Hrishika Roychoudhury

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EDUCATION

University of North Carolina at Chapel Hill (UNC-CH) | School of Data & Information Sciences (SDIS) | Chapel Hill, NC

M.S. in **Information Science (MSIS)** | BS-MS Dual Degree Pathway Program *Jan 2026 - Exp. May 2027*

B.S. in **Information Science** and **Neuroscience,** Minor in **Computer Science** *Aug 2022 - Dec 2025*

Relevant Coursework: Systems Programming; Discrete Mathematics; Data Structures; Human Information Interactions; Health Informatics; AI Literacy & Law; Database Concepts & Applications; Information Systems Analysis & Design; Machine Learning for Computational Biology; Human Factors in Health & AI; Neuropsychopharmacology; Health App Development.

North Carolina School of Science and Mathematics (NCSSM) | Durham, NC *Aug 2020 - May 2022*

TECHNICAL SKILLS

Programming: Python, SQL, Java, JavaScript, HTML/CSS, MATLAB, Assembly, Dart.
ML & data: TensorFlow, Keras, PyTorch, scikit-learn, MNE (EEG), NumPy, Linux, React, FHIR, Leaflet, AJAX, Git.
Web & tools: GitHub, Zotero, Covidence, Obsidian, Notion, WordPress, Wix, Figma, Adobe, Microsoft 365, Google Workspace.
Languages: English (Fluent), Bengali (Fluent), Spanish (Proficient).

RESEARCH & PROJECTS

Further write-ups and case studies: hris28.github.io/garden.html

AI, Machine Learning & HCI Research

Eye-Tracking Engagement in AI-Assisted Academic Search – Supervisor: Dr. Fei Yu. *Sept 2025 - Present*

- Designed a controlled between-subjects mixed methods study evaluating how students seek, interpret, and verify academic information using AI tools vs. unaided UNC Library Search (**EBSCOhost/Articles+**).
- Paired **Tobii Nano Pro** eye-tracking with think-aloud protocols, using gaze signals (fixation, saccade, pupil dilation) as cognitive-validity measures of visual attention. Applied behavioral metrics and post-task survey instruments to model cognitive load during information-seeking tasks and inform AI guidelines in education.

Brain-Computer Interface (BCI) Model Card – Supervisor: Dr. Raghavendra P Pothukuchi. *Jul 2025 - Dec 2025*

- Tested end-to-end ML pipeline in TensorFlow/Keras/MNE on neural signal data. Benchmarked three **CNN** architectures (**EEGNet, DeepConvNet, & ShallowConvNet**), generating performance metrics and training curves.
- Evaluated DREAMS framework HTML model cards with a 13-item **System Explainability Scale (SES**) across Trust, Usability, and Understandability/Interpretability dimensions. Published reproducible artifact to GitHub.

LLM-Driven Language Shift in Naturalistic Communication – Independent Study. *Aug 2025 - Feb 2026*

- Executed a **PRISMA**-guided systematic review (6 bibliographic databases, 4 preprint servers) with dual citation chasing, synthesizing evidence on how large language models have affected human communication.
- Drafted a **five-lens conceptual extraction framework** classifying how studies operationalize LLM exposure and measure linguistic outcomes, surfacing gaps and methodological weaknesses alongside a preliminary evidence map.

Software & Data Projects

Health Chart App – Supervisor: Jonathan Tweedy. *Sept 2025 - Dec 2025*

- Built a JavaScript Electronic Health Record (EHR) dashboard (**Leaflet.js, AJAX**) using the **FHIR (Fast Healthcare Interoperability Resources) API** for data integration with hospital systems like EPIC, visualizing patient vitals/trends.

3D-Printed Receptor Model – Supervisor: Dr. Alexandra Nowlan. *Aug 2025 - Dec 2025*

- Designed and 3D-printed an interactive D3 dopamine receptor model from cryo-EM structures (**ChimeraX**, **Blender**, **CAD**), demonstrating conformational change triggered by a bitopic ligand (FOB02-04A).
- Presented at UNC BeAM Makerfest as a communication tool for medicinal chemists and clinicians to visualize D3-selective bitopic agonist activity relevant to Parkinson's disease therapeutics.

Information Science & Archival Projects

Archiving the Now – Information & Library Science Student Association (ILSSA) Ad Hoc Archiving Committee. *Dec 2025 - Present*

- Established a **digital archiving initiative** student committee for documenting the merge of the School of Information and Library Science (SILS) with the School of Data Science and Society (SDSS) as they came together to form SDIS.
- Developed collaborative oral-history methodologies and digital preservation workflows for documenting institutional change; formalized a records partnership with UNC University Archives. Collected **50+ survey responses**, **9 written stories**, and **11 oral histories**; presented "Anecdote as Antidote" at the SNCA/SCAA 2026 Joint Annual Conference.

AI Scraping Access Policy Framework – Supervisors: Will Cross & Dave Hansen. *Jan 2026 - May 2026*

- Authored a board-ready annotated policy memo for the **Internet Archive** governing **bulk automated access to digital collections**, weighing interests of publishers, researchers, and AI developers across a stakeholder scenario analysis.
- Wrote Terms of Service text, tiered access framework, model Data Trust Agreement, and staff implementation guidance.

Web Archive Forensics Service Proposal – Supervisor: Leslie Thomson. *Mar 2026 - May 2026*

- Created a three-tier reference and capture service for the State Library of NC, with **automated web capture**, **metadata extraction**, and **verification workflows** grounded in a statewide information-needs analysis of independent journalists; scoped feasibility, limitations, and library-newsroom service precedents.
- Assessed preservation strategies and institutional capacity against **Archive-It** infrastructure and **WARC/ISO 28500** standards to support technical infrastructure for long-term access to sustainable digital collections.

Biomedical & Computational Research (selected) *2019 - 2022*

- Synthesized biogenic silver nanoparticles with agri-food byproducts as a novel anticancer reducing agent (Regeneron STS Top 300; NC International Science Challenge); developed chitosan-insulin nanoparticles for oral insulin delivery in noninvasive diabetes treatment (International BioGENEius Challenge); studied algae-based wastewater bioremediation (published, International Journal of High School Research; Intel ISEF).
- Employed computational chemistry molecular modeling techniques with **Schrödinger Maestro**, **Gaussian**, **MATLAB**, **Vortex**, and **WebMO**, alongside wet lab research for physicochemical property analyses and medical drug design.

LEADERSHIP EXPERIENCES

Facilitator & College Loop President – Girls Who Code (GWC), UNC Chapter *Chapel Hill, NC | Jan 2023 - Present*

- Developed lesson plans and taught **Python** programming to **50+** students weekly, beginning with **Turtle** for visual, low-barrier learning; lectured, held office hours, led instruction through semester-long app design projects.
- Started UNC's **GWC College Loop (2026)**; guided coding projects and partnered with local schools to expand CS access for underrepresented groups; communicated regularly with parents, alumni, and sponsors.

Co-President – UNC Zero Degrees *Chapel Hill, NC | Jul 2025 - Present*

- Grew UNC's largest interdisciplinary student organization to **200+** members; secured **$1,800** in Undergraduate Senate Funding for programming and ran community events. Work with board to foster a welcoming environment.
- Managed communication platform, server infrastructure, and hosted bi-weekly activities; configured automated moderation tools, interactive bots, AlertCarolina webhooks, and event analytics, increasing student engagement by **85%**.

Ambassador & Student Advisory Board Member – UNC SILS *Chapel Hill, NC | Aug 2025 - Jun 2026*

- Selected to represent SILS for prospective students and families through outreach events and academic panels.
- Served on the **SILS New School Student Advisory Board**. Advised institutional decision-making, providing input to school leadership on curriculum, student experience, spaces, and resources across graduate and undergraduate programs.

Co-Founder & Chief Operating Officer – SkyeLabs Innovation Inc. *Durham, NC | Sept 2020 - Aug 2024*

- Directed product development and organizational operations for sustainable materials startup developing **EcoGel**, a flexible biopolymer aerogel with applications in high-performance apparel, aerospace infrastructure, and space exploration. Led team through R&D, funding strategy, and prototyping phases.
- Secured **$2000** in research grant funding from the Bowman-Brockman Endowment for Entrepreneurship and Advanced Research. Won **Pete Conrad Scholar** (International Conrad Spirit of Innovation Challenge 2021, Aerospace & Aviation); recognized as **Top 10 Finalist** at **NASA iTech** & sole Honorable Mention as the youngest team nationally.

Apprentice – Girls Who Code × Pluralsight Work Prep Apprenticeship *Remote | May 2023 - Jun 2023*

- Conducted Pluralsight workshops in full-stack web & software development, Python, Java, and cloud technologies. Practiced with **SDLC**, **Agile** & **Waterfall** methodologies, **Git**, **DevOps**, and **CI/CD** pipelines.
- Handpicked as Closing Ceremony speaker out of **100+** participants; moderated official Discord server for students.

Editor-in-Chief – Broad Street Scientific (BSS) *Durham, NC | Oct 2020 - Jun 2022*

- Led annual **100-page** peer-reviewed publication; mentored **20+** editors and writers. Decided theme (Chaos Theory).
- Designed submission management system and website with **SEO Optimization**. Organized publishing workshops; reviewed and critiqued submissions. Published NCSSM-Durham's official journal of student STEM research successfully.

Community Service *Charlotte, NC | 2018 - 2022*

- Taught **16** students in Intro to Chemistry course through SMath Tutors, supporting **$24,000** raised for the Food Bank of Central & Eastern NC. Volunteered in **Hematology/Oncology** unit at Novant Health Presbyterian Medical Center. Assisted international students with class integration as an **ESL Ambassador**, translating official documents into Bengali and tutoring English one-on-one. Organized fundraising drive and donation collection for Loaves & Fishes Food Pantry.

HONORS & AWARDS

Pearl Hacks Hackathon Award; Regeneron Science Talent Search Scholar (STS; top 300 of 2,162 applicants); National JSHS Momentum Grant; North Carolina International Science Challenge Winner (NCISC); Bowman-Brockman Endowment Recipient; NASA iTech Honorable Mention & Top 10 Finalist; Pete Conrad Scholar; Coca-Cola Scholar Semifinalist (top 2% of 68,000+ applicants); Carson Scholar; American Junior Academy of Sciences (AJAS) Fellow & Lifetime Honors; Intel International Science & Engineering Fair (ISEF) State Finalist; National Speech & Debate Academic All-American; World Science Scholar; USCF Top 34 Female Player in Age Group.