



# PIRATE

*A remotely operable telescope for education and outreach*

.....  
Ulrich Kolb, Johanna F. Jarvis, Marcus Brodeur, Nicholas  
Braithwaite, Shailey Minocha,, Richard Busuttil

.....  
Life-changing Learning  
.....

# Introduction to PIRATE

## Physics Innovations Robotic Astronomical Telescope Explorer

- Sited in Mallorca and remotely operated (from 2010)
- Housed in a 3.5m Baader clam-shell dome
- PlaneWave CDK17 0.42 meter OTA on a Paramount ME
- SBIG STX-16803 4000 x 4000 pixel CCD Camera (43 arcmin fov)
- Operated using ACP – features user friendly interface and simulation mode
- <http://pirate.open.ac.uk>



# PIRATE deployment

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The OU is a world leader in flexible distance learning and PIRATE plays a key role

- **Research**

- Exoplanet transit candidate winnowing for SuperWASP and QES
- Gaia transient follow-up
- Educational research into effectiveness of remote-access labs

- **Teaching** *3 months per year*

- Level 2 & 3 undergraduates (~200 students/year)

- **Outreach/public engagement**

- The Open Science Lab initiative
- Science Festivals
- FutureLearn Massive Open Online Courses (MOOCs)

# Online Experiments Research

Broadening accessibility and enhancing experiences

- Attitudes to robotic telescope use – common concerns and opinion shifts

## Pre-activity -> Post-activity

1 = strongly disagree, 5 = strongly agree

• Reasonably accommodate solitary participants	3.4 -> 4.1	0.7 towards agree
• Reduce physical risks to participants	2.8 -> 4.2	1.4 towards agree
• Make practical science easier to conduct	2.3 -> 2.8	0.5 towards neutral
• Effective or not, just don't feel 'real'	3.3 -> 2.6	0.7 towards disagree
• Make it harder to teach collaborative skills	3.4 -> 2.6	0.8 towards disagree
• Don't convey what being at a real facility/site is like	4.1 -> 2.8	1.3 towards neutral

Mean Likert response scores from a large scale survey of PIRATE operator experiences (*Brodeur, 2015*)



# Online Experiments Research

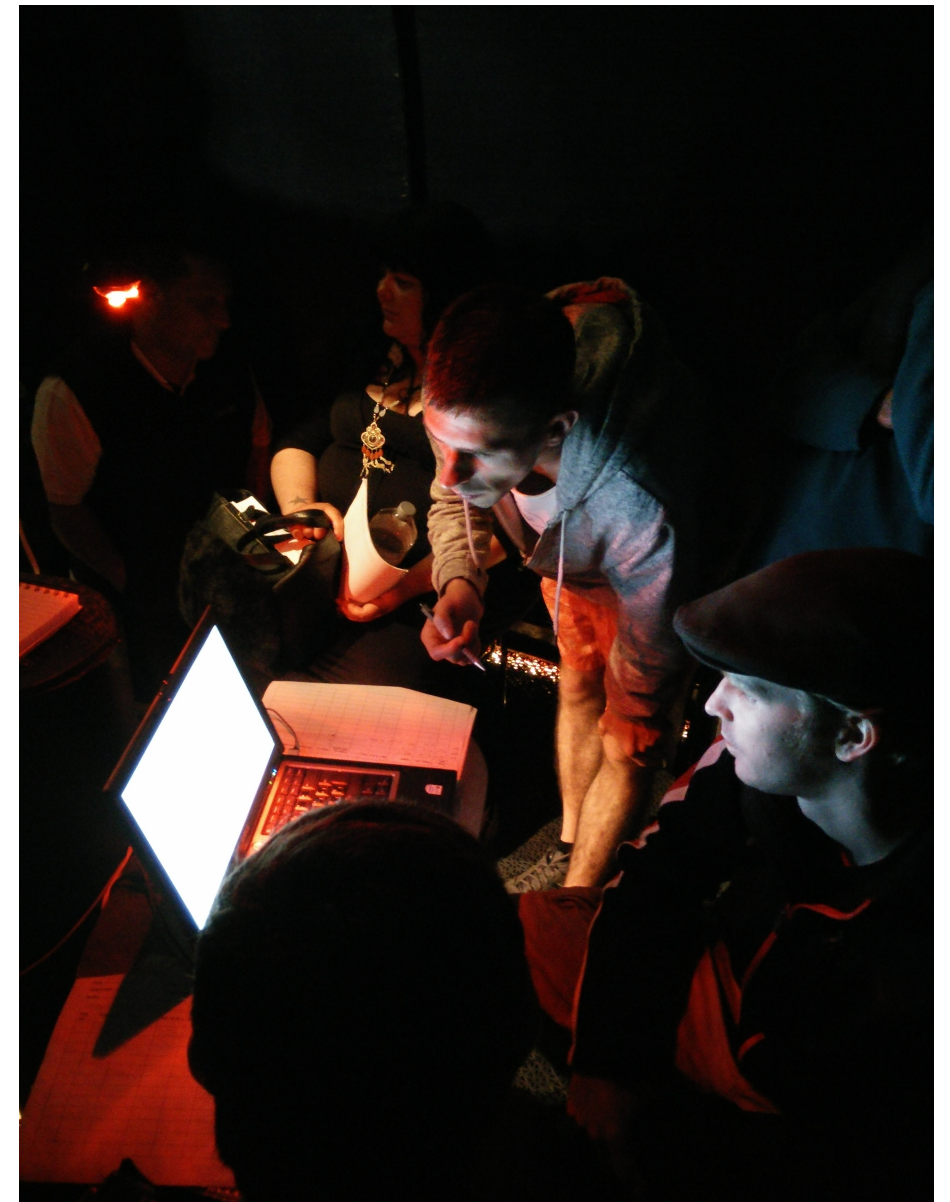
## The benefit of remote facilities for some demographics

Operating the telescope in real-time over the internet helps to accommodate individuals who:

- find face-to-face social interactions with several people highly stressful
- are unable to access an observatory due to physical disabilities
- feel anxious about the time pressures of practical/scientific work

*"I think if you're looking at [observational astronomy] in terms of unpredictability, the biggest variable for me would be the other people. It wouldn't be the weather."*

*(a 30 year-old female with ASD, participant in an online experiments study, Brodeur, 2015)*



*The close-quarters "in dome" experience can be difficult for some.*

# The Open Science Lab

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Inspiring the new generation of online experiments

- What is The OpenScience Laboratory?

- An online center that will transform the teaching of practical science
- A means of conducting authentic and rigorous investigations using real data
- A laboratory and observatory that is globally available

- What does it provide?

- Remote Experiments
- Virtual instruments and interactive screen experiments
- Online field investigations
- 3D Immersive environments
- Citizen Science



The OpenScience  
Laboratory

An initiative of The Open University  
and The Wolfson Foundation

[www.opensciencelab.ac.uk/](http://www.opensciencelab.ac.uk/)

- Who is it for?

- School students and Undergraduates
- Educators anywhere in the world who work with us to develop shared assets
- The general public: 'citizen science' projects are available to everyone
- Education funders seeking to increase access to high quality science programs

# OSL PIRATE Experiment



The OpenScience  
Laboratory

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## OpenScience Observatory: measuring the Milky Way

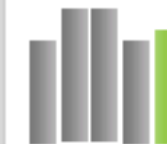
**ASTRO** **MATHS** **PHYS**



### About this experiment

- Subject: **Astronomy, Mathematics, Physics**
- Study level: **Pre-university**
- Type: **Activity**
- Timing: **3 hours**

### Popularity



Recent weeks

**#10/85**

This week

Detailed statistics

Measuring the Milky Way using a simulated astronomical telescope.

### Background and nature of the task

You will operate a simulated astronomical telescope to determine star counts in selected fields across the Sky, and make some basic, quantitative statements about the distribution of stars in our Galaxy. The document 'Measuring the Milky Way' found below provides a detailed introduction and briefing for each task.

### Duration and pattern of use

Short preparatory reading of 0.5h, 2 h online session, 0.5 h analysis, interpretation and debrief.



# The dark days ....

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- Collaborative model for running a robotic facility with a host site paid for “in-kind” is a win-win set-up ...
- ... for as long as everyone is well
- Financial crisis triggered deterioration of PIRATE host observatory infrastructure
- led to the effective loss of the 2015 science campaign that would have focused on Gaia alerts

**... come to an end**

**PIRATE will move this winter**



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The BRT is Not Accepting New Subscriptions

**Bradford Robotic Telescope**



The Bradford Robotic Telescope is a collection of telescopes and other instruments on Mount Teide, Tenerife. It is available to use for all, using this web site. For more information, [click here](#).

Over on our dedicated schools website, [schools.telescope.org](#), we aim to inspire the next generation by presenting real science in a fun and accessible way.

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**News**



**Servicing Trip Complete**

The recent service visit was carried out as part of a growing collaboration with the Open University and the Open Science Laboratory.

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