Nicolas Romanella

Vehicle Dynamics Engineer | Simulation and Modeling

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Automotive engineer with almost three years of CAE experience, covering vehicle dynamics, multibody and structural dynamics, real-time simulation and correlation with reference and track data. Writes Python and MATLAB tools to automate workflows and turn simulation and test data into engineering decisions. Looking for a vehicle dynamics role where modeling, simulation tools and data analysis come together. Currently building a real-time driving simulator aimed at lap time optimization through optimal control and machine learning.

EXPERIENCE

Volvo Cars Göteborg, Sweden

Vehicle Dynamics Engineer Jan 2026 - Sep 2026

- Formulated and implemented in MATLAB modal reduction methods to run the Volvo EX60 flexible car body in the real-time driving simulator at a 1 ms step. Ran full-vehicle simulations in MSC Adams/Car from MSC Nastran FE models and built Python data pipelines and an analysis toolchain of GUIs and visualization dashboards to correlate large simulation datasets. Validated the models on ride and handling with objective metrics and in driver-in-the-loop (DIL) sessions on VI-grade.
- Extended the study from the car body to the full vehicle, covering 28 structural components, and replaced the manual work on each component with a single automated pipeline on a Linux cluster that reduces all components and assembles the full-vehicle model in one run, keeping the same post-processing.

Impulse Modena Racing Modena, Italy

Head of Simulation and Modeling Nov 2024 - Dec 2025

- Led a team of five to rebuild the suspension, tire and track models of the motorcycle simulation, including its Simulink model. Trained new members, redefined the tire model and developed a MATLAB pipeline converting GPS telemetry into track profiles, then correlated simulated and real laps to support the track setup.

Vehicle Dynamics Engineer Nov 2023 - Oct 2024

- Rebuilt in VI-grade an undocumented motorsport motorcycle model inherited from the previous team, recomputing mass and inertia from CAD, running sensitivity studies and validating it against track telemetry.
- Integrated an oversized steering damper within geometric and regulatory constraints, building the front end multibody model in MSC Adams from the Siemens NX assembly, measuring the damper characteristic and evaluating steering stability in cross-functional work with the structures division on the supports.

PROJECTS

Vehicle Dynamics Simulator Sep 2026 - Present

Real-time driving simulator built from first principles in Python for minimum lap time studies with optimal control and reinforcement learning. Full vehicle model with load transfer, Pacejka tire and brakes at a 1 ms step, verified with automated tests and driven with a game pad through live views of forces and tire behavior.

Virtual Tire Characterization Rig Sep 2026 - Present

Virtual rig that runs a single wheel along a straight track to verify the tire model in pure and combined slip before it goes into the simulator; design completed, implementation in progress.

MotoGP Holeshot Device Oct 2024 - Dec 2024

Modeled the hydraulic holeshot system of a MotoGP bike from publicly available data, with a 2D multibody model in MATLAB for loads and strokes in launch and braking and the hydraulic circuit sized in Open Modelica.

EDUCATION

Master of Science in Automotive Engineering Modena, Italy

University of Modena, GPA: 3.93/4.00 Sep 2023 - Jul 2026

Thesis: Real-Time FEM Car Body for Driving Simulator Assessments

Bachelor of Science in Mechanical Engineering Pisa, Italy

University of Pisa, GPA: 3.75/4.00 Sep 2018 - Jul 2023

Thesis: Fuel Consumption Optimization for a Formula SAE Vehicle

Summer School in Nuclear Engineering Champaign, IL, USA

University of Illinois, GPA: 4.00/4.00 Aug 2023 - Sep 2023

SOFTWARE

Programming: Python (NumPy, Pandas, SciPy, Matplotlib), MATLAB, C++ (basic)
CAE: MSC Adams/Car, VI-grade, MSC Nastran, Simulink, Open Modelica
CAD: Siemens NX, CATIA V5/V6, SolidWorks

Languages: Italian (Native), English (Fluent)