

# Bing O'Dowd

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## EMPLOYMENT

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**Software Engineer** **Bayer AG – Remote, Germany** **April 2022 – present**

- **Built and maintained two internal applications** for Bayer CropScience small molecules research using Typescript, Terraform, AWS Lambda, Postgres, AWS AppSync, GraphQL, and React on a four person team, utilizing code reviews, pair programming, and agile methodology
- **Established testing workflows and shared knowledge with other product teams:** built front end tests of a React app that used Microsoft Authentication Library, local integration tests of AWS Lambda handlers utilizing Docker to run a local Postgres DB with RDKit extension, and end to end testing of AWS AppSync GraphQL API improving development velocity, overall confidence in our product, and spread new methods across product teams
- **Developed features which returns 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

**Data Scientist** **Bayer AG – Remote, Germany** **October 2020 – April 2022**

- **Analyzed experimental data and built machine learning models** to support small molecule research process
- **Led development on software 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, built software to automate updates of data and highlight interesting samples and visualized by building a dashboard with Python, Streamlit, and AWS (EC2, S3, Docker, and ECR)
- **Led development of internal tools** implemented from the literature, namely 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 in using machine learning outputs

**PostDoc, Data Science** **Bayer AG – Monheim, Germany** **October 2018 – October 2020**

- **Researched, developed, and published work** on variational autoencoder model for modeling molecular properties and generating chemical structures
- **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 with insecticide activity, by using a generative model and assisting in the selection of ideas for synthesis and testing

**Software Engineer, Intern** **Dow AgroSciences – Champaign, IL** **March 2017 – August 2017**

- **Led refactoring and further development** of a data cleaning pipeline to speed up data ingestion processes, from annual and manual updates, to weekly and automated updates
- **Streamlined 3D similarity searches** by automating 3D molecular similarity searches by building one interface to three separate programs, and used Python's multiprocessing library, making a week-long manual process run in <4 hours

**Graduate Research Assistant** **University of Illinois – Champaign, IL** **August 2013 – May 2018**

- **Introduced machine learning for chemical research to the lab and used ML to direct synthetic efforts** by using PCA and a generalized linear model to prioritize chemistry, which ruled out 31% of possible molecules to synthesize, thereby reducing financial costs and time spent synthesizing molecules (~6 months to 1 year)
- **Published work in academic journals:** Discovered a new 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

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- **Verse (2023):** CLI app written in Go to fetch verses from the Bible by requesting and parsing HTML from a website

## EDUCATION

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- Ph.D. Chemistry – University of Illinois at Urbana-Champaign – 2013 – 2018
- B.S. Chemistry – University of California, San Diego – 2008 – 2012

## SKILLS

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- **Programming languages:** Python, Typescript, Go
- **Tools:** Terraform, AWS, RDKit, Pandas, Unix, git, PostgreSQL
- **Frameworks:** React, Express, Flask, FastAPI, Django Rest Framework, Pytest, Jest, Cypress
- **Languages:** English (native), German (B1), Mandarin Chinese (conversational)