Society for Cryobiology Election 2021

Candidate Biographies and Vision Statements
Election Dates: October 11 – 25, 2021

Officer Candidates

President-Elect (2022-2023)
- Allison Hubel (USA)
- Tiantian Zhang (UK)

Secretary (2022-2023)
- James Benson (Canada)
- Willem Wolkers (Germany)

Treasurer (2022-2023)
- Steven Mullen (USA)
- Lindong Weng (USA)

Governor Candidates (2022-2024)
- Kelvin Brockbank (USA)
- Raquel Folgado (USA)
- Victoria Keros (Sweden)
- Estefania Paredes (Spain)
- Ramon Risco (Spain)
- Boris Rubinsky (USA)
- Shinsuke Seki (Japan)

Voting Eligibility
All Society for Cryobiology members in good standing are eligible to vote, including student members.

Voting Instructions
All members in good standing will receive an email in advance of the election to the email address listed in their member profile with a personalized one-time use voting link to cast their vote anonymously at simplyvoting.com.

Voting Methods
Officers
Each member must rank the candidates in order of preference.

Governors
Each member is assigned 100 points. Members choose how to allocate those points e.g. a voting member could give one candidate all 100 points, or divide points among the candidates. All candidates are then listed and selected by point total.

Candidates for President-Elect (2022-2023)

Allison Hubel, Ph.D.
University of Minnesota, USA

Biography: Allison Hubel is Professor of Mechanical Engineering, Director of the Technological Leadership Institute and Director of the Biopreservation Core Resource at the University of Minnesota. She received a Bachelor of Science in Mechanical Engineering from Iowa State University and a Master of Science in Mechanical Engineering and PhD from MIT under the supervision of Ernest Cravalho. She pioneered the use of low temperature spectroscopy to characterize mechanisms of damage during freezing. In addition, Dr. Hubel has developed new methods of optimizing preservation protocols using differential evolution. Her recent work has demonstrated that combinations of osmolytes act in concert to improve post thaw recovery. Dr. Hubel is the author of, "Preservation of Cells: a Practical Manual". She is a former deputy editor of *Biopreservation and Biobanking* and received the Outstanding Achievement in Biobanking Award from ISBER. She is a fellow of ASME and AIMBE and a National Blood Foundation Scholar. A member since 1985, Hubel has been involved in a variety of capacities with the Society for Cryobiology over the years. She was a member of the Board of Governors (2002-2008), a member of

the program committee (2004-2006, 2019) and co-Chair of the Society for Cryobiology annual meeting in 2005.

Vision Statement: The Society for Cryobiology stands uniquely positioned to advance the field of preservation. Should I be elected, I would organize symposia on key issues in cryobiology and invite scientists from related disciplines to attend. An example of this type of event was the Grand Challenges in Cryopreservation meeting that was held in 2021 at Telluride, Colorado. The meeting included cryobiologists, atmospheric scientist, physicists, and chemists and the talks spanned different length scales and approaches. I propose to organize and sponsor similar meetings organized around specific fundamental topics in the field with the intention of inviting scientists from adjacent fields. The structure of the talks will foster in depth conversations on the critical challenges in the field.

Cryobiology is also a translational field. The SFC needs to continue to foster a relationship with those organization who use preservation as a part of their normal function. For example, the International Society for Biological and Environmental Repositories (ISBER) is an organization in which preservation is a critical technology used but there is little work in these organizations on advancing the science of preservation. The SFC has an existing relationship with ISBER and that relationship should be fostered so that advances in preservation science can translate into advances in the practice of preservation.

Declaration of Competing Interest: I have no actual or perceived competing interests in relation to the position for which I am a candidate.

Tiantian Zhang, Ph.D.

Bournemouth University, UK

Biography: Professor Tiantian Zhang obtained her Environmental Biology degree from Liaoning University (P.R. China) in 1982 and worked as a research scientist in the area of environmental biology before obtaining an MPhil degree in Environmental Biology at Middlesex University (UK) in 1990 and a PhD degree in Cryobiology at University of Bedfordshire in 1994 (UK). She worked as a post-doctoral research fellow and a senior research fellow at University of Bedfordshire before she was made Reader in 2003 and Professor in 2005. She was appointed Director of Institute of Research in the Applied Natural Sciences at University of Bedfordshire in 2008 before joining Bournemouth University in 2012 as the Head of the Graduate School. She was subsequently appointed as the Deputy Dean of Research and Professional Practice in the Faculty of Science and Technology at Bournemouth University in 2017. She was also a member of the Executive Committee of the UK Council for Graduate Education.

Professor Tiantian Zhang is a leading figure internationally in research on cryopreservation of gametes and embryos of fish species and her research interests have been in the areas of cryopreservation of reproductive cells and the effect of cryopreservation on genome integrity and cellular metabolism. Her research activity has led to over 150 publications and over 100 presentations at international conferences and workshops. Professor Tiantian Zhang has obtained substantial funding from funding bodies such as the UK Research Councils, Wellcome Trust and EU. She has supervised over 30 PhDs and other research degree students and has been an editor or referee of over ten scientific journals including the leading journals in the field of cryobiology such as CryoLetters and Cryobiology. She served as a member of the Board of Governors of the Society for Cryobiology from 2013 to 2015 and was the elected Chairman of the Society for Low Temperature Biology (SLTB) from 2005 to 2008 following serving as General Secretary, Treasurer and Committee Member of SLTB for 10 years. She received an award from Society of Cryobiology for her service in 2016 and was re-elected as a member of the Board of Governors of the Society for Cryobiology in 2017.

Vision Statement: Cryobiology is an important area of science and it's applications in biomedicine, conservation and agriculture have significant economical, medical and environmental benefits. I would like to stand for election of Chair of the society because I believe Society of Cryobiology has an important role to play in making increased impact in these areas and I have the experience and skill required for taking on the role. I believe it is important that we have a clear vision and strategy for 21st century operation of the society and a longer term financial and operational plan. Building on our successes so far, I believe we need to engage more widely in academic and policy debate relevant to our remit in order to promote our science and raising the profile of the Society. If elected, I will focus on these priorities as well as providing excellent business services such as membership services, conferences, journal publications, and newsletters and through effective board and finance management. I would very much like to promote our society's collaborative activities with other scientific societies and organisations through joint meetings, workshops and seminars and especially in less represented regions. I also believe that education and training in cryobiology is important in promoting our science and public engagement should be an important part of our activities. I will actively support young scientist and promote widening participation of society's activities by women and other under represented groups.

Declaration of Competing Interest: I have no actual or perceived competing interests in relation to the position for which I am a candidate.

Candidates for Secretary (2022-2023)

James Benson, Ph.D.
University of Saskatchewan, Canada

Biography: I have been an active member of the Society for Cryobiology since 2004, a Governor at Large for the Society from 2013-2019, member of the Awards committee from 2010-2019, have served as the Chair of the Awards committee for the society from 2012 to 2019, and am currently serving as society secretary. I have an active interdisciplinary research program encompassing mathematics, biophysics, and molecular biology with an overarching goal of minimizing cryopreservation damage through informed models of toxicity accumulation. During my time as a Governor at Large, the Society made dramatic changes towards modernization, including retaining a high quality Society Executive to aid in day-to-day activities, and partnering with a number of key non-profit organizations and societies to ensure relevance for the decades to come. During my time as chair of the Awards committee, a number of changes were instituted including creating the revamped Crystal Session during the annual meeting, creating and awarding the first Art Rowe Young Investigator award, and initiating (and handing off to the Editorial Board) the Annual Best Paper Award. Finally, during my time as secretary, the society hosted two very successful online meetings in response to the global pandemic.

Vision Statement: One of my roles as Society secretary is to oversee membership initiatives. The Society has recently done an outstanding job of recruiting and retaining members, but I believe that further gains in membership can be made by leveraging our partnerships with other relevant societies such as ISBER and ISCT. To obtain and retain members from these other societies and elsewhere, we must offer services beyond just "membership in an academic society". I intend to push the membership committee and the Board of Governors to think creatively to develop real value for its members. One particular item that I have pushed for is an in progress Society-run webinar series to address critical issues relevant to our diverse membership. This will aid in ensuring participation from members who may be unable to attend annual meetings, and will facilitate outreach to areas that are broader in scope than our usual membership. In short, I have been a long-time active member of the Society, and am happy for the opportunity to continue to give back to it.

Declaration of Competing Interest: No actual or perceived competing interests in relation to the position for which I am a candidate.

Willem Wolkers, Ph.D.
University of Veterinary Medicine Hannover, Germany

Biography: Wim Wolkers received his education at Wageningen University (M.Sc., Molecular Sciences, 1992; Ph.D., 1998) in the Netherlands, after which he did postdoctoral research at the Center for Biostabilization, University of California, Davis, USA. He was appointed as research assistant professor at the department of Mechanical Engineering, University of Minnesota in 2006 and appointed as full professor at the Institute of Multiphase Processes, Leibniz University of Hannover in 2007, where he has been leading a group 'Biomedical Process Technology' within the cluster of excellence 'From Regenerative Biology to Reconstructive Therapy' REBIRTH. In 2019, he moved with his group to the University of Veterinary Medicine Hannover, where he is leading a biostabilization group in the research center NIFE 'Lower Saxony Centre for Biomedical Engineering, Implant Research and Development'. His research interests include; membrane biophysics, protein stability, molecular interactions in biological glasses, desiccation tolerance, membrane and tissue permeation processes, vibrational spectroscopy, and freeze-drying of cells and tissues.

Vision Statement: My fascination for cryobiology and the related field of anhydrobiology comes from working on a wide range of topics including macromolecular stability in desiccation tolerant tissues, freeze-drying of platelets and biological scaffolds, permeation of protectants in tissues, and water transport processes during freezing of cells. The inherent interdisciplinary nature of cryobiology and its link with human and animal medicine make it attractive for me. I also enjoy conveying my knowledge to young scientists and students. During my academic appointments in various geographic locations worldwide, I have supervised and mentored many PhD, master and bachelor students in various disciplines during their final projects. As associate editor of Cryobiology and editor of two editions of 'Cryopreservation and Freeze-Drying Protocols', I have gained a broad overview of the cryobiology and dry preservation field. Cryobiology should be approached as more than an empirical science. It follows thermodynamic principles, which can be used to predict cryobiological outcomes. My visions for the position of secretary are first of all to fully commit myself to all organizational duties coming with this position. Furthermore, within this executive position, I want to promote cryobiological research among different scientific disciplines, to attract new communities increasing the size of the society, and to attract young scientists. Cryobiology should provide a podium for biologists, chemists, physicists, mathematicians, and engineers that have affinity for the fascinating fields of low temperature and anhydrous biology.

Declaration of Competing Interest: I have no actual or perceived competing interests in relation to the position for which I am a candidate.

Candidates for Treasurer (2022-2023)

Steven Mullen, Ph.D.
Cook Medical, USA

Biography: Steven Mullen is a Senior Scientist and Team Lead in the Reproductive Health Business Unit at Cook Medical, Bloomington, IN USA. He has served in that position for 6.5 years. He completed his Bachelor of Science Degree from the University of Minnesota, and Ph.D. degree from the University of Missouri at Columbia, where he was also the recipient of the Donald K. Anderson

Graduate Research Award in 2006. After finishing his Ph.D. and a one-year postdoctoral fellowship in the laboratory of Professor John K. Critser, he joined 21st Century Medicine, Inc in California to continue research in the area of reproductive cryobiology. He was awarded an NIH Phase I grant to investigate automated high throughput applications of oocyte vitrification. He was subsequently recruited to join the World Egg Bank in 2011 to lead the scientific and technical aspects of the company as the Scientific Director. In 2015, he joined Cook Medical to serve in his current position. He has been a member of the Society for Cryobiology since 2001. While a graduate student, he led the International Cryobiology Young Researchers group (ICYR) for 4 years. For the past 2 years he has served as Treasurer of the Society for Cryobiology.

Vision Statement: The Society for Cryobiology has provided to me a sense of community that has lasted for 20 years. While all of us in the Society have recognized the importance of cryopreservation in various applications, the rest of the world seems to finally have caught up. Cryopreservation is being recognized as a critical aspect of supply chain management in diverse fields from animal breeding to cellular therapy. The Society has been able to capitalize on this recently in efforts from leaders in our organization. It is my desire to contribute to such efforts. We need to continue to reach out to a diverse audience to broaden our impact and demonstrate the value we bring to improvements in biotechnology and medicine.

I will soon be completing my first term as Treasurer. I have learned a lot about the inner workings of the Society, and how the finances are managed. There is a rather steep learning curve to this position, and I feel that my experience will allow the societies financial matters to continue smoothly if I were to serve a second term. I am happy to volunteer my time in this endeavor if the membership at large feels that this is appropriate.

I continue I support the efforts to improve our financial position that has allowed us to become a more attractive venue for scientific collaboration and communication. Specifics include financial support for invited speakers to our annual meeting, collaborations with other scientific societies, and awards for outstanding science at the early stage of a career. Such efforts, in my opinion, are invaluable to increasing the awareness of our strengths and unique knowledge in science and medicine and will lead to an increase in our reputation as a leading scientific organization. Our assets have increased significantly over the past several years, and I will advocate for wise investment of those resources to advance our mission.

Declaration of Competing Interest: No actual or perceived competing interests in relation to the position for which I am a candidate.

Lindong Weng, Ph.D.

Sana Biotechnology, USA

Biography: Dr. Lindong Weng is a Senior Scientist at Sana Biotechnology. He currently leads the cell therapy drug product team and devises DP process development, qualification, and validation strategy for several donor- or pluripotent stem cell-derived cell therapy product candidates. In his current position, he is also building the futuristic vision and work packages for next-generation formulation, fill/finish and cryopreservation processes in the field of cell and gene therapy. Previously, he was the Lead Microfluidics Engineer at enEvolv, a synthetic biology company that was acquired by Zymergen in early 2020. Dr. Weng received his bachelor's degree in Mechanical Engineering from Qingdao Technological University in 2007 and his PhD in Mechanical Engineering from Dalian University of Technology in 2012. His PhD work developed thermodynamic models to predict water and cryoprotectant transport in cells during freezing and characterized cryopreservation formulations using thermal analysis and molecular dynamics simulation. Dr. Weng conducted his postdoctoral research first with Dr. Gloria Elliott at UNC Charlotte and then with Dr. Mehmet Toner and Dr. Shannon Stott in the Center for Engineering in Medicine at Massachusetts General Hospital

and Harvard Medical School. During his postdoctoral fellowships, he investigated ionic liquid-based formulations for dry preservation of biologics, developed methods for cryopreserving malaria parasites, explored ice nucleation catalysis, probed the mechanisms of ice recrystallization inhibition, and developed microfluidic devices for automation of in vitro fertilization practice. As a scientist working at the interface of biology, physical chemistry, materials, and fluidics in both academia and industry settings, Dr. Weng has authored or co-authored over 40 peer-reviewed journal articles, filed five international patent applications, and gave presentations at more than a dozen of international conferences or symposiums. He has been a member of the Society for Cryobiology since 2010. He served in the program committee for the 55th Annual Meeting of the Society for Cryobiology (CRYO2018) and as the guest editor for Journal of Visualized Experiments for the method collection about cryopreservation.

Vision Statement: I believe that the Society should play a strong and bridging role in the field of cell and gene therapy which has quickly became an emerging therapeutic modality with the potential to treat and even cure a wide range of diseases. As the CGT field has pivoted to develop and manufacture allogeneic cell therapy products, cryopreservation becomes critically important for these products to be truly "off-the-shelf". On one hand, cryopreservation enables the last-mile delivery of life-saving cellular therapies, generating frozen drug products that can be stored and transported in an appropriate cryogenic environment while maintaining potency and safety. Cryopreservation, on the other hand, is interwoven with the entire manufacturing process from starting materials to final drug products and contributes to the establishment of a well-defined and well-controlled manufacturing process for cellular therapies. Based on my experience, however, there is still a significant mismatch between the urgent need of robust cryopreservation processes in the CGT industry and the current scientific innovation and technical development in academic labs. In some cases, this mismatch is caused by the lack of transparency between industry and academia. But, in other cases, there is simply no effective pairing mechanism to match the cell therapy developers with the right expertise or talent in cryopreservation. I believe the Society is in a unique position to address this pressing challenge from several different angles. For example, the Society can strengthen its focus on the area of cell and gene therapy drug product development, promoting the research of CGT cryopreservation in its annual meetings and ad hoc conferences where industrial stakeholders can learn the most innovative cryopreservation technologies and academic researchers can understand the biomanufacturing processes. Also, the Society can foster pilot collaboration programs that bring together CGT developers, cryopreservation technology providers, and academic research labs. Moreover, I would suggest the Society to invest further in its job posting and networking functions to build an exclusive talent pool specialized in cryopreservation. Given my current position, I am not only a strong advocate for these ideas but willing to lead from my seat to make it happen.

Declaration of Competing Interest: I have no actual or perceived competing interests in relation to the position for which I am a candidate.

Candidates for Governor Candidates (2022-2024)

Kelvin Brockbank, Ph.D.
Tissue Testing Technologies LLC, South Carolina, USA

Biography: Kelvin has a BA and MA in Zoology from Trinity College, Dublin, Ireland and a PhD in Experimental Pathology from the Medical University of South Carolina. He is currently the Founder and CEO of Tissue Testing Technologies LLC, a Research Professor, Department of Bioengineering, at Clemson University and an Adjunct Professor, Department of Regenerative Medicine, at the Medical University of South Carolina. His mission is "preservation of biological materials for restoration of patient health". Central to this mission is the definition and design of cold chain conditions for living biological products. He has a broad background in low temperature biology with

focus in two areas, subzero storage methods of cells and tissues and above zero hypothermic storage and transport of cells, tissues and organs. Kelvin has successfully managed company-sponsored and competitive grant funded projects in his more than thirty years of project management experience and maintained a high publication rate for a corporate scientist with 372 presentations, 38 US patents, 42 proceedings and book chapters and 144 peer reviewed publications to date. Funding agencies have included the NIH, the NIST-Advanced Technology Program, Cancer Foundations, the Department of Defense and various commercial contracts. His work has resulted in a clinical stem cell product for LifeNet Health, cryopreserved cardiovascular products for CryoLife and the LifePort Kidney Transporter for Lifeline Scientific. He also initiated research and development on SynerGraft decellularized tissue products for CryoLife and made significant contributions to a tissue engineered patch graft distributed by Organogenesis. Lifeline Scientific was successfully launched via an initial public offering on the London Stock Exchange with over 150,000 kidneys transplanted using the LifePort® kidney platform. His last company, Cell & Tissue Systems, was acquired in 2014 for its pancreas and liver organ perfusion intellectual property. A liver perfusion/transport device incorporating their liver intellectual property is presently in a 9 center US clinical trial. Kelvin has been involved in regulatory filings for tissue products including investigational device exemptions (IDEs), premarket approval (PMA) and 510k applications. He was responsible for regulatory affairs and quality control at Lifeline Scientific during the early phases of the LifePort® Kidney Transporter development.

His current company, Tissue Testing Technologies LLC, is primarily supported by US Federal grants, commercial contracts, and GMP Unisol™ solution sales for research preservation purposes. Lead projects at his Company include DMSO-free cryopreservation methods for stem cells and peripheral blood cells, ice-free vitrification of complex tissues, automation of cryopreservation protocols and optimization of hypothermic storage methods for cells, tissues and organs.

Kelvin attended his first Cryobiology Society meeting in 1986 and has been a member since 1992 with frequent contributions to annual meetings including being on the organizing committee for the Atlanta Society meeting in 1993. At present he is a frequent manuscript reviewer for the journal and a member of the Editorial Board.

Vision statement: I became involved in the Society because of opportunities to share my research, get expert criticism, and learn about low temperature biology and physics. My career has been influenced by the contacts and friendships I have made in the Society starting with Greg Fahy in front of one of his posters in 1986. One of the downsides of being a commercial scientist is the absence of the young people that most of our Society members have working in a learning environment. Therefore, I have particularly enjoyed the opportunity to meet and work with students and young faculty members during my almost 30 years of Society membership and 35 years of Society meetings. I agree with other Society members that the goals of the Society should be to both promote the science to outside groups and to continue creation of a welcoming environment for members new and old. I welcome and will encourage the strategies laid out by other candidates for Society positions, past and present, for getting increased student and young investigator involvement and their retention. I also strongly support the diversity of research areas and people in the society. Over the years I have learned most from plant and animal lessons from nature sessions at Society meetings and from attendees with diverse backgrounds that I have then applied to my own work.

Where could the Society do more? I would like to encourage efforts towards getting more industrial scientists involved in the Society. The present, thanks to the Covid-19 pandemic, is a great time to try to get them involved since the vaccine storage issues have placed low temperature biology center stage. Increased financial support for our conferences would follow more involvement of industrial scientists. Furthermore, we could do more to educate the World on low temperature biology. Short courses and webinars on freeze tolerance, freeze avoidance, impact of warm and cold ischemia, cryopreservation, shipping, and any other issue important for so called “cold chain” issues related to storage and transport of biological materials. This would also increase Society exposure, recognition

and membership as well as introduce new technologies developed by our members to other scientists and engineers who are still using archaic methods developed in the last century.

Declaration of Competing Interest: I have no actual or perceived competing interests in relation to the position for which I am a candidate.

Raquel Folgado, Ph.D.

The Huntington Library, Art Museum and Botanical Gardens, USA

Biography: Raquel Folgado serves as Cryopreservation Research Botanist at The Huntington Library, Art Museum, and Botanical Gardens (San Marino, California). She leads a cryobiotechnology program that involves conservation science projects on avocado and wild plants. Dr. Folgado joined The Huntington as a post-doctoral cryopreservation fellow in 2014, and her work focuses on developing and optimizing methods for the long-term storage of plant germplasm. Her scientific interest extends to a better knowledge of the nutritional requirements of plants in tissue culture conditions and their tolerance to abiotic constraints, which will help standardize cryobiotechnology tools for long-term plant conservation. Her work also commits to training users from other institutions and collaborations with researchers worldwide to exchange knowledge and skills in cryobiotechnology and plant abiotic stress. Native from Spain, she holds a B.S. in fundamental biology and biotechnology from the University of Oviedo (Spain) and a Ph.D. from Katholieke Universiteit Leuven (Belgium) in bioscience engineering.

Vision Statement: I have been a member of the Society for Cryobiology since 2015. However, my first contact with cryobiology was during a workshop on plant conservation when I was a grad student, and it rapidly became a field that interested me. The participation in the SfC annual meetings positively impacted my education and career as a cryobiologist. As a member of the SfC I could better access mentorship from other cryobiologists, specially cryobiophysicists. Then I had the opportunity to serve on the Awards Committee and the Student Committee, and now I would be honored to serve the Society as a Governor. The SfC has a crucial role in highlighting the last findings in the field, both in basic and applied sciences. The special sessions in less represented disciplines (plant, animal, ecology) should continue to be enhanced since they enrich the diversity of the science that concerns low-temperature biology. The support to students and young researchers is essential to maintain the growing tendance of this organization because they are the future. I am particularly interested in reinforcing the transference of knowledge inside and outside Society, ensuring visibility, and providing an environment to create new collaboration groups among sub-disciplines. The SfC could have a more significant impact on biodiversity conservation by promoting more training sessions in partnership with organizations such as FAO, or BGCI, which are already coordinating efforts in this regard.

Declaration of Competing Interest: I have no actual or perceived competing interests in relation to the position for which I am a candidate.

Victoria Keros, M.D. Ph.D.

Karolinska University Hospital and Institutet, Stockholm, Sweden

Biography: Dr. Victoria Keros developed a genuine interest in the field of Cryobiology and Cryomedicine through her experience as a physician-specialist in obstetrics and gynaecology, working at the women's clinic and applying among other cell and tissue therapy when treating patients with infertility and miscarriage problems. She graduated from the Kiev National Medical University in 1989, and after completing her Obstetrics and Gynaecology Residency (1995) joined the Department for Cryobiology of Reproductive System at the Institute for Problems of Cryobiology and Cryomedicine of NAS Ukraine.

As a PhD student and young scientist of the UNESCO Chair in Cryobiology, leading by Academician Valentin Gryschenko, Professors Colin Green and Barry Fuller sponsored by the International Medical Educational Trust - IMET2000 partnership programme for young physicians and biomedical researchers she was invited to be a visiting researcher at the Fertility Unit at the Karolinska University Hospital, where she carried out a part of her doctoral experimental work in the research setting of Karolinska Institutet, Sweden. After defending her thesis (2001) on "Cryopreservation of Human Foetal Testicular Tissue" she pursued a specialisation as a postdoctoral scientist further developing her research within cryopreservation of reproductive tissues and cells, and combining her broad specialisation as a clinician and a scientist played a key role in the multidisciplinary team, which developed and established a Fertility Preservation Program for Children and Young Adults at the Karolinska in Sweden. Being a senior scientist at the Karolinska Institutet and an internationally recognised scientist within the programme for fertility preservation and cryobiology of reproductive cells and tissues Dr. Keros contributes to the undergraduate and doctoral education, supervision of master's and PhD studies, lecturing on the national and international meetings and congresses, and as a reviewer of scientific publications.

Currently, remaining her interest to cryobiology and being a member of the Society for Cryobiology she applies her scientific knowledge and experience to the practical clinical application and continues research within the Reproductive Medicine Unit with a special interest focusing on fertility preservation and germ cells and gonadal tissues cryopreservation.

Vision Statement: As experience of the assisted reproductive technology shows, cryobiology is a rapidly evolving cross-professional research discipline with a real potential for broad clinical and industrial application such as it has made a major impact even during the bitter pandemic time. This is also where Dr. Keros believes the Society of Cryobiology plays a crucial role in further strengthening of this field with a focus on clinical applications of technologies, as an important instrument for clinicians to meet the needs of the patients and their families.

Meanwhile the medical and technical sciences are moving towards a higher level of specialisation with a closer collaboration opening up new opportunities but also asking new questions of a high dependency on a smooth interaction between the academia, practice and industry. Such an example, where Dr. Keros would contribute is the experience of the work at the Swedish Association of Local Authorities and Regions establishing national (later to become internationally recognised) guidelines on measures to preserve young people's reproductive capacity, where Dr. Keros contributed with her specialised competence and experience in cryobiology and cryomedicine, which would be a valuable addition to the Society in the sense of both competence and worldwide network.

In Vitro Fertilisation (IVF) and Assisted Reproductive Technologies (ART) were not clear areas 30 years ago, but it is a well-known routine of infertility treatment today. Reality shows that Cryobiology and Cryomedicine, while being highly investigated field by specialists and desired scientific area in everyday life, is still inefficiently recognised by society, even within a high-educated community. More educational efforts are needed for young specialists of different brancges, medical professionals, and politicians as well as general population to get knowledge about this scientific field and raise an importance of Cryobiology.

The Society for Cryobiology already plays an important role, but at the same time has a potential to become an even a greater leader in order to strengthen the current network of scientists as well as pioneer in this field by means of establishing new ways of engaging professionals in the development of this area as well as spreading the knowledge to a wide range of actors, possibly opening up to new opportunities in cross-professional development.

Declaration of Competing Interest: I have no actual or perceived competing interests in relation to the position for which I am a candidate.

Estefania Paredes, Ph.D.
University of Vigo, Spain

Biography: Estefania Paredes is a Research professor at the Universidade de Vigo, Spain. She received a degree in Oceanography from Universidade de Vigo in2008. Estefania received her PhD in Oceanography in 2014 with several awards and honours from her own university and the Royal Academy of Doctors of Spain as well as a patent. Her PhD focussed on the Cryopreservation of marine invertebrate early-life stages and the development of applications for Ecotoxicology and Aquaculture. During her PhD years she enjoyed several research stays in New Zealand at Cawthron Institute under the direction of Dr. Serean Adams and in the USA at the University of Tennessee under the direction of Dr. Peter Mazur and his research fellows, Dr. Stanley Leibo and Dr. Fritz Kleinhans.

She moved to Mazur´s lab in 2014 for her postdoctoral Fellowship until 2016. Here she focussed her interest on vitrification and ultra-fast laser warming working in several test organisms like mice, zebrafish or yeast. During her postdoc years in the US she participated in projects funded by the NIH or SBIR from the US government. In 2017 she moved back to Spain and became involved in several projects that obtained H2020 European funding to start her own lab as young faculty at the marine research station ECIMAT that belongs to the Universidade de Vigo. She led the Marine Biological Resource Functional Preservation Service at the Universidade de Vigo for three years (2017-2020), which is tightly involved in the EMBRC "European Marine Biological Resource Centre". In 2020 she received a Juan de la Cierva funded position to continue her work at the same University as a first step of the tenure-track path in Spain. She currently serves as Associate Professor to the UNESCO chair in Cryobiology as well.

After being in the research field of cryobiology since 2008 when she started her PhD, Estefania's current research interests are: the development of cryopreservation protocols for marine organisms using the latest technology and methods available within the cryobiology community; studying the specific challenges of applying vitrification to aquatic species; and furthering the basic knowledge on marine organism's cells and behaviour during cryopreservation both from the theoretical and practical point of view. Estefania has worked in developing cryopreservation protocols for over a dozen species of marine invertebrates, over 50 species of marine microalgae, mollusc cancerous cells, mice, zebrafish and yeast.

She has been a member of the Society for Cryobiology since 2010 and she has been awarded with the student travel award several times and later she has organized, chaired and co-chaired several sessions in the 2015, 2016, 2019 meetings in Ostrava, Ottawa and San Diego, as well as during the online meetings in 2020 and 2021. Dr. Paredes has also been active with the International Young Cryobiology Researchers (ICYR) group, she was involved in different parts of the organization of the ICYR activities in 2016 and 2017. She currently serves as Chair of the Awards committee.

Vision Statement: The cryobiology research community has two very unique qualities, first of all it is highly interdisciplinary, which is a source for new approaches and ideas. Secondly, but not less important, the cryobiology research community is quite tightly interconnected and interrelated and that is mostly due to the role of the Society for Cryobiology and its efforts to provide an open environment for researchers to interact, exchange ideas and work together. I believe these two factors must be treasured and everyone in the Society has/knows something that will contribute to the advancement of the field and that makes us stronger as a discipline.

I would be honoured to serve the Society as a Governor-at-Large for another term. If elected, I will continue pursuing the following initiatives: I would like to keep promoting and caring for the role of the student members as I have been these last years and I will continue my dedication to the Awards

Committee. I would like to pay special attention to ICYR as soon as we go back to meeting in person and continue my involvement in this activity and the communication with the new young members. I would also like to promote and reinforce the presence on the Society in Social Media and Media in general, as a means for the younger members to keep in touch and minimize the gap between professors and students to facilitate interaction. Finally, I am also interested in enhancing the role of postdocs and young faculty in the society by encouraging them to take part in the committees and ensure their continuity in the Society along their career, I have already been doing so by encouraging them to take part as jurors for the Best student Poster Competition for example.

I strongly believe that Investing in the actual students, postdocs and young faculty that, will become the leaders of their fields in the future, is a good way to ensure the long term good health of the Society.

Declaration of Competing Interest: I have no actual or perceived competing interests in relation to the position for which I am a candidate.

Ramon Risco, Ph.D.
University of Seville/SafePreservation, Spain

Biography: He studied his Secondary School at Seville under the teaching in the mathematics of Jose A. Alonso, who would later be Chief of the department of Artificial Intelligence at the University of Seville for several decades. He finished the degree on Theoretical Physics at the University of Granada, winning a fellowship from the Junta de Energia Nuclear, Madrid, to work on Nuclear Fusion (Tokamak). He did his PhD on the EPR paradox, proposing different local hidden variables theoretical models for all Bell's experiments based on de Broglie-Bohm theory, as well as on the Zero Point Field of stochastic quantum optics. Later, he would be part of the team, together with Michler and Weinfurter in A. Zeilinger lab (Innsbruck) which experimentally achieved Remote State Preparation of PDC photons, an early version of what later would be known as Quantum Teleportation. Finally, in Special Relativity, in collaboration with Franco Selleri, he would derive a set of transformations factually indistinguishable from Lorentz transformations, based on the homogeneity of absolute space, aimed to join quantum theory and relativity. Back in Spain, he founded the research group ”Quantum Mechanics” of the University of Seville, being this his last contribution to the field.

Afterwards, he then began to work in the field of biotechnology, in particular in cryopreservation, with the goal of cryopreservation of organs. The first step consisted in forming a fusion protein joining a Macrozoarces Americanus AFPIII dimer with a protein transfection domain (PTD), penetratin, with the idea of internalizing this AFP within the organs (unpublished). This was followed by studies on the influence of ultrasound on ice nucleation processes. He continued his training at the Center for Engineering in Medicine under the direction of Prof. M. Toner. There he explored the use of lasers in cryopreservation and the advantages of nitrogen slush and quartz capillaries in vitrification processes. There he also explored the use of magnetorheological fluids in order to increase their viscosity several orders of magnitude with the simple utilization of an external magnetic field. Back in Spain, he found an application of these fluids for the rapid rewarming of frozen samples under the action of microwave radiation. He also explored various ways capable of cryopreserving C. elegans, even in adult stage and in strains that freeze poorly, with an efficiency close to 100%. He also developed mathematical models of freezing in the case of non-ideal electrolyte solutions. All this led him to found the company SafePreservation, dedicated to cryopreserving in excellent conditions, different cell types. Always with the idea of advancing in the cryopreservation of organs, he proved the usefulness of X-ray CT in monitoring the perfusion of cryoprotective solutions based on DMSO, as well as visualizing the eventual growth of ice crystals, also of relevance in Slow Freezing, and the appearance of fractures. This drove him to develop various strategies for ovarian tissue preservation,

one of them based on step-by-step vitrification. He is now exploring ways for rewarming vitrified organs and optimizing cryopreservation techniques for human oocytes and embryos.

Vision Statement: Cryobiology still has an important unfinished business: solving the problem of organ cryopreservation. When achieved, it will mean a revolution not only in medicine but also in the whole of society. With the help of the production of organs on demand, the cryopreservation of organs will give us a resource of unimaginable potential to tackle a large part of the most mortal diseases that afflict the human being.

Since the birth of cryobiology, important progress has been made in understanding the physical, chemical and biological processes that govern it, trying to combat the toxicity of cryoprotectants, and to improve relevant imaging techniques. However, today it seems clear that a key piece that still needs to be solved is to achieve rapid and uniform rewarming of the organs. At least in the case of cryopreservation through vitrification, the importance of the warming rate, although known for a long time, has had its maximum exponent in an indisputable way in the last works of P. Mazur with oocytes. The importance of high warming rates has come to occupy a predominant role throughout the process of cryopreservation. From the development and improvement of rewarming techniques, we believe that not only the field of cryopreservation of organs in particular will benefit, but also all biological systems susceptible to be cryopreserved, in general, with applications ranging from the logistics of cell therapy, the improvement of plant preservation techniques, the development of bioreactors, the conservation of countless tissues for transplantation,…to one of the its most important uses: the preservation of the biodiversity.

Declaration of Competing Interest: I have no actual or perceived competing interests in relation to the position for which I am a candidate.

Boris Rubinsky, Ph.D.
University of California Berkeley, USA

Biography: This year is the 50th year anniversary of my work in the field of cryobiology, which began with my MSc at the Technion under the supervision of Professor Avraham Shitzer. My first paper in cryosurgery was published in 1976, and was part of a MSc thesis done throughout a five year service in the Israeli Army. I will be forever grateful to Professor Ernest Cravalho who supervised my PhD at MIT. He was the person who influenced my career, more than anyone else. There is no doubt that my career would have been very different if not for him. After graduating from MIT in 1981, I joined the faculty at Berkeley, where I have been since and where I hope to stay for the foreseeable future. I was involved in engineering research in cryosurgery and cryobiology throughout my career at Berkeley. Throughout my academic career I have also combined fundamental research with entrepreneurship. In research, I collaborated with Dr. Gary Onik to pioneer imaging monitored cryosurgery – which is now the standard way in which cryosurgery is done; directional solidification; and the use of antifreeze proteins in cryopreservation as well as many other fundamental studies in cryobiology. In entrepreneurship I co - founded Cryomedical Sciences (the first multiprobe cryosurgery system – a concept made possible by imaging monitoring of cryosurgery), A/F Protein, Aqua Bounty Technologies and their spin-offs. In the 1990's I began to branch out into bioelectronics, first with electrical impedance tomography, followed by the design of the first chip that combined a living cell with electronics and pioneering the concept of Non-Thermal Irreversible Electroporation (NTIRE). While irreversible electroporation was known, I have come up with the hypothesis that if irreversible electroporation can be done without any thermal effects it would have clinical applications that extend beyond any known tissue ablation mechanism that employs thermal effects, because the extracellular matrix will be spared. In 2006, I took a one year unpaid leave of absence from UC Berkeley and together with Paul Mikus and Dr. Gary Onik, we single handedly, just the three of us, brought the concept of NTIRE from hypothesis to clinical reality and FDA approval. Our company, Oncobionic was bought by Angiodynamics in 2008, and the

technology is now commercialized as the NanoKnife. Following the sale of Oncobionic I took early retirement from UC Berkeley, where I am now a Professor of the Graduate School, i.e. I serve as a faculty without drawing a salary. During that period I also founded the Center for Bioengineering in the Service of Humanity and Society at the Hebrew University whose focus was to bring together Israeli and Palestinian students. My former PhD students from the Center are now Professors at the top Israeli and Palestinian Universities. In 2010 I returned to Berkeley full time. I also began to collaborate with scientists in my country of birth, Romania, where I have PhD students supervising privileges at the Bucharest Polytechnic. In the mid 2010, thanks to Dr. Sebastian Gewa extraordinary vision, I returned to work on isochoric cryopreservation, a concept that I began to pursue in the very early 2000's and which I dropped because of lack of funding. Currently my research interests are in 3D cryoprinting and isochoric cryopreservation.

Vision Statement: Cryobiology is an interdisciplinary field and it benefits from interdisciplinary input. Engineering plays a major role in any life sciences field. There is a saying – you can make new contributions to science only by using new devices and new technologies. This is something that many scientists in life sciences, who focus only on the outcome of their research with biological matter without paying attention to the fact that their research is enabled by devices, do not recognize. In my vision I am inspired by the outstanding contribution of Professor Cravalho to the field of cryobiology, which is probably not properly recognized by many in the cryobiology community. Almost every bioengineer in the cryobiology community, including such luminaries as Ken Diller, Mehmet Toner and John Bischof are first , second, third and probably forth generation of Professor Cravalho's PhD students. I believe that the field of cryobiology will benefit from bringing more bioengineers into the field and this will be my goal.

Declaration of Competing Interest: I am involved in many start-ups, some of which may be perceived as carrying with them a conflict of interest. They include, BioChoric, VitriChoric, CryoE, A/F Protein. I intend to bring to the attention of the elected President of the society any situation that may involve the appearance of a conflict of interest for total transparency.

Shinsuke Seki, Ph.D.
Akita University, Japan

Biography: Shinsuke Seki is an associate professor at Akita University, Japan. During his PhD at Kochi University, Japan, in 2001, he started his research in the field of cryobiology, focusing on the cryopreservation of mammalian gametes/embryos or fish gametes/embryos (his supervisors were Dr. Magosaburo Kasai and Dr. Keisuke Edashige). As a post-doctoral research fellow in Dr. Peter Mazur's laboratory (2007–2011), he investigated intracellular ice formation by recrystallization during warming and reported that rapid warming is more important for successful vitrification rather than rapid cooling and that vitrification with rapid warming helps achieve high survival rates even with vitrification solution containing cryoprotectants at low concentrations. This finding represents a paradigm shift in cryopreservation by vitrification. It is noteworthy that ice crystals formed during cooling are small and that the subsequent warming should be rapid enough to prevent recrystallization. Currently, studies have focused on rapid warming to develop new vitrification methods.

The embryos of medaka, a freshwater fish, cannot be vitrified even with rapid warming due to their large size (diameter, 1 mm). He vitrified the entire testes (including germline stem cells spermatogonia) of medaka and transplanted them into surrogate recipients in Dr. Yoshizaki's laboratory (2011–2014). By mating these surrogate parents, medaka embryos and individuals derived from cryopreserved testicular cells were produced. He has been developing cryopreservation methods by rapid warming or cryopreservation of germline stem cells of fish.

Vision Statement: Cryobiology, an important field of science, has been applied in biomedicine, assisted reproductive technology, and reproductive biotechnology in experimental animals and domestic animals. Organ cryopreservation has an important application in medicine. To develop cryopreservation methods, it is important to promote both fundamental and applied research in biomedical and agricultural fields. Although cells can be cryopreserved, understanding the chemistry and physics of the process is important for successful cryopreservation, which also requires the assistance of mechanical engineers. The interaction of cross-disciplinary knowledge and technologies is essential for the development of new methods of cryopreservation. Researchers are aware of this fact, and they should continue to respect scientific diversity in cryobiology. The Society for Cryobiology should help gain more knowledge and develop such successful collaborative relationships.

My first meeting of the Society for Cryobiology was in Minneapolis (U.S.) in 2005. I gave an oral presentation and interacted with many cryobiologists; established cryobiologists are cordial. I am trying to attend as many annual Cryo-meetings as possible. The Society for Cryobiology should promote the science and continue to create a welcoming environment for new cryobiologists. Because it is not easy to survive as a researcher, the Society for Cryobiology should support young investigators through publishing papers in Cryobiology Journal and awards for achievements in the field. Because the Society for Cryobiology should be established as an international organization, I stand.

Declaration of Competing Interests: I have no actual or perceived competing interests in relation to the position for which I am a candidate.