

Jeremy Gray

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Summary

Data Science Instructor, Senior Data Scientist, Biologist, Statistician, Bioinformatician, R and Python Programmer.

Significant Expertise in Modeling, Bayesian Regression, Amazon AWS Technologies, Data Wrangling, Big Data, Course Instruction and Design, Statistical Computing, Web App Design, Data Analysis Automation and Reproducible Research.

Research Interests

Python and R programming, specifically in the creation and optimization of statistical tools and APIs.

Current methods used include algorithm design, Bayesian regression, hidden Markov models, MCMC, non-linear optimization, supervised clustering, agent based modelling, as well as pedagogical methods in data science.

Key Technical Skills

R: 10 years experience, expertise in ggplot2, dplyr, tidyr, knitr, nlme, caret, PerformanceAnalytics. **Python:** 6 years experience, expertise in scikit-learn, matplotlib, numpy, pandas, cython, scipy, numba, cuda. **SQL:** 9 years experience, working in SQLite, MySQL, RedShift and Netezza. Query construction and database construction and maintenance. Significant experience (3 years+) in **Bash**, **Git** and **Mathematica**. Expert in AWS migration, EC2 use, linux.

Current Position

- **Lead Educator, Data Science.** BrainStation. March 2018 - Present.
 - Design, content creation and delivery of a 10 week bootcamp for data science.
 - Creating lessons and labs for students from diverse backgrounds to learn python, statistics and machine learning
 - Leading a team of 3 to deliver the content in the classroom

Professional and Academic Experience

- **Senior Data Scientist.** Precima. May 2016 - April 2018.
 - Construction of a modeling engine for internal use, written primarily in Python, interacting with SQL databases, AWS and EC2.
 - Bayesian Hierarchical Regression, with constraints, OLS, Logistic Regression.
 - Migrating existing code into AWS compliant versions.
 - Sped up existing code by 3 orders of magnitude, as well as bugfixing and feature addition
 - Internal consulting on Python and programming to other team members.

- Introduced and drove adoption of version control and other good programming practices.
- Leading a project to convert existing code to Python throughout organisation.
- **Data Science Instructor - Python.** Precima. February 2016 - April 2016.
 - Developing, designing and presenting a course in Python programming for data science to the 50 people in the Precima data science R&D and Applied Statistics teams.
 - Available online on the course website or github.
- **Data Science Consultant.** Corporate Knights. September 2015 - November 2015.
 - Refactoring, bug fixing and completing an R Shiny Web App to compare investment portfolios with and without polluting investments. Available online at decarbonizer.co. R, JavaScript, HTML and CSS.
- **Postdoctoral Fellow in Ecology and Evolutionary Biology** University of Toronto. May 2012 - May 2015.
 - 66% Computational - Developing two major R packages for high throughput statistical analysis of experimental data, and agent based modelling of evolution. Routinely carrying out statistical tasks (ANOVA, linear and non-linear regression, survival analysis, image analysis). Working with gigabyte scale bioinformatic data - creating, automating and maintaining pipelines, carrying out evolutionary analysis of genomic data. Maintaining the lab SQL databases.
 - 33% Wet Lab - Carrying out a wide range of contemporary molecular biological techniques - CRISPR/Cas9, microinjection, molecular cloning, microscopy.
- **PhD in Biology.** University of Auckland, March 2007 - January 2011. “Testing the major theories concerning the evolution of sex using experimental evolution”
 - Major computational methods - Mathematica - Creating evolutionary dynamic simulations (stochastic agent based modelling) and likelihood based statistical analysis. R graphics, statistics and population genetics.
 - A wide range of microbiological techniques - molecular cloning, chemostat culture, microscopy.
- **Lab Technician.** Institute of Environmental Science and Research Ltd (ESR). “Horizontal Gene Transfer in the New Zealand Environment”. June 2005-June 2006
 - Responsible for a small government lab’s statistical analysis and MS Access/SQL data storage, as well as microbiological research.
- **BSc (Hons I) in Genetics.** University of Otago, 2001-2004 “PRP8 inteins of the fungi of the genus *Aspergillus*”
 - Phylogenetics and bioinformatics. Courses included a large range of statistical and computational training.
- **Rena Oil Spill Wildlife Response Team.** Maritime New Zealand. October 2011 - February 2012.
 - Responsible for cleaning and caring for oiled wildlife, public outreach and education, as well as collecting wildlife for treatment.

Teaching Experience

- **Software Carpentry Instructor.** 2015 - Present.
 - Teaching data science skills to graduate level scientists. Technologies include Git, Python, R, SQL and Bash. 2 day workshops, Taught at Sick Children’s Hospital Toronto, and University of Toronto.
- **Course Instructor.** University of Toronto. EEB225H1S - Biostatistics 2015
 - Lectured 0.5 of a course, Biostatistics, for second year EEB majors. Course content involved t-tests, ANOVA, linear and multiple linear regression, logistic regression, ANCOVA and experimental

design. Developed new R labs and statistical lectures. A total of 12 hours lecturing, and 30 hours leading computational labs.

- **Laboratory Tutor and TA.** 8 courses at the University of Auckland, 3 at the University of Otago, including computational biology and statistics.

Publications

GS Bilotta, NG Burnside, MD Turley, **JC Gray**, HG Orr. The effects of run-of-river hydroelectric power schemes on invertebrate community composition in temperate streams and rivers. **PLoS one** 2017;12 (2), e0171634

Cutter AD, **Gray JC**. Ephemeral ecological speciation and the latitudinal biodiversity gradient. **Evolution** 2016;70(10):2171-2185. doi: 10.1111/evo.13030.

Bilotta GS, Burnside NG, **Gray JC**, Orr HG. The Effects of Run-of-River Hydroelectric Power Schemes on Fish Community Composition in Temperate Streams and Rivers. **PLoS One.** 2016; 11(5): e0154271.

Jovelin R, Krizus A, Taghizada B, **Gray JC**, Phillips PC, Claycomb JM, Cutter AD. Comparative genomic analysis of upstream miRNA regulatory motifs in *Caenorhabditis*. **RNA.** 2016;22(7):968-78. doi: 10.1261/rna.055392.115.

Vielle A, Callemeyn-Torre N, Gimond C, Pouillet N, **Gray JC**, Cutter AD, Braendle C. Convergent evolution of sperm gigantism and the developmental origins of sperm size variability in *Caenorhabditis* nematodes. **Evolution.** 2016;70(11):2485-2503. doi: 10.1111/evo.13043

Gray JC, Cutter AD. Mainstreaming *Caenorhabditis elegans* in experimental evolution. **Proceedings of the Royal Society B: Biological Sciences.** 2014;281(1778) doi:10.1098/rspb.2013.3055

Gray JC, Goddard MR. Gene-flow between niches facilitates local adaptation in sexual populations. **Ecology Letters.** 2012;15(9):955-62 doi:10.1111/j.1461-0248.2012.01814.x.

Gray JC, Goddard MR. Sex enhances adaptation by unlinking beneficial from detrimental mutations in experimental yeast populations. **BMC Evolutionary Biology.** 2012;12:43. doi: 10.1186/1471-2148-12-43.

Butler MI, **Gray J**, Goodwin TJ, Poulter RT. The distribution and evolutionary history of the PRP8 intein. **BMC Evolutionary Biology.** 2006;6:42. doi:10.1186/1471-2148-6-42

Awards, Memberships and Positions

- Graduate Student Representative, Research Advisory Board, School of Biological Sciences, University of Auckland. 2008-2010 (two terms).
- Faculty of Science Postgraduate Student/Staff Consultative Committee, Biological Sciences representative, University of Auckland. 2008-2009.
- Epsom delegate, Green Party of Aotearoa New Zealand list ranking conference, 2011.