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.

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 • Ordination • Clustering • Network analysis • Model validation • Multivariate statistics • Linear & polynomial regression
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 • Teamwork • Research & analysis • Strategic planning • Consulting • Engineering • Budget management

Experience

Senior Bioinformatics Scientist *Sep 2021 – Present*
Bioinformatics Scientist *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

Bioprocess Engineer *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 lab certification by US National Renewable Energy Laboratory for pilot reactor research facility
- Supervised two research assistants for pilot and demonstration scale reactor development

Brisbane, Qld, Australia | 04 2251 5081 | robert.hoelzle@gmail.com
linkedin.com/in/robert-hoelzle/ | rdhoelzle.github.io/

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 Virdis, 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 Virdis. **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 Virdis, and DJ Batstone. **Biotechnology and Bioengineering** (2014)

Personal Interests

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

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