

PERSONAL  
INFORMATION

**Dario Spiller**

Rome, March 16, 1988

## WORK EXPERIENCE

- From 2014 up to now **Teaching assistant**  
University of Rome 'Sapienza' – Department of Mechanical and Aerospace Engineering, School of Aerospace Engineering
- *Teaching and examination assistance for “Space robotics” and “Space exploration robotic systems” at the School of Aerospace Engineering, “Space exploration systems” at the Department of Mechanical and Aerospace Engineering.*
- Business or sector** Teaching
- From 09/2016 to 09/2017 **ESA Competition “Star Trackers: First Contact”**  
University of Rome 'Sapienza' - ESA
- *Development and improvement of the Multi-poles algorithm for attitude identification in Lost-in -Space in noise environments.*
- Business or sector** Research
- From 2015 up to now **Reviewer activity (Recognized and outstanding reviewer for Elsevier)**  
University of Rome 'Sapienza'
- *Reviewer for the following journals: Advances in Space Research, Aerospace Science and Technology, Journal of Guidance, Control and Dynamics, Acta Astronautica, Journal of King Saud University, Journal of Aerospace Engineering*
- Business or sector** Research
- From 04/2017 to 09/2017 **Visiting Scholar at University of Florida (UF)**  
University of Rome 'Sapienza' –University of Florida (Florida, US). Research covered by a mobility grant from Sapienza University.
- *Research collaboration with Prof. R. Bevilacqua for optimal guidance planning applied to formation flying using the Relative Orbital Elements, the Primer Vector theory and the Particle Swarm Optimization. Attendance to the “9th International Workshop on Satellite Constellations and Formation Flying” and the “2017 AAS/AIAA Astrodynamics Specialist Conference”*
- Business or sector** Algorithms development for Optimal Control Problems
- From 08/2016 to 12/2016 **Visiting Scholar at Penn State University (PSU)**  
University of Rome 'Sapienza' – Penn State University (Pennsylvania, US)
- *Research collaboration with Prof. R. G. Melton for the improvement of the original IPSO algorithm for solving optimal control problems. Investigation of theoretical issues related to the Covector Mapping. Attendance to the “IAF International Astronautical Conference, 26 – 30 September 2016”*
- Business or sector** Algorithms development for Optimal Control Problems
- From 01/2016 to 06/2017 **Project Engineer**  
University of Rome 'Sapienza' - Selex ES (Finmeccanica) (scholarship with the School of Aerospace Engineering, from 6/2016 to 12/2016)
- *Estimation of the robustness in the presence of radiation flows of the new High Rate module to be installed onboard the AA-STR Star Tracker of Selex ES.*
  - *Study aimed at increasing the performances of the flight software for the attitude identification installed on the AA-STR Star Tracker of Selex ES in the presence of high radiation fluxes.*
- Business or sector** Algorithms development for attitude and angular velocity determination
- From 04/2014 to 03/2016 **Research Fellow**  
University of Rome 'Sapienza' (Research contract (ASSEGNO DI RICERCA) with the Department of Astronautical, Electrical and Energetic Engineering)
- *Research activities related to the PhD program.*

- *Project engineer of the new High Rate mode for the AA-STR Star Tracker of Selex ES within the ESA study: 'Robust High Rate Determination Algorithms Based on Star Sensing'. Task: software development and verification. Detailed documentation of the study at the website: <https://artes.esa.int/projects/robust-high-rate-determination-algorithms-based-star-sensing>*
- *Teaching Assistant for the course 'Systems for Space Exploration', B.Sc. in Aerospace Engineering, University of Rome 'Sapienza'. Academic years: 2014/2015, 2015/2016.*
- *Teaching Assistant for the course 'Space-Robotics Systems', M.Sc. in Space Engineering, University of Rome 'Sapienza'. Academic years: 2014/2015.*

**Business or sector** Scientific Research – Numerical Optimization – Teaching Assistance

From 05/2013  
to 12/2013

#### Research Fellow

University of Rome 'Sapienza' (Research contract with the Department of Astronautical, Electrical and Energetic Engineering) – OHB-CGS

- *Development of a high-fidelity orbital and attitude simulator for the design of the AOCS subsystem for LEO satellites (OPSIS mission).*
- *Study of the attitude control system considering Reaction Wheels (RW) and Control Moment Gyros (CMGs).*
- *Noise characterization of attitude determination sensors.*

**Business or sector** Scientific Research

From 06/2013  
to 12/2013

#### Scientific Collaborator

ASAS, Association for Space-based Application and Services

- *IT support for the management of the relationships with Small and Medium Enterprises in the Space Services business. Development and realization of the newsletter service and the ASAS website.*

**Business or sector** Computer Programming for WEB applications.

From 2013  
to 2015

#### Tutor for a Cultural Association

Cultural Association "Centro Studi 30eLode", Rome, Italy.

- *Tutoring for scientific subjects (mathematics, physics, chemistry, science, computer science), for school, college and university students.*

**Business or sector** Teaching Assistant

From 2007  
to 2014

#### Tutor in a Private Secondary School

Private School "Ugo Foscolo", Rome, Italy.

- *Tutoring for scientific subjects (mathematics, physics, chemistry, science, computer science), for school, college and university students.*

**Business or sector** Teaching Assistant

## EDUCATION AND TRAINING

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From 10/2014  
to 2/2018

#### Ph.D. student in Aeronautical and Space Engineering

University of Rome 'Sapienza'

- *Research title: 'Optimal Control Problem Solved via Swarm Intelligence'. The Particle Swarm Optimization algorithm is used for the research of the optimal minimum-time solution for attitude maneuvers and reconfiguration problems for satellite formations.*

From 02/04/2014  
to 02/08/2014

#### Course in European Projects

EU INNOVATION SRL - Innovation Business School

- *Knowledge of the main European programs and techniques of euro-design.*

From 09/2010  
to 03/2013

#### MSc in Astronautical Engineering

University of Rome 'Sapienza'

- *MSc in Astronautical Engineering. Graduated with 110/110 with honors.*
- *Thesis Title: "Constrained Reorientation Maneuvers based on Particle Swarm Approach".*

From 09/2007  
to 12/2010

#### BSc in Aerospace Engineering

University of Rome 'Sapienza'

- *BSc in Aerospace Engineering. Graduated with 110/110.*

- *Thesis Title:* 'Design and realization of a fuel injection system for a liquid propellant rocket powered with electro-pumps'.

From 2002 to 2007 **Scientific high school diploma**  
 Secondary School "Antonio Labriola", Rome, Italy.

- Final vote: 100/100 with honors

## PERSONAL SKILLS

Mother tongue(s)	Italian				
Other language(s)	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C1	C1	C1	C1	C1
FCE (First Certificate in English); 101/120 TOEFL (Exam held in October 2012)					
Levels: A1/A2: Basic user - B1/B2: Independent user - C1/C2 Proficient user <a href="#">Common European Framework of Reference for Languages</a>					

## ADDITIONAL INFORMATION

### Awards and recognitions

- Recognition of expert in the subject of aerospace system (SSD ING/ING-05) received from the School of Aerospace Engineering in July 17, 2017.
- Recognized reviewer status from Elsevier, August 2016
- Outstanding reviewer status from Elsevier, March 2017
- Scholarship for conducting PhD research abroad provided by Sapienza University of Rome, March 2017

### Registered software

- *ARMADES*: registration number D011927, 12/10/2018

### Patents

- Patent for industrial invention. Title: "*STIMA DELL'ASSETTO E DELLA VELOCITA' ANGOLARE DI UN SATELLITE BASATA SUL SOLO UTILIZZO DI SENSORI OTTICI*". Patent number: 102019000000619. Submission date: 15/01/2019. Authors: D. Spiller et al.

### Journal papers:

- Di Mauro, G., Spiller, D., Rafano Carnà, S. F., Bevilacqua, R., "Minimum-fuel Control Strategy for Spacecraft Formation Reconfiguration via Finite-time Maneuvers", *Journal of Guidance, Control and Dynamics*, accepted, in print. Publication Date (online): December 10, 2018
- Spiller, D., Curti, F., Ansalone, L., "Inverse-Dynamics Particle Swarm Optimization for Spacecraft Minimum-Time Slew Maneuvers with Constraints," *Aerotecnica Missili & Spazio, The Journal of Aerospace Science, Technology and Systems*, Vol.96, No.3, July-September 2017, 111-123. DOI: 10.19249/ams.v96i3.302
- Spiller, D., Melton, R. G., Curti, F., "Inverse Dynamics Particle Swarm Optimization Applied to Constrained Minimum-Time Maneuvers Using Reaction Wheels," *Aerospace Science and Technology* 75 (2018) 1–12, DOI: 10.1016/j.ast.2017.12.038
- Parente, D., Spiller, D., Curti, F., "Time-Suboptimal Satellite Formation Maneuvers Using Inverse Dynamics and Differential Evolution," *Journal of Guidance, Control and Dynamics*, Vol. 41, No. 5 (2018), pp. 1108-1121. DOI: 10.2514/1.G003110
- Spiller, D., Circi, C., Curti, F., "Particle Swarm Optimization with Domain Partition and Control Assignment for Minimum-Time Maneuvers," *Journal of Guidance, Control and Dynamics*, Vol. 41, No. 4 (2018), pp. 968-977. DOI: 10.2514/1.G002980

- Spiller, D., Basu, K., Curti, F., Circi, F., "Optimal Passive Formation Reconfiguration using Attitude Control and Perturbing Forces," *Acta Astronautica*, Volume 153, December 2018, Pages 259-273. DOI: 10.1016/j.actaastro.2018.01.052
- Di Mauro, G., Bevilacqua, R., Spiller, D., Sullivan, J., D'Amico, S., "Continuous maneuvers for spacecraft formation flying reconfiguration using relative orbit elements," *Acta Astronautica*, Volume 153, December 2018, Pages 311-326. DOI: 10.1016/j.actaastro.2018.01.043
- Di Mauro, G., Spiller, D., Bevilacqua, R., D'Amico, S., "Spacecraft Formation Flying Reconfiguration with Extended and Impulsive Maneuvers," *Journal of the Franklin Institute*, under revision
- Spiller, D., Curti, F., Circi, C., "Minimum-Time Reconfiguration Maneuvers of Satellite Formations Using Perturbation Forces", *Journal of Guidance, Control, and Dynamics*, Vol. 40, No. 5 (2017), pp. 1130-1143. DOI: 10.2514/1.G002382.
- Schiattarella, V., Spiller, D., Curti, F., "A Novel Star Identification Technique Robust to High Presence of False Objects: The Multi-Poles Algorithm", *Advances in Space Research*, Volume 59, Issue 8, 2017, Pages 2133-2147. DOI: 10.1016/j.asr.2017.01.034.
- Spiller, D., Ansalone, L., Curti, F., "Particle Swarm Optimization for Time-Optimal Spacecraft Reorientation with Keep-Out Cones", *Journal of Guidance, Control, and Dynamics*, Vol. 39, No. 2 (2016), pp. 312-325. DOI: 10.2514/1.G001228
- Spiller, D., Stabile, A., Lentini, D., "Design and Testing of a Demonstrator Electric-Pump Feed System for Liquid Propellant Rocket Engines", *Aerotecnica Missili & Spazio, The Journal of Aerospace Science, Technology and Systems*, Vol. 92, 10/2014, pp. 123-130. DOI: 10.19249/ams.v92i3-4.99

### Conferences papers:

- Luchena, D., Schiattarella, V., Spiller, D., Moriani, M., Curti, F., "A New Complementary Multi-Core Data Processor for Space Applications", 69<sup>th</sup> International Astronautical Congress (IAC), Bremen, Germany, 1-5 October 2018.
- Spiller, D., Curti, F., "Inverse-dynamics Particle Swarm Optimization for Real Time Optimal Control: Challenges and Opportunities", 69<sup>th</sup> International Astronautical Congress (IAC), Bremen, Germany, 1-5 October 2018.
- Schiattarella, V., Spiller, D., Curti, F., "Efficient Star Identification Algorithm for Nanosatellites in Harsh Environment", 4th IAA Conference on University Satellite Missions CubeSat Workshop & International Workshop on Lean Satellite Standardization, Rome, Italy, December 2017.
- Curti, F., Spiller, D., Ansalone, L., "Recognition of Orbiting-Objects Through Optical Measurements of Light-Reflecting-Targets by Using Star-Sensors," *Proceedings of the 1st IAA Conference on Space Situational Awareness (ICSSA)*, Orlando, Florida, US, Nov. 13-15, 2017
- Di Mauro, G., Bevilacqua, R., Spiller, D., Curti, F., "Optimal Continuous Maneuver for Satellite Formation Reconfiguration in J2-Perturbed Orbits", *Proceedings of the 2018 AIAA Space Flight Mechanics Meeting, AIAA Science and Technology Forum and Exposition 2018*, Kissimmee, Florida, US, 8-12 January, 2018
- Spiller, D., Melton, R. G., Curti, F., "Inverse dynamics particle swarm optimization applied to Bolza problems," *Proceedings of the AAS 2017 in Advances in the Astronautical Sciences Guidance, Navigation and Control 2017*, Stevenson, Washington, US, August 21th - 24th, 2017.
- Spiller, D., Basu, K., "Optimal Passive Formation Reconfiguration using Attitude Control and Perturbing Forces," 9th International Workshop on Satellite Constellations and Formation Flying, Boulder, Colorado, June 19th - 21th, 2017.
- Di Mauro, G., Bevilacqua, R., Spiller, D., D'Amico, S., "Continuous maneuvers for spacecraft formation flying reconfiguration using relative orbit elements," 9th International Workshop on Satellite Constellations and Formation Flying, Boulder, Colorado, June 19th - 21th, 2017.
- Spiller, D., Melton, R., Curti, F., "Inverse Dynamics Particle Swarm Optimization applied to constrained minimum-time maneuvers using reaction wheels", 67<sup>th</sup> IAF International Astronautical Conference, 26 – 30 September 2016, Guadalajara, Mexico.
- Spiller, D., Curti, F., "Inverse Dynamics Particle Swarm Optimization for Nanosatellites Rendezvous via Differential Drag", 3rd IAA Conference on University Satellite Missions and CubeSat Workshop & International Workshop on Lean Satellite Standardization, 30 November - 5 December 2015, Rome, Italy.
- Spiller, D., Curti, F., Ansalone, L., "Inverse dynamics particle swarm optimization for spacecraft minimum-time maneuvers with constraints", 23rd Conference of the Italian Association of Aeronautics and Astronautics (AIDAA2015), 17-19 November 2015, Politecnico di Torino, Italy.

- Curti, F., Spiller, D., Ansalone, L., Becucci, S., Procopio, D., Boldrini, F., Fidanzati, P., “Determining high rate angular velocity from star tracker measurements”, 66<sup>th</sup> International Astronautical Congress, 12 – 16 October 2015, Jerusalem, Israel.
- Curti, F., Spiller, D., Ansalone, L., Becucci, S., Procopio, D., Boldrini, F., Fidanzati, P., Sechi, G., “High angular rate determination algorithm based on star sensing”, 38th Annual AAS Rocky Mountain Section Guidance and Control Conference, GN&C 2015, USA. Published in Advances in the Astronautical Sciences Guidance, Navigation and Control 2015, Volume 154, 12 pgs.

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Autorizzo il trattamento dei miei dati personali ai sensi del D. Lgs. 196/2003.

Dichiaro che quanto riportato nel presente Curriculum Vitae corrisponde a verità ai sensi del D.P.R. 445/2000.

Date: February 5, 2019

Signature

Dario Spiller