

BATSAMBUU BATBOLD

St. Paul, MN | (763) 321-7263 | batsambuub2425@gmail.com | [GitHub](#) | [Portfolio](#)

EDUCATION

Macalester College | St. Paul, MN | Expected May 2027

B.A. Mathematics & Computer Science | GPA: 3.96/4.0

Relevant Coursework: AI Robotics, Database Management Systems, Software Design & Development, Data Structures & Algorithms

United World College Maastricht | Netherlands | May 2023

IB Diploma (43/45), Bilingual Diploma

HONORS & AWARDS

- **International Mathematical Olympiad (IMO, the World Championship Mathematics Competition for High School students):**
Bronze Medalist (2021), Honorable Mention (2020) — top 250 globally among high school mathematicians.
- **2× 1st Place, Macalester Local Programming Contest** (2025, 2026): Solved algorithmic competitive programming problems in C++.

EXPERIENCE

Full Stack Developer & Organizer | Young Mathematicians of Khuvsigul NGO | May 2019 – Present

- Built and deployed a full-stack [Mongolian math-olympiad platform](#) using Next.js, React, TypeScript, Supabase (PostgreSQL, Auth, Storage), and Tailwind CSS with continuous deployment via Vercel.
- Architected row-level security with role-based access control, security-definer RPCs, and database-enforced moderation. Wrote optimized SQL queries with indexing to power searchable problem archives, live contests, automated grading, leaderboards, and an admin CMS.
- Grew the platform to 100+ registered users and 1,300+ visitors in a single day. Organize free summer camps and weekly contests for 30+ rural students, improving STEM access in Mongolia.

Mathematics Domain Expert (Frontier AI) | Mercor (Remote) | Dec. 2025 – Jan. 2026

- Authored original competition-level math problems to evaluate state-of-the-art AI models. Graded model-generated proofs, identified logic errors, and provided step-by-step corrected solutions for AI training data.

Undergraduate Preceptor | Macalester College | Jan. 2024 – Present

- Facilitate learning for Computational Linear Algebra and Introduction to Computer Science courses. Hold office hours, grade assignments, and support 30+ students per semester.

RESEARCH & PUBLICATION

Research Assistant & Full Stack Developer | Macalester College | Summer 2026

- Analyzed a network of scientific concepts from 70 million academic papers across 150+ fields using Topological Data Analysis (TDA) to identify knowledge gaps and concept clusters.
- Built [TDA Cycle Explorer](#), a full-stack visualization app (FastAPI, React, Zustand, ECharts, Three.js) with RESTful API endpoints for exploring persistent-homology cycles in large network data.
- Wrote comprehensive unit tests (pytest) covering parser edge cases, graph relabelling and layout structural guarantees, and API contract validation (status codes, payload shapes, upload guards).
- Developed custom graph-layout algorithms for 10,000+ node networks, reducing cycle-edge crossings by ~15%.

[From Chaos to Continents](#) | Python, NumPy, Streamlit, Blender

- Engineered a procedural terrain generation engine using Voronoi Diagrams and Perlin Noise to create 50,000+ polygon worlds. Implemented NumPy vectorization, reducing generation time by 40%.
- Accepted and presented at The International Symposium on Computational Geometry (SoCG 2026) as a multimedia submission.

PROJECTS

[Mosaic Photography Platform](#) | Next.js, TypeScript, PostgreSQL, Cloudflare, Vercel | Ongoing

- Developing a digital gallery portfolio builder with serverless image processing via Cloudflare R2 cloud storage, automated color palette extraction, EXIF metadata parsing, and on-demand lazy loading for high-resolution images.

[Art2Vec](#) | Python, Scikit-learn, NetworkX, React, TypeScript | May 2026

- Analyzed 16,000+ paintings as co-occurrence networks using Louvain community detection and centrality metrics. Built a k-nearest neighbors recommendation system and an interactive React web app with scrollytelling.

[NBA 2K Player Rating Simulator](#) | Python, Pandas, Scikit-learn, Streamlit | Dec. 2025

- Built a tool (200+ users) predicting player ratings from real-world stats using XGBoost and Random Forest, achieving an average MAE of 8.58 across 36 attributes. Constructed a data pipeline to scrape, clean, and merge NBA performance data.

TECHNICAL SKILLS

Languages: Python, Java, C++, TypeScript, JavaScript, SQL, R, HTML/CSS

Frameworks & Tools: React, Next.js, Node.js, FastAPI, PostgreSQL, Supabase, Git, Vercel, Cloudflare, pytest, Excel, LaTeX

Technical Areas: Data Structures & Algorithms, Object-Oriented Programming, Full Stack Development, Database Design, SQL Query Optimization, Unit Testing, Version Control, Cloud Deployment, Agile Development