Isabella Chittumuri

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Education

Colorado School of Mines Aug. 2023 — Present
Ph.D., Applied Mathematics and Statistics

Hunter College, City University of New York Aug. 2020 — May 2022
M.A., Applied Mathematics and Statistics

Hunter College, City University of New York Aug. 2016 — May 2020
B.A., Statistics

Research Experience

Colorado School of Mines (CSM) Aug. 2025 — Present
Research Assistant, advised by Soutir Bandyopadhyay

- Assessed climate risks in Hornafjörður, Iceland using geospatial and ML methods as part of an NSF/-Fulbright Arctic Research Award
- Perform statistical analysis on high-resolution Climate Earth System Models (CESMs) to identify and assess uncertainty in sea ice leads, using smoothing and differentiation techniques
- Conduct risk analysis on oil and gas flowlines using GIS, machine learning, and spatial analysis to predict potential failures, employing high-dimensional datasets and feature engineering to improve reliability

Fulbright Commission Iceland Sep. 2025 — May 2026
Research Fellow, NSF/Fulbright Arctic Research Award

- Conduct field-based and remote sensing research through the University of Iceland and the University's Research Centre in Hornafjörður
- Apply geospatial analysis and machine learning to assess climate risks in glacier-dependent communities, focusing on tourism infrastructure and adaptation strategies
- Collaborate with local researchers and grassroots organizations to support sustainable development in rapidly changing Arctic environments

Alaska Center for Energy and Power (ACEP) Dec. 2022 — Aug. 2023
Data Analyst

- Cleaned, visualized, and identified significant variations for hourly fuel consumption data of 45 households from Alaska Fuel Use Study and identified significant variations between groups
- Documented field deployed systems and network design for a rural micro-grid in Kotzebue, Alaska
- Utilized Purple Air API for sensor data extraction, conducted statistical analysis, and provided guidance to the web development team
- Participated in code reviews and communicated results to research stakeholders

National Renewable Energy Laboratory (NREL) May 2022 — May 2023
Research Participant Program Intern

- Processed real-world datasets on post-retrofit energy usage for participants of the Thermalize Juneau 2021 Campaign that utilized air source heat pumps
- Analyzed pre-retrofit and post-retrofit data to evaluate differences in household energy consumption and greenhouse gas emissions

National Aeronautics and Space Administration (NASA) Jan. 2023 — Mar. 2023
DEVELOP National Program, Project Participant

- Assessed snow variability across the Arctic National Wildlife Refuge and neighboring National Petroleum Reserve through climatological analysis to support ecological monitoring in Northeast Alaska

- Constructed snow variability maps and time-series analyses using AMSR-E, AMSR2, Landsat 7 ETM+, Landsat 8 OLI, and NOAA Climate Data Records

National Aeronautics and Space Administration (NASA) Sep. 2022 — Nov. 2022
DEVELOP National Program, Project Lead

- Evaluated Hurricane Irma's impact on Georgia heir property owners using NASA Earth observations
- Created hurricane flood extent maps using Landsat 8 OLI, Landsat 7 ETM+, Sentinel-2 MSI, and Sentinel-1 CSAR through Google Earth Engine's Python API
- Lead partner meetings, fostered a safe environment for open communication, engaged teammates' strengths and helped them grow despite setbacks

United States Department of Energy (DOE) Aug. 2021 — May 2022
Science Undergraduate Laboratory Intern, Cold Climate Housing Research Center (CCHRC) at NREL

- Established a statistical time series analysis of baseline pre-retrofit electrical consumption data of Thermalize Juneau 2021 Campaign
- Ran CCHRC's cold climate chamber to collect electrical efficiency usage data at extremely low temperatures for four ductless heat pump models
- Documented and collected field data on housing issues resulting from permafrost thawing within the local community of Point Lay, Alaska

Industry Experience

New York City Department of Sanitation Jun. 2021 — Aug. 2021
Intern Database Analyst & Developer

- Developed an inventory database by converting Alfresco Software records to Excel, SQL, and ServiceNow

New York City Transit Authority Nov. 2020 — Jun. 2021
System Data & Research Intern

- Implemented ETL (Extract, Transform, Load) methods for transferring coding scripts between subway divisions and utilized Python to predict real-time subway data from MongoDB.
- Constructed heat maps to compare predicted and actual subway arrival and departure times

Workshops

Glacier Machine Learning and Cryosphere Summer School, University of Montana Jun. 14–23, 2025
Participant, Taft-Nicholson Center

- With GlaMaLeS, trained in deep learning and physics-informed machine learning techniques for glaciology, including CNNs, Gaussian process regression, and emulators
- Implemented numerical methods for Bayesian inference (MCMC, variational inference) and explored uncertainty quantification in glacier modeling
- Applied PyTorch and JAX to inverse problems such as estimating ice hardness and basal traction using remote sensing data

NASA Earth Sciences & UW Hackweek 2024, University of Washington Aug. 19–23, 2024
Participant, GeoSMART Track

- Collaborated on the "Crunchy Snow" project, developing machine learning models for snow depth retrieval using Sentinel-1 SAR backscatter data
- Contributed to statistical analysis, focusing on error quantification and spatial autocorrelation through variograms to enhance model reliability and accuracy
- Gained experience working in a multidisciplinary research team focused on remote sensing applications in snow science

Field Experience

Icelandic Glaciological Society Spring Expedition May 31 2026 — Jun. 5 2026
Student Field Assistant, Jöklarannsóknafélag Íslands (JÖRFÍ)

- Supported food preparation and daily camp logistics for a 25-person glacier field expedition based at Grímsfjall Hut on Vatnajökull
- Operated snowmobiles in glacier terrain, including transporting personnel and towing scientific equipment between remote field sites
- Contributed to multidisciplinary cryosphere fieldwork including mass-balance coring, microplastic sampling, geothermal gas monitoring, drone surveys, and seismic station deployment

Langjökull Glacier Paleomagnetism Fieldwork Sep. 10 2025 — Sep. 17 2025
Field Support, University of Iceland (HÍ)

- Assisted with paleomagnetic sampling of 15 lava flows in the Langjökull region using a portable drill, orienting fixture, and Brunton compass for accurate age-dating analysis
- Maintained detailed field notes on sampling procedures, site context, and geomorphic features to support laboratory analysis
- Supported field logistics, including 4x4 vehicle travel on remote F-roads and foot river crossings of braided glacial streams

Introduction to Whitewater Kayaking Jul. 9 2025 — Jul. 17 2025
Student, University of Alaska Fairbanks (UAF)

- Developed foundational skills for navigating up to Class III whitewater, including efficient paddling strokes, boat control, and hydrology-based river reading
- Practiced essential safety and rescue techniques such as wet exits, assisted rescues, swiftwater swimming, and portaging
- Applied group leadership, hazard assessment, and river etiquette on multiple day trips, culminating in a Class III whitewater descent of the Nenana River

Snow Science Winter School (SSWS) Feb. 23 2025 — Mar. 1 2025
Student, Institute for Snow and Avalanche Research (WSL-SLF)

- Conducted snowpack fieldwork at Col du Lautaret (2058 m), performing penetration resistance, density, and specific surface area measurements using SnowMicroPen, DUFISSS, IceCube, and density cutters
- Processed and visualized snowpack simulations, atmospheric data, and snow properties using Crocus models, weather station data, DEMs, and Python-based analysis tools to support stability assessments and remote sensing applications
- Collaborated with international snow science experts through field exercises, technical workshops, and data visualization projects

Juneau Icefield Research Program (JIRP) June 10 2024 — Aug. 9 2024
Student, University of Alaska Southeast (UAS)

- Collected glacier mass balance data, seismology data, and conducted a GPS survey for a velocimetry project on the Vaughan Lewis Icefall to analyze ice flow dynamics
- Completed a 75-mile (120 km) traverse of the Juneau Icefield from Juneau, Alaska to Atlin, BC
- Developed mountaineering skills essential for icefield navigation, including glacier travel, crevasse rescue, rope handling, and survival techniques in remote and extreme conditions

Toolik Field Station, University of Alaska Fairbanks (UAF) July 31 2023 — Aug. 10 2023
Volunteer, Plant Biomass and Soils Research Assistant

- Identified over 30 arctic vascular and non-vascular plants to species including graminoids, forbs, deciduous and evergreen shrubs functional types
- Deconstructed and sorted aboveground and belowground tundra quadrants for analysis of biomass, carbon, and nitrogen content to understand the relationship between changes in vegetation and carbon flux as measured by eddy covariance over time

Introduction to Expedition Kayaking May 30 2023 — Jun. 8 2023
Student, University of Alaska Fairbanks (UAF)

- Led a 158-mile Class I water Yukon River expedition, showcasing skills in route planning, hazard management, and wilderness navigation in the Arctic
- Mastered inflatable kayak handling, water reading, efficient paddle and basic river rescue techniques

Introduction to Arctic Backpacking Jun. 17 2022 — Jun. 26 2022
Student, University of Alaska Fairbanks (UAF)

- Completed intensive training on route planning, gear selection, and emergency preparedness and applied skills in a week-long Brooks Range expedition carrying a 50+ pound backpack
- Practiced Leave No Trace ethics, bear-safe procedures, map/compass navigation and safe river crossings

Introduction to Ski Mountaineering Jan. 27 2022 — Mar. 17 2022
Student, Alaska Alpine Club

- Acquired hands-on expertise in essential winter mountaineering survival skills, including managing frostbite, hypothermia, avalanche safety, ski survival techniques, crevasse rescue, glacier and roped travel
- Demonstrated competence in real-world situations during an overnight expedition on Caster Glacier, highlighting adaptability in challenging winter conditions

Papers & Publications

5. **Chittumuri, I.**, Alshehab, N., Voss, R. J., et al. Risk Analysis of Flowlines in the Oil and Gas Sector: A GIS and ML Approach, *Society of Petroleum Engineers (SPE) Journal*, 2025.

4. Anderson, K., Arooji, O., **Chittumuri, I.**, Germann, T. Using Earth Observations to Evaluate Snow Variability through a Climatological Analysis to Support Ecological Monitoring in Northeast Alaska, *NTRS – NASA Technical Reports*, 2023.

3. Stevens, V., Truffer-Moudra, D., Dodd, R., Wiltse, N., Marsik, T., **Chittumuri, I.**, Biddle, J., et al. Use of a Thermalize Campaign to Increase Community Resiliency in a Cold Climate, *ASHRAE Topical Conference Proceedings*, 2023.

2. Marsik, T., Stevens, V., Garber-Slaght, R., Dennehy, C., Strunk, R.T., **Chittumuri, I.**, Sehmel, T. Air Source Heat Pumps in Very Cold Climates, *ASHRAE Topical Conference Proceedings*, 2023.

1. **Chittumuri, I.**, Rogers, S., Tesfayi, T., Uniyal, N. Evaluating the Impacts of Hurricane Irma on Georgia Heirs' Property Owners Using NASA Earth Observations, *NTRS – NASA Technical Reports*, 2022.

Presentations & Poster Sessions

- "Geospatial Risk Analysis for Climate Resilience in Glacier-Dependent Communities" May 26, 2026
  Oral Presentation, From Detection to Action – Community Resilience to Emerging Arctic Extremes, UArctic Congress 2026, Faroe Islands
- "Risk Analysis of Oil and Gas Flowlines: A GIS and ML Approach" Aug. 3, 2025
  Poster Session, 2025 Joint Statistical Meetings (JSM)
- "Snow Variability Climatological Analysis in Northeast Alaska" Mar. 28, 2023
  NASA DEVELOP Spring 2023 Hybrid Closeout Presentations for NASA employees & general public
- "Impacts of Hurricane Irma on Georgia Heir Property Owner" Nov. 14, 2022
  NASA DEVELOP Fall 2022 Hybrid Closeout Presentations for NASA employees & general public
- "Establishment and Analysis of Baseline Electrical Data" Dec. 9, 2021
  DOE Fall 2021 Intern Poster Symposium, Final Presentation for DOE employees & general public

Awards & Grants

- Icelandic Road Administration Research Fund (1-year grant, $29,000), Mar. 2026 — Mar. 2027
- Student Travel Grant, UArctic Congress 2026 ($1,650), May 2026
- Polar Science Early Career Community Office (PSECCO) Conference Travel Grant ($250), Apr. 2026
- Fulbright–NSF Arctic Research Award, Iceland (9-month grant, $27,450), Sep. 2025 — May 2026
- Colorado Environmental Management Society (CEMS) Scholarship ($3,000), Apr. 2025
- Colorado Scientific Society (CSS) Research Grant ($1,000), May 2024
- Joan W. Miller Scholarship Fund ($3,000), Mar. 2024

Certifications

- Fundamentals of Remote Sensing & Monitoring and Modeling Floods using Earth Observations, NASA Applied Remote Sensing Training, Sep. 2022
- Wilderness Advanced First Aid, May 2022 - May 2025
- Social & Behavioral Researchers Training, CITI Program, Aug. 2021 - Aug. 2024
- NYC City Parks & Recreation Lifeguard, Jun. 2016 - Sep. 2019

Professional Affiliations

- **Jöklarannsóknafélag Íslands (JÖRFÍ) – Icelandic Glaciological Society**, Member, June 2026 — Present
- **International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI)**, Member, May 2026 — Present
- **American Statistical Association (ASA)**, Member, May 2025 — Present
- **Colorado Environmental Management Society (CEMS)**, Member, Apr. 2025 — Present
- **Rocky Mountain Association of Geologists (RMAG)**, Member, Apr. 2025 — Present
- **CSM Society for Industrial and Applied Mathematics (CSM SIAM)**, Member, Sep. 2024 — Present
- **Association for Women Geoscientists (AWG)**, Member, Feb. 2024 — Present
- **International Association of Cryospheric Sciences (IACS)**, Member, Oct. 2023 — Present
- **CSM Society for Women in Mathematics (CSM SWiM)**, Member, Aug. 2023 — Present
- **Society for Industrial and Applied Mathematics (SIAM)**, Member, Aug. 2023 — Present
- **Association for Women in Mathematics (AWM)**, Member, Jun. 2021 — Present
- **Asian Americans and Pacific Islanders in Geosciences (AAPIiG)**, Member, Apr. 2021 — Present