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**THE PROTEIN SOCIETY ANNOUNCES ITS 2022 AWARD RECIPIENTS**

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**CANYON COUNTRY, CA** – The Protein Society, the premier international society dedicated to supporting protein research, announces the winners of the 2022 Protein Society Awards, which will be conferred at the 36<sup>th</sup> Anniversary Symposium, July 7 – 10, 2022, in San Francisco, California. Plenary talks from select award recipients will take place throughout the 3.5-day event. The winners’ scientific accomplishments, highlighted here as described by their nominators, demonstrate their lasting impact on protein science.

**The Carl Brändén Award**, sponsored by Rigaku Corporation, honors an outstanding protein scientist who has also made exceptional contributions in the areas of education and/or service to the field. The 2022 recipient of this award is **Professor David Goodsell** (Scripps Research and Rutgers University). Dr. Goodsell combines his training in structural biology and experience in scientific research and software development with active practice of the visual arts. He has pioneered extraordinary visual methods for exploring molecular and cellular structure that are the foundation of his public outreach/education work. His distinctive, non-photorealistic technique creates easily-interpretable illustrations of to-scale molecules and the structure of living cells, both as watercolor paintings and computer-generated images. With the RCSB Protein Data Bank at Rutgers University, he creates educational materials for exploring molecular and cellular structure. This includes the “Molecule of the Month,” a popular column for general audiences that presents the molecular mechanisms of fundamental biology, health and disease, and bioenergy. His passion for and remarkable ability to illustrate and describe molecular landscapes to expert researchers and beginners alike has led to collaborations with science museums, filmmakers, educators, and popular authors on the creation of educational and outreach materials. Dr. Goodsell has also written several general-interest books on molecular biology, cell biology, and bionanotechnology. Throughout his unique and impressive career, Professor Goodsell has promoted and enabled effective teaching and learning of biochemistry and molecular biology and has inspired the public with his vision, his creativity, and his artistic genius.

**The Christian B. Anfinsen Award**, sponsored by The Protein Society, recognizes technological achievement or significant methodological advances in the field of protein science. The recipient of this award in 2022 is **Professor Jin Zhang** (UC San Diego). Professor Zhang pioneered a native biochemistry approach and created innovative photophysical tools to enable the precise interrogation of biochemical networks within living systems. To extract the key spatiotemporal signals that regulate life processes, Professor Zhang developed general strategies and specific fluorescent biosensors to enable study of signaling molecules in their native biological context, from living cells to live animals. These strategies have proven generalizable for the study of many signaling molecules, expanding the impact and significance of her work. More recently, she developed first-in-class technologies for visualizing kinase activities and protein-protein interactions in living cells and at a spatial resolution below the diffraction limit. These innovative molecular tools have allowed her to repeatedly make breakthrough discoveries, including the recent discovery of fundamental mechanisms underlying spatial compartmentation of a ubiquitous second messenger, cAMP. Her pioneering work has been pivotal in establishing a new conceptual framework for how we think about cellular biochemical activities—namely, that they are organized into an activity architecture to spatially encode essential information that profoundly impacts cell physiology and disease.

**The Dorothy Crowfoot Hodgkin Award**, sponsored by Genentech, is granted in recognition of exceptional contributions in protein science which profoundly influence our understanding of biology. The 2022 recipient is **Professor Sun Hur** (Harvard University). Professor Hur's structural and biochemical work on a family of vertebrate innate immune receptors, RIG-I-like receptors (RLRs), led to the discovery of receptor polymerization and clustering in response to detection of foreign RNA. Her laboratory elucidated how RLR filament formation enables detection of various types of viral and host RNA signatures, such as secondary structure and modification, and integration of such disparate information for discrimination between foreign and self nucleic acids. By reconstituting the signaling complex with purified components for the first time, Hur determined long sought-after structures of an activated RLR in complex with its co-factor and signaling adaptor. These studies revealed how receptor oligomerization activates the downstream signaling pathway. Her group also showed that certain mutations in the receptor and regulators can shift the immunological “threshold” for self-tolerance, leading to constitutive activation of RLRs by self-RNAs in lupus-like inflammatory disorders. Finally, the findings by Professor Hur's laboratory that RLRs remodel protein-RNA complexes demonstrated an unanticipated signaling-independent, effector-like function of RLRs, challenging the conventional view of immune receptors as simple signaling molecules. In summary, her investigations have provided a molecular framework for understanding the RLR pathway, which sets the paradigm for how other nucleic acid sensors play roles in innate immunity.

**The Emil Thomas Kaiser Award**, sponsored by generous individual contributions, recognizes a recent, highly significant contribution to the application of chemistry in the study of proteins. The 2022 recipient is **Professor Philipp Kukura** (Oxford University). Dr. Kukura is a physical chemist who has devoted his career to developing spectroscopic techniques to study biomolecules. Consistently pushing the boundaries of what can be detected with light, he has developed techniques sensitive to ever-smaller signals—in the form of magnetic field effects, ultrafast changes in vibrational signatures, and light scattered by nano-objects such as proteins.

Most importantly, he developed mass photometry, a technology that measures the mass of single biomolecules using light scattering, breaking new ground in the study of proteins. Dr. Kukura pursued the research that led to mass photometry despite that fact that his goal — to detect single proteins by light scattering alone — was deemed by some to be ‘impossible.’ His perseverance resulted in the first single-molecule optical technique that is both universal (requiring no labelling) and specific (providing direct information on protein identity and structure). Dr. Kukura has founded a company to commercialize this technology. Both the company and uptake of mass photometry have grown rapidly; they are a testament to the technology’s value and impact for protein research, and to his commitment to ensuring it is widely accessible.

**The Hans Neurath Award**, sponsored by the Hans Neurath Foundation, honors individuals who have made a recent contribution of exceptional merit to basic protein research. The 2022 recipient is **Professor Squire Booker** (Penn State University). Dr. Booker’s research is concerned with novel mechanisms and pathways for the biosynthesis of various natural products and cellular metabolites, with a particular focus on enzymes that use S-adenosylmethionine and iron-sulfur clusters to catalyze reactions via radical mechanisms. Having had the prescience as a post-doctoral scholar to investigate the founding member of the iron-sulfur/radical-S-adenosyl-L-methionine (radical-SAM) enzyme family, which is approaching a million assigned members and has unquestionably become the foremost frontier area in enzyme research, Dr. Booker then taught the community how to produce and handle with these fragile enzymes in his early work. During this past decade, his investigations into reactions that append sulfur, methyl(ene), and methylated sulfur moieties to unactivated aliphatic, olefinic, and aromatic carbons have provided deep insight into the governing molecular logic underpinning biosynthetic pathways, enzyme cofactors, drug action and metabolism, and the mechanisms of antibiotic resistance. Most recently, the Booker lab overcame a longstanding barrier to the study of radical-SAM enzymes with cobalamin cofactors, allowing dissection of the biosynthetic pathways leading to fosfomycin and carbapenems, clinically important antibiotics. This work elucidated fundamentally novel chemistry, including reactions that grow fully-saturated alkyl chains one carbon at a time.

**The Stein & Moore Award**, sponsored by The Protein Society and with support from Wiley, is named for Nobel laureates Dr. William Stein and Dr. Stanford Moore. The award recognizes eminent leaders in protein science who have made sustained high impact research contributions to the field. The 2022 recipient is **Professor Daniel Herschlag** (Stanford University). Dr. Herschlag’s distinctive style of scientific inquiry, applying fundamental chemical, biophysical and enzymological principles to long-standing and emerging questions in protein science and biology, has borne fruit in numerous ways. In protein enzymology, Dr. Herschlag identified the principle of “catalytic promiscuity,” a critical missing link in evolution and a foundation for the fertile area of directed evolution. His group has provided deep and extensive dissections of hydrogen bonds and their contributions to enzyme catalysis. In the field of protein-RNA interactions, the Herschlag lab developed the RNA chaperone hypothesis, presaging the discovery of cellular RNA chaperones and the appreciation of their widespread importance. He demonstrated the ubiquitous role of RNA binding proteins in coordinating gene expression. Most recently, he has elevated our previously qualitative and descriptive understanding of protein-RNA recognition to a higher—quantitative and predictive—plane and expanded the scale of biochemical characterization of enzymes from a few enzymes to thousands of variants in parallel. Through his desire to answer deep fundamental questions, Professor Daniel Herschlag has been on the frontier of de-

veloping and applying cutting edge techniques and concepts that illuminate new aspects of protein behavior and their biological consequences.

**The *Protein Science* Young Investigator Award**, sponsored by Wiley, recognizes scientists within their first 8 years of an independent career at the time of nomination who have made an important contribution to the study of proteins. In 2022 there are two recipients of The **Protein Science** Young Investigator Award: **Professor Nicolas Lux Fawzi** (Brown University) and **Nozomi Ando** (Cornell University).

**Professor Nicolas Lux Fawzi** is an internationally recognized leader in a field that his technological advances have helped to found. Dr. Fawzi uses solution NMR spectroscopy to investigate the structural biology of biomolecular condensates and the biophysical chemistry of the disordered regions of RNA-binding proteins. Dr. Fawzi's efforts were among the first to bring structural clarity to proteins following phase separation. His research described, for the first time, how three of the most important proteins in ALS remain structurally disordered in normal function and how mutations change transient structure and lead to protein aggregation in the disease. Work from the Fawzi lab has provided molecular insight into the physiology of membrane-less organelles and their pathological dysfunction associated with cancer and neurodegenerative disorders, subjects of studies that were previously hampered by an inability to characterize these poorly understood proteins at atomic resolution. His current efforts to visualize protein structures and contacts within condensates with higher resolution and with more complex compositions (including in cells) seeks to establish an exciting new frontier.

**Professor Nozomi Ando** has pioneered new experimental and computational methods to illuminate the molecular mechanisms of protein allostery. Of remarkable note is her work on diffuse scattering, faint and smeary signals in the background of x-ray diffraction images from protein crystals. For many decades, these signals were ignored by the structural biology field although they were known to contain information on how atoms in a molecule move relative to each other. Although diffuse scattering from simple molecules could be interpreted, it was thought that diffuse scattering from protein crystals is intractable. Dr. Ando's group was the first to develop methods that enable rigorous validation of data statistics and data-model agreement. In doing so, they were able to provide, for the first time, compelling evidence that two types of correlated motions exist in protein crystals: those involving atoms in different unit cells, and those involving atoms within a protein molecule. These correlated protein motions play central roles in allostery, and this breakthrough result has the potential to animate high-resolution structures from x-ray crystallography. Professor Ando is recognized for her work in advancing structural biology education and advocating for diversity in STEM.

*Delegates, exhibitors, sponsors, and the press can learn more about the 36<sup>th</sup> Anniversary Symposium on The Protein Society website <http://www.proteinsociety.org>.*

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The Protein Society is the leading international Society devoted to furthering research and development in protein science. Founded in 1986, the purpose of the Society is to provide international forums to facilitate communication, cooperation, and collaboration regarding all aspects of the study of proteins. In support of these goals, the Society publishes *Protein Science*, the premier journal in the field, hosts an annual international symposium, and facilitates the education of early-career protein scientists across all lines of discipline. The Protein Society members represent a

wide spectrum of academic, industry, governmental, and non-profit institutions from more than 40 countries around the world. Media inquiries can be directed to Raluca Cadar, Executive Director at 844.377.6834.