Nahuel VILLA

R&D Robotics Engineer

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28/11/1990
English, French, Spanish

AREAS OF EXPERTISE

- Balance and locomotion control
- Model predictive control
- Robust control - Set invariance
- Robotics and automation
- Numerical methods and optimization

COMPUTER SKILLS

- **Coding:** Python, C/C++, Matlab, pyBullet, Pinocchio, Git.
- **Writing:** LaTeX, Office
- **CAD:** SolidWorks, AutoCAD.
- **CFD:** ANSIS Fluent.

EDUCATIONAL BACKGROUND

PhD in Automation & Robotics
Inria (Univ. Grenoble Alpes) | France
Oct 2016 - Dec 2019

Academic Exchange Arfitec
Phelma, Grenoble INP | France
Sept 2015 - Aug 2016

Mechanical Engineer
Instituto Balseiro (CNEA) | Argentina
Mar 2010 - Jun 2015

RESEARCH ACTIVITY

Publications
3 peer-reviewed I-EEE articles in:
• Humanoids • IROS • RA-L

Invited Talks
• R4 Nouvelle-Aquitaine Labs • DFKI-RIC • LAAS-CNRS • LIRMM • Comanoid

Reviewer
I-EEE journals and conferences:
• Humanoids • T-RO • RA-L • ICRA • TAC

PROFESSIONAL REFERENCES

Dr. Olivier STASSE | LAAS – CNRS
olivier.stasse@laas.fr
Dr. Nicolas MANSARD | LAAS – CNRS
nicolas.mansard@laas.fr
Dr. Pierre-Brice WIEBER | Inria – UGA
pierre-brice.wieber@inria.fr

PROFESSIONAL EXPERIENCE

Research Engineer - Legged Locomotion Control
LAAS - CNRS | Toulouse (France) *Jun 2020 – Present*
Development of a robust control scheme for the locomotion of biped and quadruped robots, involving:
- Robust online motion planning (Closed-loop MPC)
- Stabilization while tracking a desired trajectory
- Task space inverse dynamics (TSID)
- Estimation and correction of structural flexibility
- Whole-body simulations

Dynamic gait achieved for the first time on the torque-controlled robot Talos (*video*).

Research Engineer - Robust Walking with Foot Dampers
Inria (Univ. Grenoble Alpes) | Grenoble (France) *Jan 2020 – Mar 2020*
Modelling and control of legged locomotion when the ground interaction is flexible.

Doctoral Candidate in Automation and Robotics
Inria (Univ. Grenoble Alpes) | Grenoble (France) *Oct 2016 – Dec 2019*
Thesis Title: Managing uncertainties in legged robots.
Advisor: Dr. Pierre-Brice Wieber.
- Online trajectory planning according to the actual robot motion obtained by using tube-based MPC.
- Established conditions to guarantee safe operation over feet in spite of disturbances (based on set invariance theory).
- Achieved minimum restrictiveness of motions by optimizing the forces required to stabilize the robot.

TEACHING EXPERIENCE

Mentor for master thesis
LAAS (CNRS) - École Centrale de Nantes| France *Apr 2021 – Oct 2021*
Robust control for the locomotion of quadruped robots.

RESEARCH INTERNSHIPS

Inria (Univ. Grenoble Alpes) | Grenoble (France) *Mar 2016 – Jul 2016*
Physical Interaction Control: Modeling and simulation of the humanoid robot Pepper. Allowing Pepper to exert and resist forces in physical collaboration with humans.

Laboratory of Subatomic Physics and Cosmology (LPSC – CNRS) | Grenoble (France) *Sep 2015 – Feb 2016*
Thermal fluid simulation: Computational Fluid Dynamics (CFD) for experiments with water in the frame of the European Project SAMOFAR, for the development of a 4th generation nuclear reactor.

Laboratory of physicochemistry of materials (CNEA) | Bariloche (Argentina) *Aug 2014 – Jun 2015*
Hydrogen compressor based on a hydride forming material: Design, construction, characterization, and operation of a hydrogen compressor based on a hydride forming material.