Robert Hoelzle, PhD

Data Scientist

Results-driven data scientist and engineer with 7 years' experience in big data analytics, 12 years' experience in high paced R&D environment, and a life-long passion for finding creative solutions to complex problems. Proficient in **Python**, **R**, and **Bash** for data extraction/cleaning/analysis, visualization, and various machine learning models.

Skills & Techniques

Languages & Libraries	Python • SKLearn, SciPy, Pandas, NumPy, BeautifulSoup, FuzzyWuzzy, Dash, Matplotlib, Plotly, Seaborn, Folium R • Vegan, NBClust, RCy3, RStatix, mvabund, lsmeans, spa, dplyr, tidyr, SpiecEasi, ggplot, sciplot, corrplot, igraph Bash • T-SQL • SQLite • C++
Modeling & Statistics	Linear/Non-Linear Regression • Logistic Regression • K-Means Clustering • Hierarchical Clustering • KNN • Decision Trees • Support Vector Machines • Network Analysis • Dimensional Reduction • Ordination • Multivariate Statistics • ANOVA • PERMANOVA • T-test • Z-test • Chi-square Test
Cloud & Systems	IBM Watson Studio • IBM DB2 • Galaxy Australia • Linux Architecture
Tools	GitHub • Atom • Spyder • Jupyter Notebook • R Studio • REST API • Adobe Suite • MS Office Suite
Professional	Predictive Modeling • Forecasting • Creative Problem Solving • Technical Writing & Communication • Project Management • Team Coordination • Leadership • Teamwork • Research & Analysis • Experimental Design • Consulting • Strategic Planning • Engineering • Budget Management

Professional Experience

Data Scientist (Bioinformatics) – Team Lead *Sep 2021 – Present*
Data Scientist (Bioinformatics) *Aug 2016 – Aug 2021*
The University of Queensland (Faculty of Science), Brisbane, Queensland, Australia

- **Python**, **R**, **Bash**, **Dimensional Reduction**, **Regression**, **Clustering**, **Classification**, **Statistical Validation**
- Design and run data analysis and modeling pipelines in **Python**, **R**, and **Bash** on environmental, agricultural, immunological, mining, electrochemical, environmental engineering, and microbial genomic data
- Coordinate interdisciplinary research programs involving researchers and industry stakeholders to define key project deliverables and design experiments for targeted data collection
- Solved groundwater cyanide issue for industry client using **dimensional reduction**, **KNN classification**, and **PERMANOVA** on complex genomic and environmental data sets
- Identified probiotic bacteria for an industry client using **dimensional reduction**, **multivariate regression**, **k-means clustering**, and **PERMANOVA** on complex immunological and genomic data sets
- Built a **Bash**-executable **Python** program to extract HTML-formatted metadata from open-source databases into pipeline-formatted data tables, given a user-specified list of target variables
- Communicate findings and deliverables through consulting reports, presentations, and peer-reviewed publications
- Mentor and coach professional and student researchers on experimental design, data management, data processing, predictive modeling, and statistical validation. Includes code reviews, workshops, and brainstorming sessions

Bioprocess Engineer *Jun 2012 – Jul 2016*
The University of Queensland (Advanced Water Management Centre), Brisbane, Queensland, Australia

- **R**, **Bash**, **C++**, **Dimensional Reduction**, **Regression**, **Statistical Validation**
- Built **C++** programs to automate experiments and collect time-series data into pipeline-formatted data tables
- Processed, modelled, and statistically validated large, multivariate datasets to validate carbon biorecycling to bioplastics process, using **dimensional reduction**, **multivariate regression**, and **PERMANOVA**
- Coordinated with research team to design experiments and communicate findings in peer-review publications

Bioprocess Engineer *Jun 2010 – Mar 2012*
Green Biologics Ltd, Columbus, Ohio, USA

- **C++**, **Regression**, **Statistical Validation**
- Built **C++** programs to automate experiments and collect time-series data on pilot-scale biofuel system
- Designed successful commercial biofuel reactor from time-series data using **regression** modelling and **ANOVA**

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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

Data Science Blog on Medium *2022 – Present*
medium.com/@RDHoelzle: Personal blog for publishing data science projects and how-to articles.

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 Peer-Reviewed 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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