

EDUCATION

PhD	Southeast University, China, Electronic Engineering	Mar. 2013-Dec. 2018
MS	Southeast University, China, Electronic Engineering (Transferred to Doctoral programme)	Aug. 2011-Jan. 2013
BS	Southeast University, China, Mechanical Engineering and Automation (Subject: electromagnetic compatibility analysis for electromechanical systems)	Aug. 2007-Jun. 2011

TEACHING QUALIFICATIONS AND EXPERIENCES

- **Associate Fellowship of the Higher Education Academy (AFHEA)** July 2023
- **Teaching in QMUL-Beijing University of Posts and Telecommunications (BUPT) Joint Programme (JP)**
 - Module EBU5476: Microprocessors for Embedded Computing
 - Module EBU6475: Microprocessor System Design
 - Module EBU6366 (module organiser, preparing): Microwave, Millimetre-Wave and Optical Transmission
- **Undergraduate Projects**
 - Viva examinations for final year projects.
 - Supervising final year projects.

RESEARCH EXPERIENCE

- **Microwave electronics: vacuum electronic devices for the generation of high-power microwave/millimetre-wave/THz radiation**, enabling applications such as plasma diagnostics in fusion power generation, radar, THz magnetic resonance spectroscopy, etc. Mar. 2019-Present
School of EECS, QMUL, London, UK
 - millimeter-wave/THz source development: designed, simulated (CST), fabricated, and tested a high-power THz double staggered grating (DSG) backward-wave oscillator (BWO) driven by high-brightness, pseudospark-sourced sheet electron beam, for generation of THz radiation.
 - Analysed electron beam generation in the pseudospark plasma cathode with MAGIC, and the beam-wave interaction with CST.
 - Invented a double non-parallel staggered grating (DNPSG) slow-wave structure (SWS) working in millimetre/THz band that improves output power in wide frequency band.
- **THz/infrared/ultraviolet spectroscopy for space exploration (Funded by Royal Society, Europlanet)** Dec. 2021-Present
School of EECS, QMUL, London, UK

Conducted THz/IR/UV spectroscopy experiments to study the formation and evolution of prebiotic molecules at larger facilities, including the free-electron laser FELIX Laboratory at Nijmegen, the Netherlands, the synchrotron ASTRID2 at Aarhus University in Denmark and the ion accelerator ATOMKI at the Institute for Nuclear Research in Hungary. We aimed to reproduce the astrophysical conditions that lead to the observed molecular complexity in star-forming regions in space and in our Solar System, and to reveal the formation routes and survivability of these molecules.
- **Microwave wireless power transfer (WPT) to beam solar energy from space** Dec. 2022-Present
School of EECS, QMUL, London, UK

A high efficiency wireless power transmission system using vector phased array transmitter and reflector array rectenna wireless power transfer
- **Doctoral research project** Mar. 2013-Dec. 2018
Microwave electronics: Impact of thermal state on backward-wave oscillation in the helix travelling wave tube (TWT, a key microwave amplifier in satellite and radar systems), providing insights into how to improve operation stability of the TWT.
School of Electronic Science and Engineering, Southeast University, Nanjing, China
 - Conducted multi-physics analysis on TWT performance, including electron beam-microwave interaction analysis, thermal analysis, mechanical analysis, and so on, as well as coupled analysis of these processes in the working TWT.

- Investigated the impact of thermal state of SWS on backward-wave oscillation (a serious instability in the TWT) and discovered that thermal deformation due to temperature rise is a contributing factor to backward-wave oscillation.
- Investigated an innovative direct testing method for inner temperature of the working helix TWT, utilising embedded optical fibre sensors to convert temperature into light wavelength; constructed a temperature sensing system using a wideband light source, optical sensors, a demodulator, and LabVIEW-based software.
- Led a sub-project, coordinated with partner institutions, and regularly reported research progress to administrative sectors.

■ **Master research project,**

Aug. 2011-Jan. 2013

School of Electronic Science and Engineering, Southeast University, Nanjing, China

Optical engineering: High-accuracy optical current transformer (OCT) based on fast variable optical attenuator (FVOA), enabling real-time current measurement in high-voltage power lines and ensuring stable power system operation. The OCT converts the signal of large current in high-voltage power lines into an optical signal using an FVOA, which is then transmitted through optical fibre to the low-voltage environment, measuring the real-time current in the high-voltage environment.

- Designed and built the FVOA driving circuit as well as the photoelectric receiver circuit.
- Developed a LabVIEW signal processing programme to analyse the received optical signal and calculate the real-time current.
- Developed a light-emitting diode (LED)-based power-supply system with low power consumption for data acquisition components in the high-voltage environment of power lines.

REVIEWER OF

[IEEE Transactions on Electron Devices](#)

[IEEE Electron Device Letters](#)

PUBLICATIONS

Journal Publications

J. Zhang, Y. Alfadhl, X. Chen, L. Zhang and A. W. Cross, "Design, Simulation, and Cold Test of a W-Band Double Nonparallel Staggered Grating Backward Wave Oscillator," *IEEE Transactions on Electron Devices*, vol. 69, no. 10, pp. 5814-5818, Oct. 2022, doi: 10.1109/TED.2022.3195484.

Jin Zhang, Tianzhong Zhang, Yasir Alfadhl, et al., "Study on Wideband THz Backward Wave Oscillator Driven by Pseudospark-Sourced Sheet Electron Beam," *IEEE Transactions on Electron Devices*, vol. 67, no. 8, pp. 3395-3402, Aug. 2020. DOI: 10.1109/TED.2020.3005362.

Jin Zhang, Huiyu Yuan, Yanmei Wang, et al., "Impact of Thermal State on Backward Wave Oscillation in Helix TWT under Operation," *IEEE Transactions on Electron Devices*, vol. 65, no.6, 2018, pp.2227-2235. DOI: 10.1109/TED.2017.2786029.

Jin Zhang, Zhongju Yin, Huiyu Yuan, et al., "Equivalent Multi-Sector Analytical Method for High-Frequency Characteristics of Integrated Three-Helix TWT", *IEEE Transactions on Plasma Science*, vol. 46, no. 5, 2018, pp.1747-1754. DOI: 10.1109/TPS.2018.2822701

Jin Zhang, Huiyu Yuan, Xingqun Zhao, et al., "Impact of Radial Deviation of Electron Beam on Backward Wave Oscillation in Helix TWT," *IET The Journal of Engineering*, vol. 2018, no. 14, 2018, pp.686-688. DOI: 10.1049/joe.2018.0097.

Conference Papers

J. Zhang, T. Zhang and X. Chen, "Design of a High-Power W-band Rising-Sun Spatial Harmonic Magnetron for Fusion Power Generation," *2023 24th International Vacuum Electronics Conference (IVEC)*, Chengdu, China, 2023, pp. 1-2.

Jin Zhang, Lei Zhang, Jinyan Wang, et al., "A Novel Method for Testing the Inner Temperature of Helix TWT under Operation using FBG," *2019 IEEE International Vacuum Electronics Conference (IVEC)*, Busan, Korea (South), 2019, pp. 1-2.

Jin Zhang, Jinyan Wang, Xiaohan Sun, et al., "Impacts of an embedded fiber inside a Helix TWT on its performance," *2018 IEEE International Vacuum Electronics Conference (IVEC)*, Monterey, CA, USA, 2018, pp. 341-342.

Jin Zhang, Huiyu Yuan, Xingqun Zhao, et al., "Full Thermal Analyses for Slow-Wave Structure in Helix-TWT under Operation", *2017 IEEE International Vacuum Electronics Conference (IVEC)*, London, UK, 2017, pp. 1-2.

Jin Zhang, Feng Wang, Huiyu Yuan, et al., "Impacts of cubic Boron Nitride (CBN) support rods on TWT performance," *2016 IEEE International Vacuum Electronics Conference (IVEC)*, Monterey, CA, USA, 2016, pp. 1-2.

Jin Zhang, Feng Wang, Huiyu Yuan, et al., "Impact of FBG Array Embedded on/in Helix Support Rods on TWT Performance," *2015 IEEE International Vacuum Electronics Conference (IVEC)*, Beijing, China, 2015, pp. 1-2.

Jin Zhang, Yasir Alfadhl, Xiaodong Chen, "Design of Dual-Band High-Power Backward Wave Oscillator using Double Staggered Grating and Pseudospark-Sourced Sheet Beam," *2021 IEEE UK-Europe-China Workshop on Millimeter Waves and Terahertz Technologies (UCMMT)*, Lancaster, 2021, pp. 1-3.

PATENTS

Xiaodong Chen, **Jin Zhang**, “A double non-parallel staggered grating backward wave oscillator for ultra-broadband high-power THz generation,” Dec. 2020, UK, No. GB2019417.1. <https://www.ipo.gov.uk/p-ipsum/Case/ApplicationNumber/GB2019417.1>

Xiaohan Sun, **Jin Zhang**, “Method and system for obtaining the parameter changes of vacuum electron devices under thermal state,” 2017, China, No. 201711498733.2. <https://patents.google.com/patent/CN108268708B>

Xiaohan Sun, **Jin Zhang**, Huiyu Yuan, Xingqun Zhao, “A method and device for testing the working temperature of the slow wave structure (SWS) in a helix traveling wave tube (TWT),” 2017, China, No. 201710037514.8. <https://patents.google.com/patent/CN106840451B>

Pu Wei, Xiaohan Sun, **Jin Zhang**, Xuefeng Wang, “An LED-Based Optical Power-Supplying Device for the High-Voltage Side of Current Transformers”, 2012, China, No. 201210529024.7. <https://patents.google.com/patent/CN103036480B>

TALKS

Talk, “Design of Dual-Band High-Power Backward Wave Oscillator using Double Staggered Grating and Pseudospark-Sourced Sheet Beam,” 2021 IEEE UK-Europe-China Workshop on Millimeter Waves and Terahertz Technologies (UCMMT), Lancaster, UK, 14 September 2021.

Talk, “Novel Double Non-Parallel Staggered Grating Ultra-Broadband High-power THz Backward Wave Oscillator with Pseudospark-Sourced Sheet Beam,” 2020 National Vacuum Electronics Conference (NVEC 2020), London, UK, 9 November 2020.

Talk, “Design of 0.365-THz backward wave oscillators using DSG/FWG SWS and Sheet Beam,” 2019 National Vacuum Electronics Conference (NVEC 2019), Glasgow, UK, 13 November 2019.

Talk, “Design of 0.365-THz Backward Wave Oscillator using Staggered Double Grating SWS and Sheet Beam,” 2019 IEEE UK-Europe-China Workshop on Millimeter Waves and Terahertz Technologies (UCMMT 2019), London, UK, 22 August 2019.

Talk, “Impacts of an embedded fiber inside a Helix TWT on its performance,” IEEE International Vacuum Electronics Conference 2018 (IVEC 2018), Monterey, CA, USA, 26 April 2018.

Talk, “Full Thermal Analyses for Slow-Wave Structure in Helix-TWT under Operation,” IEEE International Vacuum Electronics Conference 2017 (IVEC 2017), London, UK, 26 April 2017.

ACADEMIC ACTIVITIES

General Secretary of 2020 National Vacuum Electronics Conference ([NVEC 2020](#)), London, UK, 9 November 2020.

Session Chair: “Millimeter wave sources and applications” at [NVEC 2019](#), Glasgow, UK, 13 November 2019.

Local Co-Organiser of 2019 IEEE UK-Europe-China Workshop on Millimeter Waves and Terahertz Technologies ([UCMMT 2019](#)), London, UK, 20-22 August 2019.

Organiser and Chair of weekly UK-China International Webinar on Microwave and Antenna Technologies between **QMUL**, **BUPT** (Beijing University of Posts and Telecommunications), **UESTC**(University of Electronic Science and Technology of China), **RUC**(Renmin University of China), and **HZU**(Hangzhou Dianzi University) from May 2019 to July 2021.

TECHNICAL SKILLS

- Programming languages and mathematical packages: C ++, MatLab, LabVIEW, Python
- Electromagnetic or plasma simulation tools: CST Studio Suite, ANSYS, MAGIC
- Computer aided design/engineering: AutoCAD, SolidWorks.

LANGUAGES

- English: Professional working proficiency
- Chinese Madarin: Native proficiency