# HONGXING JIANG

**Edward E. Whitacre, Jr. Endowed Chair and Horn Professor**
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**http://www.depts.ttu.edu/ece/Nanophotonics/**

## Appointments

**Edward E. Whitacre, Jr. Endowed Chair and Horn Professor,** Electrical and Computer Engineering, Texas Tech University, 2013 – present (Horn Professorships, the highest honor Texas Tech University may bestow on members of its faculty: http://www.swco.ttu.edu/university_archive/uacollections11.html)

**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

## 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

- Elected Fellow of the National Academy of Inventors (NAI), 2018
- Elected Fellow of the American Association for the Advancement of Science, 2016
- Elected Fellow of SPIE - the international society for optics and photonics, 2016
- Elected Fellow of the Optical Society of America, 2014
- Elected Fellow of the American Physical Society, 2010
- Horn Distinguished Professor, Texas Tech University (TTU)
- University Distinguished Professor, Kansas State University, 2004-2008
- Barnie E. Rushing, Jr. Faculty Distinguished Research Award, TTU, 2011
- Named the Kan Tong Po Visiting Professor by the Royal Society of London, 2011
- Edward E. Whitacre, Jr. Endowed Chair, Texas Tech University
- CUSPEA Fellow, 1981 (http://en.wikipedia.org/wiki/CUSPEA)
- Graduate Student Fellow, Syracuse University (1984-1986)

**Biographic Reference:** *Who's Who in America; Who's Who in the World*

## Research Grants Activities

Over the past two decades, in addition to the continuous support from DOE and NSF for conducting fundamental research, our research group has been an active team member of important R & D programs in the US related to the development of III-nitride materials and devices, including DARPA's Semiconductor Ultra-Violet Optical Sources (SUVOS), Deep Ultraviolet Avalanche Photodetectors (DUVAP), Visible InGaN Injection Lasers (VIGIL), and Compact Mid Ultraviolet Technology (CMUVT) programs, and MDA's GaN Microwave Power Amplifier program (GAMPA), as well as the Department of Homeland Security DNDO's ARI program. Currently, we are a team member of the DOD Directed Energy – Joint Transition Office (JTO) Multidisciplinary Research Initiative Program.

## Students and Postdocs Mentored

Total number of graduate students and postdoctoral scholars mentored: > 50
Total number of undergraduates hosted: 12
Total number of international exchanged students hosted: 6
Visiting professors Hosted: 13

## Professional Activities

- Original inventor of MicroLED (https://en.wikipedia.org/wiki/MicroLED), III-nitride self-emissive microdisplays, and single-chip high voltage AC/DC-LED. The MicroLED invention has also lead to the realization of MicroLED flat-panel display, which is regarded as one of the hottest new technologies in 2018 (see e.g., https://www.pocket-lint.com/tv/news/samsung/143311-what-is-microled-the-tv-technology-to-take-on-oled-explained)
- Pioneered the development of BN neutron detectors. Our research group has achieved BN neutron detectors with a record high detection efficiency among solid-state detectors to date.
- Co-Founder and Owner: III-N Technology, Inc. (3N) and AC-LED Lighting, L.L.C. 3N develops proprietary next-generation photonic devices for advanced lighting and compact displays. In particular, 3N has invented single-chip high voltage AC/DC-LEDs. The high voltage AC LEDs address the compatibility issue between LEDs and power grid infrastructure. The high voltage DC LEDs have been adopted for automobile headlights to increase their durability while reducing costs. 3N has facilitated the commercialization of high voltage AC/DC LED technology through its related entity AC-LED Lighting, LLC. 3N has also further developed MicroLED based self-emissive microdisplays for future ultra-portable products such as next generation pico-projectors, wearable displays, and head-up displays.

## 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 12 books
- Invited presentations: Delivered a total of 150 plenary, keynote, and invited presentations and short courses in international conferences and various universities
- 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, China, 2000-2004
  Xi'an Jiaotong University, China, 2001-2005

## Patents issued

1 "Micro-size LED and detector arrays for mini-displays, hyperbright light emitting diodes, lighting, and UV detector and imaging sensor applications"
US patent #6,410,940 (filed: 06/15/2000; issued date: 06/25/2002)

2 "Micro-size LED and detector arrays for mini-displays, hyperbright light emitting diodes, lighting, and UV detector and imaging sensor applications,"
Korean patent #100802764 (filed: 06/13/2001; priority date: 06/15/2000; issued date: 02/12/2008)

3 "Light emitting diodes for high AC voltage operating and general lighting"
US patent #6,957,899 (filed: 10/24/2002; issued date: 10/25/2005)

4 "Light emitting diodes for high AC voltage operating and general lighting"
US patent #7,210,819 (filed: 04/19/2005; issued date: 05/01/2007)

5 "Light emitting diodes for high AC voltage operating and general lighting"
US patent #7,213,942 (filed: 05/03/2005; issued date: 05/08/2007)

6 "Nitride microlens and arrays for blue and UV wavelength applications"
U.S. patent #7,193,784 (filed: 05/20/2004; priority date: 05/20/2003; issued date: 03/20/2007)

7 "Heterogeneous integrated high voltage DC/AC light emitter"
US patent #7,221,044 (filed: 01/21/2005; issued date: 05/22/2007)

8 "Micro-LED based high voltage AC/DC indicator lamp"
US patent #7,535,028 (filed: 04/08/2005; issued date: 05/19/2009)

9 "Micro-LED based high voltage AC/DC indicator lamp
(基于微型发光二极管的高压交直流 指示灯)"
Chinese patent #1819255 (application date: 09/05/2005; priority date: 02/03/2005; issued date: 06/02/2010)

10 "Extreme ultraviolet (EUV) detectors based upon aluminum nitride (AIN) wide bandgap semiconductors"
US patent #7,498,645 (filed: 10/04/2007; priority date: 10/04/2006; issued date: 03/03/2009)

11 "Light emitting diode lamp capable of high AC/DC voltage operation"
US patent #8,272,757 (filed: 06/03/2005; issued date: 09/25/2012)

12 "AC/DC light emitting diodes with integrated protection mechanism"
US patent #7,714,348 (filed: 03/07/2007; priority date: 10/06/2006; issued date: 05/11/2010)

13 "Micro-emitter array based full-color microdisplay"
US patent #8,058,663 (filed: 09/26/2008; priority date: 09/26/2007; issued date: 11/15/2011)

14 "Er doped III-nitride materials and devices synthesized by MOCVD"
US patent #8,227,328 (filed: 08/24/2006; issued: 07/24/2012)

15 "CMOS IC for micro-emitter based microdisplay"
US patent #9,047,818 (filed: 03/12/2011; priority date: 03/23/2009; issued date: 06/02/2015)

16 "Structures and devices based on boron nitride and boron nitride-III-nitride heterostructures"

US patent #9,093,581 (filed: 05/29/2012; issued date: 07/28/2015)

17 "Charge storage imaging devices using persistent photoconductivity crystals" U.S. Patent #5,072,122 (Expired)

18 "Persistent photoconductivity quenching effect crystals and electrical apparatus using same" U.S. Patent #5,101,109 (Expired)

19 "Method and apparatus for use of III-Nitride wide bandgap semiconductors in optical communications" US patent #7,345,812 (Expired)

**Patents pending**

20 "Solid-state neutron detectors," US application.

**Patent disclosures filed**

"Optical Hearing Device Based on Micro-LED Arrays," filed May 2009.

**Press Coverage on Our Research Work**

Our group's research work on MicroLED has been reported in German, Japanese, Russian, French, Italian, Indian, British, Portuguese, and Chinese technical magazines, in addition to press releases by media outlets including The New York Times, CNN.com, ABCnews.com and USA Today. Our recent achievement of thermal neutron detectors with a record high detection efficiency based on B-10 enriched hexagonal boron nitride epilayers has been reported by various technical media outlets, including AIP, AAAS (EurekAlert), APS (Physics.org), etc. http://www.depts.ttu.edu/ece/Nanophotonics/news.html

**Publications: 420 total** (as of 12/2018)

**Total Citations: >18,000; H-index: 76** (according to Google Scholar as of 12/2018)

**Google Scholar Citations**

https://scholar.google.com/citations?user=IHdUwEEAAAAJ&hl=en

**Research ID**

http://www.researcherid.com/rid/F-3635-2011

**List of Publications**

http://www.depts.ttu.edu/ece/Nanophotonics/publications.html