

Qianhao Han

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EDUCATION

The Bishop Strachan School, Toronto, ON

Sep 2018 – Jun 2027

- GPA: 98/100, Top 1% of the grade; SAT: 1550 (Reading and Writing: 750, Math: 800)
- AP Courses: Calculus BC (5), English Language and Composition (5), Physics 1 (5), Statistics (5), Computer Science A (5), Computer Science Principles (5), Chinese Language and Culture (5), Microeconomics (4), Seminar (4), Physics C: Mechanics (4), , English Literature and Composition, Biology, Chemistry, Research

RESEARCH

Researcher, Mural Restoration with Deep Learning Framework ([Preprint](#))

Dec 2024 – Present

- Proposed a novel coarse-to-fine Mask-Aware Transformer framework for automated mural restoration to address the specific "mixed degradation" characteristics of ancient murals
- Allowed fine cracks and large-scale peeling to coexist, combining the texture-preserving strengths of an existing restoration pipeline with the global contextual modeling capabilities of Transformers
- Consisted of a two-stage framework: 1. The Coarse Restoration Network is responsible for hallucinating the main semantic structure and filling large holes; 2. The Refinement Network focuses on enhancing high-frequency details and texture consistency
- Designed experiments on two real-world mural datasets to benchmark our approach against state-of-the-art methods
- Expanded the research into a youth-led cultural-preservation initiative and presented how AI can support under-resourced heritage sites at a UN ECOSOC Youth Forum side event
- Under review for the Asian Conference on Machine Learning (ACML) 2026
- Article about project: <https://news.northeastern.edu/2025/11/10/ai-research-restores-ancient-art/>

Researcher, Director, and Editor, Mural Preservation & Cultural Memory Documentary and Independent Research

Dec 2024 – Present

- Went on a 10-day trip, traveled to 7 towns and cities in Shanxi and Hebei, and interviewed 20 villagers, museum staff, and experts
- Conducted historical and cultural research on the fate of the Ming-Qing temple and tomb murals during and after the Cultural Revolution
- Examined how political movements have reshaped rural religious identity, folk belief systems, and cultural memory through the destruction and reinterpretation of religious art
- Filmed and edited a research-based documentary titled [Fluid Heritage in a Revolutionary Century: Destruction, Neglect, and Preservation of Murals in North China](#), exploring material culture and memory in rural China

Researcher, Founder, and CEO, HiveGuard: Honeycomb-Inspired Concussion Protection Helmet ([Hiveguard.ca](#))

May 2023 – Present

- Developed a smart helmet prototype integrating an intelligent Electroencephalogram (EEG) feedback system with deep-learning inference to capture data and predict head-injury risk for athletes
- Upgraded the team structure and recruitment process 3 times to improve iteration speed, testing/validation, and product execution
- Iterated the product to the third prototype version (Prototype v3.0) and launched investor pitching and early commercialization conversations
- Secured NHL-drafted hockey player Kevin He as brand ambassador to drive early market validation, user outreach, & partnership development
- **Prototype v3.0 (Patent in progress):**
 - [Full research paper](#) "Honeycomb-Inspired Concussion Protection Helmet with Intelligent EEG Feedback System" accepted by the 44th IEEE International Conference on Consumer Electronics (ICCE 2026), will present in Dubai in Feb. 2026 as the only high school presenter
 - [Demo paper](#) "Honeycomb-Structured Helmet with Embedded EEG System" accepted by the ACM/IEEE Symposium on Edge Computing (SEC); presented in Washington, D.C. in Dec. 2025 as the only high school presenter; won 2nd place in the Student Research Competition
- **Prototype v2.0:** Received the Silver Merit Award at the Bay Area Science and Engineering Fair 2025; Received the IEEE Hamilton Section Award and the Mechanical Contractors Association Hamilton Niagara Award
- **Prototype v1.0:** Won 3rd place in the Youth Team category at the MIT App Inventor Appathon; Secured CAD 50,000 in R&D funding from a NASDAQ-listed edtech company
- Introductory Video (1 min): <https://www.youtube.com/watch?v=UOkqvBz2-pU>
- Pitch Video (5 min): <https://www.youtube.com/watch?v=qU82r3wgK5U>

Researcher, RadGen: A Cross-Modal Fusion System for Automated Radiology Report Generation ([Paper](#), [Poster](#))

Jan 2025

- Accepted by the 38th IEEE International Symposium on Computer-Based Medical Systems (CBMS), mentored by Prof. Zheng Zheng from Northeastern University
- Demonstrated RadGen, a cross-modal fusion-based system using MedCLIP to enhance imaging and textual data for medical use

Researcher, Integrating MedCLIP and Cross-Modal Fusion for Automatic Radiology Report Generation ([Paper](#), [Slides](#))

Mar – Dec 2024

- Accepted by the IEEE BigData 2024 Undergraduate and High School Symposium (Runner-Up Paper Award, AI Youth Star Award), mentored by Prof. Zheng Zheng from Northeastern University
- Presented in-person at the IEEE BigData Conference in Washington, D.C., December 2024
- Proposed a novel cross-modal framework using MedCLIP to improve medical report generation, and the experimental results highlight our improvements over existing methods

SUMMER PROGRAMS

Participant and Team Leader, University of Pennsylvania Management and Technology Summer Institute (M&TSI)

Jul 2026

- Selected as 1 of 75 students (3-4% acceptance rate) for a rigorous, for-credit summer program exploring the integration of technological concepts and management principles
- Studied product development, lean startup, venture capital, finance, marketing, and technology strategy through coursework and visits to Google and Morgan Stanley
- Led and developed Ellis, an AI-powered automatic cello tuner integrating sensors, machine learning, predictive modeling, pitch detection, servo control, CAD, and app design; won the program's Most Innovative Idea Award for Ellis

Participant, Sotheby's Summer Institute, Art Conservation & Appraisal Track

Jul 2025

- Authored and presented a professional-grade condition report on a Yuan dynasty mural (Buddha of Medicine, ca. 1319)
- Conducted market research and valuation analysis for Roy Lichtenstein's Blue Lily Pads using auction databases, provenance research, and comparative pricing methodologies

Assistant to Director and Producer, The Cambridge Shakespeare Festival Summer Camp

Aug 2024

- Studied and produced Shakespeare's play *A Midsummer Night's Dream*
- Collaborated with the director to coordinate daily activities and support the director in departmental planning and monitoring progress
- Received Travel Grant awarded by Cambridge Rivers Project at King's College, Cambridge

LEADERSHIP EXPERIENCES

Student Representative, FIRST Canada Youth Council

Aug 2025 – Present

- Selected as 1 of 20 students to represent FIRST Canada's 10,000+-student community for youth voice and STEM outreach
- Interviewed 2 FIRST alumni and produced short-form video content sharing their stories to promote girls in STEM
- Organized and moderated a "See It, Be It" panel featuring 5 female alumni, highlighting career pathways and mentorships in STEM
- Co-hosted FIRST Canada LIVE and produced alumni interview content highlighting girls' experiences, mentorship opportunities, and leadership pathways in STEM and robotics
- Volunteered at FIRST events, supporting competition participants and promoting equity, diversity, and inclusion

Editor-in-Chief, Spectrum Newspaper, The Bishop Strachan School

May 2025 – Present

- Co-led editorial direction for Spectrum, overseeing content planning, deadlines, and publication quality across print and digital issues
- Recruited 55+ student contributors and built a structured workflow for pitching, drafting, editing, and revision
- Launched a STEM column in collaboration with the STEM Council, coordinating a 25-member writing team to publish science and tech articles
- Created and led a junior school magazine initiative, mentoring younger students through idea generation, interviewing, and article writing
- Managed the newspaper's blog platform, editing and publishing student pieces while ensuring consistent style, accuracy, and voice
- Ran meetings and journalism workshops to train writers on reporting, interviewing, headline writing, and ethical journalism standards

Founder and Leader, OneAI (Youth-led Nonprofit for AI Education)

Jan 2025 – Present

- Established a global program for AI Education with branches in 20+ schools across Canada, the US, the UK, China, and South Africa
- Organized the 2025 Global Youth Conference centred around the theme "AI for Tomorrow: Connecting the World, Empowering Youth's Dreams"; Recruited 120+ participants and hosted the Youth Conference on April 20, 2025, via Zoom
- Invited two AI Scientists, Prof. Zengchang Qin (ISEF Judge) and Dr. Steven Chen (IOAI Board Member), to share insights on AI, competition preparation, and research innovation; provided a platform for AI Olympiad members and an MIT undergraduate to share their learning journeys
- Organized 2 AI literacy workshops for youth across the Greater Toronto Area with 100+ participants
- Launched SmartStop, an AI-enabled, solar-powered, and wireless-connected stop sign system designed to enhance pedestrian safety; received support from Northeastern University and Toronto's AI Lab
- Recruited and organized a junior all-girls team to participate in the Canada National AI Competition, spending 6 hours mentoring the team directly, contributing to a total of 29 hours over 3 weeks of project support provided collaboratively with two additional mentors

Founder & Co-Head, Computer Science & AI Club, The Bishop Strachan School

Sep 2024 – Present

- Established the school's 1st club to promote and explore advancements in artificial intelligence, successfully recruiting over 40 members
- Organized and led bi-weekly meetings to discuss AI knowledge, technologies, and applications
- Taught members Python skills that can be used in AI projects or competitions, such as IOAI (International Olympiad for Artificial Intelligence)

Co-Founder and President, Art & Museum Club, The Bishop Strachan School

Sep 2024 – Present

- Aimed to promote a deep appreciation for history, art, and cultural heritage through engaging discussions on different historical periods and artifacts, successfully recruiting 50 members
- Developed and conducted educational workshops to introduce artworks and iconic museums to students
- Organized field trips to local museums (inc. the Royal Ontario Museum) for 7 participants
- Led 60+ junior school students in an interactive, school-wide treasure hunt to deepen their understanding of the school's history

Team Member & Youth Committee Member, International Olympiad in Artificial Intelligence (IOAI), Canada

Aug 2024 – Present

- Represented Team Canada to compete in IOAI 2024 as one of the four team members
- Led the committee's work dedicated to our mission of inspiring and nurturing AI by hosting workshops and presentations in different regions
- Organized Canadian outreach initiatives, implementing the "AI in a Box" program in 7 schools as a curriculum for high school AI education
- Presented at the Canada Youth Club Summit to highlight IOAI Canada's mission and initiatives
- Hosted the inaugural Canada Youth AI Conference, leading workshops and activities for 40+ participants
- Founded the Canada AI Olympiad Youth Council and is currently organizing a conference themed "Responsible AI"

Co-Founder and CEO, Tech2Gether ([Official Website](#))

May 2024 – Present

- Established a non-profit organization to provide funding and mentorship to financially disadvantaged students passionate about robotics, enabling their participation in competitions such as the VEX Robotics Competition (VRC), VEX AI, and FIRST Robotics Competition
- Raised \$38,499 total in sponsorships and donations through fundraising campaigns and social media outreach in collaboration with TechArena, SisterSophie, Beaver Edge AI Institute, and individual sponsors to support 200+ students
- Awarded \$5,900 in scholarships to support 20+ students with travel, registration, and equipment costs
- Organized and led 7 technical workshops to share knowledge and experiences with other VEX Robotics Competition and FIRST Tech Challenge teams for 200+ students across the Greater Toronto Area
- Hosted a week-long robotics camp for 85 deaf students at the Rumball Camp of the Deaf
- Raised \$2,140 to support the camp, including producing T-shirts, purchasing VEX equipment, and building a robotics field
- Connected with 17 international teams from 14 countries, engaging ~100 students in cross-cultural collaboration

Research Assistant and Youth Representative, Changier Education Foundation (UN ECOSOC Special Consultative Status)

Sep 2023 – Present

- Joined the Foundation as a research intern upon certification and completed 2 UN-mandated University for Peace courses: Indigenous Peoples' Rights and Development and Child Rights and Development
- **Sustainable Development Goals (SDGs) 4 & 10 | AI & Educational Equity:** Synthesized academic research and UN policy documents to map how AI shapes educational disparities; developed a framework for UNESCO policy dialogues on equitable access to AI in education
- **SDG 5 | AI-Based Mural Conservation & Gender Research:** Integrated AI-driven mural restoration with cultural heritage protection and gender studies; analyzed how women can use technology to safeguard cultural memory; drafted a policy proposal for submission to the UN Commission on the Status of Women (CSW 2026)

- **Global Accessibility of AI Educational Tools:** Led cross-national comparisons (Canada, the U.S., South Africa, and regions across Asia) on how infrastructure gaps, localization challenges, and language policies interact with AI systems to influence equity; translated complex technical frameworks for policymakers and educators
- Delivered a speech at a parallel forum during the 70th session of the United Nations Commission on the Status of Women (CSW70)
- Contributed to discussions on advancing gender equality under the theme “Equal Rights, Real Change: For All Women and Girls”
- Applied to speak in person at the United Nations Youth Council Assembly (application in progress)

Programmer and Outreach Officer, FIRST Robotics: FRC, FTC (First Tech Challenge) and FLL (First Lego League) Sep 2017 – Present

- Served as the main programmer for robots that compete in competitions 4 hrs/week; organized robotics workshops for the community to promote FTC/FLL 4+ times/year; used Java to program the robots for autonomous programming and driver control

Annual Forum Host and Keynote Speaker, OTLF Youth Entrepreneurship Forum Feb – Sep 2025

- Delivered keynote “How Will Generative AI Change the Future of Work?” across two flagship sessions with 200+ in-person attendees
- Led volunteer teams and managed research exhibitions
- Co-authored “Impact of AI on Graphic Designers” on ethical and educational challenges of AI in creative industries; wrote the Education chapter and Policy Recommendations proposing AI ethics curricula and teacher-training programs; presented publicly at the forum
- Helped organize the OTLF AI Entrepreneurship Contest and served as MC for the finals

Programmer and Outreach Officer, VEX IQ, and VRC (VEX Robotics Competition) Sep 2021 – May 2025

- Served as the main programmer for robots that compete in competitions for 4 hrs/week; used C++ to program the robots for the autonomous period, driver control, and robot skills challenge; organized bi-monthly outreach events like workshops and competitions to promote VEX

Program Coordinator & Assistant Coach & Volunteer, STEAM Program for Youths Sep 2018 – May 2025

- Promoted STEM in Toronto by teaching 100+ students robotics and coding; Mentored 8 public school FLL teams as the robotics coach
- Volunteered at the Welcome Center to recruit more students for FIRST robotics programs
- Spearheaded the Powered Girls Grant, supporting 6 FLL teams and 3 FTC teams every season with \$6000+ in funding and technical sessions
- Sponsored an all-girls FLL team’s trip to the world championships in 2023
- Received recognition from a Richmond Hill Member of Parliament 3 times

Co-Founder and Programmer, SnowyBonds™ Jan – Apr 2024

- Established a Toronto-based non-profit and a mobile app to connect individuals needing snow shoveling services with local community helpers
- Integrated cloud computing, weather forecasting, mapping, and AI-powered data analysis for optimized snow removal processes using rideshare models like Uber; Won Semifinalist in the Senior Division of Canada in the 2024 Technovation Girls

COMMUNITY SERVICES

Junior and Middle School AI Team Mentor, The Bishop Strachan School Apr 2025 – Present

- Recruited and organized a junior all-girls team to participate in the Canada National AI Competition, contributing a total of 29 hours of project support over 3 weeks with two additional mentors; Expanded membership from 7 to 17 students
- Led the team to earn [Gold at the Canada National AI Competition](#) after competing against 54 projects and 93 participants from across the country

Math Peer Tutor, The Bishop Strachan School Sep 2025 – Present

- Tutored Grades 9–11 students on math concepts and homework support (algebra, functions, trig, and test prep)
- Explained problems step-by-step and tailored explanations to build confidence and independent problem-solving

Student Ambassador, The Bishop Strachan School May 2025 – Present

- Selected to represent the student body at school events for prospective families and visitors
- Led campus tours, introducing student life, academics, and extracurriculars while answering questions and supporting admissions initiatives

Curriculum Developer & Volunteer Teacher, Computer Science (ICS4U), The Bishop Strachan School Jan – Jun 2026

- Designed and wrote the school’s 1st AI and machine learning curriculum for Grades 11–12
- Created lessons and lab guides and taught Grade 12 students core AI concepts and applications

ADDITIONAL EXTRACURRICULARS

Cellist Jan 2016 – Present

- Took private lessons 3 times a week and practiced 1 hour daily; played in the BSS Orchestra twice a week and attended two concerts per year
- Passed the Royal Conservatory Music Level 6 for Cello with First Class Honors

Latin Dancer Jan 2016 – Present

- Took weekly Latin dance lessons and trained consistently to build technique and performance quality
- Performed and practiced multiple styles, including Rumba, Cha-Cha, Jive, and Samba

Editorial Assistant, The Concord Review Aug 2025 – Jan 2026

- Contributed 28+ hours to the editorial review process for secondary-student research essays
- Checked submissions for plagiarism and AI-generated writing; verified citation formatting and source usage
- Wrote detailed feedback notes to improve clarity, argument quality, and academic integrity

Participant, Qing Dynasty Vases Repair Case Study at Fitzwilliam Museum (Cambridge, UK) Aug 2024

- Mentored by the senior curator, James C.S. Lin, of the Asian section of the museum to learn the history of collections
- Learned about the restoration process of three Qing dynasty vases worth about £100,000

HONORS AND AWARDS

Publication and Scholarship:

- **Han, Qianhao.** “Advancing SDG 11.4: Low-cost Digital Tools for Overlooked Heritage.” *International Institute for Sustainable Development*, Issues: Human Settlements & Population, Sustainable Development, Stakeholder Participation, August 12, 2026.
- Edwards S. Rogers Family Scholarship: granted annually by The Bishop Strachan School Foundation to an exceptional Grade 11 student (amount \$10,000), 2025
- Signature Award for Science: awarded to a Grade 11 student demonstrating curiosity, resilience, self-awareness, and leadership in the sciences, The Bishop Strachan School Foundation, 2025

Computing and AI:

- M&TSI 2026: Most Innovative Idea Award (1/16 Teams), University of Pennsylvania, 2026
- Bronze Medal, International AI Olympiad (IAIO), 2026

- CAIO National Training Camp Gold Medal, International AI Olympiad (IAIO) Team Canada Member, 2026
- Team Canada Member, 2nd International Olympiad in Artificial Intelligence (IOAI), 2025
- Silver Medal in Practical Round, Bronze Medal in Scientific Round, 1st International Olympiad in Artificial Intelligence (IOAI), 2024
- Platinum Division, USA Computing Olympiad (USACO), 2025
- Silver Merit Award, Bay Area Science and Engineering Fair, 2025
- Runner-Up Paper Award, AI Youth Star Award, IEEE BigData Conference 2024 High School and Undergraduate Symposium, 2024
- Recognition by Member of Parliament for Richmond Hill, Outstanding Contribution for Promoting STEAM for Youth, and Representing Canada in Robotics Competition, 2024
- Perfect Score, Canadian Computing Competition (CCC) Junior, 2024
- Semifinalist, Technovation Girls, 2024 & 2023
- Third Place, Youth Team in MIT App Inventor Appathon – International, 2023

Math:

- Canadian Mathematical Olympiad (CMO) Qualifier: scored 65/80 on the Canadian Open Mathematics Challenge (COMC) 2025 and 87/100 on the CMO-Qualifying Repêchage, 2026
- The USA Mathematical Olympiad (USAMO), Qualifier, 2026
- Scored 11/15 in 2026 American Invitational Mathematics Examination (AIME) I, Qualified for United States of America Mathematical Olympiad (USAMO), 2026
- Math Prize for Girls (hosted at MIT) Qualifier, 2024, 2025, 2026
- Jane Street AMC 12A Award and Certificate of Excellence, 2026; Jane Street AMC 12B Certificate of Excellence, 2026
- Scored 145.5/150 in American Mathematics Competition 12 (AMC12) B, 2025, Qualified for AIME
- Scored 150/150 in American Mathematics Competition 12 (AMC12) A, 2025, Qualified for AIME
- Scored 11/15 in 2025 American Invitational Mathematics Examination (AIME) I, Qualified for United States of America Junior Mathematical Olympiad (USAJMO), 2025
- D. E. Shaw Group AMC 10 Certificate of Excellence, 2025
- Honor Roll of Distinction, American Mathematics Competition 10 (AMC10) A, Score 145.5/150, Qualified for American Invitational Mathematics Examination (AIME), 2024
- Scored 10/15 in 2024 American Invitational Mathematics Examination (AIME) I, Qualified for United States of America Junior Mathematical Olympiad (USAJMO), 2024
- Honor Roll of Distinction, American Mathematics Competition 10 (AMC10) B, Score 141/150, Qualified for American Invitational Mathematics Examination (AIME), 2023
- Perfect Score, Student Champion in CEMC Pascal Contest, 2024
- Distinguished Honor Roll, Global Top 1 %, American Mathematics Competition 8 (AMC8), 2023

Robotics:

- **FIRST Robotics Competition**
 - 2026 FIRST Robotics World Championship Archimedes Division
 - 2026 Ontario Provincial Championship Industrial Design Award
 - 2026 Ontario North Bay District Event Finalist and Excellence in Engineering Award sponsored by Littelfuse
- **FIRST Tech Challenge**
 - 2025 FIRST Tech Challenge World Championship Ochoa Division
 - 2024 FIRST Tech Challenge World Championship Jemison Division: Semi-finalist
 - 2024 Canada Ontario Provincial Championship: Winning Alliance - 1st Team Selected, Control Award
 - 2023 FIRST Tech Challenge World Championship Jemison Division: Design Award Finalist
- **VEX Robotics Competition**
 - 2025 VEX AI Robotics Competition Championship: Robot Skills 3rd Place
 - 2025 VEX Robotics Competition High School World Championships Technology Division
 - 2024 VEX Robotics Competition Middle School World Championships: Ranked 3rd in Design Division
 - 2024 Ontario Provincial Championship: Design Award and Robot Skills Champion
- **VEX IQ Competition:**
 - 2023 VEX IQ Challenge Middle School: Division Semi-finalist
 - 2022 VEX IQ Challenge Middle School: Robot Skills World Champion

Business and Biology/Healthcare:

- DECA International Career Development Conference (ICDC), 3rd Place in Entrepreneurship Innovation Plan (EIP), 2026
- The Conrad Challenge 2025-26, China Regional Gold (2nd Place), Top 5% in the Health & Nutrition Track, 2026
- HOSA International Leadership Conference (ILC) Finalist, Top 10 in Public Health Secondary School, 2025
- HOSA Spring Leadership Conference (SLC) Public Health 2nd Place, International Leadership Conference (ILC) Qualifier, 2025

Literature:

- Shortlisted, Global Top 16%, 2023 John Locke Competition Junior Prize, 2023

Certification:

- Stanford Pre-Collegiate University Level Online Linear Algebra course, Spring 2026
- Stanford Pre-Collegiate University Level Online Multivariable Differential Calculus course, Fall 2025
- Child Rights and Development by Human Rights Centre of UN-mandated University for Peace, August 19, 2025
- Indigenous Peoples' Rights and Development by Human Rights Centre of UN-mandated University for Peace, February 25, 2025
- Deep Learning Course Series by Stanford University & DeepLearning.AI on Coursera, August 27, 2024
- Machine Learning Course Series by Stanford University & DeepLearning.AI on Coursera, June 24, 2024

SKILLS

Languages: English (Fluent), Mandarin Chinese (Native), French (Intermediate)

Computing: C++, Java, Python

Interests: Latin Dance, Cello, Reading, Art Appreciation