A community learning resource for Python-based computing in the geosciences

A quick update fo...

Brian E. J. Rose
University at Albany

23 2021

Anderson Banihirwe[1], Drew Camron[2], John Clyne[1], Orhan Eroglu[1], Max Grover[1], Julia Kent[1], Austin Kootz[1], Matt Long[1], Ryan May[2], Kevin Paul[1], Brian Rose[3], Michaela Sizemore[1], Kevin Tyle[3] and Anissa Zacharias[1]

1. National Center for Atmospheric Research, 2. Unidata, 3. University at Albany

What?

The **Pythia** (/ˈpɪθiə/;[1] Ancient Greek: Πυθία [pyːˈtʰi.aː]) was the name of the high priestess of the Temple of Apollo at Delphi who also served as its oracle, also known as the **Oracle of Delphi**.

PROJECT PYTHIA

Project Pythia: Education and Training

Pangeo has driven forward the capabilities of Python tools for geosciences massively in the past years. ***But these tools will only realize their potential impact if scientists have access to high-quality training for learning to use them!***

A new NSF EarthCube grant, awarded to NCAR and the University at Albany, will fund the development of Project Pythia: a community educational resource. The **Project Pythia portal** aims to provide geoscientists at any point in their career with the **educational content** and **real-world examples** needed to learn how to navigate and integrate the myriad packages within the burgeoning Scientific Python Ecosystem. Pythia will cover a range of topics from beginning Python programming to advanced subjects such as developing scalable workflows. A particular emphasis will be placed on **migrating workflows to the cloud**. Educational content in the Pythia portal will be developed and vetted in part through **integration with graduate and undergraduate-level coursework** at the University at Albany.

Why?

Most Geoscientists...

Data!

PROJECT PYTHIA

A mountain of languages, software packages, environments, and tools

Happy Pangeans

To **reduce barriers** to **tool adoption** and **participation**;
To **empower** more people to do **better**, more **reproducible data-heavy science**;
To **organize** the community around a **well-maintained** set of **learning resources**

Who?

Hopefully we'll add some mugshots to the Portal site soon!

# Big picture goals

Goals

1. **Pythia Portal**: A *go-to* resource for learning the Scientific Python Ecosystem
   - Geoscience focused
   - From novice to power user
   - Tutorials, videos, examples, on-line courses, and sample data
   - Community owned
2. **Pythia Platforms**: Binder-like infrastructure for launching workflows on a cloud platform
   - Customizable
   - Cloud vendor agnostic

Community owned

➢ A community-owned resource enabled by the *Open Development* model. The user community is expected to contribute by:

- Providing feedback
- Helping identify and prioritize content needs
- Helping develop **new** content or identifying **existing** content for inclusion
- Responding to questions from other users
- Reporting or correcting problems
- ... and more

PROJECT PYTHIA
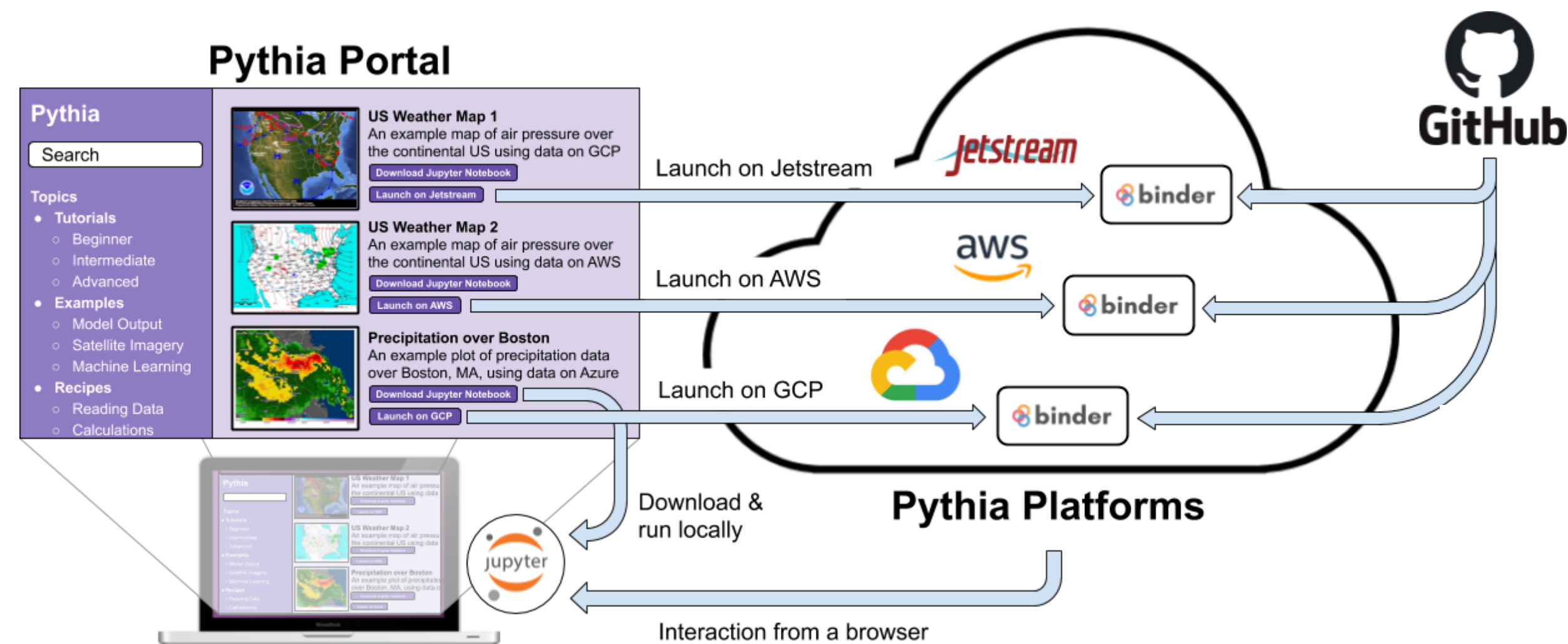
The Platform: portable, plug-and-play, Pangeo-style cloud workflows that "just work" on multiple platforms
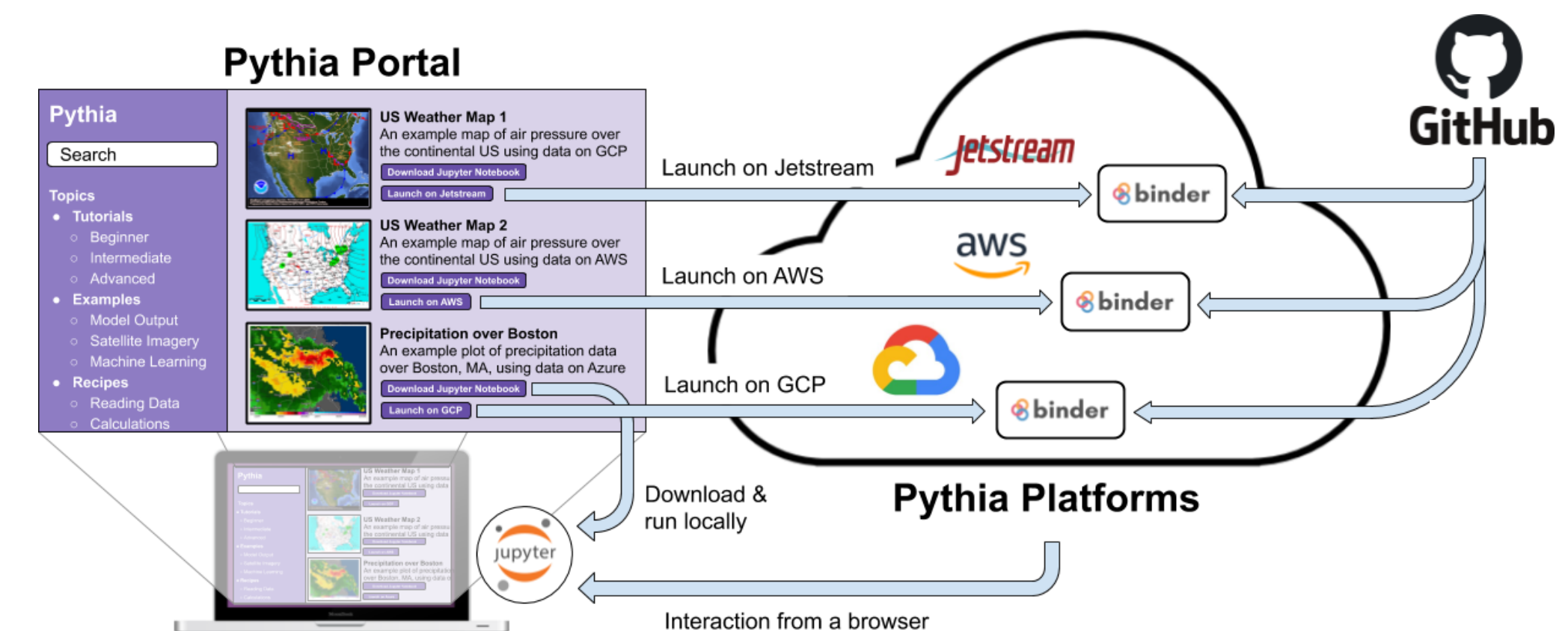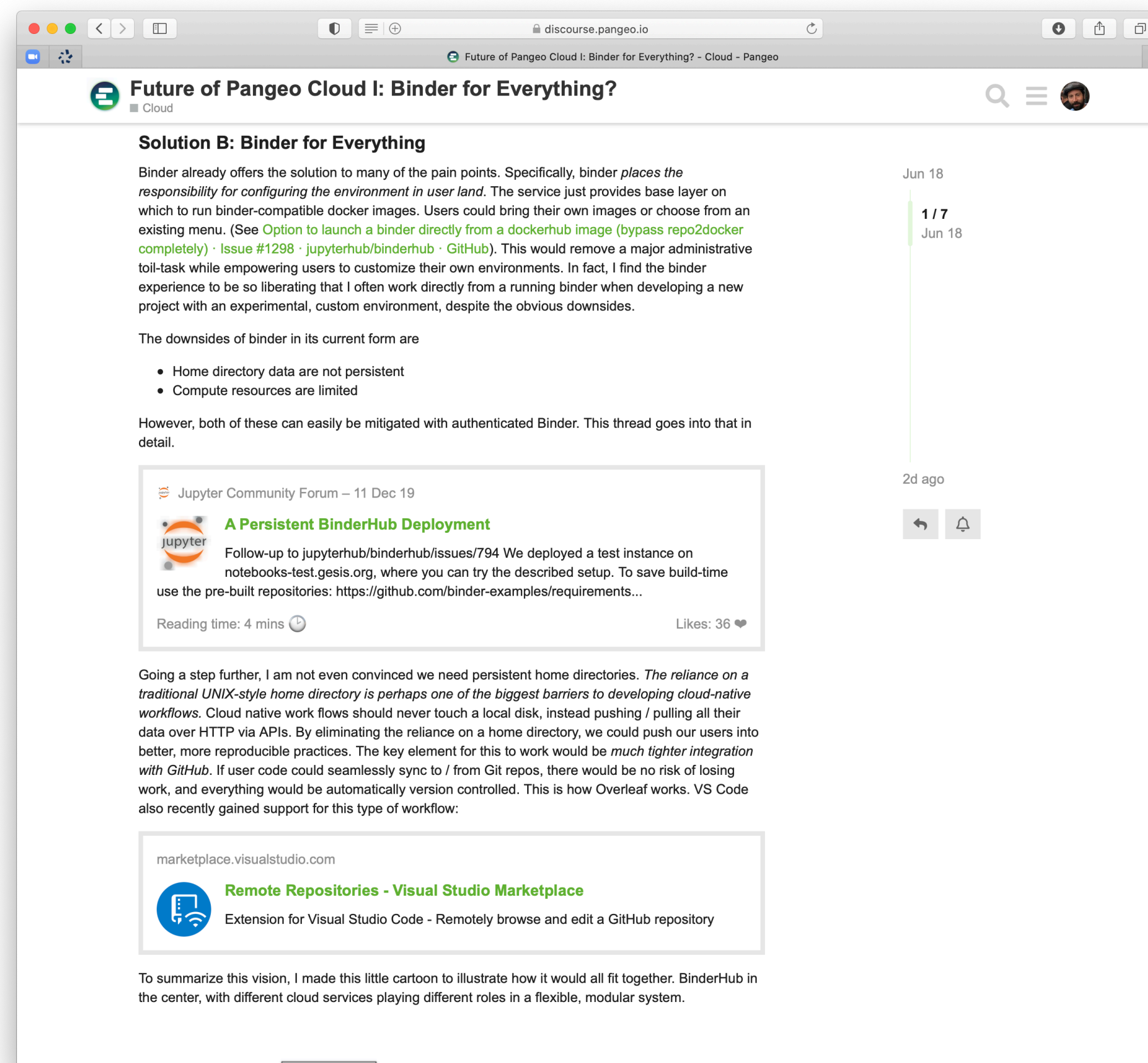
Will be a [ ] ocus of activity in Year 2 of the grant

PROJECT PYTHIA

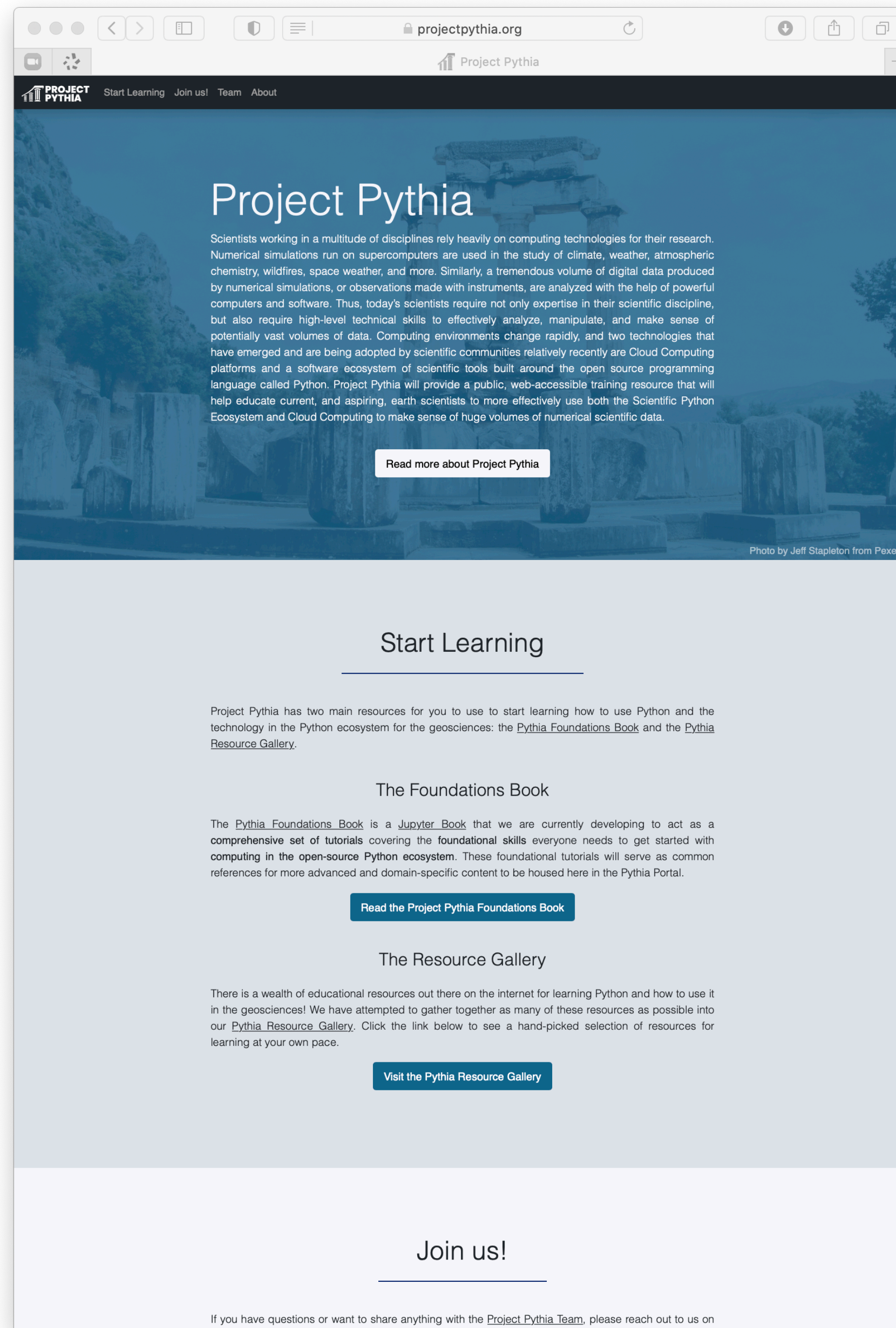*A very similar vision was recently expressed by Ryan Abernathey in this <u>discourse post</u>:*

(June 18, 2021)

*Project Pythia brings NCAR-based **developer resources** and an **Infrastructure Working Group** to push this vision forward*
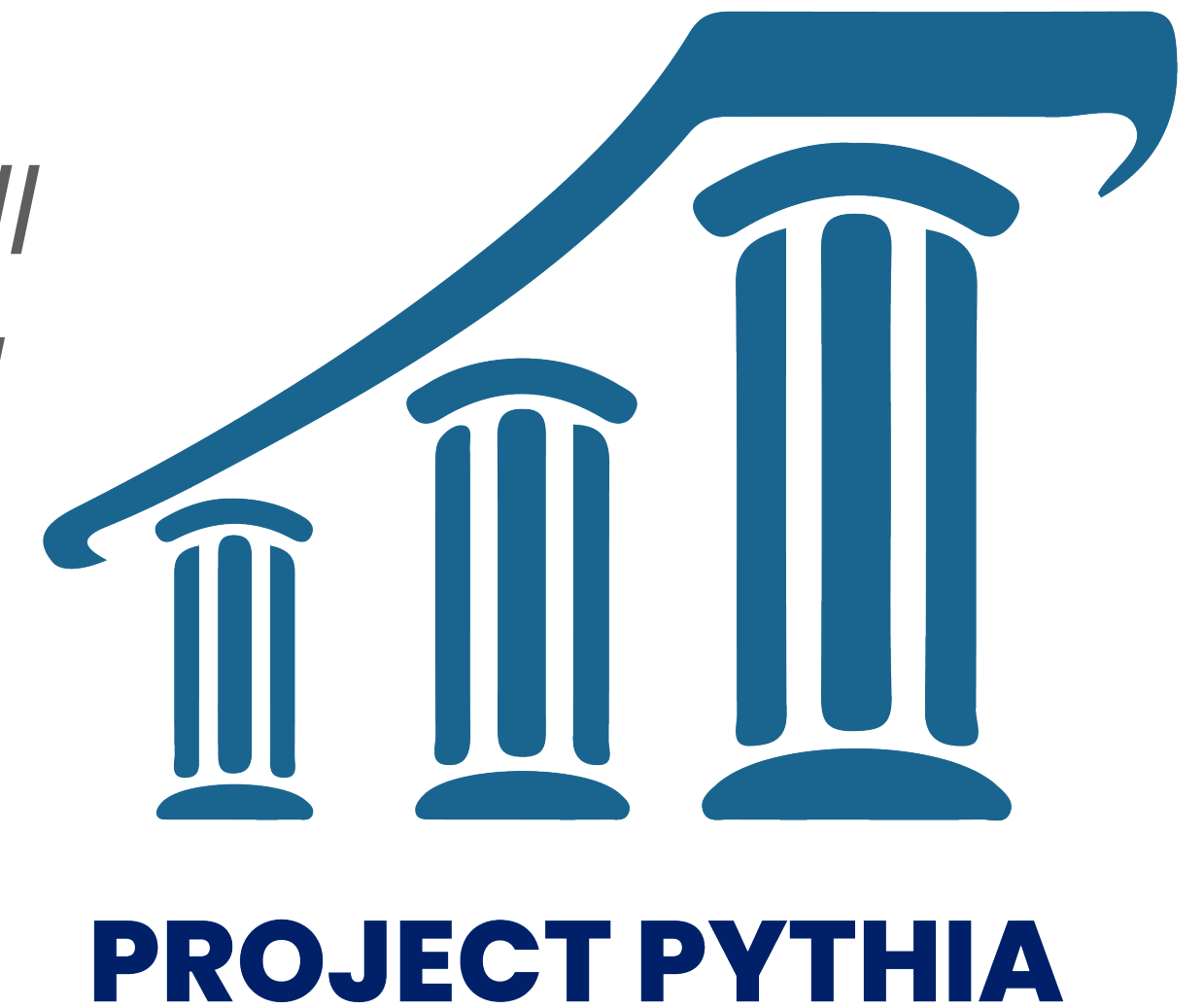
The Portal

Is live now, will keep evolving

PROJECT PYTHIA

https://projectpythia.org/

… with a beautiful new **custom Sphinx theme**, to be published as a separate installable and customizable package

The Foundations book

Is live now, will keep evolving

PROJECT PYTHIA

https://foundations.projectpythia.org/

*a Jupyter Book that we are currently developing to act as a **comprehensive set of tutorials** covering the **foundational skills** everyone needs to get started with **computing in the open-source Python ecosystem**. These foundational tutorials will serve as common references for more advanced and domain-specific content to be housed here in the Pythia Portal.*

All tutorials are Binderized for exploratory learning
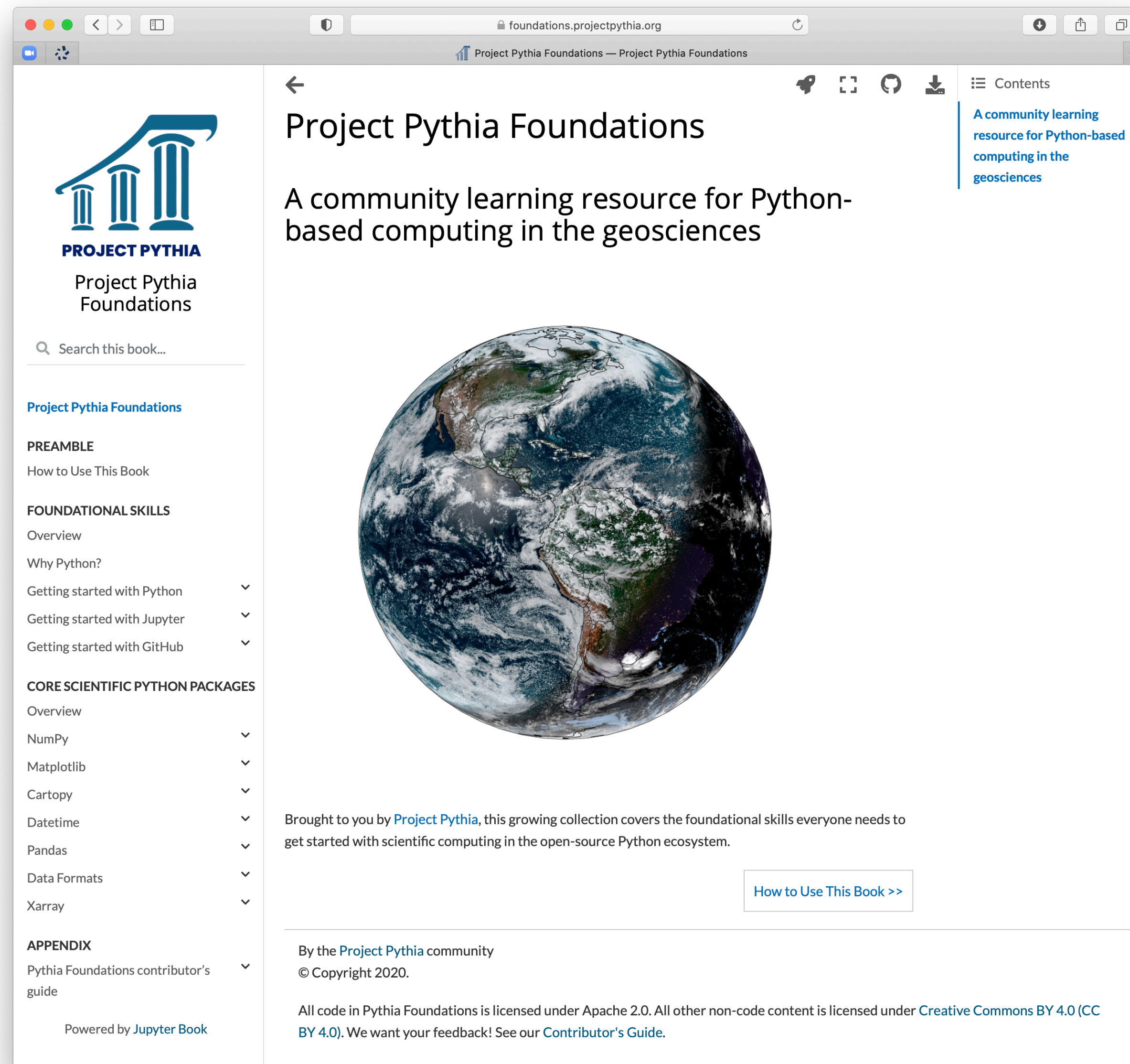
The Resource Gallery

Is live now, will keep evolving

PROJECT PYTHIA

https://projectpythia.org/gallery.html

A curated, searchable, and extensible gallery of links to external learning resources

Want to add or update a link in the gallery*? Take a look at our Contributor's Guide!
https://projectpythia.org/contributing.html

* *or anything else on our sites!*

We have some nice collaboration infrastructure in place on GitHub for auto-rendering Pull Requests, triggering reviews, etc.
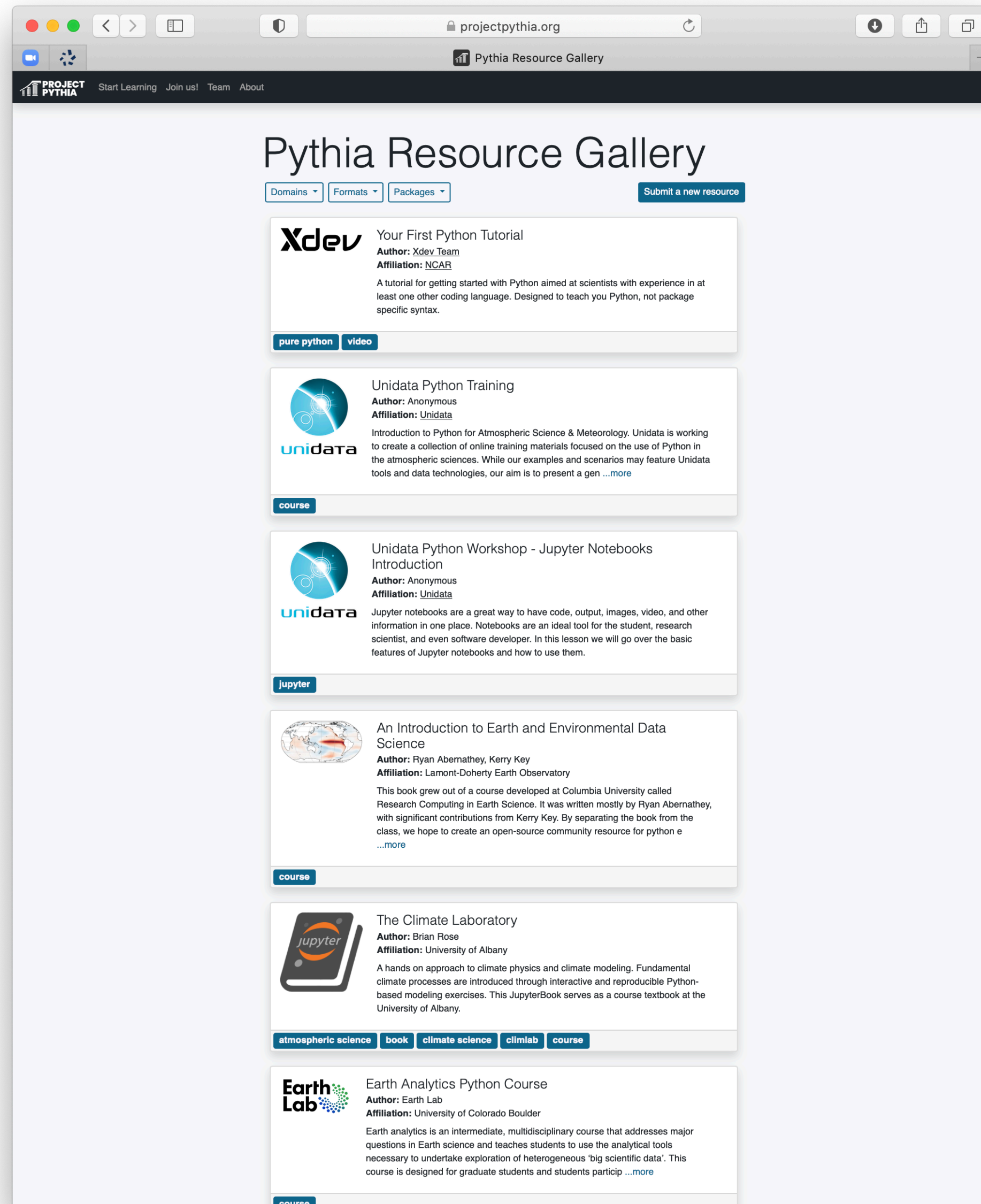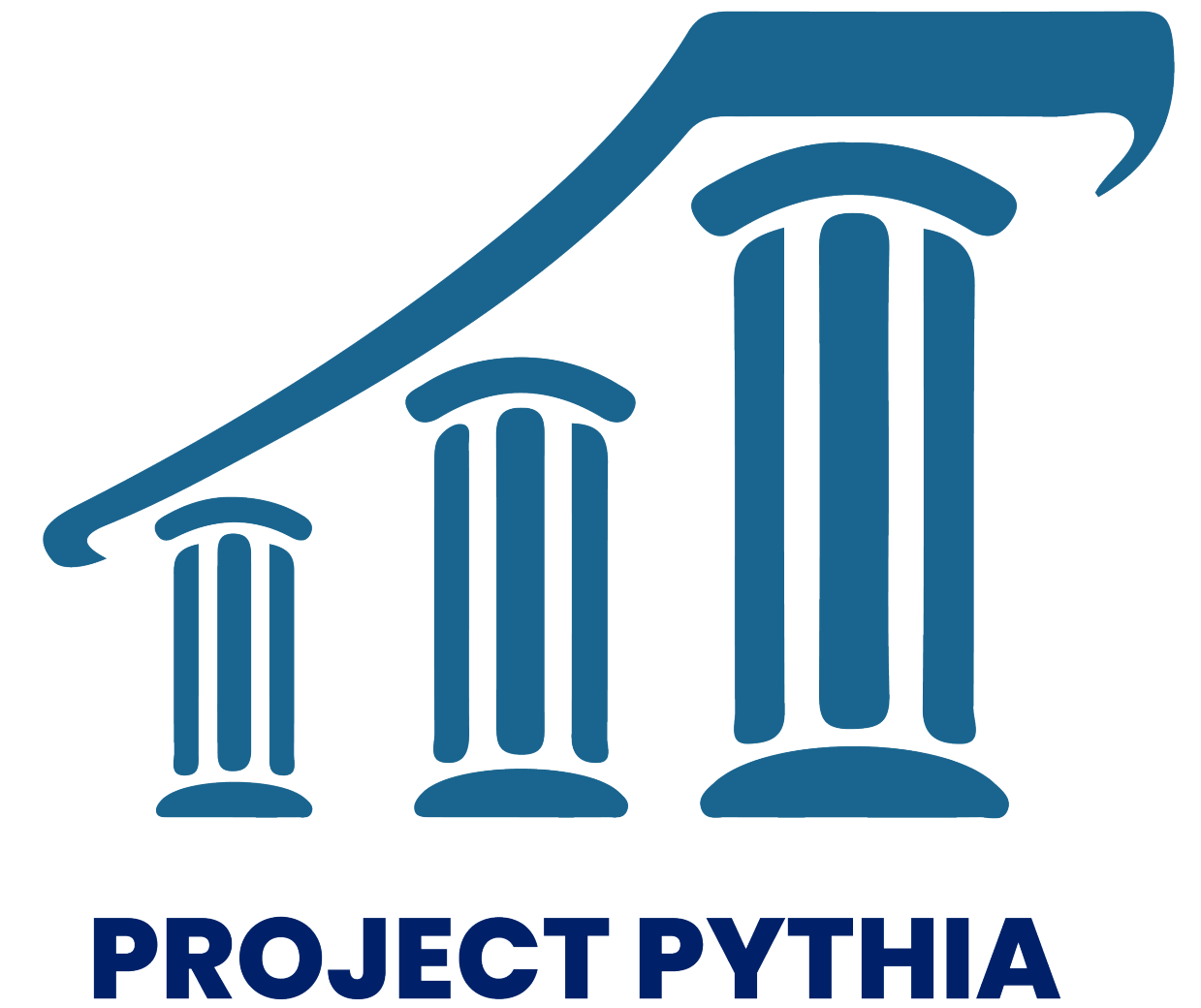
Future content directions
a non-binding list…

- Complete "Getting Started" and Python package tutorials in **Foundations** book

- Tutorials on **cloud computing** and scaling up through the **Pythia platform**

- **Galleries** of community-contributed, domain-specific exemplar science content. Emphasis on **teaching** and **learning**, with thorough **cross-references** to **Foundations** tutorials. *A permanent home for Pangeo Galleries?*

- **User-contributor gateway** material:

  - Beginner-friendly **Contributors Guide** including spin-up tutorials on **GitHub** etc.

  - Guidance on **packaging**, **testing**, and **documenting** scientific software

  - Commitment to **open-source tools** for all our content, **use of Pythia sites** themselves as **learning models**

- A robust **working group** organization and **PR review** cycle to keep things moving and **up-to-date**

- A fundamental commitment to **open development**, **inclusivity**, and **putting learners first**.
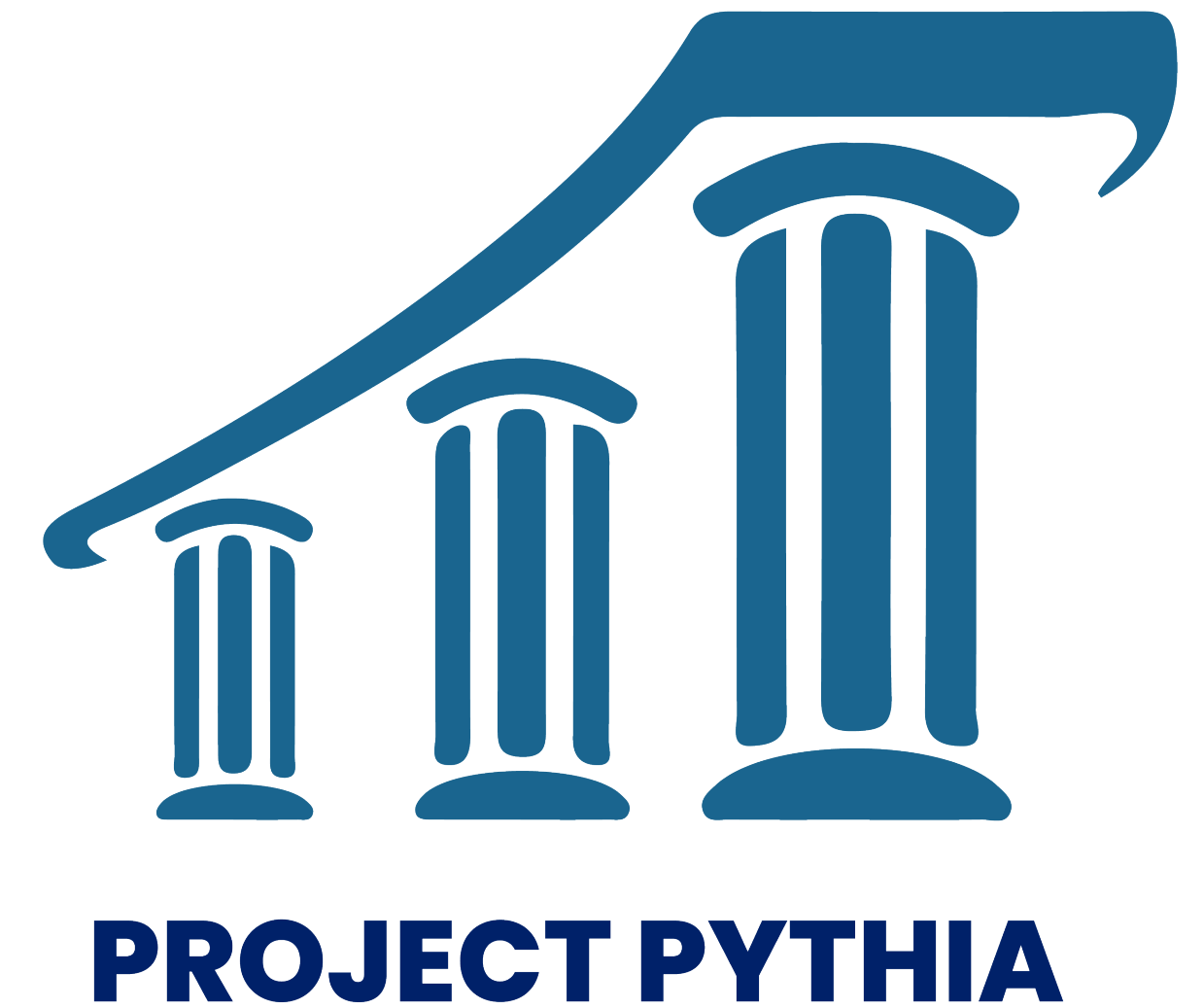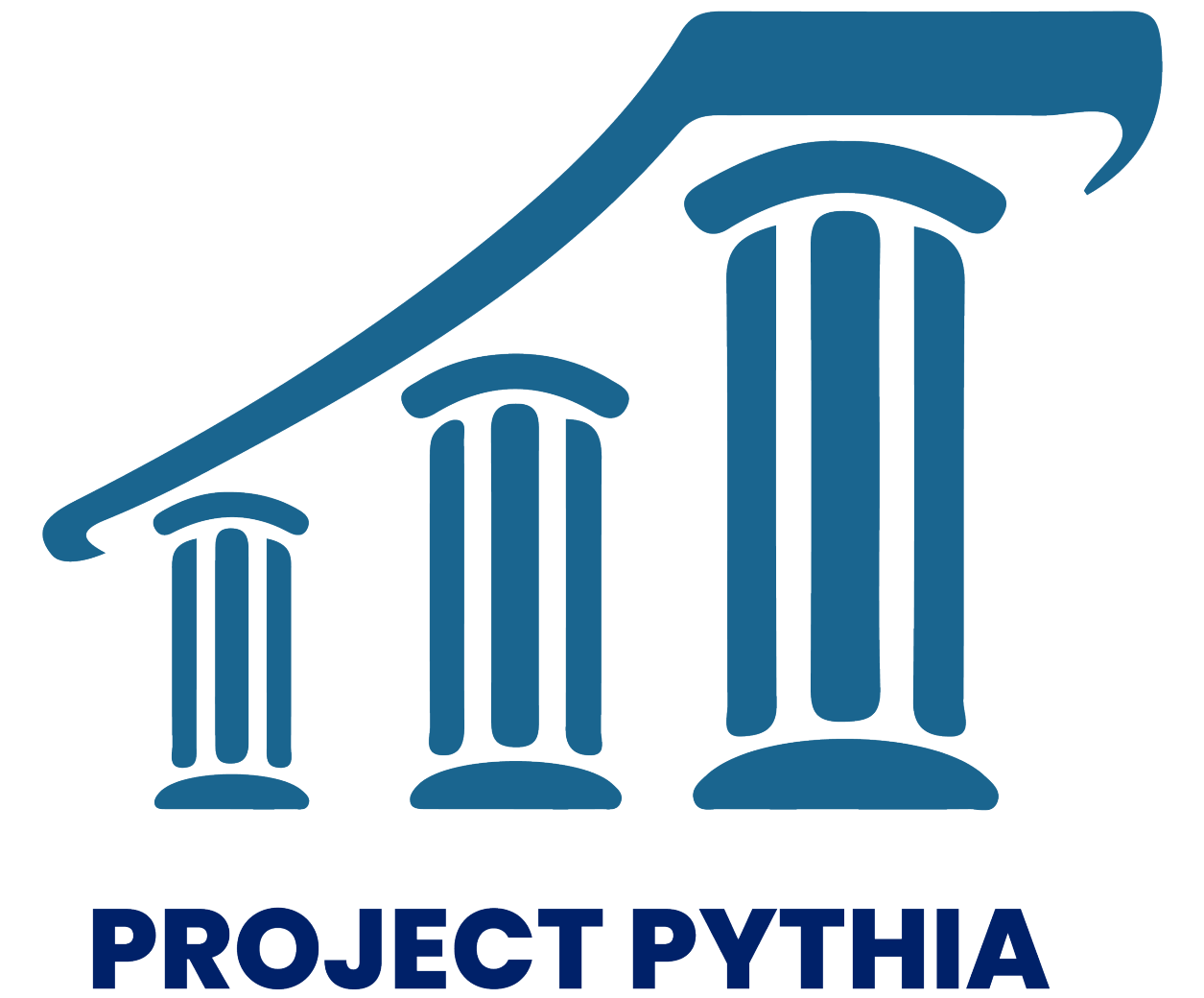
Questions for the community

- What are the biggest barriers to new users getting started with the Pangeo stack?

- What topics should the Foundations book cover?

- What resources should appear on the Portal?

- How can we best catalyze community involvement?

- … what should Pythia do next?

PROJECT PYTHIA

Links

- Portal home: https://projectpythia.org/

- Foundations book: https://foundations.projectpythia.org/

- GitHub org: https://github.com/ProjectPythia

- Discussion board: https://github.com/ProjectPythia/projectpythia.github.io/discussions

- Meeting calendar: https://projectpythia.org/index.html#meeting-event-calendar