Protein Science Best Papers for 2020

The winners of the 2020 *Protein Science* Best Paper awards are Yu-Ting Huang (Figure 1) from National Chung Hsing University, Taiwan, and Samuel Junod (Figure 2) and Joseph Kelich (Figure 3) from Temple University, USA.

Dr. Huang, working in the lab of Pei-Fen Liu, made the unexpected finding that ATP can alter the folding and function of human proteins through protein destabilization.[1] This phenomenon may be relevant in studying the function of proteins that exist in the specific metabolic environment of a cancer cell.

As Yu-Ting explains, she wanted to be either a doctor, a scientist, or a medical specialist. "Although I couldn't get into a medical school, I met Dr. Pei-Fen Liu when I was a graduate student in National Chung Hsing University. He gave me a chance to get closer to my dream. Nowadays, people are paying more and more attention to their health, especially in these two years. It couldn't be better if what we have found in this research can help solve the problem of drug-resistance, and contribute to medical fields. For now, I'm teaching chemistry and science for teenagers. I hope that those kids will be inspired and become leading lights in academia."

Pei-Fen Liu speaks highly of the skill and determination which Yu-Ting brought to the project. "Yu-Ting is an eminent and self-motivated young scientist in protein science. She originally joined my laboratory with limited background knowledge about protein folding. Surprisingly, she picked up most of the concepts and learned the key experiments quickly. Her problem solving and logical thinking are also beyond other students' standards. We initially suffered from the protein purification and sample preparation in this project for a human protein, uridine phosphorylase I. She managed to overcome all of the obstacles step by step. Continuously, she came up with a new experimental design to study the interaction between ATP and the partially unfolded state of this protein. An exciting model was then developed to explain the correlation between protein concentration and ligand binding effect. It is a pleasure to work with her in exploring unknown subjects. I believe that she is on the way to achieving success in her career path."

The two other Best Paper awardees, Samuel Junod and Joseph Kelich, were recognized for their studies of the nucleocytoplasmic transport of intrinsically disordered proteins.[2] By using high-speed super-resolution fluorescence microscopy in the lab of Weidong Yang, they could measure the transport kinetics and 3D spatial locations of transport routes through the nuclear pore complexes for various intrinsically disordered proteins. They found that the roles executed for folded proteins are not followed by disordered ones. For the latter, diffusion efficiencies and routes are determined by their content ratio of charged and hydrophobic amino acids.

As Dr. Kelich explains "I am currently a post-doctoral researcher at the Wistar Institute in Philadelphia studying the role of telomeric protein defects in cancer. The project for which this

award was given was conducted during my PhD studies in Weidong Yang's lab. I would also like to note that Samuel Junod and I formed a great team for this project and that the Yang lab provided a great multidisciplinary team-based approach to science that I love."

Sam also outlines his own background. "My initiation to research began during my undergraduate studies under the guidance of Dr. Weidong Yang. With Dr. Yang's mentorship I resolved the spatial location of several nuclear pore complex (NPC) scaffold proteins using nanobody-specific labeling and single-molecule microscopy. Since the NPC is a major pathway for proteins entering and exiting the nucleus, mapping the location of its scaffold proteins gave further insight into the structural composition of the important cellular complex. After a brief departure into the private sector as a chemist, I returned back to Temple University to pursue my PhD and continue my research of the NPC with Dr. Weidong Yang. Currently, I have expanded my research of nuclear proteins to include the impact of disordered nucleoporins (Nups), characterized by the presence of phenylalanine-glycine (FG) repeats, on nucleocytoplasmic protein transport. I am very fortunate to study under Dr. Weidong Yang and to have collaborated on several projects with Dr. Joseph Kelich. I look forward to applying my knowledge of the NPC and single-molecule microscopy to other biological questions."

As Dr. Yang explains, Sam and Joe were a great team. "Samuel Junod joined my lab initially as an undergraduate student in 2014, and then a master student in 2017. Based on his great performance in research, I recommended him to the graduate committee to admit him as a PhD candidate in our department in 2018. Joseph Kelich is one of the best PhD students in my lab. He graduated from my lab in 2018 and is currently a postdoctoral fellow at the Wistar Institute. Sam and Joe formed a good team to work on several projects including the nucleocytoplasmic transport of IDPs. In the IDP project, they had conquered the challenges of purifying and labeling various IDPs. They also took great efforts to learn single-molecule and super-resolution microscopy techniques before they successfully tracked single IDPs to move through native nuclear pores by these advanced methods."

On behalf of *Protein Science* and the Protein Society, all congratulations to these three gifted young scientists for their outstanding accomplishments.

Brian W. Matthews
Editor

References

1. Huang Y-T, Yeh P-C, Lan S-C, Liu P-F. Metabolites modulate the functional state of human uridine phosphorylase I. Protein Sci. 2020;29:2189-2200.

2. Junod SL, Kelich JM, Ma J, Yang W. Nucleocytoplasmic transport of intrinsically disordered proteins studies by high-speed super-resolution microscopy. Protein Sci. 2020;29:1459-1472.

Figure Legends

Figure 1: Yu-Ting Huang

Figure 2: Samuel Junod

Figure 3: Joseph Kelich