SoftwareCarpentry & OpenLifeScience
two great initiatives to help young scientists to be more open

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About me

Background

- **Biologist** and **Computer Scientist** by training, PhD in Bioinformatics
- **Software Devops** (RSE?) at EMBL, developing scientific databases & webservices
- Previously head of **scientific IT** at Leibniz institute for Aging Research
- Tried out being a full-time **Python** backend **developer**
- Since 2019 head of **IT** at **MPI** for Biological Cybernetics

Enjoy teaching (technical) courses

- Linux Commandline
- Python
- GIT

- Linux Scripting
- Data Management
- Software Carpentry

Software Carpentry History

1995–96 Greg Wilson organized a series of **articles** "What Should Computer Scientists Teach to Physical Scientists and Engineers?"

1998 **First course** at LANL; repeated multiple times over the next years

2004–05 SC materials were updated and released under a CC license (support from the Python Software Foundation)

2010 Greg Wilson reboots SC with sponsor support (120 **videos**)

2011–12 grants from Mozilla Foundation / Sloan Foundation

2014 Software Carpentry **Foundation**

2018 Software & Data Carpentry merged: "The Carpentries"

TODAY: With over **50** member organizations in **10** countries, The Carpentries seek to build and grow communities of practice around computational skills development for researchers.

THE CARPENTRIES

Non-profit organization that:

- **Trains** people in software development and data science skills for more effective work and career development
- Builds **community** and local capacity for teaching and learning these skills and perspectives
- **Curriculum** is developed & improved in a **public** repository using methods borrowed from the **open source** software community.
- Instructors **volunteer** their time, while workshop host sites cover their travel and accommodation costs.
- Instructors use live coding instead of slides while learners following along on their own machines.
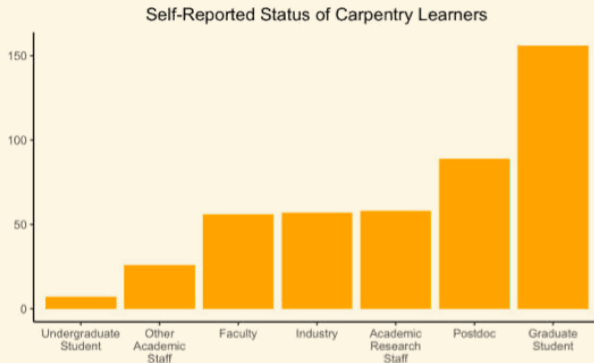
The Teaching

- Max 40 people/course
- Tutors and **helpers** (1 per 8 learners)
- **Live coding** instead of long talks (slower, making mistakes)
- Feedback loops (eg. sticky notes)
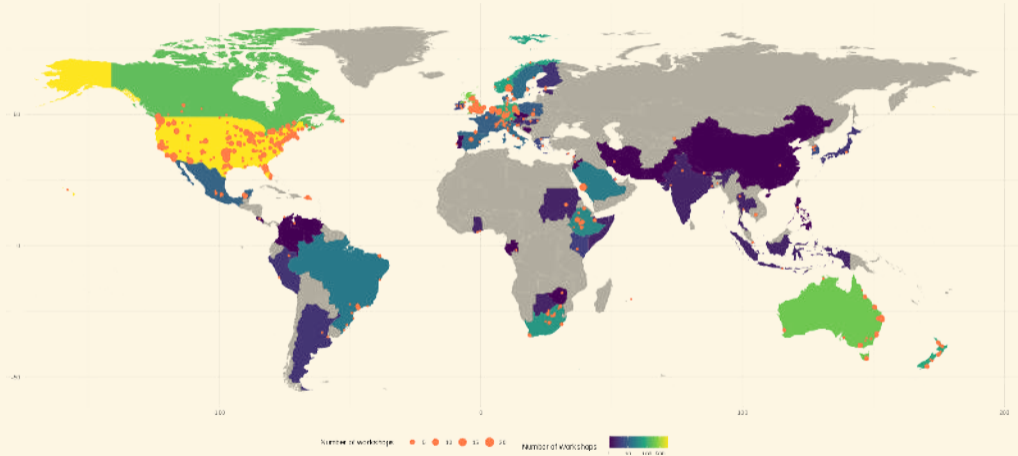- pre/post-course **questionnaire**

Teach "computational competence"

- Get people started and introduce them to what's possible
- Build confidence in using these skills
- Encourage people to continue learning
- Positive learning experience
- Trained instructors: https://carpentries.org/instructors/
- Code of Conduct:
  https://docs.carpentries.org/topic_folders/policies/code-of-conduct.html
- Friendly learning environment
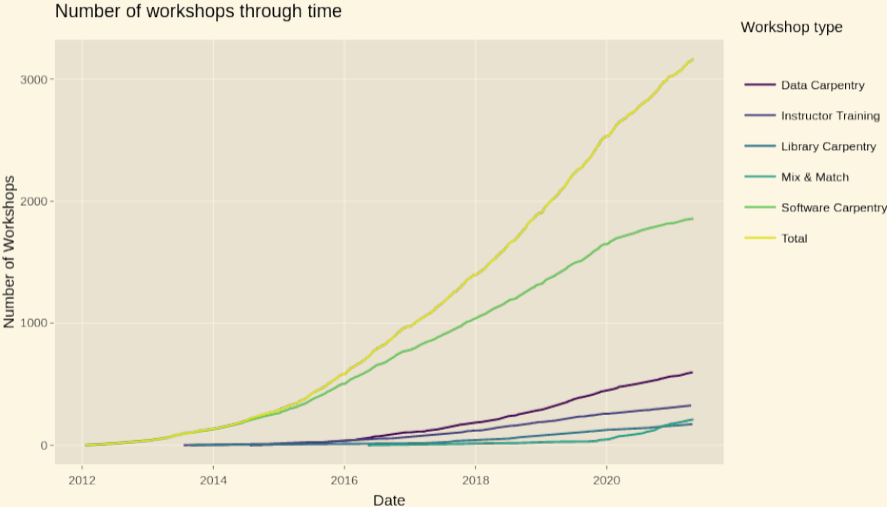
Who partakes in workshops?

Self-Reported Status of Carpentry Learners

Workshops all around the world

Number of workshops • 1 • 11 • 21 • 26   Number of Workshops

https:/feeds.carpentries.org/

WORKSHOPS OVER TIME

Number of workshops through time

Workshop type
- Data Carpentry
- Instructor Training
- Library Carpentry
- Mix & Match
- Software Carpentry
- Total

WORKSHOPS PER YEAR

Number of workshops per year

Workshop type
- Library Carpentry
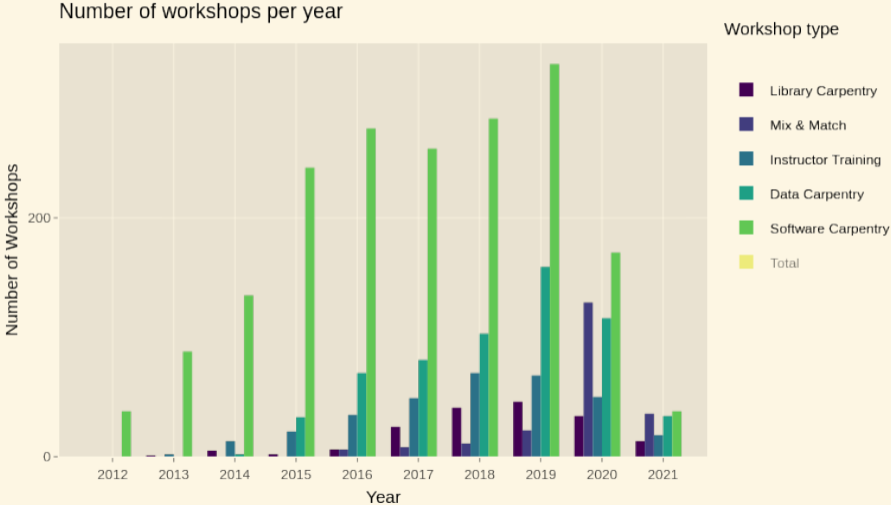- Mix & Match
- Instructor Training
- Data Carpentry
- Software Carpentry
- Total

10

Curriculum

- Open and collaboratively developed
- Lessons are loosely sketched scripts (often specific to discipline)
- Continual testing, improvement and up-to-date
- Instructor community

FOSTER REPRODUCIBILITY IN SCIENCE

> LINUX: Enhance reproducibility
>
> PYTHON/R: Teach programming skills to repeat steps of analyses
>
> GIT: Encourage code sharing and Collaboration

Our Core Lessons in English

Lesson	Site	Repository	Reference	Instructor Notes	Maintainer(s)
The Unix Shell	🖵	🖥	👁	➕	Gabriel Devenyi, Colin Morris, Will Pitchers, Gerard Capes
Version Control with Git	🖵	🖥	👁	➕	Ivan Gonzalez, Daisie Huang, Nima Hejazi, Katherine Koziar, Madicken Munk
Programming with Python	🖵	🖥	👁	➕	Trevor Bekolay, Valentina Staneva, Anne Fouilloux, Maxim Belkin, Lauren Ko
Plotting and Programming in Python	🖵	🖥	👁	➕	Nathan Moore, Allen Lee, Sourav Singh, Olav Vahtras
Programming with R	🖵	🖥	👁	➕	Katrin Leinweber, Diya Das, Rohit Goswami
R for Reproducible Scientific Analysis	🖵	🖥	👁	➕	Thomas Wright, Naupaka Zimmerman, Jeffrey Oliver, David Mawdsley

MPG & THE CARPENTRIES

software
carpentry

- we organized first SC course at my institute earlier this year
- institute is hiring first Research Software Engineer (RSE)
- we try to get more attention/traction within the MP society
- I gave presentations to IMPRS coordinators & wider MPG community
- MPG currently in the process of obtaining a silver carpentries membership

shoutout to **Stephan Janosch** (MPI-CBG, also boardmember of de-RSE)

Summary

- There is a **need** for extracurricular technical education
- Software Carpentry can **satisfy** this need
- **Open** community
- Scales very well (thousands of students)
- No "traditional" approach;
  rather live coding, fast feedback loops, questionnaires, . . .
- Carpentry courses can contribute to **reproducible research**

Shoutout to people, friends, colleagues who helped and supported me along this way:
Frank Thommen, **Toby Hodges**, Renato Alves, Aidan Budd, **Malvika Sharan**, . . .

OPEN LIFE SCIENCE

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Yo Yehudi
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Malvika Sharan
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Open Life Science

We believe that to truly impact our society, we should **share** our **science openly** and make it **freely available** online for others.

What is OpenLifeScience

A mentoring & training program for Open Science ambassadors.
Mentees submit an Open Science Project, will receive tutoring/mentoring.

It is a **16-week long** personal **mentorship** and cohort-based **training**, where participants (organisers, hosts, mentors and project leads/mentees) of this program will:

- share their expertise and gain knowledge essential to
  create, **lead**, and **sustain** an **Open Science project**
- **connect** with members across projects, communities, backgrounds, and identities
- **empower** each other to become Open Science ambassadors in their communities

FAQ:

I'm a...
undergraduate / large group /
humanities researcher / other
can I participate?

Yes! OLS graduates include:

Bioinformaticians ·
Archaeologists ·
Undergraduate & Graduate
students · PIs with their
groups · Anthropologists ·
Postdocs · Independent
researchers · Linguists ·
Research Software
Engineers · Community
managers

Open Life Science

Schedule

(based on Mozilla Open Leader program)

- Mentors and mentees meet every 2 weeks for a 30 minutes call
- Mentees participate every other week to 90-minutes cohort calls during which the program leaders introduce new topics and resources, facilitate break-out discussions, and invite experts from the field to give talks
- Mentees can meet together for coworking sessions every 2 weeks for a 30 minutes call
- Mentors take part to mentoring workshop and calls

Content includes:

- Community design for inclusivity
- Career guidance
- Using github for collaboration
- Project development
- . . .

OLS numbers

Legend:
- Green: Project lead
- Dark gray: Returning project lead
- Blue: Project lead -> mentor
- Yellow: New mentor
- Orange: Returning mentor

OLS-1   OLS-2   OLS-3   OLS-4

TOPICS/PROJECTS

Projects are very diverse

- local community building (bioinformatics hub of kenya)
- creating a database for open use
- working on a software package (python)
- creating teaching material (Practical Guide to Reproducibility in Bioinformatics)
- contributing to existing science projects (Growing the Galaxy Community)
- creating a repository of scientific workflows (Sharing 3D Modeling Workflows for Biomechanists and Palaeontologists)
- . . .

We build global networks

We are OLS:

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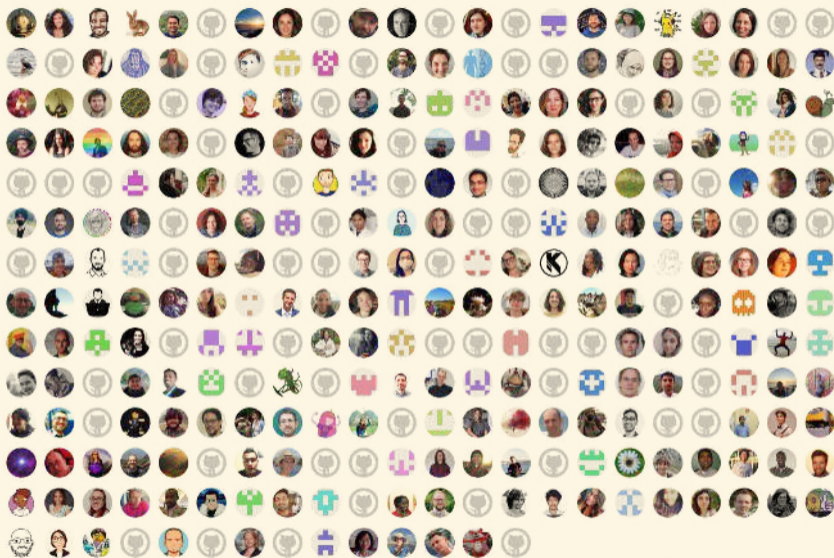
Outcomes/Anecdotes

Success stories that make it seem worth while to spend my time on open science:

SC course:

- participant got new exciting job because of SC course
- one of this year's SC students already in his final steps to becoming a SC instructor

OLS mentee

- program started before pandemic
- mentee had no concept of version control
- learned about git during OLS
- then pandemic hit
- managed to be part of nationwide consortium of scientists to work on COVID data together
- was able to efficiently communicate with nation's top-level programmers (well known game devs)

Thank you for listening

Are you interested

- in meeting great enthusiastic likeminded people?
- in learning something new?
- being an OLS mentee/mentor? $\implies$ Apply now! Cohort V starts Jan 2022
- in hosting a carpentries workshop?
- in taking part in the community?

Get in touch!

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- carpentries.org/volunteer
- team@openlifesci.org
- www.youtube.com/c/OpenLifeSci

- the-turing-way.netlify.com
- software.ac.uk
- society-rse.org
- de-rse.org