

Robert Hoelzle, PhD

Data Scientist

Results-driven data scientist and bioinformatician with 6 years' experience in bioinformatics big data analytics, 11 years' experience in high paced R&D environment, and a life-long passion for problem solving. Proficient in **Python**, **R**, and **Bash** for data extraction/transformation/analysis, multivariate modelling and statistics, and visualization.

Experience

Senior Bioinformatician

Sep 2021 – Present

Bioinformatician

Aug 2016 – Aug 2021

Faculty of Science, The University of Queensland, Brisbane, Queensland, Australia

- Published 4 peer-reviewed publications (+3 in review) which develop data-driven insights from integrated genomic, proteomic, and environmental datasets in **Python**, **R**, and **Bash**
- Delivered microbiology data-driven solutions to biotech industry stakeholders by developing **multivariate regression** and **general linearized models** in **R** on consulting projects for groundwater quality monitoring, soil carbon sequestration, and copper bioleaching
- Slashed research group's processing time for genomic data by 60% through custom built **Python** bioinformatic programs for manipulating and extracting genomic data
- Supervised eight research students, and mentored four research professionals, providing guidance for coding and data analysis in **Python**, **R**, and **Bash**
- Coordinated cross-institutional research collaborations, including synthesizing technical information between such diverse disciplines as microbiology, immunology, mining, and electrochemistry
- Awarded and managed \$6M+ in fellowships, research grants, and strategic funding through competitive national and international funding schemes

PhD Student – Bioprocess Engineering

Jun 2012 – Feb 2017

Advanced Water Management Centre, The University of Queensland, Brisbane, Queensland, Australia

- Discovered and published novel bioplastic production method (+2 additional publications) by integrating complex genomic, proteomic, and environmental datasets in **R** and **Bash**
- Developed custom bioreactor control systems in **C++** for experimental bioplastics and wastewater which automated conditions such as nutrient supply, temperature, and pH

Bioprocess Engineer

Jun 2010 – Mar 2012

Green Biologics Ltd, Columbus, Ohio, USA

- Developed custom bioreactor control systems in **C++** for pilot and demonstration scale biofuel reactors, resulting in a commercially operating biofuel plant
- Coordinated certification by US National Renewable Energy Laboratory for pilot reactor research facility
- Supervised two research assistants for pilot and demonstration scale reactor development

Skills & Techniques

Languages

Python • SKLearn, SciPy, Pandas, NumPy, Dash, IBM_db, FuzzyWuzzy, Matplotlib, Plotly, Seaborn, Folium
R • Vegan, NBCLust, RCy3, RStatix, mvabund, lsmeans, spa, dplyr, tidyr, SpiecEasi, ggplot, sciplot, corrplot, igraph
Bash • T-SQL • SQLite • C++

Modelling & Statistics

Predictive modelling • Generalized linear models • Advanced multivariate statistics • Single/multiple linear & polynomial regression models • Ordination • Network analysis • Clustering

Cloud & Infrastructure

IBM Watson Studio • IBM DB2 • Galaxy Australia • Linux architecture

Tools

GitHub • Atom • Jupyter Notebook • R Studio • Cytoscape • Adobe Suite • MS Office Suite

Professional

Creative problem solving • Technical writing & communication • Project management • Team coordination • Leadership • Research • Consulting • Budget management

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Education & Certificates

- PhD**, Bioprocess and Chemical Engineering, The University of Queensland 2017
 Thesis: *Metabolic mechanisms and regulation of mixed culture fermentation*
- BSc w/ Hons**, Bioprocess Engineering, The Ohio State University 2010
 Hons Thesis: *Genetic improvement of Clostridium tyrobutyricum for butanol production by insertion of adhE from Clostridium acetobutylicum*
- Professional Certificate**, Data Science, IBM 2022

Community Engagement

- Mental Health Working Group: UQ School of Earth & Environmental Sciences** 2020 – Present
Mentorship and Activities Committees: Working group to develop and implement positive mental health programs within the School of Earth & Environmental Sciences, including a mentorship program for early career researchers, networking events, and lunch and sporting activities.
- Joint Academic Microbiology Seminars (JAMS)** 2018 – Present
Brisbane Organizing Committee: Bimonthly networking and seminar series aimed at developing collaboration between academic, industry, and medical microbiologists across Southeast Queensland.
- March for Science: Brisbane** 2017
Organizing Committee: Coordinated international demonstration calling for increased scientific and data-driven governmental policy making, especially on issues of climate change and public health.
- Engineers Without Borders** 2015 – 2016
UQ Institute Engagement Committee: International engineering aid organization. The UQ Institute Engagement program aligned PhD candidates with UQ researchers working on infrastructure projects for developing nations, especially low-maintenance wastewater and drinking water facilities.
- Navigating the Realities of a Diverse Engineering Workplace: UQ School of Chemical Engineering** 2015
Organizing Committee: Panel Q&A session on workplace culture in professional engineering, with a focus on diversity of race and gender identity. The panel consisted of a highly diverse range of early, mid, and late career engineering professionals, and facilitated networking between engineering students and professionals.

Top Publications

- Substrate availability drives mixed culture fermentation of glucose to lactate at steady state.* RD Hoelzle, D Puyol, B Viridis, D Batstone. **Biotechnology and Bioengineering** (2021)
- A facile method to enhance the performance of soil bioelectrochemical systems using in situ reduced graphene oxide.* C Camedda, RD Hoelzle, A Carucci, S Milia, and B Viridis. **Electrochimica Acta** (2019)
- Genome-centric view of carbon processing in thawing permafrost.* BJ Woodcroft, CM Singleton, JA Boyd, PN Evans, JB Emerson, AAF Zayed, RD Hoelzle, TO Lamberton, CK McCalley, SB Hodgkins, RM Wilson, SO Purvine, CD Nicora, C Li, S Frolking, JP Chanton, PM Crill, SR Saleska, VI Rich, GW Tyson. **Nature** (2018)
- Influence of pH regulation mode in glucose fermentation on product selection and process stability.* Z Mohd-Zaki, JR Bastidas-Oyanedel, Y Lu, R Hoelzle, S Pratt, FR Slater, and DJ Batstone. **Microorganisms** (2016)
- Regulation mechanisms in mixed and pure culture microbial fermentation.* RD Hoelzle, B Viridis, and DJ Batstone. **Biotechnology and Bioengineering** (2014)

Personal Interests

Rock climbing • Ultimate frisbee • Home brewing • Escape rooms • Photography • Gardening