

Foreword: 25 Years of Optical Coherence Tomography

This special issue commemorates the 25th anniversary of the development of optical coherence tomography (OCT). OCT has had a transformative impact in the field of ophthalmology and vision research, contributing to fundamental understanding of disease pathogenesis, drug discovery and development, and everyday clinical decision making in all ophthalmic subspecialties. The role of OCT in research and clinical care continues to accelerate, as judged by the cumulative number of publications in scientific journals (Fig. 1). Ophthalmic applications have developed the earliest, and continue to be the primary area of research and clinical application for OCT. In the past decade, OCT has been the most commonly used ophthalmic imaging procedure by far. It is estimated that there are now ~30 million OCT imaging procedures performed worldwide every year. The growth in many other medical specialties has also become significant in the past few years, particularly in the fields of cardiovascular imaging (i.e., coronary intravascular OCT), dermatology, and gastroenterology. Advances in OCT technology itself, as well as fundamental scientific and industrial applications, are also active areas of research. At this quarter century mark, it is appropriate to take stock of this burgeoning technology by the collection of original, review, and historical articles in this special issue of *Investigative Ophthalmology & Visual Science*.

The special issue consists of more than 70 articles which include invited review articles from pioneering research groups, as well original scientific articles and reviews submitted in response to the call for papers (Fig. 2). Invited papers from Massachusetts Institute of Technology, "The Development, Commercialization, and Impact of Optical Coherence Tomography," and the Medical University of Vienna, "Key Developments for Partial Coherence Biometry and Optical Coherence Tomography in the Human Eye Made in Vienna," provide historical perspectives from two groups with early and continuous contributions to OCT development. The invited paper "Clinical Utility of OCT in Glaucoma," from Joel Schuman at New York University, reviews the development of OCT morphometry for the detection of glaucoma and assessment of disease progression. The development of anti-VEGF therapy not only had a profound impact on patient care but also drove the acceptance of OCT, establishing structural measurements as key markers for treatment response. The history of anti-VEGF is reviewed in "Optical Coherence Tomography and the Development of Antiangiogenic Therapies in Neovascular Age-Related Macular Degeneration," by Philip Rosenfeld at the University of Miami Miller School of Medicine. "Optical Coherence Tomography Angiography," is described in a review by David Huang's group from the Oregon Health & Science University. With over 20 papers on OCTA in this special issue alone, this advance is driving a renaissance in clinical and fundamental studies as well

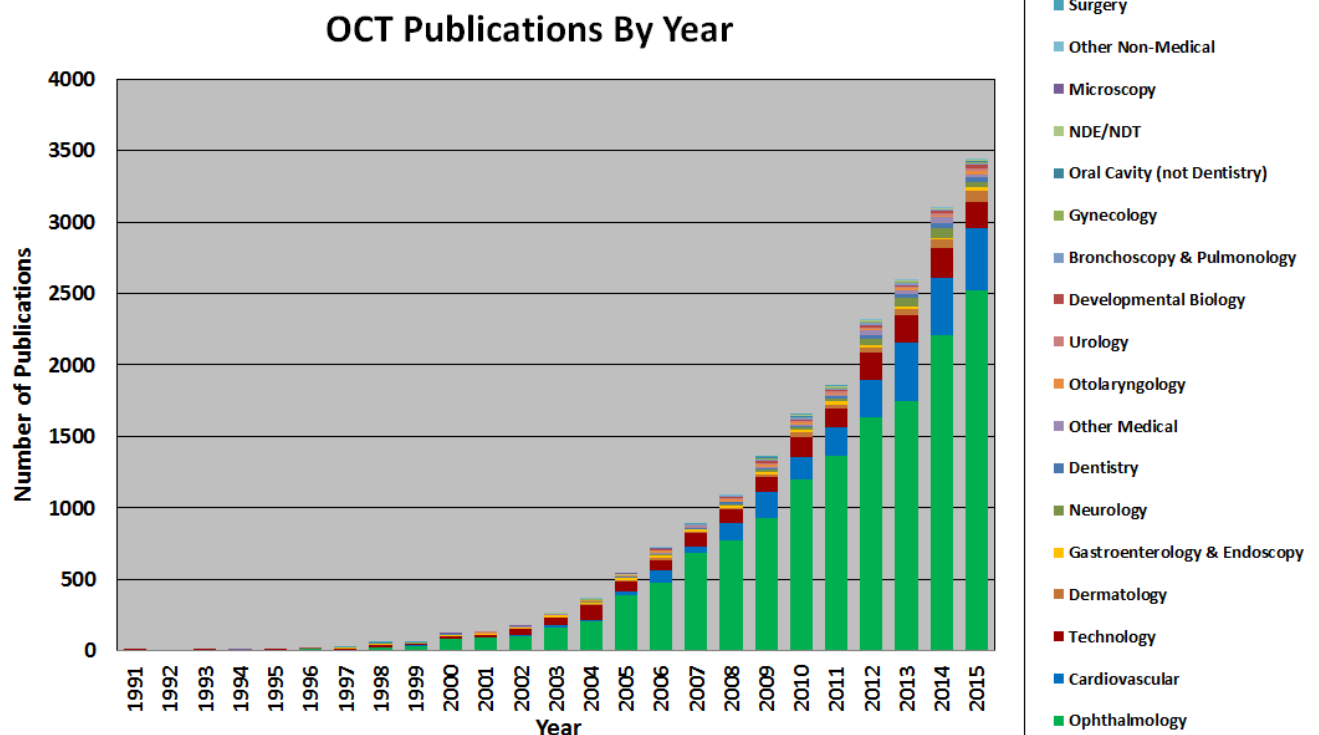


FIGURE 1. OCT publication volume according to research area. Ophthalmology has the largest volume of publications, attesting to the wide acceptance and impact of OCT in our field. OCT technology continues to make advances and applications in many medical specialties are being developed. Compiled from PubMed abstract search. Image courtesy of Eric Swanson, www.OCTNews.org.



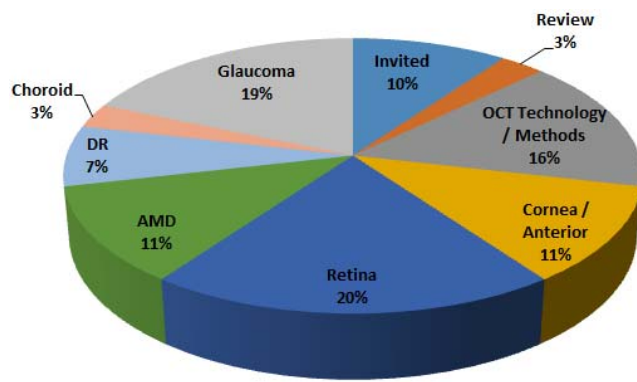


FIGURE 2. Contents of special issue by topic.

as commercial development. Increases in imaging speed and novel visualization techniques are enabling new applications for surgical visualization and guidance. These are reviewed in “Optical Coherence Tomography for Retinal Surgery: Perioperative Analysis to Real-Time Four-Dimensional Image-Guided Surgery,” by Joseph Izatt’s and Cynthia Toth’s Groups at Duke University. “A Review of Adaptive Optics Optical Coherence Tomography: Technical Advances, Scientific Applications, and the Future,” by Donald Miller’s and John Werner’s groups at Indiana University and the University of California-Davis describes powerful advances in resolution, enabling cellular

resolution imaging. These invited papers by pioneers in their respective fields provide a framework for the special issue.

The contributed papers represent an exceptionally broad scope of research, spanning new technologies and methods, fundamental and clinical studies in retina, age-related macular degeneration, diabetic retinopathy, glaucoma, anterior eye, and choroid with contributions from leaders in fundamental and clinical research.

The overwhelming number of papers submitted (over 180) gives witness to the large OCT research community, while the diversity of institutions contributing to this special issue makes clear that OCT research is very much an international enterprise. We would like to especially thank the more than 200 reviewers who have carefully read and critiqued the submissions. We would also like to thank the *IOVS* management, Thomas Yorio, Editor-in-Chief of *IOVS*, and Kiyah Morrison and Debbie Chin, *IOVS* staff, for the incredible amount of work in managing the submissions. Finally, we would like to express our sincerest thanks to all of the researchers who have contributed to this special issue. We hope that this special issue will advance scientific and clinical knowledge and will be a benchmark in the development and application of OCT.

James Fujimoto
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Special Issue Editors