**Ellen Luojia WANG**

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**EDUCATION\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Horace Mann School (HM)**   **Bronx, NY**

***GPA: 3.95/4.00******Sept 2018 – June 2025***

* STEM courses**:** Science Research (I & II), Physics Honors, Chemistry, Biology, Theoretical Computer Science, Art of Data, Intermediate Programming, Introduction to Python, Precalculus with Theory Honors, Algebra II & Trigonometry Honors, Geometry Honors

**Western Connecticut State University (WCSU)**                                                                                        **Danbury, CT**

***GPA: 4.00/4.00******May - July 2023***

* Summer courses: Introduction to Linear Algebra, Machine Learning and Wavelets

**Other Courses/Certificates**

* Introduction to Quantum Computing (Qubit X Qubit by IBM), AP Physics I (UC Scout, AP Exam score 5), Space, Time & Matter (World Science Scholars (WSS)), [The Computational Universe: A New Kind of Science](https://worldsciencescholars.com/courses/the-computational-universe-a-new-kind-of-science/) (WSS), Development of Emotion Regulation Neurobiology and the Role of Caregiving (WSS)

**RESEARCH EXPERIENCE\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Deep Learning on a Novel Ising Model to Study Arctic Sea Ice Dynamics**

*Individual Research* ***April 2023- Present***

* Independent research project under the mentorship of Professor Joan Wang at Xiamen University Malaysia and Dr. Alyssa Shearer at the Horace Mann Science Research program.
* Modeling Arctic Sea Ice dynamics to study climate change by combining the 100-year-old Ising model in statistical physics with modern deep learning methods including Convolutional Neural Network; intensively coding in Python
* Named 2024 Regeneron International Science and Engineering Fair Finalist (Physics Category) and won 2024 Terra NYC STEM Fair First Place (Physics Category)
* An earlier version “A Study on Arctic Sea Ice Dynamics Using the Continuous Spin Ising Model” won Physics Bronze Medal at the 2023 USA Competition of the International S.-T. Yau High School Science Awards and is in press: *Journal of Applied Physics, vol 135, issue 19, 2024.*

**Defending Quantum Neural Networks against Adversarial Attacks with Homomorphic Data Encryption**

*Group Research @ WCSU* ***June 2023- Present***

* Working in a group of 4 high school/college/graduate students to design a novel defense model to protect quantum neural networks against adversarial attacks by using homomorphic data encryption, which converts the encrypted data into ciphertext so that they can be handled in its original form without any risks of privacy breach.
* Accepted for presentation and proceedings publication (forthcoming) at the 2023 International Conference on Computational Science and Computational Intelligence (Las Vegas, Dec. 2023); accepted for full-paper presentation and PME Student Poster Session presentation at the 2024 Joint Mathematics Meeting (San Francisco, Jan. 2024).

**Learning Hard Quantum Distribution with Generative Artificial Intelligence Methods**

*Independent Study* ***Aug 2023- Present***

* Studied the fundamentals of quantum mechanics and quantum computation and the advancement in machine learning under the mentorship with Dr. Sergii Strelchuk at the University of Cambridge.
* Generated quantum distribution data ranging between 3 and 12 qubits in a simulated quantum cirq.qsim circuits; Experimenting with various ideas of learning such quantum distributions with the recently developed generative neural network models, including Variational Autoencoders (VAE), Normalizing Flows (NF), and Bayesian Flow Networks (BFN), implemented using Tensorflow/Keras and PyTorch APIs.

**LEADERSHIP/WORK EXPERIENCE\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Horace Mann FIRST Robotics Competition (FRC) Team 5806 *Basement Lions***  **Bronx, NY**

***Division Head of Programming, Electrician & Pneumatics Sept 2021- Present***

* Winner of HM Alexander Capelluto Award for the initiative of introducing robotics competition in Kenya and other under-developed countries; spearheaded a one-week robotics camp at Mang’u High School in Kenya (<https://www.africanavoice.com/education/robotics/>); managing weekly remote coding and robotics instructions; working closely with school head, coaches, department chairs, student and grade deans to establish a long-run exchange program with Kenyan schools.
* Leading a team of 40+ members in Java programming, electrical wiring, and pneumatics of a 120-pound industrial-size robot each competition season, with time spent totaling 250+ hours.
* Mentor for HM Middle Division First Lego League (FLL) teams; volunteer judge and referee at regional FLL competitions; Promoting STEM initiatives by advising elementary/middle schoolers & advocating for the team at various school functions; connecting with local public schools to help establish girls STEM clubs.

**Chess Through Challenges Inc. (501(c)(3) not-for-profit /** www.chessCTC.org**) Bronx, NY**

***Founder & President Apr 2021 - Present***

* Leading the Unruly Queens national women’s chess initiative; offered 120+ online free group lessons year-round and benefited 500+ girl players from 20+ states; awarded **$3800** by US Chess Women in 2021, **$1500** in 2022, and **$2000** in 2023; featured in US Chess Federation magazines *Chess Life* and *Chess Life Online*, and multiple local newspapers including *Washington Square News*, *Our Town* and *West Side Spirit, Tapin,* and *West Essex Tribute*
* Launched Salama Gachie Chess Club in Nairobi, Kenya in 2016; hosted in-person chess workshops in March 2023, followed by year-round group lessons to Nairobi and Kisumu youth players; created the chess library project and managing a team of 10 regional leaders for book donations

**Chess Connections Magazine (**www.chessconnections.org**) Houston, TX**

***Co-Editor-in-Chief June 2022 – Present***

***Managing Editor & Designer Jan 2020 – May 2022***

* Overseeing the submission, editing, designing and publication processes of the quarterly student-run free online chess magazine; expanded the editorial and design team to 15 members worldwide
* Deeply committed to the female representation in chess journalism; won “Special Achievement Award” by Chess Journalists of America

**HORNORS & AWARDS\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**STEM**

* 2024 Regeneron International Science and Engineering Fair Finalist (Physics Category)
* 2024 Terra NYC STEM Fair First Place (Physics Category)
* 2024 USA Physics Olympiad (USAPHO) Qualifier
* 2024 National Honorable Mention at NCWIT Aspirations in Computing High School Awards
* 2024 (via AMC12) and 2022 (via AMC10) American Invitational Mathematics Examination Qualifier
* 2023 Physics Bronze Medal at USA Competition of the International S.-T. Yau High School Science Awards
* 2023 World Science Scholar (one of 52 scholars selected worldwide)
* 2023 Global Top 100 & Division (NY & MD) Top Scorer at Physics Bowl Contest
* 2023 Gold Division Promotion at USA Computing Olympiad
* 2022 Global Honorable Mention at Physics Unlimited Premier Competition (PUPC) by Princeton University
* 2022 World Championship Qualifier & NYC Regional Winner at FIRST Robotics Competition (FRC)

**CHESS(Highlighted International & National Awards)**

* 2024 Scholar Chess-player Award (only girl among national top 5 & $1500 prize)
* 3x National Grant Awardee by US Chess Federation for the Unruly Queens initiative (2021, 2022 & 2023)
* 2023 National Girls Chess Champion (under 16)
* 2023 Special Achievement Award by Chess Journalists of America
* 2022 Gold Medalist at FIDE World School Chess Championship (under 17 girls)
* 2022 National Team Champion (NYS Representative) at National Chess Championships of State Champions
* 2x Invitee to US Junior Girls Chess Championships (national top 10 under age 20 in 2022 & 2023)
* Awarded Woman International Master title, 2 Women Grandmaster Norms, US National Master title in 2021
* 2x Gold Medalist in North American Junior Girls Chess Championship (2020 & 2021)

**OTHER**

* 2023 Gold Medal at National Spanish Examination (99th Percentile)
* 2023 Winner of Horace Mann Alexander Capelluto Award
* 2023 & 2022 Gold Medal of Presidential Volunteer Service Award
* 2022 State Debate Championship Qualifier with NY State Forensic League
* 2022 & 2021 Ivy Preparatory School League Team Champion with Horace Mann Junior Varsity Tennis Team
* 2021 State Champion & Best Speaker with NYC Urban Debate League

**OTHER ACTIVITIES\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Editor of HM *Spectrum* (science magazine); HM Wind Ensemble First Flutist and Piccolo Soloist (Band Officer); President of HM Upper Division Chess Club; Division Head of HM FRC Club; Member of HM Physics Club