|  |  |  |  |
| --- | --- | --- | --- |
| **First Supervisor** | Prof. Tanya Vladimirova | | |
| **School/Department** | CMS | | |
| **Email** | [tv29@leicester.ac.uk](mailto:tv29@leicester.ac.uk) | **Telephone Ext** |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Second Supervisor** | Prof. Lu Liu | | |
| **School/Department** | CMS | | |
| **Email** | [l.liu@leicester.ac.uk](mailto:l.liu@leicester.ac.uk) | **Telephone Ext** |  |

|  |  |
| --- | --- |
| **Additional Supervisor** |  |

**Section 2 – *Project Information***

|  |  |  |
| --- | --- | --- |
| **Project Title** | Deep learning algorithms for real‐time extraction of environmental remote sensing information from space | |
| **Project Highlights:** | 1. | Efficient real-time image processing using DL algorithms. |
| 2. | Performance validation and optimisation with satellite imagery. |
| 3. | Real‐time testing on a drone platform. |
| **Project Summary** | | |
| To date, real‐time information extraction with deep‐learning (DL) level performance has not been achieved from space. The novel Sparse‐Split‐Parallelism (SSP) approach to reduce Convolutional Neural Network (CNN) algorithm size considerably while maintaining high accuracy performance, developed in Prof. Vladimirova’s group, provides a disruptive enabling technology poised to unlock a wide range of real-time services from space that previously would not have been possible due to their complexity.  In this project DL algorithms will be developed to operate two rapid data extraction Earth Observation applications: traffic monitoring and wildfire detection, which are essential environmental remote sensing applications, each addressing distinct environmental challenges. Traditional ground-based traffic monitoring systems have limitations in scalability, coverage, and real‐time analysis. Wildfires represent a growing global challenge, causing significant environmental, economic, and human losses. Timely detection and monitoring of wildfires are critical for effective response and mitigation strategies. Satellite‐based monitoring, coupled with machine learning techniques, holds immense potential for enhancing the speed and accuracy of both traffic and wildfire detection and monitoring.  The image processing performance shall be validated and optimised by using satellite imagery from space providers, including Planet, along with synthetic data simulated from physics-based models. Real‐time testing will be done on a drone platform, using a multi‐spectral imager. | | |