Paolo De Petris

Robotics Engineer

Personal Information

Date of Birth	15/01/1994
Place of Birth	Trieste (TS), Italy
Nationality	Italian
Current Job	Research Assistant at the Autonomous Robots Lab, University of Nevada, Reno
Work Address	1664 N. Virginia St. Reno, NV 89557, US

Education

2019–Present	**PhD Student, Research Assistant**, *University of Nevada*, Reno.
2017–2019	**Master ICT e Progettazione Avanzata (III ed.)**, *University of Turin*, Italy.
2016–2018	**Master's Degree in Mechatronic Engineering**, *Polytechnic of Turin*, Italy.
2013–2016	**Bachelor's Degree in Telecommunications Engineering**, *Polytechnic of Turin*, Italy.

Masters Thesis

Title	*A dynamic and risk-aware path planning approach for autonomous UAVs*
Supervisor	Prof. Alessandro Rizzo

Research Interests

Robotics, Unmanned Aerial Systems, Miniaturized System, Resilient Micro Aerial Vehicles, Autonomous Systems, Multi-Modal Perception in Degraded Environments, Optimization Strategies, Path–Planning, Sensor Fusion, Estimation, Reinforcement Learning and Optimal Control.

Current Research Investigation

Design, prototype, develop and testing of a small scale (<30cm) and lightweight (<500g) autonomous Resilient Micro Flyer (RMF) vehicle. Studying the effects of collisions with respect to the on board estimation. Focus on resilient autonomy for fast, agile, collision-tolerant and computationally-constrained aerial platforms.

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Working Experience

2019–Present **Graduate Research Assistance at the Autonomous Robots Lab**, University of Nevada, Reno, US.
Role: researcher with main focus on design and development of autonomy stack for collision-tolerant micro aerial flying vehicles.
ARL Web Page: https://www.autonomousrobotslab.com/people.html

2017–2019 **Project Manager and Robotics Engineer**, WpWeb srl, Torino, Italy.
Role: Leader of the ARS (Autonomous Remote Sensing) Project: design, mechanical and software development, in-field testing of an autonomous aerial vehicle for tunnel. inspection and 3D model reconstruction for maintenance of hydroelectric power plants environments.
Project Web Page: https://poloinnovazioneict.org/en/projects/ars-2/
Project Video Summary: https://www.youtube.com/watch?v=o9nM3LCu7jg&t=83s

Research Projects

2019–Present **DARPA Subterranean (SubT) Challenge**, Defense Advanced Research Projects Agency (DARPA), Total Budget: $4,275,509.
Role: robotics engineer part of team responsible for the flying robots. Part of Team "CERBERUS: CollaborativE walking & flying RoBots for autonomous ExploRation in Underground Settings" Consortium involving a) the University of Nevada, Reno, b) ETH Zurich, c) University of California, Berkeley, d) Sierra Nevada Corporation, and e) Flyability.
Further details: http://www.autonomousrobotslab.com/projects.html
Official DARPA Website https://subtchallenge.com/
Project Website https://www.subt-cerberus.org/

2019–Present **A-PNT Demonstration: Visual Odometry Module for High-Speed Navigation**, Sierra Nevada Corporation (SNC), Total Budget: $148,150.
Role: design and develop of visual/visual-inertial solutions for urban and off-board GPS-denied autonomous ground vehicle navigation.
Further details: http://www.autonomousrobotslab.com/projects.html

2019–Present **Mine Inspection Robotics**, Nevada Governor's Office of Economic Development, Barrick Gold Corporation, AboveGeo, Total Budget: $398,174.
Role: software and hardware developer, logistic support for in-field testing of flying robots for autonomous exploration.
Further details: http://www.autonomousrobotslab.com/projects.html

Programming and other Hands–on Experience

- C++, C, Mixed C++ & C programming especially for single board computers
- Programming and using the Robot Operating System (ROS) middleware
- Robots, sensors and environments modeling and simulation in Gazebo/Ignition
- Python scripting and mixed Python & C++
- Hardware interfacing and driver writing
- CAD Design and 3D printing/Milling (Solidworks/Blender)
- Soldering, cable management, small scale robot design optimization

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Publications

- Paolo De Petris, Huan Nguyen, Kostas Alexis, *"Visual-Tactile Navigation of a Resilient Micro Aerial Robot through Manhole Environments"*, IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR2020) (submitted by August 25 2020)
- Paolo De Petris, Huan Nguyen, Kostas Alexis, *"On the Interplay between Collision-tolerance and Autonomous Navigation for Aerial Robots"*, IEEE Aerospace Conference 2021 (submitted, accepted at abstract phase)

Open Source Contribution

- CERBERUS Gagarin Virtual SubT Model
  Simulation model of the Gagarin robot for the DARPA SubT Virtual Circuit
- CERBERUS M100 Virtual SubT Model
  Simulation model of the Alpha robot for the DARPA SubT Virtual Circuit
- Image Brighten
  ROS node implementing a dehaze-based low light image enhancement algorithm
- Arducam Stereo Hat Driver
  ROS node interfacing the time-synchronized Arducam Stereo Hat
- Stair Detection
  ROS node stair detection algorithm based on raw Point Cloud data

Languages

Italian	Mother tongue
English	Excellent
Spanish	Good
French	Good

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