Dhanyasri Bolla

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PROFESSIONAL SUMMARY

Master of Science in Engineering Management candidate at The George Washington University, combining a technical foundation in Electronics and Communications Engineering with advanced expertise in data analytics and systems engineering. Currently serving as a Graduate Research Assistant at GWU, utilizing LLM-based pipelines, Python, and statistical methods to analyze complex resilience trends and climate adaptation strategies. Specific research contributions include developing quantitative frameworks for megacities and co-authoring publications on adaptation co-benefits in *Environmental Research: Climate*. An AWS Certified Data Engineer with broad technical proficiency in R, SQL, and full-stack web development, complemented by leadership experience in student organizational management and operational optimization.

WORK EXPERIENCE

The George Washington University **Washington D.C**
Research Data Analyst **May 2024 - Present**

- **Climate Adaptation in Megacities:** Built a quantitative framework across **43 megacities**, using chi-square, Cramer's V, and regression in Python/Excel to assess resilience trends; applied an **LLM-based pipeline** to analyze climate action plans and identify adaptation gaps.
- **GAMI Co-benefits Mapping:** Coded and categorized **adaptation co-benefits** from the GAMI database for about **430+ articles**, surfacing patterns in health, economic, and biodiversity outcomes.
- **Web of Science Scraping:** Automated extraction and cleaning of **80+ adaptation research records**, creating structured datasets and visualizations (treemaps, category frequency charts) to highlight cross-disciplinary research trends.
- **U.S. Foreign Aid Policy Impacts:** Conducted inductive qualitative analysis of **18 expert interviews**, developing a **14-category, 40+ sub-code framework** to map systemic disruptions in humanitarian food aid and security programs.
- **What Our Region Grows 3.0:** Automated USDA CoA 2012/2017/2022 pulls and county to region aggregates, built a Food Self-Reliance Ratio (edible-weight & loss factors), and analyzed FAF SCTG 01–07 flows to rank top inbound food-supplier states - delivering CPI-normalized trend dashboards used by COG's FARM Policy Committee.

Business Web Solutions **India**
Web Development Intern **June 2022 - August 2022**

- Designed and implemented UI/UX improvements for a tourism website, enhancing user experience and engagement by 25% through responsive design and improved navigation.
- Assisted in database integration and API development, optimizing server response times by 30% and ensuring seamless user interactions.
- Conducted cross-browser testing and debugging, improving website performance across multiple platforms.

Unschool **India**
Marketing & Operations Intern **August 2021 - September 2021**

- Led a team of 6 junior interns, managing digital marketing campaigns that resulted in a 45% increase in course enrollments through targeted outreach and engagement strategies.
- Analyzed performance metrics, identifying optimization opportunities that improved lead conversion by 20%.
- Streamlined operational workflows, reducing course delivery time by 30% by implementing more efficient student onboarding and engagement processes.

SKILLS

- **Data Engineering & Cloud Analytics:** AWS (Glue, Redshift, Athena, DynamoDB, CloudWatch, Kinesis, Lambda [Custom Layers], EMR, S3, Lake Formation, IAM, Step Functions, EventBridge, SNS), Python (Pandas, Boto3, NumPy, Matplotlib, Seaborn, XML/JSON Parsing), SQL, Spark (PySpark), R (Tidyverse, dplyr, ggplot2, Shiny, Quarto Markdown), Metadata-Driven ETL/ELT Pipelines, Data Warehousing, Data Lakes & Lakehouse Architecture, Serverless Architecture, Parquet Optimization, Jupyter Notebooks, Excel
- **Research Skills:** Literature Review, Thematic Coding, Comparative Policy Analysis, Co-benefit Mapping (GAMI), Poster Presentation (AGU Conference 2024, Washington D.C.), Policy Modeling, Data-Driven Research
- **Systems Engineering:** SysML (ConOps, OV-1, Functional Decomposition), Arcadia Capella Tool, Systems Thinking, Trade-off & Architecture Analysis
- **Finance & Decision Modeling:** Monte Carlo Simulation, Value at Risk (VaR), Quantitative Risk Analysis, NPV, IRR, Payback Period, Sensitivity Analysis, Cost-Benefit Modeling in Excel, Engineering Economics
- **Statistical & Research Methods:** Stochastic Modeling, Chi-Square, Cramer's V, Regression Analysis, Conjoint Analysis, Survey Design, Binary Variable Coding, LLM-based Textual Analysis
- **Web Development & APIs:** HTML, CSS, JavaScript, PHP (basic), Responsive UI Design, REST API Integration (Alpha Vantage, Rate-Limiting Strategies), Git, GitHub, Netlify, Formspree
- **Conceptual Knowledge:** Climate Adaptation & Resilience, Urban Systems & Sustainability, Infrastructure Policy & Risk Mapping, UI/UX, Energy Emissions Forecasting

- **Soft Skills:** Leadership & Collaboration, Problem Solving & Critical Thinking, Public Speaking & Communication, Time & Project Management, Attention to Detail, Self-Motivation, Organizational Strengths

PUBLICATIONS

- **Author -** Urban Giants Under Threat: Unveiling Climate Vulnerabilities and Adaptive Strategies in Megacities (Submitted for possible publication in the Regional Environmental Change Journal).
- **Co-Author - Gore, C., et al. (2026).** *Patterns and gaps in co-benefit reporting in global adaptation research*. **Environmental Research: Climate**.

CERTIFICATIONS

- **AWS Certified Data Engineer – Associate (DEA-C01) -** Validates expertise in designing, implementing, and optimizing data pipelines, ETL processes, and secure data storage solutions using core AWS services.

TECHNICAL PROJECTS

Climate Adaptation Dashboard

- Built an AI-powered dashboard using GPT-4 to analyze climate adaptation plans, extracting structured insights on risks, infrastructure, financing, and stakeholders.
- Developed a full-stack web app with Flask, Leaflet.js, and OpenAI API, featuring interactive maps, city profile extraction, and multi-city comparison.
- Engineered an NLP pipeline to parse policy documents (PDFs), generate LLM-based recommendations, and visualize adaptation strategies dynamically.

Metadata-Driven Energy & Climate Data Lakehouse (AWS)

- **Architecture**: Designed a serverless ingestion framework using AWS Glue (Python Shell) and DynamoDB to dynamically fetch data from disparate sources (XML/JSON APIs) without hard-coding logic.
- **Ingestion Engine:** Built a resilient Python pipeline handling legacy API constraints (CAISO), implementing dynamic date parameter injection and automated SSL certificate handling for strict utility gateways.
- **Complex Transformation:** Engineered a custom "Brute Force" XML parser in Python to resolve schema drift and namespace conflicts in energy data, normalizing it alongside nested weather JSON into a unified Silver Layer (Parquet).
- **Analytics & Insights:** Leveraged AWS Athena (SQL) to perform cross-domain analysis, using ISO 8601 timestamp parsing to correlate solar radiation spikes with real-time grid load fluctuations.

Serverless Green Energy Arbitrage Engine (AWS)

- **Engineered a fully automated, serverless ETL pipeline** utilizing AWS Lambda and EventBridge to continuously extract live hourly electrical grid fuel-mix data via the EIA REST API.
- **Transformed and aggregated data** using Python and Pandas (via custom Lambda Layers), implementing strict type-casting to calculate real-time carbon intensity metrics (gCO_2/kWh).
- **Architected a NoSQL data storage** solution in Amazon DynamoDB, optimizing partition and sort keys for time-series data to build a historical environmental dataset.
- **Deployed an event-driven alerting system** via Amazon SNS with IAM-authenticated subscriptions, triggering automated notifications to optimize energy consumption during low-emission windows.

Real-Time Financial Risk Engine (AWS Serverless)

- **Architecture:** Designed a serverless pipeline using **AWS Lambda**, **EventBridge**, and **SNS** to automate daily portfolio risk assessment.
- **Quantitative Finance:** Implemented a **Monte Carlo Simulation** (1,000 runs) using **NumPy/Pandas** to calculate Value at Risk (VaR) with a 95% confidence interval.
- **Data Engineering:** Integrated external financial APIs (Alpha Vantage) with robust error handling, rate-limiting logic, and custom Lambda Layers for dependency management.
- **DevOps:** Automated daily cron schedules via EventBridge and configured real-time alerts via Amazon SNS for high-volatility events.

Project ANDRA: Real-Time Multimodal Threat Detection Agent (Hoya Hacks 2026)

- **Engineered a real-time event-driven pipeline** integrating computer vision (YOLOv8, OpenCV) with LLM reasoning (Google Gemini 2.0 Flash) to continuously assess spatial threat proximity via webcam feeds.
- **Architected an asynchronous state-machine** that processes asynchronous audio/video streams, utilizing dynamic bounding-box logic to trigger distinct AI behavioral modes.
- **Integrated telecommunications automation** via the Twilio API, deploying a "dead man's switch" protocol that automatically dispatches emergency voice calls based on sustained audio-silence detection.

Global Adaptation Co-Benefits Mapping (GAMI Database)

- Analyzed **430+ articles** to systematically map adaptation co-benefits across health, economic, and biodiversity domains.
- Designed workflows in **Python & Excel** for coding, categorization, and visualization, enabling comparative policy analysis.

Web of Science Research Scraping

- Automated scraping and categorization of adaptation-related publications across **20+ research categories**.
- Built **visual analytics** in Python & Excel to highlight cross-disciplinary overlaps in adaptation research.

Tracking Systemic Impacts of U.S. Foreign Aid Policy

- Led thematic coding of **18 expert interviews** with NGOs, UN agencies, and policy advocates.
- Developed a **14-category qualitative codebook**, enabling longitudinal analysis of disruptions caused by abrupt U.S. foreign aid policy changes.

Automobile System Operational Architecture **Systems Engineering Project - GWU**

- Developed Concept of Operations (ConOps), Operational View (OV-1), and architecture breakdowns for a car system using Arcadia Capella & SysML software.
- Defined external stakeholders and top-level system capabilities. Created architectural artifacts, including derived requirements, functional flow, and architecture alternatives.

San Diego Renewable Energy Transition Modeling **Capstone Project - GWU**

- Investigated the emissions and operational cost impact of transitioning San Diego's electricity generation to 60% renewables by 2034 using CAISO operational data (2018–2025).
- Scaled statewide data to city level using population share (~9%) to localize emissions and energy modeling.
- Modeled a 20% coal-to-renewables shift (solar, wind, geothermal) and simulated exponential renewable adoption to reflect infrastructure and policy trends.
- Projected $1.56M in annual operational cost savings and a reduction of 27,000+ metric tons of CO_2 emissions per year.
- Delivered a scalable, data-driven framework for municipal climate and energy transition planning.

Scootistic DC **Marketing Analytics & Design Decisions Project - GWU**

- Designed a conjoint survey to assess consumer preferences for an integrated subscription service across providers like Capital Bikeshare, Lime, and Veo.
- Modeled key attributes: vehicle type options (bike/scooter/both), ride duration caps (30/60/180 minutes), and extended ride fees ($1/$5/$10 per extra minute).
- Conducted regression analysis and visualized coefficient estimates with 95% confidence intervals to evaluate impact of ride characteristics on user choice.
- Performed power analysis to determine optimal sample size (450–500), with attention to the high variability in "Vehicle type : Both" preferences.
- Proposed pricing strategies and platform partnership models to enhance convenience, retention, and manufacturer insight into user trends.

PROFESSIONAL DEVELOPMENT AND LEADERSHIP

Google Developer Student Club **Washington, DC**
Financial Officer **October 2024 – January 2026**

- Managed the budgeting, allocation, and tracking of funds for large-scale on-campus events with over 150+ participants. Coordinated with multiple teams to ensure proper financial planning and vendor payments, maintaining transparency and cost efficiency.

The George Washington University Desis Organization **Washington, DC**
Vice President **October 2024 – January 2026**

- Lead planning, budgeting, managing member engagement and recruitment of executive board, ensuring smooth operations and initiatives to foster community among 250+ graduate Indian students.

EDUCATION

The George Washington University, School of Engineering & Applied Science **Washington, DC**
Master of Science in Engineering Management GPA: 3.8/4.0 **December 2025**
Relevant coursework: Marketing Analytics, R Programming, Systems Engineering, Project Management, Corporate Finance, Systems Thinking, and Policy Modelling

Sardar Vallabhbhai National Institute of Technology **India**
Bachelor of Technology in Electronics and Communications Engineering GPA: 8.4/10.0 **May 2023**