

Bylaws of the LIGO Scientific Collaboration

LIGO M050172-11

September 2015

1. MEMBERSHIP

1.1. BASIC STRUCTURE

1.1.1. LIGO is comprised of the LIGO Laboratory and the LIGO Scientific Collaboration. These two entities report to the LIGO Directorate, consisting of the LIGO Director, the LIGO Scientific Collaboration Spokesperson, and the LIGO Laboratory Deputy Director.

The LIGO Laboratory is responsible for the operation of the LIGO Observatories and for the development and implementation of future detector systems, and it participates in all aspects of research with the LIGO detectors.

The LIGO Scientific Collaboration is responsible for coordinating the scientific research performed with and in support of the LIGO detectors, and for ensuring equal scientific opportunity among its member groups and individuals.

1.1.2. The LIGO Scientific Collaboration (LSC) is comprised of LSC Groups. Each LSC Group makes an on-going commitment to the Collaboration in the form of presence at the Observatories for commissioning and observation, service work, and technical and/or analysis contributions. The Group's commitments are specified in a Memorandum of Understanding (MOU) between LIGO and the Group.

1.1.3. Detector Groups are LSC Groups that operate a gravitational wave detector that supplies gravitational wave data to the LSC. The LIGO Laboratory is a Detector group.

1.1.4. A LSC Group is comprised of individuals, known as LSC Members, from a single institution or multiple institutions. A Group's LSC roster will list its current LSC Members and their level of commitment. A Member is any person who will contribute substantially to the Group's scientific commitments. An individual may be a member of more than one LSC Group,

but their level of effort as reported by each Group should not duplicate effort reported by another Group.

1.1.5. Each LSC Group shall designate one or more senior members to be Principal Investigators (LSC-PI) for the Group. The senior members determine a Group's overall research plan and direction. The LSC-PI is the formal point of contact for all official LIGO business with the Group.

1.1.6. The Collaboration is governed by the LSC Council (see Section 3) and is led by the LSC spokesperson (see Section 4). The continual operation of the Collaboration is performed by its Standing Committees (Section 7) and Working Groups (Section 8).

1.2. LSC GROUP ADMISSION

1.2.1. New Groups are admitted to the LSC through a vote of the LSC Council. They remain members of the LSC until they withdraw or are expelled.

1.2.2. Groups interested in joining the LSC will contact the LSC Spokesperson. They will develop a plan together with the Spokesperson and other members of the LSC for how the Group will contribute to the LSC. This plan will be described in Attachments to the Group's draft MOU with LIGO.

1.2.3. When the candidate Group's plan is complete, the Spokesperson will transmit the draft MOU and Attachments to the Collaboration Council as a motion to admit the Group to membership. The candidate Group will present its proposed collaborative program to the Collaboration at a regularly scheduled full Collaboration meeting. The Election and Membership Committee will conduct a vote on the Group's application at the LSC Council meeting, held during the same full Collaboration meeting. Approval requires a 2/3 majority of the ballots cast at the meeting.

1.3. LSC-PI

1.3.1. The admission of a new LSC Group represents approval of its proposed LSC-PI by the LSC Council.

1.3.2. A LSC Group may change or add an additional LSC-PI. The LSC Group will inform the LSC Spokesperson in writing of the change. The Spokesperson will inform the LSC Council.

1.3.3. For a LSC Group with more than one LSC-PI, all LSC-PI's shall take full responsibility for their Group.

1.3.4. The LSC-PI is responsible for ensuring that all individuals in their Group understand and comply with the rules of the LSC.

1.3.5. The LSC-PI takes ultimate responsibility for the Group's performance against the commitments delineated in the Group's MOU and its Attachments.

1.4. SENIOR MEMBERS

1.4.1. To add a new senior member to a LSC Group, the LSC-PI should contact the LSC Spokesperson, who may review the situation with the Executive Committee. The proposed new senior member will make a presentation to the Collaboration at its next full meeting.

1.4.2. Adding a new senior member who is not a current LSC member to a LSC group that is not a detector group, requires approval by a 2/3 vote of the ballots cast by the LSC Council.

1.5. RIGHTS OF MEMBERS.

1.5.1. LSC Members who have made substantial contributions to MOU-sanctioned LSC efforts have the right to co-authorship on all LSC-wide publications. Rules governing the construction of the author list are given in the LSC Publication and Presentation Policy, LIGO-T010168.

1.5.2. An individual, who either voluntarily withdraws from the Collaboration or is a member of a Group that voluntarily withdraws from the Collaboration, will retain rights to co-authorship on LSC-wide publications for a period of time specified in the LSC Publication and Presentation Policy, LIGO-T010168. After the authorship period expires, the individual may still co-author a LSC-wide publication if a significant contribution by the departing individual will first appear in that paper and if the Spokesperson and the LSC-PI of the relevant group agree to this arrangement.

1.5.3. Undergraduate students represent a special case, because they frequently have a shorter time horizon for LSC membership and benefit more from near-term rewards than longer term ones. Undergraduates,

performing at the level of a typical graduate student, who have a longer anticipated association with the LSC may be included as full members on the Group's roster (Attachment Z of its MOU), and the group will accrue all the normal rights and responsibilities of their full LSC membership. This decision is the responsibility of the LSC-PI and is verified annually by the MOU Review Panel. Undergraduates with a shorter anticipated association with the LSC, may be listed in a separate category (Short-Term-Undergraduate Student) in Attachment Z. Such students do not increase a Group's council representation or shift allocations. They may be included as coauthors on LSC papers by special petition, and LSC-PI's are encouraged to propose undergraduate authors through this mechanism to reward their contributions in a timely way.

- 1.5.4. LSC members who choose to participate in activities of other GW collaborations may do so under the provisions of the LSC Policy on Membership of other GW Collaborations, LIGO-M1200043.

1.6. TERMINATION OF MEMBERSHIP

- 1.6.1. The LSC-PI shall remove the name of any individual from the Group's LSC roster, when that individual ceases to be a member of the collaboration from that group for any reason. The individual will retain all rights as a former collaboration member under section 1.5.
- 1.6.2. A Group may end their membership in the Collaboration by notifying the Spokesperson in writing of their intent to withdraw. The Spokesperson shall record the change in the Collaboration membership.
- 1.6.3. A group or individual may be expelled from the Collaboration either for non-performance in the agreed-upon MOU tasks or for willful and/or egregious violations of Collaboration rules. The recommendation for expulsion may come from either the MOU Review Panel (clause 7.6.5) or the LSC Spokesperson. The affected party or parties will be given an appropriate opportunity to respond to and/or remedy the points behind

the recommendation. The Spokesperson will schedule a presentation of the recommendation at a regular or special meeting of the LSC Council, followed by discussion and vote. If the recommendation is approved by a 2/3 majority vote of the ballots cast, the group or individual is expelled from the Collaboration, and they will not retain any further authorship rights under clause 1.5.2.

2. MEMORANDA OF UNDERSTANDING

- 2.1. An MOU will be signed between LIGO and each LSC Group (except for the LIGO Laboratory). The MOU will define the Group's institutional structure and any special conditions required for the Group to be part of the LSC. Attachments to the MOU will be updated annually.
- 2.2. Attachment Z is a roster of all Group members, their position, their planned level of effort, and their institutional affiliation.
- 2.3. In additional Attachments, the Group will describe its planned activities for the next year. The MOU Review Panel will define the set of Attachments and their topical focus.
- 2.4. For multi-institutional Groups, the LSC-PIs and the MOU Review Panel will determine if a set of Attachments is required from the Group or from each institution in the Group.
- 2.5. A LSC Group's activities should include a significant service contribution to the LIGO effort, following guidelines for required service work, which may include stationing of group members at Observatories. The extent of the service contribution (e.g., staffing science runs) is determined by the Group's author count.
- 2.6. Each year a LSC Group will submit a report detailing the progress made against the commitments described in the Attachments of previous year's MOU. The report, which is submitted with the MOU Attachments, is reviewed by the MOU Review Panel.

3. THE COLLABORATION COUNCIL

- 3.1. The Collaboration will be governed by the Collaboration (or LSC) Council. The Council has the responsibility to discuss scientific and procedural matters arising in the Collaboration, will be informed of all significant activities of committees of the LSC, and will vote on Collaboration policies and directions. All votes are by simple majority unless otherwise indicated. In addition, the Council
- Elects the Spokesperson
 - Votes on new group memberships
 - Approves and revises the Charter and its Bylaws
 - Approves appointments made by the Spokesperson, and
 - Carries out other responsibilities as indicated in the Charter and Bylaws.
- 3.2. Members of the Collaboration Council are appointed by the LSC Groups. Each Group will appoint a number of members equal to one plus one-fifth, truncated, of the number of full-time equivalent members in Attachment Z of the Group's current MOU. Collaboration Council members represent their Group and have the responsibility to discuss Council issues with those they represent. The Council membership will be updated with every update of LSC Group members, but in no case less often than once every 6 months. Each Council member is expected to attend most full LSC meetings; if this is not possible, a different delegate should be designated.

4. SPOKESPERSON FOR THE COLLABORATION

- 4.1. The Spokesperson leads the LSC, and is empowered to represent the LSC to the outside world.
- 4.2. The Spokesperson is a member of the LIGO Directorate. The Spokesperson shares in developing strategies and resolving challenges faced by LIGO, and uses the forum of the Directorate to address LSC issues at the interface to the Laboratory. The Spokesperson is free to participate as a voting member in the activities of organizations of the LSC.
- 4.3. The Spokesperson is responsible for the proper functioning of the LSC, and is responsible and empowered to resolve differences and deadlocks in any issues arising in the LSC. In particular, the Spokesperson has the responsibility to give

the final approval for publications and release of scientific results from the Collaboration. In exceptional cases, the Spokesperson may also (with the consent of the LSC Executive Committee) remove an elected leader of a LSC Working Group.

4.4. The Spokesperson

- chairs the Council and Executive Committee
- organizes a minimum of two full meetings of the Collaboration each year, at which Council meetings will take place and major issues are discussed
- identifies key issues and opportunities and brings them to the attention of the Collaboration
- provides leadership regarding additions to the membership, for evolution and innovation in Collaboration activities, and for advances in external collaborative relationships
- provides a receptive ear for any member of the Collaboration who wishes to raise any issue of concern; resolves otherwise unsolved differences between individuals or committees in Collaboration issues
- represents the Collaboration to the LIGO External Oversight Committee and in formal presentations to the funding agencies.
- participates (as a member of the LIGO Directorate) in setting the charge for the Program Advisory Committee and receives advice from the PAC on behalf of the Collaboration.

4.5. The Collaboration Council membership will elect a Spokesperson to serve for 2 years. Spokesperson elections will be by secret ballot. The Collaboration Council approves the spokesperson by a majority vote. The Spokesperson may be removed by a two-thirds majority vote of the Collaboration Council.

4.6. The Spokesperson may appoint an Assistant Spokesperson for the duration of his/her term. The appointment shall be confirmed by a majority vote of the Collaboration Council. The Spokesperson may delegate some responsibilities to the Assistant Spokesperson, but ultimate authority always remains with the Spokesperson. The Assistant Spokesperson

may be removed at the discretion of the Spokesperson, in which case the Spokesperson will inform the Council of the decision.

5. PUBLICATIONS AND PRESENTATIONS POLICY:

- 5.1. The LSC has the responsibility for:
 - 5.1.1. maintaining a publications and a presentation policy promoting the visibility of junior members of the collaboration by identifying and providing opportunities for junior members to speak at conferences and workshops,
 - 5.1.2. maintaining processes which lead to appropriate presentations, publications and PhD thesis research involving LIGO data,
 - 5.1.3. appointing a publications and presentation committee to foster the development as well as to maintain the scientific integrity of publications and presentations of results derived from the LIGO data,
 - 5.1.4. providing the forum for the discussion, debate, and the resolution of the astrophysical findings of the project leading to the publication of the LIGO astrophysics results.
- 5.2. Astrophysical results, publications and presentations containing new results must be approved by the appropriate Review Committee, and subsequently approved by consensus of LSC members at a LSC meeting. Final approval is given by a consensus of the LSC Executive Committee.

6. DATA

- 6.1. All members of the Collaboration will have free and equal access to any data taken by the Collaboration, but must abide by Collaboration rules for the use, distribution, and publication of results from the data. Members will inform the Spokesperson, in a manner to be determined by the Analysis Committee, of their plans to analyze data.
- 6.2. The Analysis Committee will maintain a list of all on-going analysis activities, which will include a description of the activity and the individual who serves as the point of contact

for the activity. That list will be available to all members of the Collaboration.

- 6.3. The procedure to bring new results to public view is as follows:
 - 6.3.1. Papers originate in an Analysis Working Group. When they are close to a result, they should inform the standing Review Committee attached to that Analysis Group, and review begins. This involves review of analysis codes as well as of all choices made in setting up a pipeline.
 - 6.3.2. When a paper is close to ready, it should be presented to the LSC (groups are also encouraged to present work in progress.) The venue is the Data Analysis Session at a LSC meeting, although other venues may be considered when necessary. The group is to post a draft of the paper one week in advance. Then, the result and the paper are presented, along with a recommendation from the Review Committee of that group. The paper is then discussed by the LSC members present and a consensus is developed.
 - 6.3.3. The paper will be brought to a subsequent meeting of the LSC Executive Committee for final approval. The intent there has been that the group and its reviewers say the paper is really ready. In a few cases, the LSC Executive Committee can ask that certain specific changes be made, and give the Group and its Reviewers the authority to decide that those changes have been made properly.

7. STANDING COMMITTEES

- 7.1. EXECUTIVE COMMITTEE
 - 7.1.1. The Executive Committee is chaired by the Spokesperson and serves to provide a continuum of governance between the Collaboration meetings.
 - 7.1.2. The Executive Committee is empowered to make key decisions (those normally requiring a Council vote) for the Council between Council meetings, and thus acts as a proxy for the Council. Issues decided by the Executive Committee will be reviewed by the Council at the next full meeting of the LSC. At their discretion, the Executive Committee or the Spokesperson may convene a Council meeting using remote participation. Key decisions by the

Executive Committee will be by vote, with the individual vote results given in the meeting minutes.

- 7.1.3. The Executive Committee is chaired by the Spokesperson, or the Spokesperson's delegate.
- 7.1.4. The Executive Committee will meet nominally monthly, and the notes from the meeting will be made available to the LSC within two weeks of the meeting.
- 7.1.5. The Executive Committee consists of :
 - The Spokesperson (elected) and Assistant Spokesperson (appointed by LSC Spokesperson)
 - The LIGO Lab Executive Director and Deputy Director
 - A representative from each Detector Group. The LIGO Laboratory is represented by the Executive Director and Deputy Director
 - A representative of each LIGO Observatory (appointed by the LIGO Laboratory Executive director)
 - Data Analysis Committee Chair (appointed by LSC Spokesperson)
 - A Detector Characterization Committee co-Chair (appointed by LSC Spokesperson)
 - Advanced Detector Committee Chair (appointed by LSC Spokesperson)
 - A Computing and Software Committee co-Chair (appointed by LSC Spokesperson)
 - A Publications and Presentations Committee co-Chair (appointed by LSC Spokesperson)
 - 4 additional 'at large' members elected by the Council, with a spread of interests represented (with the election to be held after appointees to the Executive Committee are named)
- 7.1.6. The Spokesperson will retain the right to invite other non-voting observing members from the members of the collaboration to specific meetings.
- 7.1.7. The elected members will serve for a term of 2 years, and may be re-elected; the appointed members serve for a term of 2 years, and may be re-appointed.

7.2. RUN PLANNING COMMITTEE

- 7.2.1. The Run Planning Committee is charged with the strategic planning of engineering and observing runs. It will coordinate activities with other gravitational-wave partners.
- 7.2.2. The chair of the Run Planning committee is appointed by the LIGO Laboratory Directorate.
- 7.2.3. The members of the Run Planning Committee are the Chair, a representative of each Observatory (appointed by the Observatory heads with the concurrence of the LIGO

Directorate), the LIGO Laboratory chief detector scientist, the chair of the Data Analysis Committee, a chair of the Calibration Committee, a chair of the Detector Characterization Committee, and a chair of the Computing and Software Committee.

- 7.2.4. The LIGO Directorate may appoint other members to the Run Planning Committee as needed.

7.3. DATA ANALYSIS COMMITTEE

- 7.3.1. The Data Analysis Committee (DAC) is responsible for coordinating, overseeing, and reviewing analysis work.
- 7.3.2. The members of the DAC are the two co-chairs and the review chair of each standing analysis working group, and the chairs of the Detector Characterization Committee, Calibration Committee, and Computing and Software Committee.
- 7.3.3. A Chair of the Data Analysis Committee is appointed by the LSC Spokesperson for a 2 year term.
- 7.3.4. New analysis working groups are proposed to, and voted on by, the LSC Council, with the co-chairs in the DAC named at the time of the vote. Only such approved analysis groups may bring an analysis (and publication) forward for review.
- 7.3.5. The Data Analysis Committee establishes Review Committees for analysis working groups and is responsible to see that a thorough review is performed of analyses.
- 7.3.6. The Data Analysis Committee will prepare and maintain a White Paper relevant to the Collaboration's plans and activities for future analyses, updated annually.
- 7.3.7. Regular DAC meetings are open to all LSC members and any LSC member can participate in its deliberations, except in special meetings and voting, which are only open to the membership of the DAC.

7.4. DETECTOR CHARACTERIZATION COMMITTEE

- 7.4.1. The Detector Characterization (DetChar) Committee is responsible for organizing and documenting the Collaboration's efforts in detector characterization and the development of tools for that purpose.

- 7.4.2. The DetChar Committee is made up of the chairs of the DetChar subgroups.
- 7.4.3. Two co-chairs of the DetChar Committee are appointed by the LSC Spokesperson for a term of 2 years.
- 7.4.4. The DetChar Committee will prepare and maintain White Papers relevant to the Collaboration's plans and activities for detector characterization, with an up-to-date version to be available one month before the due date for the annual MOU review.

7.5. ADVANCED DETECTOR COMMITTEE

- 7.5.1. The Advanced Detector Committee is responsible for organizing and documenting the Collaboration's plans for future detectors and the R&D leading to those detectors.
- 7.5.2. The Advanced Detector Committee is made up of the chairs of the instrument Working Groups.
- 7.5.3. The chair of the Advanced Detector Committee is appointed by the LSC Spokesperson for a term of two years.
- 7.5.4. The Advanced Detector Committee will prepare and maintain a White Paper relevant to the Collaboration's plans and activities for future detectors, with an up to date version to be available one month before the due date for the annual MOU review.

7.6. MOU REVIEW PANEL

- 7.6.1. The Executive Committee appoints an MOU Review Panel to make an annual critical review of the accomplishments of the LSC Groups against their past MOU Attachments and their proposed work as described in their new Attachments. The contributions to commissioning and operation of the Observatories, service work, education and outreach work, and to the technical and/or analysis efforts of the LSC, are judged. This Panel makes recommendations to sign or not to sign each Group's MOU Attachments.
- 7.6.2. This Panel also makes a technical assessment of the overall LSC program for feedback to the Working Groups of the LSC.
- 7.6.3. The MOU Review Panel establishes guidelines for service work, for education and outreach work, for contributions to Observatories, and for the technical and/or analysis efforts.

7.6.4. The MOU Review Panel will rotate in membership, with at least one-quarter of the committee to change at each meeting. The Panel is to be balanced and broadly distributed in technical expertise and interest, and among LSC groups.

7.6.5. In the rare event that a group or individual consistently fails to perform their agreed-upon MOU tasks, the MOU Review Panel may recommend expulsion to the Executive committee, as described in clause 1.6.3. In its recommendation, the MOU Review Panel shall detail its reasons and the steps it has taken to remedy the situation. A period of persistent non-performance in Collaboration activities may be grounds for expulsion.

7.7. PUBLICATIONS AND PRESENTATIONS COMMITTEE

7.7.1. The Publications and Presentations (P&P) Committee is responsible for maintaining adherence to the Publications and Presentations policy, T010168. In broad strokes, this includes:

- Maintaining a full and complete list of all Collaboration Publications in any medium and making that list accessible to the Collaboration and to the general scientific community;
- Maintaining a full and complete archive of all Collaboration presentations to open meetings, whether scientific or managements.
- Managing the review of proposed technical publications.
- Reviewing proposed presentations and making recommendations to the collaboration.
- Maintaining a collection of approved results/slides for presentations.
- Maintaining a list of members nominated for speaking roles at major conferences and nominating speakers for conferences.

7.7.2. The P&P Committee will consist of 6 persons appointed by the Spokesperson for 2 year terms. They may call on all members of the LSC to help them in their tasks.

7.7.3. The P&P Committee has two co-chairs, who are appointed by the Spokesperson for 2 year terms.

7.8. ELECTION AND MEMBERSHIP COMMITTEE

7.8.1. The Election and Membership (E&M) Committee organizes and oversees all elections processes, including the nomination process. Any member of the collaboration (in the Council or otherwise) may be considered for election to a position for which they are technically qualified.

- 7.8.2. The chair and the 4 regular members of the Election and Membership Committee are appointed by the Spokesperson for 2 year terms in consultation with the LSC Executive Committee.
- 7.8.3. The E&M Committee is responsible for maintaining the membership roster of the Collaboration, and the authorship list. This information is used to maintain lists of password access and mailing lists for the Collaboration.
- 7.8.4. The E&M Committee is responsible for carrying out the election of groups to the Collaboration.
- 7.8.5. The E&M Committee oversees the elections for chairs of working groups and other elected representatives in LSC groups, following procedures in [LIGO-M1200052](#). The procedure for working groups is intended to be flexible to account for the various sizes and styles of groups.
 - 7.8.5.1. Groups will vote by simple majority, before candidates are chosen, if they wish to have elected chair(s) or have chair(s) appointed by the Spokesperson.
 - 7.8.5.2. If an election is chosen, the E&M committee will solicit nominations and carry through with email balloting.
 - 7.8.5.3. Chair(s) are elected by simple majority for a term of 2 years; if there are multiple chairs, the elections are staggered to encourage continuity.
 - 7.8.5.4. The solicitation for votes for a Working Group Chair will be sent to all Collaboration members. All Collaboration members who believe they have a significant knowledge of the research and operations of the Working Group are encouraged to vote. Short-Term-Undergraduate Students or Administrative Staff in Attachment Z of their member institution's MOU are not eligible to vote.
 - 7.8.5.5. The election will be conducted by secret ballot. The winner will be chosen by simple majority of the votes cast. If no candidate wins an outright majority the candidates with the two highest vote totals will participate in a run-off election. In each case the E&M committee will announce the winner or run-off candidates, and the list of voters who participated.

7.9. DETECTION COMMITTEE

- 7.9.1. The Detection Committee is responsible for advising the LSC and the Spokesperson on issues relating to making a claim that we have detected gravitational waves. It is a standing committee, committed to establishing our procedure, helping to ensure that the tools are in place, and then taking on the particular cases of potential discoveries.
- 7.9.2. The chair of the Detection Committee is appointed by the LSC Spokesperson for a two year term.
- 7.9.3. There will be approximately 10 other members, appointed by the Spokesperson, in consultation with the Analysis Committee chair and Analysis Working Group Chairs; appointees serve a term of two years.
- 7.9.4. The Detection Committee will prepare and maintain a procedure to be followed, both in general, and for specific examples of anticipated kinds of detections. It will distribute the procedure to the Collaboration at least once per year in advance of LSC meetings, with comments invited at LSC Council meetings; revisions will be brought to the attention of the Collaboration.

7.10. COMPUTING AND SOFTWARE COMMITTEE

- 7.10.1. The Computing and Software Committee is responsible for organizing and documenting the Collaboration's computing hardware and software infrastructure and for formulating plans for its evolution.
- 7.10.2. Two co-chairs of the Computing and Software Committee are appointed by the LSC Spokesperson for a term of two years.
- 7.10.3. The Computing and Software Committee consists of the chairs of the Computing and Software subgroups, and the co-chairs of the Committee.
- 7.10.4. Regular Computing and Software Committee meetings are open to all LSC members and any LSC member can participate in its deliberations, except in special meetings and voting, which are only open to the membership of the Computing and Software Committee.
- 7.10.5. The Computing and Software Committee will prepare and maintain White Papers relevant to the Collaboration's

plans and activities for computing and software, with an up-to-date version to be available one month before the due date for the annual MOU review.

7.11. CALIBRATION COMMITTEE

- 7.11.1. The Calibration Committee is responsible for organizing, delivering, and documenting the calibration information for the detectors in the Collaboration.
- 7.11.2. The Calibration Committee is made up of a minimum of one representative from each of the standing analysis working groups, and one representative from each of the detector sites, with additional expertise in analysis and instrument science as needed. The representatives are appointed by the Spokesperson for two year terms, in consultation with the Analysis Working group chairs and the site heads.
- 7.11.3. A Calibration Review Subgroup is appointed by the Spokesperson to give guidance, support, and independent review of the Calibration Committee's efforts. Its members and Chair serve for two year terms.
- 7.11.4. The Calibration Committee has two co-chairs, who are appointed by the LSC Spokesperson for a term of two years. Between them, they must have significant experience with calibration issues in instrument science and with data analysis.
- 7.11.5. The Calibration Committee will prepare and maintain documentation of the calibration, and inform the Collaboration of any planned changes in procedure or scope in advance.

7.12. EDUCATION AND PUBLIC OUTREACH COMMITTEE

- 7.12.1. 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

help improve science literacy and education among the citizenry.

- 7.12.2. 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.
- 7.12.3. 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 her/his tenure in consultation with the LSC Spokesperson.
- 7.12.4. 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.

7.13. LSC ACADEMIC ADVISORY COMMITTEE

- 7.13.1. The LSC Academic Advisory Committee (LAAC) is responsible for overseeing and documenting the Collaboration's activities in representing and protecting the interests of students and postdocs. The LAAC is also responsible for providing education and training activities for new students and postdocs in the Collaboration.
- 7.13.2. The LAAC will report annually to the LSC Council on items relevant to the Collaboration's plans and activities for education and training for students and postdocs in the LSC.
- 7.13.3. The LAAC consists of two co-chairs, two senior LSC members, two postdoctoral members, and two graduate student members. All members of the LAAC will be elected by the LSC through elections. The term of membership will be two years, and members may run for reelection. The members of the LIGO Directorate (LSC spokesperson, LIGO Laboratory Executive Director, LIGO Laboratory Deputy Director) are ex-officio members of the LAAC.
- 7.13.4. The elections for LAAC membership will be conducted by the LSC's Election and Membership Committee. At the

time of the vote, any LSC graduate student will be eligible for election as a LAAC graduate student member, and to vote in the election for the LAAC graduate student members. At the time of the vote, any LSC postdocs will be eligible for election as a LAAC postdoctoral member, and to vote in the election for the LAAC postdoctoral members. All LSC members will be eligible to vote for the co-chairs and senior members of the LAAC.

8. WORKING GROUPS

- 8.1. Working groups are created as needed to bring collaboration members together to address specific needs and interests of the Collaboration. Each working group will establish a charter in collaboration with the Spokesperson.
- 8.2. Each working group will maintain a working and updated mailing list of members.
- 8.3. The procedure for choosing the Working Group Chair is described in Section 7.8.5. Data Analysis groups will have two co-chairs; between them, they must have significant experience with instrument science and with data analysis.
- 8.4. Chairs of the Working Groups are members of the appropriate Committee: Data Analysis, or Advanced Detectors, Run Planning, Detector Characterization, or Computing and Software.
- 8.5. The working group will prepare an annual report of progress and plans (which in general will be made up of contributions to the relevant White Paper, and contributions to the annual report prepared by the Spokesperson.)

Apart from election of their Chair, Working Groups may determine their internal decision-making processes (elections, consensus, etc.)