

## What do we do?

Our main programmes of activity are:

- Technical – we conduct theoretical and experimental research and development across many aspects of interstellar studies: [i4is.org/what-we-do/technical](http://i4is.org/what-we-do/technical)
- Education – we support interstellar education and research from secondary/high school level through to university (including the Master's programme at the International Space University in France). We have also developed a Starship Engineer course for anyone with a general interest in interstellar: [i4is.org/what-we-do/education](http://i4is.org/what-we-do/education)
- And our free quarterly publication, *Principium*, will keep you up to date: [i4is.org/publications/principium](http://i4is.org/publications/principium)

Highlights of our work include:

- Project Glowworm – a near-term project to demonstrate the world's first laser sail in space; and
- Project Lyra: a feasibility study for a mission to the interstellar object Oumuamua.

We have also produced design studies for laser-propelled interstellar probes, including:

- Project Andromeda – a design study for a gram-scale interstellar probe to be sent to the nearest stars at one-tenth light speed, using current or near-future technology;
- Project Dragonfly – a feasibility study for an interstellar mission, conducted by small, distributed spacecraft propelled primarily by laser sails.

## If we've sparked your interest, why not join us?

i4is was founded in 2012. Since then we have achieved a lot, and we have ambitious plans for the future of interstellar exploration. But those plans require resources – of people, time and money. If you are enthusiastic about our mission, please join us. Together, we can plot a route to a future amongst the stars – and start to take the first practical steps on that long journey. Join up at:

[www.i4is.org/membership](http://www.i4is.org/membership)

Membership of i4is costs £50 per year, but there is a 20% discount for members of the British Interplanetary Society (BIS), an 80% discount for those over 65 (£10/yr) and 90% for students in full-time education (£5/yr).

Membership benefits include:

- access to member exclusive newsletter, posts, videos and advice;
- free or discounted pricing for selected i4is publications and events;
- opportunities to meet the team; and
- the option to contribute directly to our work.

### Contact details

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Twitter: @I4Interstellar

Facebook: @InterstellarInstitute

# Initiative for Interstellar Studies



## Your gateway to interstellar exploration

If you are interested in worlds in other star systems beyond our own, and in the discovery of new knowledge and life, you have come to the right place.

The 20th Century was the time we explored the planets.

The 21st Century is the time to explore the stars.

The Initiative for Interstellar Studies (i4is) is your portal to the cosmos.

*'Working towards the achievement of interstellar flight through knowledge to the stars — starships in our lifetime!'*

## Why interstellar?

It's not yet seven decades since the start of the Space Race, and we've come a long way:

1957: Sputnik-1 becomes the first object to be launched into space.

1961: Yuri Gagarin becomes the first human to orbit the Earth.

1969: Neil Armstrong becomes the first human to walk on the Moon.

1981: The Space Shuttle launches for the first time.

1989: Voyager 2 passes Neptune, on its way out of the solar system towards interstellar space.

2000: The International Space Station has been continuously occupied since Nov 2000.

2017: The Kepler space telescope discovers 4000 planets outside our solar system.

*So what's next? Isn't it time we looked beyond our immediate solar neighbourhood? Two of our ideas, explained in detail overleaf, are:*

*2021: Project Glowworm launches to LEO?*

*2030: Project Lyra heads for Oumuamua?*

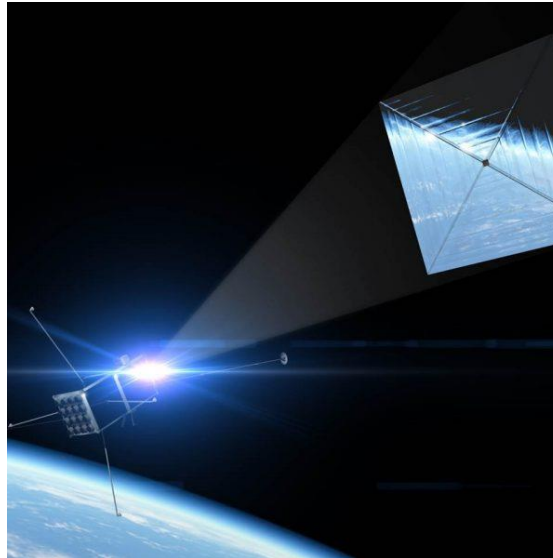
The Initiative for Interstellar Studies strives for a long-term ambition to enable both robotic and human exploration and colonisation of the nearby stars.

*'Spreading out into space will completely change the future of humanity. It may also determine whether we have any future at all.'*

**Professor Stephen Hawking**

## Case study: Project Glowworm

i4is is interested in both theory **and** practice. Project Glowworm is a mission to demonstrate the world's first laser sail in space.



The probe we are developing would fit into the palm of your hand: the sail is the size of a credit card, and the ChipSat deployed with it is 1 cm<sup>2</sup> in area, smaller than your thumbnail.

The project would start with ground demonstrations of critical technologies, leading to a space mission to gain experience of launching a ChipSat and targeting and propelling a laser sail in space.

Our plan is to launch the system into low earth orbit, deploy the sail system from a CubeSat, propel it with a laser, and then capture its flight on video. We are currently targeting a launch in the early 2020s. Want to help us make it happen? Find out how at:

[i4is.org/what-we-do/technical/project-glowworm](http://i4is.org/what-we-do/technical/project-glowworm)

## Case study: Project Lyra

In 2017, for the first time ever, astronomers identified an object flying through our solar system which had didn't originate here. Oumuamua, as it was named, is thought to be a long, thin asteroid which originated in another star system in the direction of the constellation Lyra many millions of years ago.

As the first interstellar asteroid, Oumuamua would be an incredibly valuable object to study up close. However, it is travelling away from the Sun very quickly – faster than our spacecraft can currently go. So is there any way to catch up with it with a spacecraft launched from Earth?

Project Lyra is a feasibility study for a mission to send a spacecraft to Oumuamua, using only current or near-term technologies.

Our first Project Lyra study, which got worldwide media coverage, showed that this could be achieved, but only if the spacecraft was launched by 2021 – a challenging timescale to develop a suitable spacecraft.

Following further intensive work, we have now shown that it would be possible, using multiple gravity assists, to develop a spacecraft over the next decade, launch it in 2030, and reach Oumuamua in 2047 – coincidentally the 90<sup>th</sup> anniversary of the start of the Space Race!

Having shown the mission is possible, we are now working on a conceptual design for the spacecraft – and the scientific instruments it should carry to our interstellar visitor! Want to get involved? Find out more at:

[i4is.org/what-we-do/technical/project-lyra](http://i4is.org/what-we-do/technical/project-lyra)