

News Release

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National Academy of Inventors Names Liang a Senior Member

According to the Centers for Disease Control and Prevention, more than 2.8 million Americans contract antibiotic-resistant bacterial infections each year, and approximately 35,000 of those infections lead to death.

To help improve those outcomes, Hongjun “Henry” Liang, Ph.D., a professor for the Texas Tech University Health Sciences Center (TTUHSC) School of Medicine’s Department of Cell Physiology and Molecular Biophysics and the TTUHSC Graduate School of Biomedical Sciences, is developing novel hydrophilic nanoparticles known as nanoantibiotics that target bacterial infections, especially those that are resistant to treatment with known antibiotics.

In addition to his pioneering work with nanoantibiotics, Liang also holds several patents related to the development of new bionanotechnologies. His U.S. Patent #11,332,555 for polymer-encased nanodiscs (“Polymer-Encased Nanodiscs with Improved Buffer Compatibility”), which was filed October 7, 2020, and issued May 17, 2022, was licensed to Anatrace, a leading supplier of detergents, lipids and other reagents for molecular biology and membrane protein research. Liang has been awarded three additional U.S. patents since arriving at TTUHSC in 2015.

To recognize these significant contributions to biomedical science and engineering, Liang has been named to the 2024 class of Senior Members for the National Academy of Inventors (NAI). He will be inducted at the 13th NAI Annual Conference June 17 in Raleigh, North Carolina.

Lindsay Penrose, Ph.D., an associate professor in the School of Medicine’s Department of Obstetrics and Gynecology, was named an NAI Senior Member in 2023. She was unable to attend the 2023 conference and will be recognized at the 2024 conference with Liang.

The NAI is a member organization comprising U.S. and international universities and governmental and nonprofit research institutes with more than 6,000 individual inventor members and fellows representing 30 countries. The 2024 Senior Member class includes 124 academic inventors representing 60 NAI-member institutions across the U.S., and Liang said he is honored and humbled to join them.

“My long-term goal is to understand the fundamental science of biology, and to make use of this knowledge for the development of engineering solutions to benefit health care,” Liang said. “I’m fortunate to enjoy the great intellectual support available at TTUHSC and I look forward to building new collaborations with colleagues across the nation to tackle the challenges in biomedical science and engineering.”

The nanoantibiotics created by the Liang team resemble tiny hairy particles composed of many hydrophilic polymer brushes grafted onto synthetic or natural nanoparticles of defined sizes and shapes. These synthetic

compounds are designed to kill bacteria via membrane disruptions using a different mode of membrane remodeling that damages bacterial membranes while leaving mammalian cells intact.

To date, Liang's nanoantibiotics research has resulted in several peer-reviewed publications. On July 26, 2022, his most recent invention in nanoantibiotics was issued U.S. Patent #11,395,804 ("Hydrophilic Nanostructured Membrane Active Antimicrobials with High Activity, Selectivity and Biodegradability").

"We are proud of Dr. Liang's selection to join the 2024 NAI Class of Senior Members," Lance McMahon, Ph.D., TTUHSC senior vice president for research and innovation said. "His innovative research has unlocked the potential of nanoparticle-based technologies to combat antibiotic resistance, a serious threat to human health. Dr. Liang joins a growing list of faculty inventors recognized by NAI for their outstanding innovations in biomedical science."

The NAI recognition began in 2018 when Samuel Prien, Ph.D., a professor of obstetrics and gynecology at the TTUHSC School of Medicine, became the university's first NAI Senior Member. Since then, Penrose and Ted Reid, Ph.D., vice chairman for the School of Medicine's Department of Ophthalmology and Visual Sciences, also were named NAI Senior Members in 2023.

In addition, Prien was named an NAI Fellow in 2021, an honor also received in 2023 by P. Hemachandra Reddy, Ph.D., a professor in the School of Medicine's Department of Internal Medicine.

As the latest of TTUHSC's NAI Senior Members, Liang expressed his deep gratitude to the university's Office of Research Commercialization and Office of Research Innovation, Collaboration and Entrepreneurship, or RICE, for their devotion and support of their translational adventures.

"Like we always say," Liang added, "we are the future of health."