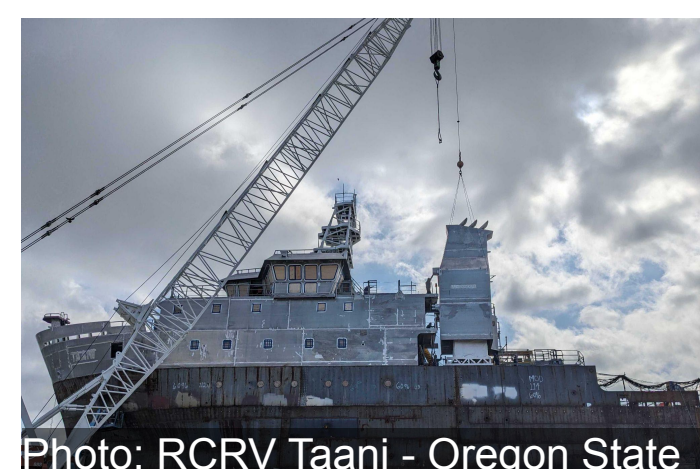


Photo: RCRV Taani - Oregon State

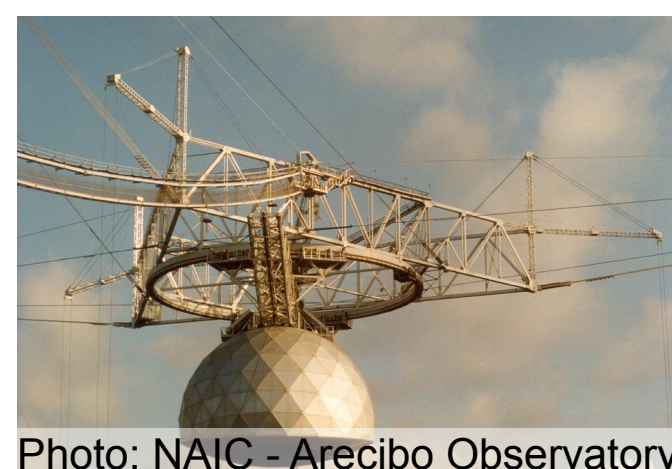


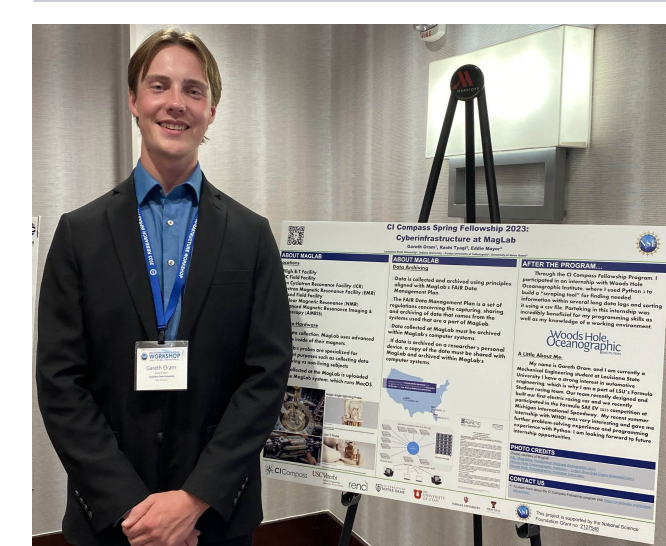
Photo: NAIC - Arecibo Observatory

CI COMPASS STUDENT FELLOWSHIP PROGRAM (CICF)

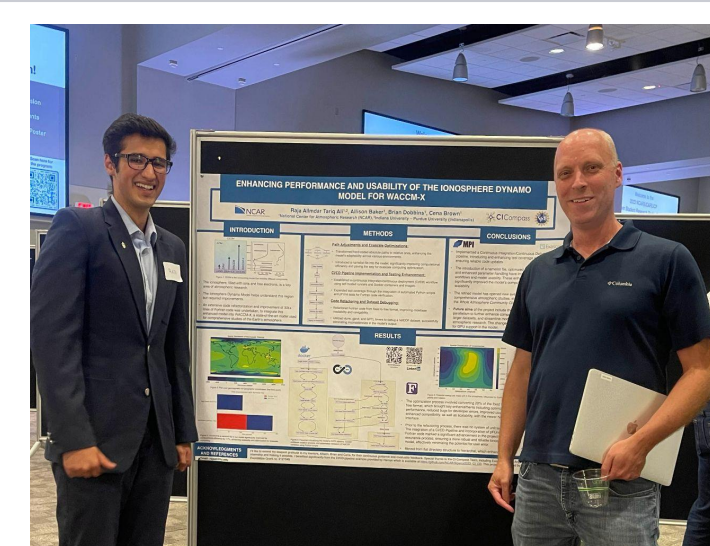
Goal: Broaden undergraduate student participation in CI research, development, deployment, and operations.

Student fellows:

- Learn about CI development and MFs
- Develop CI-related skill sets important to the work of MFs
- Engage with CI Compass and MF personnel
- Participate in an optional/invited summer program to apply the skills learnt for a particular MF project



Gareth Oram, CICF 2023, with his poster about internship with OOI at the 2023 NSF Research Infrastructure Workshop.



Raja Ali, CICF 2023, and Brian Dobbins, Sr. Software Engineer at NCAR, stand in front of Ali's final poster in 2023 at NCAR.



CICF facilitator Rajiv Mayani with Fellow Nona Nersisyan, CICF 2022, at USC's Information Sciences Institute in May '22.



CICF Student Fellows Edward Lin, Mahee Shah, and Raja Alimdar Tariq Ali in Boulder, Colorado, where they spent Summer 2023 working with NCAR.

SPRING PROGRAM (Virtual)

Technical Skills Component

- Learn technical skills relevant to CI (basic software development, programming for scientists, systems, ML/AI relevant to CI and MFs)

Data Lifecycle Component

- Learn about the importance and context of MFs, the related data lifecycle and CI, and their science missions
- Engage with guest speakers from MFs and CI community

CICF is free to students and the Spring Program can be taken for course credit, depending on their institutions requirements.

To learn more about the CI Compass Fellowship program visit, <https://ci-compass.org/student-fellowships/> or email us at cicf@ci-compass.org.

2025 CICF SPRING PROGRAM

Week	Tuesday Class	Thursday Class
1	Orientation: MFs, CI, and the DLC	Command Line
2	Scientific Python Programming	Guest Speakers from NCAR
3	Scientific Computing	Guest Speaker from TACC
4	Git and Coding Standards	Guest Speakers: CRV & IceCube
5	Containers and Debugging	MFs and the DLC: Group Work
6	FAIR Data	Guest Speakers: ORCID & MagLab
7	Software Architecture, Systems, Archives	Guest Speakers: NEON & OOI
8	Cloud Computing	MFs and the DLC: Group Work
9	Spring Break	Spring Break
10	Data Workflows	Professional Skills & Networking
11	Machine Learning (Classical)	Neural Networks
12	Group Presentation Day 1	Group Presentations Day 2

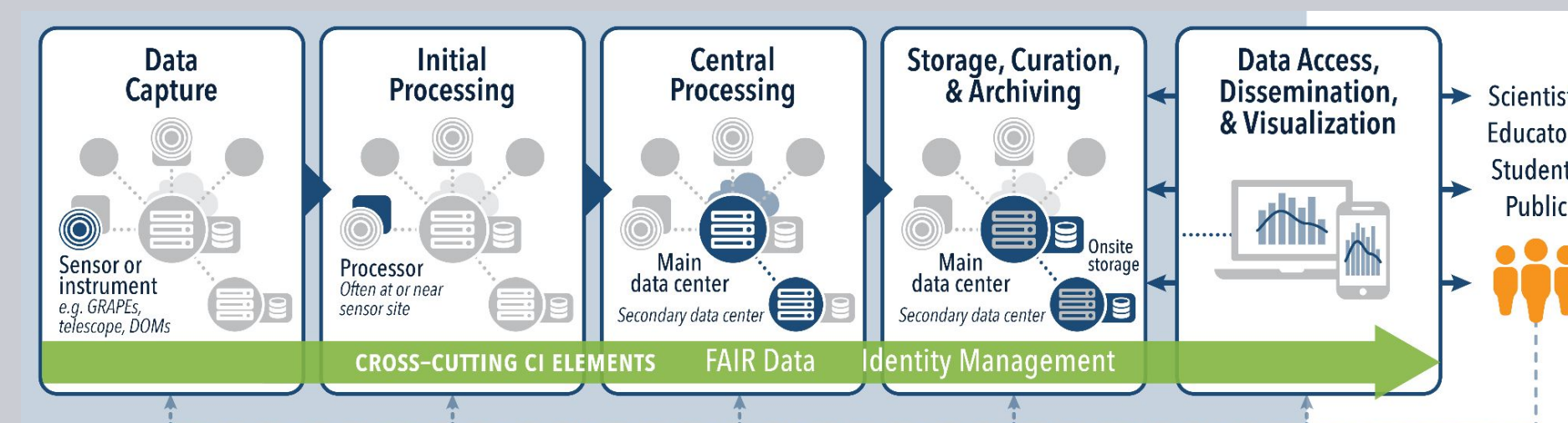
Technical Skills Component is highlighted in blue; Data Life Cycle Component is highlighted in green.

The CICF Github is publicly accessible at <https://github.com/ci-compass/cicf>

MF DLC RESEARCH PROJECTS

In groups, students research a specific MF to learn about its science mission, CI, and data lifecycle.

- Students reviewed websites and published documents, and met with MF staff to learn about the MF they choose.
- At the end of the Spring Program, students presented their work to demonstrate the knowledge gained.



Past groups researched the following MFs:

- 2022: RCRV, NCAR, NSO
- 2023: TACC, MagLab, OOI, CHESS
- 2024: NAN, JOIDES/IODP, IceCube, LHC
- 2025: NSO, GAGE, NEON, NCAR

Final presentations can be viewed here:



PROGRAM REACH

Year	Total Applicants	Applicant Institutions	Accepted Fellows	Fellow Institutions	Fellow Majors
Year 1	17	2	6	2	1
Year 2	26	15	14	9	8
Year 3	128	52	20*	17	8
Year 4	113	46	20*	15	6

- Fellows' majors have included computer science, computer engineering, data science, mathematics, statistics, and domain science (oceanography, marine engineering)
- **In the past 4 years, we have had 58 fellows from 37 institutions.**

SUMMER PROGRAM (Virtual or onsite)

Fellows may apply for an optional, invited, and paid Summer Program to gain hands-on experience.

2022 (3 students)	2023 (7 students)	2024 (11 students)	2025 (9 students)
USC	NCAR/NEON, OOI	NCAR, OOI, MagLab, Globus, UNDERC, NSO	NCAR, OOI, Globus, STEMSEAS cruise on R/V Sikuliaq

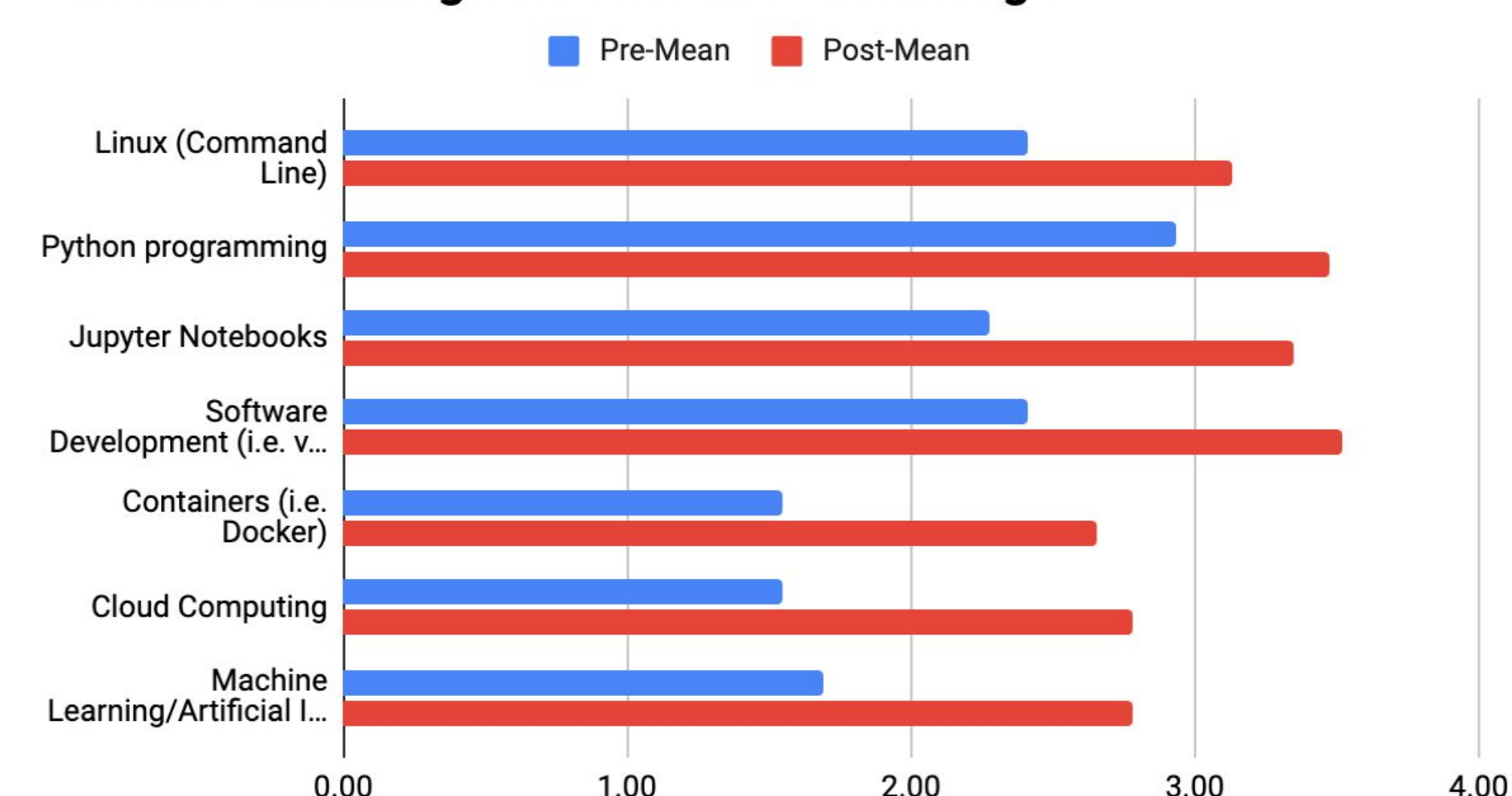
Students present their research at the Virtual CICF Summer Symposia, which can be viewed here:



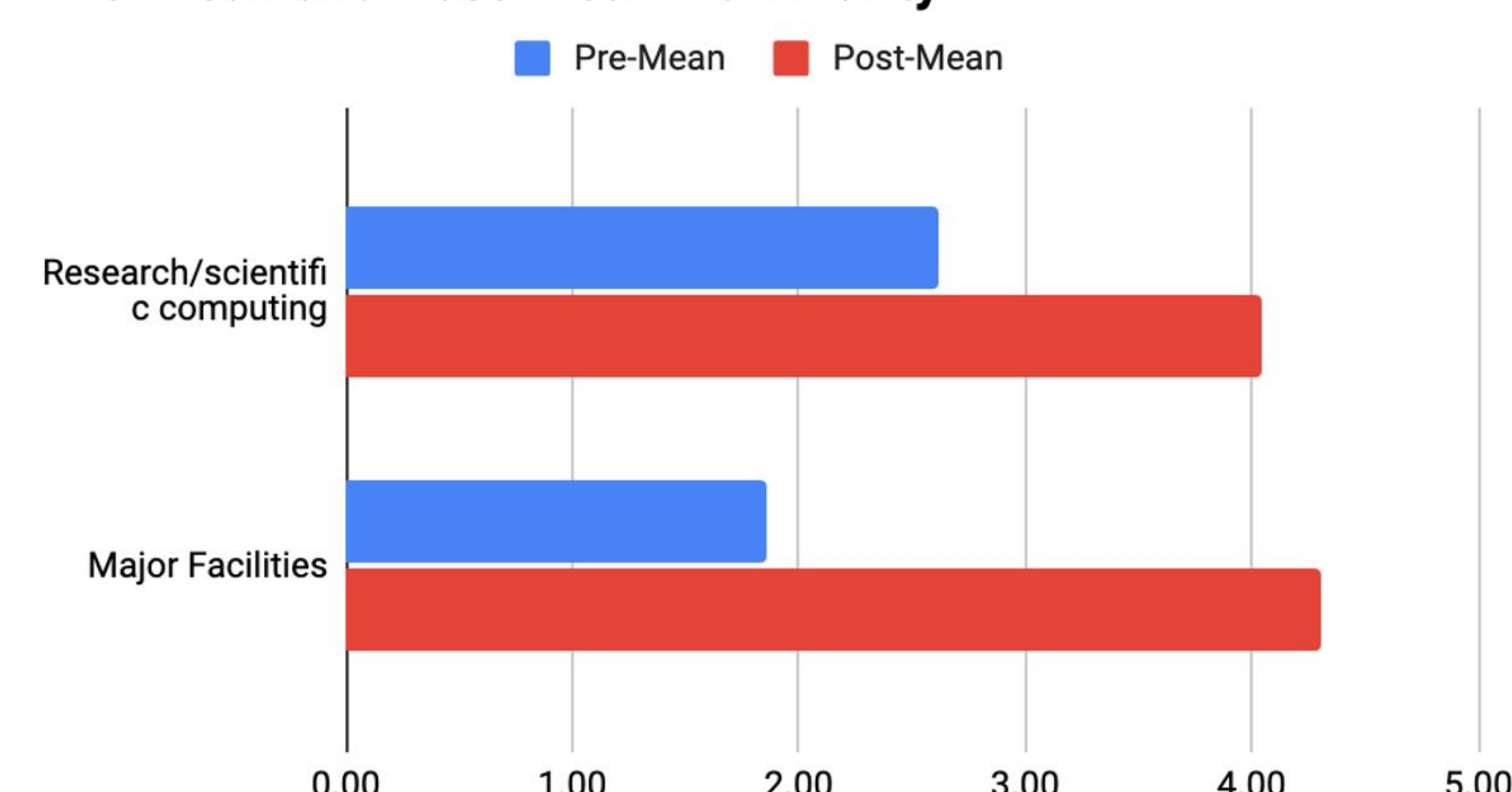
PROGRAM EVALUATION

- Pre/post spring survey, mid-spring survey + interviews.
- Mid-summer survey + interviews

Pre-CICF Knowledge vs. Post-CICF Knowledge



Pre-Mean and Post-Mean: Familiarity



- I gained a **deeper appreciation** for the immense computational power and infrastructure required to solve complex scientific problems. I am **now more eager than ever** to explore opportunities in scientific computing and CI. I believe that by harnessing the power of HPC and advanced CI, we can **drive innovation** and address some of the most pressing scientific challenges.

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WAYS TO GET INVOLVED

- We are currently recruiting Faculty Mentors for CICF. Faculty Mentors will assist with recruiting student fellows, providing course credit and auditing options, holding check-ins with students, and providing feedback on the program.



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