JONATHAN CARROLL, PHD

I provide software design and implementation for statistics, analysis, visualisation, exploration, curation, transfer, and storage - all things data.

I enjoy solving complex puzzles, both mathematical, algorithmic, and biological. I build tools to ease data flow between storage and scientists.

I am comfortable with a UNIX/Linux environment and a variety of platform ecosystems. I have successfully navigated remote positions since 2017.

CONTACT

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I have experience working in academia, government, and in both large and small biotech.

🎓 EDUCATION

2009 | 2006

PhD
Theoretical Physics

University of Adelaide

- Thesis: Applications of the Octet Baryon Quark-Meson Coupling Model to Hybrid Stars https://doi.org/10.48550/arXiv.1001.4318
- Fortran, MPI, bash

2005 | 2002

Bachelor of Science, Honours
Physics & Theoretical Physics

University of Adelaide

🖥 RESEARCH EXPERIENCE

2013 | 2009

Postdoc

Special Research Centre for the Subatomic Structure of Matter

- Dense matter nuclear astrophysics, hybrid stars
- Muonic hydrogen spectroscopy, "the proton radius puzzle"

💼 INDUSTRY EXPERIENCE

Current | 2022

Senior Research Software Engineer

Human Immunology Biosciences (HIBio) & Biogen

- Development of internal tooling supporting translational science, antibody discovery, and infrastructure. Built exploratory dashboards, connected data via APIs, managed deployment of GoAnywhere.
- Migrated contents of a LIMS from Benchling to Sapio. Processing of petabytes of data on UK BioBank.

Current | 2024

Research Software Engineer

Rancho Biosciences / Roche / Genenetech

- Integration of AI tooling to shiny dashboard, prompt engineering, data processing in Redshift databases.
- Exploration of ADaM and SDTM data.

Current | 2015

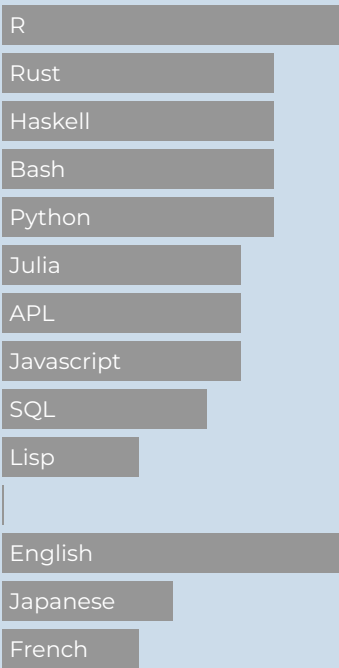### Principal Consultant

Irregularly Scheduled Programming

- Independent contractor / consultant (ABN: 43 486 039 320)
- Selected clients: Gate Biosciences, Lander Analytics

LANGUAGE SKILLS

R
Rust
Haskell
Bash
Python
Julia
APL
Javascript
SQL
Lisp

English
Japanese
French

2022 | 2021

Technical Lead / co-Product Owner

Cancer Immunology Department @ Genentech / Roche

- Coordinated development of a large shiny app project for interactive exploration of genomics visualisation, aimed at life-scientists without coding experience. Remotely directed a team of 10 developers located worldwide.
- R (shiny), CSS, JavaScript, HTML, SQL/SQLite, Docker, Git, CI/CD, database management, statistics, computational biology/genomics, management, agile scrum, leadership

2022 | 2017

Data Curator / Integrator & Software Developer

Cancer Immunology Department @ Genentech / Roche

- Developed software tooling supporting extraction and integration of multiple high-dimensional data modalities for FAIRification of internal data (MultiAssayExperiment / DataMart).
- R (Bioconductor, shiny), CSS, JavaScript, HTML, Docker, Git

2017 | 2013

Senior Research Officer / Fisheries Modeller

South Australian Research and Development Institute (SARDI)

- Developed and maintained fisheries stock assessment models, spatio-temporal catch rate analyses, and geographic information system tools
- Database management, statistics, biology, and the interface between fishers and government policy
- R, C++ (ADMB), SQL, Microsoft Access

👥 COMMUNITY

Current | 2022

Chess Club Teacher (Volunteer)

Highbury Primary School

Current | 2016

Governing Council (Chair, Vice Chair, Subcommittee Chair, General Member)

Highbury Preschool, Highbury Primary, Modbury High

Current | 2016

Editor

rweekly.org

- Compliation, curation, and editing of the rweekly.org newsletter

⌨ SELECTED WRITINGS

2025	Counting Digits Quickly[1]
2024	I Patched R to Solve an Exercism Problem[2]
2024	Let's Talk About the Weather[3]
2024	IPv4 Components in APL[4]
2023	Hyperlink Annotations in JavaScript and CSS[5]
2022	Australian Signals Directorate 50c Coin Decryption[6]
2022	Lissajous Curve Matrix in Julia[7]
2021	Adventures in x86 ASM with rx86[8]
2020	isEven without modulo[9]
2018	Adding strings in R[10]

I regularly write on my blog https://jcarroll.com.au about puzzles, syntax, and my own learnings as I explore multiple languages - R, Julia, Rust, Python, APL, Haskell, and many more.

❯_ SELECTED SOFTWARE PACKAGES

{ntfy} (author, maintainer) CRAN(https://cran.r-project.org/package=ntfy)

· Lightweight Wrapper to the 'ntfy.sh' Service

{ggeasy} (author, maintainer) CRAN(https://cran.r-project.org/package=ggeasy)

· Provides a series of aliases to commonly used but difficult to remember 'ggplot2' sequences

{charcuterie} (author, maintainer) CRAN(https://cran.r-project.org/package=charcuterie)

· Handle Strings as Vectors of Characters

{DFplyr} (author, maintainer) Bioconductor(https://bioconductor.org/packages/release/bioc/html/DFplyr.html)

· A `DataFrame` (`S4Vectors`) backend for `dplyr`

{mathpix} (author, maintainer) CRAN(https://cran.r-project.org/package=mathpix)

· Support for the 'Mathpix' API (Image to 'LaTeX')

{benchlingapi} (author, maintainer) GitHub(https://github.com/jonocarroll/benchlingapi)

· Wraps the Benchling API for access in R

{weatherOz} (contributor) CRAN(https://cran.r-project.org/package=weatherOz)

· An API Client for Australian Weather and Climate Data Resources

{datapasta} (contributor) CRAN(https://cran.r-project.org/package=datapasta)

· R Tools for Data Copy-Pasta

📖 SELECTED PUBLICATIONS

2025 — **Negative impact of the GABA pathway on αPD-1 PD-L1 immunotherapy**

Submitted

2022 — **Natural killer cell educating KIR/HLA combinations impact survival in anti-PD-L1 treated cancer patients**

medRxiv

2021 — **Genetic variation associated with thyroid autoimmunity shapes the systemic immune response to PD-1 checkpoint blockade**

Nature Communications, volume 12, number 3355

2020 — **Polygenic risk for skin autoimmunity impacts immune checkpoint blockade in bladder cancer**

Proceedings of the National Academy of Sciences, volume 117, number 22, 12288–12294

I contribute R packages to open-source software and engage with users, integrating feature requests and bug fixes. I maintain several R packages hosted on CRAN and Bioconductor.

I have experience as a first author and as a collaboator on articles in a diverse range of fields.

2018 Beyond Spreadsheets with R

https://www.manning.com/books/beyond-spreadsheets-with-r

· Manning Publications
· 352 pages

2016 Influence of Wind and Swelloncatch Rates in a Dive Fishery: A Case Study from the South Australian Abalone Fishery

Journal of Shellfish Research, volume 35, number 3, 685–694

2016 Setting quotas using provisional data: a case study from the South Australian abalone fisheries

New Zealand Journal of Marine and Freshwater Research, volume 50, number 3, 371–388

2016 Spawning biomass of jack mackerel (Trachurus declivis) off eastern Australia: Critical knowledge for managing a controversial fishery

Fisheries Research, volume 179, 10–22

2014 Quark–meson coupling model, nuclear matter constraints, and neutron star properties

Physical Review C – Nuclear Physics, volume 89, number 6

2012 Nuclear quasielastic electron scattering limits nucleon off-mass shell properties

Physical Review C – Nuclear Physics, volume 86, number 6

2011 Nonperturbative relativistic calculation of the muonic hydrogen spectrum

Physical Review A – Atomic, Molecular, and Optical Physics, volume 84, number 1

2011 Toward a resolution of the proton size puzzle

Physical Review A – Atomic, Molecular, and Optical Physics, volume 84, number 2

2009 Phase transition from quark–meson coupling hyperonic matter to deconfined quark matter

Physical Review C – Nuclear Physics, volume 79, number 4

2005 Neutral pion decay into $\nu\bar{\nu}$ in dense Skyrmion matter

Physical Review D – Particles, Fields, Gravitation and Cosmology, volume 71, number 11

🔗 LINKS

1: https://jcarroll.com.au/2025/06/29/counting-digits-quickly/
2: https://jcarroll.com.au/2024/02/26/i-patched-r-to-solve-an-exercism-problem/
3: https://jcarroll.com.au/2024/07/27/let-s-talk-about-the-weather/
4: https://jcarroll.com.au/2024/08/22/ipv4-components-in-apl/
5: https://jcarroll.com.au/2023/06/02/hyperlink-annotations-in-javascript-and-css/
6: https://jcarroll.com.au/2022/09/01/asd_coin/
7: https://jcarroll.com.au/2022/05/12/lissajous-curve-matrix-in-julia/
8: https://jcarroll.com.au/2021/12/23/adventures-in-x86-asm/
9: https://jcarroll.com.au/2020/03/09/iseven-without-modulo/
10: https://jcarroll.com.au/2018/10/06/adding-strings-in-r/
11: author, maintainer
12: https://cran.r-project.org/package=ntfy
13: author, maintainer

14: https://cran.r-project.org/package=ggeasy
15: author, maintainer
16: https://cran.r-project.org/package=charcuterie
17: author, maintainer
18: https://bioconductor.org/packages/release/bioc/html/DFplyr.html
19: author, maintainer
20: https://cran.r-project.org/package=mathpix
21: author, maintainer
22: https://github.com/jonocarroll/benchlingapi
23: contributor
24: https://cran.r-project.org/package=weatherOz
25: contributor
26: https://cran.r-project.org/package=datapasta