

HONGXING JIANG

Appointments

Paul Whitfield Horn Distinguished Professor and Edward E. Whitacre, Jr. Endowed Chair, Electrical and Computer Engineering, Texas Tech University, 2013 – present

([*Horn Professorships, the highest honor Texas Tech University may bestow on members of its faculty*](#))

Edward E. Whitacre, Jr. Endowed Chair and Professor, Electrical and Computer Engineering, Texas Tech University, 2008 - 2013

Co-Director, Center for Nanophotonics, Texas Tech University (Center formed in Sept. 2010)

University Distinguished Professor, Kansas State University, 2004-2008

Professor of Physics, Kansas State University, 1998-2004

Director, Kansas Advanced Semiconductor Coordinated Laboratory, 1998-2008

Visiting Scientist, Sandia National Lab (Albuquerque, NM), 1/99-6/99

Associate Professor of Physics, Kansas State University, 1993-1998

Assistant Professor of Physics, Kansas State University, 1988-1993

Postdoctoral Research Associate, Michigan State University, 1986-1988

Education

B. S., Fudan University, Shanghai, China, 1977-1981

M. S. in Physics, Syracuse University, Syracuse, New York, 1981-1983

Ph. D. in Physics, Syracuse University, Syracuse, New York, 1983-1986

Honors/Awards

- Global SSL Award of Outstanding Achievements 2021 for the invention of MicroLED - awarded by the International SSL Alliance (ISA), 2021
- Elected Fellow of the National Academy of Inventors, 2018
- Elected Fellow of the American Association for the Advancement of Science, 2016
- Elected Fellow of SPIE - [the international society for optics and photonics](#), 2015
- Elected Fellow (Optical Society of America), 2014 // Elected Fellow (American Physical Society), 2010
- Horn Distinguished Professor, Texas Tech University (TTU), 2013 - present
- Bernie E. Rushing, Jr. Faculty Distinguished Research Award, TTU, 2011
- Named the Kan Tong Po Honorary Visiting Professor by the Royal Society of London, 2011
- University Distinguished Professor, Kansas State University, 2004-2008
- Edward E. Whitacre, Jr. Endowed Chair, Texas Tech University, 2008 - present
- [CUSPEA](#) Fellow, 1981 // • Graduate Student Fellow, Syracuse University (1984-1986)

Selected Professional Activities

- Invented in 2000 MicroLED and Microdisplay – The invention created the new industry of microLED display with a [market size to hit USD 24 billion by 2027](#). MicroLED large flat panel displays/TVs have been commercialized. MicroLED and microdisplay currently are under intensive pursuits by almost all the big names in the tech industry for smart watches, smart phones, i-glasses, and 3D/AR/VR displays. MicroLED will play an important role in the metaverse technologies as well as in the field of medicine for neural stimulation and optogenetics.
- [Invented in 2009 the first active driving full-scale high resolution and video-capable microLED microdisplay in VGA format \(640 x 480 pixels, 12 \$\mu\text{m}\$ pixel size and 15 \$\mu\text{m}\$ pitch distance\) via flip-chip bonding between microLED matrix array and Si CMOS IC.](#) The driving scheme has **been** adopted as a **standard** approach for the development of semiconductor microLED microdisplays today.
- [Invented in 2002 the single-chip high-voltage AC/DC-LED](#), which eliminated power converters and has been commercialized worldwide for general and automobile lighting applications.

- [Realization of the first III-nitride photonic crystal \(PC\) and PC-LED](#). PC-LED is recognized as one of the most effective technologies to boost the efficiency of III-nitride LEDs.
- [Pioneered the development in 1997 of the first deep UV picosecond time-resolved optical spectroscopy system for probing the static and dynamic recombination processes in semiconductors with ultrahigh bandgaps \(up to 6.2 eV\)](#). The design has been adopted by the photonic industries to benefit the research communities at large.
- [Made substantial contributions to the understanding of fundamental band structure and doping issues of III-nitride deep UV materials](#), including the first to predict and confirm Al-rich AlGaN deep UV emitters emitting light in the transverse-magnetic (TM) mode and among a few groups in the world capable to achieve conductivity control in Al-rich AlGaN alloys in the early 2000s.
- [Pioneered the development of epitaxial growth of hexagonal boron nitride \(h-BN\)](#) with large wafer size (up to 4-inches in diameter to date) and thickness (up to 200 μm to date).
- [Realized in 2020 high sensitivity BN thermal neutron detectors with a record high efficiency of 59%](#).

Professional Services

- Panelist: NSF and DOE interdisciplinary research programs
- Individual proposal reviewed for: DOE, NSF, DOD, NSERC, NRC, Research Corp., NSFC
- Meeting organized: Served as chair, co-chair, or committee member for 19 international conferences
- Book edited: Edited 13 books
- Invited presentations: Delivered over 150 plenary, keynote, and invited presentations and short courses in international conferences, universities, and industries
- Papers reviewed for: *Applied Physics Letters*, *Journal of Applied Physics*, *Physical Review Letters*, *Physical Review B*, *Nature*, *Nature Photonics*; *Nature Materials*, *ACS Nano*, etc
- Guest professorships: Zhejiang University, 2000-2004, & Xi'an Jiaotong University, China, 2001-2005. Kan Tong Po Honorary Visiting Professor, Hong Kong PolyU., Summer 2011.

Patents: 22 issued and 3 pending

Publications: 450 Total; Citations: >25,000; H-index = 87 ([Google Scholar](#)) (As of 12/2022)

8 Representative publications (after 2000):

- A. Tingsuwatit, A. Maity, S. J. Grenadier, J. Li, J. Y. Lin, and H. X. Jiang, "Boron nitride neutron detector with the ability for detecting both thermal and fast neutron," *Appl. Phys. Lett.* **120**, 232103 (2022).
- A. Maity, S. J. Grenadier, J. Li, J. Y. Lin, and H. X. Jiang, "High efficiency hexagonal boron nitride neutron detectors with 1 cm^2 detection areas," *Appl. Phys. Lett.* **116**, 142102 (2020).
- H. X. Jiang and J. Y. Lin, "Development of nitride microLEDs and displays," Chapter 1 in "Micro LEDs," Volume 106 in SEMICONDUCTORS AND SEMIMETALS, edited by H. X. Jiang and J. Y. Lin, Academic Press (an imprint of Elsevier), 1st Edition (2021).
- J. Day, J. Li, D.Y.C. Lie, C. Bradford, J. Y. Lin, and H. X. Jiang, "III-nitride full-scale high-resolution microdisplays," *Appl. Phys. Lett.* **99**, 031116 (2011).
- T. N. Oder, K. H. Kim, J. Y. Lin and H. X. Jiang, "III-nitride blue and ultraviolet photonic crystal light emitting diodes," *Appl. Phys. Lett.* **84**, 466 (2004).
- J. Li, K. B. Nam, M. L. Nakarmi, J. Y. Lin, H. X. Jiang, Pierre Carrier, and Su-Huai Wei, "Band structure and fundamental optical transitions in wurtzite AlN," *Appl. Phys. Lett.* **83**, 5163 (2003).
- H. X. Jiang, S. X. Jin, J. Li, J. Shakya, and J. Y. Lin, "III-nitride blue microdisplays," *Appl. Phys. Lett.* **78**, 1303 (2001).

Professional development

Presented more than 150 invited and plenary talks, participated in organizing 20 national and international conferences and workshops, edited 13 books, contributed more than 20 invited technical reviews and feature articles for research journals and popular trade magazines. Group's research work has been featured by popular magazines and major news media. Quarter and annual project reviews presented in DOD and DOE multidisciplinary programs.