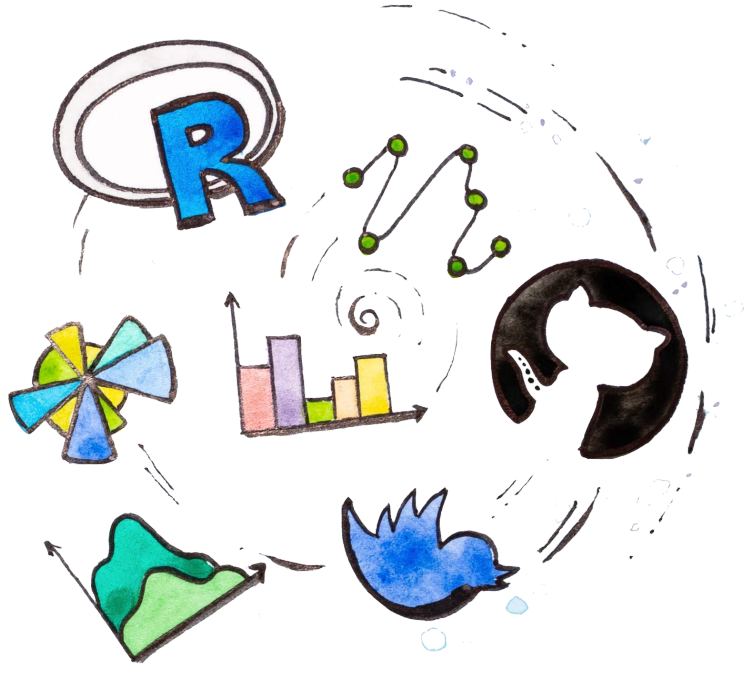


R for better science in less time

Julia Stewart Lowndes, PhD
Marine Data Scientist & Mozilla Fellow
National Center for Ecological Analysis & Synthesis
University of California at Santa Barbara, USA

@juliesquid
lowndes@nceas.ucsb.edu
jules32.github.io/useR-2019-keynote

NCEAS National Center for Ecological Analysis and Synthesis

moz://a

Lessons learned

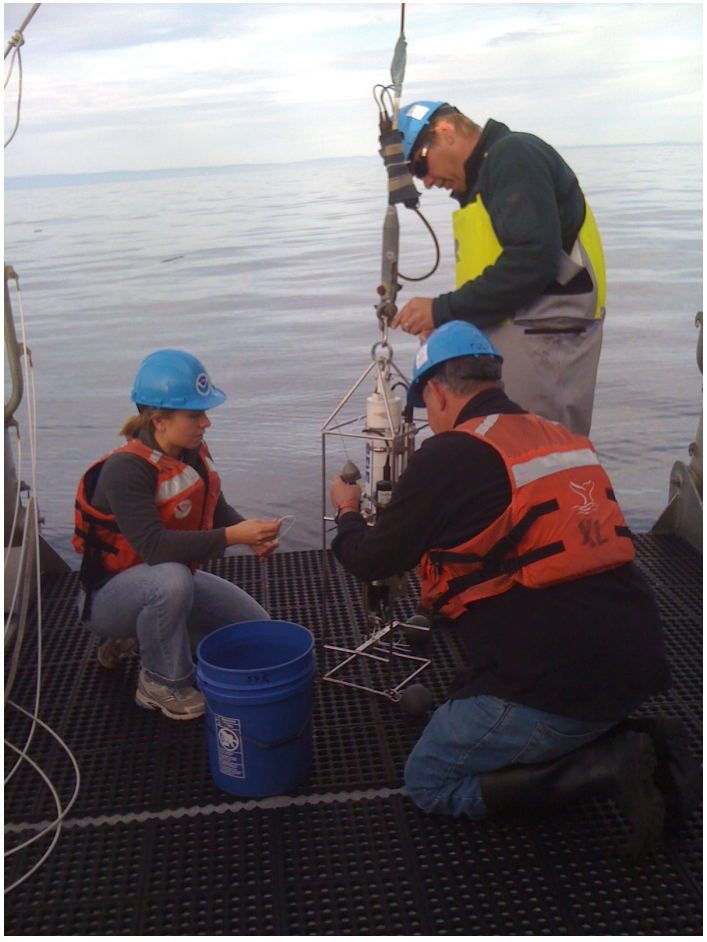
Open data science is a mindset

Teamwork starts with openness

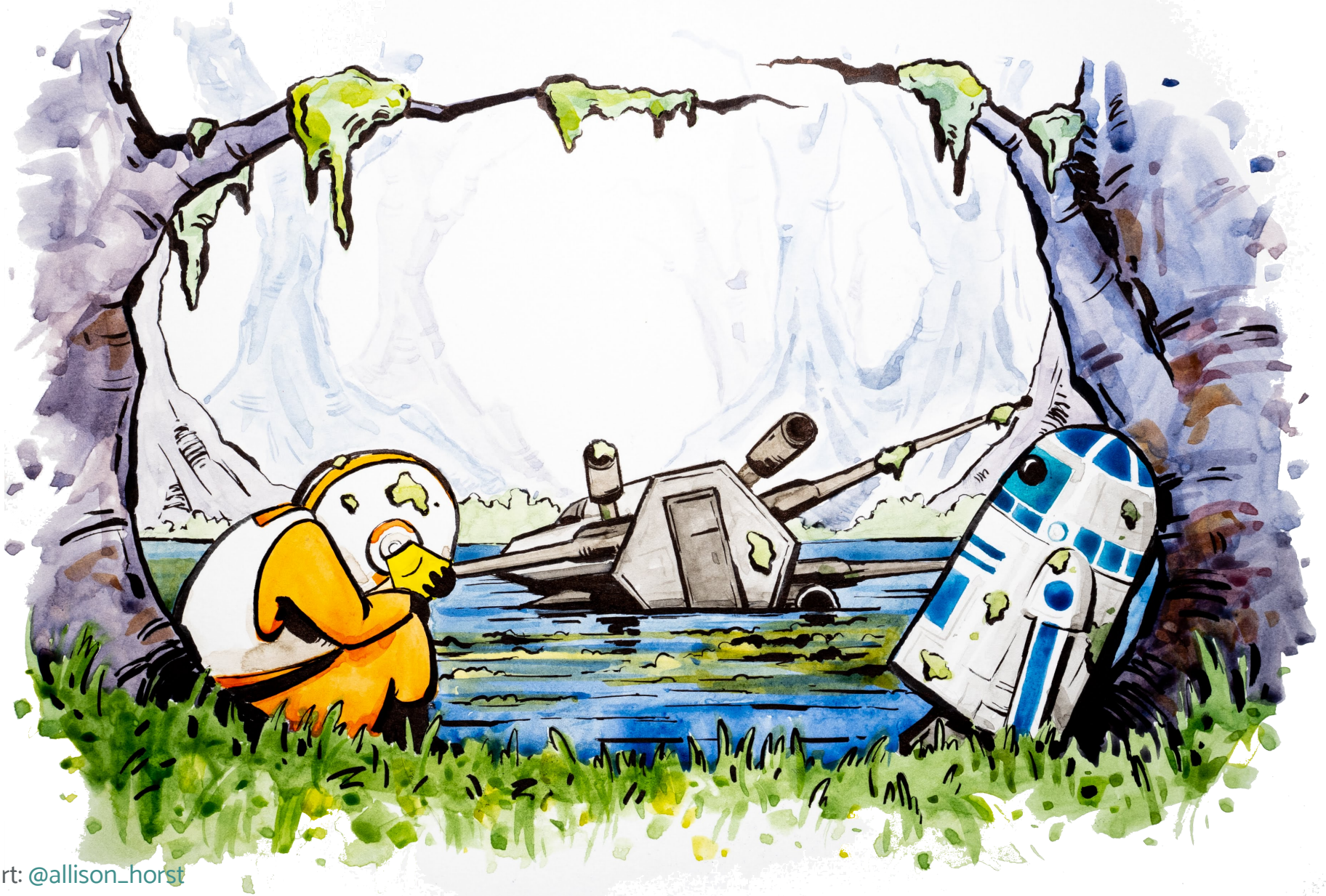
Harness the power of welcome

@juliesquid

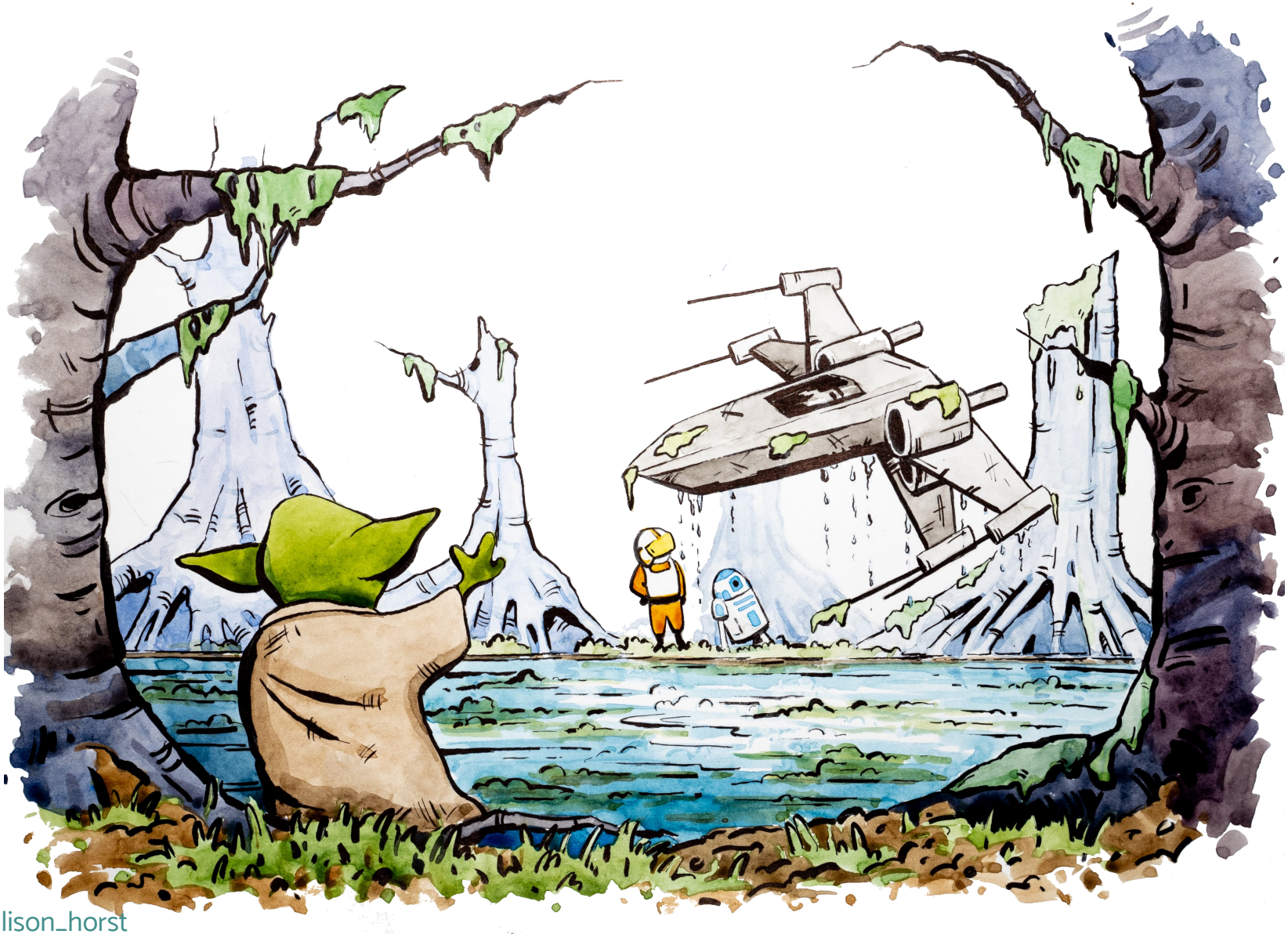
photo: Greg Auger



web: Gilly Lab



art: @allison_horst



art: @allison_horst

art: @allison_horst

art: @allison_horst

web: ohi-science.org; @OHIscience

nature ecology & evolution

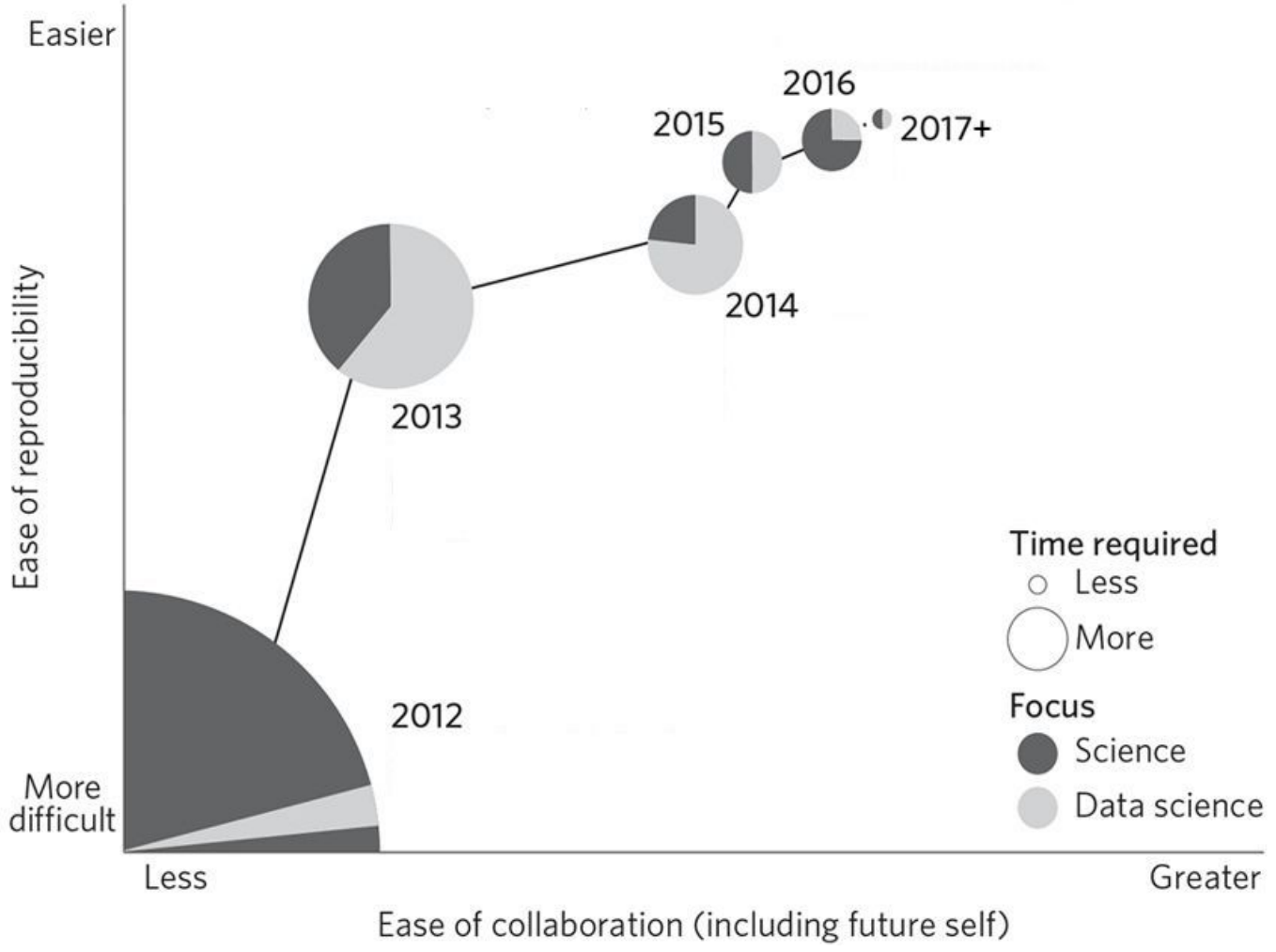
PERSPECTIVE

PUBLISHED: 23 MAY 2017 | VOLUME: 1 | ARTICLE NUMBER: 0160

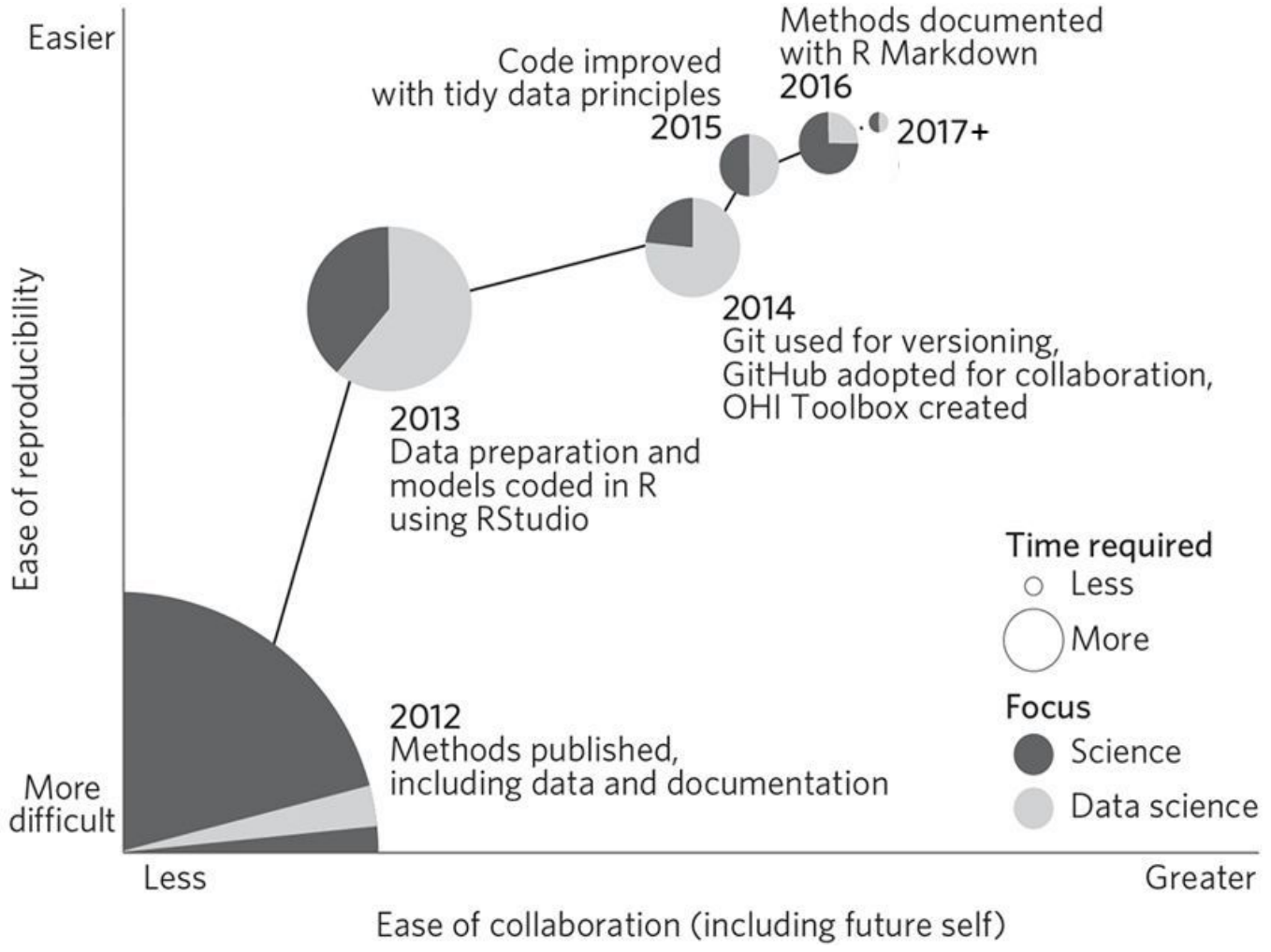
Our path to better science in less time using open data science tools

Julia S. Stewart Lowndes[1]*, Benjamin D. Best[2], Courtney Scarborough[1], Jamie C. Afflerbach[1], Melanie R. Frazier[1], Casey C. O'Hara[1], Ning Jiang[1] and Benjamin S. Halpern[1,3,4]

source: Lowndes *et al.* 2017; web: ohi-science.org/betterscienceinlesstime



source: Lowndes *et al.* 2017



source: Lowndes *et al.* 2017

R
Ladies
ROpenSci
moz://a
R Studio®
THE CARPENTRIES

Eco-Data-Science & RLadies SB

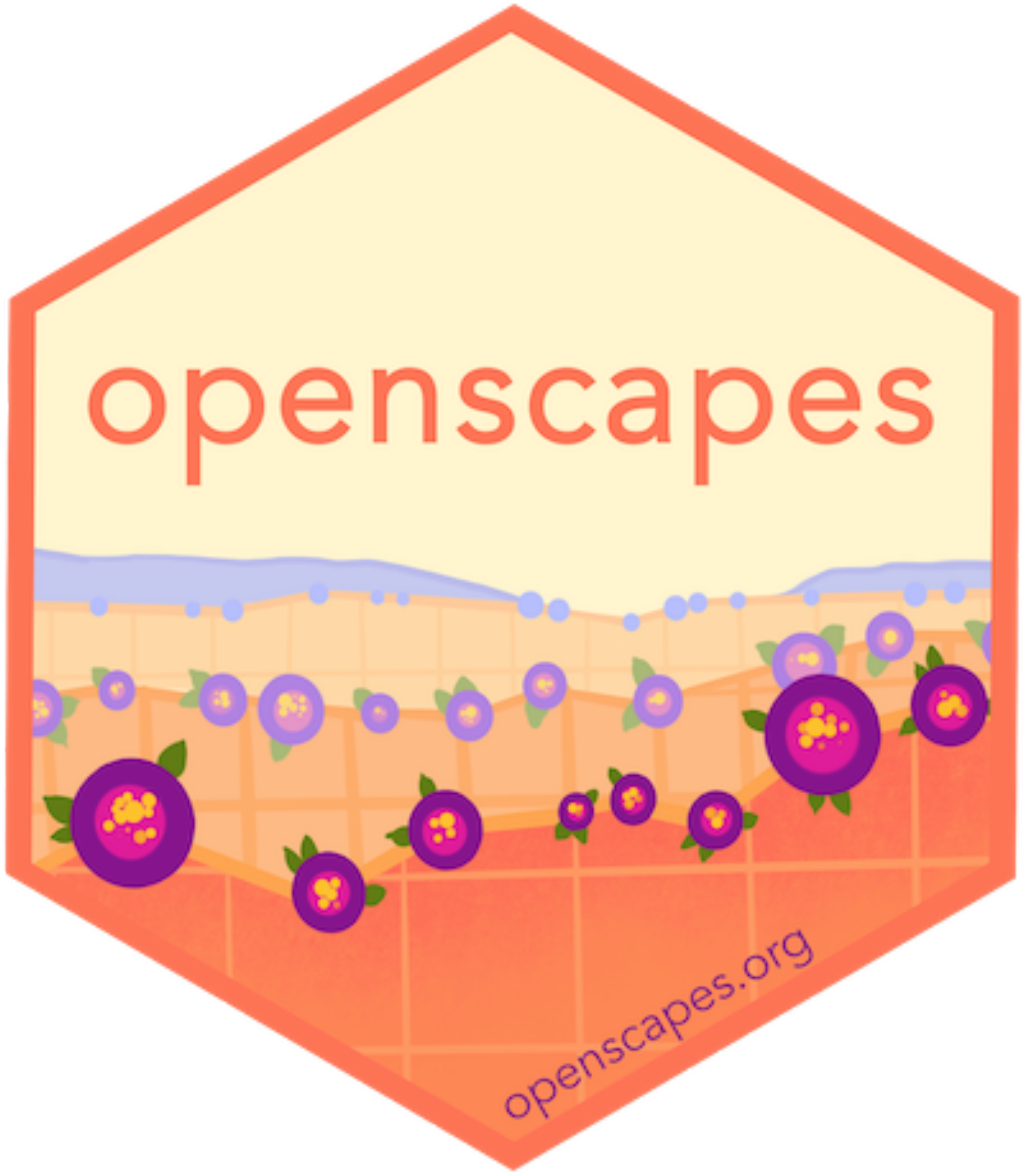
art: @allison_horst; twitter: @ecodatasci; @RLadiesSB

Mozilla Announces 26 New Fellows in Openness, Science, and Tech Policy

Mozilla | August 21, 2018

These technologists, activists, and scientists will spend the next 10 to 12 months creating a more secure, inclusive, and decentralized internet

blog: blog.mozilla.org

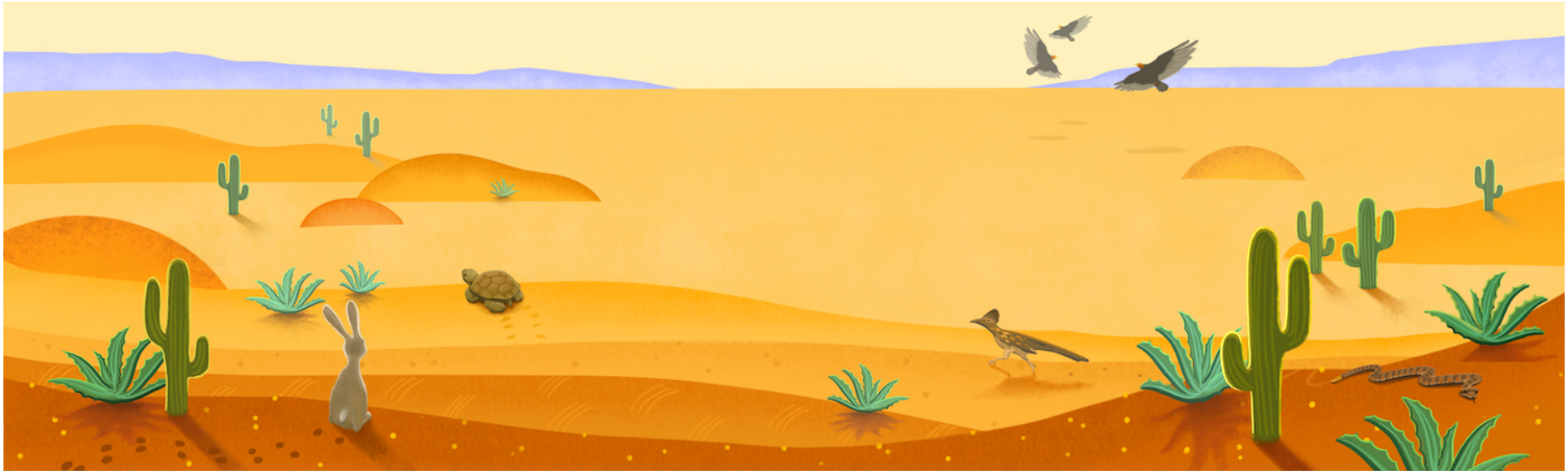


art: @allison_horst; web: openscapes.org; @openscapes

Welcome and empower scientists as labs

Increase visibility and value by amplifying labs

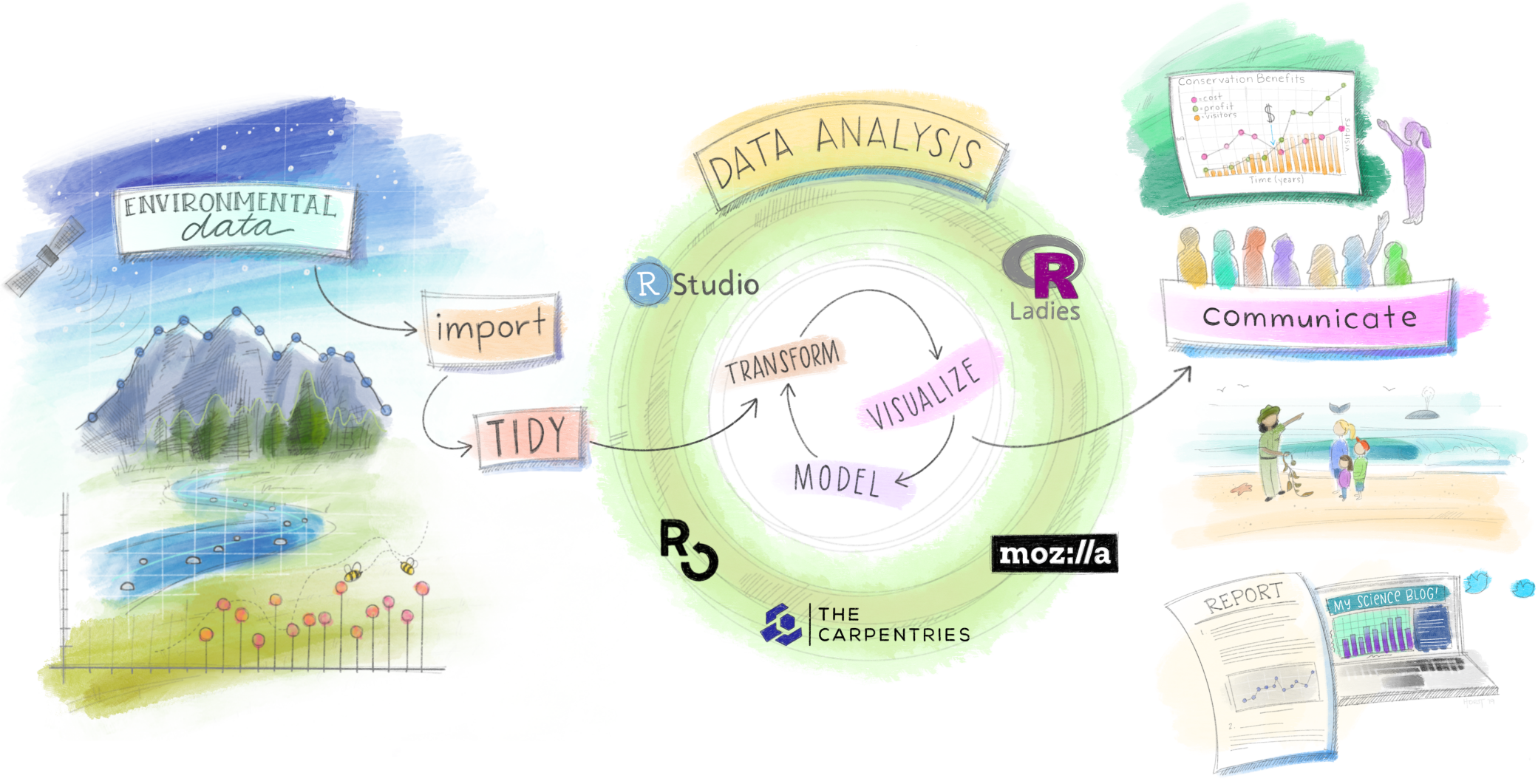
art: @allison_horst; web: openscapes.org



Mentorship program for early career scientists & their labs

Normalize open data science in the lab & seed change beyond

art: @allison_horst; web: openscapes.org/champions



art: @allison_horst; updated from Wickham & Grolemund

art: @allison_horst

Lessons learned

Open data science is a mindset

Teamwork starts with openness

Harness the power of welcome

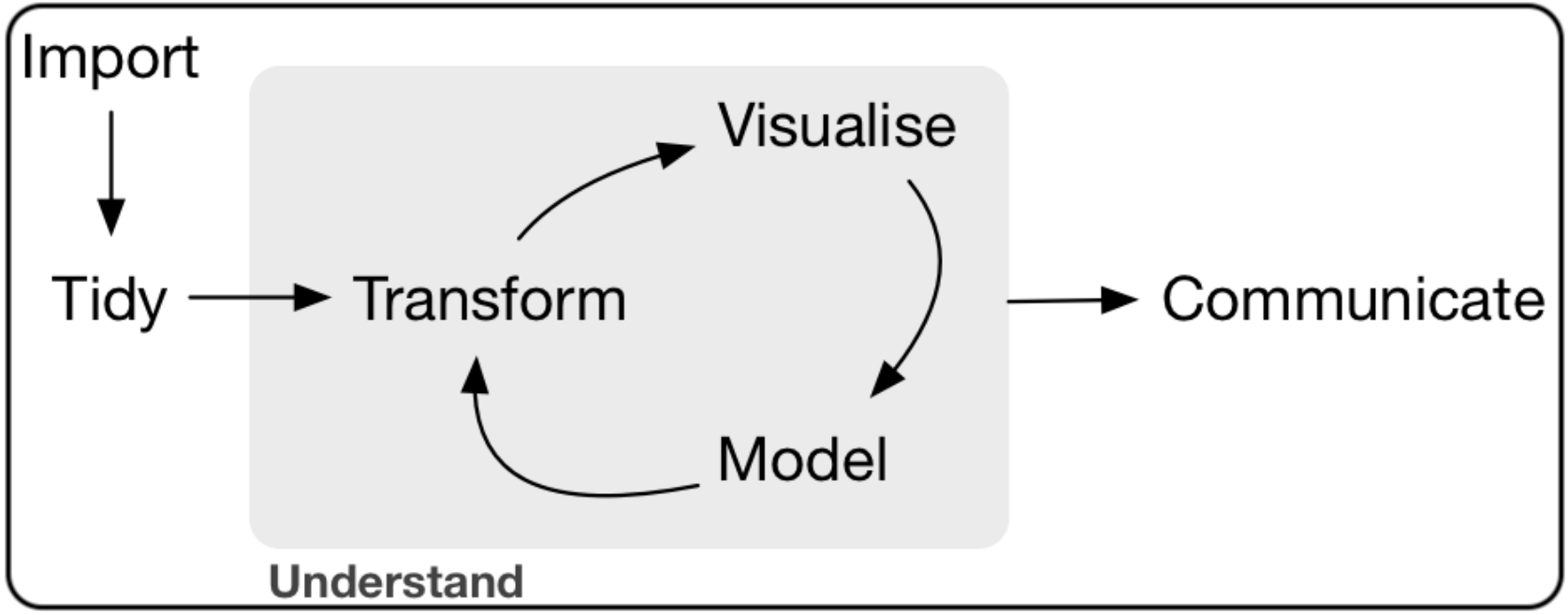
Open data science is a mindset

expect a better way • build confidence & willingness • reimagine science communication

Expect there is a better way

Data science

Data science is the discipline of turning raw data into understanding



source: Wickham & Grolemund

Build confidence & willingness

Open science

Open science is the concept of transparency at all stages of the research process, coupled with free and open access to data, code, and papers

source: Hampton et al. 2015

Reimagine science communication

Communication tools

Communication tools

open coding language

- shared practices
- streamlined tools

collaboration platform

- bookkeeping
- display, publication, & distribution

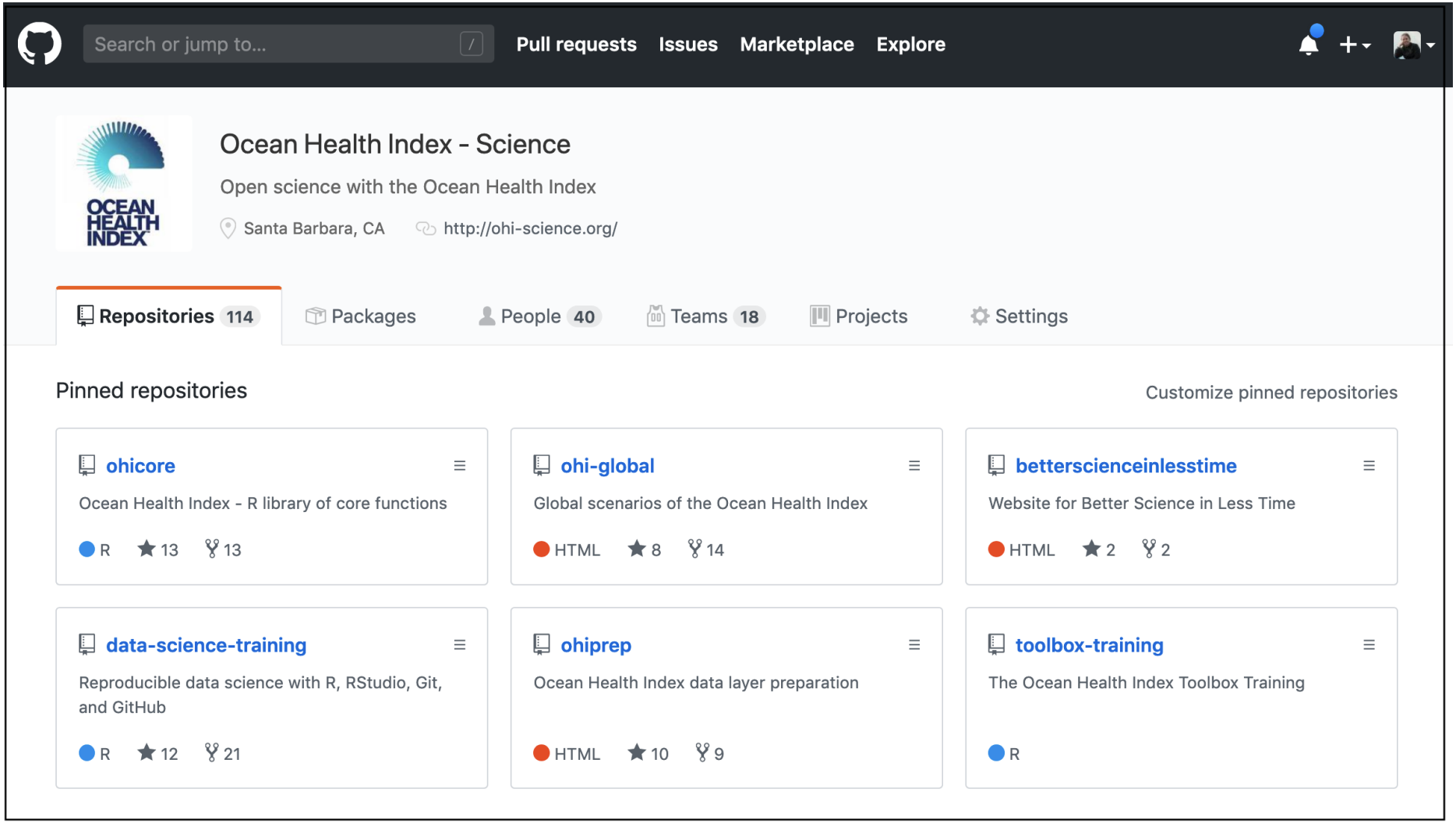
docs, slides, sheets

- coordinate
- co-develop
- share

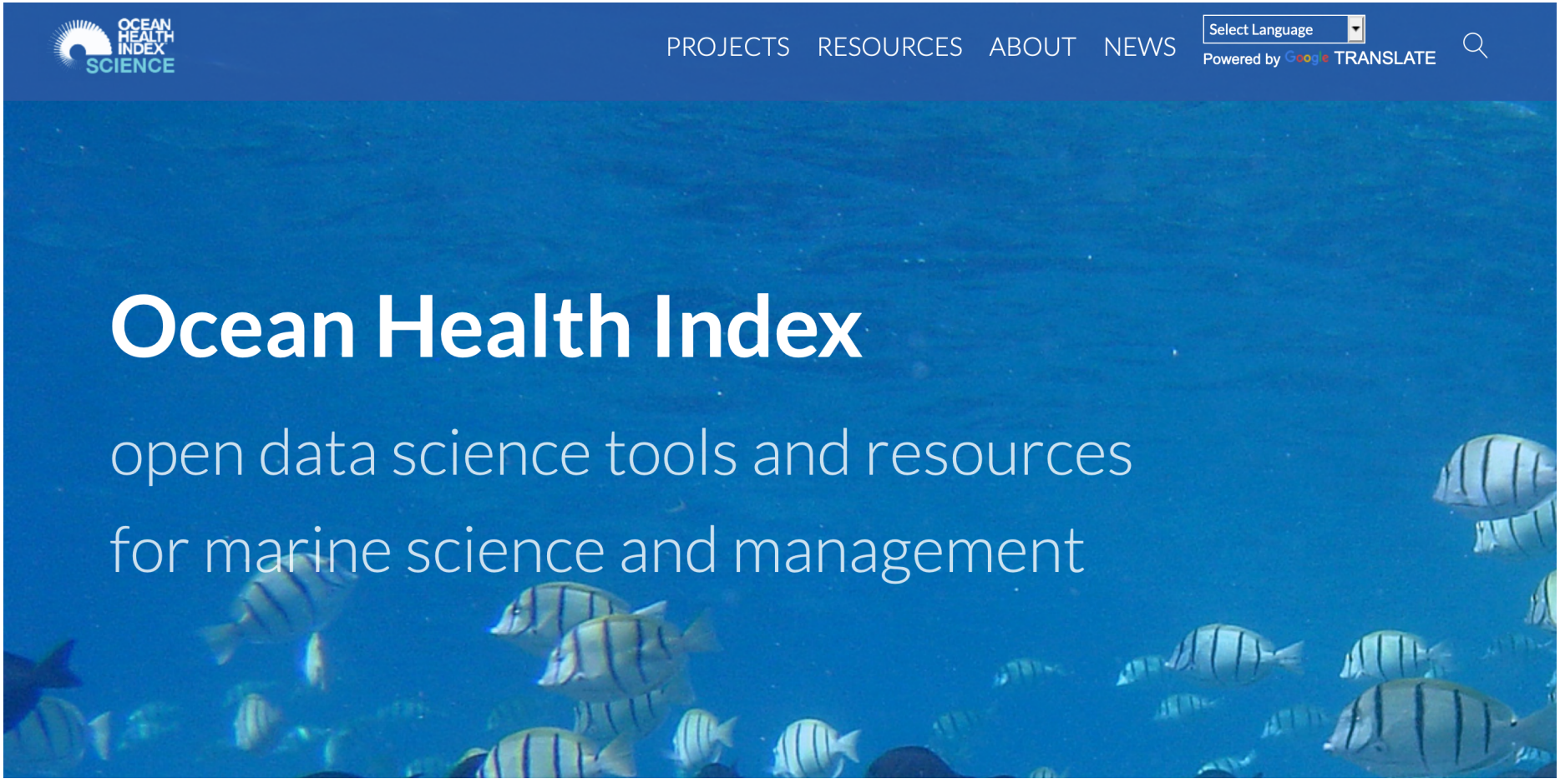
connection to broader communities

- listen
- learn
- contribute

source: OHI slides



web: github.com/ohi-science

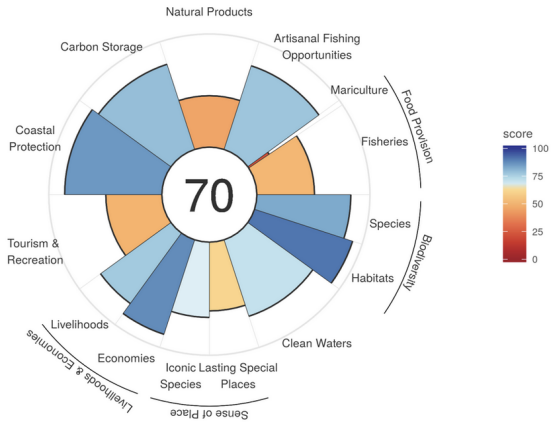


web (Jekyll): ohi-science.org

GLOBAL Goals Layers Scores Download Fellows

Annual OHI global assessments

Ocean Health Index scores provide invaluable, comprehensive, and quantitative assessments of progress towards healthy and sustainable oceans. Such assessments are particularly valuable when repeated annually. 2018 marks the seventh year of annual global Ocean Health Index (OHI) assessments, with scores representing ocean health for 220 coastal nations and territories. For detailed description of our up-to-date data and methods, see the Supplemental Information. And visit our Story Map!



The average 2018 Index score was 70 out of 100. Average Index scores have not dramatically changed over seven years, which could be expected at a global scale. However, some individual goals and regions have had significant changes.

- Learn about the goals
- Read the 2018 results summary
- Explore scores by region and goal
- Download data
- Dig deeper with the 2018 methods
- Learn more at oceanhealthindex.org

The OHI framework has not changed since its inception in 2012 (*Halpern et al. 2012*). We continue to assess ocean health based on the sustainable delivery of a suite of goals that are important to humans. We score each goal on a scale of 0-100 based on current status, trend, and external pressures and resilience measures. Scores are calculated for each coastal nation before being

web (simple RMarkdown): ohi-science.org/ohi-global

Home About Frequently Asked Questions Goals Who we are

An Ocean Health Index for South West England

The Ocean Health Index

The Ocean Health Index (OHI) is a tool to measure the benefits and services that the ocean provides for people now and into the future. Assessments are developed with the support of local stakeholders to better understand how to sustainably balance current and future ocean use. Discover more at ohi-science.org.

The project

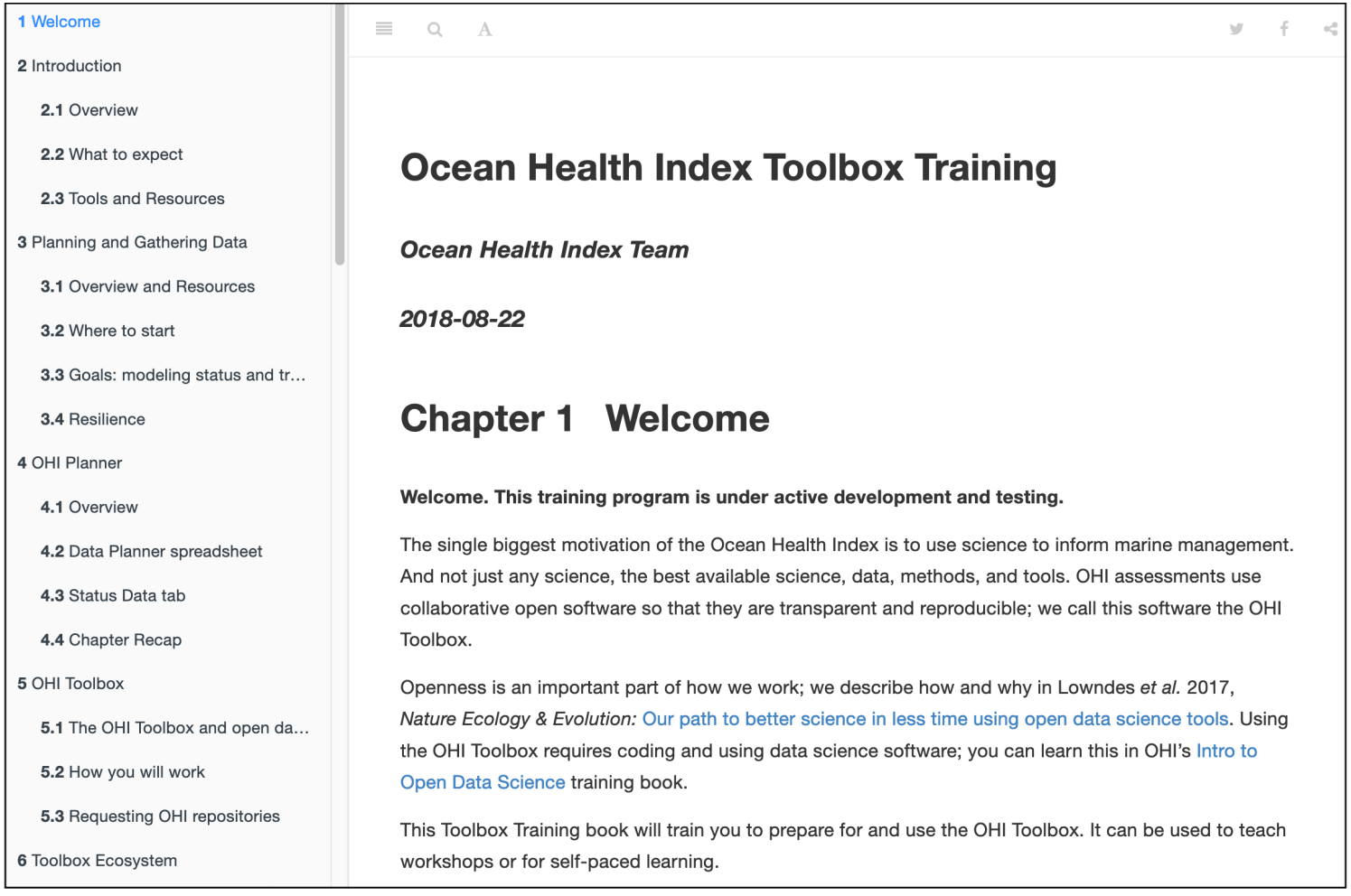
The application of OHI to the South West aims to provide a regional baseline for marine health and to assess the impact of management policies. The project specifically coincides with development of the Marine Management Organisation's South West Marine Plan. Results will help inform management decision making with all data openly available.

The team

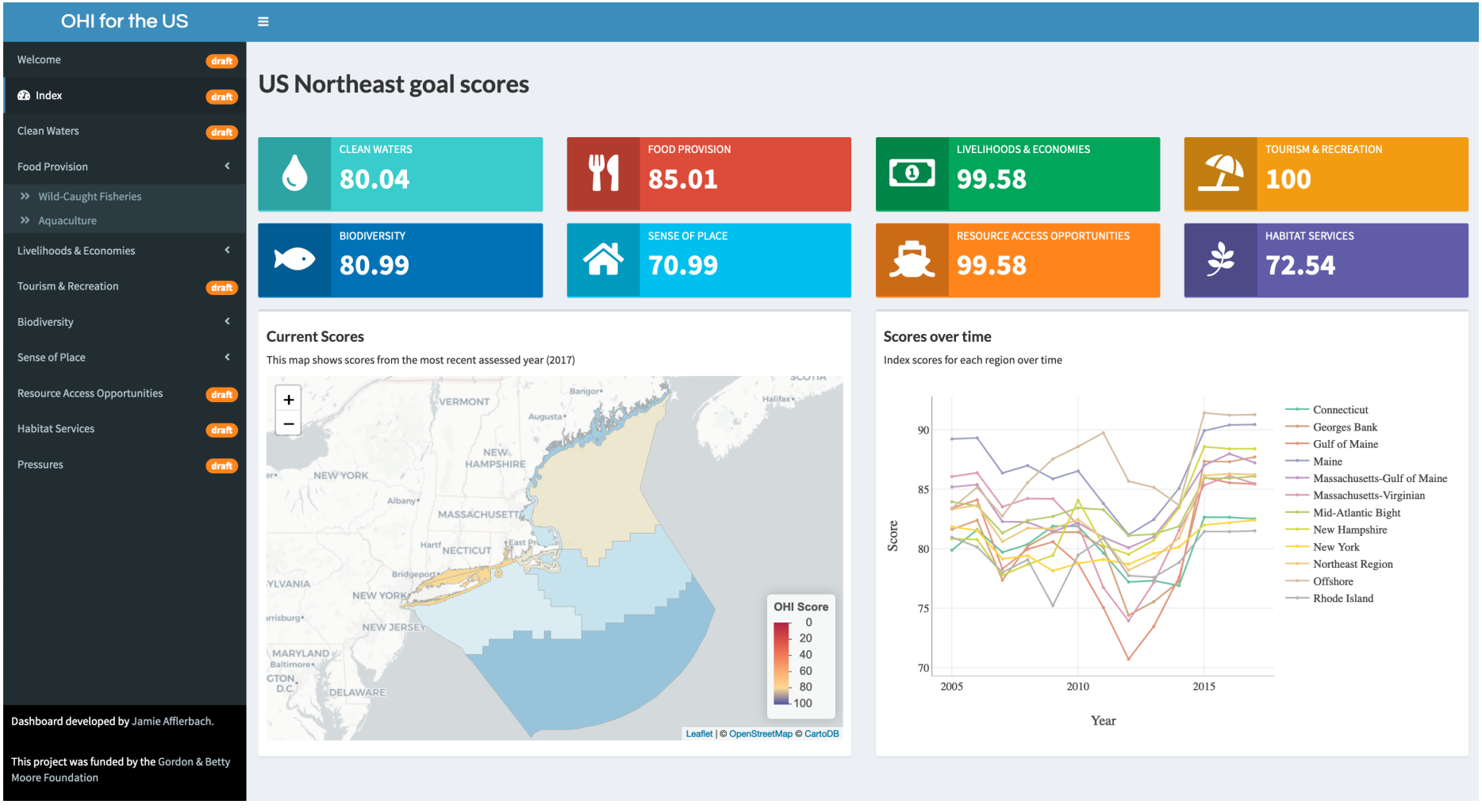
The South West Ocean Health Index is being conducted by researchers from the University of Exeter. The project began in 2018 and results are expected to be made available early 2020.

For further information please visit our FAQ page and a link for email updates will be available here shortly.

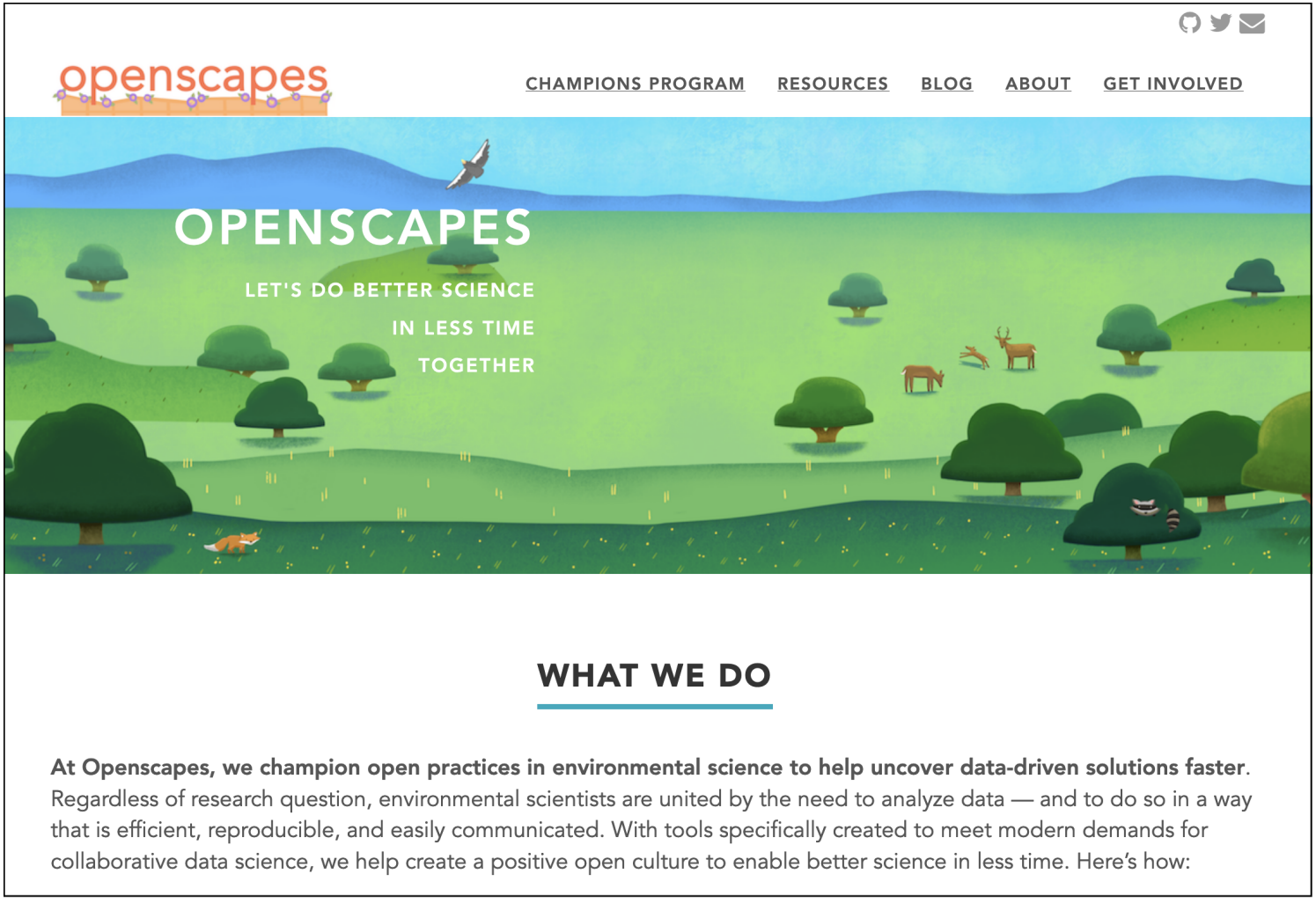
web (simple RMarkdown): ohi-science.org/esw



web: ohi-science.org/toolbox-training



dashboard (Shiny): @jafflerbach, work in progress. inspiration: Imagine Boston



web (blogdown): openscapes.org

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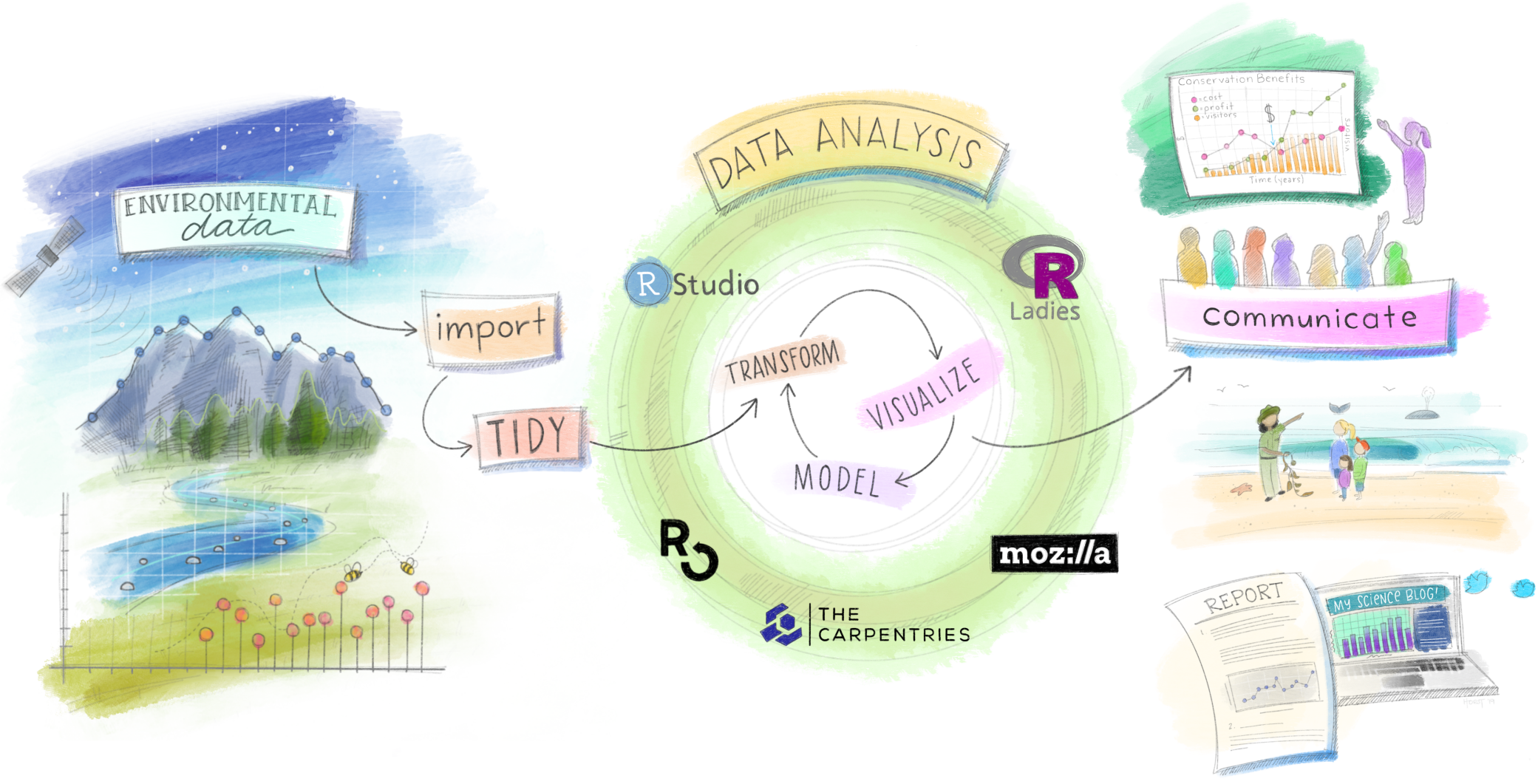
NCEAS National Center for Ecological Analysis and Synthesis | moz://a

slides (xaringan): jules32.github.io/useR-2019-keynote



art: @allison_horst; updated from Wickham & Grolemund

Teamwork starts with openness

working openly • vertical & horizontal leadership • community

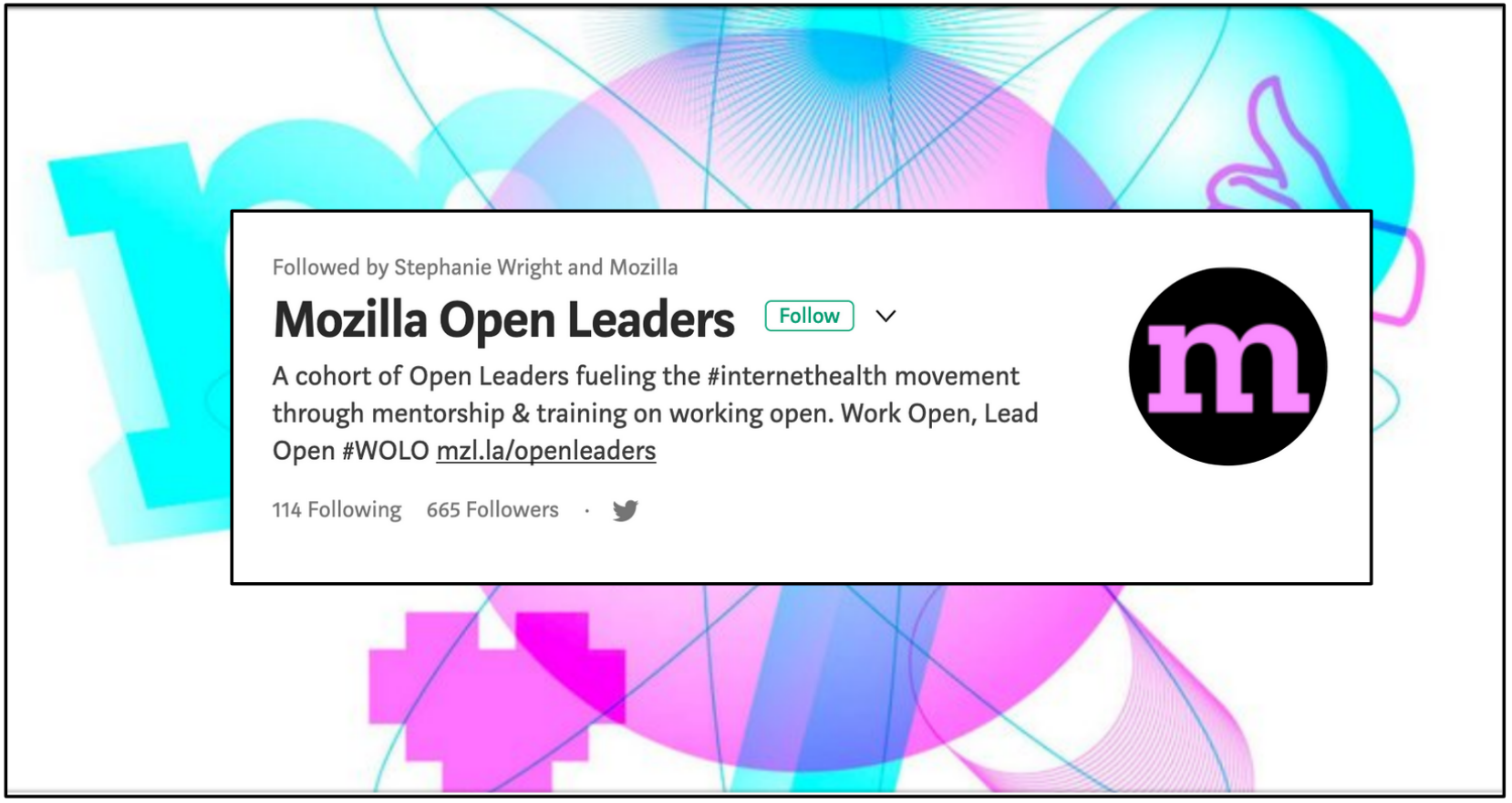
Working openly

Ocean Health Index team

Ocean Health Index team

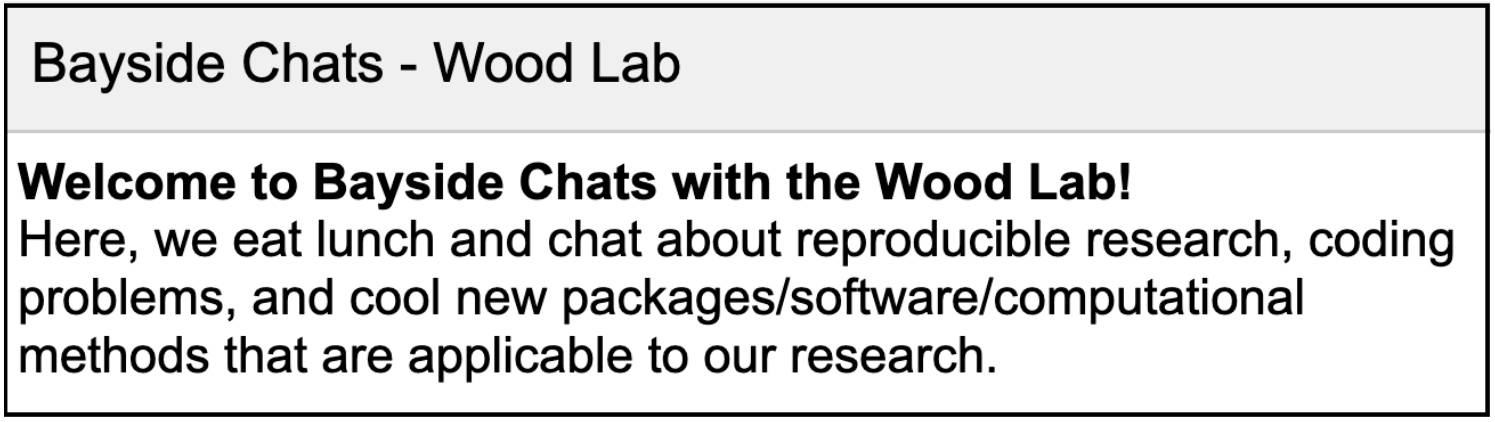
Openscapes Cohorts

blog: openscapes.org



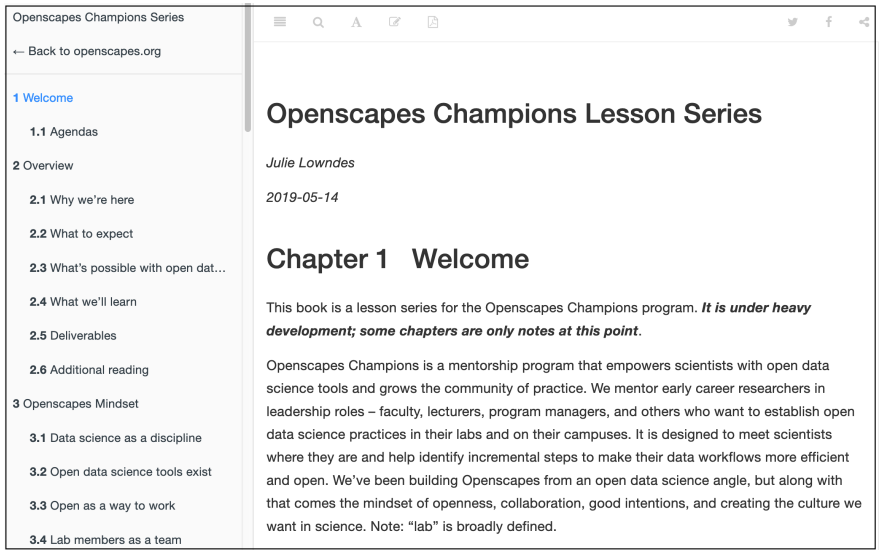
web: Mozilla Open Leaders (Apply for OLX by August 1!)

[Sea]side chats & hackathons



blog: openscapes.org; Wood lab

Openscapes lesson series



lesson series: openscapes.org/series

tweet thread: @openscapes

Vertical & horizontal leadership

Ocean Health Index team

web: National Center for Ecological Analysis & Synthesis;

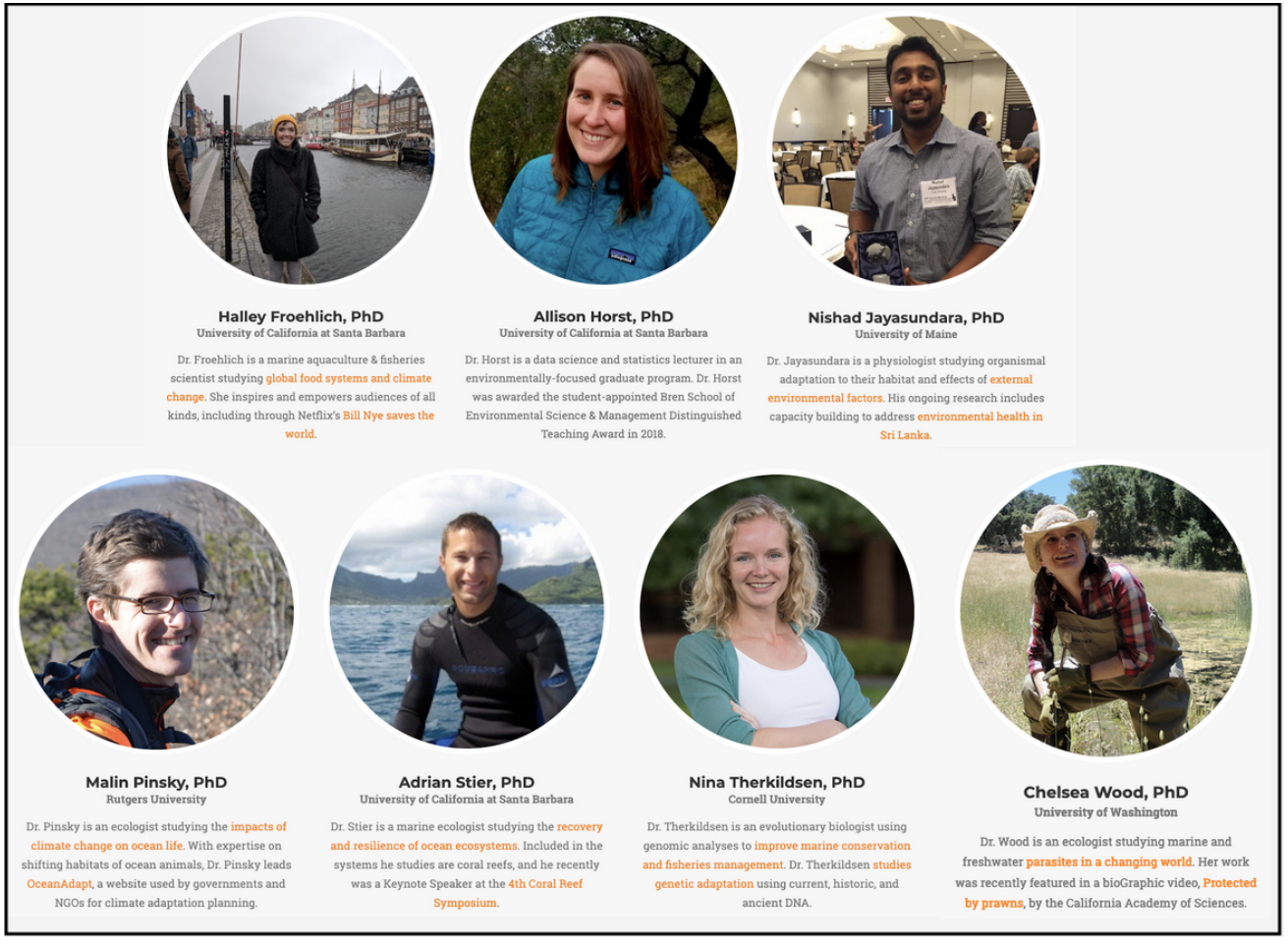
tweet: @juliesquid

Ocean Health Index team

web: National Center for Ecological Analysis & Synthesis;

tweet: @juliesquid

Openscapes Champions



Halley Froehlich, PhD
University of California at Santa Barbara

Dr. Froehlich is a marine aquaculture & fisheries scientist studying global food systems and climate change. She inspires and empowers audiences of all kinds, including through Netflix's Bill Nye saves the world.

Allison Horst, PhD
University of California at Santa Barbara

Dr. Horst is a data science and statistics lecturer in an environmentally-focused graduate program. Dr. Horst was awarded the student-appointed Bren School of Environmental Science & Management Distinguished Teaching Award in 2018.

Nishad Jayasundara, PhD
University of Maine

Dr. Jayasundara is a physiologist studying organismal adaptation to their habitat and effects of external environmental factors. His ongoing research includes capacity building to address environmental health in Sri Lanka.

Malin Pinsky, PhD
Rutgers University

Dr. Pinsky is an ecologist studying the impacts of climate change on ocean life. With expertise on shifting habitats of ocean animals, Dr. Pinsky leads OceanAdapt, a website used by governments and NGOs for climate adaptation planning.

Adrian Stier, PhD
University of California at Santa Barbara

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Nina Therkildsen, PhD
Cornell University

Dr. Therkildsen is an evolutionary biologist using genomic analyses to improve marine conservation and fisheries management. Dr. Therkildsen studies genetic adaptation using current, historic, and ancient DNA.

Chelsea Wood, PhD
University of Washington

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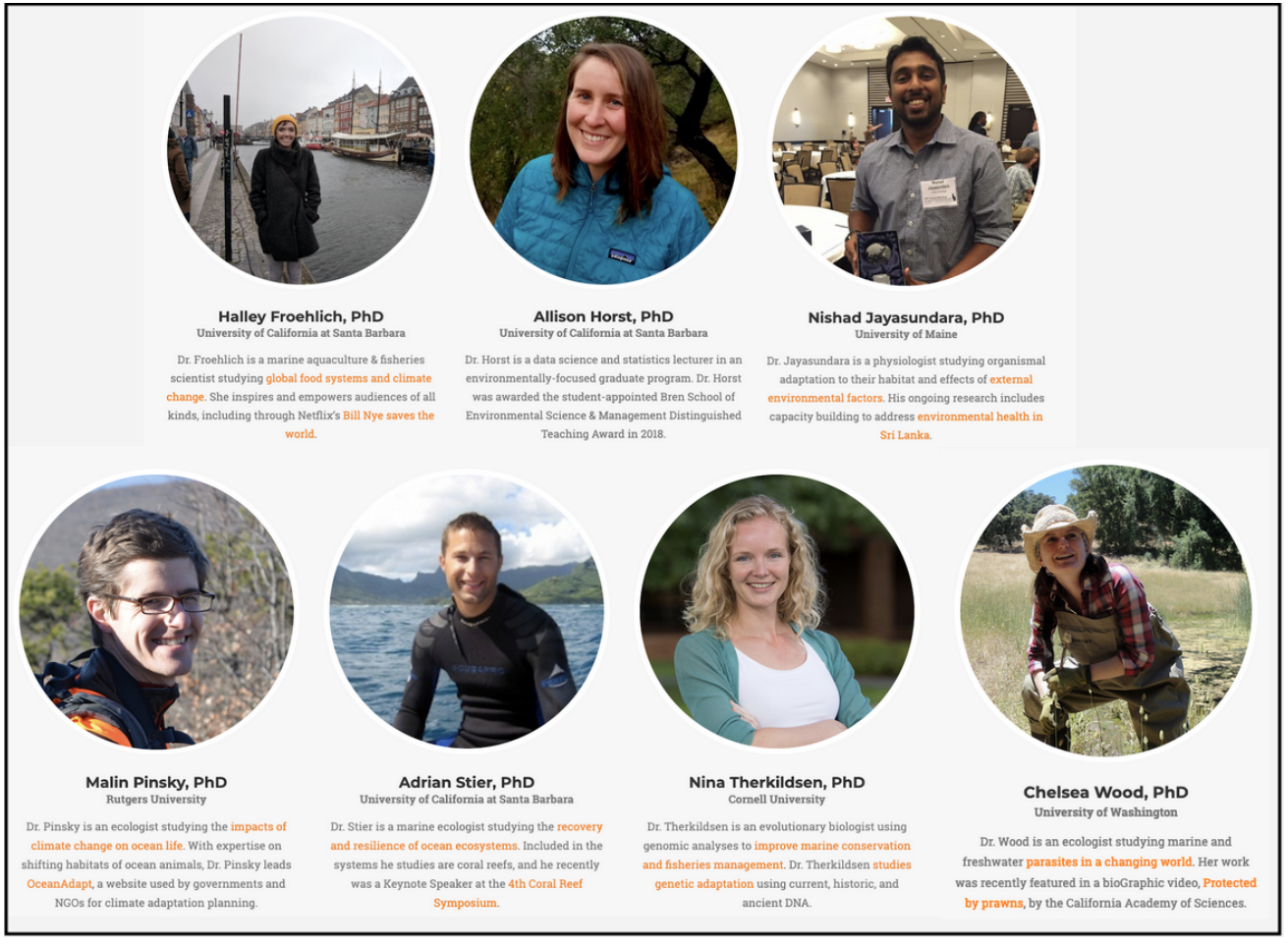
blog: openscapes.org

Openscapes Champions



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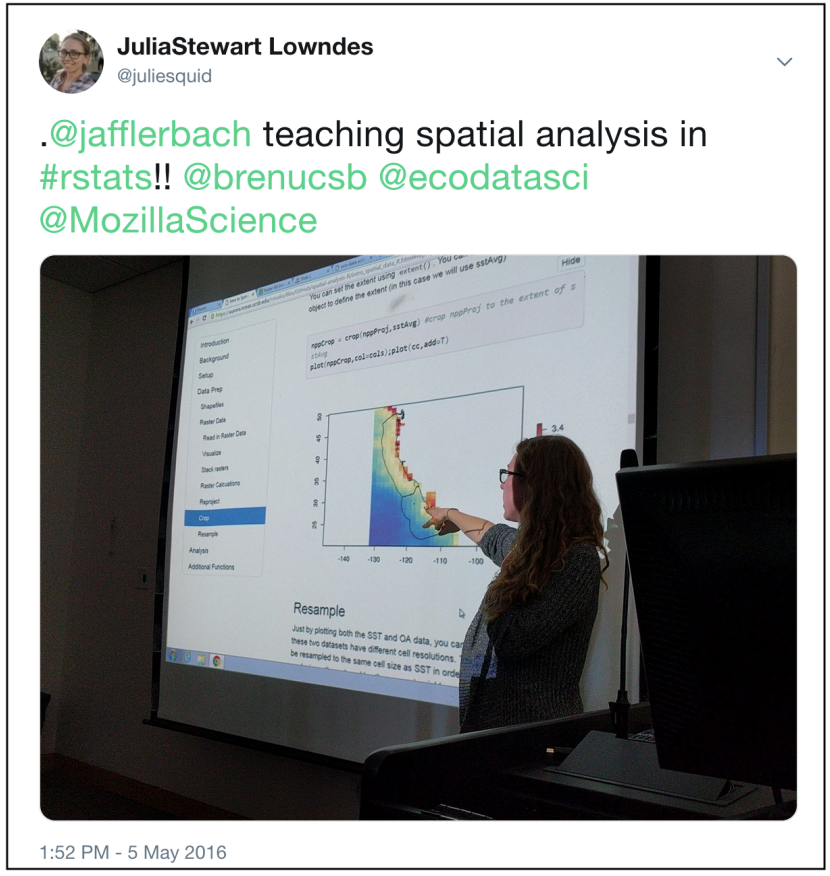
blog: openscapes.org

twitter: @stuart620

tweet: @RLadiesHPNJ

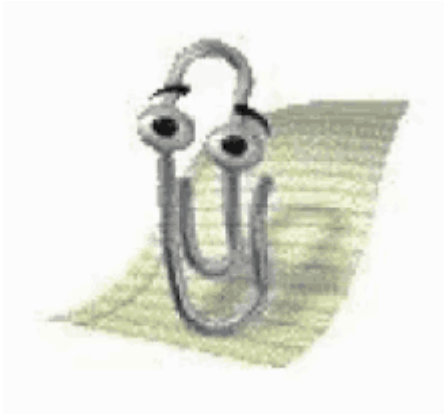
Community

#rstats



tweet: @juliesquid

tweet: @jcheng



JuliaStewart Lowndes
@juliesquid

4-year-old niece: who's @hadleywickham? Husband of this #rstats #openscience girl: he's a wizard who lives on the internet

2:19 PM - 30 Apr 2016

tweet: @juliesquid

tweet: @DocFroehlich

rOpenSci & RStudio

tweet: @jafflerbach

tweet: @juliesquid

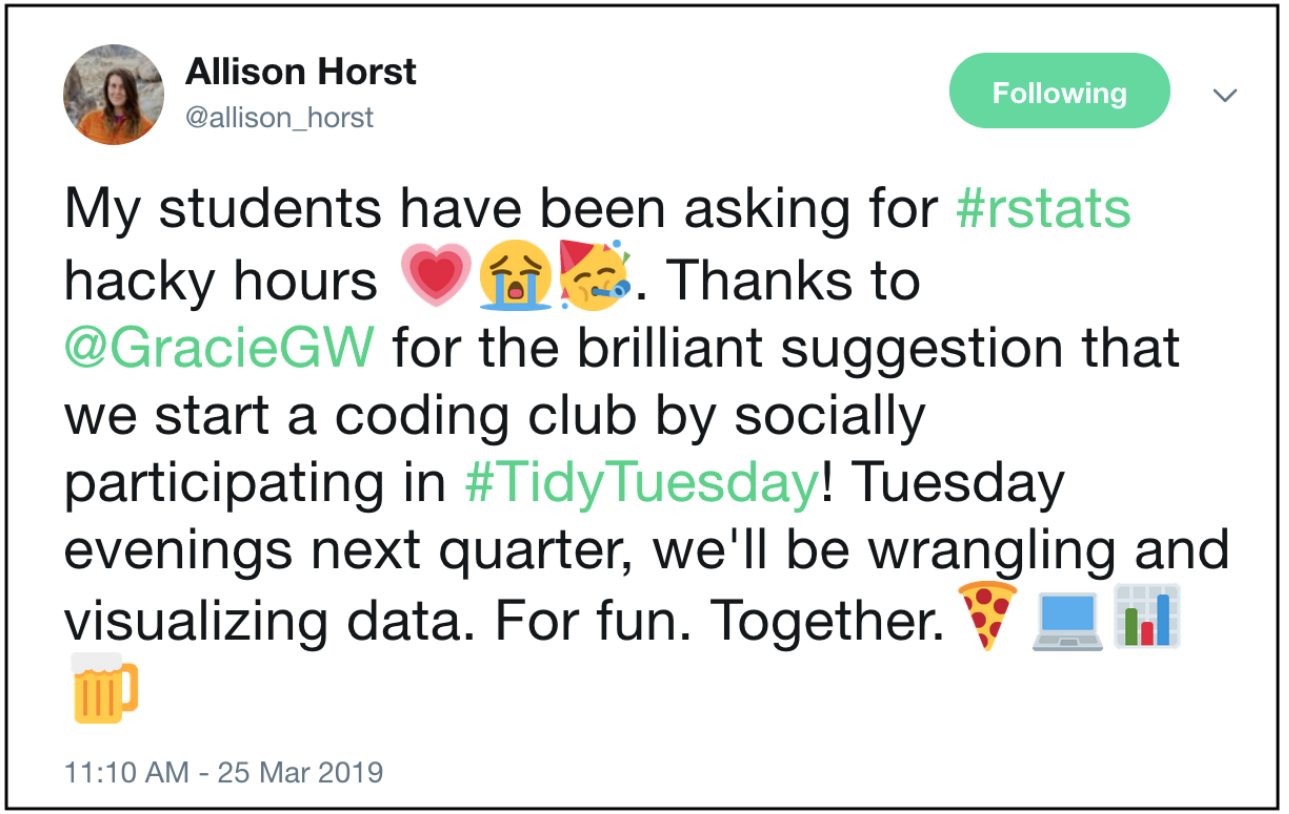
blog: openscapes.org

This isn't just about coding and GitHub, this is about changing how we do science
— Malin Pinsky

RLadies

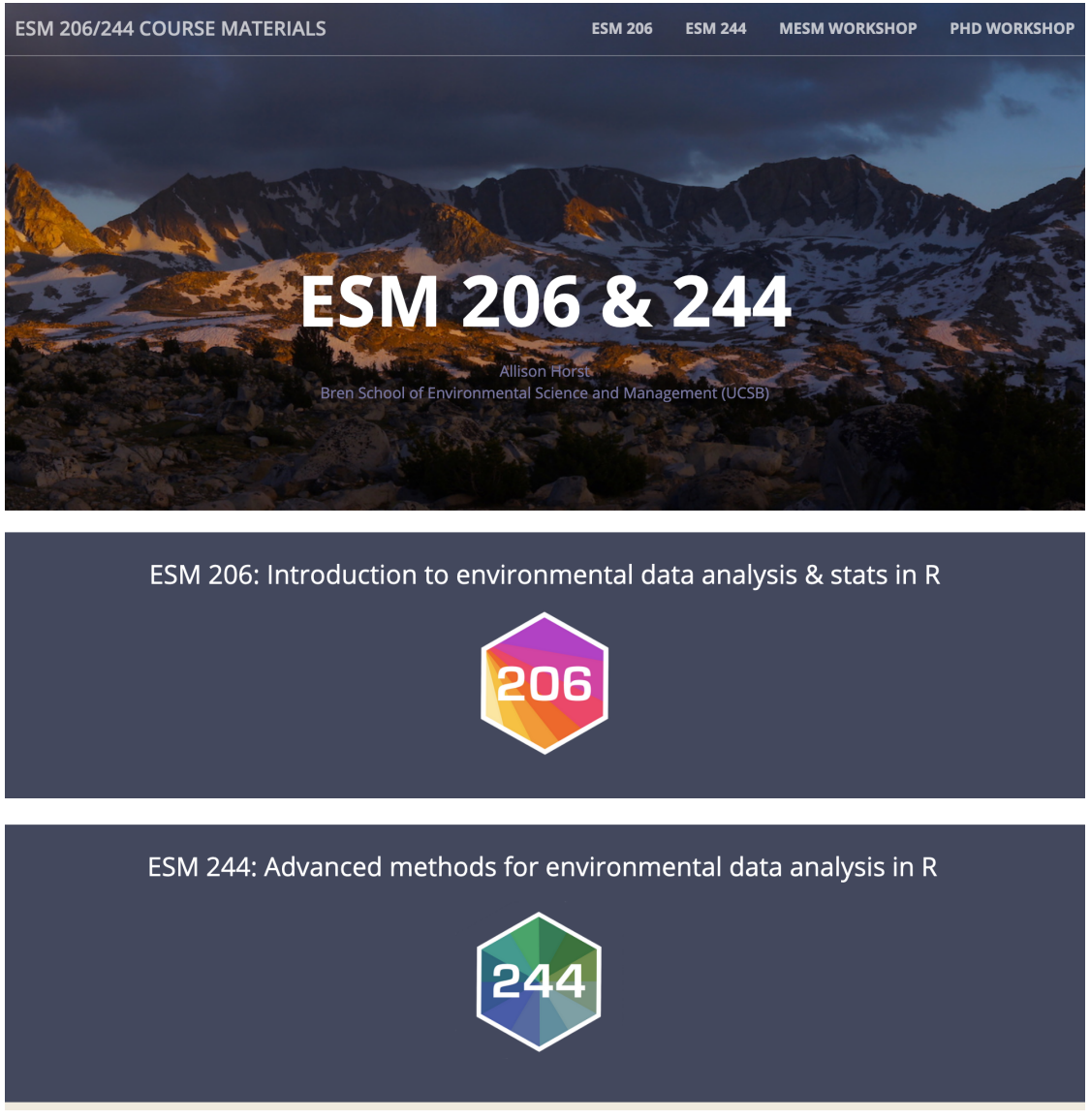
web: rladies.org, photo: JD Long

#tidytuesday hacky hours

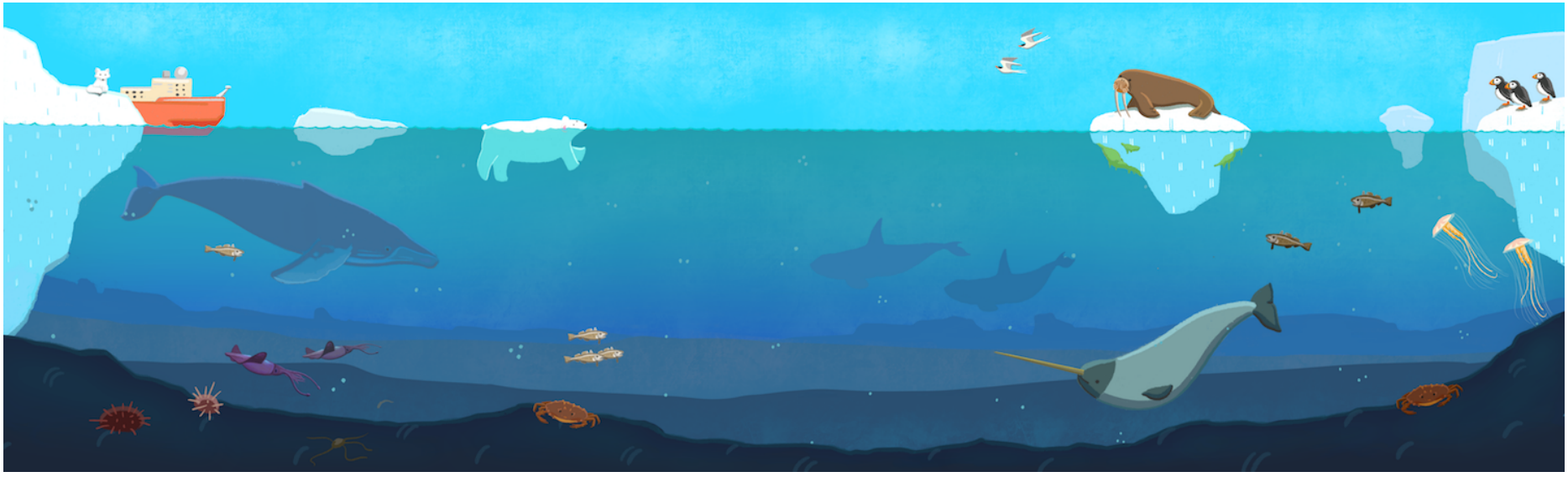


tweet: @allison_horst; blog openscapes.org

art: @allison_horst; blog: openscapes.org



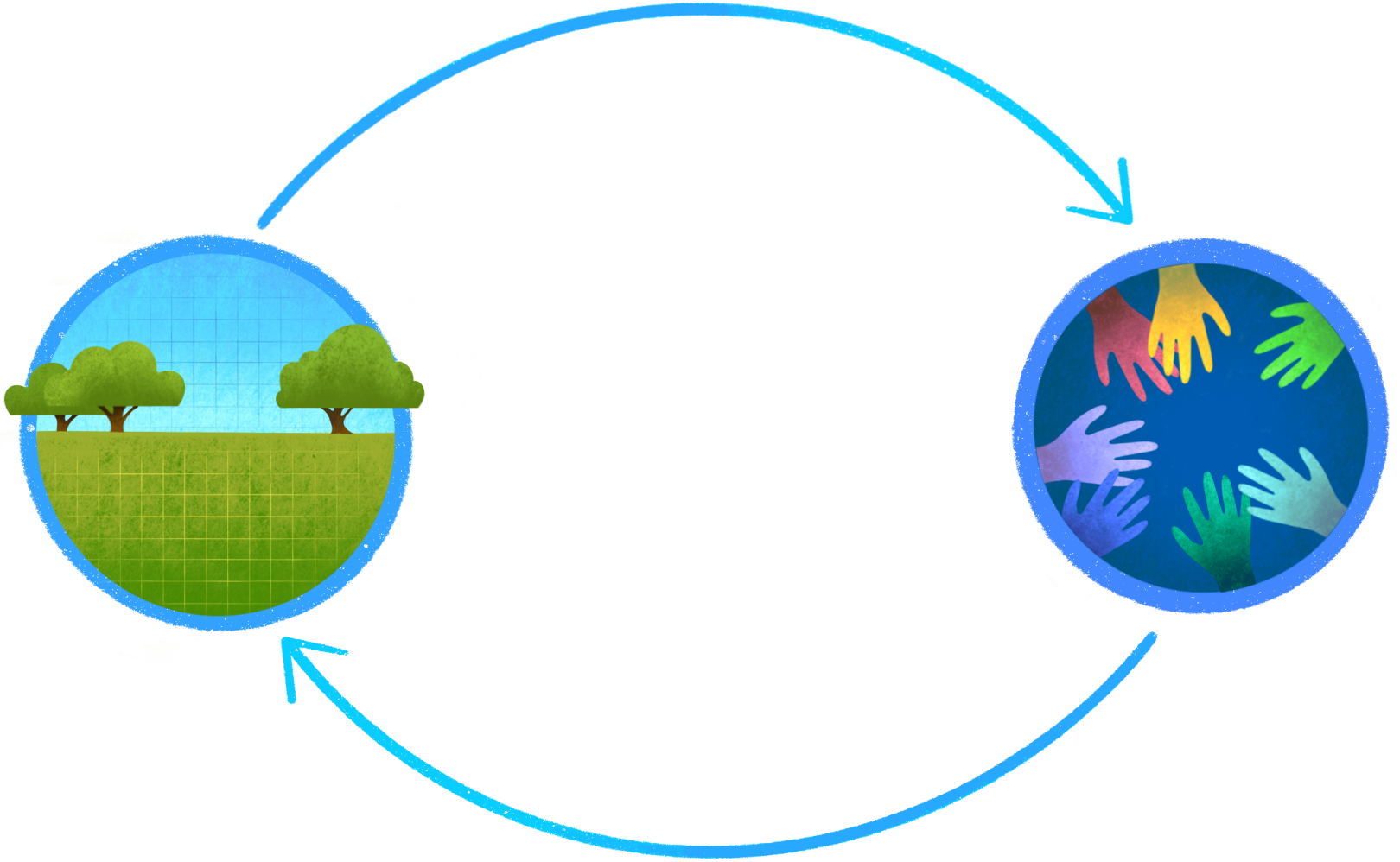
web: allisonhorst.github.io



Mindset shifts in individuals
Increase in skills & practice

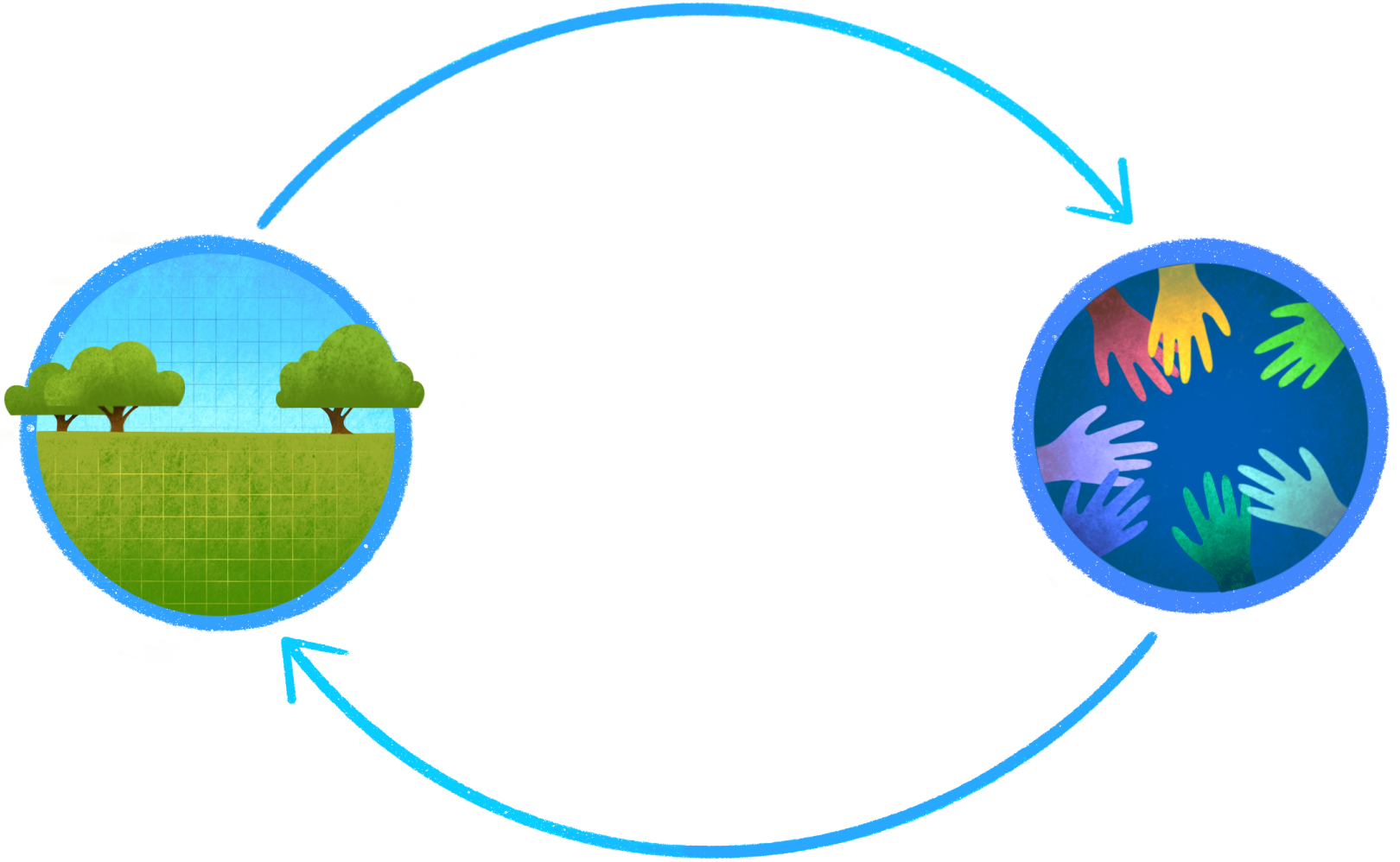
Culture shifts in labs
Leadership & championing

art: @allison_horst; web: openscapes.org; blog: openscapes.org



art: @allison_horst

tweet: @dataandme



art: @allison_horst

Harness the power of welcome

blog: ropensci

Lessons learned

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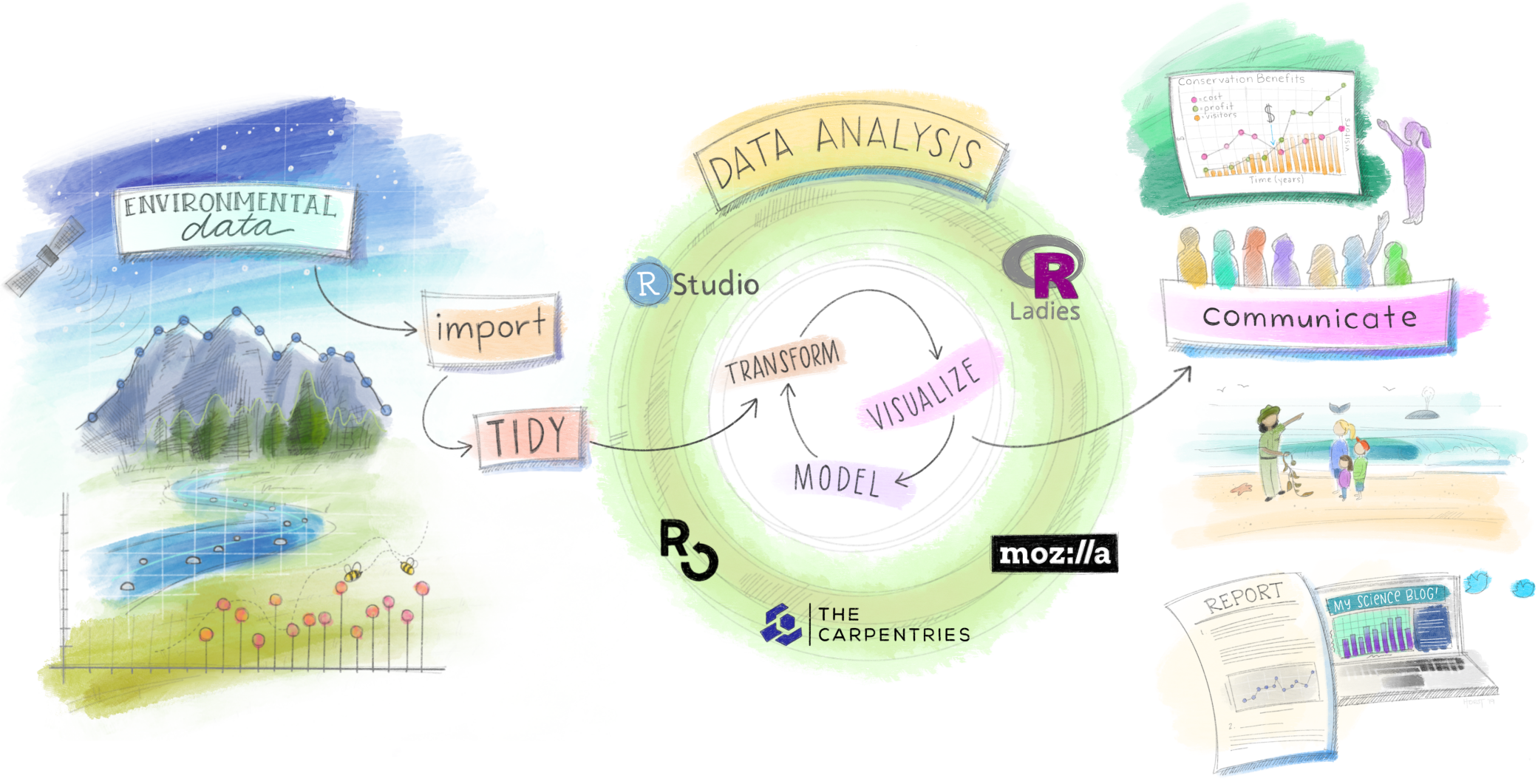

art: @allison_horst; updated from Wickham & Grolemund

Thank you all so much

especially for this talk:

OHI team
Mozilla team
Openscapes labs
Allison Horst
RLadies team

Please get involved:
openscapes.org/contact;
@openscapes

all artwork: @allison_horst

xaringan theme: @apreshill