

ETOP Retrospective: An Update

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Abstract: The ETOP meeting is the oldest international conference devoted solely to optics/photonics education. Looking back at the history of the conference can help gain insight into past successes and plan for challenges of the future. © 2021 The Author(s)

1. The Education and Training in Optics and Photonics (ETOP) Conference

1.1 Conference overview

ETOP is the oldest and largest international conference specifically targeting education and training in optics and photonics at all levels from K-12 through graduate education and including informal education and outreach. Beginning in 1988, the biannual conference has met fifteen times in 11 different countries on three continents. According to Chad Stark of the Optical Society, “ETOP’s focus on improving and sharing the practice of teaching optics at all levels is critical to ensuring the next generation of engineers, scientists and corporate leaders have a keen understanding of the impact light has on technology, the economy, culture and society.” [1]

The ETOP conference has four permanent sponsor organizations who provide seed money for the conference: SPIE, OSA, ICO and IEEE. The remaining funding is raised by the local host organization. A Long Range Advisory Committee (LRAC) consisting of a representative from each of the four societies plus OSA and SPIE staff reviews applications from prospective hosts and determines the location and local organizer of the next conference. The committee considers a variety of criteria including location, infrastructure, ease of travel to the venue from both developed and developing nations, collaborating organizations, and level of detail in the application. [2] According to Karen Newman of Photonics Media, the LRAC also “provides leadership and vision for the future of the conference.” [3]

1.2 A Brief ETOP History

The first ETOP was held in San Diego, CA, USA in 1988, organized by SPIE’s Academic Advisory Committee and co-sponsored by OSA. Since that time the conference has been held in alternate years in eleven different countries on three continents: North America, Europe and Asia. The first ETOP to be located on the African continent (Tunisia, 2011) was at first postponed and then cancelled due to political upheaval associated with the Arab Spring. Table 1 lists the locations, hosts and number of publications for the 15 ETOP conferences from 1988 through 2019. Data for the first 12 ETOP conferences is taken from a retrospective paper by K. Robinson and V. Lakshminarayanan delivered at ETOP 2015 in Bordeaux, France. [4]

A few things set the ETOP meeting apart from technical conferences. Since it is devoted to education, many attendees have teaching as their primary role or at least view it with great importance. Some attendees are from secondary schools or community/technical colleges and are not likely to attend a technical conference. Indeed, some authors have only ETOP or other education conference papers in their online profiles. Also, ETOP has evolved to include not just sharing of new and innovative pedagogies, but also to have more social interactions than one might expect at a technical meeting. At the last several meetings hosts have devoted one evening to showcasing the culture of the local region, from a medieval dinner in Wales to the stunning Impression Westlake show in Hangzhou, China to a night of singing and dancing at a sugar shack in Québec City, Canada. For ETOP devotees, this biannual meeting is a chance to catch up on two years of news, both personal and professional, a sort of “family reunion” of optics educators and collaborators.

2. Summary of first 12 conferences

Robinson and Lakshminarayanan summarized several key metrics from an analysis of over 800 papers found in the published ETOP Proceedings, available in the SPIE Digital Library. Data that can be gleaned from examining the papers include paper title, first author name, first author country of residence, first author geo-region of residence

based on the United Nations geoscheme (developed by the United Nations Statistical Division), first author employer, and number of pages of the paper. They also looked at the level of education addressed by papers, but in many cases the level is unclear or papers may address several levels of education as well as informal outreach. The primary findings of the 2015 paper were:

- Part of ETOP's mission is to provide assistance to educators in developing countries, so the authors looked at first author country of residence. The majority of papers were by authors with affiliations in North America and Europe. This was attributed in part to the locations of the meetings, 4 times in North America and 5 times in Europe, plus the relatively strong economies of these areas allowing authors to find the resources needed to travel.
- Meetings held in Europe and Asia were slightly more effective at getting participation from educators in developing nations. Conferences in Europe and Asia tended to attract more participants from developing nations, but as the San Diego (1993) conference showed the number can be improved by providing travel assistance grants for educators from targeted nations.
- Women comprised about 16% of first authors overall, ranging from near 0 in 1988 to around 25% in 2013.
- There was little input from industry; nearly all papers were written by academicians with a few from national laboratories or international societies.

Table 1. Summary of ETOP meeting locations and publications

Year	Location	Chair(s)	Published Papers
1988	San Diego, CA, USA	Brij M. Khorana, Rose-Hulman Institute of Technology	24
1991	Leningrad (St.Petersburg), USSR (Russian Federation)	Gregory B. Altshuler, St. Petersburg Institute Brian J. Thompson, Univ. of Rochester	79
1993	Pecs, Hungary	J. Erostyak, A. Fuzessy, L. Kozma	NA
1995	San Diego, CA, USA	M. J. Soileau, CREOL/Univ. of Central Florida	83
1997	Delft, The Netherlands	Christiaan Velzel, Nederlandse Philips Bedrijven B.V. (Netherlands)	56
1999	Cancun, Mexico	Javier Sanchez Mondragon, Inst. Nacional de Astrofisica, Optica y Electronica & Univ. Autonoma del Estado de Morelos	55
2001	Singapore	Tuan-Kay Lim, Nanyang Technological Univ. (Singapore) Arthur H. Guenther, Univ. of New Mexico	78
2003	Tucson, AZ, USA	Barry Shoop, US Military Academy Grover Swartzlander, Worcester Polytechnic Institute	104
2005	Marseille, France	Francois Flory, Institut Fresnel, France	101
2007	Ottawa, Canada	Marc Nantel, Ontario Centres of Excellence	74
2009	St. Asaph, Wales, UK	Alan Shore, Photonics Academy for Wales and Bangor University	66
2013	Porto, Portugal	Manuel Filipe P. C. Martins Costa, Universidade do Minho, Portugal; Mourad Zghal, Université de Carthage, Tunisia. Honorary co-chairs: Zhora Ben Lakhdar and Vasudevan Lakshminarayana	104
2015	Bordeaux, France	Eric Cormier (CELIA, PYLA, Université de Bordeaux) Laurent Sarger (PYLA, Université de Bordeaux)	80
2017	Hangzhou, China	Xu Liu (Zhejiang University, China), Xi-Cheng Zhang (University of Rochester, USA)	190
2019	Québec City, Canada	Anne-Sophie Poulin-Girard, Université Laval, Canada Joseph Shaw, University of Montana, USA	100

3. ETOP Conferences XIII, XIV AND XV

We examined an additional 370 papers from the ETOP proceedings of 2015, 2017 and 2019 from the SPIE Digital Library plus the three host organizations' final reports to the LRAC. The findings are summarized in Table 2. It should be noted that it is typical that not all presenters produce a paper to be published in the proceedings.

Table 2. Summary of the last three ETOP meetings

Year	Location	Published Papers	Female 1 st authors	Countries represented by 1 st authors	1 st authors from developing countries/# of countries represented	Attendees (Host report)	Attendee countries (Host report)
2015	Bordeaux, France	80	23%	18	25/7	151	N/A
2017	Hangzhou, China	190	N/A	23	151/12	250-300	28
2019	Québec City, Canada	100	23%	18	28/9	180	23

While all three of these meetings exceeded the “typical” attendance cited in the 2015 ETOP review, Hangzhou, China stands out for a number of reasons. The attendance (250-300) and number of papers published (190) were much larger than usual. Also the papers from transitioning or developing countries, as defined in the United Nations World Economics Situation and Prospects Statistical Annex (2019) [4], comprised a large percentage of total papers. Of course, most of these (132) were from Chinese authors but there were also papers from sub-Saharan Africa as well as Pakistan, India and Iraq among other developing nations. The hosts noted that 10 travel assistance grants were provided to attendees from developing countries. We noted many papers with themes such as active learning, project and problem based learning, critical thinking, innovation and entrepreneurship.

The most thorough final report was from the Québec City meeting in 2019, where the hosts distributed a detailed survey to assess attendee satisfaction with all aspects of the conference. Among their findings was high support for workshops, and satisfaction with the conference with 91% of respondents saying they would recommend ETOP to others. (Approximately 20% of total attendees completed the survey.) “Networking, meeting the community” rated high among people’s favorite things about the meeting; “too many interesting things at one time” was one of the complaints. Most respondents had no complaints or left that blank. The organizers of ETOP XV also made a conscious effort toward diversity, equity and inclusion, including a local organizing committee of more than 50% women and the first ETOP Diversity, Equity and Inclusion event. While the percent of female authors (23%) is similar to other ETOP meetings, 58% of session chairs were female.

4. Conclusions

It is difficult to quantify the impact of an event where some of the most valuable outcomes are sharing of ideas, connections made, participation in outreach workshops and collaborations begun and continued. In the case of ETOP it is difficult to find even basic metrics to assess outcomes and make recommendations. We suggest the LRAC set guidelines for reporting information critical to assessing whether the conference is meeting its goals. A standardized template including data such as gender and nationality of authors and attendees, number and satisfaction of workshop attendees, and detail on tabletop demonstrations and special events would enable future organizers to better track and promote the conference to ensure it is truly international in scope and meeting its educational goals. The satisfaction survey of ETOP XV should be adapted and continue to be used at future meetings. The four societies should also explore ways of increasing participation from developing nations, including encouraging and assisting organizations capable of hosting ETOP meetings in South America, Africa and Asia.

5. References

- [1] J. Donnelly, “Innovative Optics Instruction: Prominent Theme of ETOP 2017”, *Photonics Spectra*, August, 2017.
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- [4] K. Robinson and V. Lakshminarayanan, "ETOP: a retrospective study", *Proc. SPIE 9793, Education and Training in Optics and Photonics: ETOP 2015*, 979303 (8 October 2015); <https://doi.org/10.1117/12.2223047>.
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