STATEMENT OF PURPOSE

FOSSEE OpenFOAM GUI Internship - Spring 2026

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INTRODUCTION

I am a third-year Computer Science student at VIT Bhopal University, writing to express my strong interest in the FOSSEE OpenFOAM GUI Internship. With a CGPA of 9.20 and hands-on experience building production-grade full-stack applications, I am passionate about making complex scientific tools accessible through intuitive software design. The FOSSEE mission of promoting open-source software in education resonates deeply with me, and I am excited to contribute to making OpenFOAM more user-friendly for the engineering community.

TECHNICAL BACKGROUND & RELEVANT EXPERIENCE

My technical foundation spans full-stack development, database management, and AI/ML technologies. I have extensive experience with Python, React.js, Next.js, Node.js, and databases like PostgreSQL and MongoDB. Through my projects, I've developed skills directly applicable to this internship:

1. SensAI - AI-Powered Career Platform: I engineered a scalable platform integrating multiple AI systems, real-time communication (Stream API), and automated workflows. I built interactive UI components using React Flow and optimized the system to achieve a 24% latency reduction. This project demonstrates my ability to handle complex architectures and create responsive user interfaces.

2. Signalist - Real-Time Stock Market Platform: I developed an interactive financial analytics platform with real-time data visualization using TradingView charts, implemented automated alert systems, and built a responsive UI with complex state management. This experience is particularly relevant for creating data-driven interfaces for OpenFOAM.

Beyond development, I have published a peer-reviewed IEEE research paper on network coding for biomedical data transmission, demonstrating my ability to engage with technical research and documentation. As President of ANTERiX Club, I lead a 60+ member technical team, developing leadership and collaboration skills essential for open-source contribution.

SCREENING TASK IMPLEMENTATION

I completed both screening tasks to demonstrate versatility in data structures, algorithms, and GUI development:

1. Task 1 - Binary Tree Implementation & YAML Integration:
   I built a complete pip-installable Python package with all required features: binary tree operations (create, add, delete, edit, print), path-based node insertion using intuitive L/R notation, and YAML file integration for data persistence. I also implemented a general n-ary tree supporting unlimited children per node, adding comprehensive type hints and documentation, and creating extensive test coverage. My database experience helped me structure tree data effectively, while my API integration skills made YAML serialization straightforward.

2. Task 2 - Blender Addon Development:
   Learning Blender's Python API from scratch, I created a fully functional addon with two feature sets. For cube array generation, I implemented input validation with error popups (N > 20), optimal grid calculations for square-ish layouts, organized collections, and a bonus collision avoidance system using spiral search algorithms. For mesh merging, I developed geometric validation to detect common faces using 3D spatial calculations, automatic vertex merging, and interior face deletion with comprehensive error handling.

These tasks showcase my ability to learn new APIs quickly, implement complex algorithms (spatial analysis, collision detection), write clean, maintainable code, and create user-friendly interfaces with proper validation.

WHY I'M AN EXCELLENT FIT

I bring a unique combination of technical excellence and soft skills:

- Technical Strengths: Strong academic performance (9.20 CGPA), proven ability to build production-grade applications, experience with complex UI/UX design, published research demonstrating technical writing skills, and quick learning ability (mastered Blender API for screening task).
- Development Experience: Full-stack expertise with modern frameworks, database design skills crucial for configuration management, API integration and system architecture knowledge, optimization mindset (24% latency improvement in SensAI), and strong version control practices.
- Leadership & Collaboration: Leading a 60+ member technical club, coordinating large-scale projects, strong communication skills for remote work, and comfortable with distributed team environments.
- Proven Track Record: Hackathon finalist (Top 40/300+ teams), Chief Minister's Award for academic excellence, and consistent delivery of production-quality projects.

LEARNING GOALS & COMMITMENT

Through this internship, I aim to master Blender's Python API for GUI development, understand large-scale scientific software architecture, learn CFD fundamentals and OpenFOAM workflows, and contribute meaningfully to open-source scientific software. I want to collaborate with experienced developers, learn distributed project workflows, and build impactful contributions to engineering education.

I am available for the full internship period and can dedicate significant hours per week consistently. My strong time management skills - maintaining a 9.20 CGPA while leading a large technical club - ensures I can balance academic responsibilities with meaningful internship contributions.

WHY FOSSEE & OPENFOAM GUI?

The FOSSEE initiative aligns perfectly with my values. I am passionate about democratizing access to powerful engineering tools and believe strongly in open-source software for education. This project offers a challenging technical problem - creating a GUI for complex scientific software - with direct impact on engineering education in India. The opportunity to work at the intersection of software engineering and science, contributing to India's technological advancement, is incredibly meaningful to me.

CONCLUSION

I am genuinely excited about contributing to the FOSSEE OpenFOAM GUI project. My strong technical foundation, proven project experience, leadership capabilities, and passion for open-source educational software make me an ideal candidate. The screening tasks demonstrate my technical proficiency, ability to learn quickly, and attention to code quality and documentation.

I am eager to bring my skills, enthusiasm, and growth mindset to the FOSSEE team and contribute to making OpenFOAM more accessible to students and researchers across India. Thank you for considering my application.

Sincerely,
Priyanshu Paul
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