R for better science in less time

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jules32.github.io/useR-2019-keynote
Lessons learned

Open data science is a mindset

Teamwork starts with openness

Harness the power of welcome
art: @allison_horst
Our path to better science in less time using open data science tools

Julia S. Stewart Lowndes¹, Benjamin D. Best², Courtney Scarborough¹, Jamie C. Afflerbach¹, Melanie R. Frazier¹, Casey C. O'Hara¹, Ning Jiang¹ and Benjamin S. Halpern¹,³,⁴
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
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
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.
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
Ocean Health Index
open data science tools and resources for marine science and management
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
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
Ocean Health Index Toolbox Training

Ocean Health Index Team

2018-08-22

Chapter 1  Welcome

Welcome. This training program is under active development and testing.

The single biggest motivation of the Ocean Health Index is to use science to inform marine management. And not just any science, the best available science, data, methods, and tools. OHI assessments use collaborative open software so that they are transparent and reproducible; we call this software the OHI Toolbox.

Openness is an important part of how we work; we describe how and why in Lowndes et al. 2017. Nature Ecology & Evolution: Our path to better science in less time using open data science tools. Using the OHI Toolbox requires coding and using data science software; you can learn this in OHI’s Intro to Open Data Science training book.

This Toolbox Training book will train you to prepare for and use the OHI Toolbox. It can be used to teach workshops or for self-paced learning.
dashb oard (Shiny): @jafflerbach, work in progress. inspiration: Imagine Boston
At Openscapes, we champion open practices in environmental science to help uncover data-driven solutions faster. Regardless of research question, environmental scientists are united by the need to analyze data — and to do so in a way that is efficient, reproducible, and easily communicated. With tools specifically created to meet modern demands for collaborative data science, we help create a positive open culture to enable better science in less time. Here’s how:
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

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

<table>
<thead>
<tr>
<th>Bayside Chats - Wood Lab</th>
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<tr>
<td><strong>Welcome to Bayside Chats with the Wood Lab!</strong></td>
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<tr>
<td>Here, we eat lunch and chat about reproducible research, coding problems, and cool new packages/software/computational methods that are applicable to our research.</td>
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blog: openscapes.org; Wood lab
Tomorrow our Openscapes Champions will present their accomplishments 🎉! These 24 scientists have spent the last 5 months learning together & bringing open data science to their labs. We'll share after their presentations, but thought we'd recap the topics we covered (thread):

- Mentorship program for early career scientists & their labs
- Normalize open data science in the lab & seed change beyond

Openscapes Champions Lesson Series
Julie Lovejoy
2019-05-14

Chapter 1 Welcome
This book is a lesson series for the Openscapes Champions program. It is under heavy development; some chapters are only notes at this point.
Openscapes Champions is a mentorship program that empowers scientists with open data science tools and grows the community of practice. We mentor early career researchers in leadership roles – faculty, lecturers, program managers, and others who want to establish open data science practices in their labs and on their campuses. It is designed to meet scientists where they are and help identify incremental steps to make their data workflows more efficient and open. We’ve been building Openscapes from an open data science angle, but along with that comes the mindset of openness, collaboration, good intentions, and creating the culture we want in science. Note: “lab” is broadly defined.
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 Froelich, PhD
University of California at Santa Barbara
Dr. Froelich is a marine ecologist & behavior economist 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 scientist and statistician dedicated to an environmentally-focused graduate program. Dr. Horst was awarded the student-organized Oceanic Society of Environmental Science and Management Distinguished Teaching Award in 2018.

Nishad Jayasundara, PhD
University of Malawi
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 marine life. With expertise on shifting habitats of ocean animals, Dr. Pinsky leads OrcaWatch, a website used by governments and NGOs for climate-adaptation planning.

Adrian Stier, PhD
University of California at Santa Barbara
Dr. Stier is a marine ecologist studying the recovery and resilience of ocean ecosystems. Included in this systems level are studies on coral reefs, and he recently was a keynote speaker at the 4th Coral Reef Symposium.

Nina Therkildsen, PhD
Cornell University
Dr. Therkildsen is an evolutionary biologist using genomics 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
Dr. Wood is an ecologist studying marine and freshwater parasites in a changing world. Her work was recently featured in a bestselling video, Protected by Prions, by the California Academy of Sciences.

blog: openscapes.org
Openscapes Champions

Dr. Hailey Froehlich, PhD
University of California at Santa Barbara
Dr. Froehlich is a marine ecologist and 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.

Dr. Allison Horst, PhD
University of California at Santa Barbara
Dr. Horst is a data scientist and statistician driving an environmentally-focused graduate program. Dr. Horst was awarded the student-organized Dean School of Environmental Science & Management Distinguished Teaching Award in 2018.

Dr. Nishad Jayasundara, PhD
University of Malawi
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.

Dr. 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 GreenReef, a website used by governments and NGOs for climate-adaptations planning.

Dr. Adrian Stier, PhD
University of California at Santa Barbara
Dr. Stier is a marine ecologist studying the recovery and resilience of ocean ecosystems. Included in his studies are coral reefs, and he recently was a keynote speaker at the 4th Coral Reef Symposium.

Dr. Nina Therckelsden, PhD
Cornell University
Dr. Therckelsden is an evolutionary biologist using genomics analyses to improve marine conservation and fisheries management. Dr. Therckelsden studies genetic adaptation using coral, human, and ancient DNA.

Dr. Chelsea Wood, PhD
University of Washington
Dr. Wood is an ecologist studying marine and freshwater parasites in a changing world. Her work was recently featured in a BBC Nature video, Protected by Prawns, by the California Academy of Sciences.
twitter: @stuart620
R-Ladies Highland Park
@RLadiesHPNJ

We had the first meeting of the first R-ladies group in New Jersey last night over drinks @PinosHP. 🍷 These women are so cool, fun, and wonderful to talk to. (Of course I forgot to take a picture). Next meeting in July with laptops! 💻

5:09 AM - 15 Jun 2019
Community
#rstats

@juliesquid: .@jafflerbach teaching spatial analysis in #rstats!! @brenuhsb @ecodatasci @MozillaScience

Tweet: @juliesquid
@jcheng Awesome work Joe!

@_inundata @_inundata @jcheng yay this is so great!!! cc: @juliesquid @ben_d_best

@jafflerbach @_inundata @juliesquid @ben_d_best This isn’t the feature we did at rOpenSci (dynamic tiles). That was cooler but less useful

@jafflerbach @_inundata @juliesquid @ben_d_best We could do that feature too but this seemed higher priority.

@jcheng @jafflerbach @_inundata @juliesquid Dynamic tiles will be great, esp for high res global rasters, addRasterImage() a sensible start
4-year-old niece: who's @hadleywickham? Husband of this #rstats #openscience girl: he's a wizard who lives on the internet
Um 'rnoaa' package is an absolute game changer. Thanks @juliesquid @openscapes for the intro! 😎

cran.r-project.org/web/packages/r ...
rOpenSci & RStudio

tweet: @jafflerbach
Getting raster data into @LeafletJS at runconf15 @jcheng @juliesquid

tweet: @juliesquid
Thanks @rstudio! rstats heroes at shinydevcon: @hadleywickham @jcheng @winston_chang; @jafflerbach @ben_d_best
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

My students have been asking for #rstats hacky hours ❤️😭😢. Thanks to @GracieGW for the brilliant suggestion that we start a coding club by socially participating in #TidyTuesday! Tuesday evenings next quarter, we'll be wrangling and visualizing data. For fun. Together. 🍕💻📊!

11:10 AM - 25 Mar 2019
art: @allison_horst; blog: openscapes.org
ESM 206 & 244

ESM 206: Introduction to environmental data analysis & stats in R

ESM 244: Advanced methods for environmental data analysis in R

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
Harness the power of welcome
The Value of #Welcome

Stefanie Butland

July 18, 2017
Lessons learned

Open data science is a mindset
- expect a better way • build confidence & willingness • reimagine science communication

Teamwork starts with openness
- working openly • vertical & horizontal & leadership • community

Harness the power of welcome
DATA ANALYSIS

import

TIDY

R Studio

TRANSFORM

VISUALIZE

MODEL

Conservation Benefits

Communicate

moz://a

REPORT

THE CARPENTRIES

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