

**Topic of the Speech:**

Pleats Make Sense: A Study of Knitted Origami Capacitive Sensors for Wearable Motion Recognition

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Prof. Tsai-Chun Huang After graduating from National Taiwan University, and the Shih-Chien University, Tsai-Chun Huang acquired his Ph.D. from the Royal College of Art, London. He is currently an assistant professor in the School of Fashion and Textiles at The Hong Kong Polytechnic University. His research focused on the history of pleats and innovation in pleating technology. Before starting his PhD research in London, he designed for theatres and TV shows in Taiwan. During his Ph.D. research, he was invited to several design schools, including Fashion Institute of Technology (FIT), PARSONS, New York University (NYU) in New York, Royal College of Art (RCA), Instituto Marangoni, London, to demonstrate innovative pleating method and to facilitate workshops. Recently, he has worked with European art festivals, such as Hull UK City of Culture 2017, and the Prague Quadrennial 2019.

Tsai-Chun's research concentrates on the relationship between materials and the body. Designing costumes for theatres, with the demands for ranges of movement and durability, has sharpened his observations of daily wear. He found that the expansion and contraction of pleats offer the potential for new ways of wearing. He learned the technique of conventional pleating, becoming a studio technician in the longest-standing pleating studio in the UK, Ciment Pleating Ltd. Cutting-edge technology is also part of Tsai-Chun's focus. Smart textiles will hugely alter the look and function of garments. He contributed to the reactive textile research team at Kyoto Design Lab, Kyoto Institute of Technology in 2016, co-developing smart textiles with pleats. He also adopted 3D printing to redesign pleats, and costumes for Taiwanese folk legend and Chinese Opera, including Beijing Opera and Cantonese Opera after he came to Hong Kong. The redesigned costumes have been shared with Victoria and Albert Museum in London, and participating in the 5th and 6th Art and Science International Exhibition and Symposium by Tsing Hua University in The Museum of China, Beijing. Taiwanese folk legend costumes are exhibited in Tainan, Taiwan, and Palermo, Sicily, Italy. Recently, he also exhibited his work in Venice Biennale Artchtettura 2025, representing Hong Kong Pavilion; in 2025 he also exhibited his collaborative project with Tsinghua University in United Nations Head Quarter, NYC. His collection, Style in Motion, won several international design awards, including Red Dot 2025 Design Concept.

After joining The Hong Kong PolyU in 2020, his research expanded to a more movement orientation and focused more on the sport wear/ activewear design, examining how pleating structures with cutting-edge technology assist athletes to perform better and prevent injury, and at the same time strike the balance between functionality and aesthetics. His research is published across the disciplines of fashion, textiles, design and sports science, including The Journal of Cloth and Culture, Encyclopedia of World Textiles, Healthcare and Medical Devices, International Journal of Fashion Design, Technology and Education, etc. He also actively joins conference, such as 15th International Conference on Applied Human Factors and Ergonomics (AHFE2024, winning best paper award at International Association of Societies of Design Research 2025: Design Next.