applied optics

Digital Holography and 3D Imaging 2020: introduction to the feature issue

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This feature issue of JOSA A and *Applied Optics* is dedicated to the fourteenth OSA Topical Meeting "Digital Holography and 3D Imaging" held 22–26 June 2020 in a virtual meeting. The conference, taking place every year, is a focal point for global technical interchange in the field of digital holography and 3D imaging, providing premier opportunities for people working in the field to present their new advances in research and development. Papers presented at the meeting highlight current research in digital holography and three-dimensional imaging, including interferometry, phase microscopy, phase retrieval, novel holographic processes, 3D and novel holographic displays, integral imaging, computer-generated holograms, compressive holography, 3D holographic display, AR display, full-field tomography, specific image and signal processing, and holography with various light sources, including coherent to incoherent and x-ray to terahertz waves. Techniques of digital holography and of 3D imaging have numerous applications, such as the state-of-the-art technological developments that are currently underway and have also stimulated further novel applications of digital holography and 3D imaging in biomedicine, deep learning, and scientific and industrial metrologies.

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The fourteenth OSA Topical Meeting "Digital Holography and 3D Imaging" was held 22–26 June 2020 in a virtual meeting. This feature issue is a continuation of a tradition, since 2007, to follow the conclusion of the OSA Topical Meeting on Digital Holography and 3D Imaging.

That first DH conference was held at the Sheraton Vancouver Wall Centre, Vancouver, BC, Canada, and featured 69 contributed presentations. Since that time, DH has grown into an important international conference that attracts scientists, researchers, engineers, and students from around the world with more than 100 papers per year.

Techniques of digital holography and of 3D imaging have numerous applications. The included articles will present state-of-the-art technological developments that are currently underway and stimulate further novel applications of digital holography and 3D imaging in measurement, imaging, display, biomedicine, deep learning, and scientific and industrial metrologies.

The DH Topical Meeting is now recognized as the world's premier forum for science, technology, and applications of digital holography, 3D imaging, and display methods. The DH conference in 2020 provided a forum for science, technology, and applications of topics of advances in digital holographic techniques, 3D imaging and display systems, computer-generated holograms, quantitative phase imaging, transport of intensity, compressive holography, 2D and 3D image processing for digital holography and feature recognition, deep learning and neural networks in digital holography and applications, digital holographic microscopy, digital holographic tomography, digital holographic optical processing, metrology and profilometry, holographic lithography, digital holography for inspection of scattering media, polarization holography, gated digital holography (time and coherence gating), digital holography in lidar and related remote sensing techniques, incoherent holography, terahertz generation and its application to digital holography, biomedical/clinical/medical applications, dynamic holography and novel recording materials, digital holography in nonlinear optical systems, emerging applications of digital holography, 2D and 3D holographic display, holographic optical elements, and its novel applications.

The DH 2020 lasted five days, a total of 347 people from 22 countries attended, and 137 technical papers were presented.

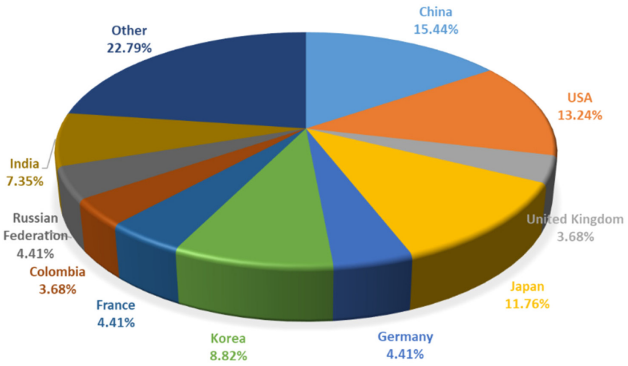

Fig. 1. Distribution of conference presenters by country.

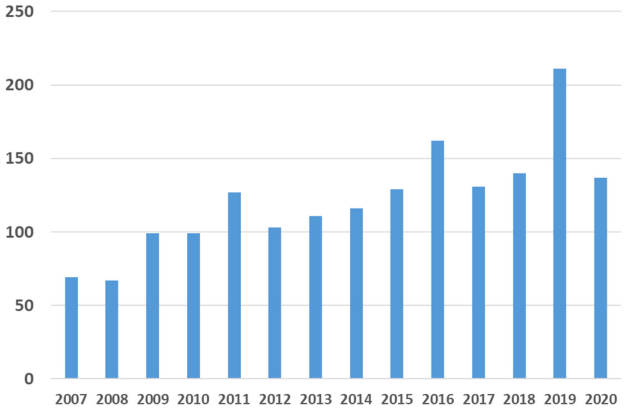

Fig. 2. Historical trends of presentations at DH conferences from 2007 to present.

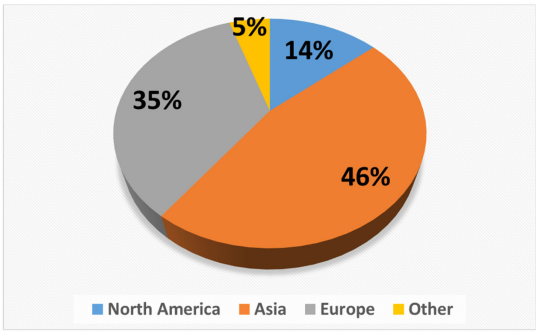

Fig. 3. Distribution of 2020 DH contributed presentations by continent.

Figure 1 illustrates the distribution of conference presenters by country; China, USA, and Japan were the most numerous in this conference. Figure 2 shows historical DH conference trends in terms of the number of contributed presentations, slightly decreased because of Coronavirus-19, compared to DH 2019. Figure 3 shows the distribution of DH 2020 presentations by continent of the contributing institutions; Asia made the largest contribution.

The papers in this feature issue of JOSA A and *Applied Optics* cover major research topics in holography, including digital holography, holographic imaging, holographic measurement, holographic display, holographic deep learning, and other

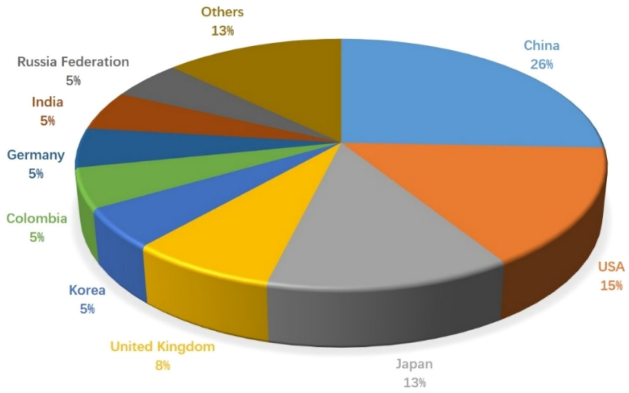

Fig. 4. Distribution of journal presenters by country.

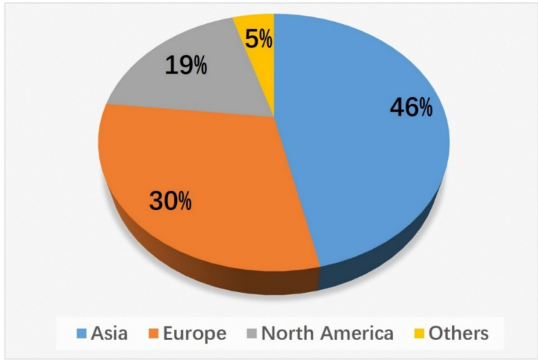

Fig. 5. Distribution of journal contributed presentations by continent.

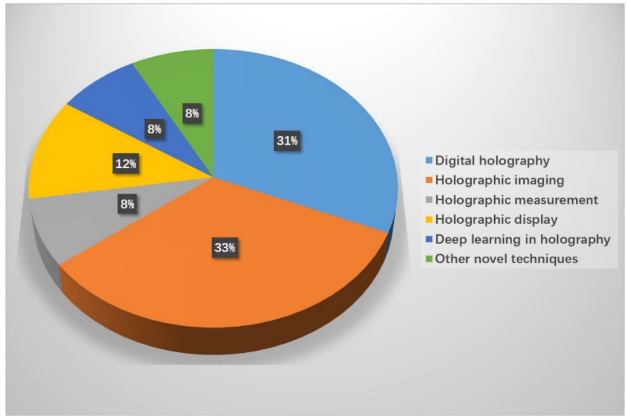

Fig. 6. Distribution of journal contributed presentations by research topic.

novel techniques. Figure 4 depicts a chart showing the distribution of journal presentation by country, showing amazing contributions from China, USA, and Japan. Figure 5 shows the distribution of journal presentations by continent of the contributing institutions, still exhibiting a booming contribution from Asia. Figure 6 shows the distribution of journal presentations by research topic; the most impressive topics—digital holography, holographic imaging, holographic measurement, holographic display—still dominated, and deep learning in holography has shown fantastic development in recent years.