Dr Vatsalya Sharma has spent the last three years as a postdoctoral researcher at KU Leuven, working with Dr. Andrea Lani at the Von Karman Institute of Fluid Dynamics (VKI) and CmPA KU Leuven to explore the use of computational aero-science for hypersonic and reusable spacecraft. His work focuses on mitigating the challenges of atmospheric descent, including high heat flux on the body and radio communication blackout, using Magnetohydrodynamics (MHD). To this end, he has created a 3D finite volume-based unstructured grid CFD solver within COOLFluiD framework in C++ and Python, coupling the thermo-chemical non-equilibrium (TCNEQ) Navier Stokes equations with the Maxwell equations. The solver has been successfully validated with benchmark experiments and numerical studies. He is currently utilizing this code to explore the physics of Earth and Mars's atmospheric re-entry with MHD heat shields. He is also exploring higher-order flux reconstruction methods for TCNEQ flows.

He will be giving a talk on Friday. Those of you who are interested in the CFD of supersonic/hypersonic flows and/or the development of large CFD codes, and the physics of re-entry may be interested to attend. Dr Chakarborty will join us, some of you may also wish to see him.

Talk Title: Navigating the Flow - Developing CFD Codes for Hypersonic Flow.
Venue: CLH3 at 12:00 noon Friday 10th November

Abstract: As a spacecraft enters earth's (or any planet's) atmosphere, it creates a very strong shock that generates hot plasma around it. This phenomena is immeasurably difficult to replicate at ground, so sophisticated computer codes are required to accurately simulate these complex multi physics phenomena. In this presentation, the speaker shares his experience in developing such codes and then using them for exploring complex hypersonic flow physics. The presentation would also shed light on the challenge of numerically handling hypersonic physics and how new solutions are being explored through these codes for the next generation spacecraft for interstellar travel.