

# The LVK White Paper on Communications, Education and Public Outreach

**Goals, Status and Plans, Priorities  
(July 2021 – December 2022)**

Prepared by the Communications and Education Division of the LSC<sup>1</sup>

Written in conjunction with the Education and Public Outreach Groups  
of the Virgo Collaboration and the KAGRA Scientific Collaboration.

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<sup>1</sup>EPO E-mail: [lsc-epo@ligo.org](mailto:lsc-epo@ligo.org), EPO Wiki: <http://wiki.ligo.org/EPO>, and EPO White Paper Internal Version in DCC: <https://dcc.ligo.org/LIGO-T2100307>

# Executive Summary and List of Priorities

This document presents an Executive Summary of the priorities and objectives of the Communications and Education Division of the LIGO Scientific Collaboration – covering the period July 2021 to December 2022 and aligning with the 2021 edition of the [LSC Program](#). Broader context for these priorities – including brief articles describing EPO activities, strategies and goals of the Virgo and KAGRA Collaborations, and how these are integrated into coherent LVK plans – is provided in the subsequent chapters. LSC Groups are encouraged to consult this Executive Summary, and the associated tables of activities and tasks<sup>1</sup>, when formulating their 2021-22 MoU plans. Groups are also welcome to contact the C&E Division Chair or relevant member(s) of the EPO Committee to discuss their plans. (See below for names and contact details.)

## Communications and Education Division: Mission and Goals

A core mission of the LSC is to harness the excitement and enthusiasm generated by gravitational wave research to inspire and educate students and the general public in astronomy and fundamental science; the LSC believes that the opportunity to discover the beauty of the cosmos should not be limited by age, culture or abode.

The LSC EPO working group was established in 2008 and aims to lead the LSC efforts to carry out this mission. In 2020, following a comprehensive review of LSC structures and organisation, the EPO working group was re-designated and re-organised as the Communications and Education (C&E) Division of the LSC. The full structure of the new Division has yet to be fully implemented, and this is an over-arching goal for the Division over the first six months of the next MoU review period - i.e. before the end of 2021.

By combining and synthesising a range of ideas and approaches across participating institutions, and promoting collaboration and sharing of best practise, the LSC C&E Division seeks to communicate LSC science and to create education and outreach programs which are far more effective than they would be if LSC member institutions worked independently.

The C&E Division's program of activities and priorities is shaped by the following general goals:

- To communicate LSC results in an accessible way to the world - to other physicists, students, and the general public.
- To develop educational resources that will inspire and train the next generation of scientists and build overall scientific literacy.

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<sup>1</sup>available on google sheets [here](#). Note, ligo.org login credentials required.

- To advocate for future development and growth in our field, in partnership with LSC/Lab leadership and the broader GW and EM astronomy communities.

## **EPO Priorities: July 2021 to December 2022**

The following sections identify priority activities for the next 18 months, a period that will include the first months of Observing Run 4. The activities listed below are further broken down into detailed tasks, as summarized in google sheets available [here](#).

### **1. Priorities for the LIGO Laboratory**

Priority areas for LIGO Laboratory Outreach are as follows:

1. We will expand the LLO Science Education Center (SEC) capability for evaluating the impact it has on students participating in field trips, continuing to serve the local teacher community through summer workshops and collaborative teacher exchanges (including remote activities, where appropriate / required).
2. We will continue work to develop the LIGO Exploration Center (LExC) at LHO, for which \$7.7M has been approved by Washington State for design, with construction making steady progress during 2021.
3. We will continue to organize a yearly International Physics and Astronomy Educator Program at LHO (online or in person, as appropriate).
4. We will continue to work with collaborators from across astronomy to produce a multi-messenger astronomy masterclass.
5. We will change our virtual offerings, primarily targeting local schools with virtual tours and classroom oriented experiences in order to help deal with the current pandemic and to adapt to post-pandemic constraints and opportunities.
6. We will assist Observatory staff with refreshing the range of LIGO and LVK merchandise available through cafepress.

### **2. Priorities in Formal and Higher Education**

Priority areas for Formal and Higher Education are as follows:

1. We will develop new classroom units for high schools aligned with Next Generation Science Standards (NGSS) and other appropriate international school standards, including updates and revisions of existing classroom activities.
2. We will develop high-school teacher training materials that can be tested and evaluated prior to use.
3. We will conduct professional development with high school teachers at local, regional, national, and international venues – online and face-to-face.

4. We will develop new classroom and laboratory activities on LIGO-related data analysis, astrophysics, and experimental topics, suitable for use in high school and undergraduate introductory astronomy and physics classes.
5. We will help to promote the Gravitational-Wave Open Science Center, in order to encourage and facilitate the use of the public strain data and other analysis data products that are curated there by the public, in educational settings, and by professional scientists.
6. We will organize, promote and deliver the LIGO (I)REU Programs that host undergraduate students undertaking research experiences with LSC scientists.

### **3. Priorities in Informal Education and Public Outreach**

Priority areas for Informal Education and Public Outreach are as follows:

1. We will maintain, update and renovate the ligo.org website for informal learners and members of the public.
2. We will continue worldwide outreach and communication through social media (Twitter, Facebook, Instagram, Reddit) and other informal educational materials that showcase our community, our observational and instrument science and the importance of multi-messenger astronomy.
3. We will provide educational materials and social media support for exceptional event announcements.
4. We will continue answering question@ligo.org queries, developing efficient approaches to curate and organize them.
5. We will develop printable material and multi-lingual resources, including science summaries for all collaboration papers.
6. We will promote development of innovative approaches that communicate LVK science, such as audio, video, virtual reality, web and phone apps, video games and planetarium shows
7. We will develop and maintain tools to share, in low latency, public alerts of detection candidates and resources to explain the content of these alerts.
8. We will explore innovative approaches to generating and disseminating this content that will be scalable to the candidate event rates expected for O4.
9. We will support and promote Gravity Spy and other citizen science projects.
10. We will support LVK members communicating our science through public talks at local or national community events, including science festivals, museums, science centers, astronomy societies etc.
11. We will support LVK presence at major science festivals, exhibitions, and other high-profile public events that attract large audiences – both online and face-to-face.

12. We will develop flexible and easily portable resources that can be used at exhibitions as well as other informal education and outreach events.

#### **4. Priorities for Professional Outreach**

Priority areas for Professional Outreach are as follows:

1. We will maintain, update and renovate the [ligo.org](http://ligo.org) website for professional scientists.
2. We will support the provision of information and materials for professional astronomers, including public alerts during observing time, organization and promotion of LVK webinars and communication with the Astronomy community.
3. We will promote outreach to scientists / policy makers at professional conferences and meetings, both online and face-to-face, working in collaboration with other gravitational wave communities where appropriate.
4. We will develop flexible and easily portable resources that can be used at professional conferences and exhibitions as well as informal educational activities and other outreach events, including e.g. engagement with politicians and funders.
5. We will aim to enable our collaboration members to present the science of our latest results at conferences in talks and panel discussions, through online presentations, and at seminars and colloquiums at individual institutions.
6. We will help to promote the Gravitational-Wave Open Science Center, in order to encourage and facilitate the use of the public strain data and other analysis data products that are curated there by the public, in educational settings, and by professional scientists.

#### **5. Priorities for Public Relations and Communications**

Priority areas for Public Relations and Communications are as follows:

1. We will continue to support communication with media contacts and liaisons, and we will provide media guidance and training for collaboration members.
2. We will support and coordinate preparations for LVK public announcements of scientific results, particularly (but not only) O4 exceptional event papers and webinars.
3. We will help to develop a framework, appropriate for O4, for deciding when LVK papers are worthy of announcement as exceptional event papers and/or webinars, and for effective and efficient management of these announcements.
4. We will maintain and produce public materials such as the LIGO Magazine.

## LSC EPO Committee: Present and Future

The LSC EPO Committee is defined in the Bylaws of the LSC as:

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7.13 Education and Public Outreach Committee

7.13.1 The Education and Public Outreach (EPO) Committee is responsible for overseeing and documenting the Collaboration’s activities in education and public outreach. The EPO committee is also responsible for formulating the Collaboration’s strategic plans to harness the excitement and enthusiasm generated by gravitational wave research in order to inspire and educate students and the general public in astronomy and fundamental science, and thus to help improve science literacy and education among the citizenry.

7.13.2 The EPO Committee consists of a chair appointed by the LSC Spokesperson, and at least four additional members from the LSC (including members from LIGO Observatories) with a spread of interests and expertise in formal and informal education, media relations, and in public and professional outreach.

7.13.3 The chair of the EPO Committee is appointed by the LSC Spokesperson for a term of two years. Other members of the EPO committee are appointed by the EPO Chair for the term of the Chair’s tenure, in consultation with the LSC Spokesperson.

7.13.4 The EPO Committee is also responsible for preparing and maintaining a White Paper relevant to the Collaboration’s plans and activities for education and public outreach, with an up-to-date version to be available before the beginning of the annual LSC MOU review cycle.”

As of July 2021, the LSC EPO Committee comprises:

- Martin Hendry (EPO Chair: [martin.hendry@ligo.org](mailto:martin.hendry@ligo.org))
- Amber Stuver (Informal Education & Public Outreach Lead: [amber.stuver@ligo.org](mailto:amber.stuver@ligo.org))
- Amber Strunk (Formal & Higher Education Lead, and EPO Lead for LIGO Hanford: [amber.strunk@ligo-wa.caltech.edu](mailto:amber.strunk@ligo-wa.caltech.edu))
- William Katzman (EPO Lead for LIGO Livingston: [wkatzman@ligo-la.caltech.edu](mailto:wkatzman@ligo-la.caltech.edu))
- Marc Favata (WebComm Chair: [marc.favata@ligo.org](mailto:marc.favata@ligo.org))

Following re-organisation of the EPO working group and its re-designation as the Communications and Education Division, before the end of 2021 the EPO Committee will similarly be re-designated and re-organised to include representation from the Chairs (to be appointed) of the C&E Division Committees. These Committees are:

- Formal Education Committee
- Informal Education and Public Outreach Committee
- Professional Outreach Committee
- LSC Web Committee
- Media Relations Committee
- LIGO Magazine Committee