

**EUROPEAN  
FORMAT FOR  
RESUME**



Declaration made under Articles. 46 and 47 DPR No. 445/2000

**PERSONAL INFORMATION**

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Nationality	British
Date of birth	01/05/1997

**WORK EXPERIENCE**

Dates (from-to)	11/2020 – 04/2021
Employer's name and address	<b>Technology for Propulsion and Innovation (T4i) S.p.A.</b> , Via Altinate 125, 35121 Padova, Italy
Type of company or industry	Plasma Propulsion Engineering
Type of employment	Contract
Main tasks and responsibilities	Development and exploitation of the 'Starfish' plasma simulation (Particle-in-Cell) code for design optimisation of the 'E-REGULUS' magnetically enhanced Helicon plasma thruster. Supervision and teaching of the 'Starfish' code to colleagues. Writing of conference and journal papers on the above. Presenting at conferences. Remote working position, where I was required to work in a completely autonomous way and structure the work plan independently.
Dates (from-to)	03/2020 – 10/2020
Employer's name and address	<b>Advanced Space Propulsion Group, University of Padova</b> , Via Gradenigo, 6/a - 35131 Padova, Italy
Type of company or industry	University/Research – Plasma Propulsion
Type of employment	Borsa di Ricerca (Research Scholarship)
Main tasks and responsibilities	Research scholarship titled "Code Development for Plasma Source Simulations and Numerical Study on Plasma Antennas", funded by Horizons 2020 project PATH (Plasma Antenna Technologies), in collaboration with T4i S.p.A.. Development of the 'Starfish' plasma simulation (Particle-in-Cell) code for plasma discharge and transport in magnetically enhanced Helicon plasma thrusters and magnetic nozzles. Design of new boundary conditions for enabling steady-state results in such simulations. Application of simulation to characterisation of 'STRONG' and 'REGULUS' thrusters. Supervision and teaching of the Starfish code to PhD and master's students. Writing of conference and journal papers on the above. Remote working position, where I was required to work in a completely autonomous way and structure the work plan independently.
Dates (from –to)	07/2018 – 10/2018
Employer's name and address	<b>University of Bristol Satellite Laboratory</b> , Queens Building, University Walk, Bristol, BS8 1TR, United Kingdom
Type of company or industry	University/Research – Payload Instrumentation
Type of employment	Engineering and Physical Sciences Research Council (EPSRC) Research Internship
Main tasks and responsibilities	UK Space Agency and EPSRC funded research internship. Establishing requirements, design,

optimisation and qualification of the PROVE (Pointable Radiometer for Observation of Volcanic Emissions) thermal imaging module for the University of Bristol CubeSat Programme. Task consisted of designing a lightweight, compact mechanism to mount filters and calibration blackbody to a COTS infrared camera within a 3U CubeSat platform. Finalised with prototyping and flight qualification of mechanism mounted on UAV. Supervised third-year student projects as assistant chief engineer on the CubeSat mission.

Dates (from –to)  
Employer's name and address  
Type of company or industry  
Type of employment  
Main tasks and responsibilities

05/2017 – 10/2017  
**School of Planetary and Space Sciences (ExoMars Trace Gas Orbiter Team), The Open University**, Robert Hooke Building, Kents Hill, Milton Keynes MK7 6AA, United Kingdom  
University/Research  
Research Internship – ExoMars Mission Science  
Characterisation of the NOMAD/UVIS spectrometer, a payload on the European Space Agency's ExoMars Trace Gas Orbiter mission. The project exploited a vast repository of data collected in Mars orbit to improve characterisation of the CCD detector, providing a significant improvement to the final atmospheric science which can be achieved with the UVIS instrument. Automated radiometric calibration tools were developed including frequency-based decomposition and machine learning, with final tool integrated into the ESA data pipeline and onboard software. Results presented at the Remote Sensing and Photogrammetry Society's Annual Conference at Imperial College London.

## EDUCATION AND TRAINING

Dates (from –to)  
Name and type of educational or training institution  
Main subjects/professional skills studied

10/2015 – 10/2019  
**University of Bristol**  
Space systems engineering, rarefied gas and plasma dynamics, applied numerical methods, computational aerodynamics, advanced techniques in multidisciplinary optimisation, propulsion, structures and materials, thermodynamics and heat transfer, engineering mathematics

Thesis:  
**Ion Thruster Plume Plasma Interactions in the Thermosphere: Particle Simulation of Drag-Compensated Aeronomic Satellites in VLEO**

*Supervisors: Prof. Lucy Berthoud, Mr Jonathan Walsh*

Development of a coupled Direct Simulation Monte-Carlo/Particle-in-Cell (DSMC/PIC) code 'Starfish' for analysing the effect of ion thruster plume-thermosphere interactions on satellite aerodynamics in very low Earth orbit (VLEO) in the context of drag-compensating missions. Supported by Thales Alenia Space Bristol. Presented at conferences and produced journal paper.

Qualification achieved  
Level in national classification (if applicable)

**MEng Aerospace Engineering with First Class Honours**  
QF-EHEA second cycle (end of cycle) master's degree

Dates (from –to)  
Name and type of educational or training institution  
Main subjects/professional skills studied

10/2013 – 07/2015  
**Sheldon School and Sixth Form (Secondary Education)**

Mathematics (A\*), Further Mathematics (A\*), Additional Further Mathematics (B), Physics (A\*), Chemistry (A\*), Extended Project Qualification (A), General Studies (A)

Qualification achieved  
Level in national classification (if applicable)

**A Levels 4A\* 2A 1B** as above  
UK school-leaving qualification, EQF level 4

## PERSONAL SKILLS AND SKILLS

*Acquired over the course of a lifetime and career but not necessarily recognized by official certificates and diplomas.*

NATIVE SPEAKERS

OTHER LANGUAGES

**Reading** skills

**Writing** skills

Oral expression capacity

## RELATIONAL SKILLS AND SKILLS

*Living and working with other people, in a multicultural environment, occupying places where communication is important and in situations where it is essential to work as a team (e.g. culture and sport), etc.*

## ORGANIZATIONAL SKILLS AND SKILLS

*For eg. coordination and administration of people, projects, budgets; in the workplace, in voluntary activities (e.g. culture and sports), at home, etc.*

## TECHNICAL SKILLS AND SKILLS

*With computers, specific equipment, machinery, etc.*

ENGLISH

FRENCH

GOOD

GOOD

ELEMENTARY

-Teamwork: Worked in various research teams including University of Padova/T4i, the ExoMars NOMAD/UVIS science team, University of Bristol CubeSat project and the Space Generations Advisory Council working group, as well as numerous group projects throughout my undergraduate studies. Also member of road cycling team, including coaching duties.

-Multicultural: Working with Italian teams at University of Padova and T4i. Have collaborated with international partners for my master's thesis and ExoMars internship, and have attended, and presented at, several international conferences. Selected as part of the International Space Education Board scheme by European Space Agency in 2019, which is focused on federating efforts between different cultures (i.e. national space agencies).

-Communication: Presented at several national and international conferences, and authored/co-authored several journal/conference papers. Taught the 'Starfish' plasma simulation code to students and colleague. Have performed outreach activities to school students for the European Space Agency at the 70th IAC.

-Remotely working with University of Padova/T4i (during Covid-19 pandemic), therefore have had to organise research plans/strategies independently and work in a completely autonomous way.

-Have supervised and conducted teaching of the 'Starfish' plasma simulation code to students and colleagues. Independently determined the technical-operational procedures for carrying out this process.

-Self-proposed and established work packages for master's thesis, and organised seminars on relevant topics for students in the university space group.

-Chief engineer for final-year group design project, coordinating a team of 8 people designing a next-generation commercial aircraft for Airbus.

-Administered the payload activities for the University of Bristol CubeSat, including budget keeping and management of third-year student projects.

-Organise road cycling activities as committee member for local cycling club.

-Programming: MATLAB, C, C++, Java, Python, G-code, LaTeX, Fortran

-Software: 'Starfish' plasma simulation code, STK, MSC Patran-Nastran, GMAT Orbital Package, Microsoft Office, Cosmography, Autodesk Inventor, Catia, Solidworks, Fostrad

-Equipment: High-performance computing, high-vacuum laboratories, clean-rooms, optoelectronics, foundation radio licence from the Radio Society of Great Britain to operate CubeSat ground stations.

## FURTHER INFORMATION

### Awards:

#### **ESA Scholarship for International Astronautical Congress (IAC) 2019**

*European Space Agency Education Office*

Full funding to attend 70th IAC in Washington D.C. The IAC student participation programme is an initiative of the International Space Education Board (ISEB), federating educational efforts from AEM, CNES, CSA, ESA, JAXA, KARI, NASA, SANSA and VSSEC. Included exclusive events for sponsored students such as meetings with Heads of Agencies and NASA astronauts.

#### **International Astronautical Federation Hermann Oberth Gold Medal**

*International Astronautical Federation (IAF) & Internationaler Forderkreis für Raumfahrt (IFR)*

1st prize for undergraduate student paper at IAC 2018 in Bremen, Germany. For paper titled "Modelling and Characterisation of Plasmadynamic Drag on Gridded Ion Propelled Spacecraft in Very Low Earth Orbit".

#### **Winner UK Undergraduate Paper Competition 2018**

*British Interplanetary Society (BIS)*

Awarded best national undergraduate paper after presenting Bachelor thesis to senior BIS fellows as part of BIS student paper competition. Selected to represent the UK in the international student competition at IAC 2018 in Bremen, Germany.

#### **Boeing Scholarship**

*Boeing UK & University of Bristol*

Scholarship worth £1500 awarded for highest accumulative grade (81.7%) over first 3 years of undergraduate study in the Department of Aerospace Engineering.

#### **Roderick Collar Prize in Aerospace Engineering**

*University of Bristol*

Prize awarded of £200 for achieving the highest overall grade (85%) in the academic year for Department of Aerospace Engineering.

#### **Dr Peter Spence Award**

*University of Bristol & Medlock Trust*

Scholarship award worth £6000 over all 4 years of undergraduate study for academic excellence following 1st year grade (85%) in Department of Aerospace Engineering

### Relevant Publications:

*Publications marked with \* relate specifically to the 'Starfish' plasma simulation code:*

\*S. Andrews, S. Di Fede & M. Magarotto, "Fully Kinetic Model of Plasma Expansion in a Magnetic Nozzle", Submitted to Plasma Sources Sci. Tech.

\*S. Di Fede, M. Magarotto, S. Andrews et. al., "Simulation of the Plume of a Magnetically Enhanced Plasma Thruster with SPIS", J Plasma Phys., vol. 87, 905870611, Dec. 2021.

\*M. Magarotto, S. Di Fede, N. Souhair, S. Andrews et. al., "Numerical Suite for Magnetically Enhanced Plasma Thrusters", 72nd International Astronautical Congress, Dubai, UAE, Oct 2021, IAC-21,C4,6,3,x64083.

\*S. Di Fede, M. Magarotto, S. Andrews et. al., "Numerical Simulation of the Plume of a Magnetically Enhanced Plasma Thruster", 7th Space Propulsion Conference, Estoril, Portugal, Mar 2021, SP2020-111.

\*S. Andrews & L. Berthoud, "Characterising Satellite Aerodynamics in Very Low Earth Orbit inclusive of Ion Thruster Plume-Thermosphere/Ionosphere Interactions", Acta Astronautica, vol. 170, pp. 386-396, Jan. 2020, doi:10.1016/j.actaastro.2019.12.034

\*S. Andrews & L. Berthoud, "Effect of Ion Thruster Plume-Thermosphere Interactions on Satellite Drag in Very Low Earth Orbit", Proceedings of the 70th International Astronautical Congress, Washington D.C., USA, Oct 2019, IAC-19,C4,5,1,x54388

\*S. Andrews & L. Berthoud, "Modelling and Characterisation of Plasmadynamic Drag on Gridded Ion Propelled Spacecraft in Very Low Earth Orbit", Proceedings of the 69th International Astronautical Congress, Bremen, Germany, Oct 2018, IAC-18-E2.2.10.x48637

S. Andrews, J. Bell, J. Mason and M. Patel, "Characterising the CCD Dark Current on the UVIS Spectrometer for the ExoMars Trace Gas Orbiter Mission", Proceedings of the Remote Sensing and Photogrammetry Society Conference, London, UK, Sept 2017

References:

**Prof. Daniele Pavarin**

*Associate Professor, University of Padova and CEO, T4i S.p.A.*

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**Dr. Mirko Magarotto**

*Postdoctoral Research Fellow, University of Padova*

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I declare that you are informed, under the d.lgs. n.196/2003, that the personal data collected will also be processed with computer tools exclusively in the context of the procedure for which this declaration is made.

Il dichiarante

Chippenham, li 27/01/22

  
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