**SPACE RESEARCH NETWORK APR Intern Opportunity**

**Name of Company: German Aerospace Center (DLR), Institute of Space Propulsion**

**Website URL:** [**https://www.dlr.de/ra/en/**](https://www.dlr.de/ra/en/)

**For your Space Pitch Research Project choose from one of 5 areas below:**

**Project Description & Scope:**

Beside the full-scale testing of flight engines performed at the institute, research and technology development activities are pursued in five departments with the following focus areas:

1. Department of Rocket Propulsion Technology

Cryogenic engine components and fundamental processes with LOX-H2 or LOX-CH4 propellants

* Combustion dynamics: injection, ignition, combustion stability, detonative combustion
* Flows: supersonic expansion flows, jet acoustics, numerical modelling of reactive flows
* Structures: thermomechanical design, fatigue life prediction, additive manufacturing
* Diagnostics: visualization, spectroscopic, and laser-based diagnostic methods for internal and external reacting/non-reacting flows, robotic post-test inspection

1. Department of Rocket Propulsion Systems

Cryogenic engine systems with LOX-H2 or LOX-CH4 propellants

* System analysis and control: cycle architecture, engine and launcher performance prediction
* Thrust chamber technology: thrust chamber design, cooling design, manufacturing methods
* Turbopump technology: turbopump development and testing, reusability, health monitoring

1. Department of Satellite and Orbital Propulsion

Storable green and high-speed airbreathing propulsion systems

* Advanced green propellants: sustainable storable bipropellant and hypergolic propellants
* Scramjet propulsion: transpiration cooling, novel ramjet/scramjet fuels
* Hybrid propulsion: fundamental processes, high regression rate fuels
* Gel propulsion: new propellants, rheology, spray, combustion

1. Department of Chemical Propellant Technology

Chemical laboratory developing novel propellants

* Chemical analysis: liquid, gas, solid propellant analysis
* Green propellants: development and characterization of ionic liquids
* Nanomaterials: synthesis and characterization of nanofluids, catalytic properties, lubricants

1. Department of Applied Hydrogen Technology

Technology development and demonstration for the hydrogen economy

* Green hydrogen: electrolysis from renewable energy sources
* Supply chain: storage, handling, transport, safety, component testing
* Hydrogen mobility: system design and testing for hydrogen powered transportation