Biological Collections: Ensuring Critical Research and Education for the 21st Century

Committee

James P. Collins

Co-Chair

DR. JAMES P. COLLINS is Virginia M. Ullman Professor of Natural History and the Environment in the School of Life Sciences at Arizona State University. He is an evolutionary ecologist whose research group studies host-pathogen biology and its relationship to the decline of species, at times even to extinction. The intellectual and institutional factors that have shaped Ecology's development as a science as well as Ecological Ethics are other research foci. From 1989 to 2002, he was Chairman of ASU’s Zoology, then Biology, Department. At the National Science Foundation (NSF), Dr. Collins was Director of the Population Biology and Physiological Ecology program from 1985 to 1986. He joined NSF’s senior management in 2005 serving as Assistant Director for Biological Sciences from 2005 to 2009. Within the Biological Sciences Directorate, he oversaw a research and education portfolio that spanned molecular and cellular biosciences to global change as well as biological infrastructure. Dr. Collins currently serves as the Chair of the Board on Life Sciences.

Shirley A. Pomponi

Co-Chair

DR. SHIRLEY A. POMPONI is a Research Professor at Florida Atlantic University-Harbor Branch Oceanographic Institute and Professor of Marine Biotechnology in the Bioprocess Engineering Group at Wageningen University, The Netherlands. Dr. Pomponi received her Ph.D. in Biological Oceanography from the University of Miami. Her research focuses on marine biotechnology, and in particular, the development of sponge cell models to study how and why sponges produce chemicals with pharmaceutical relevance. She served on the President’s Panel on Ocean Exploration, was Vice Chair of the National Academies’ committee on Exploration of the Seas, and Co-Chaired the National Academies’ study on ocean science priorities for the next decade, “Sea Change: 2015 – 2025 Decadal Survey of Ocean Sciences”. She is also a member of the NSF Advisory Committee for Geosciences.

Andrew C. Bentley

Member

MR. ANDREW C. BENTLEY is Collection Manager of Ichthyology as well as the Bioinformatics Manager for the Biodiversity Institute and Usability Lead for the Specify collections management software project. He has an interest in marine fishes as well as all things collections (primarily alcohol preserved and Cryogenic tissue collections) and databases. His research interests include collection management, specifically of preservation, digitization, databasing and maintenance of wet and cryogenic collections. Mr. Bentley also has an interest in database development and usability. Bentley also serves as President of the Society for the Preservation of Natural History Collections (SPNHC) and is a member of the American Society of Ichthyologists and Herpetologists (ASIH). He earned his M.Sc. in Zoology from the University of Port Elizabeth, South Africa in 1996. He has not previously served on a National Academies Study.

Rick E. Borchelt

Member

MR. RICK E. BORCHELT is Director of communications and public affairs for DOE's Office of Science, which represents a $6.5B portfolio supporting the basic physical sciences. In addition to DOE, his career in science, communications, and public policy includes stints at five other federal science agencies – USDA, NIH, NASA, USIA, and the Smithsonian (where he was a graduate student curatorial assistant in the Lepidoptera collection); and tours of duty as a Congressional committee press secretary and as special assistant for public affairs in the Executive Office of The President/OSTP. His experience also reflects work for the National Academy of Sciences, Johns Hopkins University, Vanderbilt University, MIT/The Whitehead Institute, and the University of Maryland. He was a member of the National Academies' roundtable on Public Interfaces in the Life Sciences, and served on the National Academy of Engineering's study of engineering communication. He currently serves on the editorial board of the peer-reviewed journal Science Communication. He is a contract instructor for Graduate School USA in the Natural History Field Studies certificate program, jointly managed by the Audubon Naturalist Society of the Central Atlantic States. Areas of particular interest include trust in science, extension communication research, natural history citizen science, adult science learning in informal settings, and developing community-based public engagement in science.

Kyria Boundy-Mills

Member

DR. KYRIA BOUNDY-MILLS is curator of Phaff Yeast Culture Collection, Food Science and Technology, at the University of California, Davis. Dr. Boundy-Mills' professional expertise involve the study and expansion of the use of the Phaff collection. She has utilized and expanded the biodiversity of the Phaff collection to expand knowledge of interactions of agricultural insect pests with yeast, oleaginous (high lipid) yeasts, tolerance of yeasts to stresses including ionic liquids, and food fermentations. These publications each used numerous yeast strains, one using 180 strains belonging to over 100 different species. Since 2013, Dr. Boundy-Mills has served on the executive board of the World Federation for Culture Collections. Responsibilities include screening and approving new WFCC member collections, convening international conferences, and developing international standards for culture collection management. Since 2011, she has been on the steering committee of the NSF-funded US Culture Collection Network led by Kevin McCluskey, FGSC Curator (Kansas State U). The USCCN coordinates and promotes microbial culture collections in the US. She hosted the fall 2014 USCCN meeting at UC Davis. Through these avenues, she has learned of and promoted awareness of emerging issues affecting microbial culture collections and their users, especially the Nagoya Protocol of the Convention on Biological Diversity. She has co-authored numerous publications alerting the scientific public, especially US microbiologists, about Nagoya Protocol legislation. Dr. Boundy-Mills earned her Ph.D. in biochemistry from the University of Minnesota, Minneapolis in 1992. She has not previously served on a National Academies activity.

Joseph A. Cook

Member

DR. JOSEPH A. COOK is Regents Professor of Biology and Curator of Mammals, Museum of Southwestern Biology, University of New Mexico. Previously, he held tenured faculty and curatorial positions at the University of Alaska Fairbanks (1990-2001), was Chair of Biology at Idaho State University (2000-2003), and Director of the Museum of Southwestern Biology (2011-2017). Cook's research is highly collaborative and focuses on conservation, molecular evolution and systematics, producing >190 peer-reviewed publications, including the Recent Mammals of Alaska. He held the Fulbright Fellowship in Uruguay (1993), Rotary Fellowship in Bolivia (1997), Sitka Sound Science Center Fellowship (2013), was awarded the American Society of Mammalogists' Joseph Grinnell Award in 2016, and appointed UNM Regents Professor in 2018. He was President of the Natural Science Collections Alliance (2016-17) and chaired the international AIM-UP! Research Coordinating Network (RCN), which explored new ways to integrate collections-based digital resources into education initiatives. Moving from the tenth largest mammal collection in the US when he assumed leadership in 2003, the Division of Mammals has nearly tripled in size and is now ranked third in size, worldwide. Until 2017, he was also Curator of Genomic Resources, a frozen tissue collection for mammals that is unrivaled worldwide for size, diversity, global coverage, or the number of peer-reviewed papers on genomes, viruses and other topics that it produces annually (ca. 70). Over 25 years, he led two international field projects, one that sampled mammals and their parasites across more than 250 remote sites in Canada, Alaska, Siberia, and Mongolia and aimed to understand the biogeography of Beringia (Beringian Coevolution Project) and the other effort (ISLES) focused on the mammals and parasites of the Alexander Archipelago of Southeast Alaska, including the incomparable Tongass National Forest. Dr. Cook received his PhD from the University of New Mexico.

Lynn D. Dierking

Member

DR. LYNN D. DIERKING is a Sea Grant Professor in Free-Choice/Informal STEM Learning, Colleges of Science and Education, Oregon State University, and Director of Strategy & Partnerships, Institute for Learning Innovation. Her research focuses on lifelong learning, particularly free-choice learning (in after-school, home-, and community-based contexts, such as museums and libraries), with an emphasis on youth and families, particularly those living in poverty, and/or not historically engaged in STEM learning across their lifetime. Dr. Dierking publishes extensively and is on Editorial Boards for Connected Science Learning, Afterschool Matters and Journal of Museum Management and Curatorship. Dierking received a Ph.D. in Science Education in 1987 from the University of Florida. She received the 2016 Distinguished Contributions to Science Education through Research Award from NARST, an international organization supporting research on science learning and teaching, recognizing her contributions to, and creation of a research field focused on lifelong, free-choice/informal learning. Dierking was a 2013 Education & Human Resources Distinguished Lecturer at the U.S. National Science Foundation, in recognition of her leadership within the STEM education field. She also was a 2011 State Department Distinguished Keynote Speaker for International Council on Museums (ICOM) meetings in Brno, Czech Republic and the U.S. Embassy in Prague. She received a 2010 John Cotton Dana Award for Leadership from the American Alliance of Museums, the highest honor bestowed to a person outside the museum field, who exhibits outstanding leadership and promotes the educational responsibility and capacity of museums. She also was on the 2006 Centennial Honor Roll of the American Alliance of Museums as one of 100 leaders who had provided leadership and service to the field throughout their careers.

Scott V. Edwards

Member

DR. SCOTT V. EDWARDS (NAS) is Alexander Agassiz Professor of Zoology and Curator of Ornithology in the Museum of Comparative Zoology at Harvard University. He joined Harvard in December 2003 after serving as faculty for 9 years in the Zoology Department and the Burke Museum at the University of Washington, Seattle. His research focuses on diverse aspects of avian biology, including evolutionary history and biogeography, disease ecology, population genetics and comparative genomics. He has conducted fieldwork in phylogeography in Australia since 1987 and conducted some of the first phylogeographic analyses based on DNA sequencing. He did a postdoctoral fellowship in immunogenetics at the University of Florida and gained experience with studying the major histocompatibility complex (MHC) of birds, an important gene complex for interactions of birds and infectious diseases, pathogens and mate choice. His work on the MHC led him to study the large-scale structure of the avian genome and informed his current interest in using comparative genomics to study the genetic basis of phenotypic innovation in birds. In the last 10 years Dr. Edwards has helped develop novel methods for estimating phylogenetic trees from multilocus DNA sequence data. His recent work uses comparative genomics in diverse contexts to study macroevolutionary patterns in birds, including the origin of feathers and the evolution of flightlessness. From 2013-2015 Scott served as Director of the Division of Biological Infrastructure at the National Science Foundation, overseeing funding programs focused on undergraduate research, postdoctoral fellowships, natural history collections and field stations, and cyber- and other infrastructure for all areas of biology. He served as President of three international scientific societies based in the US—the Society for the Study of Evolution, the Society of Systematic Biologists, and the American Genetic Association—each of which publishes a scientific journal and has memberships ranging from 500 to 2500 scientists and students. He has served on the National Geographic's Committee for Research and Exploration, the Senior Advisory Boards of the NSF-funded US National Evolutionary Synthesis Center (NESCent) and the National Institute for Mathematical and Biological Synthesis (NIMBioS), and on the Advisory Boards of the National Museum of Natural History at the Smithsonian and the Cornell Lab of Ornithology. He oversees a program funded by NSF to increase the diversity of undergraduates in evolutionary biology and biodiversity science. He is a member of the American Academy of Arts and Sciences (2009), a Fellow of the American Association of the Advancement of Science (2009), and a member the National Academy of Sciences (2015). Dr. Edwards currently serves as a member of the National Academies' Board on Life Sciences.

Manzour H. Hazbon

Member

DR. MANZOUR H. HAZBÓN is a Senior Scientist at American Type Culture Collection (ATCC) overseeing ATCC's bacteriology laboratory operations and bioresources since 2013. Through his leadership position at ATCC, Dr. Hazbón employs a combination of microbiological knowledge and modern laboratory techniques to support infectious disease research. Dr. Hazbón represents ATCC in several national and international Scientific meetings through presentations of his scientific research findings and as a Subject Matter Expert for ATCC in global culture collection meetings. Dr. Hazbón is actively participating with the World Federation of Culture Collections (WFCC), the U.S. Culture Collection Network (USCCN) and the World Catalogue for Microorganism (WDCM). Dr. Hazbón has devoted most of his professional career to developing molecular assays to detect and identify respiratory pathogens, and in the study of the molecular mechanisms of drug resistance in Mycobacterium tuberculosis. Prior to ATCC, Dr. Hazbón was a Senior Scientist for Meso-Scale Diagnostics, LLC. In addition, Dr. Hazbón has served as a Microbial Genomes Curator for the National Institutes of Health from 2006 to 2008 and as a Senior Diagnostic Laboratory Scientist with Walter Reed Army Institute of Research from 2008 to 2010. Dr. Hazbón received both his Ph.D. and M.Sc. in Molecular Biology from the Free University of Brussels and his B.Sc. in Microbiology from the Universidad de los Andes.

Talia S. Karim

Member

DR. TALIA S. KARIM is the Collection Manager for Invertebrate Paleontology and Paleobotany at the University of Colorado Museum of Natural History (2010-present) and was previously the Invertebrate Paleontology Collection Manager at the University of Kansas Biodiversity Institute (2008-2010). Her research interests include trilobite systematics, biostratigraphy, taphonomy, museum collections care and management, digitization of collections, and cyber infrastructure as related to sharing museum data. Talia's interest in collections management extends into the classroom and she has taught, or co-taught, collections management related courses for the museum studies programs at the University of Colorado and the University of Kansas. She is an active SPNHC member and is currently serving as member-at-large. She is also the co-chair of the iDigBio Paleo Digitization Working Group. Talia received a B.S. in Geology and a BA in Classical Culture from the University of Oklahoma in 2001. She went on to attend Oxford University on a Marshall Scholarship and earned an MSc in Earth Sciences in 2004. She completed her PhD at the University of Iowa in 2009 focusing on Lower Ordovician Trilobite Systematics. Throughout her career, she has been a specimen-based researcher and focused on the critical role specimens and museum collections play in research and communicating science to the general public.

George I. Matsumoto

Member

DR. GEORGE I. MATSUMOTO is currently the Senior Education and Research Specialist at the Monterey Bay Aquarium Research Institute. With an AB degree from UC Berkeley and a PhD from UCLA, George's research interest focus on Ctenophores but include other gelatinous organisms especially those that live in the deep-sea. He also coordinates the MBARI summer internship program, educator professional development workshops, and works with the Monterey Bay Aquarium both as a volunteer and as a reviewer of science content. George has served on the National Ocean Studies Board (2008-2013), the National Marine Educators Association Board (2010-2016), was awarded the QuickScience Ocean Science Leadership Commitment to Education Award, and is an ASLO Fellow. He has served on a number of review boards for NSF, NOAA, GoMRI, and NAS and does his best to spend more time in or on the Ocean than on travel.

Pamela S. Soltis

Member

DR. PAMELA S. SOLTIS is a Distinguished Professor and Curator in the Florida Museum of Natural History and Director of the Biodiversity Institute at the University of Florida. She serves on the Executive Committee of the UF Genetics Institute and on several committees of the Museum and the Department of Biology and has recently served on the UF Graduate Council. She is Director for Research at iDigBio, the NSF-funded national center for digitization of biodiversity collections, where she works with the collections community and biodiversity scientists from around the world to develop and promote the use of herbarium specimens (and other natural history collections) in innovative research. She is President-Elect of the American Society of Plant Taxonomists and has served ASPT on the Council (1993-96), on the Honors and Awards Committee (1993-95; Chair, 1995), as a Cooley Award Judge (several years; Chair, 1995), and as a reviewer of manuscripts for Systematic Botany. She has also served her profession as President of the Botanical Society of America, President of the Society of Systematic Biologists, a Council Member for the Society for the Study of Evolution, the International Society for Phylogenetic Nomenclature, and the American Genetics Association, and an associate editor of numerous journals (currently, Board of Reviewing Editors, Science; consulting editor, The Plant Cell; previously, associate editor for Systematic Biology, Evolution, Molecular Biology and Evolution, Molecular Phylogenetics and Evolution, Taxon, Journal of Evolutionary Biology, Conservation Biology). She has received several awards for her contributions to the study of plant diversity, most notably the International Prize in Botany (Physiographic Society of Lund, Sweden), the Asa Gray Award (American Society of Plant Taxonomists), the Darwin-Wallace Award (Linnean Society of London), and the Botanical Society of America’s Merit Award, all jointly with Douglas E. Soltis. Dr. Soltis received a B.A. in Biology from Central College (Pella, IA) (1980), a Ph.D. in Botany from the University of Kansas (1986), and an Honorary Doctorate of Humane Letters from Central College (2017). She is a member of the National Academy of Sciences and the American Academy of Arts and Sciences.

Barbara Thiers

Member

DR. BARBARA M. THIERS is currently a Vice President and Director of the William and Lynda Steere Herbarium of the New York Botanical Garden, where she has been since 1981. From 2014 to 2017, Dr. Thiers oversaw the Garden's research division and continues to serve in an advisory role to the CEO and COO of the institution today. She earned her Ph.D. in Botany from the University of Massachusetts. Her research area is the systematics of the Lejeuneaceae, a family of leafy Hepatics. Since becoming director of the Herbarium, Dr. Thiers has managed and raised funds for the facility, which contains approximately eight million specimens. The Steere Herbarium is among three largest herbaria in the world, and the largest in the western hemisphere. Since 2008 she has managed the online resource Index Herbariorum, which is a directory of the approximately 3000 herbaria worldwide. In 2010, Dr. Thiers served on the NSF-funded committee to develop the NIBA (Networked Biocollections Alliance) strategic plan for the digitization of natural history collections in the U.S. This plan led to the establishment of NSF's Advancing Digitization of Biodiversity Collections funding program (2011-present). Currently she serves as a member of the External Advisory Committee for iDigBio, and the Biodiversity Collections Network Advisory Committee, BCON. She is also currently the President of the Society for the Preservation of Natural History Collections (SPNHC), vice president of the Natural Science Collections Alliance, and a member of the external advisory committee for the Harvard University Herbaria.