Gravitational Wave International Committee (WG.11) report to IUPAP

8 August 2017

prepared by David Shoemaker [*MIT*, Executive Secretary],
Stan Whitcomb [*Caltech*, co-Secretary], and Sheila Rowan, [*U. of Glasgow*, Chair]

The Gravitational Wave International Committee (GWIC) was formed in 1997 to facilitate international collaboration and cooperation in the construction, operation and use of the major gravitational wave detection facilities world-wide. From 1999 until 2011, GWIC was recognized as a subpanel of PaNAGIC (IUPAP WG.4). In 2011, GWIC was accepted by IUPAP as a separate Working Group (WG.11).

GWIC meets annually adjacent to an appropriate conference. In July 2017, GWIC met in Pasadena California, in conjunction with the twelfth Amaldi Meeting. Other recent meetings have been held in New York City (2016), Gwangju (2015), Banff (2014), Warsaw (2013), Rome (2012), Cardiff (2011), and Hannover (2010). Other business during the year is conducted via email or other electronic communication.

GWIC maintains a website at https://gwic.ligo.org/ which contains an up-to-date listing of members, its by-laws, announcements of its activities, and links to other items of interest to the gravitational wave community.

GWIC Membership

The membership of GWIC represents all of the world's active gravitational wave projects, as well as other relevant communities, covering gravitational wave frequencies from nanohertz to kilohertz. Each project has either one or two members on GWIC depending on size. GWIC also includes representatives from ISGRG (IUPAP AC2), International Astronomical Union (IAU) Commission on Gravitational Wave Astrophysics, and from the astrophysics/theoretical relativity community, to help facilitate communication with those bodies. Two members of GWIC in 2017 (Eugenio Coccia and Sheila Rowan) were also members of ApPIC (WG.10), ensuring close communications.

The GWIC Chair is elected by its membership at its annual meeting in odd years. At our most recent meeting, GWIC chose Sheila Rowan once again as its Chair, serving until 2019. This year David Shoemaker (MIT) served as the Executive Secretary.

Each member project in GWIC determines its representatives on GWIC. In this year, the US LISA Collaboration appointed a new representative: James (Ira) Thorpe, replacing Robin Stebbins. The LIGO Scientific Collaboration has a new spokesperson, with David Shoemaker replacing Gabriela Gonzaléz, and similarly Virgo elected Jo van den Brand as

the new spokesperson for the Virgo Collaboration, after Fulvio Ricci's tenure in that position.

In a significant transition, two of GWIC's founding member projects, the NAUTILUS and AURIGA cryogenic acoustic 'Weber Bar' detectors, have ceased operation, and as a consequence two past GWIC chairs, Eugenio Coccia and Massimo Cerdonio, stepped down from GWIC. This change is bittersweet, as both the technologies and the personalities have been central in the establishment and development of our field, but it is also a sign of the maturity of the ground-based interferometric detectors.

We also note with sadness the passing of Neil Gehrels, who (among many roles) was the IAU Commission D1 Representative to GWIC. The Commission elected Marica Branchesi as the replacement chair and she will serve as the representative on GWIC.

GWIC Activities in 2016-17

GWIC convenes the biennial Edoardo Amaldi Conference on Gravitational Waves, sponsored by IUPAP as a "class B" Conference. The Amaldi meeting is considered by many in the gravitational wave community to be their most important international gathering. The members of GWIC serve as the Scientific Organizing Committee for the Amaldi meetings. The 2017 Amaldi meeting was held in Pasadena (USA) from 9-14 July 2017, and was quite successful in bringing the wide range of activities in the gravitational-wave field to a broad audience, but with also participation by and speakers from the non-gravitational-wave astrophysics and astronomy domains.

Planning for the 2019 Amaldi meeting is starting; it will be held with the ISGRG-sponsored International Conference on General Relativity in Valencia.

Since 2006, GWIC has awarded an annual international prize for an outstanding Ph.D. thesis based on research in gravitational waves. Since 2013, GWIC has coordinated its prize with the Stefano Braccini Thesis Prize, (sponsored by the Friends of Stefano Braccini). GWIC manages the solicitation of nominations and selection of the two winners. The two prizes are distinguished by emphasizing the impact to the field for the GWIC Thesis prize and by emphasizing creativity and innovation for the Stefano Braccini Prize.

There were 9 theses nominated this year, from 6 countries. The 2016 GWIC Thesis Prize is awarded to Eric Oelker from MIT for his thesis "Squeezed States for Advanced Gravitational Wave Detectors. The 2016 Stefano Braccini Thesis Prize is awarded to Davide Gerosa from the University of Cambridge for his thesis "Source modelling at the dawn of gravitational-wave astronomy". Both theses were nominated for publication in the Springer Thesis Series, per GWIC's agreement with Springer.

With Advanced LIGO's detections of gravitational waves from two binary black hole mergers and with the start of joint observations of Advanced Virgo and LIGO, and noting

considerable progress in KAGRA and the construction approval of LIGO-India, substantial attention in the ground-based interferometer community has been turned to the longer term future of the ground-based interferometer network. Because this network must be international in scope, GWIC is well placed to help the community formulate its plans. After an initial discussion concerning different possible future directions at its 2016 meeting, GWIC decided to form a committee on third-generation ground-based observatories ('3G'). The charge for this subcommittee is to engage the community broadly to help formulate the best possible science case and to lay out the best path toward a robust international project.

This committee has created subcommittees in several crucial areas. The first subcommittee's mission is to develop the science case for these new observatories; it has issued an open call for participants from the physics and astronomy communities, and received more than 140 responses. The goal of the second subcommittee is to develop methods to coordinate R&D globally, taking into account both the desirability to pursue multiple approaches to difficult technical problems and the need to maximize efficiency. The final subcommittee is studying governance models for international collaborations and will advise the community on the best options, taking into account the unique aspects a gravitational wave network. These subcommittees are holding regular meetings and expect to develop preliminary results to be shared in the coming year.

Membership of GWIC (as of October 2017)

Chair: Sheila Rowan
ACIGA: Bram Slagmolen
Einstein Telescope: Michele Punturo
European Pulsar Timing Array (EPTA): Michael Kramer
GEO 600: Karsten Danzmann, Sheila Rowan
IndIGO: Bala Iyer
KAGRA: Takaaki Kajita, Yoshio Saito
LIGO, including the LSC: David Shoemaker, David Reitze
LISA: Neil Cornish, Bernard Schutz, Ira Thorpe, Stefano Vitale
NANOGrav: Xavier Siemens
Parkes Pulsar Timing Array (PPTA): George Hobbs
Spherical Acoustic Detectors: Odylio D. Aguiar
VIRGO: Jo van den Brand, Fulvio Ricci
Theory Community: Clifford Will
AC2 Representative: Beverly Berger
IAU Commission D1 Representative: Marica Branchesi
Executive Secretary: David Shoemaker