

Press Release

September 30, 2024

The Honda Prize 2024 Awarded to Dr. James G. Fujimoto
— Contribution to the invention and development of Optical Coherence Tomography —

The Honda Foundation is a public interest incorporated foundation established by Soichiro Honda and his younger brother Benjiro, and is currently led by President Hiroto Ishida. The foundation established the Honda Prize in 1980 as Japan's first international award that acknowledges achievements contributing to "the creation of a truly humane civilization."

In 2024, the 45th Honda Prize will be awarded to Dr. James G. Fujimoto, Elihu Thomson Professor of Electrical Engineering at the Research Laboratory of Electronics, Department of Electrical Engineering and Computer Science, Massachusetts Institute of Technology (MIT, U.S.A.) for his research group's development of Optical Coherence Tomography (OCT). The prize also acknowledges his contribution to the commercialization and clinical translation of OCT in ophthalmology, cardiology, and biomedical research.



The latest OCT device with a fundus camera.
Today OCT is a standard imaging modality in ophthalmology.

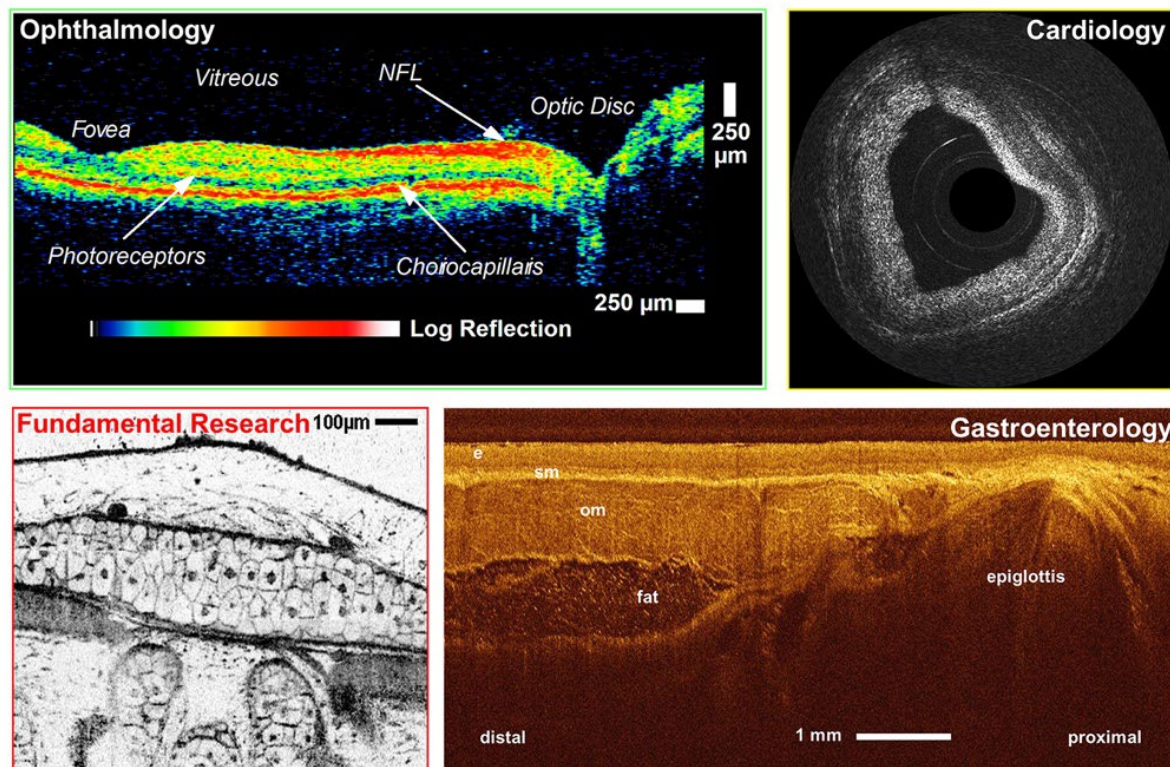
OCT is a new imaging modality which is analogous to ultrasound, except that it measures the echo time delay and magnitude of backscattered light instead of sound. OCT enables real time, microscopic resolution imaging of subsurface structure in biological tissues and materials. It has applications in multiple medical specialties as well as fundamental research and manufacturing. OCT can be combined with fiber optic catheters, endoscopes, and laparoscopes to enable imaging inside the body. It enables "optical biopsy", imaging pathology in real time, without the need to remove specimens as in conventional excisional biopsy.

The development of OCT is an example of the power of multidisciplinary collaborative research teams which span fundamental research, engineering, clinical medicine, and industry. In the late 1980s, such a multidisciplinary project was relatively uncommon, and the team demonstrated a pioneering approach to joint medical-engineering research.

Dr. Fujimoto's team first aimed to apply OCT in ophthalmology. OCT was invented by David Huang, an MD, PhD student in Fujimoto's research group, working in close collaboration with Eric Swanson, an expert on satellite optical communication, and Drs. Carmen Puliafito and Joel Schuman, retina and glaucoma

specialists. OCT has become a standard of care in ophthalmology with 20 to 30 million procedures performed worldwide every year. It facilitates early detection of diseases such as age-related macular degeneration, diabetic retinopathy, and glaucoma, enabling patients to be treated before irreversible loss of vision occurs.

Intravascular OCT was pioneered by visiting scientist Mark Brezinski an MD, PhD cardiologist. Startup companies led by Swanson combined with industry investment played a key role in commercializing OCT in ophthalmology as well as cardiology. Today there is an international research community with over a hundred academic research groups and companies developing OCT technology and clinical applications.



OCT has diverse applications spanning many medical specialties.^{*1}

OCT can be used to guide treatment of disease, improving outcomes and saving health care costs. In the future, OCT of the eye may be used in optometrists’ shops, drug stores, and primary care doctors’ offices to screen for diabetes, neurological and other systemic diseases. In the field of cardiology, intravascular OCT is emerging as a valuable technique for guiding treatment of myocardial infarction. Clinical studies have shown intravascular OCT treatment guidance can reduce rates of major adverse cardiac events.

Over the years, the Honda Foundation has been promoting “ecotechnology^{*2}” as its mission. Dr. Fujimoto, who led the OCT research team, is the only researcher who consistently contributed to the proposal, development, and dissemination of OCT is fully in accord with the mission and worthy of the highest recognition. Therefore, the 45th Honda Prize will be awarded to Dr. Fujimoto.

The award ceremony will be held at the Imperial Hotel in Tokyo, Japan on November 18, 2024. In addition to the prize medal and the diploma, the laureate will be awarded a total of 10 million yen.

*1 Image credits: M. Hee, et al. Archives of Ophthalmology 1995 (top left); G. Tearney, et al., Circulation, 1996 (top right); (bottom row) MIT Biomedical Optics Group.

*2 Ecotechnology: Human-friendly philosophy founded on science and technology and designed to harmonize the natural and human environments and find resolutions to social issues, adopting a methodology that implies something more than just "being friendly to the Earth," which is the meaning usually associated with the word "ecology."

[The Honda Foundation]

The Honda Foundation was established in December 1977 with a donation from Soichiro Honda, the founder of Honda Motor Co., Ltd., and his younger brother, Benjiro. The Foundation defines approaches to resolve issues by harmonizing the human and natural environments in "ecotechnology." The Foundation focuses on the following three activities to develop and disseminate ecotechnology.

- (1) Honda Prize: An international award that acknowledges significant achievements in the field of ecotechnology
- (2) International symposia and colloquia: Providing opportunities for extensive discussions into various issues of modern society to search for resolutions
- (3) Honda Y-E-S Program: Various programs designed to develop young talented engineers and scientists for the next generation

The Foundation aims to contribute to "the creation of a truly humane civilization" through these activities.

* For your reference, please see the Achievement Commentary at Honda Foundation website.

https://www.hondafoundation.jp/commemoration/index_en/285/year:2024

For more information, contact the Honda Foundation via:

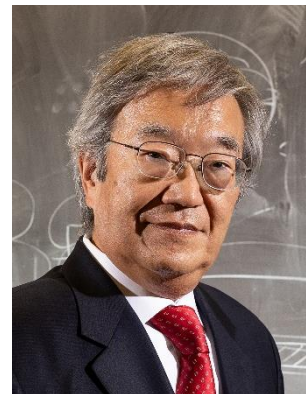
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Dr. James G. Fujimoto

Elihu Thomson Professor,
Department of Electrical Engineering and
Computer Science and Research Laboratory of Electronics
Massachusetts Institute of Technology (MIT)



Born

September 28, 1957, Illinois, U.S.A.

Education

- 1979 Massachusetts Institute of Technology, SB
- 1981 Massachusetts Institute of Technology, SM, EE
- 1984 Massachusetts Institute of Technology, PhD

Research and Professional Experience

- 1985-1988 Assistant Professor, Department of Electrical Engineering and Computer Science, MIT
- 1985-1996 Consultant, Optical Communications Group, Lincoln Laboratory, MIT
- 1988-1994 Associate Professor, Department of Electrical Engineering and Computer Science, MIT
- 1992 Co-Founder of Advanced Ophthalmic Devices, startup developing ophthalmic OCT
- 1992-1995 Consultant, Humphrey Instruments
- 1994-present Adjunct Professor of Ophthalmology, Tufts University
- 1994-present Professor, Department of Electrical Engineering and Computer Science, MIT
- 1998 Co-Founder of LightLab Imaging, startup developing intravascular OCT
- 1998-2002 Consultant, LightLab Imaging
- 2010 Co-Founder of Idesta Quantum Electronics, startup developing ultrafast laser technology
- 2011-present Elihu Thomson Professor of Electrical Engineering, MIT
- 2016-present Adjunct Professor, Medical University of Vienna

Professional Service

- 1996, 1998 Ultrafast Phenomena Conference: Program Co-Chair, General Co-Chair
- 2000-2023 Optical Coherence Tomography and Coherence Domain Methods in Biomedicine, Biomedical Optics Symposium, SPIE Photonics West
- 2001-2003 Optical Society of America: Board of Directors
- 2002, 2004 Conference on Lasers and Electro-Optics (CLEO): Program Co-Chair, General Co-Chair
- 2003-2017 Laser Microbeam and Medical Program (LAMMP), NIH Biomedical Technology Resource Center, University of California: Scientific Advisor
- 2003-2005 National Academy of Engineering, Japan-America Frontiers of Engineering Symposium: Co-Chair
- 2003, 2005 European Conferences on Biomedical Optics ECBO, Munich, Germany: Program Co-Chair
- 2007-present International Society for Imaging in the Eye / Association for Research in Vision and Ophthalmology (ARVO) Imaging Conference: Co-Chair
- 2008-2019 SPIE Biomedical Optics Symposium: General Co-Chair
- 2008-2014 Multidisciplinary Optical Imaging Group of the Association for Research in Vision and Ophthalmology (ARVO): Co-Chair
- 2013-2018 SPIE, International Optics and Photonics Society: Board of Directors

Awards

- 1990 National Academy of Sciences Baker Award for Initiatives in Research
- 1999 Discover Magazine Award for Technological Innovation
- 2001 National Academy of Engineering
- 2002 IEEE Lasers & Electro-Optics Society William Streifer Scientific Achievement Award
- 2002 Co-recipient of the Rank Prize in Optoelectronics
- 2002 American Academy of Arts and Sciences
- 2003 SPIE President's Award
- 2006 National Academy of Sciences
- 2011 Carl Zeiss Research Award
- 2012 Co-recipient of the António Champalimaud Vision Award
- 2015 Honorary Doctorate, Nicolaus Copernicus University, Torun, Poland
- 2015 Optical Society of America Ives Medal
- 2017 Co-recipient, European Inventor Award
- 2017 Beckman-Argyros Award in Vision Research
- 2017 Co-recipient, National Academy of Engineering, Fritz J. and Dolores H. Russ Prize
- 2018 Honorary Doctorate, Friedrich-Alexander-Universitat Erlangen-Nuremberg, Germany
- 2022 IEEE Medal for Innovations in Healthcare Technology
- 2023 National Medal of Technology and Innovation
- 2023 Lasker-DeBakey Clinical Medical Research Award
- 2024 Lawrence A. Yannuzzi Award, International Retinal Imaging Society

Publications

- Journal Publications (568 Publications)
- Books (13 Books)
- Chapters in Books (44 Chapters in Books)