



## How to empower researchers with open science

through meeting analytical needs & supporting people

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[@juliesquid](https://twitter.com/juliesquid)

slides: [openscapes.org/media](https://openscapes.org/media)



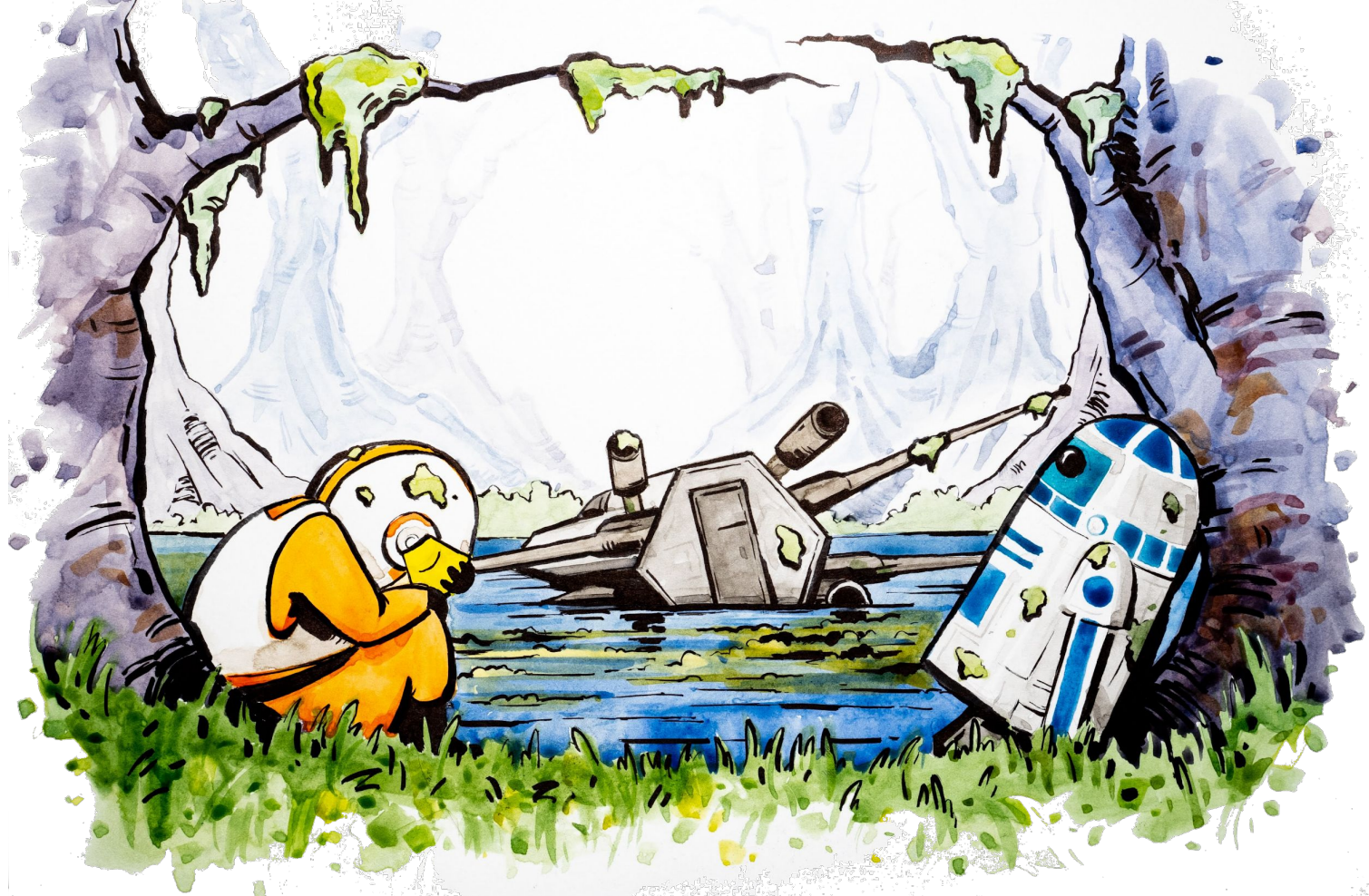
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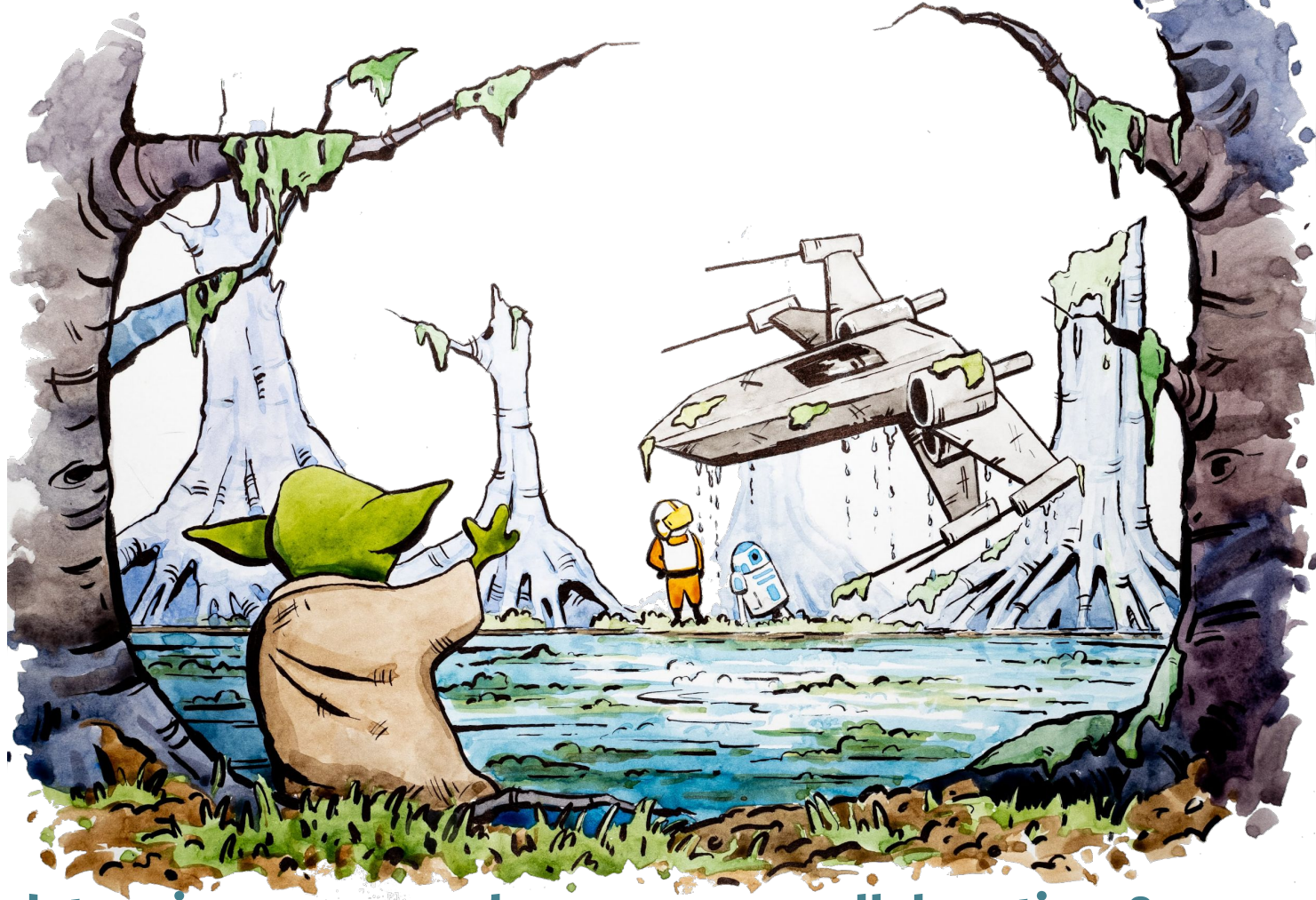
I am a champion for **open data science**:  
the tooling and people enabling reproducible,  
transparent, inclusive practices for data analysis.

Open data science **empowers researchers** by  
meeting their analytical needs and helps turn  
**open science from an idea to a daily benefit.**



**Default approaches to data analysis are closed, individual, & demoralizing**





**Open data science approaches are open, collaborative, & empowering**



**The open community is powerful because it is diverse and inclusive**

# An example with the Ocean Health Index



We found out the hard way that our default approaches for data analysis were not reproducible by even ourselves.



- Required new skillsets & mindsets
- Possible because of trust, teamwork, & leadership
- Enduring open benefits beyond data analysis
  - Reimagine public engagement & scicomm
  - Code & data sharing, open access publishing

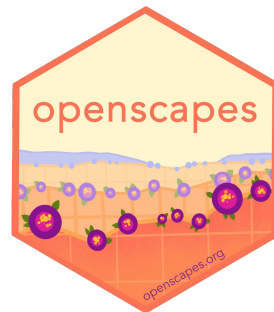


Open science was a means to meet our analytical needs.

Open habits endure because of trust and teamwork.

**Key design elements for Openscapes**

# Openscapes empowers scientists with open data science, focusing on teams and community



We approach open science as a:

- spectrum – entryways to meet researchers where they are
- behavior change – new skillsets and mindsets
- movement – empowering leaders and champions

**Openscapes Champions** is a mentorship program for research teams

- Remote-by-design & cohort-based, Mozilla-style
- 13 teams mentored so far from academia and government

## **Biggest impact: research teams work more openly together**

Reframe analysis as collaborative effort not an individual burden.

- students participate in research faster
- grant money goes further
- co-creating norms promoting diversity, equity & inclusion
- new collabs

## **Biggest lesson: power of research teams to normalize open science**

[openscapes.org](https://openscapes.org)

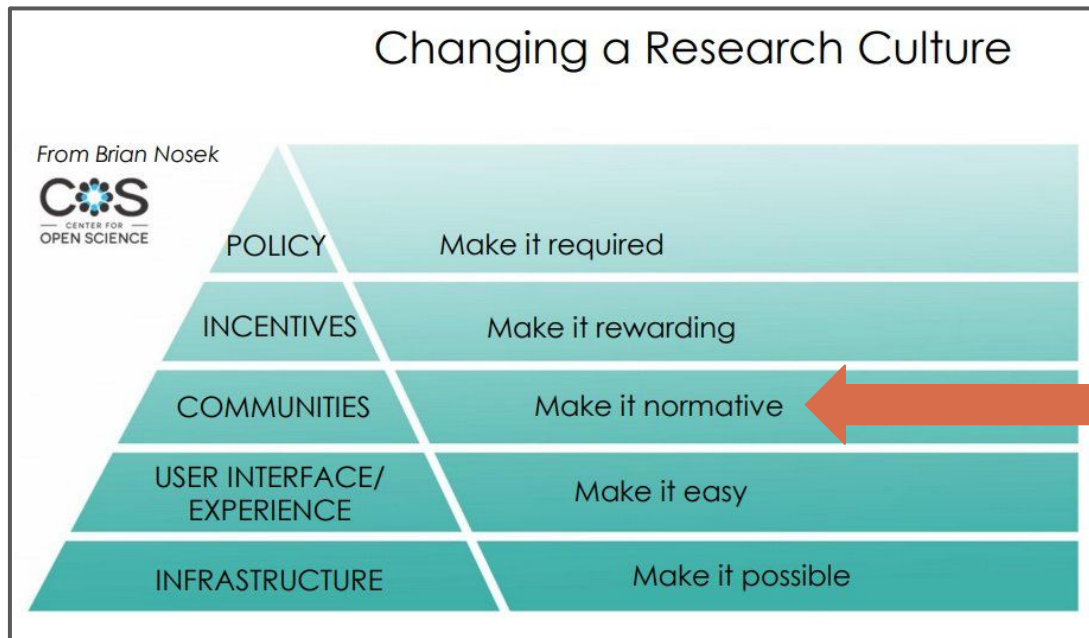
Lowndes 2019

Lowndes et al. 2019



**Supporting people** is critical for enduring and inclusive participation in open science.

We must **support research teams** by providing training and mentorship and **support open leaders** who are trainers and mentors - and expect more of them.



We've made so much progress to make open science possible, easy, rewarding, & required.

Now we must **support people to make it normative.**



# Let's invest in human infrastructure to normalize open science

## 1. **Sponsor research teams** to be trained & mentored by existing efforts

- Hackweeks, Meetups, Carpentries, Openscapes
- Meet existing needs with existing programs and grow the open movement

## 2. **Salary for open leaders** to train & mentor research teams

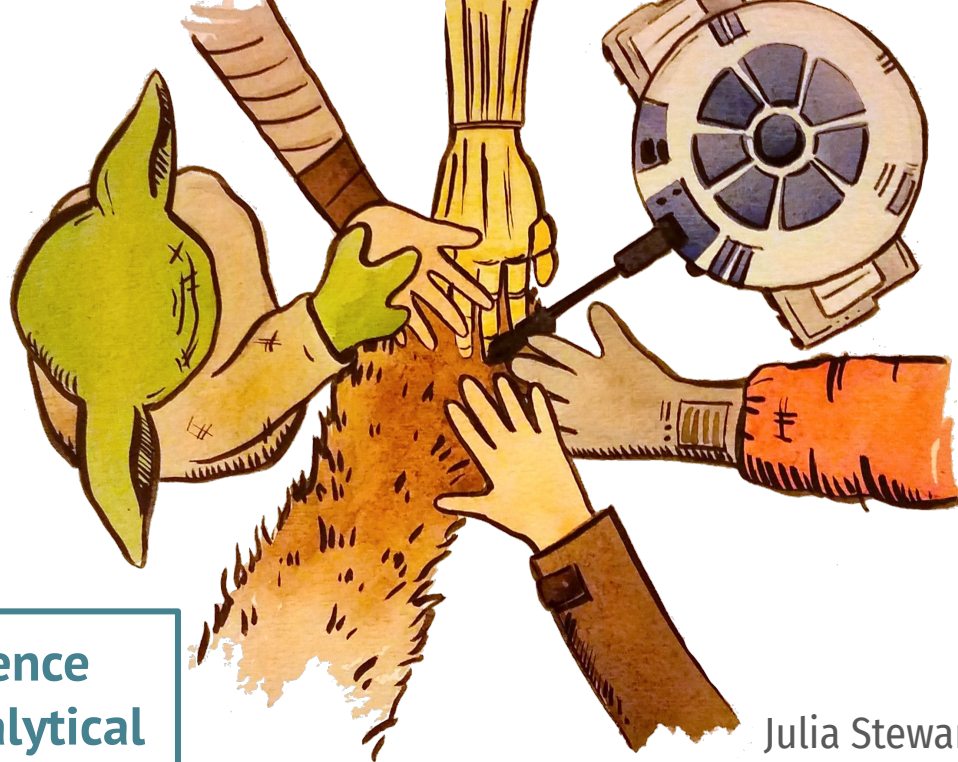
- Trainers, mentors, research software engineers, community managers
  - Often academic early career, “soft money”, no job security or career path
- Lets trainers focus on training, increase continuity, reduce burnout

**Open leaders do jobs that aren't currently valued in academia, and they are critical to normalizing open science.**

# Thank you!

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GORDON AND BETTY  
MOORE  
FOUNDATION



**We can normalize open science through addressing the analytical needs of research teams.** We must fund people that are already working to make this happen and grow the open movement.



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All art by [@allison\\_horst](https://twitter.com/allison_horst)

NASEM Roundtable on Aligning Incentives for Open Science, November 5, 2020

## Further reading (incomplete list):

- The value of #Welcome - Butland 2017
- Unmet needs for analyzing biological big data - Barone et al. 2017
- Barriers to integration of bioinformatics into undergrad life sci education - Williams et al. 2019
- Skills and knowledge for data-intensive environmental research - Hampton et al. 2017
- Creating and maintaining high-performing collaborative research teams: the importance of diversity and interpersonal skills - Cheruvelil et al. 2014
- Data-intensive ecological research is catalyzed by open & team science - Cheruvelil & Soranno 2018
- Open software means kinder science - Lowndes 2019
- Supercharge your research: a ten-week plan for open data science - Lowndes et al. 2019
- Our path to better science in less time using open data science tools - Lowndes et al. 2017
- 3 lessons from remote meetings we're taking back to the office - Cabunoc Mayes et al. 2020
- Open science is a behavior - Corker 2018
- Career paths and prospects in academic data science - Geiger et al. 2018
- Low availability of code in ecology: A call for urgent action - Culina et al. 2020