UNIVERSITY OF LEICESTER

Physics and Astronomy

Education and Training in the Space Sector: University of Leicester, East Midlands

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(With thanks to Prof Nigel Bannister and Prof Ian Hutchinson)

Introduction

- Areas where Leicester contributes to Training and the Development of Skills in the Space Sector
- Pre-Degree (Apprenticeships)
- Undergraduate Degrees
- Postgraduate Degrees
- Long Term Career Development

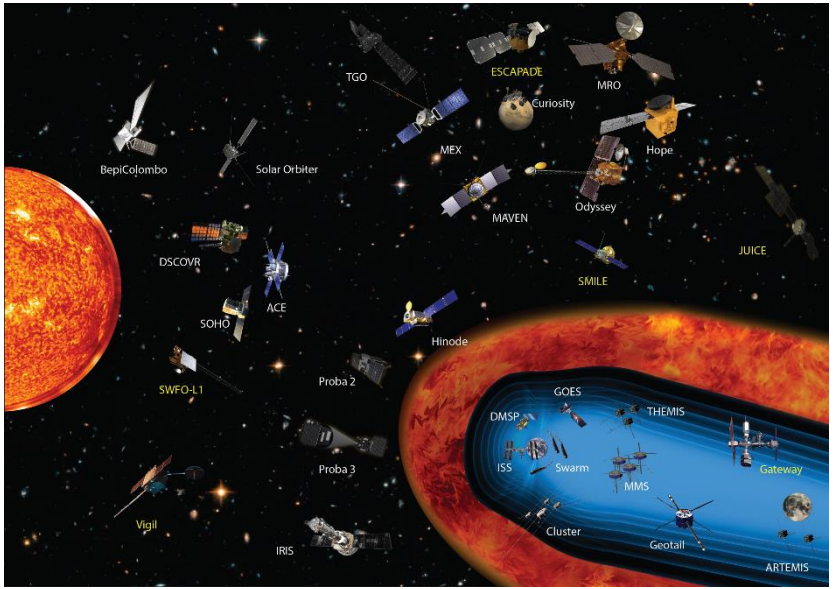


Figure courtesy of Dr Matt Taylor, ESA

The Space Sector - A UK Perspective

Space Park Leicester

Space workforce – now and in the future

- Up to 50,000 new staff needed by 2030 to support National Space Strategy (+15,000 to replace retirees)
- 77 per cent of employees hold a degree, but significant need for technicians (L4/5) - difficult to find, high impact
- Brexit impacts - reduced early career applicants, significant drop in experienced senior applicants
- Need for early career entry points with enough capacity (Graduates and Apprentices)
- Need for mid-career transition routes to reskill and upskill from other sectors (+ support UK MoD)
- Sustainable UK pipeline required

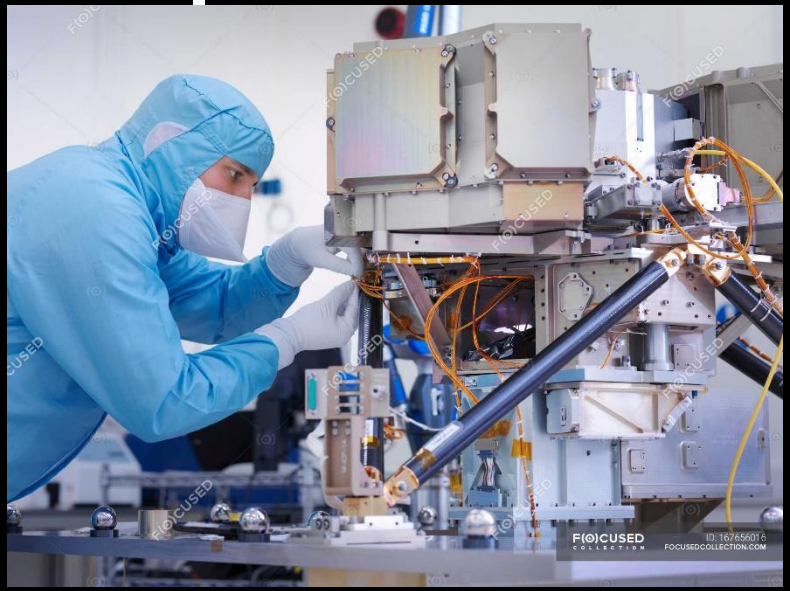


Image:Reaction Engines

Image:Airbus

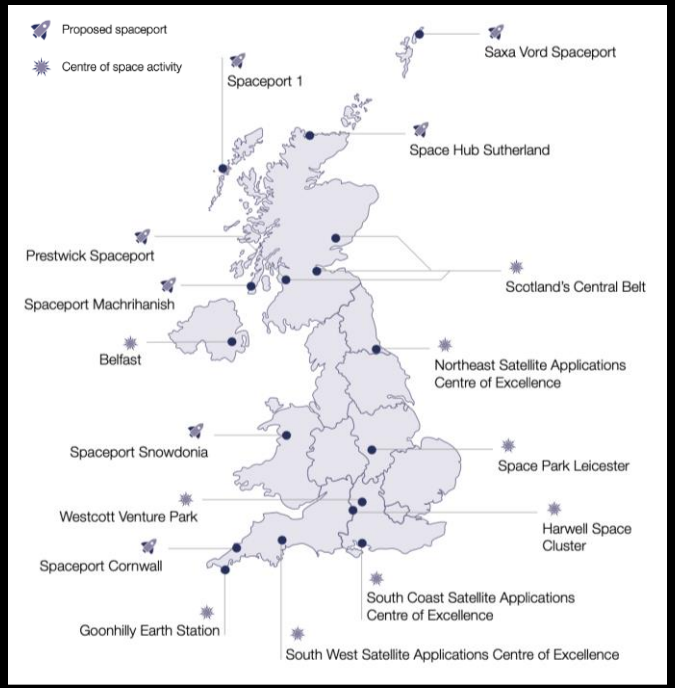
The University of Leicester

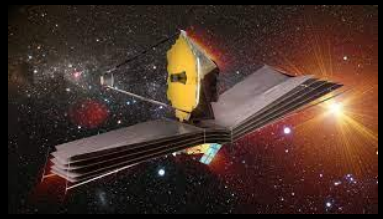
World-leading space expertise

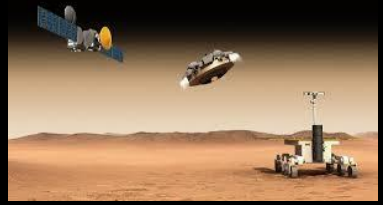
- One of the most experienced and successful space science & technology universities – continuous presence in space since 1967
- Powerful combination of world-leading research, teaching & industrial activity - end-to-end capability
- Leading across a range of training initiatives
- Support for further education and widening participation
- “Community” activities that benefit the wider sector, not focused on UoL return.

Space Park Leicester

- Unique academic, industrial and skills hub
- ‘An absolutely vital part of the national space infrastructure’ Science Minister, George Freeman
- Launched by Tim Peake in March 2022







UK Space Apprenticeships

Space Park Leicester

New Entry Routes

- Space Engineering Technician (Level 4) – approved in 2020 and now active
- Space Systems Engineer Degree Apprenticeship (Level 6) – standard approved, fee band setting in October, first intakes expected Sept 2023

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FE WEEK

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Opinion

England's first space apprenticeship set for lift-off

AMANDA SOLLOWAY

Science minister

Mon 2nd Nov 2020, 15:36

Rocket starts in the night starry sky. A spaceship flies into outer space. Concept of travel to other planets | FE Week

Science minister Amanda Solloway explains why England's first space engineering apprenticeship is set for launch

"Without you Tom, we wouldn't have gotten to the Moon."

Those were the immortal words of gratitude expressed by then President, Richard Nixon, in 1961 to British rocket engineer Tom Bacon at a White House reception to mark the successful completion of mankind's most audacious mission; the Apollo 11 moon landing.

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BAE SYSTEMS

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REACTION ENGINES

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NATIONAL SPACE ACADEMY

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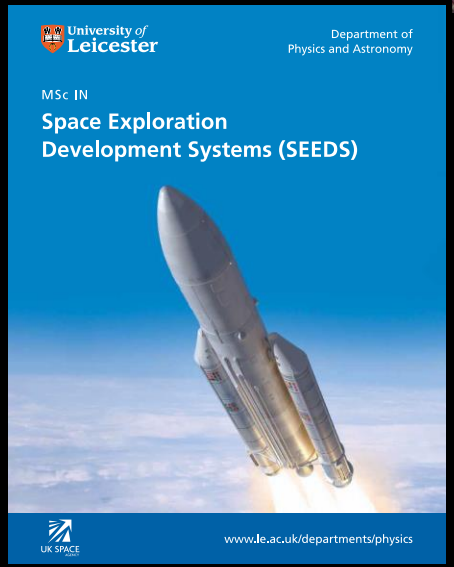
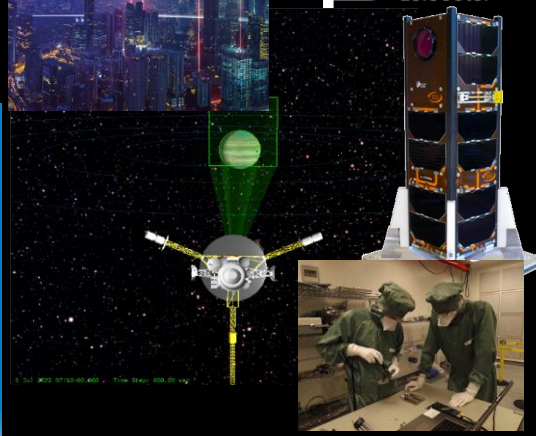
KISPE

University Degree Programmes

World-recognised Undergraduate and Postgraduate programmes

- Physics, Engineering, Digital, Data, Geography
- Knowledge, skills, behaviours
- Industry collaborations
- International partnerships
- Student outputs published & submitted to space agencies
- Extensive presence of alumni across sector including senior roles in agencies and industry worldwide





Space Park Leicester

Rolls-Royce

Reaction Engines

ThalesAlenia Space

ISAE SUPAERO

Politecnico di Torino

KISPE

Industrial placements: A good idea?

- Companies across the UK are reshaping the way they recruit talent - **32% of graduate entry-level positions are expected to be filled by graduates who have already worked for their organisations**
  (paid internships, industrial placements or vacation work)
- Top Undergraduate Employers

- Placement students are **more employable**
- Skills development (time management, reporting)
- Benefit from professional approach
- Build your network (contacts)
- Enhance your CV (stand out, experiences)
- Identify industrial PhD opportunities (CASE)

HIGH FLIERS

★ RATEMYPLACEMENT

An industrial placement is often like a year long job interview!

University of Leicester students have completed a Year in Industry with these employers and many more!

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Placements module

- Support with: searching, applying for and obtaining a placement

Week	E-Learning to Complete	Live Session to Attend	Additional Tasks
1	Finding Opportunities	Placements Introduction	Start finding placements
2	CV Writing	Placement Students - Festival of Careers Session	Attend the Festival of Careers
3	Cover Letter Writing and Answering Competency Questions	Application Skills Webinar	Get your application reviewed
4	Psychometric Tests	Psychometric Tests Webinar	Complete three practice tests
5	Interview Skills	Interview Skills Webinar	Complete a practice video interview
6	Interview Skills - Student Training	Disclosing Your Disability to Employers	Book a mock interview
7-8	Assessment Centres Introduction	Mock Assessment Centre	N/A

Skills Electives (Year 3)

Designed to help you improve students' skills and enhance their career options

Unique amongst UK physics departments

Active – all about skills, professional behaviour - e.g. team working, time management, communication, independent learning, open-ended tasks etc.

Project-like

PA3241 Group Industry projects

PA3244 Lean Launchpad

PA3245 Physics in Education

NT3100 Sustainability Enterprise Project

Skills

PA3242 Astrodynamics

PA3243 Electronics

PA3246 Python

PA3247 Numerical programming in C

PA3241 Group Industry Projects

- Individual contacts with industry
  - build opportunities for the future
- Development of broad skillset attractive to employers
- Ideal preparation / source material for interviews
  - E.g. team working; ability to overcome problems; etc.
- Significant opportunity for development of research projects (i.e. path to PhD, etc.)
- Business development opportunities (patents, IP, business plan writing)
- Innovative solutions encouraged
- Student defined / led projects encouraged
  - speak to Ian Hutchinson

MIDLANDS INNOVATION

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European Union

European Regional Development Fund

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PA3241 Group Industry Projects

- Jet Propulsion Laboratory: Europa lander project
- Airbus Intelligence: AI software development)
- National Space Centre: Innovative displays and outreach (GeoBus)
- D-Orbit (new SME in space industry)
- Artec Vida (novel fuel solutions)
- Medical science (partner in Liege using spectroscopy in clinical applications)

NASA JPL

TELEDYNE e2v
Everywhereyoulook™

Science & Technology Facilities Council
Rutherford Appleton Laboratory

NATIONAL SPACE CENTRE

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PA3241 Group Industry Projects

- X-ray imager development with ESA for the THESEUS mission
- Leicester Hospital medical physics projects
- Analytical instrumentation for motorsport
- Interaction of radiation with semiconductors (detectors / lasers) with Cobham Advanced Electronic Solutions
- Systems solutions (digital electronics / programming) Thales Alenia Space
- Teledyne-e2v camera systems for NASA/ESA/fundamental physics projects

AIRBUS

NHS
University Hospitals of Leicester
NHS Trust

esa

ThalesAlenia Space
a Thales / Leonardo company

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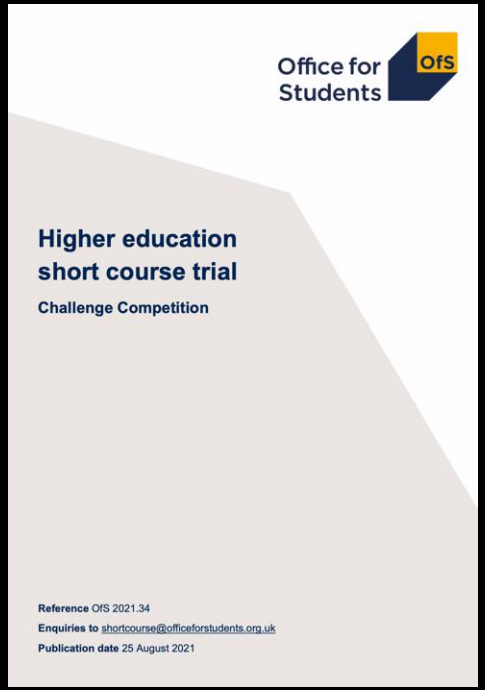
OFS-Funded Short Course & CPD

Space Park Leicester

Course title	Level	Credit value	Awarding body
Fundamentals of Space Systems, Regulations and Applications	**5**	**40**	**University of Leicester**
Space Applications	4/5	2	UoL (delivered by NSA)
Systems Engineering and Concurrent Design for Space	4/5	5	UoL
Spacecraft Subsystems	4/5	3	UoL
Spaceflight Dynamics	5/6	5	UoL
Spacecraft Communications	5/6	5	UoL
Space Law, Regulation, Policy & Spectrum	4/5	2	UoL (delivered by AL & SFN)
Space Radiation Design	5/6	5	UoL
The Space Environment	5/6	5	UoL
Human Factors	4/5	2	UoL
Space for sustainable development goals	4/5	2	UoL (delivered by NSA & AL)
UK defence space: history, priorities	4/5	2	UoL (delivered by NSA)
International space – strategies, policy and geopolitical drivers	4/5	2	UoL (delivered by UoL/AL/NSA)



NATIONAL SPACE ACADEMY

ALDEN

UK SPACE AGENCY

ROLLS ROYCE

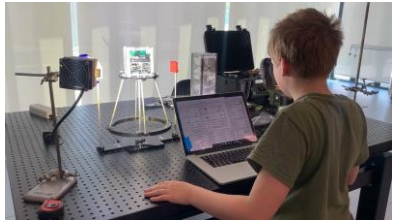
Development nearing completion, pilot course planned for Feb-Mar 2023 with selected industry & agency participants

Space Park Leicester

Hosting students for elements of technical training and projects

Space Park Leicester Concurrent Design

AR/VR Lab



Wolfson Lab

Conference & Lecture Space