Gnaneswara Sai Akhil Teja Marupilla

akhil@marupilla.dev | https://marupilla.dev | https://github.com/gmarupilla | https://linkedin.com/in/gmarupilla

Summary

Senior Software Engineer and Research Software Engineer specializing in reproducible scientific software, geospatial agricultural modeling, scalable backend systems, and workflow automation. Contributor to NIH-funded scientific modeling platforms (e.g., VCell, BioSimulations, BioSimulators, VCell Algorithms). Developer of large-scale agricultural modeling and data pipelines at Climate LLC/Bayer Crop Science LLC. Focused on advancing reproducible, scalable scientific and decision-support infrastructure with broad U.S. impact.

Professional Recognition

- Senior Member, Institute of Electrical and Electronics Engineers (IEEE), 2026

Research Interests

- Reproducible scientific software and workflow automation
- Geospatial agricultural modeling and environmental analytics
- Bayesian diagnostics, uncertainty quantification, and model validation workflows
- Distributed scientific computing and modeling orchestration

Scholarly Impact & Profiles

Citation Metrics (Google Scholar):

- Total citations: 73
- h-index: 3
- i10-index: 3

Profiles:

- Google Scholar: https://scholar.google.com/citations?user=R1alV7YAAAAJ
- ORCID: https://orcid.org/0000-0002-6030-8707

Core Technical Skills

Languages: Python, Java, Scala, TypeScript/JavaScript
Backend: FastAPI, Django, Flask, Spring Boot, microservices, NestJS
Cloud: AWS, GCP (and Azure exposure)
Data/Storage: PostgreSQL, MySQL, DynamoDB, MongoDB, BigQuery
Messaging: SQS/SNS, Pub/Sub, NATS (Kafka concepts)
APIs: REST/OpenAPI, GraphQL Federation (Apollo), gRPC concepts
Containers/Orchestration: Docker, Kubernetes, Docker Compose, Singularity
Observability: Prometheus, Grafana, Loki, OpenTelemetry, ELK
CI/CD: GitLab CI/CD, GitHub Actions, Jenkins; automated testing

Security: IAM, SSM Parameter Store, KMS, OAuth/JWT

Professional Experience

Climate LLC / The Climate Corporation / Bayer Crop Science   *Jun 2021 – Present*

Senior Software Engineer	*Nov 2024 – Present*
Engineer II	*May 2022 – Nov 2024*
Software Engineer (Contract)	*Jun 2021 – May 2022*

Engineering Impact

- Designed and delivered high-scale FastAPI microservices for agricultural data and model-execution workflows.
- Owned distributed architecture across AWS (ECS/EKS, DynamoDB, SQS/SNS, SSM, ECR, IAM).
- Built internal service templates (auth hooks, logging, validation, error handling) and reusable SDKs (signing, retries, telemetry).
- Implemented schema evolution patterns and backward-compatible upgrades across services and APIs.
- Built SQS-based async ingestion with batching, DLQs, replay safety, and checkpointing; introduced rate-limited flows with fault isolation.
- Improved performance and reliability via load testing, profiling, caching (Redis/in-memory/DynamoDB TTL), backpressure, and retry design.
- Implemented observability (Prometheus/Grafana/Loki/OpenTelemetry), SLO dashboards, alerting, and production readiness practices.
- Built federated GraphQL platform (Apollo Federation) across subgraphs: composition, tracing, schema governance.
- Integrated analytics telemetry into GCP BigQuery; designed cost-optimized query patterns and reporting models.

UConn Health   *Jun 2019 – Jun 2021*
Programmer Analyst

- Developed a SLURM-based dispatch server for biological simulations (submission, monitoring, lifecycle, recovery, checkpointing).
- Built Flask and NestJS APIs for simulation setup, metadata persistence, workload control, and results retrieval.
- Implemented microservices connecting simulation engines, data stores, and visualization layers aligned to pipeline boundaries.
- Containerized simulation environments for reproducible scientific workflows; published a SLURM dispatch client to PyPI.
- Integrated NATS messaging for distributed coordination and real-time status signaling.

Education

- M.S., Computer Information Systems, California University of Management and Sciences, 2018

- M.S., Information Technology, Washington University of Science and Technology, 2017
- B.E., Mechanical Engineering, Andhra University, 2015

Peer-Reviewed Publications

1. B. Shaikh, G. Marupilla, et al. *RunBioSimulations: an extensible web application that simulates a wide range of computational modeling frameworks, algorithms, and formats.* Nucleic Acids Research, 2021. doi:10.1093/nar/gkab411
2. J. Karr, G. Marupilla, et al. *BioSimulators: a central registry of simulation engines and services for recommending specific tools.* Nucleic Acids Research, 2022. doi:10.1093/nar/gkac331
3. A. T. Marupilla et al. *Analysis of exhaust manifold using computational fluid dynamics.* Fluid Mechanics Open Access, 2016.

Manuscripts Under Review / In Preparation

- **TerraFlow-Agro:** A Reproducible Workflow for Geospatial Agricultural Modeling (*under review*)
- **TrialFlow-Agro:** A Reproducible Workflow for Trial Analytics (*under review*)

Professional Service

- Reviewer, Journal of Open Source Software (JOSS)
- Reviewer, ACM (conference / journal peer review)
- Artifact Evaluation Committee (AEC) Reviewer, IEEE Symposium on Security and Privacy
- Senior Member, Institute of Electrical and Electronics Engineers (IEEE), 2026

Professional Recognition

Senior Member, IEEE *2026 – Present*
Elevated based on documented technical contributions and peer review; recognition of professional maturity and sustained engineering impact.

Additional Evidence Links

- Website: marupilla.dev
- GitHub: github.com/gmarupilla
- LinkedIn: linkedin.com/in/gmarupilla