ISBER Elections Biosketch

First Name	Last Name
Dayong	Gao
What ISBER Board position are you applying for?	
President-Elect	
Degree (if applicable)	
Ph.D., B.Sc.	

Current position and institution

Professor, the University of Washington, Seattle, WA, USA

Education and Experience

Dr. Dayong Gao is the Distinguished ORGINCELL Endowed Professor of Biobanking Science and the Director of the Center for Cryo-Biomedical Engineering and Artificial Organs at the University of Washington (UW), Seattle, USA (2004-present). Prior to joining the UW, Dr. Gao was the Baxter Healthcare Chair of Biomedical Engineering and the Alumni Professor at the University of Kentucky, Lexington, KY, USA. He received the Bachelor of Science Degree from the University of Science and Technology of China, Hefei, China (1982), and the Ph.D. in Cryobiology and Bioengineering from the Concordia University, Montreal, Canada (1991). With research grant support from the US National Institutes of Health (NIH), Dr. Gao conducted his postdoctoral research in fundamental cryobiology & biobanking science under the supervision of Dr. John Critser and Dr. Peter Mazur, in the Cryobiology Research Institute, the Methodist Hospital of Indiana, Indianapolis, USA (1992-1994).

Dr. Gao has been continuously promoting technology transfer to industries and has served on the Scientific and Medical Advisory Boards of several biobanks, biorepositories, and corporations in the USA and Canada. He has also provided support, services, and education to medical centers and the Bill & Melinda Gates Foundation programs in the global health initiatives. Recently, supported by major grants from the Bill & Melinda Gates Foundation and the NIH, Dr. Gao served as Director and PI of an international consortium and successfully developed optimal techniques to cryopreserve human mucosal tissues and their derived immune cells for the development and testing of HIV vaccines and anti-AIDS drugs.

Biobanking Interests

Dr. Gao's major research has focused on cryobiology, cryopreservation technology, biobanking science, and their applications, including: (a) investigating fundamental mechanisms of cryoinjury and cryopreservation of living cells-tissues, and (b) developing optimal methods and novel technology-instruments for long-term cryopreservation and biobanking of cells and tissues for scientific research, biotech development, gene-cellular therapy, regenerative medicine, organ transplantation, tissue engineering, disease screening, vaccine-drug development, in vitro fertilization, and conservation of endangered species, *etc.*

Having actively worked in biobanking research and practice for more than 30 years, Dr. Gao has collaborated with research institutions, biobanks, hospitals, and corporations worldwide. He has successfully developed optimal techniques, protocols, and instruments for long-term cryopreservation and biobanking of human immune cells, PBMCs, CAR-NK cells and CAR-T cells (for cellular therapy), pancreatic islets (for treating diabetes), sperm/oocytes/reproductive tissues (for treating infertility), platelets (for treating bleeding disorders), adipose cells/tissues (for plastic surgery), adipose tissue-derived stem cells (for stem cell transplant), skin (for treating burn patients), arteries (for bypass

surgery), corneas (for treating blindness), hematopoietic stem cells (for treating cancers/leukemia and blood disorders), and engineered tissues etc.

Dr. Gao pioneered a series of innovative technology and instruments for both cryopreservation research and biobanking practice, including (1) cell perfusion technology and micro-fluidic devices for the study of cell membrane transport properties of water and cryoprotective agents at low temperatures, as well as their associated activation energies; (2) an advanced differential scanning calorimetry for investigation of phase transition, ice formation dynamics, and cell membrane permeabilities at sub-zero temperatures; (3) a low temperature "lab on a chip" with cryo-microscopy to study cells' or tissues' cryobiological characteristics and mechanisms, which determine their life-or-death during cryopreservation processes; (4) minimally invasive bio-sensors to measure thermo-physical properties of biomaterials at different temperatures; and (5) biophysical and mathematical modeling as well as computer software to simulate and optimize cryopreservation-biobanking conditions. Based on these research and development accomplishments, Dr. Gao's team made distinguished achievements and breakthroughs in cryopreservation technology for biobanking, including: (1) a directional-passive cooling technology and instrument to prevent lethal intracellular ice formation and severe cryo-dehydration injury to cells and tissues during the freezing process; (2) the discovery and application of microwave irradiation on the suppression of ice formation in cryoprotective solutions during the cooling process; (3) the pioneering single-mode electromagnetic resonance (SMER) technology and instrument to achieve optimal rapid and uniform rewarming of the frozen or vitrified biomaterials to prevent fatal ice re-crystallization and thermal-stress-induced fracture in tissues during the rewarming-thawing process; and (4) membrane-diafiltration technology and bio-MEMS for addition and removal of cryoprotective agents in cells and tissues to prevent osmotic injuries. These innovative methods, technology, and instruments are currently utilized in the cryopreservation research and biobanking practice worldwide.

Professional Activities (ISBER and other)

ISBER Working Groups

Dr. Gao currently serves as Chair of the "ISBER Best Paper Award in Biopreservation & Biobanking" Committee, a member of the ISBER's Annual New Product Award Task Force Committee, and Co-Chair of the ISBER 2023 Annual Meeting and Exhibits (to be held on May 3-6, 2023, Seattle, USA).

Dr. Gao was previously a member of the Scientific Program Committees for various annual ISBER meetings and the ISBER webinars.

Dr. Gao has closely worked with the ISBER leadership and successfully established the collaboration between the ISBER and the Society for Cryobiology: (1) organized joint lectures, workshops, and symposia/sessions in both societies' annual conferences, (2) established official agreements between two societies for collaboration and mutual support, and (3) jointly developed and published "the Liquid Nitrogen-based Cryogenic Storage of Specimens Best Practices Addendum" for the Fourth Edition of the ISBER's Best Practices.

Professional Societies and Volunteer Organizations related to biobanking

Dr. Gao was the President-Elect, President, and Past-President of the Society for Cryobiology (the International Society for Low Temperature Biology and Medicine, founded in 1964, USA). He has also been serving as a committee member on panels and review boards of national and international organizations, including the US National Advisory Council, the NIH-National Center for Research Resources, US Department of Energy, National Science Foundation, American Society of Mechanical Engineers, Naval Medical Research, NASA, Arizona Disease Control Research Commission, Canadian

Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada (NSERC), Canadian Alberta Science and Research Investments Program, Ireland Science Foundation, *etc.*

Organizer or co-organizer of meetings/conferences:

Dr. Gao was Co-Chairman of the 1996 Annual Meeting of the Society for Cryobiology, Chairman of the 2004 World Conference of Cryobiology and Cryo-Medicine, and Chairman of the 2017 International Conference of Cryobiology and Biobanking. Currently he serves as Co-Chair of the 2023 ISBER Annual Meeting and Exhibits. He was previously a member of the Scientific Program Committees for numerous international conferences and meetings.

Invited as a plenary or keynote speaker, Dr. Gao has delivered over 200 conference presentations worldwide.

Editorial Boards

Dr. Gao is a founding member of the Journal of "Cell Preservation Technology" which later became the ISBER official Journal "Biopreservation and Biobanking". He has been continuously serving as the Section Editor (2002 – 2015) and the Deputy Editor (2015 – now) of this Journal for over 20 years.

Currently, Dr. Gao also serves as the Editor-in-Chief of the "Journal of Electronics Cooling and Thermal Control" and the Editorial Board Member of 9 other international journals.

Other

Dr. Gao has published over 500 peer-reviewed research articles (including over 270 full journal papers), 33 chapters in 21 books, and obtained 25 US and international patents. He graduated over 100 graduate students (35 of whom have obtained Ph.D. degrees), and trained numerous post-doctoral fellows, visiting professors, and scientists. His research work has been supported continually through awards and grants from US National Institutes of Health (NIH), Department of Defense, National Science Foundation, National Cancer Society, American Heart Association, Bill and Melinda Gates Foundation, Whitaker Foundation, Washington Research Foundation, Murdock Foundation, and corporations, *etc.*

Dr. Gao's work in both scientific research and leadership service has significantly impacted the advancement of biobanking science and its applications. He has gained international recognitions, including the national and international honors/awards as follows: Fellow of International Academy of Medical and Biological Engineering, Fellow of American Institute of Medical and Biological Engineering (AIMBE), Member of the Washington State Academy of Sciences-USA, Fellow of American Society of Mechanical Engineers (ASME), Fellow and the Basil Luyet Medal of the Society for Cryobiology, American Heart Association Award, American Cancer Society Award, Asian American Engineer of the Year 2013 Award, Bill & Melinda Gates Foundation Global Health Research Award, Whitaker Foundation Young Investigator Award, Washington Foundation Innovation Award, International Society for Biological and Environmental Repositories (ISBER) Special Service Award, and Murdock Foundation Award, *etc*. Recently, the "Dayong Gao Young Investigator Award" was named and established by the Society for Cryobiology to recognize the most outstanding young cryobiologist and biobanking scientist in the world each year since 2019. (www.societyforcryobiology-.org/dayong-gao-young-investigator-award).