Computational Skills Training

Curtin Institute for Computation
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Initiate and foster collaborative, interdisciplinary research and education programs that apply computational methods across all faculties to provide innovative solutions to complex problems.
CIC Specialists

Prof. Andrew Rohl
Dr Kevin Chai
Dr Rebecca Lange
Shiv Meka
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Dr Kathryn Barker
Dr Roberta Fornarelli
Dr Richard Hosking
Dr Sawitchaya Tippaya
Cara Kreck
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Support and collaborate with Curtin researchers:

- Computational modelling, data analytics and visualisation
- Inspire and foster collaboration across Curtin and other institutes
- Develop and oversee the delivery of training
- Provide a nexus to share ideas
- Provide a platform for delivering cross-disciplinary research

Provide computing advice and tools to enhance research
The importance of software in research and academia
A computer language for scientists
A computer language for scientists

- High level/interpreted languages
  - Instrument Software/GUI
  - Search Engines, API, etc

- Machine language
  - C, C++, FORTRAN,
    - Instrument Software, etc

Human thought → High level/interpreted languages → 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

```python
fig = plt.figure(figsize=(30, 30))
markersize = 1
markertype = ',' # a pixel
markeralpha = '0.5' # a bit of transparency

m = Basemap(
    projection='mill', lon_0=0, lon_1=0, lat_0=0, lat_1=0,
    llcrnrlon=-10, llcrnrlat=50, urcrnrlon=10, urcrnrlat=50
)

# Avoid border around map
m.drawmapboundary(fill_color='0.8', linewidth=0)

# Convert locations to x/y coordinates and plot them as dots.
x, y = zip(*locations)
x, y = m(x, y)
m.scatter(x, y, markersize, markertype, color=markercolor, alpha=markeralpha)

# Set the map title.
plt.annotate('Britain & Ireland drawn from pubs',
             xy=(0.05, 0.5),
             size=15,
             xycoords='axes fraction',
             color='0.5',
             family='Gloria')

# Set the map footer.
plt.annotate('Authors: Ramiro Gómez - ramiro.org | Data: OpenStreetMap - openstreetmap.org',
             xy=(0.05, 0.05),
             size=13,
             xycoords='axes fraction',
             color='0.5',
             family='Gloria')

plt.savefig('img/britain-ireland-drawn-from-pubs.png', bbox_inches='tight')
```

http://ramiro.org/notebook/mapping-pubs/
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

who were you, denvercoder9?
what did you see?!
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 ➡ check our webpage

**ResBaz**
★ 2 - 4 July 2019
★ Biggest WA ResBaz yet

Support from the CIC!