SRCPAC Fall 2021 Update

December 3rd, 2021
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
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
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
August 2021 bootcamp

- Offered remote
- Trained 120 researchers
- All instructors from the last cohort participated as helpers and instructors
Demand is higher than what Foundations can provide. **1,500 unique applicants** to the Fall bootcamps, we were able to train **120 researchers**.
“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.”
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 minutes
- 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
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
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
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.

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