Society for Cryobiology 2020 Election
Candidate Biographies and Vision Statements
Election Dates: October 12 - 26, 2020

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. The email will contain a personalized one-time use voting link to cast your vote anonymously at simplyvoting.com. If you do not receive your voting email within 24 hours of the election opening please check your spam folder and then contact admin@societyforcryobiology.org urgently.

Candidates for Governor-at-Large (2021-23)

- **Baust,** John M.
- **Kilbride**, Peter
- **Risco,** Ramon
- **Shu,** Zhiquan (Andy)
- **Tessier,** Shannon
- **Walters,** Christina

Voting Method: Each voter is assigned 100 points to allocate to one or more candidates e.g. a voting member could give one candidate all 100 points, or divide points between any number of selected candidates. All candidates are ranked by total number of points received, with the top 3 candidates named as the winners.

John M. Baust, PhD

CPSI Biotech, USA

Biography: John M. Baust, Ph.D. is the President and Lead Scientist of CPSI Biotech. He received his Bachelors of Science in Entomology from Cornell University (1998) followed by a PhD in Biological Sciences (Cell and Molecular Biology) from Binghamton University (2001). Dr. Baust's PhD research focused on the molecular response of cells to cryopreservation and how control of this response can improve cell survival and function. This research led to the discovery of cryopreservation-induced delayed-onset cell death, for which he was awarded the Peter L. Steponkus Crystal award in 1999. During this period, he was also a member of the founding team of BioLife Solutions, Inc. for which through his research he developed CryoStor. Baust completed post-doctoral studies under Dr. Mehmet Toner at the Center for Engineering in Medicine (Harvard Medical School and Massachusetts General Hospital) where his focus shifted to investigating the initiation of cell stress and death signaling cascades during dry state preservation. Upon completing his post-doc, Dr. Baust founded CPSI Biotech, a bio/medtech greenhouse technology development company, focused on the integration, development and translation of cryobiological principles and discoveries in the engineering and life science from the R&D bench to the bedside. Baust's current work focuses on the development of new cryoablation devices and strategies for the treatment of pancreatic, bladder and breast cancer as well as cardiac arrythmias. This research includes the development of next generation anticancer treatments incorporating the combination of low dose chemotherapy and/or immunotherapy with cryoablation. Additionally, he is developing several new devices and strategies for the improved cryopreservation of stem cells. These projects are funded by several ongoing NIH grants for which Baust is PI. Dr. Baust has been instrumental in the advancement of the field of cryobiology into the molecular biological era focusing on signal transduction

and apoptosis. He has authored over 100 papers, reviews, and book chapters and is an inventor on over 50 issued patents focused on cryoablation and cryopreservation technologies. These efforts have resulted in CPSI twice receiving the Small Business Technology Council National Tibbetts Award (2006, 2013) as well as Baust being named to the America's Registry of Outstanding Professionals (2003 and 2014) and Cryogenics Society of America, Young Faces - Next Generation in Cryogenics (2014). Dr. Baust has been a member of the Society for Cryobiology (SfC) since 1998. In service to the SfC, he has served on the Board of Governors (2003-2010), annual meeting Scientific Committees (2002, 2006, 2019, 2020, 2021), the membership committee (2006-2010) and the Program Committee for Cryo2002. He has also served on the Board of Governors, including as Treasurer, for the American College of Cryosurgery (2013-2016).

Vision Statement: My vision is simple: The SfC must establish a leadership position in the ever-growing fields of biotechnology and biomedicine so as to guide the development and use of cryobiological-based advancements. To accomplish this, the SfC needs to embrace, recruit and welcome industry, clinical medicine, and researchers from other disciplines to engage with the SfC through meetings, membership and publishing in our journal. Recent advances in the biomedical areas of reparative and regenerative medicine (i.e. tissue engineering, cell therapy, etc.) as well as cancer therapy have placed new demands on the cryobiological sciences (Cryo). As a result, we are experiencing new challenges and undergoing notable changes due to Cryo serving as an enabling platform for numerous disciplines. Unfortunately, all too often, outside groups do not turn to the SfC for guidance but seek out ad-hoc assistance from select individuals, the majority of whom are not involved with the SfC. As a long standing SfC member, I believe we have a duty to encourage, foster, and guide this development proactively and position the SfC as the "go to" experts for researchers and industry alike. Accordingly, I will work with the Board to accomplish goals that serve the Society's and discipline's best interests in the future. As a member of the Board, I will encourage the development of an agenda that enhances our discipline's visibility and work towards implementation of the following initiatives. First, it is critical for the SfC to establish and strengthen relationships with other societies, journals, and the bio/medtech industry segments. Expansion will not only increase SfC exposure but will also help expand our membership base. Second, it is in the SfC's long-term interest to systematically expand our corporate membership base. Involvement and training of industry dependent on cryobiological principles such as cell and gene therapy, reparative medicine, cell and tissue repositories and tissue ablation is critical for our future. This a lofty goal and one the SfC has been working towards for several years. As the exponential growth in use of cryo in the areas of cell therapy, cancer ablation, and cardiac arrythmia management is being led by industry, we have a unique opportunity to engage industry, encouraging their R&D and clinical personnel to become involved with the SfC through membership, meeting attendance/ presentations and publishing in our journal. Make no mistake, industry and clinical medicine will lead the translation of cryobiological discoveries in the next decade and as a Society we must engage now or become an afterthought. Third, I intend to work with fellow BOG members to move the satellite workshop program forward with the goals of introducing, educating, and training researchers in a broad scope of new methodologies being utilized in cryopreservation and cryoablation today. While disciplinary involvement and training are important to support the diverse group

within biotechnology, education of SfC members is equally important. One of my goals is to work to establish pre-meeting workshops which are attractive to industry and/or clinicians as a mainstay at the annual meetings for years to come. Fourth, engagement of clinical medicine has now reached a critical point. Cryo is now being used clinically to treat 100's of 1,000 of patients annually globally. New devices, therapies, clinical trials, etc. which incorporate Cryo now appear quarterly yet few of these developments are presented at our annual meeting or published in our journal. One of my goals is to increase the clinical medicine component of Cryo at our annual meeting. As a society we do an excellent job featuring discovery science across a broad scope of areas from plants to gametes to cell and tissue research. My hope is that this can be supplemented with presentations and/or sessions highlighting the clinical translation of our labor of love, cryobiological research, "from the bench to the bedside". As a member of the Scientific Committee and Session Chair for the last few annual meetings, we have laid the groundwork for this initiative – now we must expand. Lastly, the overall success of these initiatives and long-term stability of the SfC is only as strong as our young and new researcher base. The SfC has embraced this in recent years providing motivation and incentives to students to become and stay involved with the SfC. This must continue to be encouraged to further increase the level of enthusiastic involvement in the SfC for not only students, but also new investigators from other disciplines.

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

Peter Kilbride, PhD

Asymptote, Cytiva (formerly GE Healthcare Life Sciences), United Kingdom

Dr Peter Kilbride has been the Senior Research Scientist at Asymptote in Cambridge, UK, since 2015. In his position he has been involved in and managed a range of projects, including: Non-Newtonian cryopreservation techniques; Developing large volume freeze-drying protocols for entomopathogenic fungi; Developing optimal cryopreservation techniques for regenerative medicine applications such as T-cell therapies; Working with GMP compliant cold-chain delivery; and Designing and constructing specially designed cryolab facilities. These projects have received internal and external funding from Innovate UK.

Dr Kilbride obtained his Ph.D from University College London in the field of "Mathematics and Low Temperature Biology", in a joint program with Asymptote. His Ph.D focused on large volume cryopreservation of a bio-artificial liver for clinical delivery. His undergraduate program was in Physics at King's College London, with his final project examining the detection of oral cancers using novel spectrographic techniques. A principal aim of his research involves linking together developments from different fields to benefit cryopreservation problems.

Dr Peter Kilbride has published fourteen first author papers in journals including Cryobiology, Tissue Engineering, PLoS One, PeerJ, Scientific Reports, and BioResearch Open Access, as well as registering 7 cryobiology related patents to help bridge the gap between academic research and commercial opportunities and funding.

Since 2013 he has been actively involved in the Society for Cryobiology including organising the ICYR events and for the 2016 conference and organising student moderator sessions for the 2017 meeting.

He has been awarded the 1st prize at the 2015 Organ Banking Summit; 1st prize for the Medical Research Council's Centenary Challenge writing competition in 2013; and best student presentation at the 2013 Society for Low Temperature Biology Annual Meeting.

Vision Statement: If elected to the position of Governor in the Society for Cryobiology there are three primary areas I would like to develop further.

The first is to help increasing funding for the society through approaching more potential sponsors, in not just the cryobiology field, but those who use a cryochain for a final therapy

The second strand would be to help standardise the field and cement the Society as the go-to experts in cryobiology, through an increase in publishing general cryopreservation protocols and gold standard techniques to develop new protocols (such as criteria for post-thaw tests, time points, regulatory approval etc.). There are many cryo groups not involved in the society and as well as helping to standardise the field, this would increase the profile and perhaps membership of the society.

The third area I would like to pursue would involve increasing the profile of the Society in disparate cryopreservation groups, and increase industrial sponsorship of the Society in areas such as regenerative medicine where the criticality of cryopreservation is becoming more widely appreciated.

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Ramon Risco, PhD

University of Seville/SafePreservation, Spain

Biography: Ramon Risco 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, this being his last contribution to the field.

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. In particular:

I will propose the creation of an open international forum for discussion on problems in cryobiology. Anyone would have access to ask general or specific questions on the matter.

Also, I will promote the creation of an online cryobiology course, to be offered to different universities around the world as part of the training of their undergraduate or graduate students.

I will seek alliances and collaborations of the SfC with other institutions: national and international transplant societies, tissue banks, universities, research centers and hospitals.

Finally, I will try to promote the creation of a research institute dedicated exclusively to problems of stabilization of biological material, capable of attracting young talents from all the fields involved in the matter: doctors, pharmacists, biologists, physicists, computer scientists, engineers, ...

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Zhiquan (Andy) Shu, PhD

University of Washington, USA

Biography: Dr. Shu is an Assistant Professor at the School of Engineering and Technology, University of Washington (UW) Tacoma, the Associate Director of the Center for Cryo-Biomedical Engineering and Artificial Organs and an Affiliate Assistant Professor at UW Seattle. Dr. Shu obtained his Bachelor's degrees in both Mechanical Engineering and Computer Science from the University of Science and Technology of China in 2001, and his Master and PhD degrees from the University of Washington in 2009 and 2013, respectively. After that he worked as a postdoctoral research fellow at UW from 2014 to 2015 with funding supports from NIH and Bill & Melinda Gates Foundation. Then he worked at the Washington State University Everett as a Clinical Assistant Professor until joining UW Tacoma in 2020. Dr. Shu's research has been focusing on fundamental and applied cryobiology, development of novel methods, technology, and instruments for cryobiology study and cryopreservation applications, and optimal biopreservation of various types of cells and tissues, including red blood cells, hematopoietic stem cells, adipose-derived stem cells, peripheral blood mononuclear cells, immune cells, sperm, mycobacterium complex cells, islets, adipose tissues, mucosal tissues, carotid arteries, and others, by freeze-thawing, freeze-drying, or vitrification. Dr. Shu has published 5 book chapters, authored/co-authored more than 60 peer-reviewed journal papers, and many conference papers and abstracts. Dr. Shu is a Section Editor for the journal of Biopreservation and Biobanking, Editorial Board Member of a few other journals, and invited reviewer for about 20 scientific journals. Dr. Shu has been a member of the Society for Cryobiology since 2004. In the society, he served as the Treasurer in 2018-2019. In the last few years, he has also actively served our society on the Conference Program Committee, Student Awards Committee, Scientific Review Committee, or Session Chair (Session of Tools and Technology) for CRYO2017, CRYO2018, CRYO2019, CRYO2020.

Vision Statement: It was my great honor that I served our society as the Treasurer and other roles in the last few years. If elected as a governor, I would work with other colleagues on the board to foster the advancement of our society and the success of all of the members. We are living in a quickly changing world. We should be creative in promoting communication, exposure, and collaboration in this era of social media, cloud, and online sharing. My vision is that the officers of the society should lead to forge interactions with the outside and strengthen the bond inside the society. For the interactions outside, I propose to closely work with other societies or institutes, such as the International Society for Biological and Environmental Repository (ISBER), American Association of Blood Banks (AABB), even CDC, WHO, etc. on research, education, training, accreditation, and combating the shared urgent public health problems, such as establishment of the policy and guidance on the collection, shipping, storage, and processing of the COVID-19 biospecimens for the research and treatment. For the bonding in the society, I would work to promote the collaborations in our community, especially among young investigators, raise funding from national or international agencies to address some of the most challenging problems in cryobiology. Another idea is to facilitate mentoring within the community, promote awards and recognition, encourage career path boosting for mid-career faculty, have birthday/celebration parties for the senior members, etc. I would also like to initiate the discussion in the society on the education of cryobiology, especially the pressing demand on suitable textbooks for undergraduate and graduate studies.

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Shannon Tessier, PhD

Harvard Medical School and Massachusetts General Hospital, USA

Biography: Shannon Tessier is junior faculty at the Center for Engineering in Medicine and Surgery at the Massachusetts General Hospital and Harvard Medical School. In 2007, she received her B.Sc. in Biology from Carleton University with an area of concentration in molecular genetics. Subsequently, she received her M.Sc. and Ph.D. in molecular biology and biochemistry from Carleton University. While both her Master's and Doctoral thesis focused on understanding the molecular mechanisms which support natural suspended animation in a rodent model, the thirteen-lined ground squirrel, she also studied multiple forms of suspended animation across diverse phylogeny including squids, primates, frogs, and turtles. Dr. Tessier used a classical molecular biology and biochemistry approach and as a result acquired adept skills in physiology, proteomics, transcriptomics, bioinformatics, and immunohistochemistry, to name a few. For her next step as a postdoctoral fellow, she wanted to significantly diversify her expertise and focus on translational research that would impact society. As a result, in 2014, she stepped outside her comfort zone by entering the field of biomedical engineering at the Center for Engineering in Medicine and Surgery at Massachusetts General Hospital to translate lessons from nature to human cells that are important for diagnostics and therapeutics. Currently, as junior faculty, Dr. Tessier is leading a research profile aimed at overcoming barriers in regenerative medicine and organ transplantation, including introducing a new model system to interrogate mechanisms of ischemic injury, developing new approaches to limit *ex vivo* organ injury, and creating solutions for quantitative assessment of organ viability. Dr. Tessier has received several scholarly awards, including NIH K99/R00 Pathway to Independence award, American Heart Association Career Development Award, MGH Dept. of Surgery Eleanor and Miles Shore Fellowship, and MGH Claflin Distinguished Scholar Award.

Vision Statement: This is an exciting time to be working in the field of cryobiology since preservation approaches are critical enabling technologies for diverse sectors, including human health, biodiversity, and food supply. For example, stopping biological time holds the promise of making transplantable organs/tissues available to those who need them, decreasing the time and cost of drug development, helping to feed the world, protect living organisms from extinction, and enable planetary missions to Mars and beyond. Since cryobiology and biopreservation plays such a significant role in diverse fields, one area I would like to emphasize and develop further is engagement of diverse research scientists, clinicians, for profit and not for profit organizations, etc. This would grow the profile of the society and increase membership, but would also build new international relationships, foster interdisciplinary collaborations, and ultimately promote innovation. Secondly, the future of our society rests in the hands of the next generation of brilliant cryobiologists, so I would like to focus on work force development, including several career development initiatives and training opportunities. Specifically, this would include opportunities for trainees to engage with senior scientists, taking part in conference planning, workshops for grantsmanship, faculty applications, or CV preparation, etc. Thirdly, as a woman cryobiologist, I aim to create a sense of inclusion to every race, religion, gender, sexual orientation, age, socio-economic status, physical disability, etc. Therefore, another major focus would be to promote diversity in the society, ensure equal opportunity, and remove socioeconomic barriers in participation. Specifically, this could include developing international exchange programs with restructuring countries or funding for under-represented minorities and women to explore a

cryobiology-centered summer research project.

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Christina Walters, PhD

USDA-ARS-National Laboratory for Genetic Resources Preservation, USA

Biography: Christina Walters is Lead Scientist for the plant & microbe programs at USDA's National Laboratory of Genetic Resources Preservation (NLGRP) in Fort Collins, CO, USA. NLGRP is a premier biorepository devoted to preserving plant, animal and microbial germplasm that support agriculture. Under Dr. Walters' leadership, research conducted by the plant & microbe unit increases the efficiency and effectiveness of biobanking, by expanding the number and types of propagules banked, improving understanding of plant responses to cryopreservation stresses, and assessing impact of deterioration on the recovery potential of germplasm as well as genetic integrity of collections. NLGRP actively partners with land managers and conservation groups, such as Center for Plant Conservation (at San Diego Zoo Global), to biobank germplasm of US flora in support of plant biological diversity. Multidisciplinary expertise and state-of-art facilities available at NLGRP provide excellent recruitment tools for visiting scholars and professors from around the world who conduct research on cryobiological approaches or effects of long-term storage. Several of Dr. Walters' colleagues have continued in cryobiology pursuits, becoming long-term members of SfC.

Christina received her BS (Plant Sciences) and PhD (Botany) degrees from Cornell University, Ithaca, NY in 1981 and 1986, respectively. She came to NLGRP as a postdoctoral associate in 1986 and became Research Leader of the plant research program in 1999. In 2019, she was made Lead Scientist of the plant & microbe research and curation programs. Christina is a respected scientist with a career-long h-index score of 57 (GoogleScholar, visited 20Sept2020).

Dr. Walters' journey into cryobiology began with her PhD investigation of dry seeds and water regulation of metabolism. At the time, SfC was an important forum for debates about bound water and glassy matrices, and the kind mentorship from some of SfC's stalwart members (including and especially Robert (Bob) Williams from the American Red Cross) helped her to navigate the intensity as well as develop a sustaining curiosity about solid-state biology. Dr. Walters currently focuses on the natural engineering of solidified cytoplasm and the inevitable but subtle changes that occur over time leading to degradation -- even at liquid nitrogen temperatures.

Vision Statement: The Society for Cryobiology embraces a diverse group of professionals. Just about every organism (or cellular constituent) on the planet could be subject to cryobiological investigation; approaches can be highly theoretical to highly empirical; objectives can vary widely among groups running the gambit from human cryosurgery to microbial community ecology. Diverse questions about diverse organisms for diverse reasons with really different funding sources can be destabilizing, and it takes commitment to find balance and cohesiveness. Areas of commonality compel us to act like a society, that is, to participate, go to meetings, and initiate or encourage a collaboration. Therefore, I think it is leadership's responsibility to seek and encourage areas that are useful to the diverse interests of SfC membership. These might be fundamental

scientific principles of cryobiology, but can also be tangential issues that give context or breadth to current cryobiological applications. I believe meeting the challenge of satisfying members with scientifically rigorous, relevant, and perhaps peripheral contexts will take work, creativity and experimentation.

The cryobiology discipline is both unique and multidisciplinary, which presents a challenge for new cryobiologists to assimilate needed background and skills. A formalized curriculum is rare and on-the-job training is the norm. One also can't deny that our work is highly technical, and often unforgiving; learning from experts is an important path to success. Therefore, conceptual/technical mentorship must be a role of SfC. I envision a program to better link established cryobiology labs with aspiring cryobiologists. Online learning opportunities and chat groups are powerful tools to initiate interactions, but one-on-one exchanges or sabbatical visits are likely to have longer-lasting impacts. The vision, here, is for the Society to facilitate mentorship by diverse mechanisms such as staging pro/con workshops about concepts or instrumentation, having a cadre of "ambassadors" at meetings to facilitate introductions that might be difficult otherwise, or providing monetary incentives for exchange programs.

Our world is literally on fire causing a biodiversity crisis and we are in the midst of a pandemic where the best vaccines need cold-chain technologies. Could the benefits of cryobiology be more relevant? The promise of "buying time" during periods of rapid change is timely and a message from SfC should be one of hope that 'we got this' [and, of course, we should be celebrating our scientists on the front lines].

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