

YONGLIN JU

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UNIVERSITY EDUCATION

- **Ph.D.** 1998, Mechanics and Cryogenics, Institute of Mechanics and Cryogenic Laboratory, Chinese Academy of Science, Beijing, China
- **ME** 1995, Engineering Thermal Physics, Xi'an Jiaotong University, Xi'an, China
- **BE** 1992, Mechanical Engineering, Xi'an Jiaotong University, Xi'an, China

EXPERIENCE

Expert in cryogenics and thermal physics, with more than 10 years extensive experience and strong skills in cryogenics, cryocooler, heat transfer, thermodynamics, fluid mechanics, vacuum technology, CFD, advance thermal/fluid and cryogenic system modeling (FLUENT, ANSYS), experimental hardware design, facilities development and test

10/2002 ~ Present *Cryogenic Physicist*, Columbia University, Nevis Laboratories, Irvington, NY 10533

- Study and develop a new electron bubble ("e-Bubble") particle detector, using cryogenic liquids (Helium, Neon and hydrogen) as the detecting medium, for the detection of low-energy particle tracks, in particular neutrinos from the Sun and accelerator beams
- Designed and constructed the cryogenic devices and vacuum systems for a small size electron bubble test chamber to start the detector R&D, and performed experimental proofs of the operation principle, including measurements of a number of key physical and technical parameters of electron bubble transport in liquid and at the interface of liquid/vapor.
- Conducted experimental study of cryogenic avalanche detectors based on gas electron multipliers
- Performed computer modeling (using FLUENT) on buoyancy-induced thermal/fluid instabilities of liquid helium inside electron bubble chamber.

11/2000 ~ 10/2002 *Research Professor and Project Leader*, Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, Beijing, 100080, P. R. China

- Led, designed and constructed 4K multi-stage pulse tube refrigerators (PTRs) for cryogen-free operation of superconducting magnets (dry-cooling magnets), including hardware and software design, lab facilities development, experimental test and measurements
- Led, proposed and performed studies on non-metallic non-magnetic miniature cryocoolers for low-noise continuous cooling of highly sensitive high-T_c SQUIDS
- Developed 2W/60K medium-size low power pulse tube cryocoolers (PTCs) for cooling HTS RF filter subsystem in ground base stations for wireless telecommunications
- Proposed and performed heat transfer enhancement of cryogenic regenerators (reverse flow heat exchangers) subjected to oscillating flows
- Led, proposed and conducted investigations on performance analysis and structure optimization of micro-scale cryogenic heat pipes at liquid nitrogen temperatures
- Directed and supervised graduate student thesis in MS and Ph.D. level

10/1998 ~ 10/2000 *Post Doctoral Fellow*, Department of Physics, Eindhoven University of Technology, Eindhoven, 5600MB, the Netherlands

- Studied multi-stage PTRs operated at liquid helium temperatures, including hardware and software design, experimental test and measurements. A world record lowest temperature of 1.75K (lower than the lambda transition of ⁴He) was achieved by using ³He as working fluid
- Developed a comprehensive CFD model (with mixed Eulerian-Lagrangian methods) and a computer code, performed numerical analysis for simulating time-variations of dynamic parameters and visualizing the cooling-down processes of different types of PTRs
- Performed thermodynamic analyses on GM-type PTRs and rotary valves, and general expressions of the COP have been derived out and discussed
- Performed pulse tube performance at very low temperatures

07/1998 ~10/1998 **Assistant Professor**, Cryogenic Laboratory, Chinese Academy of Sciences, Beijing, 100080, P. R. China

- Performed thermal analysis for predicting transient temperature distributions in the freezing process and thermal treatment of biological tissue in cryosurgery
- Conducted researches on oscillating flow behavior and heat transfer characteristics of regenerators (compact heat exchangers) in pulse tube cryocoolers

09/1995 ~06/1998 **Ph.D. Candidate, Research Assistant**, Institute of Mechanics and Cryogenic Laboratory, Chinese Academy of Sciences, Beijing, 100080, P. R. China

- Designed and built a dynamic experimental set-up with computer controlled fully automated measuring system for PTCs and regenerators.
- Conducted experimental study on oscillating flow characteristics of PTCs. DC-gas flow was first observed in the PTCs and evaluated from experimental measurements. Effects of double-inlet and multi-bypass versions on the refrigeration performance and flow mechanism of PTCs were clarified
- Performed experiments and theoretical analysis on the oscillating flow characteristics (pressure drop and phase shift) for the high frequency regenerators
- Developed a CFD model and a computer code and performed numerical analysis for the PTCs, and further developed into a design and optimization tool for regenerative cryogenic cryocoolers, which has been accepted and now being used by Pulse Tube Group of CL/CAS

02/1995 ~08/1995 **Research Assistant**, Cryogenic Laboratory, Chinese Academy of Sciences, Beijing, 100080, P. R. China

- Investigated experimentally two-stage pulse tube refrigerators, including software and hardware design, experimental test and measurements. A low temperature of 11K was obtained

09/1992 ~02/1995 **Master Degree Candidate, Research Assistant**, Department of Energy and Power Engineering, Xi'an Jiaotong University, Xi'an, 710049, P. R. China

- Designed and constructed an experimental set-up for melting and solidification heat transfer, and developed a data acquisition system and codes for data reduction and graphics
- Investigated and visualized melting and solidification heat transfer in a rectangular enclosure with discrete protruding heat sources on one of its vertical wall
- Developed a CFD model and performed thermal analysis on natural heat transfer within an enclosure with discrete heat sources for quantitative comparison with benchmark and references

HONORS AND AWARDS

- **2003, Carl von Linde Award**, International Institute of Refrigeration (IIR), Washington DC. USA
- **2001, International Scientist of the Year**, International Biographical Center, Cambridge, UK
- **1999, National Technology Invention Prize**, The Ministry of Science and Technology, China
- **1998, Young Outstanding Paper Prize**, Beijing Association of Science and Technology, China
- **1998, Academic Invention Prize**, Chinese Academy of Sciences, China
- **1997, Presidential Scholarship**, Chinese Academy of Sciences, China
- **1997, CEC Meritorious Paper Award**, CEC/ICMC 97, Portland, Oregon, USA
- **1995, Sunlight Engineering Prize**, Xi'an Jiaotong University, China
- **1994, First Class Excellent Graduate Scholarship**, Xi'an Jiaotong University, China

MEMBERSHIPS

Member of **AAAS** (*American Associate for Advancement of Sciences*), **NYS** (*New York Academy of Sciences*) and **APS** (*American Physical Society*)

SKILLS

- Programming Languages: FORTRAN, Pascal, C++ and ANSI C
- DOS, Windows, Linux, Unix, LabView, FEMLAB, Microsoft Word/Excel/ PowerPoint/Access, Designer, Origin, Scientific Workplace, Auto CAD, Fluent, Ansys, Internet Navigation

PUBLICATIONS (Available upon request)

- Authored and co-author 36 papers in peer-reviewed scientific journals.
- Authored and co-author 44 papers in international conference proceedings.
- Numerous presentations at international conferences and workshops in the U.S., Europe and China.
- Owned 5 patents and 4 pending patent applications.

REFERENCES

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