

# LOOKING FOR A STELLAR PARTNER?

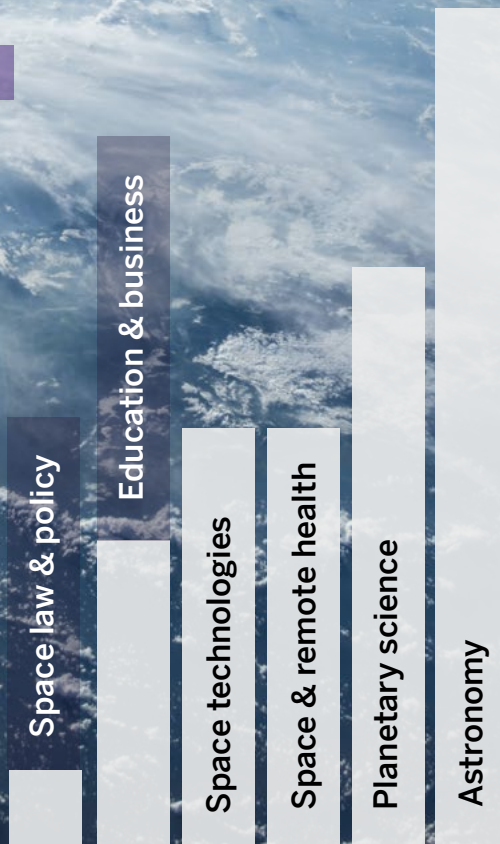
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**Western**  
Institute for Earth  
& Space Exploration



# LEADING THE WAY



Distribution of Western Space  
members by research expertise

**Western Space is a leading organization for Earth and space exploration research and training in Canada.**

We take pride in being a leader in Earth and space innovation, whether that's advancing technology for space exploration, developing new data analysis methodologies, generating remote health-care solutions or being a thought leader in space policy.

**Our interdisciplinary researchers bring unique perspectives to solving technical challenges and complex problems that span disciplines.** They also have an excellent track record of working with businesses, universities, not-for-profits, health organizations and governments to provide valuable insights and expertise.



## Why partner with us?

Through mutually beneficial partnerships, our researchers enable partners to advance and develop technology, commercialize technical innovations and move the needle on some of society's biggest challenges.

Our partners gain access to talent and technology, including machine learning, AI and sophisticated image analysis, to accelerate and improve research and development.

## What we can offer you



Space & tech companies

Collaborate on the development of prototype technologies and processes with a wide range of applications in space and beyond



Health-care businesses

Support development or testing of technologies and protocols that enable remote care



Organizations interested in equity & ethics

Advise on policies regarding open source, open science, space law and inclusion at work



Foundations & nonprofits

Explore creative solutions to technical challenges that hinder progress on societal priorities

# CASE STUDIES



## ANA LUISA TREJOS

Professor,  
Electrical & Computer Engineering

**Partner**  
Formid

### Interested in...

partners who would like to advance the field of wearable soft robotics for remote health

### Profile

My research focuses on the design, integration and evaluation of mechatronic devices designed to provide medical care. In 2013, I established the Wearable Biomechatronics Laboratory to design devices for upper body rehabilitation and motion assistance.

### Partnership highlight

I currently work with Formid, a company that manufactures a dynamic seat that keeps your body in motion.



On the hardware side, we are developing sensors that are placed on the surface of the seat to measure the pressure distribution as a person is sitting on it.

On the software side, we are developing algorithms that allow us to detect a person's posture while using the seat, assess quality of posture and provide feedback if a person holds a particular posture for too long.



## DENIS VIDA

Research Scientist,  
Physics & Astronomy

### Partners

Defence Research and Development Canada,  
Istrastream, OBAFGKM

### Interested in...

- partners in the Space Domain Awareness industry
- collaboration on utilizing Global Meteor Network data for atmospheric physics and climate change

### Profile

I leverage my formal training in computer science to introduce AI and machine learning to physics and astronomy. I am the founder of the Global Meteor Network, an open-source project with over 1,000 low-light video cameras worldwide intending to observe every accessible meteor. My driving vision is to release intellectual property from its usual confines and make expertise accessible to non-traditional actors, setting new benchmarks for both academia and industry.



We can monitor everything that is happening in the atmosphere and the night sky worldwide. Our partners picked up our open-source software and open data to achieve their research and industry goals, skipping years of R&D. The result is a range of applications: we collaborate with NASA in meteor research, US Air Force Research Lab in atmospheric monitoring, and the DRDC in satellite tracking.

### Partnership highlights

I currently work with two small businesses, Istrastream and OBAFGKM, to produce, distribute and maintain meteor camera systems I developed at Western.

The design of these cameras is fully open and transparent, as is the software, which means anyone can build them from the blueprints. My industry partners provide service to individuals who want to buy plug-and-play systems, make bulk purchases, and require installation and long-term support.

We also have a contract with Defence Research and Development Canada to extract satellite observations from Global Meteor Network data. We're moving towards monitoring contrails produced by airplanes, which has the potential to grow into a partnership with the Breakthrough Foundation.

## JOSHUA PEARCE

Professor,  
Electrical & Computer Engineering

### Partners

Agrivoltaics Canada, re:3D, Food Security  
Structures Canada

### Interested in...

- industry partnerships for research
- internships for my graduate students

### Profile

My work focusses on the use of open source appropriate technology (OSAT) to find collaborative solutions to problems in sustainability and to reduce poverty. My research spans areas of engineering from solar photovoltaic technology to open hardware and distributed recycling and additive manufacturing (DRAM) using RepRap 3-D printing. It also includes policy and economics.



All the research my group does is released with an open-source license. This provides my corporate partners with an easy way to collaborate and seamlessly use the hardware designs, firmware and software to benefit their customers. We often find ways to expand the market for my partners by open sourcing complementary products.

### Partnership highlights

I am currently working with Agrivoltaics Canada, an industry partnership between solar developers and farmers to bring agrivoltaics to Canada. Agrivoltaics are the co-location of solar photovoltaics and agriculture, which radically improves land-use efficiency and adds new sources of renewable energy.

Another current partnership with Food Security Structures Canada aims to develop easy-to-assemble, scalable and energy-efficient vertical farming systems powered by the sun to control energy costs.

I have also worked with re:3D to develop a large-scale, open-source 3-D printer capable of manufacturing directly from shredded, post-consumer, recycled plastic waste.





## SARAH GALLAGHER

Professor,  
Physics & Astronomy

### Partners

City of London, Comcor Environmental,  
GHGSat

### Interested in...

- partners who distribute natural gas to monitor their system for leaks
- provincial and municipal agencies concerned with monitoring orphan gas wells
- companies in the downstream satellite Earth observation sector using remote-sensing to identify, quantify and monitor greenhouse gas emission sources

### Profile

My research focuses on studying growing supermassive black holes at the centres of distant galaxies and the interactions between galaxies in crowded environments. I also speak regularly to audiences of all ages about black holes, space and equity and inclusion in the space sector.

### Partnership highlight

We are currently working with the City of London to help measure methane released by London's landfills. My team uses drones, satellites, stationary and hand-held devices to determine exactly how much methane is produced at city landfill W12A – and whether any of it is escaping the current collection system.

The ultimate goal is to provide information to the City of London and to the company that runs the methane collection system, so they can do the best job they can to capture all the methane and reduce emissions into the atmosphere.



Western Space members from  
Physics & Astronomy, Engineering  
and Computer Science preparing a  
methane-detecting drone sweep of a  
city landfill.

Our partner Comcor Environmental will collect methane emission data from ground-based surveys. They also designed the methane collection system at the London landfill. GHGSat will collect images of the landfill site over the course of a year to look for seasonal variability of total emission rates.

## JAYSHRI SABARINATHAN

Professor,  
Electrical & Computer Engineering

### Partners

Honeywell Aerospace, Wyvern, LightSail,  
Canadensys

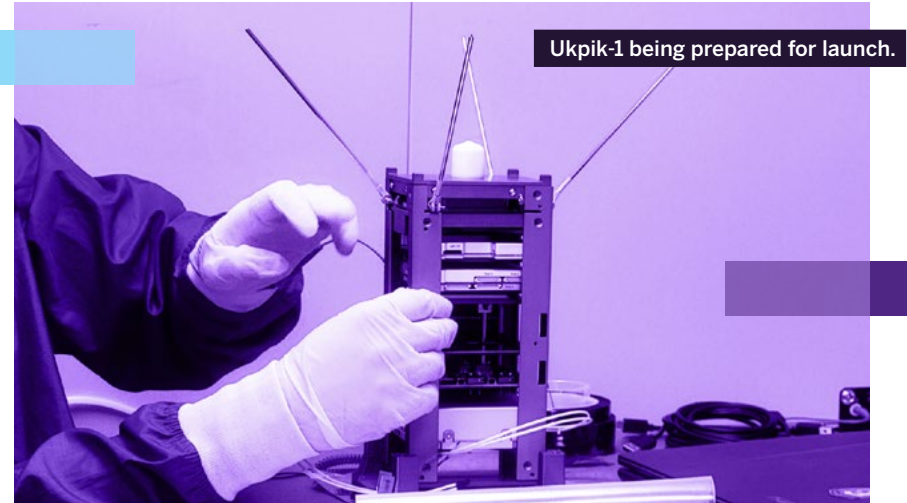
### Interested in...

- collaborative projects in photonic integrated circuits; design and testing for space applications
- space missions and developing instrumentation and testing in our end-to-end space instrumentation facility
- OISL, optical and S-band ground station projects

### Profile

My primary expertise is in novel nano-photonic sensors, integrated photonics and miniature remote-sensing instrumentation. I have extensive experience in collaborating with industry and academic partners through large grants to develop novel sensors and imagers for practical applications. My research work

has also led to two US patents for micro photonic-sensors and multi-spectral camera innovations.



### Partnership highlights

My team and I worked with Honeywell Aerospace, utilizing our expertise in photonic integrated circuits design and testing. This is part of a large collaborative project that involves three other academic partners. We are building Silicon Nitride-based Optical Phased Arrays for satellite communications.

My team was involved in prototyping a camera control board with LightSail specifically designed for testing Wyvern's hyperspectral camera system. The camera system will be housed on their Remote-Sensing Cubesat constellation. We contributed to designing and implementing complex electronic systems that are robust and efficient in the challenging environment of space.

Recently, my team worked with Canadensys on integrating their VR cameras into Western's first CubeSat mission Ukpik-1, which was launched from the ISS in July 2023.







a proposed Canadian space mission. POET's goal is to detect and study extrasolar planets. POET has received high ranking in the small-mission category, and could be Canada's next space telescope.

## STANIMIR METCHEV

Professor,  
Physics & Astronomy

### Partners

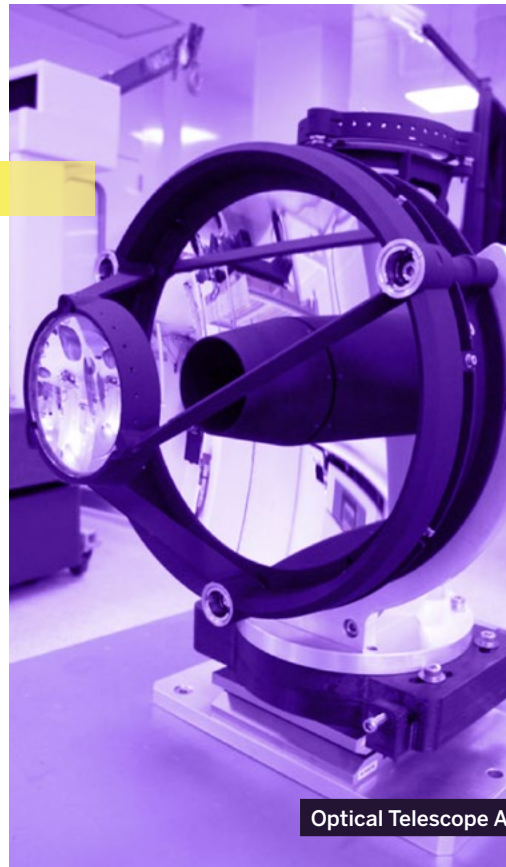
ABB, Space Flight Laboratory

### Interested in...

- space-based remote-sensing development with industrial partners
- non-cryogenic infrared cameras for low-light applications on space satellites
- novel concepts for polarimetric observations from space for Earth-facing or astronomical observations

### Profile

I research brown dwarfs and exoplanetary systems to create a context for the existence of our own solar system and its one habitable planet. I am also the Co-PI on Photometric Observations of Exoplanet Transits (POET),



Optical Telescope Assembly (OTA) in ABB's lab.

### Partnership highlight

We are working with our partner ABB on putting the Photometric Observations of Exoplanet Transits mission together to search for Earth-like habitable extrasolar planets. With a proposed launch in 2029, POET would be Canada's third- ever space astronomy mission, and could help answer one of the biggest questions in science: are we alone in the universe?

Teams at Western and Bishop's University are leading the science behind ABB's design of the space telescope and its cameras.

The project also includes the Space Flight Laboratory (SFL) at the University of Toronto Institute for Aerospace Studies as an industrial partner. SFL is providing the spacecraft and the avionics for controlling the telescope, cameras and communications.

# TECH



**In today's connected world, reliable satellite communication plays a vital role across many industries.**

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Western Space recently installed a satellite ground station — the first in London, Ontario.

Our ground station integrates UHF/VHF and S-bands for versatile and seamless communication with satellites in orbit.

Our partners can benefit in various ways from our latest technological addition, including by providing redundancy for data downlink facilities.

**To learn more about how we can help you with your satellite communication needs, please reach out to [westernspace@uwo.ca](mailto:westernspace@uwo.ca)**

**Connect with us!**



**@westernuspace**

**space.uwo.ca**



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