Newton Bhabha Activities 2017-2021

Giles Hammond

Institute for Gravitational Research, SUPA, University of Glasgow

Grant Aims

3 year grant (March 2017- March 2020)

+1.5 year extension (March 2020-September 2021)

+ COVID extension (September 2021-March 2022)

1. Advanced science and technology skills training through learning to develop, operate and exploit LIGO India

2. Implement an outreach programme to inspire STEM take-up in schools and universities.

3. Encourage entrepreneurial activity

Newton-Bhabha Fund

Science & Technology Facilities Council

Collaboration Agreement

GRAVITATIONAL WAVES RIPPLE INTO HIGHER EDUCATION IN INDIA

Issued: Fri, 08 Dec 2017 11:08:00 GMT

An important agreement has been signed in India that will open the way to closer working between scientists in India and their counterparts in UK universities.

The LIGO India agreement was signed officially at the British Council offices in New Delhi between a consortium of universities in India led by IUCAA (Inter-University Centre for Astronomy and Astrophysics), in Pune, and a consortium of UK universities led by the University of Glasgow. The signatories were Principal and Vice-Chancellor Professor Sir Anton

British Council offices in New Delhi, Dec 2017

Newton-Bhabha Fund

Science & Technology Facilities Council

Newton-Bhabha Website

+ Indian Institutes

+ United Kingdom Institutes

Face-to-face meetings

Face to face meeting are held annualy between the members of the partnership as well as monthly calls to keep all members up to date with the research and news.

Education and Outreach

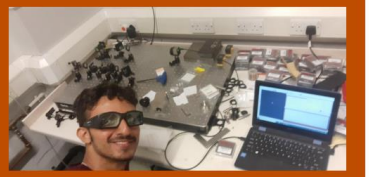
A key element in the LIGO India-Newton Bhabha partnership is to inspire and encourage the next generation of scientists and the general population to learn about the nature of our Universe.

Build-a-detector workshop

The build-a-detector workshop is a series of lectures, Q&A sessions (given by LVK members) and group based project solving projects, where the students get to theoretically design their own gravitational wave detector. The lectures and Q&A sessions focus on teaching the basics of gravitational wave astronomy, ranging from instrumental, data analysis and theoretical subjects. Ending with students presenting their work to a panel of international expert judges where a team will be named the winner.

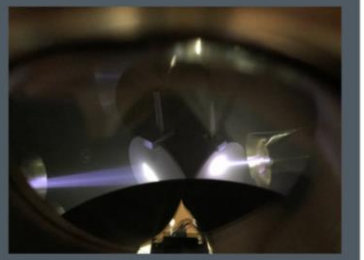
Exchange visits

One of the core elements in the LIGO India-Newton Bhabha partnership is the exchange of knowledge and skill transfer. This is achieved by having members of the collaboration visit different laboratopries in the U.K and vice versa and working together to achieve the final goal.



Research & Development

The planned research and development will foster key skills to underpin future research in GW astronomy in addition to providing routes for knowledge exchange to support local industries.



https://www.gla.ac.uk/schools/physics/research/groups/igr/ligo_india/

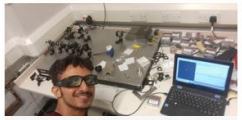
STUDENT EXCHANGES

As part of the Newton Bhabha project we encourage PhD students and early career researchers as there is a crucial need for critically skilled students and early career researchers to be trained in all the areas involved in GW, from the astronomy science to the construction and data pipelines. By facilitating the exchanges we can make sure that the generation in charge of LIGO India will have the full support of the community. If you are interested in applying for an exchange position please don't hesitate in contacting Dr. Mariela Masso Reid

"The U.K. has a proven track record in delivering high-quality technology and outreach activities relating to gravitational wave science, including the delivery of key hardware for the LIGO mirror suspensions. A model of sharing knowledge via staff, postdoc and student exchanges to the U.K., together with trips to Indian institutes, will strengthen and benefit the U.K. and Indian academic communities, providing high quality training of the next generation of scientists and engineers."
- PI. Prof Giles Hammond

Nancy Gupta

→ Nancy Gupta came to the University of Glasgow in 2019 to work alongside Prof. Strain and Dr. Barr.



Thejas Seetharamu

→ Thejas came to Glasgow in 2019 as an ERASMUS+ scholar to work on the fabrication of fused silica suspension fibers alongside Prof. Hammond. During his time here he also work with other institutes members of the Newton-Bhabha partnership such as working with Prof. Daw at the University of Sheffield. Thejas has now started a PhD under the supervision of Prof. Hammond.

Chetan Vishwakarma (IISER Pune) and Jamney Jay Panda (TIFR)

→ Jamney and Chetan came together to work between The University of Strathclyde and The University of Sheffield. They work alongside Prof. Reid on building and commissioning a new measuring system for characterising the mechanical dissipation in optical coatings.

First LIGO India Newton Bhabha - Glasgow 18-20 July 2018

Second LIGO India Newton Bhabha meeting - Pune 18-19 Jan 2019

Third LIGO India Newton Bhabha meeting - Glasgow 01 Ap 2019

Fourth LIGO India Newton Bhabha meeting - Zoom meet 25-26th Nov 2021


University
of Glasgow
VIA VERITAS VITA


IUCAA


IISER PUNE


IISER KOLKATA


INDIAN INSTITUTE OF TECHNOLOGY MADRAS
सिद्धिर्भवति कर्मजा


PER ARDUA AD ALTA


UNIVERSITY OF
BIRMINGHAM

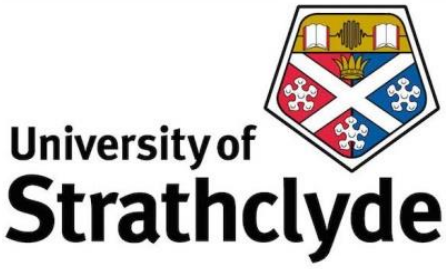

Disce Doce
RERVM COGNOSCERE CAVSAS


The
University
Of
Sheffield.


CARDIFF
UNIVERSITY
PRIFYSGOL
CAERDYDD


UNIVERSITY OF
Southampton


tifr
TIFR Centre for
Interdisciplinary
Sciences


University of
Strathclyde


UNIVERSITY OF THE
WEST of SCOTLAND
UWS


INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
ज्ञानम् परमम् ध्येयम्

Workpackages

WP1: Project Management

WP2: Data analysis and Modelling

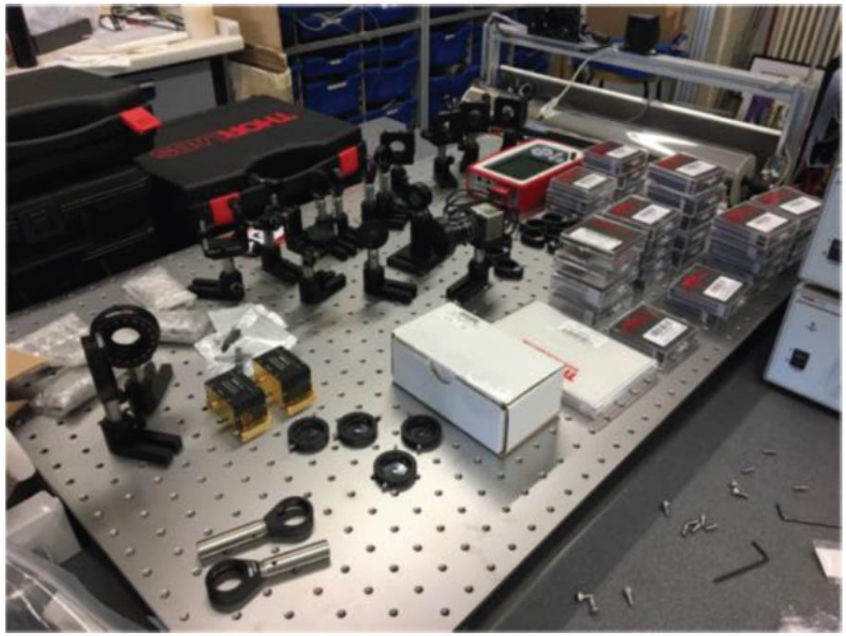
WP3: Low thermal noise coatings and suspensions

WP4: Interferometer modelling & simulation

WP5: Entrepreneurial activities

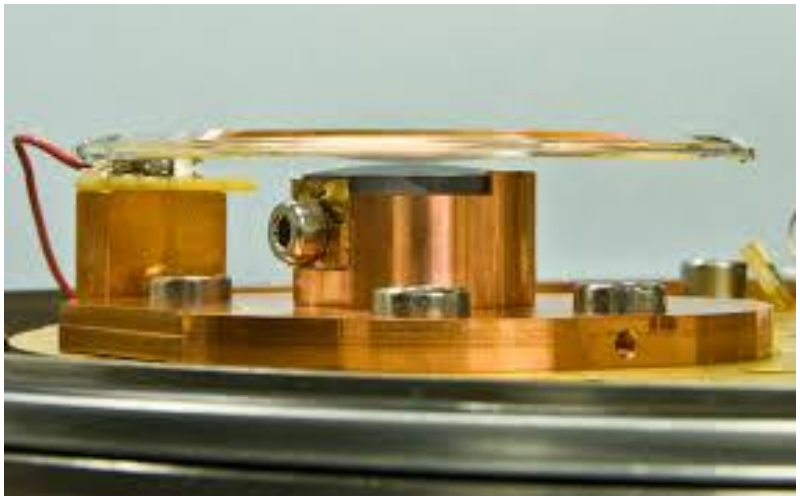
WP6: Outreach activities

1. Skills Training



- Laser stabilisation: Sheffield / IIT Madras / IISER Pune

- Coating development: Strathclyde / IISER Pune / TIFR Hyderabad



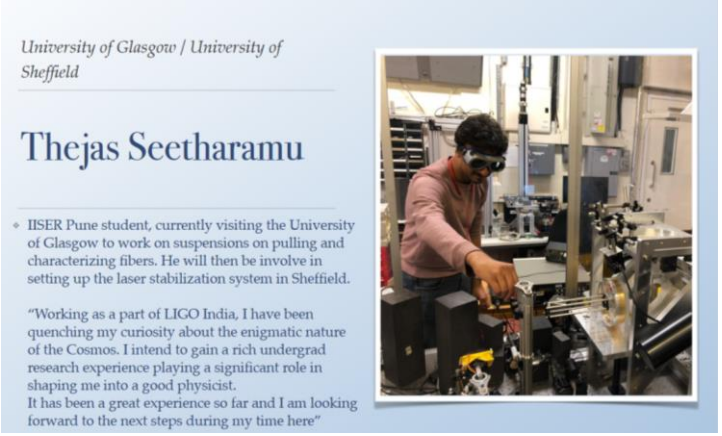
Finesse 2

- Birmingham / Sheffield distance learning

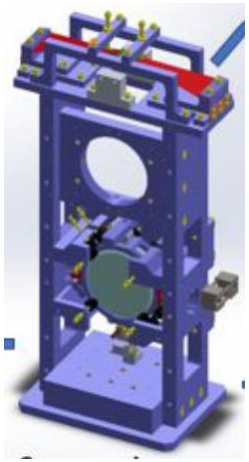
Newton-Bhabha Fund

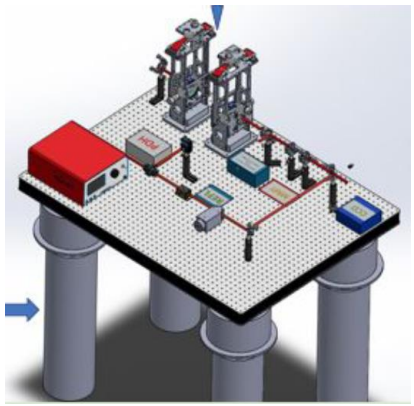
Science & Technology Facilities Council

1. Skills Training



- Laser stabilisation ⟶ UK PhD student

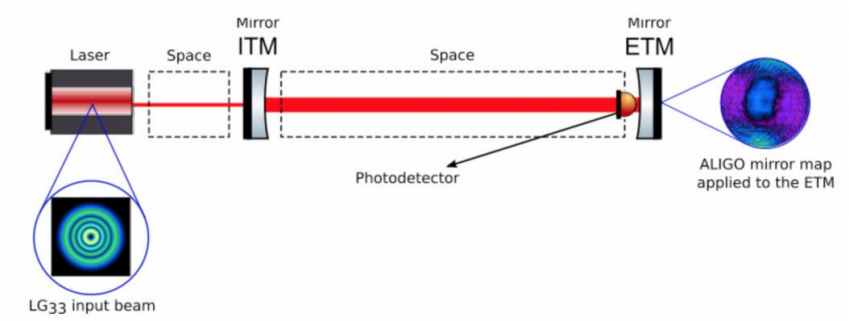




- Suspensions: IUCAA

Build-a-Detector WORKSHOP

- Glasgow/IUCAA (remote)

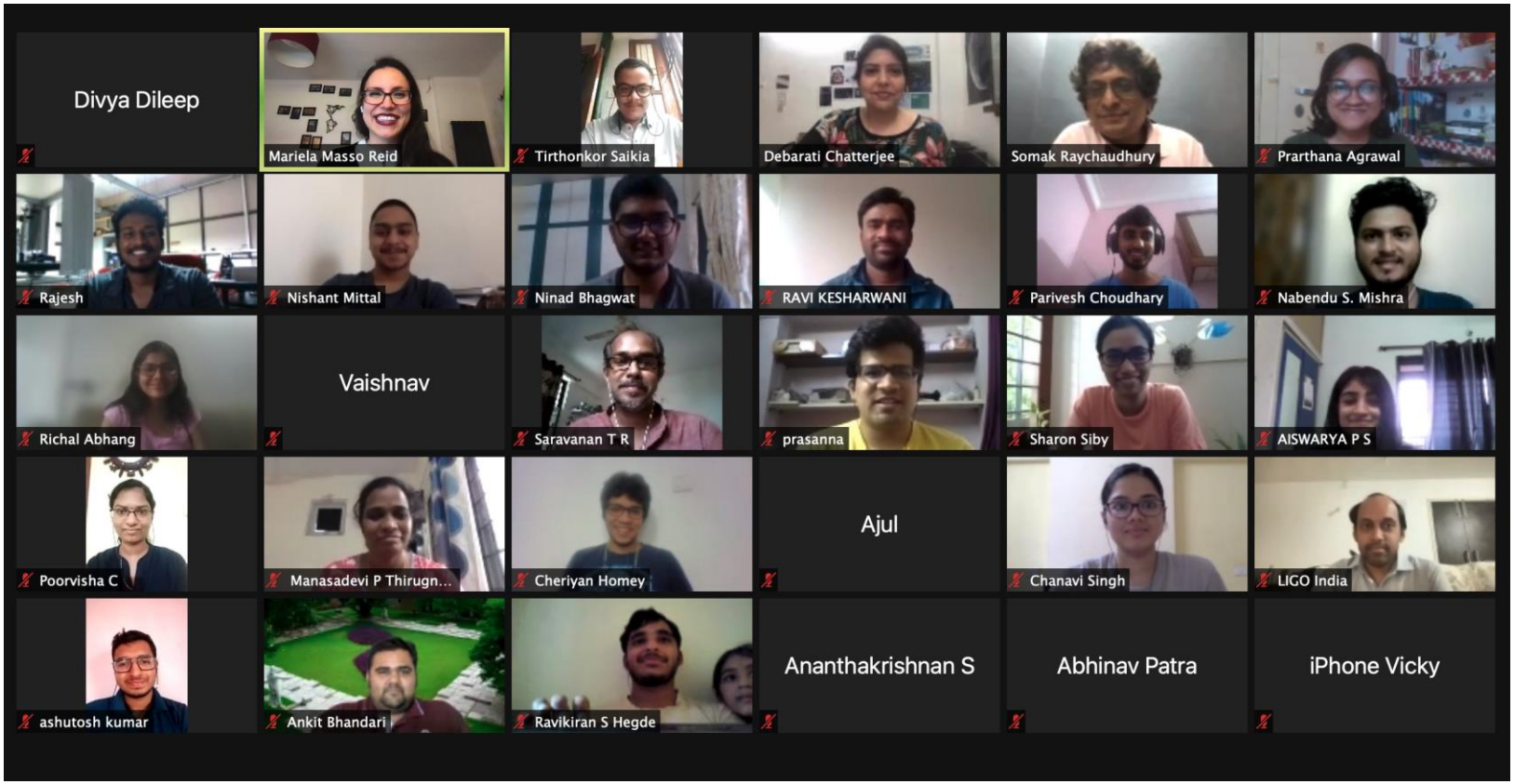


- Finesse Workshop and Hackathon: IUCAA

Build-a-Detector

WORKSHOP

- Newton-Bhabha project with help from LI-EPO
- Masters and PhD students
- 10 day workshop
- Mix of pre-recorded lectures and live Q&A sessions
- Submission of final presentations by students



Build-a-Detector WORKSHOP

Feedback from students

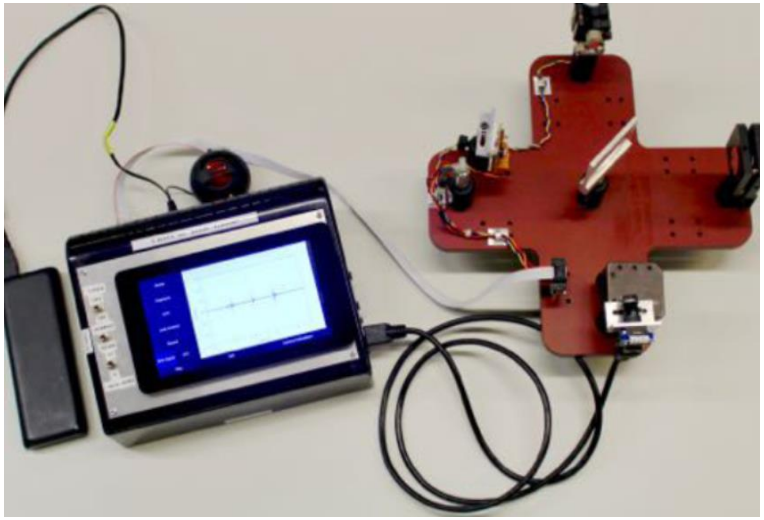
"Very exciting and we learned a lot from these workshop. Looking forward to more workshops like this."

"it definitely left a mark on my career as a future scientist."

- Lectures on:
  - Thermal noise
  - Coating Brownian noise
  - Newtonian (gravity gradient) noise
  - Quantum noise
  - Seismic noise
  - Continuous /periodic sources
  - Coalescing compact binary
  - Neutron star transients
  - Stochastic sources
  - Basic of searching for signals in the data
  - Building a detector
  - Basics of PyGWINC
  - Why do we need larger networks

2. Outreach/STEM

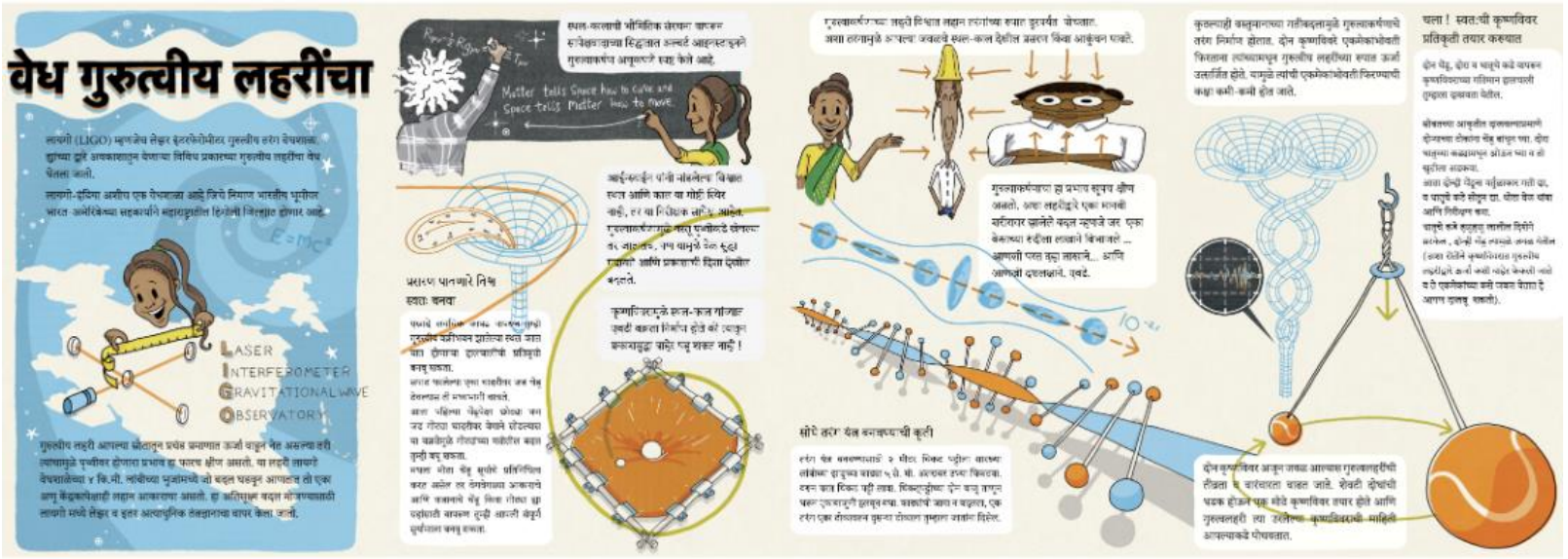
- Book launch: IUCAA / Southampton



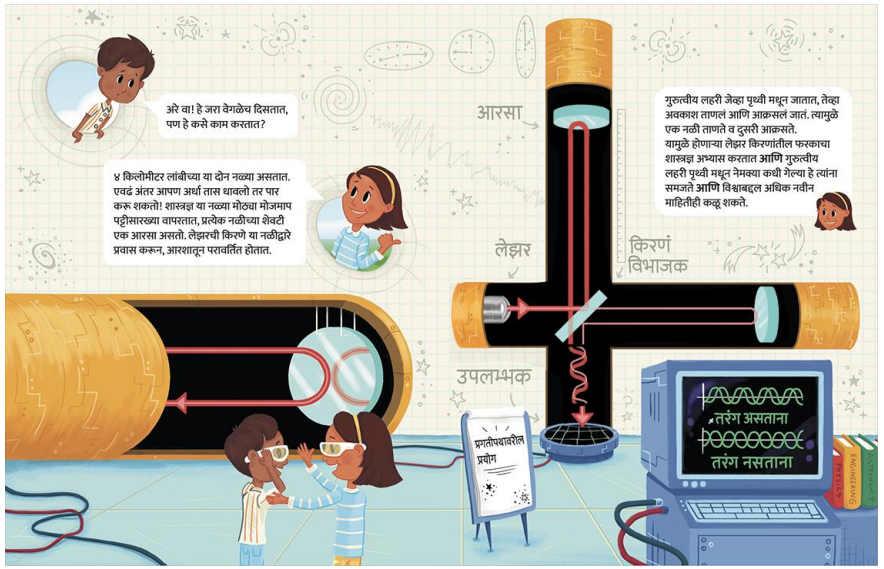
- LIGO in your Hands: IUCAA / Glasgow

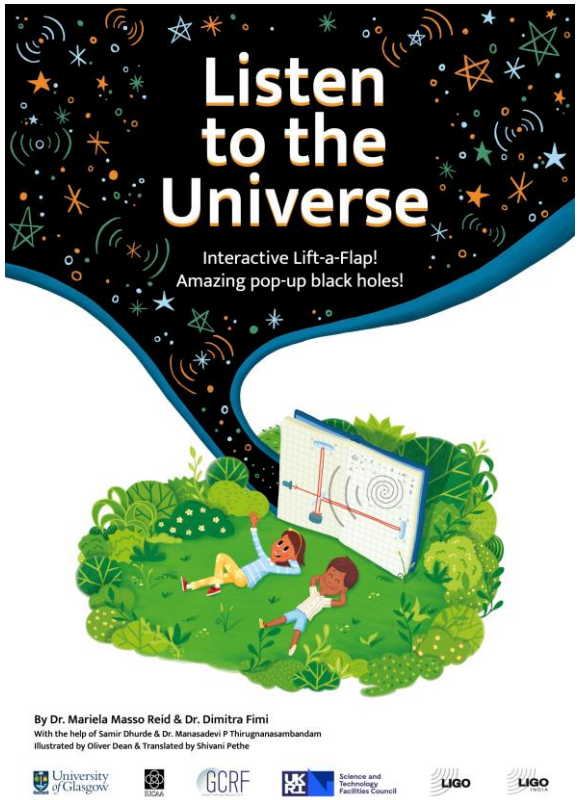
- Spacetime Quest: IUCAA / Birmingham

- Leaflets (Southampton)



- Pop up book (Glasgow)

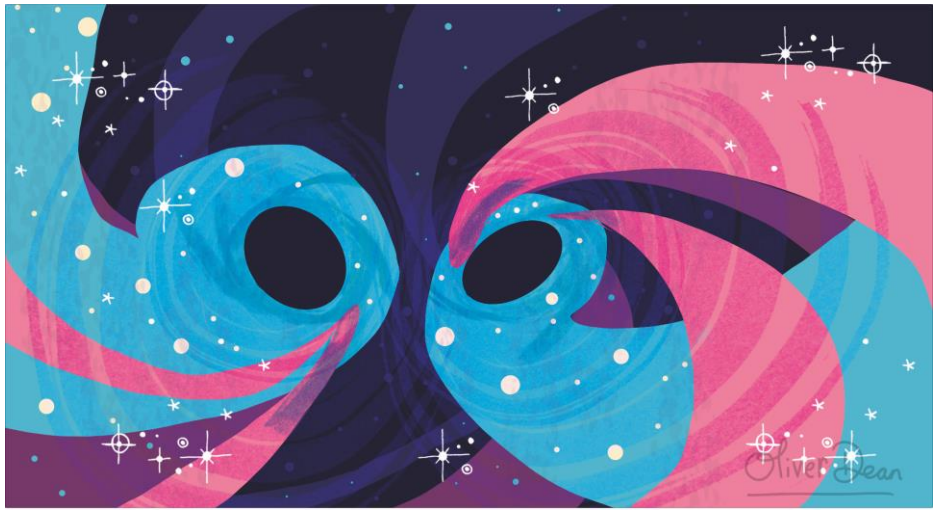




Children's pop-up/lift-a-flap book

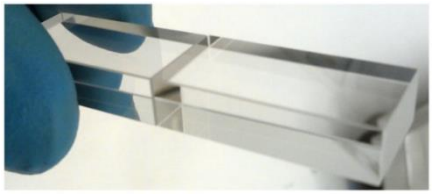
Written by: Dr. Mariela Masso Reid and Dr. Dimitra Fimi

- UKRI funded project, 1000 books
- Written in English and translated to Marathi
- Event launch on 14th September 2021
- Other languages being considered
- #ListentotheUniverse

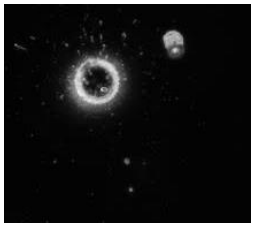


3. Entrepreneurial Activities

- The goal of today/tomorrow

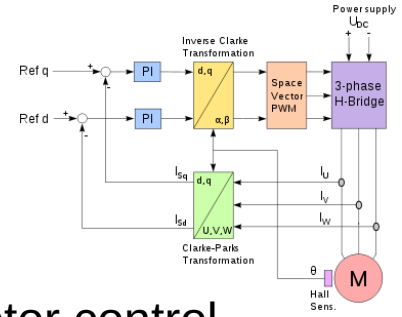


High precision bonding

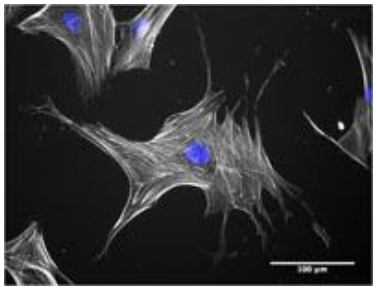


Coating damage

Analysis of retinal scans



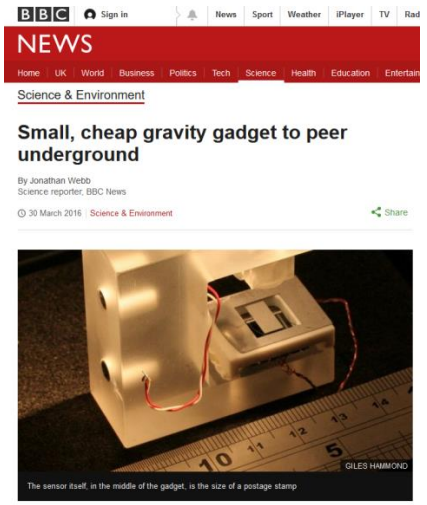
Motor control



Stem cell differentiation

Gas sensors (GSS)

Weathering of sandstone



Gravity sensors

3. Entrepreneurial Activities

GSS Gas Sensing Solutions

TWI

HELIA PHOTONICS

THALES

AAC CLYDE SPACE

LARSEN & TOUBRO

AIRBUS

Glasgow 1st April 2019

The third face-to-face meeting between UK and India scientist was held in Glasgow. This meeting was coordinated as a follow up to the meeting held in India earlier in the year. The British trade embassy supported the visit from LIGO India members to the UK. The objective of the visit was to show case the UK capabilities/ supply chain to help set-up the Gravitation Wave Detector.

Attendance list:

helped facilitate face-to-face contact between industrial partners, academic researchers and served as the base from which further discussions and collaborations were initiated.

Pictures of the meeting can be found here.

For further details on the meeting please visit our wiki page

LIGO INDIA

ABOUT ACTIVITIES LISC NEWS & ANNOUNCEMENTS F

India-UK Entrepreneurial Workshop

18-19 Jan 2019, IUCAA, Pune

LIGO-India > Events > India-UK Entrepreneurial Workshop

18-19 Jan 2019, IUCAA, Pune

Program schedule | List of participants | Visitor & Travel Information

Opportunities

Foreign, Commonwealth & Development Office

Prime Minister's Office, 10 Downing Street

Policy paper

2030 Roadmap for India-UK future relations

Published 4 May 2021

2. Migration and mobility

- Implement the comprehensive Migration and Mobility Partnership covering movement of students and professionals …

3. Consular cooperation

- Strengthen the India-UK Consular Dialogue

4. Education, research and innovation and enterprise

- Expand cooperation between our universities
- Support and promote the two-way mobility of a greater number of students, teachers and researchers.
- Develop collaborations between Industry, Academia and the Government to foster innovation
- Build on existing bilateral research, science and innovation infrastructure and governmental relationships to continue to support high-quality, high-impact research and innovation through joint processes.
- Leverage and build on existing, long-standing bilateral partnerships