



Prof. DAI Jiyan

Professor

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Education	Postdoc Northwestern University, USA Ph.D. Chinese Academy of Sciences B.Sc. Fudan University
Research Interests	Smart Materials, Nanomaterials, Thin Films and Ultrasonic Device
ORCID	0000-0002-7720-8032
Publication	240
H-index	33
Sum of the Times Cited	5472

Awards

- President Award in Research and Scholarly Activities, **2007**
- Faculty Award in Research and Scholarly Activities, **2007**
- Supervised Final Year Project student received Award of Best Paper in Materials from the Hong Kong Institute of Engineering, **2006**
- BEST IN SESSION at ISTFA **2001** in Santa Clara, California, the ASM Electronic Device Failure Analysis Society

Patents

- **J.Y. Dai**, S.F. Tee, C.L. Tay, E. Er, and R. Shailesh, Method for a Plan-view transmission electron microscopy sample preparation technique for via and contact characterization. US 6,683,304
- **J.Y. Dai**, P.F. Lee and X.B. Lu, Process and apparatus for fabricating nano-floating gate memories and memory made thereby. US 7,585,721B2
- J. Peng, C. Chao, **J.Y. Dai**, and H.L.W. Chan, Piezoelectric Single crystalline thick film on silicon wafer for Piezoelectric micro-electro-mechanical systems, US Patent, US 8536665B2
- 一種複合壓電陣子及其製備方法。已授權。申請時間：2011年01月05日，授權時間：**2014年12月31日**。發明人：周丹，張國峰，林國豪，陳燕，**戴吉岩**，陳王麗華，申請號：201110001124.8
- 環狀陣列超聲波內窺鏡探頭及其製備方法和固定旋轉裝置。已授權。申請時間：2011年05月23日，授權時間：**2014年12月10日**。發明人：**戴吉岩**，張國峰，周丹，焦逸靜，林國豪，陳燕，陳王麗華，申請號：201110132195.1
- 旋轉超聲成像系統，已授權。申請時間：2010年11月12日，授權時間：**2013年9月18日**。發明人：林國豪，陳燕，**戴吉岩**，陳王麗華。申請號：201010542689.2
- 基於三維超聲成像的二維陣列超聲換能器及其製備方法，發明人：**戴吉岩**，方華靖，黃智文，陳燕。已授權申請號：2014106173593

Publications (selected)

- Peng, K. L., Lu, X., Zhan, H., **J.Y. Dai** et al. Broad temperature plateau for high ZTs in heavily doped p-type SnSe single crystals, Energy & Environmental Science, Vol 9, Issue 2, pp. 454-460 (**2016**).
- Li, L., Liu, Y., **Dai, J.Y.**, Zhu, H.X., Hong, A.J., Zhou, X.H., Ren, Z.F., Liu, J.M., Thermoelectric property studies on $\text{Cu}_x\text{Bi}_2\text{Se}_2$ with nano-scale precipitates Bi_2S_3 , Nano Energy, 12, 447 (**2015**).
- Zhang, X., Zheng, Y., Liu, X., Lu, W., **Dai, J.**, Lei, D.Y., Macfarlane, D.R., Adv. Mater., Vol 27, 1090 (**2015**).
- Ngai Yui Chan, Meng Zhao, JianXing Huang, Kit Au, Man Hon Wong, Hei Man Yao, Wei Lu, Yan Chen, Chung Wo Ong, Helen Lai Wa Chan and **Jiyan Dai**, Highly-sensitive gas sensor by the $\text{LaAlO}_3/\text{SrTiO}_3$ heterostructure with Pd Nanoparticle Surface Modulation, Adv. Mater., 26, 5962 (**2014**).
- J.X. Zhang, H.R. Fu, W. Lu, **J.Y. Dai** and H.L.W. Chan, Nanoscale free-standing magnetoelectric heteropillars, Nanoscale 5, 6747 (**2013**).
- Au, D. F. Li, N. Y. Chan, and **J. Y. Dai**, Polar Liquid Molecule Induced Transport Property Modulation at $\text{LaAlO}_3/\text{SrTiO}_3$ Heterointerface, Adv. Mater., 24, 2598 (**2012**).
- X.S. Gao, J.M. Liu, Kit Au, and **J.Y. Dai**, Nanoscale ferroelectric tunnel junctions based on ultrathin BaTiO_3 film and Ag nanoelectrodes, Appl. Phys. Lett. 101, 142905-09 (**2012**).
- Zhang XY, Zhao X, Lai CW, J. Wang, X.G. Tang, and **Dai JY**, Synthesis and piezoresponse of highly ordered $\text{Pb}(\text{Zr}_{0.53}\text{Ti}_{0.47})\text{O}_3$ nanowire arrays, Appl. Phys. Lett. 85, 4190 (**2004**).

Research Overview

Research Foci/ Projects

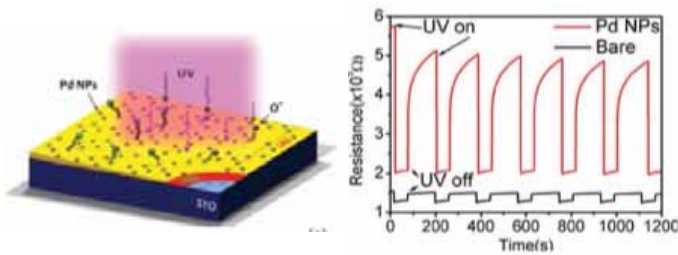
GRF (As PI) 01 Jan 2015 - 31 Dec 2017	Photovoltaic, Spin Field Effect Transistor and Sensing Devices Based on Polar Oxide Heterostructural Two-dimensional Electron Gas
GRF (As PI) 01 Jan 2017 - 31 Dec 2019	Study of Dynamic Strain Modulation to Transport Properties of Oxide Heterostructure

Prof. Dai's group has been devoting in developing high-performance ultrasound transducers including phase-array, annular-array, high-frequency transducers as well as endoscopic and intravascular ultrasound transducers for medical imaging. He has successfully finished two ITF projects in ultrasound transducers development and is running a new ITF project for high-frequency phase-array transducer for eye and small animal imaging. He has also led a team for National 973 project for developing high-performance ultrasound transducers, and some inventions have been implemented and licensed to industry. These efforts and pioneer works have greatly accelerated the progress of China's medical ultrasound imaging technology.

Functional Oxide Thin Films and Devices

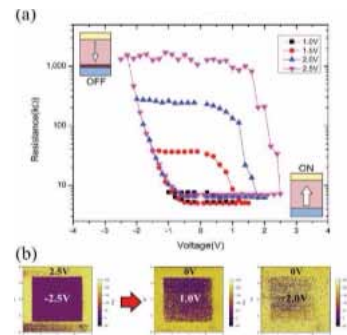
- (i) Polar liquid, UV light and gas sensing properties in the LaAlO₃/SrTiO₃ 2D electron system.
- (ii) Multiferroic tunnelling junction and RRAM

With LaAlO₃ surface modification by Pd nanoparticles, LaAlO₃/SrTiO₃ (LAO/STO) interfacial two-dimensional electron gas presents a giant optical switching effect with a photoconductivity on/off ratio as high as 750% under UV light irradiation.



► *Adv. Mater.*, 26, 5962 (2014)
Adv. Mater., 24, 2598–2602 (2012)
ACS Nano, 22, 8673 (2013)

We demonstrate a success of this four-state memory in a material system of NiFe/BaTiO₃/La_{0.7}Sr_{0.3}MnO₃ with improved memory characteristics such as lower switching field and larger tunneling magnetoresistance (TMR). *Scientific Reports* | 5:12826 | DOI: 10.1038/srep12826



Ultrasound Transducers and Biomedical Imaging

PMN-PT single crystal-based array transducers, high-frequency transducers and Intravascular transducers and imaging.

