

BIOSCIENCES EXPERT ADVISORY COMMITTEE

R. Alta Charo, JD

UNIVERSITY OF WISCONSIN LAW
SCHOOL



R. Alta Charo is the Warren P. Knowles Professor of Law and Bioethics at the University of Wisconsin at Madison, where she is on the faculty of the Law School and the Department of Medical History and Bioethics at the medical school. She also has served on the faculty of the UW Masters in Biotechnology Studies program and lectured in the MPH program of the Dept. of Population Health Sciences.

Charo (B.A. biology, Harvard 1979; J.D. Columbia, 1982) is an elected member (2004) of the World Technology Network and (2005) the Wisconsin Academy of Sciences, Arts and Letters. And in 2006 she was elected to membership in the National Academies' Institute of Medicine (IOM) (now known as the National Academy of Medicine). In 2013 she was awarded the Adam Yarmolinsky Medal for her service to the IOM.

Charo offers courses on public health law, bioethics, biotechnology law, food & drug law, reproductive rights, stem cell policy, torts, and legislative drafting. In addition, she has served on the UW Hospital clinical ethics committee, the University's Institutional Review Board for the protection of human subjects in medical research, and the University's Bioethics Advisory Committee. She has been a visiting lecturer at law and medical schools in Argentina, Australia, Canada, China, Cuba, France, Germany, and New Zealand. In 2006, she was a visiting professor of law at the University of California -- Berkeley, School of Law (Boalt Hall).

Charo has authored or contributed to over 100 articles, book chapters and government reports on law and policy related to environmental protection, reproductive health, new reproductive technologies, medical genetics, stem cell research, science funding, and research ethics.

Charo's advisory committee service for the federal government includes the 1994 NIH Human Embryo Research Panel, and (1996-2001) President Clinton's National Bioethics Advisory Commission where she participated in drafting its reports on "Cloning Human Beings"(1997); "Research Involving Persons with Mental Disorders that May Affect Decisionmaking Capacity"(1998); "Research Involving Human Biological Materials: Ethical Issues

and Policy Guidance"(1999); "Ethical Issues in Human Stem Cell Research"(1999); "Ethical and Policy Issues in International Research: Clinical Trials in Developing Countries" (2001); and "Ethical and Policy Issues in Research Involving Human Participants" (2001).

At present she is the co-chair of the NAS/IOM committee charged with making recommendations on the use of gene-editing for both somatic and germline (heritable) changes in humans, as well as an NAS/IOM Forum on Regenerative Medicine. She also serves on the Program Board of the Greenwall Foundation and was a witness for the congressional panel looking at the practice of fetal tissue research.

Charles Craik, PhD

UNIVERSITY OF CALIFORNIA, SAN
FRANCISCO



Charles S. Craik is a Professor in the Department of Pharmaceutical Chemistry at the University of California at San Francisco. He is also the founder and director of the Chemistry and Chemical Biology Graduate Program.

He joined the UCSF faculty in 1985 and has published over 280 research articles on various biochemical topics. He has co-authored two books, and served on advisory panels for the National Institutes of Health, the National Science Foundation, the National Academy of Sciences and the Department of Energy. In 2004 he founded Catalyst Biosciences and serves on its Scientific Advisory Board, along with those of CytomX Therapeutics, Protagonist Therapeutics and the Biotechnology and Enzymes Expert Committees of the US Pharmacopeia. He is a Fellow of the American Association for the Advancement of Science.

The current research in the Craik lab focuses on defining the roles and the mechanisms of enzymes in complex biological processes and on developing technologies to facilitate these studies. His study of numerous proteases, their receptors and their endogenous inhibitors has recently found practical applications in translational research in oncology and infectious diseases. The work includes developing technologies for determining the extended substrate specificity and for selectively inhibiting or monitoring enzyme activity, determining the role of a novel class of membrane bound proteases implicated in various forms of epithelial cancers, targeted inhibition of a family of human herpes virus proteases and monitoring enzymes associated with programmed cell death at the single molecule level. The reagents being developed may provide therapeutic potential in addition to their prognostic value.

Edward DeLong, PhD

MASSACHUSETTS INSTITUTE OF TECHNOLOGY



Edward DeLong a Professor in the School of Ocean and Earth Science and Technology at the University of Hawaii, Manoa. He began his career as a Professor at the University of California Santa Barbara for seven years, before moving to the Monterey Bay Aquarium Research Institute where he was a Senior Scientist and Chair of the Science Department also for seven years. He served for 10 years as a Professor at the Massachusetts Institute of Technology in the Departments of Civil and Environmental, and Biological

Engineering, where he held the Morton and Claire Goulder Family Professorship in Environmental Systems, before moving to the University of Hawaii, Manoa in 2014.

DeLong's scientific interests focus on central questions in microbial genomics, biochemistry, biogeochemistry, ecology, and evolution. His research efforts combine both laboratory and field-based approaches, and he is recognized as a pioneer in the emerging field of metagenomics. DeLong is best known for his research that led to the discovery of phototproteins called rhodopsins in Bacteria, their ubiquity, and their biochemical

function as light driven ion pumps. DeLong's efforts also led to the discovery of marine planktonic Archaea, and also the organisms responsible for anaerobic methane oxidation in anoxic habitats. Currently, DeLong is coupling the use of autonomous robotic sensors and samplers with genomic technologies, to derive highly resolution spatial and temporal maps of microbial community gene expression datasets in situ.

Currently DeLong serves as co-Director for both the Center for Microbial Oceanography: Research and Education (C-MORE), and the Simons Collaboration on Ocean Processes and Ecology (SCOPE). DeLong is a Fellow in the U. S. National Academy of Science, the American Academy of Microbiology, the American Academy of Arts and Science, the American Association for the Advancement of Science, and the European Molecular Biology Organization. He currently serves as the Vice President of the International

Society of Microbial Ecology (ISME), and stand as President of ISME starting August 2018. He has also served in a scientific advisory capacity in many settings, including as a Technical Advisor of LS9 Inc, Joule Biotechnologies Inc., and Seres Health, Inc.

Heiner Dreismann, PhD



Heiner Dreismann, is the former President and CEO of Roche Molecular Systems and an active member of the biotechnology industry. Dreismann earned a Master's Degree in Biology and a PhD in Microbiology/Molecular Biology both from Westfaelische Wilhelms University in Muenster, Germany. He has his post-doc stay at the French Atomic Research Center in Saclay (1982). Joined Roehm GmbH in Darmstadt in 1983 as a microbiological geneticist and then joined Hoffmann la Roche in 1985 and held various positions including head of diagnostics manufacturing in Grenzach-Wyhlen, head of diagnostics R&D for infectious diseases in Kaiseraugst, head of business unit Microbiology, head business unit PCR Europe, head strategic portfolio planning for Roche Molecular Systems, member of Roche's global Executive Committee for Diagnostics, head of global Business Development for Roche Diagnostics and President and CEO of Roche Molecular Systems (RMS) in Pleasanton, California.

His notable accomplishments include:

Renewal and re-structuring of Roche Molecular Systems' global product portfolio. During his

tenure as president and CEO, RMS developed several PCR based diagnostic tests e.g. HIV qualitative and quantitative assays, Hepatitis C assays, septicemia and P 450 tests and several more.

Roche Molecular Systems also developed a diagnostic system, TaqScreen, for use in bloodbanks worldwide in response to the threat of infections of blood donations with viruses. The test entered FDA clinical trials and could detect HIV, HCV and HBV in blood donations possibly ensuring the safety of North American blood banks supplies in the future

By his departure in 2006, Roche Molecular Systems had doubled in size. The Molecular Diagnostics business unit grew from \$640 million to \$1.2 billion.

Dreismann serves on the boards of a number of high-technology companies, including Singulex, Myriad Genetics, Ignyta, Dynex, Stratos Genomics and others.

Geoffrey Duyk, MD, PhD

TPG BIOTECH



Geoffrey Duyk served on the board of directors and was president of research and development at Exelixis where he focused on the discovery and development of small molecule therapeutics, prior to joining TPG Biotech in 2004. Prior to Exelixis, he was one of the founding scientific staff at Millennium Pharmaceuticals. As VP of genomics at Millennium, Duyk was responsible for building and leading the informatics, automation, DNA sequencing and genotyping groups as well as the mouse and human genetics group. Prior to his tenure, Duyk was an assistant professor at Harvard Medical School in Dept. of Genetics and assistant investigator of the Howard Hughes Medical Institute. While at HMS, Duyk was a co-principal investigator in the National Institutes of Health funded Cooperative Human Linkage Center.

Duyk holds a PhD and M.D. from Case Western Reserve University and completed his medical and fellowship training at UCSF. While at UCSF, Duyk was a fellow of the Lucille P. Markey Foundation and was also awarded a post-doctoral fellowship from the Howard Hughes Medical Institute.

Duyk, a partner at TPG, co-leads TPG Biotechnology, a health care oriented venture capital group

with >\$1bn under management. He is also the managing partner for TPG ART (Alternative and Renewable Technologies). He serves on the board of directors of number of companies including Amyris, Genomatica, Elevance and Beta Renewables.

Outside of TPG, he is a member of the Board of Trustees of Wesleyan University and serves on visiting committees at Harvard Medical School and Case Western Reserve University School of Medicine. Duyk is a member of the Board of Directors for the American Society of Human Genetics. He has also served on the council of NHGRI and a number of NIH and DOE advisory groups. He is also a member of the SAB of Jackson Labs and the SMA foundation.

Replidyne, Macrogenics, Aerie, FoldRx, Amyris, Galleon, Moksha8, ShangPharma, Agria, Renewco and JCR, council member of the National Human Genome Research Institute at the National Institutes of Health, serves on the scientific advisory boards of the NHGRI DNA Sequencing Advisory Panel, chair of the KOMP (Global Mouse TKO project), ESC (Expressed Sequenced Consortium), co-chair advisory panel Cancer Genome Anatomy Project, Program in Genomics Applications (NHBLI); the Bioethics Advisory Group at Case Western Reserve University; the Spinal Muscular Atrophy Foundation; WIL Laboratories; VLST; and FoldRx.

Duyk is a former member of the board of directors of Avidia, recently sold to Amgen.

Dianne K. Newman, PhD

HOWARD HUGHES MEDICAL INSTITUTE



Dianne K. Newman serves as the Gordon M. Binder/Amgen Professor of Biology and Geobiology at the California Institute of Technology (Caltech), which she joined in 2000. She was appointed a Howard Hughes Medical Institute Investigator in 2005-2016, and served as the John and Dorothy Wilson Professor of Biology and Geobiology at MIT from 2007-2010. Her research focuses on microbial stress responses, with an emphasis on mechanisms of energy generation and survival when oxygen is scarce. The contexts that motivate her work span ancient sedimentary deposits to chronic infections yet are linked by similar physiological questions. Newman has been honored as a David and Lucille Packard Fellow in Science and Engineering and a fellow of the American Academy of Microbiology. Newman received her B.A. degree in German Studies from Stanford University and her Ph.D. in Environmental Engineering from MIT. She was a postdoctoral fellow at Harvard Medical School in the Microbiology and Molecular Genetics Department.

Newman won the National Academy of Sciences Award in

Molecular Biology for her “discovery of microbial mechanisms underlying geologic processes.” On September 22, 2016 Newman received yet another prestigious award—a MacArthur Foundation fellowship.

Edward Penhoet, PhD

ALTA PARTNERS



Ed Penhoet joined Alta in 2000 as a Director and has been full time at Alta since 2008. He currently serves on the board of directors of ChemoCentryx, Immune Design, Metabolex, Scynexis and Veloxis Pharmaceuticals.

A co-founder of Chiron, Ed served as the Company’s President and Chief Executive Officer from its formation in 1981 until April 1998. He served as Vice-Chair of the governing board of the Independent Citizens Oversight Committee for the California Institute of Regenerative Medicine (CIRM) from 2005 to 2010, and served as the President of the Gordon and Betty Moore Foundation from 2004 to 2008.

Penhoet was recently appointed to President Obama's Council of Advisors on Science and Technology (PCAST). PCAST is an advisory group comprised of 20 of the nation’s leading scientists and engineers who directly advise the President and the Executive Office of the President. PCAST makes policy recommendations in the

many areas where understanding of science, technology, and innovation is key to strengthening our economy and forming policy that works for the American people.

For 10 years prior to founding Chiron, Penhoet was a faculty member of the Biochemistry Department of the University of California, Berkeley.

Penhoet is the immediate past Dean of the School of Public Health at the University of California, Berkeley. He is a member of both the Institute of Medicine of the National Academies and the American Academy of Arts and Sciences. He has co-authored more than 50 scientific articles and papers.

John Pierce, PhD

DEVENIR CONSULTING, LLC



John Pierce consults in the fields of agricultural and industrial biotechnology. From 2010-2015 he was Chief Bioscientist at BP where he developed the strategies, competencies, and innovation pipeline needed for BP to gain maximum benefit from the application of biosciences to their worldwide businesses.

Prior to that time, he had a long career at DuPont commencing in 1982 as a research scientist in Central Research and Development and culminating as Vice President for DuPont

Applied BioSciences and Director of Biochemical Sciences & Engineering where he had responsibility for DuPont's biotechnology research and development efforts in the production of fuels, chemicals, and materials.

Throughout his career, Pierce has focused on the integration of biological approaches with chemistry, engineering, and material sciences to create biotechnological applications in agricultural chemistry, plant genetics, and industrial chemistry. He led the move of DuPont into industrial biotechnology in the mid-90s, and has long been involved in a variety of public policy activities associated with public acceptance and governmental support of biotechnology.

Martha Schlicher, PhD

MALLINCKRODT
PHARMACEUTICALS



Martha is accountable to the Mallinckrodt Specialty Generics Business Unit President for identifying, developing and supporting new generic products as the lead of Mallinckrodt's Specialty Generics Science and Technology organization. Functions within Science and Technology include Formulations, Analytical Chemistry, Regulatory,

Regulatory API Support, Clinical Pharmacology and Development, Program Management and Technology Transfer.

Martha has over 25 years of industry experience with the majority of that experience in roles identifying, developing and commercializing new technologies. These include leading the Sustainability and Stakeholder Engagement, Environmental and Regulatory Sciences and Regulatory Policy Groups, the Agricultural Portfolio Strategy Group, the US Western Corn Belt Commercial Business, and serving in the Office of the President.

Martha has a B.S. degree in Chemistry from Indiana University, a Ph.D. in Bio-organic Chemistry from the University of Illinois and an MBA from the Kellogg Graduate School of Management at Northwestern University.

Martha has served on the Secretary of Energy Advisory Board to Secretary Moniz, as a Trustee for the St. Louis Academy of Science, and as a member of the United States Department of Energy Biological and Environmental Research Advisory Committee, and as an industry advisor to the International Center for Advanced Renewable Energy Research at Washington University in St. Louis, the Department of Agricultural Economics at University of Missouri - Columbia, and the National Corn Grower Association.

Kate Scow, PhD

UNIVERSITY OF CALIFORNIA, DAVIS



Kate Scow is Deputy Director of the Agricultural Sustainability Institute and Director of the Russell Ranch Sustainable Agriculture Facility, and professor in the Department of Land, Air, and Water Resources (LAWR). For over 20 years, Scow's research has focused on the role of soil and subsurface microorganisms in carbon and nitrogen cycling and biodegradation of contaminants, and soil management and sustainability of smallholder farms in Uganda.

The Russell Ranch Sustainable Agriculture Facility is a unique 300-acre facility near UC Davis dedicated to long-term research on irrigated and dryland agriculture in a Mediterranean climate.

Lucy Shapiro, PhD

STANFORD UNIVERSITY



Lucy Shapiro employs a bacterial model system to probe fundamental aspects of developmental biology. Following

her graduate studies in molecular biology and biochemistry, she went on to make major advances in understanding the genetic and molecular decision-making process that directs an asymmetric cell division yielding cells of different cell fates, akin to the process carried out by stem cells in higher organisms.

Shapiro's research aims to integrate the dynamic spatial organization of the cell into the complete genetic circuitry that defines cell specification and the cell cycle in *Caulobacter*. Likening the bacteria's regulatory network to the act of "playing three-dimensional chess," Shapiro and her colleagues pioneered a systems biology approach to show that the transcriptional circuitry is interwoven with the 3-D deployment of regulatory and morphological proteins. Shapiro's studies have revealed a striking similarity between the organization of cell cycle behavior in bacteria and more evolutionarily advanced organisms.

Shapiro is a professor in the Department of Developmental Biology and Ludwig Professor of Cancer Research at the Stanford University School of Medicine. Shapiro received a PhD in molecular biology from the Albert Einstein College of Medicine. Her many honors include election to the National Academy of Sciences, the Institute of Medicine, the American Academy of Arts and Sciences, and the American Philosophical Society. She is the recipient of the Waksman Award from the NAS, the Gairdner International Award, the Abbott Lifetime Achievement Award, the Horwitz Prize, and the United States National Medal of Science.

NIGMS has supported Shapiro's research since 1986.

James Tiedje, PhD

MICHIGAN STATE UNIVERSITY



James Tiedje is University Distinguished Professor of Microbiology and Molecular Genetics and of Plant Soil and Microbial Sciences, and is Director of the Center for Microbial Ecology, one of the original NSF-funded Science and Technology Centers. His B.S. degree is from Iowa State University and his M.S. and PhD degrees are from Cornell University.

Tiedje's research focuses on microbial ecology, physiology and diversity, especially regarding the nitrogen cycle, anaerobic processes and biodegradation of environmental pollutants. His group has discovered several microbes that live by halo-respiration on chlorinated solvents and is now using genomics to better understand microbial diversity and function. He served as Editor-in-Chief of Applied and Environmental Microbiology. He was President of the American Society for Microbiology (ASM), the International Society of Microbial Ecology, and shared the 1992 Finley Prize from UNESCO for research contributions in microbiology of international significance. He is Fellow of the AAAS, the American Academy of

Microbiology, the Soil Science Society of America, and a member of the U.S. National Academy of Sciences.

Keith Yamamoto, PhD

UNIVERSITY OF CALIFORNIA, SAN FRANCISCO



As UCSF's first vice chancellor for Science Policy and Strategy, Keith Yamamoto leads efforts to anticipate the needs of an increasingly dynamic biomedical research endeavor, and to position UCSF optimally, by working within the University as well as influencing and shaping science policy at the state and national levels and beyond.

Throughout his career, Yamamoto has been focused on the practice of science, science education and mentoring, peer review, communication of science, and advocacy for federal support for research. He also directs a research laboratory that for 40 years has made important discoveries on mechanisms that regulate gene expression in health and disease.

Yamamoto has long been a voice for science policy that emphasizes integration at three levels: 1) basic, clinical and social/behavioral/population research; 2) a merging of the concepts and approaches of physical sciences, engineering and computation/math with those of the life sciences; and 3) effective partnerships between academia, industry and government.

He believes that such integration will produce transformative scientific advances with potential to address urgent societal challenges.

After earning his PhD from Princeton University, Yamamoto joined the UCSF faculty in 1976. He has served in several significant leadership roles including chair of the Department of Cellular and Molecular Pharmacology, vice dean for research in the School of Medicine, and vice chancellor for research. He chaired the committee that led the planning of the UCSF Mission Bay campus.

Yamamoto has chaired or served on numerous national committees focusing on a wide range of areas (e.g., public and scientific policy, public understanding and support of biological research, science education, training the biomedical workforce, research funding, and the process of peer review at the NIH). He chairs the Coalition for the Life Sciences and sits on the National Academy of Medicine

Executive Committee, the National Academy of Sciences Division of Earth and Life Studies Advisory Committee and the Executive Committee of Research America. As Chair of the NAS Board on Life Sciences, he created the study committee that produced *Toward Precision Medicine: Building a Knowledge Network for Biomedical Research and a New Taxonomy of Disease*, the report that enunciated the precision medicine concept, and he has helped lead efforts to implement it at the state and national levels, as well as at UCSF.

He is an elected member of the National Academy of Sciences, National Academy of Medicine, American Academy of Arts and Sciences, and American Academy of Microbiology, and is a fellow of the American Association for the Advancement of Science.

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