

Better Science for Future Us:

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



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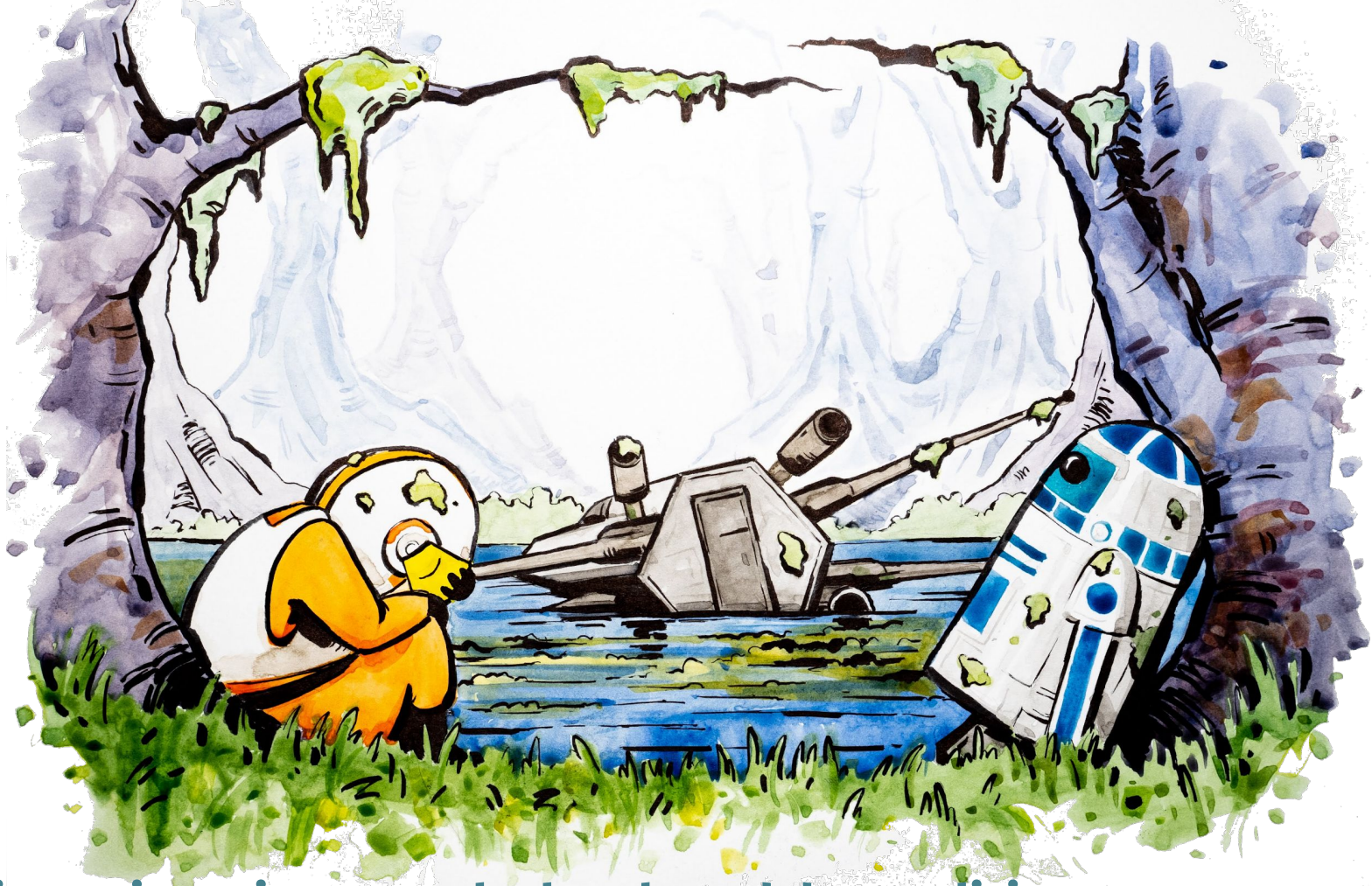
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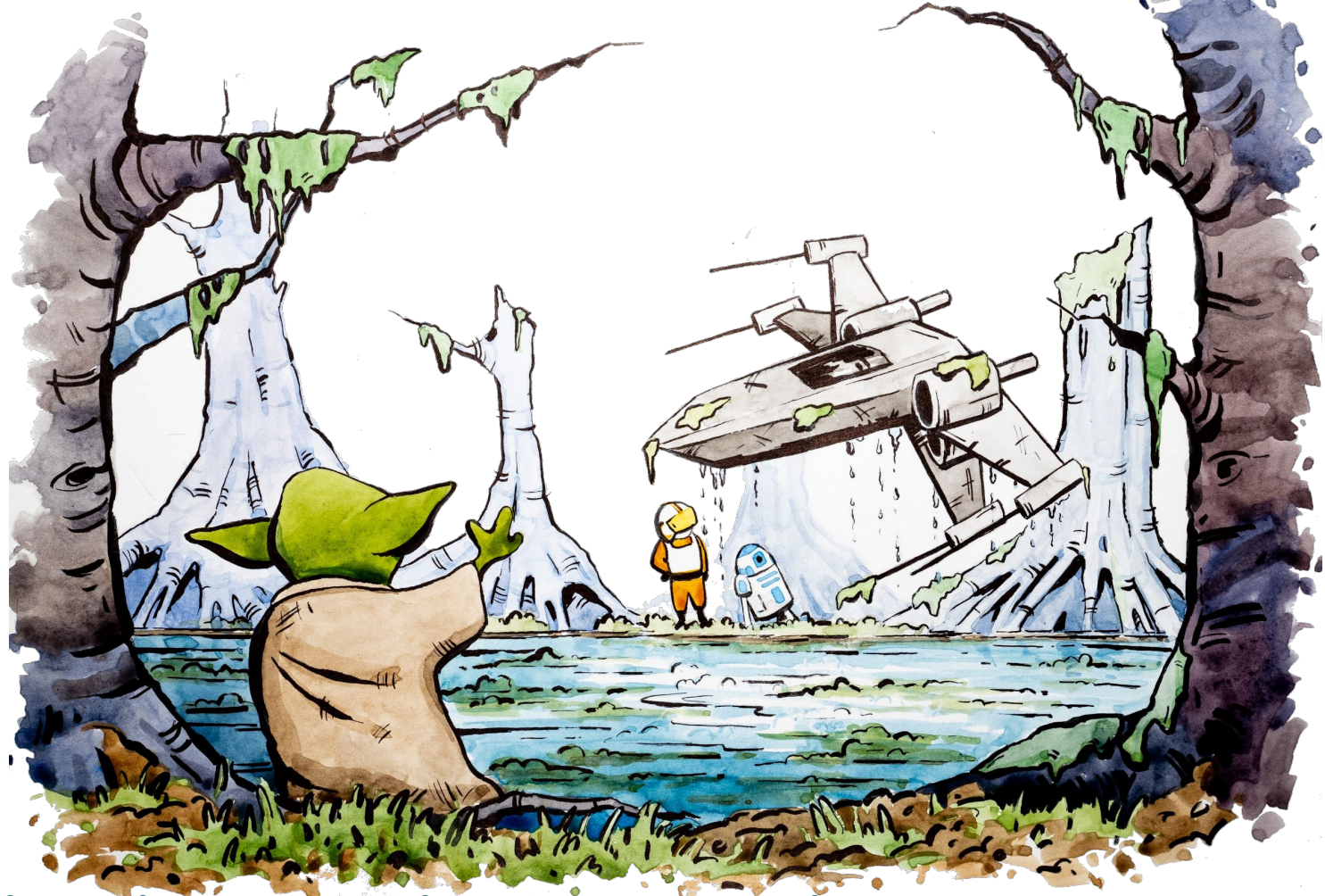
Pangeo Showcase, June 30, 2021

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



Engage Mentors

Develop Champions Mentor
– professional development
and leadership skills

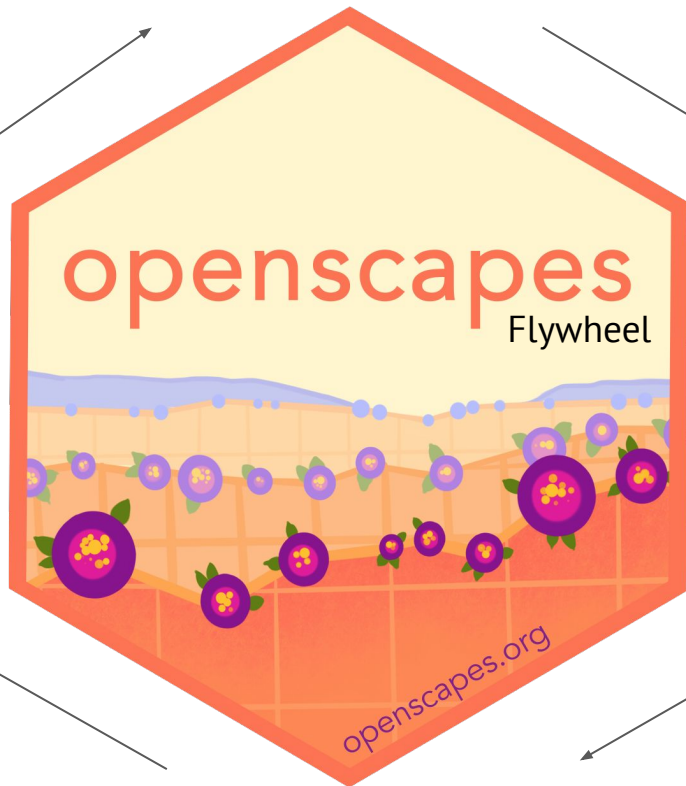
Mozilla Open Leaders



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

Amplify leaders

Invest in Champions Program curriculum



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

Empower research teams

Deliver Champions Program
for a Cohort of research teams

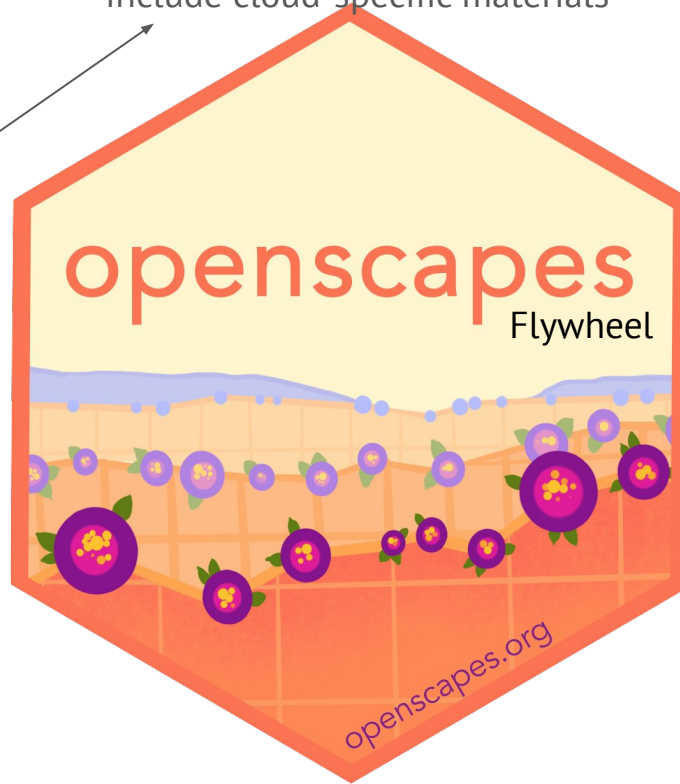
Transform research teams
workflows towards kinder,
inclusive open science

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



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>

EarthData Cloud Cookbook

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



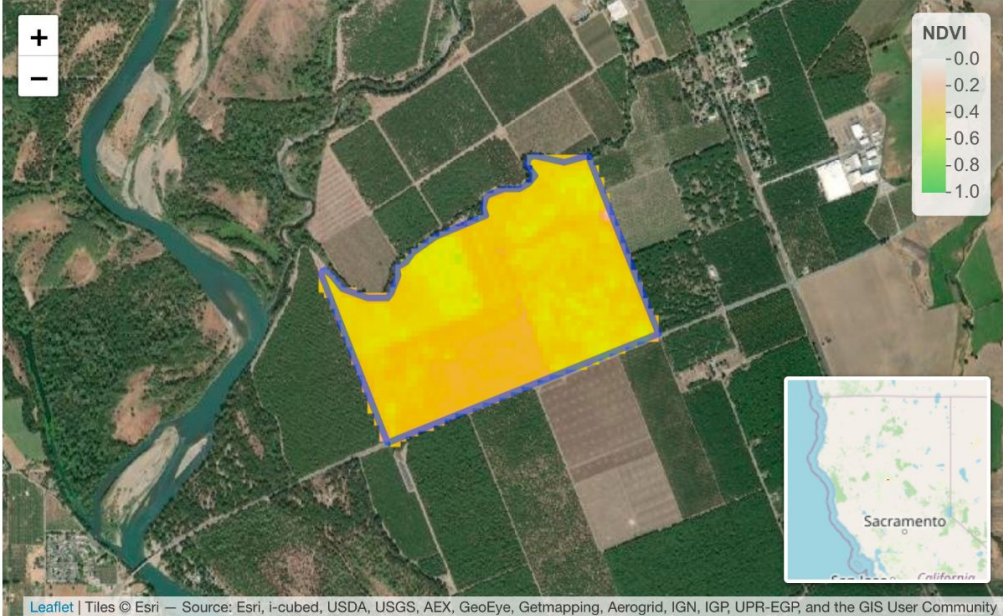
Common
Cloud
Foundation

The screenshot shows the EarthData Cloud Cookbook website. On the left is a navigation sidebar with the NASA and openscapes logos at the top. Below them is the title 'EarthData Cloud Cookbook' and a search bar. The sidebar lists various sections: 'Welcome Here', 'Getting Started' (with a dropdown arrow), 'NASA Cloud Data Discovery' (with a dropdown arrow), and 'NASA Cloud Data Access' (with a dropdown arrow). The main content area has a 'Welcome' heading, followed by a sub-heading 'Welcome to the NASA Openscapes EarthData Cloud Cookbook!' and a paragraph stating the cookbook is under active development. Below this is another heading 'The new cloud paradigm' followed by a paragraph explaining the migration of DAAC data to the cloud. A diagram titled 'High-level Cloud Paradigm' illustrates the flow of data from DAACs through EarthData Cloud to various tools and services. On the right side of the main content, there is a 'On this page' section with links for 'The new cloud paradigm' (with a dropdown arrow), 'About', 'Edit this page', and 'Report an issue'.

NASA
Specific
Science
Tutorials

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

Knit on Save Knit Run



Leaflet | Tiles © Esri — Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, UPR-EGP, and the GIS User Community

```

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
348:59 snow/ice). We'll use this value to mask out poor quality pixels from the ndvi stacks. HLS quality

```

R Markdown

Console Terminal Jobs

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R 4.1.0 · ~/github/nasa-openscapes/lpdaac_hls_tutorial_r/
+ addProviderTiles(providers$Esri.WorldImagery) %>%

```

Environment History Connections Git Tutorial

Diff Commit

Staged Status Path

.rcookies

Files Plots Packages Help Viewer

Zoom Export

Show 10 entries

Search:

Collection	Granule_ID	Cloud_Cover	band
HLSS30.v1.5	G1990673295-LPCLOUD	99	B8A
HLSS30.v1.5	G1990673295-LPCLOUD	99	B04
HLSS30.v1.5	G1990673295-LPCLOUD	99	Fmask
HLSS30.v1.5	G1992453385-LPCLOUD	13	B8A
HLSS30.v1.5	G1992453385-LPCLOUD	13	B04
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 ...

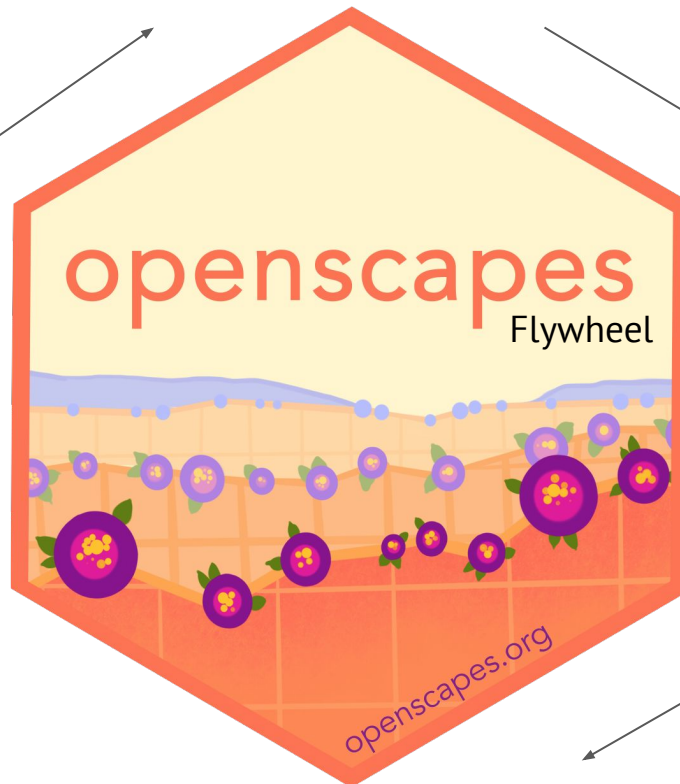
20 Next

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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

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



Engage Mentors

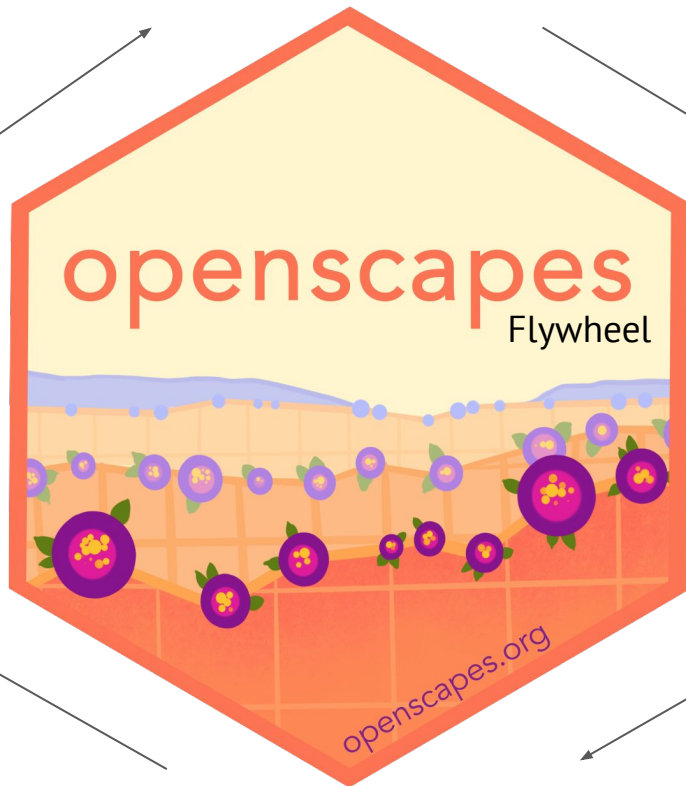
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communities through visible
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Amplify leaders

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towards kinder, inclusive open science



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Thank you to our DAAC Mentors!



Cole Krehbiel

Aaron Friesz

Catalina Oaida

Jack McNelis

Makhan Viridi

Matt Tisdale

Vishal Bagadia

Amy Steiker

Luis Lopez

Andy Barrett

Christine Smit

Jennifer Adams

Alexis Hunzinger

Kumar
Ramasubramanian

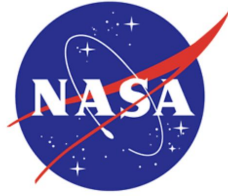
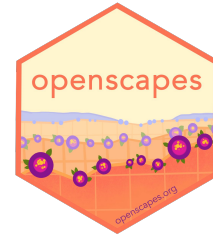
Shubhankar Ghalot

Iksha Gurung



Thank you

We're looking forward to working together!



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@connector_erin

Julia Stewart Lowndes, PhD

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Join us:

Twitter: @openscapes

Details: openscapes.org

nasa-openscapes.github.io

Further background:

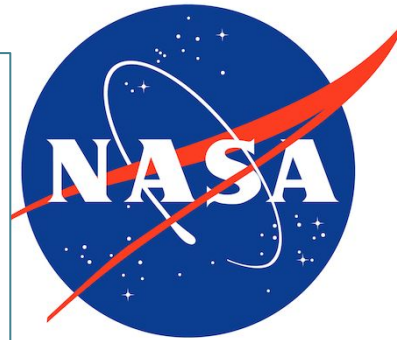
Entryways to open data science and the power of welcome

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

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.



NOAA FISHERIES
National Oceanic and Atmospheric Administration



CAL POLY
SAN LUIS OBISPO

CSUN | CALIFORNIA STATE UNIVERSITY NORTHRIDGE



California State University
MONTEREY BAY



SAN FRANCISCO STATE UNIVERSITY



GORDON AND BETTY
MOORE
FOUNDATION

CS&S Code for Science & Society

W
UNIVERSITY of
WASHINGTON



UCSB

1865 THE UNIVERSITY OF
MAINE

RUTGERS

UC DAVIS
UNIVERSITY OF CALIFORNIA

UNIVERSITY OF CALIFORNIA
SANTA BARBARA

UBC THE UNIVERSITY OF BRITISH COLUMBIA



Cornell University

USF
UNIVERSITY OF SOUTH FLORIDA



THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

Environment and Climate Change Canada
Environnement et Changement climatique Canada

TRIBES AND THE EXCHANGE NETWORK

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

Openscapes Champions Series

← Back to openscapes.org

1 Welcome

1.1 Agendas

1.2 About

2 Overview

3 Openscapes Mindset

4 Better science in less time

5 Data strategies for future us

6 Coding strategies for future us

7 Team culture

8 Code of Conduct

9 GitHub for Publishing

10 GitHub for Project Management

11 Coding with communities

12 RMarkdown for sciocomm

13 Resources that influence us

Published with bookdown

Openscapes Champions Lesson Series


Openscapes team

2021-06-05

Chapter 1 Welcome

Hello! This book is the lesson series for the [Openscapes Champions program](#), an open data science mentorship program for science teams.

Openscapes Champions is a professional development and leadership opportunity for teams to reimagine data analysis & stewardship as a collaborative effort, develop modern skills that are of immediate value to them, and cultivate collaborative and inclusive research communities. Cohorts are ~7 research teams (~35 total participants including team leads and members) that convene remotely to explore open data science tooling and practices together.



Artwork by Allison Horst

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

Modeling open behavior:

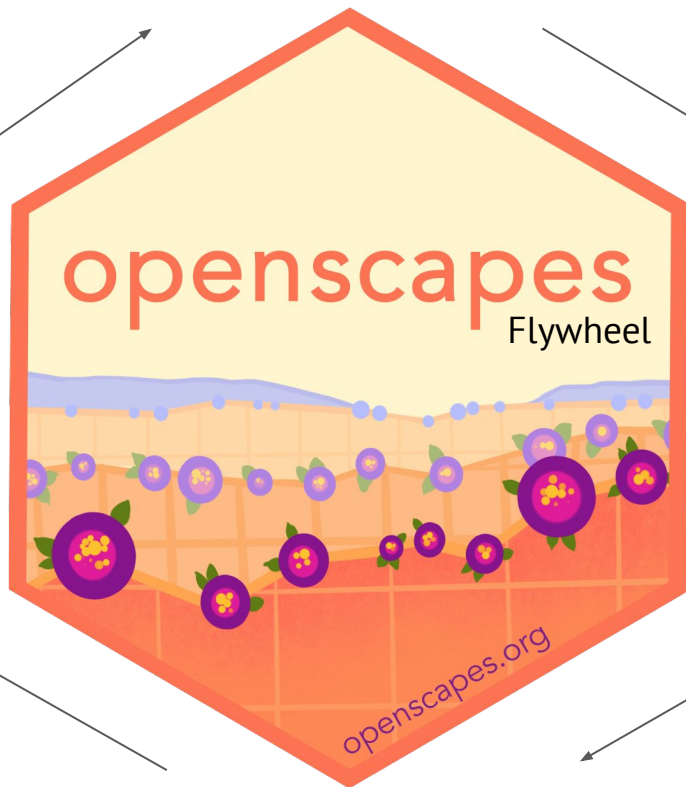
- Iteratively & openly developed
- Built & published using tools we discuss:
RMarkdown & GitHub

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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