Advanced Scientific Programming in Python - Latin America

Location

July 2020

Organization Committee

- Josué Martínez Moreno (head) from the Research School of Earth Sciences of the Australian National University
- Richardo Méndez Fragoso form the School off Sciences of the National Autonomous University of Mexico.
- Carlos Echeverría Serur from the Institut für Mathematik of the Technische Universität Berlin.
- Luis García Ramos from the Institut für Mathematik of the Technische Universität Berlin.
- [c1]
- [c2]

Faculty

- Josué Martínez Moreno
- Ricardo Méndez Fragoso
- Carlos Echeverría Serur
- Luis García Ramos
- Tiziano Zito

[c1] *add*: Look for and add someone from currently in Latin America

[c2] *add*: We should add someone else in Mexico so they can help Rich later on with the local organization (@Rich Could you suggest someone?).

- [c3]Who else may be interested? Ideally we should invite people from the US, and America Latina

Note: The budget will fund travel, accommodation and *Per Diem* expenses of lecturers and organizers. Typically, organizers also serve as lecturers. The budget may not allow for funding of organizers who do not actively participate in the school as lecturers. Additional budget will be use to support accommodation or travel expenses of international and local students.

Scope

The Advanced Scientific Programming in Python (ASPP) - Latin America will follow the structure of the previous organized schools in Europe and Asia-Pacific. This intensive programming course aims to teach the rudiments of scientific python and how to use it in a reproducible, efficient and academic way. We are concerned with the current use of programming languages without fully understanding the foundations and their potential. We are also interested in concepts and tools to use programming as an open-source community for the purpose of scientific development. With only a week of lectures, we accept that these broad aims will be at best be partially realized. Nonetheless, the students will be exposed to a suite of resources which, if studied and practiced, will help to train a future scientists able to improve their codes, but also to make it reusable and easy to understand in case someone wants to reproduce their results.

The course will be taught in a traditional manner with spoken lectures and discussions, along with practical sections which will supplement lectures and will encourage students to engage and take advantage of the lectures. The student is assumed to have prior knowledge on any coding language and a basic understanding of Python. The lectures will move at a rapid, though pedagogical pace. In general, the material covered will be more than the average amount an student could digest in a single week. Therefore to take fully advantage of this course, we encourage students to read the pre-course and post-course study. This particular topic requires devoted engagement and interaction not only during the lectures but after the course is finished.

This course is not *per se* a how to code course, though some basics will be cover. This is also not an programming engineering or computer science course. Rather, the lectures are focused on how scientists can optimize their work-flow, as well as to facilitate the reproducibility, collaboration and maintenance of their codes. Correspondingly, there will be a strong hands-on component, where students are encouraged and expected to participate, discuss and proactively learn not only from the faculty but also from other students.

[c3] *Josue: Text added.*

Participants

Participation is free, i.e. no fee is charged, however participates should take care of travel, living, and accommodation expenses by themselves.

0.1 Prerequisites

There are only two requirements to ASPP - Latin America:

- Applicants are recommended to know programming and the basics of Python to get the most out of this Summer School.
- Applicants should provide proof of their English proficiency, as all lectures will be on presented in English. At least, applicants should be able to understand lectures in English. Applicants are not required to provide results from a proficiency test. [c1].

Lecture Topics

These lectures will build from feedback obtained during the previous ASPP-Europe and ASPP-Asiapacific schools (topics include some of the potential speakers).

- Version control (GitHub) -
- Tidy data analysis and visualization - Rich [c2]
- Testing and debugging scientific code - Luis
- Advanced NumPy - Carlos
- Organizing, documenting, distributing scientific code and contimuous integration -
- Advanced scientific Python: context managers and generators -
- Writing parallel applications in Python -
- Profiling and speeding up scientific code with Cython and numba -

[c1] *Josue*: Is there something else to add? Shall we ask for a reference letter or something?
[c2] *Josue*: Perhaps change the structure and remove Tidy data?s

Schedule

Monday XX July 2020			
Time	Topic	Speaker	Tutors
9:00-9:30	Introduction		
9:30-11:00	Git & Github		
11:00-11:30	Coffee Break		
11:30-13:00	Git & Github		
13:00-14:00	Lunch Break		
14:00-15:00	Git & Github		
15:00-16:00	Data visualization	Ricardo Méndez	
16:00-16:30	Coffee Break		
16:30-18:00	Data visualization	Ricardo Méndez	

Tuesday XX July 2020			
Time	Topic	Speaker	Tutors
9:00-9:30	Testing & debugging		
9:30-11:00	Testing & debugging		
11:00-11:30	Coffee Break		
11:30-13:00	Testing & debugging		
13:00-14:00	Lunch Break		
14:00-15:00	Advanced Numpy		
15:00-16:00	Advanced Numpy		
16:00-16:30	Coffee Break		
16:30-18:00			

c1

Wendsday XX July 2020			
Time	Topic	Speaker	Tutors
9:00-11:00	Organizing, documenting, distributing & CI		
11:00-11:30	Coffee Break		
11:30-13:00			
13:00-XX:XX	Social activity		

[c1] *Josue*: I would like to add some Scipy, what do you think?

[c2]

Thursday XX July 2020			
Time	Topic	Speaker	Tutors
9:00-10:30	Parallel Python		
10:30-11:00	Coffee Break		
11:30-13:00	Parallel Python - Pycuda		
13:00-14:00	Lunch Break		
14:00-14:30	Project Introduction		
14:30-16:00	Programming Project		
16:00-16:30	Coffee Break		
16:30-18:00	Programming Project		

Friday XX July 2020			
Time	Topic	Speaker	Tutors
9:00-10:30	Profiling, Cython & numba		
10:30-11:00	Coffee Break		
11:30-13:00	Profiling, Cython & numba		
13:00-14:00	Lunch Break		
14:00-16:00	Programming Project		
16:00-16:30	Coffee Break		
16:30-18:00	Programming Project		

[c2] *Josue*: Do we want a social activity?

Saturday XX July 2020			
Time	Topic	Speaker	Tutors
9:00-10:30	Programming Project		
10:30-11:00	Coffee Break		
11:30-13:00	Programming Project		
13:00-14:00	Lunch Break		
14:00-16:00	Programming Project		
16:00 16:00-16:30	Repository Freeze Coffee Break		
16:30-16:45	How to contribute to ASPP		
16:45-17:00	Programming project - Learning report		
17:00-18:00	Friendly Tournament		
18:00-XX:XX	Final Social Event		

[c1]

Additional materials

Partner Organizations (Funding)

- School of Science (UNAM) -
- CONACYT -
- [c2]More Options

Policies

Inclusiveness

Behavior

[c1] *Josue*: I've remove 1 hour from the lunch break so people can go earlier home, do you think we should use that hour or should'nt?
[c2] *Josue*: *Text added.*