SRCPAC Fall 2021 Update

December 3rd, 2021

Foundations Mission

Foundations for Research Computing provides **informal training** for Columbia University graduate students and postdoctoral scholars to develop fundamental skills for harnessing computation: core languages and libraries, software development tools, best practices, and computational problem-solving.

Foundations Primary Activities

- **Novice boot camps**: 2 day training based on Software Carpentry curriculum for novice learners

- **Python User Group**: twice-monthly meeting for those using Python in their research or who are curious about the Python programming language

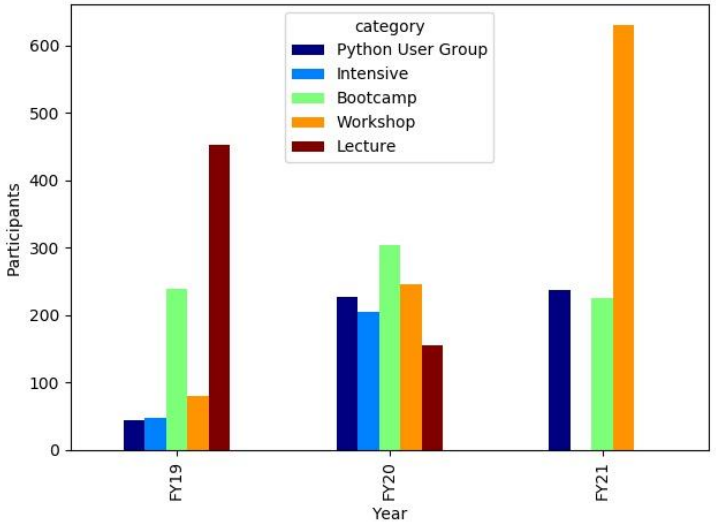
- **Intermediate intensives:** 1 day training for intermediate learners with curriculum developed internally or with external partners e.g. Google

- **Workshops:** 1.5 - 2 hour training opportunity to advance computational skills in a group setting. Workshops are often led by partners including CUIT and the Libraries

Foundations for Research Computing: Highlights

Year 3 Goals were met:

- Aimed to reach **900 researchers**
- Surpassed this goal, reaching **1,054 researchers**, mostly through attending remote CUIT workshops, Library workshops, and the Python User Group sessions



Foundations response to Covid

The challenges presented by COVID-19 required changes to the format of Foundations instruction, including the bootcamps. The shift to remote teaching provided some positive outcomes, including:

- Zoom format allowed helpers to address questions quickly in bootcamps
- Zoom format allowed for recordings & sharing with participants for all programming
- Able to support same number of workshop participants with a smaller number of workshop helpers
- Remote allows for greater participation in Python User Group
- Able to identify more specific needs for training by the way that researchers attended bootcamps

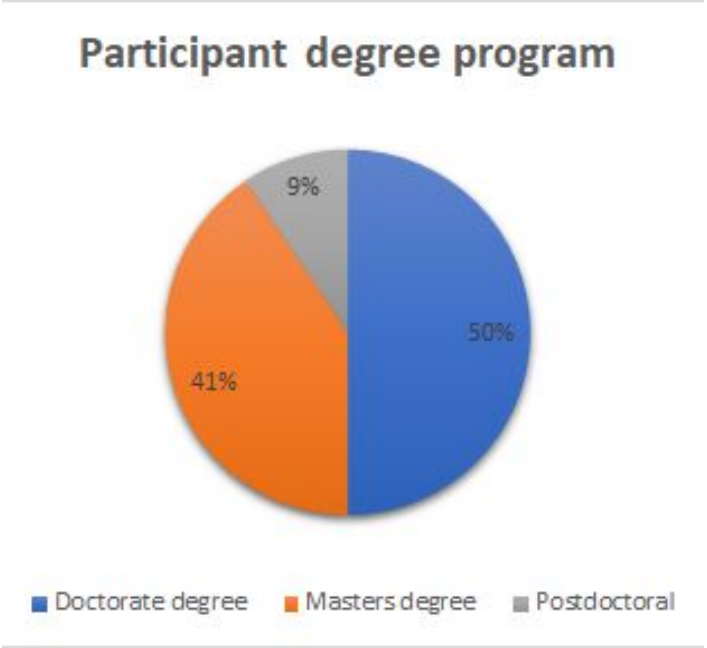
However there are some downsides to the transition as well:

- Software Carpentry is focused on in-person pedagogy
- Zoom fatigue
- Fewer (volunteer) instructors are comfortable with teaching in the zoom environment

Fall 2021 Bootcamps

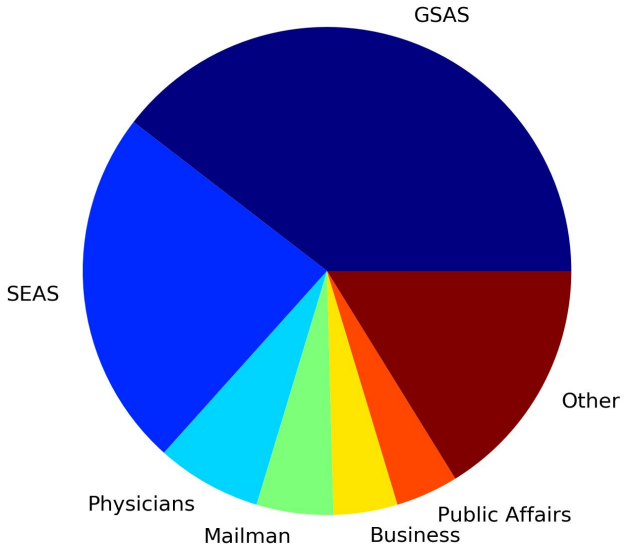
August 2021 bootcamp

- Offered remote
- Trained 120 researchers
- All instructors from the last cohort participated as helpers and instructors



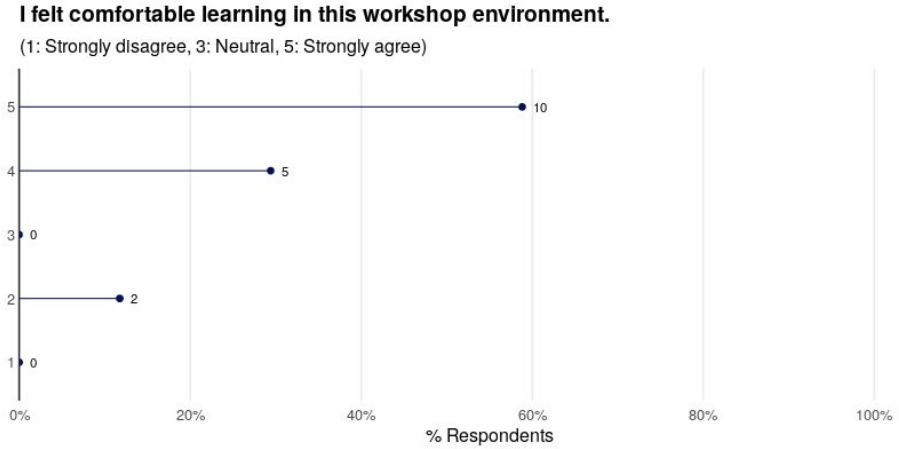
Foundations for Research Computing: Highlights

Demand is higher than what Foundations can provide. **1,500 unique applicants** to the Fall bootcamps, we were able to train **120 researchers**.



Fall 2021 Bootcamps

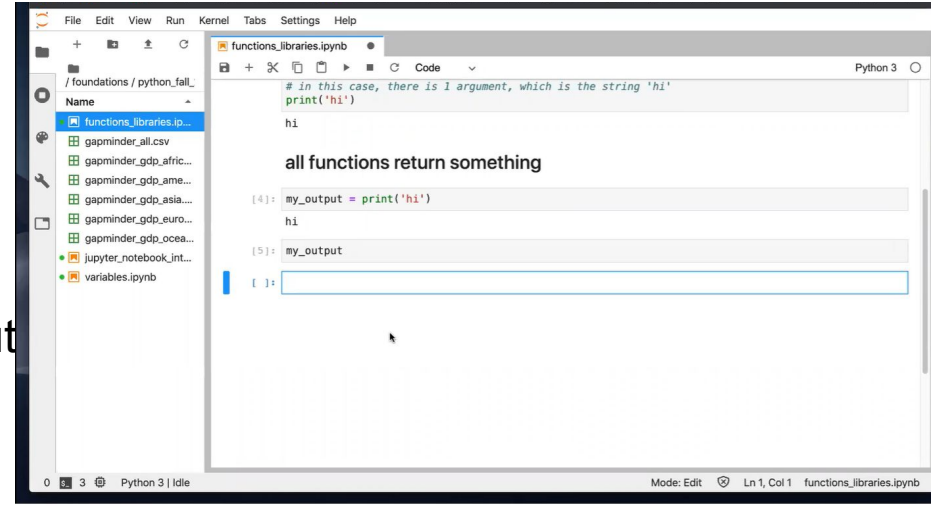
“Having the helpers answer chat questions, the explanations of everything were helpful and no question was too simple, everyone was made to feel comfortable, I have never felt more comfortable in a coding course environment, all of the instructors were great, the setup information/resources given before the bootcamp started were very helpful.”



Bootcamps

January 2022 bootcamp

- Scheduled for January 12th & 13th
- Will be offered remotely again
- Planning is in the works, invitation email sent out November 29th
  - 300+ applicants within the first 40 minut
- Return to in person will be considered for Fall 2022



Community Building: Python User Group

- Originally organized by Patrick Smyth (Foundations Coordinator)
- Currently administered by Jeremiah Trinidad-Christensen, *Head, Research Data Service*
- Employ two graduate students to create regular ongoing content
- Both are trained instructors, have been with the program for multiple years
- Students are paired with RDS librarians for guidance in content creation, curriculum development, and program assessment
- Sessions offered remotely in the Fall semester
- Three sessions were taught in Fall
  - Machine Learning with TensorFlow
  - Web Programming in ELM
  - Probabilistic Programming with PyMC3
- Will offer two sessions per week in Spring 2022

Foundations for Research Computing: Highlights

Instructors

- Trained 9 new instructors last year
- Currently recruiting new instructor for spring cohort using the revised interview process designed last year.
- Underwritten the Software Carpentry Training for 46 instructors over time
  - 85% of the instructors have participated in Foundations offerings
  - 45% have participated in more than 1 bootcamp
- Current instructor pool at 29 Instructors

Foundations for Research Computing: Demand

Demand has always been higher than what Foundations can provide.

- **Fall Bootcamp:** 1,500 unique applicants for 120 spots.
- **Spring Bootcamp**: 300+ applicants within the first 40 minutes

Continuing questions:

- How to scale to meet demand?
- Who should Foundations serve?

Models for Expansion: Departmental Partnerships

Mechanical Engineering

- Ran a Software Carpentry bootcamp in mid August for incoming masters students
- Adapted Python portion to be discipline specific
- Intends to offer a full week bootcamp next year
- Successfully running smoothly, minimal central resources
- Calls upon Foundations trained instructors

Models for Expansion: Supporting Center Grant Proposals

Center for Learning the Earth with Artificial Intelligence & Physics (LEAP)

- Participated in successful proposal for a $25 million NSF Science & Technology Center award
- Currently working with Tian Zheng, *Chair, Department of Statistics & Education Director for LEAP* to train students as Software Carpentry instructors, 1-2 per semester
- Depending on timing, they will participate as helpers for the regular bootcamps, before being instructors for the LEAP bootcamps
- Those students will join the growing Foundations instructor community on campus

Future goals for the program

- Recruit a new Foundations Program Manager
- Increase the capacity of the program to try and meet demand
- Continue to cultivate aligned programs similar to Mechanical Engineering
- Further develop the Python User Group community
- Develop a more robust assessment plan

- Seeking input/new partners in guiding future directions of Foundations
- Happy to take any questions

Other Business and Closing Remarks

- Consumer-grade GPU cluster

  Contact rcs@columbia.edu

Fall 2021 Bootcamps

Quotes:

The overall breadth of the material, as well as the UNIX and Git training, were excellent

I think the ability to follow step by step what the instructor was doing (doing this on Zoom probably helped), also helpers were extremely efficient and resolving questions. Additionally, I felt the material was made very amenable for complete beginners.

Having the helpers answer chat questions, the explanations of everything were helpful and no question was too simple, everyone was made to feel comfortable, I have never felt more comfortable in a coding course environment, all of the instructors were great, the setup information/resources given before the bootcamp started were very helpful.