



Chemical Propulsion / Mechanical Engineering: Development of breakthrough water propulsion thrusters

Code: 20/15

Company: URA Thrusters

Location: Harwell campus, Oxford

Company Description:

OUR SUCCESS IS OUR PEOPLE

AVS is proud to be one of the world's leading companies in the design and development of bespoke equipment for Space and large Science and Research infrastructure across the globe. AVS, who develops and conceives unique mechanisms, instruments and robotics for Earth Observation, Telecom, Exploration and Science missions, is also developing an innovative catalogue of Space products for in-space propulsion systems, thermal devices and mechanisms. AVS has spun-out all the water propulsion activities into a new company, URA [water] Thrusters, who is developing breakthrough water propulsion technologies based in electrolysis, microwave electro-thermal and microwave ion thrusters.

Satellite primes have a strong interest in developing alternative “green” propulsion solutions, due to the prospect of Hydrazine regulation, cost reduction, and operational benefits from eliminating this toxic fuel. Due to launch ride-share restrictions, costs and mass/volume constraints, the small satellite propulsion market will be completely dominated by green propellant systems. And water, as a high-density (liquid) storable, completely non-hazardous, low-cost fuel is of particular interest.

URA Thrusters combines all the skills and IP from the Propulsion team of AVS and Imperial College as well as the expertise in production, integration, quality/product assurance and industrialisation of complex Space and scientific equipment. URA disrupts the status-quo of current propulsion systems by the use of the ultimate green propellant: URA [water].

Project Description:

AVS and URA are developing a wide range of new Propulsion systems that will enhance new mission services by increasing platform capabilities, from CubeSats to large GEO telecom satellites. The selected candidate will work in the design, modelling and development of new alternative propellant propulsion thrusters, with a special focus on a new water-based hybrid thruster.

The candidate should have knowledge and hands-on experience in the modelling, design, analysis and/or design-for-manufacture / materials selection of chemical thruster' nozzles.

The candidate will be involved in the development of a large family of water-based propulsion thrusters and should have a first class degree in Mechanical Engineering, Chemical propulsion, Materials or other mechanical related subjects.

Applicant Specification:

Chemical propulsion / Mechanical engineering internship for the development of novel water thrusters for a wide range of spacecraft. Duration 4-12 months

- Material characterisation studies of current components at AVS water thrusters.
- Literature study of materials, engineering, design and production of miniature nozzles for small chemical thruster' nozzles.
- Material study and trade-off analysis for thruster' nozzle and support structure.
- System design and integration of new thruster type within the product family.
- Flow analysis and calculations of propellant injection.
- Thermal and structural analysis of thruster' nozzle, structure, components and system level.
- Collaboration with top UK universities for the test of current AVS thrusters at Electric Propulsion test facilities including vacuum chamber, thrust balance, diagnostics, etc.
- Design and characterisation of experimental setups required.

Minimum Requirements:

- 2:1 Master's degree in Chemical Propulsion, Mechanical Engineering, Space, Materials, etc.
- Hands-on knowledge and/or experience with CAD software in mechanical engineering, analysis, design or chemical propulsion.
- Hand-on knowledge and/or experience with FEM structural or thermal analysis in mechanical engineered concepts.
- Availability to work in the UK.
- Be a registered student (Bachelor, Master or PhD) at the time of application submission.
- Availability to join permanently soon after the termination of the placement.

Preferred Additional Requirements:

- First degree
- PhD or Deng in Engineering, Space propulsion, Mechanical, Materials or Design engineering.
- MPhys and/or MSc in Engineering, Aerospace or Space
- Knowledge / Experience / Expertise with chemical thrusters and nozzles.
- Other courses will be an advantage.

Further details:

4 to 12 months internship (fixed term contract) to be agreed with successful candidate but nominally with a start date around 15 June 2020 to attend the SPIN Induction day at the Satellite Applications Catapult, and completion before mid-September. Salary is £1,500 per calendar month gross.

Closing Date for Applications: 5pm Tuesday 24 March

Applications should be made through the online form attaching a CV, before the closing date. Please note that elements of the form left incomplete will be deemed to render the application ineligible. They will be checked for eligibility and forwarded to the employer.