Chandramouli Gnanasambandham, Dr.-Ing.

Böblingen, Germany • + 49 179 6588043 • *chandramouli681990@gmail.com* • *Linkedin* • *GitHub* • *Matlab*

Software Control Engineer

Advancing Unmanned Vehicles with Expertise in Dynamical Systems and Scalable Software Architectures

Experienced Robotics and Software Engineer with 10+ years of experience in simulation tool development, dynamic modeling and C++ programming. Specialized in physics based simulation, control theory, and scalable software architectures. Strong background in safety critical systems and software validation, with a proven track record of leading international teams and collaborating with cross-functional teams.

- ✓ **Led development of physics based vehicle models** (300+ users) using test-driven development and C++.
- ✓ **Mathematical modeling and simulation** of electromechanical components of an autonomous vehicle.
- ✓ **Integrated real-time models into ROS2 simulator** for V&V activities, ensuring ISO-26262 compliance.
- ✓ **Played a vital role in providing simulation expertise** to validate control algorithms for real-time systems.
- ✓ **Proficient in Git, DevOps and containerization tools** for scalable and maintainable software solutions.

TECHNOLOGIES & TOOLS

Languages: C/C++, Python, BASH, MATLAB, Julia
Simulation: Simulink, CarMaker
Operating systems: Linux (Debian/Ubuntu), Windows
Linear algebra libraries: PETSc, EIGEN
DevOps Tools: Git, Docker, Jenkins, GitHub actions
Testing frameworks: pytest, Google test
Middleware & Comm.: ROS2, TCP/IP
Debuggers/Profilers: `gdb`, `calgrind`, Intel VTune
Build Systems CMake, Bazel
Standards: ISO-26262

PROFESSIONAL EXPERIENCE

Torc Europe GmbH, Stuttgart, Germany **04/2023 - present**

Staff Software Engineer

Led development of highly-scalable software tools in C++ using TDD and CI/CD methodologies.

Reported to: Director, Simulation **Direct reports:** 1 Staff, 2 Senior Engineers and 2 Interns

- Collaborated with cross-functional teams to develop scalable validation strategies as per ISO-26262.
- Integrated real-time capable vehicle models in a ROS2 project using Bazel for validation of AD stack.
- Championed software best practices, including code formatting, linting, and peer reviews.
- Auto-generated documentation, including control system block-diagrams from code based on Git-events.

Daimler Truck AG, Stuttgart, Germany **08/2021 - 03/2023**

Vehicle Model Engineer

Developed multi-fidelity vehicle models using MATLAB/Simulink.

Reported to: Product Owner, Simulation **Direct reports:** 1 Senior Engineer and 2 Interns

- Developed multi-fidelity vehicle models in MATLAB/Simulink, to enable tuning of motion control parameters.
- Implemented a co-simulation interface in C++ to integrate high-fidelity truck models, including CAN bus simulations, with AD stack, showcasing expertise in system integration and networking

University of Stuttgart, Germany **05/2016 - 04/2021**

Academic Researcher

Academic Researcher in Particle Dynamics, Software Development, and Experimental Mechanics.

- Development and administration of the particle simulation software Pasimodo in C++.
- Conducted experiments and simulations to determine the optimal particle shape for enhanced dissipation, using CAD/3D printing technology for validation.
- Planning and execution of measurement campaigns of virbational structures using Laser-Doppler Vibrometry.

Fraunhofer Institute (ITWM), Kaiserslautern, Germany **10/2015 - 04/2016**

Intern

Implemented innovative simulation tools to automate vehicle drive data analysis.

EDUCATION

Ph.D. in Mechanical Engineering, University of Stuttgart, 2021
Grade: Magna Cum Laude | ***Thesis***: Particle Dampers - Enhancing Energy Dissipation using Fluid/Solid Interactions and Rigid Obstacle-Grids.

M.Sc. in Commercial Vehicle Technology, Technical University of Kaiserslautern, 2016
Grade: 1.9 | ***Focus***: Automotive Software Engineering, Embeded Systems, Vehicle Dynamics and Control Theory.

B.Eng. in Production Engineering, Anna University, Chennai, India, 2012
Grade: 8.3/10 (equivalent to a German grade of 1.3)

AWARDS & HONOURS

Best Presentation Award 2015
An adaptive approach to real-time estimation of vehicle dynamics parameters using kalman filtering.

Best Presentation Award 2014
Optimization of vehicle parameters based on lap-time simulations using multi-objective evoluation algorithm.

CERTIFICATION & PROFESSIONAL DEVELOPMENT

Demonstrated cross-cultural team leadership | Implemented ISO-26262 functional safety requirements.

LANGUAGES

English (Proficient) | German (Proficient) | Tamil (Native) | Hindi (Advanced)

ADDITIONAL PROJECTS

Custom PCB for Bluetooth Remote – DIY Electric Skateboard **2023**

- ✓ Designed and built a custom PCB for a Bluetooth remote to control a self-built electric skateboard.

Raspberry Pi Powered Smart-Home Network **2020**

- ✓ Built a versatile Raspberry-Pi smart home network with remote-access, custom file storage server with automatic backups using rsync, Zigbee2Mqtt server for controlling IOT devices using siri/google-nest and custom automations.

Machine Learing Suite **2015**

- ✓ Implement a deep convolution neural network for optical character recognition as part of a freelance software project in MATLAB. Used MEX API to increase performance.

Driver-in-the-Loop Simulator **2014**

- ✓ Implemented a driver-in-the-loop simulator by coupling IPG CarMaker and MATLAB/Simulink.

SELECTED PUBLICATIONS*

Gnanasambandham, C.; Fleissner, F.; Eberhard, P.: Enhancing the dissipative properties of PDs using rigid obstacle-grids. Journal of Sound and Vibration, 2020.
Gnanasambandham, C.; Stender, M.; Hoffmann, N.; Eberhard, P.: Multi-scale dynamics of PDs using wavelets: Extracting particle activity metrics from ring down experiments. Journal of Sound Vibration, 2019.

*for a complete list of publications, visit my Google Scholar Profile