Better Science for Future Us:

Supporting NASA Earth science research teams' migration to the cloud with Openscapes

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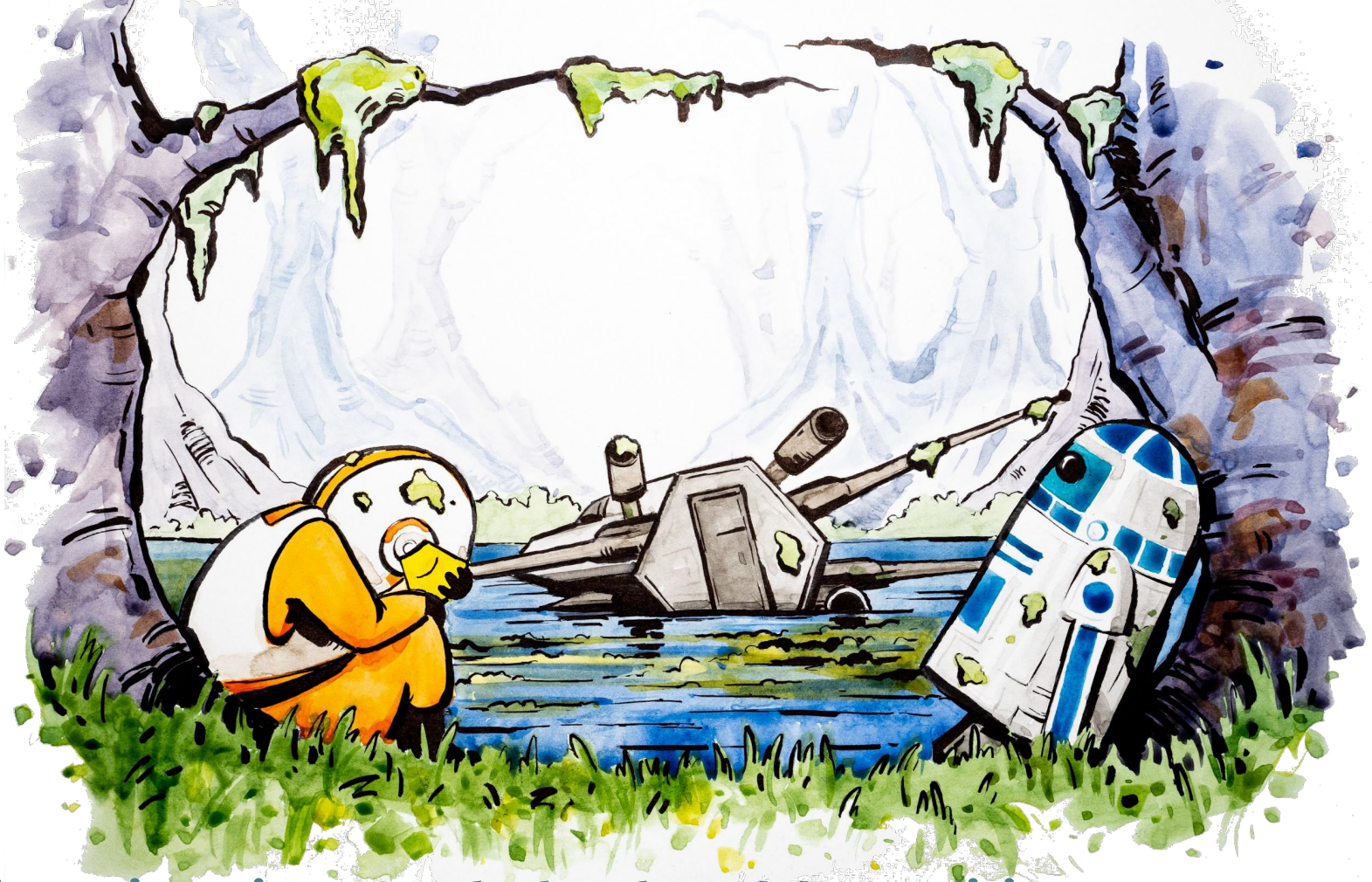
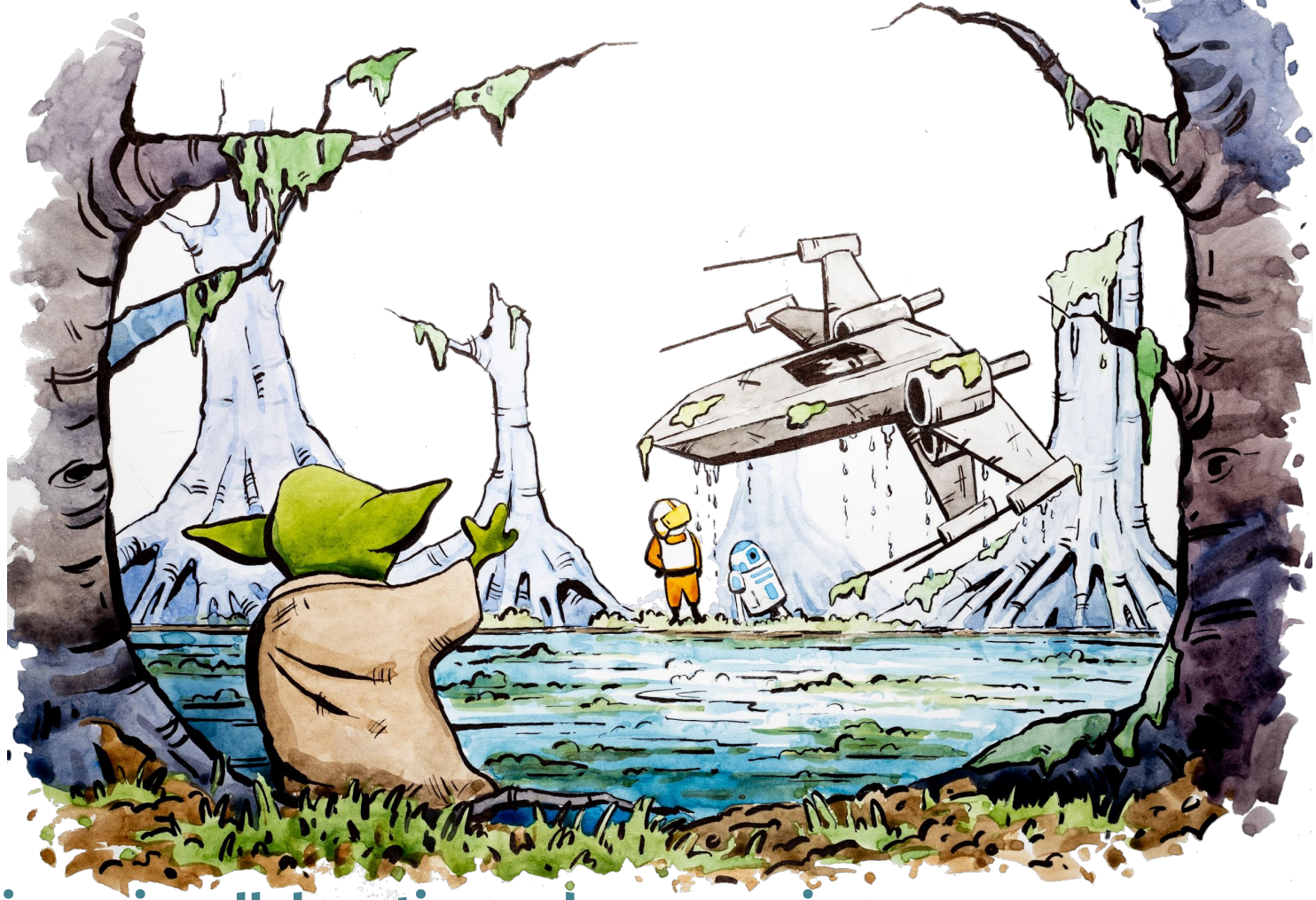
Pangeo Showcase, June 30, 2021
Slides: openscapes.org/media
All artwork by Allison Horst



Data-intensive science can be lonely and demoralizing



Open science is collaborative and empowering

Diverse, inclusive teams and communities are key

The Openscapes Champions Program helps researchers move from lonely science as they explore and navigate the open science landscape with their teams

"***This isn't just about coding & GitHub, it's about changing the way we do science***."
- Dr. Malin Pinsky, Rutgers

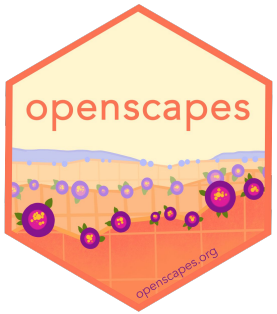
"***This program has honestly completely re-made how I think about my science***. *[It is] a supportive training course for moving your lab towards open science, that meets you where you are."*
- Dr. Chelsea Wood, U Washington

"***Openscapes has created a new way of thinking about merging empathy and science***. *That's an invaluable gift to me." - Dr. Halley Froehlich, UCSB*

Biggest impact: research teams work more openly & effectively together

Teams reframe analysis as collaborative effort not an individual burden, and use open source tools to streamline work/life for Future Us.

less reinventing & loneliness • grant money goes further • co-creating norms promoting diversity, equity & inclusion • new folks onboard to projects faster

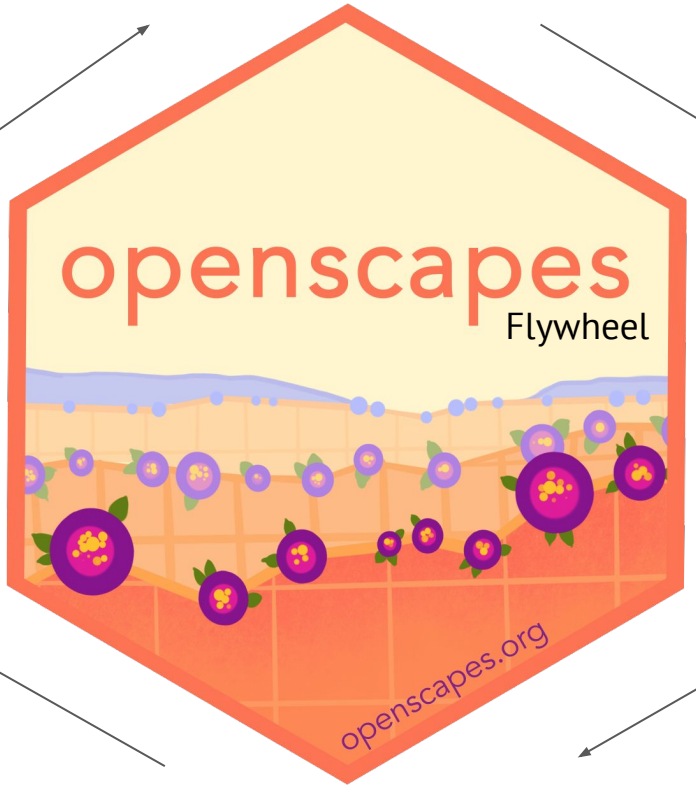


Invest in Champions Program curriculum

Engage Mentors

Develop Champions Mentor – professional development and leadership skills

Mozilla Open Leaders



Attract research teams interested in better practices for data-intensive science

Empower research teams

Deliver Champions Program for a Cohort of research teams

Transform research teams workflows towards kinder, inclusive open science

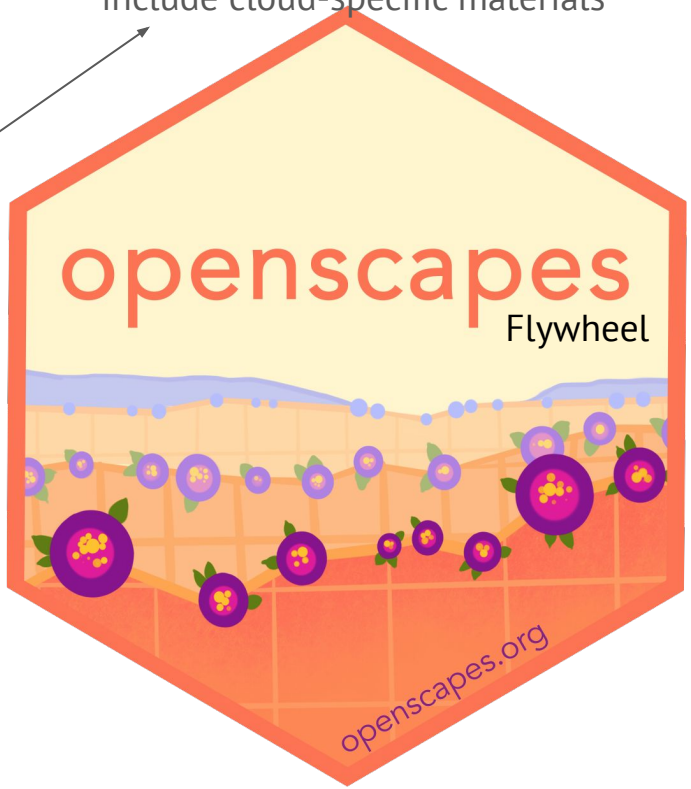
Amplify leaders

Inspire broader scientific communities through visible examples and leaders – Open science shift

Engage Mentors

Develop Champions Mentors – professional development and leadership skills

Invest in Champions Program curriculum & co-create with a Cohort of Mentor teams to include cloud-specific materials



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Engage Mentors

- People: Building community, trust, normalizing talking about tutorials
- Process: Identifying common parts and shared needs for NASA Earth Science Cloud workflows
- Technology: shared skills & practices:
  - GitHub
  - Quarto
  - Carpentries Workshops
  - Carpentries Instructor Training
  - 2i2c

https://nasa-openscapes.github.io

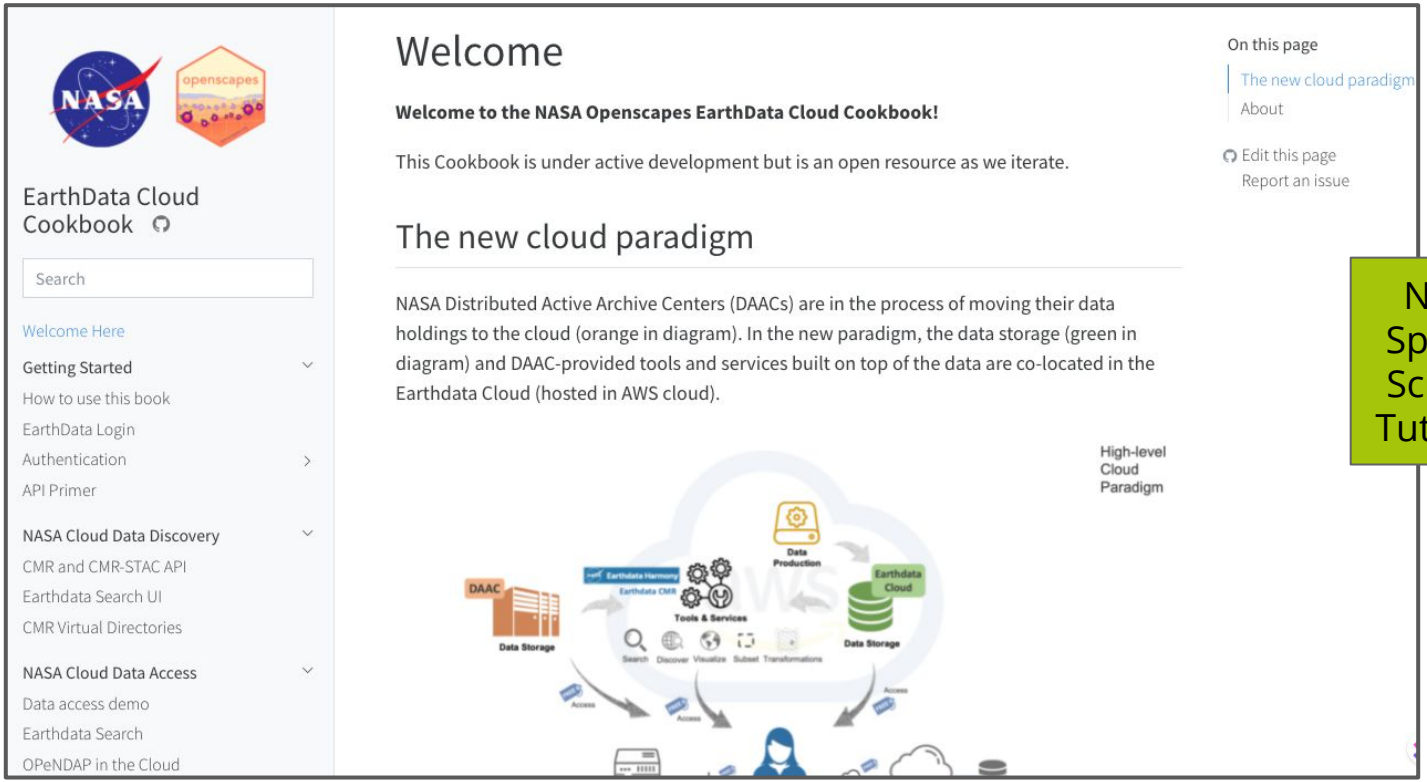
Engage Mentors

EarthData Cloud Cookbook

Support Mentors to co-create a common set of Cloud tutorials that they can then build off their specific science tutorials

THE CARPENTRIES

Common Cloud Foundation



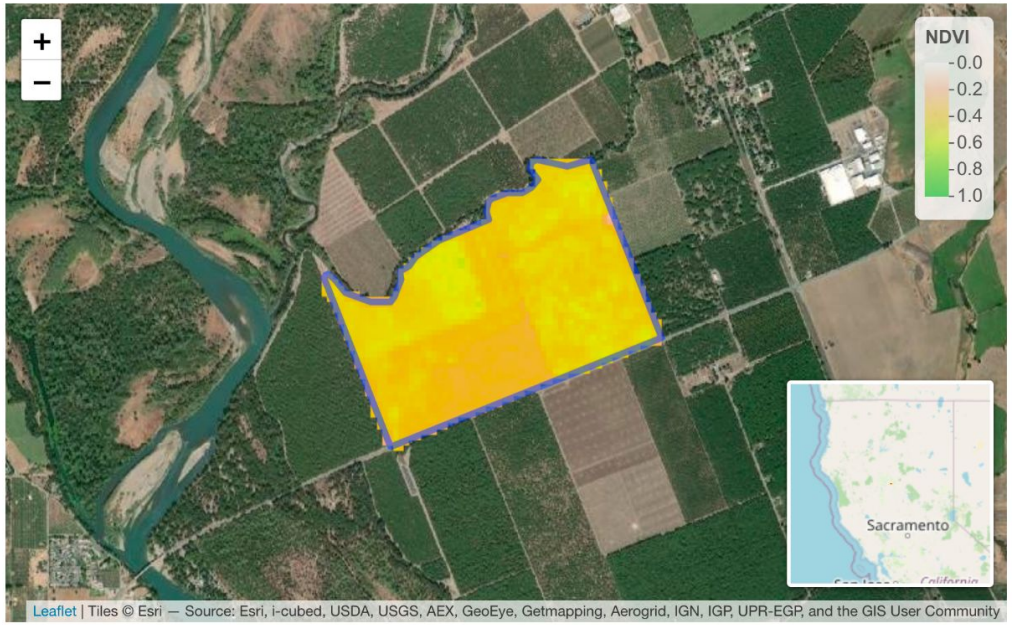
NASA Specific Science Tutorials

https://nasa-openscapes.github.io/earthdata-cloud-cookbook

NASA Specific Science Tutorials

README.md | CMR_STAC_Tutorial.Rmd | earthdata_netrc_setup.R | HLS_Tutorial.Rmd

Knit on Save | Knit | Run




```
427
428  ***
429  ## 4b. Quality Filtering
430  A value of 0 in the Fmask layer indicates the best quality pixel (no cloud, cloud shadow, water, or
     snow/ice). We'll use this value to mask out poor quality pixels from the ndvi stacks. HLS quality
```

348:59 | Chunk 22 | R Markdown

Console | Terminal | Jobs

R 4.1.0 · ~/github/nasa-openscapes/lpdaac_hls_tutorial_r/

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+   addProviderTiles(providers$Esri.WorldImagery) %>%
```

Environment | History | Connections | Git | Tutorial

Diff | Commit

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Files | Plots | Packages | Help | Viewer

Zoom | Export

Show 10 entries

Search:

Collection	Granule_ID	Cloud_Cover	band
HLSS30.v1.5	G1990673295-LPCLOUD	99	B8A
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HLSS30.v1.5	G1992453385-LPCLOUD	13	B8A
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HLSS30.v1.5	G1992453385-LPCLOUD	13	Fmask
HLSS30.v1.5	G1994181506-LPCLOUD	11	B8A

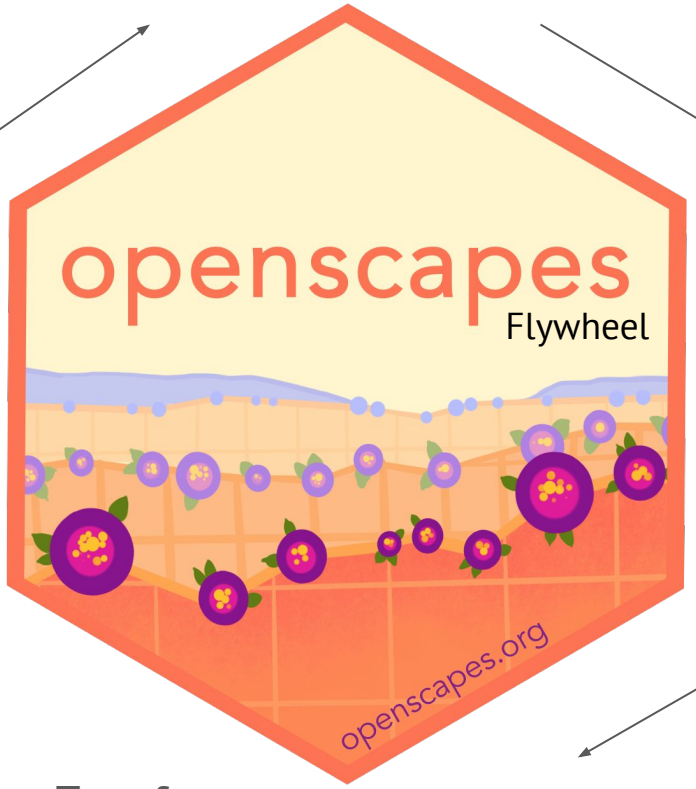
Showing 1 to 10 of 195 entries

Previous 1 2 3 4 5 … 20 Next

Engage Mentors

Develop Champions Mentors – professional development and leadership skills

Invest in Champions Program curriculum – co-create with a Cohort of Mentor teams



Attract research teams interested in better practices for data-intensive science

Empower research teams

Deliver Champions Program for a Cohort of research teams

Transform research teams workflows towards kinder, inclusive open science on the cloud

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Empower research teams

The NASA Earth Science Openscapes Champions Program will empower researchers & DAAC mentors. Teams will work together to identify their pathway to transition their research workflows to the cloud

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Invest in Champions Program curriculum – co-create with a Cohort of Mentor teams

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Flywheel
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Thank you to our DAAC Mentors!

Cole Krehbiel

Aaron Friesz

Catalina Oaida

Jack McNelis

Makhan Virdi

Matt Tisdale

Vishal Bagadia

Amy Steiker

Luis Lopez

Andy Barrett

Christine Smit

Jennifer Adams

Alexis Hunzinger

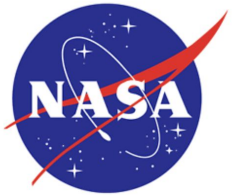
Kumar Ramasubramanian

Shubhankar Ghalot

Iksha Gurung

Thank you

We're looking forward to working together!



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Join us:

Twitter: @openscapes

Details: openscapes.org

nasa-openscapes.github.io

Further background:

Entryways to open data science and the power of welcome
Lowndes 2020, plenary at Earth Science Information Partners (ESIP) Summer Meeting

Putting data to work
Robinson 2020, Leptoukh Lecture at the American Geophysical Union (AGU) Conference

slides: openscapes.org/media
Openscapes artwork by Allison Horst

We've been working with awesome teams through groups like NASA and NOAA who book the Champions Program for teams within their research communities, as well as with groups like Mozilla and the Moore Foundation who sponsor teams from across different research fields to participate.

NASA

NOAA

NOAA FISHERIES
National Oceanic and Atmospheric Administration

CalPoly Pomona

COAST

CAL POLY
SAN LUIS OBISPO

CSUN
CALIFORNIA STATE UNIVERSITY NORTHRIDGE

California State University
MONTEREY BAY

SAN FRANCISCO STATE UNIVERSITY

moz://a

GORDON AND BETTY MOORE FOUNDATION

CS&S Code for Science & Society

UNIVERSITY of WASHINGTON

KENAI WATERSHED FORUM

UCSB

1865 THE UNIVERSITY OF MAINE

RUTGERS

UCDAVIS
UNIVERSITY OF CALIFORNIA

UNIVERSITY OF CALIFORNIA
SANTA BARBARA

UBC THE UNIVERSITY OF BRITISH COLUMBIA

Cornell University

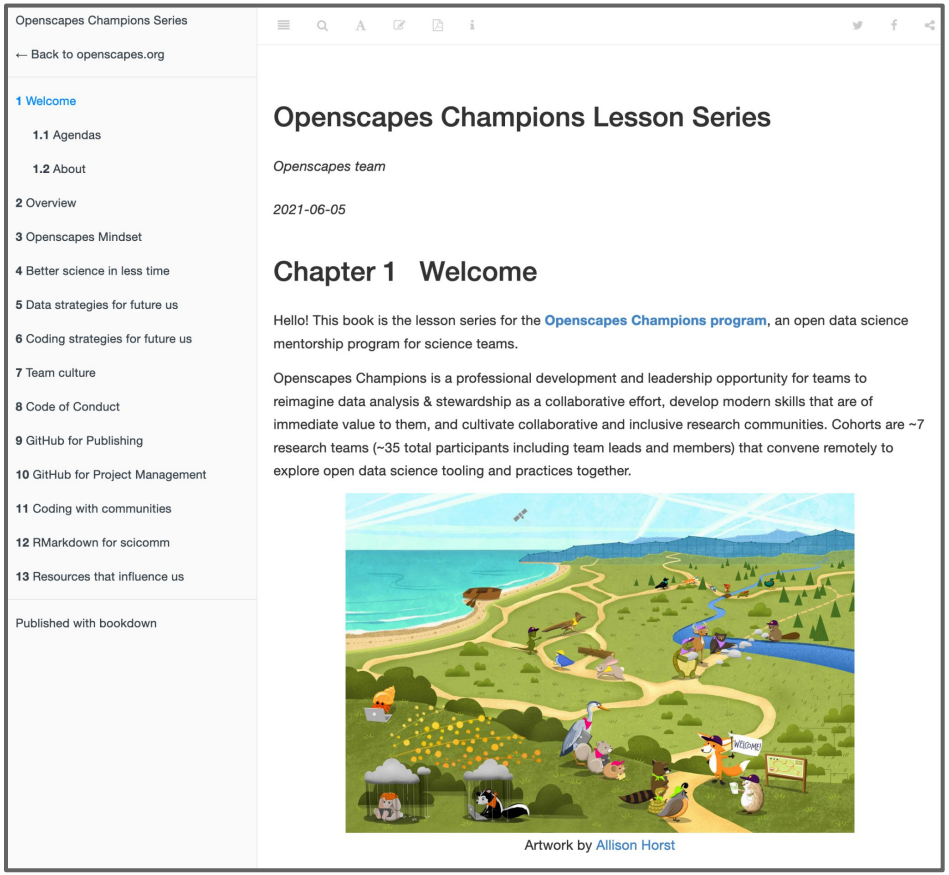
USF
UNIVERSITY OF SOUTH FLORIDA

TRIBES AND THE EXCHANGE NETWORK

THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

Environment and Climate Change Canada
Environnement et Changement climatique Canada

Openscapes Champions lesson series will be extended and focused on Cloud migration



Openscapes Champions open source curriculum: All lessons available for use and reuse: openscapes.org/series

Modeling open behavior:

- Iteratively & openly developed
- Built & published using tools we discuss: RMarkdown & GitHub

Discussion-based to help normalize talking about data, identify and address shared needs, and think ahead for Future Us

(Supercharge your research Lowndes et al. 2019)

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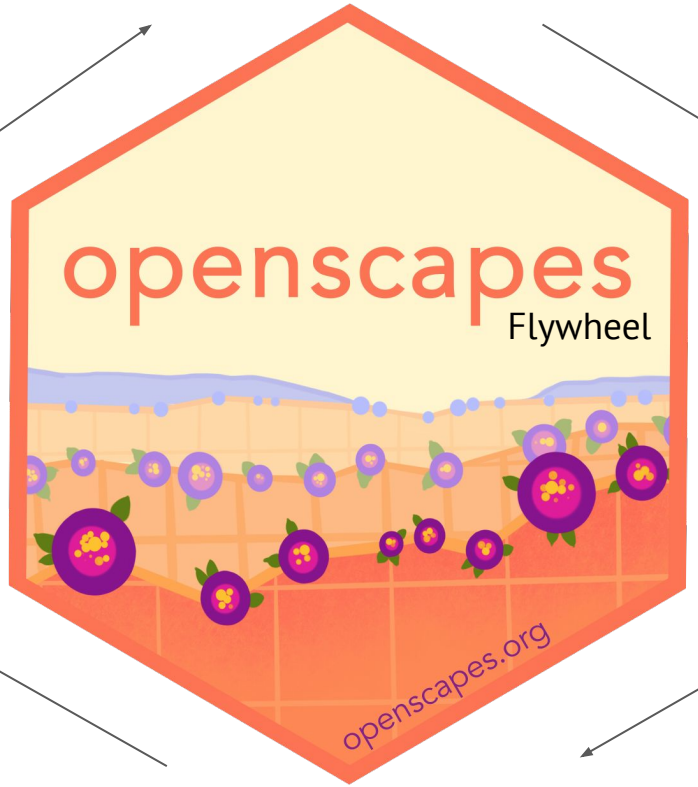

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