Kaoru Minoshima Statement

ICO offers high-quality academic information and networking opportunities through its worldwide optics and photonics conferences and activities, and I have always enjoyed participating in and contributing to these important ICO activities. It is my honor to be a candidate for the position of vice president. If elected, I would like to further serve ICO and the optics and photonics community by prioritizing the following.

**Strengthening collaboration among optics community and related societies**

The world is currently facing many challenges and problems, such as infectious diseases, global warming, natural disasters, etc. In particular, the COVID-19 pandemic revealed to each of us that none of these problems are local, as it spread worldwide at an incredibly high speed and impact.

To resolve such global issues, interdisciplinary collaboration between academic communities is essential. However, modern science and technology fields as well as related academic societies are so specialized, so cooperation among them often seems inefficient. Without innovative ideas crossing over different fields, it is difficult to adapt to progress in science and technology and solve new and global problems in society.

Optics and photonics can play an important role in linking and integrating diverse areas of science and technology due to its nature of the field. To make this role work efficiently, efforts to facilitate collaboration between related communities and academic societies worldwide are necessary, and ICO should play a key role in this regard. ICO has a high potential to combine people from different backgrounds with regard to their specific technical areas, countries, gender, and careers. Thus, we must work on providing more opportunities to diverse communities to participate in ICO activities and to ensure that every organizational area is accessible.

**Providing attractive opportunities to young scientists and women scientists**

It is highly important to make optics and photonics an appealing career choice for young scientists and students by offering attractive services, such as opportunities for networking and organizing informative events. Such services can include activities organized by students, where they network among themselves, or networking opportunities at conferences and other places between people new to the field and veterans. Moreover, enhancing opportunities for female students and scientists is also very important to further the growth of the field and to society, in general. Also, enhancing international collaboration for such activities is necessary to establish attractive career options for students, young scientists and women in this field, as well as for the sustainable development of international societies.

**Building new roles of optics and photonics after COVID-19**

Due to COVID-19, many challenges have arisen in academic activities and societies. Before the pandemic, our academic international exchanges were becoming more and more active and fluent in every aspect, from students to professionals and from personal visits to international conferences. Our “real” connection was suddenly lost and became “virtual.” However, new convenient tools, such as online meetings, have quickly become available. As a result, international communication was made more accessible and frequent than ever. People can now attend international conferences without travel cost limitation, which brought more chance to people under difficult economic situation. However, online communications are limited in terms of spontaneous networking and creating innovative ideas by free discussion and collaboration especially between different fields.

Now, we are facing a new challenge—that is, how to reopen real communication in our academic activities. We have to build a new normal with a good balance between the real and virtual and create various formats that can provide fruitful opportunities to diverse communities. Here, the role of optics and photonics become more and more important for technology development to establish the new society, in terms of communication, sensing, imaging, quantum technology, and more.

I have been working in broad areas of optics and photonics, such as ultrafast optics, optical frequency comb, metrology, sensing and imaging, quantum optics, etc. Thus, I have witnessed the fact that the fusion of heterogeneous fields revolutionizes new innovative areas. I have also witnessed the importance of networking people by conducting volunteer roles for international academic activities, such as Program vice-Chair of ICO-24, General Chair of CLEO:2011, and Associate Editor of *Optica*. Based on such experiences, I would like to make contributions to the ICO so as to create new possibilities for optics and photonics in this new era.
Curriculum Vitae

1. Name: Kaoru Minoshima
2. Affiliation: The University of Electro-Communications (UEC)
3. Position: Professor
4. Address: 1-5-1 Chofugaoka, Chofu, 1828585 Tokyo, Japan.
   E-mail: k.minoshima@uec.ac.jp
6. Latest Degree: Ph. D., 1993, University of Tokyo, Tokyo, Japan
7. Education
   • Ph. D. (Science) in Physics, University of Tokyo, 1993, "Ultrafast optical responses of J-aggregates in cyanine dyes studied by pump-probe spectroscopy and interferometry"
   • Master of Science in Physics, University of Tokyo, 1989, "New method for the measurements of electro-optic constants and its application to polymer films doped with organic dye molecules"
   • Bachelor of Science in Physics, University of Tokyo, 1987
8. Employment
   • Director, Institute for Advanced Science, The University of Electro-Communications, Apr. 2021 - present
   • Distinguished Visiting Professor, cross-appointment, Institute of Post-LED Photonics, University of Tokushima, August 2019 - present
   • Division Leader, Institute for Advanced Science, The University of Electro-Communications, Apr. 2015 - March 2021
   • Research Director, JST-ERATO MINOSHIMA Intelligent Optical Synthesizer Project, Japan Science and Technology Agency (JST), Oct. 2013 - March 2020
   • Professor, The University of Electro-Communications, Apr. 2013 - present
   • Guest Professor, Tokyo University of Science, Apr. 2007 - Mar. 2013
   • Bureau Manager, Innovation Promotion Headquarter, National Institute of Advanced Industrial Science and Technology (AIST), Apr. 2011-Mar. 2013
   • Group Leader, Chief of Length Standards Section, National Metrology Institute of Japan (NMIJ), AIST, Apr. 2007- Mar. 2011
   • Visiting Scientist, Massachusetts Institute of Technology (MIT), Jan. 2000-May 2001
   • Visiting Professor, University of Bordeaux I, Oct. 1996 - Nov. 1996
   • Senior Research Scientist, AIST, Apr. 2001 - Mar. 2007
   • Senior Research Scientist, National Research Laboratory of Metrology (NRLM), Oct. 1997-Mar. 2001
9. Awards
   • 2019 Hermann Anton Haus Lecturer, Research Laboratory of Electronics (RLE), MIT, USA,
2019

- Senior Member, Laser Society of Japan, 2017
- OSA Fellow Recognition, The Optical Society (OSA), USA, 2015
- JSAP Fellow, The Japan Society of Applied Physics (JSAP), Japan, 2014
- NISTEP Award, national Institute of Science and Technology Policy (NISTEP), Minister of Education, Culture, Sports, Science and Technology (MEXT), Japan, 2013
- Outstanding Paper Award, Laser Society of Japan, Japan, 2013
- 1st Women Researcher Achievement Award (Kashiko Kodate Awards), JSAP, Japan, 2010
- The Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology, MEXT, Japan, 2008
- Director General's Award, NRLM, Japan, 1998

10. Research Area and Contributions

- Frequency comb science and technology: First demonstration of application of frequency combs in length metrology. Development of new techniques for ultrahigh-accuracy length metrology ranging from pm to km, including absolute long distance measurement, picometer-accuracy optical interferometry, self-correction of air refractive index with accuracy better than the empirical equations. High-accuracy frequency metrology based on mode-locked fiber lasers, including first demonstration of absolute frequency measurement using fiber based frequency comb. Tunable frequency generation and application of THz frequency comb.
- Development of ultrashort lasers: Development of mode-locked fiber lasers and solid-state lasers for precision metrology, including shortest pulse generation in Er/Yb:glass lasers by use of carbon nanotube saturable absorber mirror.
- Photonic device fabrication using femtosecond laser: Nonlinear material processing in glass using femtosecond laser oscillator, functional photonic device fabrication, and characterization by Optical Coherence Tomography.

11. Memberships

- The Optical Society (OSA Fellow)
- IEEE
- SPIE
• American Physical Society
• Japanese Society of Applied Physics (JSAP Fellow, Director 2019-2021)
• Physical Society of Japan
• Laser Society of Japan (Senior Member, Director 2018-present)

12. ICO Related Activity
• Member, ICO Sub-committee, Science Council of Japan (2011-present)
• ICO conference committee
  ➢ Program vice-Chair: ICO-24, Japan, 2017
  ➢ Program Committee Member, ICO-25, Germany, 2020 (postposed due to COVID-19)
  ➢ Local Program Committee Member, ICO 2004, Japan, 2004

13. Editorial Activity
• Optica (OSA), Associate Editor, 2021 - present
• Optik (Elsevier), Editorial Board, 2004-present
• Editor of Association of Asia Pacific Societies (AAPPS) Bulletin, 2019-2020
• Editor of Monthly Journal of Japan Society of Applied Physics, 2010-2011
• Editor of Japanese Journal of Applied Physics (JJAP), 2006-2009
• Editor of Journal of Laser Society of Japan, 2002-2011

14. Conference Committees
• Conference on Electro-Optics (CLEO)
  ➢ 2021-2022 CLEO Steering Committee
  ➢ 2011 CLEO: Science & Innovation, General Co-Chair
  ➢ 2009 CLEO, Program Co-Chair
  ➢ 2006-2008 CLEO Subcommittee Member, SC 14: Optical Metrology
  ➢ 2004-2005 CLEO Subcommittee Chair, SC 14: Optical Metrology (created a new
  subcommittee as the 1st Chair)
• Technical Committee for Others:
  ➢ Fourier Transform Spectroscopy 2021
  ➢ FiO/Laser Science 2020 (LS SC Chair & FiO SC member)
  ➢ ALPS/OPIC 2017, 2018, 2019, 2020, 2021
  ➢ APLS 2018
  ➢ SPIE OM 2015
  ➢ Optics Photonics Japan: 2011 (Program Chair), 2010 (vice Program Chair), 2006
  ➢ Laser Society Meeting 2010, 2013, 2018 (SC Chair), 2021
  ➢ Advanced Photonics Symposium 2010, 2011
  ➢ CLEO PacificRim 2013 (SC Chair), 2009, 2020 (SC Chair), 2022 (SC Chair & Steering
Committee)

- CLEO·Europe 2007
- ODF 2006
- Fringe 2005
- IQEC/CLEO-Pacific Rim 2005
- Ultrafast Phenomena 2014, 2004

15. Miscellaneous Activities

- Member, Science Council of Japan (2011-present)
- Director, The Japan Society of Applied Physics (2019-2021)
- Director, Laser Society of Japan (2018-present)
- JST International Technical Advisor (2018-2020)
- JST PRESTO Technical Advisor (2008-2014)
- Several committees for Government and Societies, Japan: METI, MEXT, JSPS (present and past)
- National Science Foundation (USA), Advanced LIGO Construction Review Committee (2006)
- European Space Agency Technical Adviser (2006)
- Swiss National Science Foundation, Review Committee (2019, 2020)
- OSA, Fellow Selection Committee (2019-2020)
- OSA, Townes Award Selection Committee (2012-2013, 2017-2018)
- OSA, Hopkins Leadership Award Selection Committee (2015-2016, 2020-2021)
- Several other international and Japanese committees (present and past)
List of Publications

1. **Articles in Refereed Journals and Conference Proceedings**

   (Up to 2020, total 253 records, and 3,755 times cited in Web of Science. Only Refereed Journals are listed below.)


[21] Ryo Oe, Shuji Taue, Takeo Minamikawa, Kosuke Nagai, Kyuki Shibuya, Takahiko Mizuno, Masatomo Yamagiwa, Yasuhiro Mizutani, Hirotsgu Yamamoto, Tetsuo Iwata, Hideki Fukano, Yoshiaki Nakajima, Kaoru Minoshima, and Takeshi Yasui, "Refractive-index-sensing optical comb based on photonic radio-frequency conversion with intracavity multi-mode interference


34 Yi-Da Hsieh, Hiroto Kimura, Kenta Hayashi, Takeo Minamikawa, Yasuhiro Mizutani,


2. Books and Review Articles

(In addition to the list below, she has published 64 books and review articles in Japanese.)


3. International Keynote Presentations and Invited Talks

(In addition to the list below, she has presented 135 Japanese Keynote and Invited Talks, and 433 contributed talks in international and domestic conferences.)

[1]. Kaoru Minoshima. Precision measurements with optical frequency comb beyond frequency metrology, IFMI & ISPEMI 2020, (Plenary), Beijing, China in hybrid format, 2020

[2]. Kaoru Minoshima. Fiber-based optical frequency comb applications beyond frequency metrology, Advanced Fiber Laser Conference AFL 2020, (Keynote), Chansha, China in hybrid format, 2020

[3]. Kaoru Minoshima. Takashi Kato, Fully scan-less three dimensional imaging using optical frequency comb, EOSAM (Invited), Poland in virtual format, 2020

[4]. Kaoru Minoshima. Akifumi Asahara, Optical coherence synthesizer with optical frequency comb [ME1.4], IEEE IPC (Invited), Vancouver in virtual format, 2020

[5]. Kaoru Minoshima. Intelligent Optical Synthesizer: Versatile Control of Optical Waves with Frequency Combs Towards Innovative Applications, CLEO·2020 (Plenary), San Jose, USA in virtual format, 2020
[6]. **Kaoru Minoshima.** Intelligent Optical Synthesizer: versatile control of optical waves enables studies from molecular physics to astronomy, 2019 Hermann Anton Haus Lecture, RLE, MIT (Special Lecture), MIT, Boston, USA, 2019

[7]. **Kaoru Minoshima.** Introduction of group activities: Generation and applications of optical frequency comb beyond a frequency ruler, Stanford University Seminar, 2019 (Invited)

[8]. C. Ohae, A. Tomura, T. Gavara, **Kaoru Minoshima,** and M. Katsuragawa, Continuous Generation of the Arbitrary Optical Waveform Based on the Optical Frequency Division, UltrafastLight-2019, Lebedev Physical Institute of RAS, Russia, 2019 (Invited)

[9]. Takashi Kato, Hirotaka Ishii, Kazuhiro Terada, Tamaki Moritoh, **Kaoru Minoshima.** One-shot 3D imaging using ultrafast all-optical Hilbert transform with chirped optical frequency comb, The 8th Asia-Pacific Optical Sensors Conference(APOS2019), The University Of Auckland Science Centre, 2019 (Invited)

[10]. **Kaoru Minoshima,** Takashi Kato, Megumi Uchida, Yurina Tanaka, Scan-less 3D imaging using ultrafast all-optical information conversion with chirped optical frequency comb, SPIE Optics+Photonics (Invited), San Diego, USA, 2019

[11]. **Kaoru Minoshima.** Akifumi Asahara, Multi-comb coherent control for material studies, American Physical Society March Meeting 2019 (Invited), Boston, USA, 2019

[12]. Akiifumi Asahara, **Kaoru Minoshima.** New Optical Comb Spectroscopy Combined with Optical Vortex, PIERS 2019 Rome (Invited), Rome, Italy, 2019

[13]. **Kaoru Minoshima.** Applications of optical frequency comb in precision metrology beyond a frequency ruler, National Metrology Institute Seminar (Special Lecture), National Metrology Institute (NIM), China, 2018

[14]. **Kaoru Minoshima.** Ultrahigh accuracy distance measurements with self-correction of the air-refractive index using optical frequency combs, 19th Coherent Laser Rader Conference, CLRC 2018 (Invited), Okinawa Institute of Science and Technology, 2018

[15]. Yoshiaki Nakajima, Yuya Hata, **Kaoru Minoshima.** All-polarization-maintaining dual-wavelength mode-locked fiber laser with nonlinear amplifying loop mirror, APLS2018, 2018 (Invited)

[16]. Akifumi Asahara, **Kaoru Minoshima.** Metrological Applications Using Coherent Controllability of Optical Combs, LSC2018, Yokohama, Japan, 2018 (Invited)

[17]. Chiaki Ohae, Jian Zheng, **Kaoru Minoshima.** Masayuki Katsuragawa, Tailored optics with a highly-discrete optical frequency comb: toward high resolution nonlinear spectroscopy in the vacuum ultraviolet wavelength region, MPLP 2018, Academpark, Novosibirsk, 2018 (Invited)


[19]. **Kaoru Minoshima.** Applications of optical frequency comb beyond a frequency ruler,
Seminar on Precision Measurement by Optical Frequency Comb, Tsinghua University, Beijing, China, 2018 (Invited)

[20]. Kaoru Minoshima, New applications of versatile optical wave manipulation by use of optical frequency comb beyond a frequency ruler, Tianjin University Seminar, Beijing, China, 2018 (Special Lecture)

[21]. Kaoru Minoshima, New trends in applications of optical frequency comb beyond a frequency ruler, Femtosecond laser measurement and applications in semiconductor field, AOE, Beijing, China, 2018 (Invited)

[22]. Kaoru Minoshima, Akifumi Asahara, Multi-comb technique for metrological applications with coherent control of optical pulse train, Fourier Transform Spectroscopy (FTS) 2018 (Invited), Resort World Sentosa, Singapore, 2018


[24]. Kaoru Minoshima, Optical frequency comb applications beyond frequency metrology by use of versatile optical wave manipulation, KEIO symposium on microresonator frequency comb (Keynote), Keio, Hiyoshi, 2018

[25]. Kaoru Minoshima, Optical Frequency Comb Applications beyond Frequency Metrology, CLEO:2017 (Tutorial Talk), San Jose, USA, 2017

[26]. Kaoru Minoshima, Ultra-precision control of optical waves by use of fiber-based frequency combs and its metrology application, OPTICS & PHOTONICS International 2017 Congress(OPIC) (Plenary), Yokohama, Japan, 2017

[27]. Kaoru Minoshima, Overview of femto second laser based technology for distance measurements, International Workshop on Trends and Developments in Laser Based Distance Metrology (Plenary), Leiden, Netherland, 2017

[28]. Trivikramarao Gavara, Chiaki Ohae, Ken-ichi Nakagawa, Kaoru Minoshima, Masayuki Katsuragawa, Injection-locked tunable continuous-wave laser and its application to generation of ultrahigh repetition rate, S1.3.3, IOPHS'17 (Invited), Russia, 2017

[29]. Kaoru Minoshima, High-precision and large range one-shot 3D imaging with chirped fiber-based optical frequency comb, BIOS/Photonics West 2017 (Invited), The Moscone Center, California, 2017


[32]. Kaoru Minoshima, Akifumi Asahara, Ken-ichi Kondo, Yue Wang, Tailoring the fiber-based frequency combs for metrology application, Advanced Solid State Lasers Conference, ASSL 2017, AW1A.1 (Invited), Nagoya Congress Center, 2017

[33]. Kaoru Minoshima, Ultra-precision control of optical waves by use of fiber-based frequency combs and its application, Asia-Pacific Optical Sensors Conference, APOS 2016 (Plenary), Shanghai, China, 2016

[34]. Kaoru Minoshima, Precision Length Metrology with Phase Control of Fiber-based Optical Frequency Combs, APLS 2016 (Invited), Jeju, Korea, 2016

[35]. Kaoru Minoshima, Optical length metrology with extreme precision using fully controlled fiber-based frequency combs, ICO/DGaO 2016 (Plenary), Hannover, Germany, 2016

[36]. Kaoru Minoshima, Application of fiber-based optical frequency combs in precision metrology beyond frequency measurements (Special Lecture), Tsinghua Univ. Seminar, Beijing, China, 2016

[37]. Chiaki Ohae, Nurul Sheeda Suhaimi, Trivikramarao Gavara, Ken'ichi Nakagawa, Feng-Lei Hong, Kaoru Minoshima, and Masayuki Katsuragawa, Generation and application of five phase-locked harmonics in the continuous wave regime, VI International Conference 'Frontiers of Nonlinear Physics', Nizhny Novgorod, Russia, 2016 (Invited)

[38]. Kaoru Minoshima, Recent progress on application of fiber-based optical frequency combs in precision metrology (Special Lecture), Seminar AOE/CAS, Beijing, China, 2016

[39]. Kaoru Minoshima, Development and application of fiber-based optical frequency combs in precision metrology, Beihang Univ. Seminar (Special Lecture), Beijing, China, 2016

[40]. Bo Xu, Hideaki Yasui, Yoshiaki Nakajima, Ma, Zigang Zhang, Kaoru Minoshima, Fully stabilized narrow linewidth 750-MHz Yb fiber laser frequency comb, CLEO:2016 (Invited), San Jose, 2016

[41]. Kaoru Minoshima, Development of Fiber-based Frequency Combs and Their Application in Precision Metrology, China-Korea-Japan Joint Workshop for Ultrafast Photonics Technology 2015 (Invited), Beijing, China, 2015


[43]. Kaoru Minoshima, Length metrology with ultra-high precision using fiber-based frequency combs, CLEO-PR 2015 (Invited), Busan, Korea, 2015

[44]. Kaoru Minoshima, Optical frequency comb and its applications to metrology, CLEO-PR 2015 (Short Course Lecture), Busan, Korea, 2015

[45]. Kaoru Minoshima, Yoshiaki Nakajima, Guanhao Wu, Ultra-precision optical metrology using highly controlled fiber-based frequency combs, Optical Metrology 2015 (Invited), Munich, Germany, 2015

[46]. Kaoru Minoshima, Fundamentals and applications of frequency combs for high-accuracy optical metrology, Summer School, 3rd International Summer Course and Workshop on
Ultrafast Lasers and Applications in Quantum Matters, Taiwan, 2014 (Invited)

[47]. **Kaoru Minoshima**, Ultrahigh-accuracy optical metrology using fiber-based frequency combs, Workshop, 3rd International Summer Course and Workshop on Ultrafast Lasers and Applications in Quantum Matters (Invited), Taiwan, 2014

[48]. **Kaoru Minoshima**, Ultrahigh-accuracy optical metrology using optical frequency combs, MIPT-UEC Workshop, 2014 (Invited)

[49]. **Kaoru Minoshima**, Ultrafast Optical Comb Length Measurement, APPC-12 (Invited), C3-1-I1, 2013

[50]. **Kaoru Minoshima**, Ultraprecision practical long distance measurement using frequency combs, ICMTE 2012, Seoul, 2012 (Invited)


[52]. **Kaoru Minoshima**, Basics of optical frequency combs and its application to high-accuracy measurements, Beijing, 2011 (Invited)

[53]. **Kaoru Minoshima**, High Precision Absolute Length Metrology using Optical Frequency Combs, IMEKO, LMPMI 2011 Laser Metrology for Precision Measurement and Inspection in Industry (Keynote), Braunschweig, Germany, 2011

[54]. **Kaoru Minoshima**, High accuracy length metrology using fiber-based optical frequency combs, ISMTII 2011 (Keynote), Daejeon, Korea, 2011


[58]. **Kaoru Minoshima**, H. Inaba, Precise length metrology using fiber-based frequency combs, Optical Sensors, Karlsruhe, 2010 (Invited)


[60]. **Kaoru Minoshima**, Precise length metrology using optical frequency combs, Precision engineering seminar, Tsinghua University, China, 2009 (Invited)

[61]. **Kaoru Minoshima**, H. Inaba, H. Matsumoto, Y. Iino, K. Kumagai, Ultrahigh dynamic-range distance measurement using a femtosecond frequency comb, LEOS Summer Topicals, Portland, USA, 2007 (Invited)

[63]. Kaoru Minoshima, Development and achievement of fiber based frequency comb, BIPM/NMIJ, Tsukuba, Japan, 2007 (Invited)

[64]. Kaoru Minoshima, High-accuracy long distance measurements using a femtosecond frequency comb, High Accuracy Absolute Distance Measurement Workshop, Munich, Germany, 2007 (Invited)

[65]. Kaoru Minoshima, Precision length metrology using optical comb., Max-Planck Seminar, Max-Planck, Erlangen, 2007 (Invited)

[66]. Kaoru Minoshima, Ultrahigh dynamic-range distance meter using an optical frequency comb, KAIST-NMIJ Symposium, Daejon, 2006 (Invited)


[69]. Kaoru Minoshima, Precision length metrology using optical comb., Length seminar, Daejon, Korea, 2006 (Invited)


[72]. Kaoru Minoshima, H. Matsumoto, High-precision distance measurement using a frequency comb of an ultrashort pulse laser, CLEO-Europe, Munich, Germany, 2005 (Invited)


[74]. Kaoru Minoshima, A micrometer-resolution long-distance measurement using a femtosecond frequency comb, Photonic Time/Frequency Metrology and Control, Vancouver, Canada, 2003 (Invited)


[76]. Kaoru Minoshima, T. Tomita, H. Matsumoto, FEMTOSECOND-COMB DISTANCE...
METER: ULTRAHIGH-RESOLUTION DISTANCE MEASUREMENT, CLEO/PacificRim2003, Taipei, 2003 (Invited)


[79]. Y. Yamaoka, Kaoru Minoshima, H. Matsumoto, Femtosecond interferometry for direct measurement of group refractive index of air using mode-lock frequency, 17th Asia Pacific Metrology Program (APMP), Technical Committee for Length (TCL) Workshop, Tsukuba, 2001 (Invited)


[83]. Kaoru Minoshima, Ultrashort pulse application to 3-D measurements, International workshop on femtosecond technology (FST’96), Tsukuba, 1996 (Invited)

[84]. Kaoru Minoshima, New 3-D measurements using color information, CLEO/PacificRim’95, Makuhari, 1995 (Invited)

4. Patents

28 patents in Japan, 1 US patent, and 5 PCT patents.