Computational Skills Training

Curtin Institute for Computation
Initiate and foster collaborative, interdisciplinary research and education programs that apply computational methods across all faculties to provide innovative solutions to complex problems.
The importance of software in research and academia
Research Cycle

1. Design Experiment
2. Form Hypothesis
3. Collect Data
4. Communicate Results
5. Explore or Test
Research Cycle

- Collect Data
- Tidy data into useable form
- Explore or Test
  - Transform the data. Do feature engineering.
  - Write code to apply a modeling algorithm.
- Communicate Results
  - Visualize the data and/or results
- Build app or write paper
- Design Experiment
- Form Hypothesis
- Deploy app or publish paper
- Import data into software
  - Transform the data. Do feature engineering.
  - Write code to apply a modeling algorithm.

Import data into software:
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A computer language for scientists
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- Human thought
- High level/interpreted languages
  - Instrument Software/GUI
  - Search Engines, API, etc
- C, C++, FORTRAN, Instrument Software, etc
- Machine language
Why use R and/or Python?
Python and R are supported by a large open source community.
Python and R are free

- No paywalls
- No subscription costs
- You can use your favourite OS
- Open source software is free (as in freedom)

➡ everyone can afford their vegetables this week!
The code is readable

and it is your record of your analysis!

⇒ research becomes reproducible
Analysis is scalable
Results are shareable

Learning to code on your own ≠ trivial

Never have I felt so close to another soul.
And yet so helplessly alone.
As when I google an error
And there's one result.
A thread by someone with the same problem.
And no answer.
Last posted to in 2003.
Leveraging the community for skills training

Teaching
★ The Carpentries
★ Research Bazaar

Ongoing Support
★ CIC drop in sessions
★ Code review sessions in your area
★ teach foundational computational, coding, and data science skills to researchers

★ workshops are in-person events, generally two days long

★ global community of volunteers

★ Carpentry certified instructors are trained in pedagogy

★ lessons are freely available under the Creative Commons - Attribution License
Hacky Hour / Code Review / StandardError

What is it?

★ Regular meetup designed to build a community around
  ○ data
  ○ coding/programming
  ○ reproducible research

★ Talk about code & methods

★ Encourage good practices, stylistic choices

★ Ask questions
Support from the CIC!

CIC drop in
★ Held every Tuesday, 3pm-4pm at the CIC office (B216:202)

Hacky Hour
★ **Curtin**: currently on hiatus (we need you, the community, to help run it)
★ run at **UWA, QEII, Murdoch**

Computing Workshops
★ planned during teaching free periods
★ The Carpentries R & Python in March ➡ check our webpage

ResBaz
★ Planning in progress ➡ will be at Curtin July 2019