Bing O'Dowd

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Experience

- **Bayer AG** — Remote, Germany
  Software Engineer — *April 2022 - Present*
  - **Built and maintained two internal applications** for small molecules research and development using Typescript, Terraform, AWS Lambda, Postgres, AWS AppSync, GraphQL, and React on a four person team, performing code reviews, pair programming and using agile methodology
  - **Established automated testing workflows and shared knowledge:** improved developer velocity and confidence by building front end tests, local integration tests, and end-to-end tests, and shared practices with other software development teams
  - **Developed features which return the lineage of a molecule** by casting the problem as a graph and applying a breadth first traversal to the graph to provide the user with the lineage of a molecule of interest
- **Bayer AG** — Monheim am Rhein, Germany
  Data Scientist — *October 2020 - April 2022*
  - **Analyzed experimental data and built machine learning models** to support small molecule research process
  - **Lead development on API to track machine learning predictions** across iterative rounds of active learning, by using SQLite, FastAPI, Docker, and Pytest, which is used by internal data scientists across 4 projects
  - **Received performance award for leading analysis and development of dashboard:** identified previously untracked effects across 20,000 biological tests, and built dashboard to visualize results with Python, Streamlit, and AWS (EC2, S3, Docker, and ECR)
  - **Led analysis and built machine learning models**, one example being a Random Forest model for chemical projects, classifying desirable molecules at ~70% accuracy and 93% recall compared to the baseline of manual selection of compounds which yielded ~30% accuracy
  - **Lead developer of internal tools** implemented from the literature – Conformal Predictors and Random Matrix Discriminant
  - **Pioneered use of active learning** by leading and persuading chemical project leaders to pursue active learning as a strategy for using machine learning prediction outputs
- **Bayer AG** — Monheim am Rhein, Germany
  PostDoc — *October 2018 - October 2020*
  - **Researched, developed, and published work** on a variational autoencoder model for modeling molecular properties and generating chemical structures (https://chemrxiv.org/articles/preprint/7977131/2)
  - **Jointly developed and maintained** a variational autoencoder in Python and PyTorch in a 3-person team, and also applied the model in active chemical discovery projects
  - **Co-inventor on patent application** for novel molecules by using a generative model and assisting in the selection of ideas for synthesis and testing and later confirmed to be novel and of interest – "Novel heteroaryl-substituted pyrazine derivates as pesticides" (pending)
- **Dow AgroSciences** — Champaign, IL, USA
  Software Engineer, Intern — *March - August 2017*
  - **Led refactoring and further development** of data cleaning pipeline to speed up data ingestion process, from annual and manual updates, to weekly and automated updates
  - **Sped up 3D similarity searches** by automating 3D molecular similarity searches by building one interface to three separate programs, and used Python's multiprocessor library, making a week-long manual process run in < 4 hours
- **University of Illinois at Urbana-Champaign** — Champaign, IL, USA
  Research Assistant — *August 2013 - May 2018*
  - **Introduced Machine Learning for chemical research to the lab and used ML to direct synthetic efforts**: Ruled out 31% of possible molecules to synthesize using PCA and a generalized linear model to prioritize chemistry efforts and reduce time (ca. 6mo-1yr) and financial costs
  - **Published work in academic journals**: Discovered new a class of bacterial enzyme as an antimicrobial drug target, characterized novel inhibitor activity, and demonstrated previously unknown mechanism of action of bisphosphonates against cancer cell lines

Projects

- **Verse (2023)** : CLI app written in Go to fetch Bible verses by requesting and parsing HTML from a website
- **Command line app to automate building slide deck on Google Slides (2021)** : Scraped lyrics for songs from a site with song lyrics and automated putting them into Google slides via Google Slides API for a local church

Education

- **University of Illinois at Urbana-Champaign** — Champaign, IL, USA
  Ph.D. Chemistry — *2013 – 2018*
- **University of California, San Diego** — La Jolla, CA, USA
  B.S. Chemistry — *2008 – 2012*

Skills

- **Programming languages**: Python, Typescript, Go
- **Tools/Technologies**: Terraform, AWS, GitHub Actions, Git, Docker, React
- **Languages**: English (native), German (B1), Mandarin Chinese (conversational)