# Arpit Thool

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## Education

**Virginia Tech** **August 2021 – January 2026**
*PhD in Computer Science* *Blacksburg, VA*

**Virginia Tech** **August 2021 – May 2024**
*Master's in Computer Science* *Blacksburg, VA*

**University of Pune** **August 2016 – May 2020**
*Bachelors of Engineering in Computer Science* *Pune, India*

## Experience

**Adobe** **February 2026 – Present**
*Research Scientist* *Seattle, WA*
- Advancing AI-powered creative tools through applied research in video, depth estimation, and generative media at Adobe's Research Engineering and Design lab. ,

**Virginia Tech** **August 2025 – December 2025**
*Graduate Teaching Assistant* *Blacksburg, VA*
- Assisted in teaching CS5244, focusing on technologies for modern data-centric web applications.

**Adobe** **May 2025 – August 2025**
*Research Engineer Intern* *Seattle, WA*
- Contributing to Firefly's Eval-Hub, an a platform for evaluating and benchmarking AI models used across product teams.
- Migrated the frontend and backend services infrastructure from East Coast to West Coast, reducing latency and improving performance for the primary user base.
- Optimized application performance by implementing Redis caching system for critical API endpoints, reducing leaderboard and evaluation page load times by 90%+ through strategic caching, automatic cache invalidation on data mutations, and seamless integration with existing FastAPI backend and MongoDB database infrastructure
- Collaborated with the Eval Strategy team to design the system architecture and UX for study-based validation, implementing efficient MongoDB queries using indexes, robust API endpoints, and backend services to embed gold-standard questions in studies.

**Virginia Tech** **August 2021 – May 2025**
*Software Engineer* *Blacskburg, VA*
- Researched, designed, implemented, tested and maintained software applications, writing clean code with version control, and appropriate unit and functional tests.
- Developed a Java software system to communicate effectively with OWASP ZAP, conducting thorough DAST scans on web applications, leveraging API calls, processing JSON data, and generating vulnerability reports.
- Deployed an AWS distributed load testing instance through a configured template and designed intricate JMeter scripts to conduct load testing of the login service effectively; done every semester before the first day of classes to ensure a smooth login experience.
- Designed & implemented a Python(Flask) web app with CAS SSO login feature to store and manage files on an on-premise RedHat server. This app is used by internal users over the VPN.
- Designed and implemented a Python-Flask middleware security solution bridging Splunk and Grouper, automating fraud detection workflows to process real-time alerts and manage user access controls. This system reduced fraud recognition time by 90% compared to manual processes, enhancing security and operational efficiency.

**Adobe** **May 2024 – Aug 2024**
*Research Engineer Intern* *Seattle, WA*
- Worked in the Research Engineering and Design lab on the Stardust, an object-based image editor powered by AI and Adobe Firefly. I built the image analysis pipeline using a node-based graph framework for data processing and building interactive workflows.
- The new pipeline resulted in better performance, flexibility, and deployment, allowing researchers to rapidly iterate and experiment to build new 2D and 3D features.
- Implemented a 3D feature to move a selected object within a 2D image in a perspective-aware manner, resizing and reordering layers as needed.
- Wrote quality TypeScript code in the AdonisJS framework using the MVC design pattern. Undertook system design and UX decisions to optimize the system performance & scalability and enhance usability.

**Lutron** **May 2022 – August 2022**
*Software Engineer Intern* *Coopersburg, PA*
- Collaborated with tech lead, product owner and senior engineers to understand requirements, create UML diagrams and to create the documentation for the system architecture.
- Spearheaded design, development and deployment of a large scale Java Spring application used to migrate from manual management of a Cloud resource to Terraform, slashing manual process time by 50%.
- Wrote CI/CD pipeline script in Groovy to connect the BitBucket repository to the Terraform Provider which in turn performed required changes on Lutron's Artifactory instance.
- Extended functionality of Lutron's System Diagnostics app to enable debug logging for a connected system using TypeScript and React.

**Acquia** **September 2020 – June 2021**
*Associate Software Engineer (Full Stack)* *Pune, India*
- As a part of the Marketing Cloud team, I worked on the Campaign Factory and Campaign Studio products.
- Collaborated with the product owner and senior engineers to participate in code reviews and discuss innovative solutions to add new functionality and increase system efficiency.
- Modeled and implemented an efficient solution to synchronize the creation, modification and deletion of an asset in the parent template to children templates, saving 2000 clients 90% of their time spent on duplicating templates.
- Worked closely with the QA and the UX teams to ensure the features are built according to the requirements of the customers using VueJS, Bootstrap, HTML and CSS.
- Mentored 3 new college graduates joining Acquia. Conducting weekly progress meetings and provided guidance on revising and focusing on key concepts and technologies for a seamless transition to their respective projects.

## Projects

**Multi-GPU LLM Fine-Tuning Pipeline** | *Python, PyTorch, Hugging Face, Accelerate, PEFT, BitsAndBytes* **October 2025**
- Developed a distributed fine-tuning pipeline for large-context LLaMA/Qwen models using 4-bit QLoRA, running on multi-GPU HPC clusters with gradient checkpointing and memory-efficient adapters.
- Integrated accelerate for distributed training, early stopping, and BERT & ROUGE evaluation; visualized loss and metric curves across epochs.

**AI Agent** — Hugging Face Space Link | *Python, MCP, SmolAgent* **September 2025**
- Deployed on Hugging Face : A text-based LLM chat app using the lightweight Qwen model, with an agentic backend that can fetch local time by location, and search the web based on requirements via tool integrations.
- Built the agent with Smolagents (CodeAgent), leveraging its MCPClient to connect to external MCP servers and integrate their tool collections into the workflow.

**SafeAIMerge** — GitHub Link | *Python, GitHub-Actions, Docker, ZAP, LLM-API* **September 2025**
- Developed an automated DevSecOps tool that integrates ZAP and OpenAI within GitHub Actions to perform dynamic web app security scanning, generate natural-language summaries of findings, and post actionable feedback directly on pull requests.
- Implemented a configurable pipeline-gating framework that classifies and enforces risk levels via YAML settings, enabling automated build failures for critical alerts and improving developer-centric security feedback loops.

## Publications

- **Integrating Log-Based Security Analytics in Agile Workflows: A Real-World Experience Report** — **HCSE 2026** International IFIP Working Conference on Human-Centered Software Engineering
- **SafeAIMerge: A Tool for Integrating DAST and LLM-Generated Security Feedback into GitHub Actions Workflows** — **SecDev 2026** ACM Secure Development Conference
- **Practitioner Perspectives of DAST Integration in Agile Development Workflows: An Experience Report** — **FSE 2026** 34th ACM International Conference on the Foundations of Software Engineering
- **Harnessing the Power of LLMs to Simplify Security: LLM Summarization for Human-Centric DAST Reports** — **VLHCC 2024** IEEE Symposium on Visual Languages and Human-Centric Computing
- **Securing Agile: Assessing the Impact of Security Activities on Agile Development** — **EASE 2024** 28th International Conference on Evaluation and Assessment in Software Engineering

## Academic Service

- **Program Committee Member (SEIP Track)** — **ICSE 2027** 49th IEEE/ACM International Conference on Software Engineering, Software Engineering in Practice Track
- **Program Committee Member (Industry Track)** — **SANER 2027** 34th IEEE International Conference on Software Analysis, Evolution and Reengineering
- **Program Committee Member (Research Track)** — **CHASE 2027** 20th International Conference on Cooperative and Human Aspects of Software Engineering
- **Program Committee Member** — **SIGCSE TS 2026** 57th ACM Technical Symposium on Computer Science Education
- **Program Committee Member** — **SE4AgenticAI 2026** 2nd IEEE Big Data International Workshop on Software Engineering for Agentic AI
- **Junior Program Committee Member (Junior PC Track)** — **MSR 2025** 22nd IEEE/ACM International Conference on Mining Software Repositories

## Technical Skills

**Programming Languages**: Java, Python, Go, C#, C++, Javascript, TypeScript, PHP
**Database Technologies**: MySQL, Redis, NoSQL, MongoDB
**Frameworks**: Spring, Spring Boot, Flask, FastAPI, Django, React.js, JavaServer Faces, Angular, Vue.js, Node.js
**Other Technologies**: MCP, CodeAgent, Terraform, AWS, GCP, Docker, Kubernetes K8, REST APIs, Git, GitHub, GitLab, HTTP, JSON, TDD, XML, Linux, Ubuntu, shell script, Jenkins, HTML5, Groovy, DAST
**Industry Skills**: Backend & DevOps, Test Driven Development, SOLID Principles, Agile, Object Oriented Programming, CI/CD, Data Structures and Algorithms, Microservices