Sean Xie
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Education

- **University of Waterloo** — Waterloo, Canada
  Honours Bachelor of Mathematics, Minors in Computational and Pure Mathematics — *Sep 2021 – Apr 2026*

Experience

- **Research Assistant** — Toronto, Canada
  Environment and Climate Change Canada — *Jan 2025 – Apr 2025*
  - Co-authored a research paper using satellite snapshots of tropical cyclones to evaluate wind models.
  - Implemented the best-performing model into Canada's operational ocean prediction system using **Fortran**, enabling detection of coastal flooding that was previously missed.
  - Automated retrieval and image processing of over 1000 raw satellite snapshots with **Python** to build the data set used for comparison with theoretical predictions.
- **Research Assistant** — Toronto, Canada
  Environment and Climate Change Canada — *May 2024 – Aug 2024*
  - Developed a **Python** tool that converted 1D wind profiles into 2D radial wind fields for use in experiments.
  - Implemented four tropical cyclone models in **Python** and **MATLAB** to be used in experiments.
  - Parsed and consolidated buoy-recorded historical wind data (**NetCDF**, **CSV**, **JSON**) into a unified format for downstream comparison.
- **Backend Software Engineer** — Remote in USA
  Atolio — *May 2022 – Aug 2022*
  - Developed a document ETL pipeline in **Go**, enabling reliable processing of large-scale unstructured data.
  - Spearheaded the implementation of Okta's user identity management API.
  - Developed a performance benchmarking tool in **Java** for the internal search engine, enabling quantitative evaluation of latency and throughput.
  - Deployed containerized applications on **AWS EC2** using **Docker** for testing.
  - Wrote thorough unit tests in **Go**, increasing codebase test coverage from 5% to 70%.

Publications

- Wang, P., Bernier, N. B., & **Xie, S**. (2026). *Synthetic Aperture Radar (SAR)-based evaluation of tropical cyclone wind profiles and a theory-based radius of maximum wind estimation.* Geophysical Research Letters, 53, e2026GL122677. https://doi.org/10.1029/2026GL122677

Sample Projects

- **polygo (Go)**
  - Developed a library for polynomial algebra, many operations including fast multiplication via FFTs.
  - Designed a clean and extensible API for mathematical operations, emphasizing usability and performance.
  - Implemented efficient algorithms for polynomial manipulation using optimized data representations.
  - Wrote comprehensive unit tests to ensure correctness across edge cases and numerical scenarios.
- **tempo (Go, JavaScript, HTML, CSS)**
  - Developed a web application with a **Go** backend to process user input and generate rendered animation frames.
  - Designed RESTful API endpoints for asynchronous rendering requests and response handling.
  - Implemented server-side processing pipelines for transforming user input into visual outputs.
  - Developed frontend rendering using **HTML canvas API**, **JavaScript**, and **CSS**.
- **GithubCodeBot (Python, aiohttp, urllib)**
  - Built a Discord bot using Discord API that parses and renders GitHub code snippets in real time.
  - Designed event-driven architecture to handle real-time user interactions.

Skills

- **Languages**: Go, Python, C/C++, Java, C#, SQL, JavaScript, TypeScript.
- **Technologies**: Git, SSH, VS Code, LaTeX, AWS, Azure, GraphQL, Docker, React.js, Vue.js.