

# JingleiPing

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## Research Interests

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- Nanomaterials, particularly two-dimensional materials
- Devices/systems based on two-dimensional (2D) materials for sensing and bioanalytical applications
- Translation of device structures into biomedical/biological tools in healthcare, drug testing, point-of-care testing, and environmental monitoring

## Professional Position

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### University of Massachusetts Amherst

Department of Mechanical and Industrial Engineering	Assistant Professor	Sep 2018 – date
Institute for Applied Life Sciences	Associated Faculty Member	Sep 2018 – date
Department of Biomedical Engineering	Adjunct Assistant Professor	May 2019 – date

## Education and Training

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### University of Pennsylvania

Research Associate Dec 2015 – Sep 2018

### University of Pennsylvania

Postdoctoral Researcher Dec 2013 – Dec 2015

### Monash University

Occupational Trainee Jan 2013 – Jul 2013

### University of Maryland–College Park

Ph.D. Chemical Physics Dec 2013

### Sun Yat-sen University

M. Phil. Condensed Matter Physics Jun 2008

B.S. Materials Physics Jun 2003

## Awards

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- a1. Air Force Office of Scientific Research YIP Award, 2019
- a2. NIBIB Trailblazer Award, 2022

## Grants

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- g1. *Portable Devices for Ultra-Sensitive Determination of Heavy Metals in Whole Blood.* DoD CDMRP PRMRP, 04/19–09/21, PI
- g2. *Wireless Network of Smart Graphene Sensors for Large-Scale Monitoring of Water Heavy Metals.* USGS WRIP, 06/19–12/21, sole-PI
- g3. *Multiscale Electrical Mapping of Biosystems.* AFOSR YIP, 07/20–06/23, sole-PI

- g4. UMass IALS Midgrant, 2021, sole-PI
- g5. UMass IALS LGC, 2022, PI
- g6. *Controllable Atomic-Scale Functionalization of Two-Dimensional Materials*. AFOSR DURIP, 02/22–01/23, sole-PI
- g7. *Highly Integrated Nucleic-Acid Analysis Using Graphene Bioelectronics*. NIBIB Trailblazer Award, 04/22–12/25, sole-PI

## Patents

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- f1. *Nanodevices and methods for measuring biofluidic flow using a graphene-based microelectrode*. **Jinglei Ping** and Xiaoyu Zhang, US Patent App. 63/311,123
- f2. *Scalable back-gated functionalized graphene field effect transistors for detection of DNA and other target molecules*. A. T. Charlie Johnson, **Jinglei Ping**, and Ramya Vishnubhotla, US Patent App. 16/084,739
- f3. *pH sensing technique based on graphene electrodes*. A. T. Charlie Johnson and **Jinglei Ping**, US Patent 11,327,041
- f4. *Multiplexed detection of toxins using graphene-based aptasensors*. A. T. Charlie Johnson, **Jinglei Ping**, Chengyu Wen, and Steven Vitale, US Patent App. 16/299,615

## Books and Chapters

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- b1. *Scalable arrays of chemical vapor sensors based on DNA-decorated graphene*. **Jinglei Ping** and A.T. Charlie Johnson, *Biomimetic Sensing*, 2019, Springer

## Publications

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\*Equal contribution

### 2022

- j1. *Microscale Molecule Focusing and Sensing between Graphene Microelectrodes*. Xiao Fan, Xiaoyu Zhang, Jinglei Ping, ACS Nano (2022).
- j2. *Electrical Contactless Microfluidic Flow Quantification*. Xiaoyu Zhang, Xiao Fan, **Jinglei Ping**, APL 120, 044102 (2022).

### 2021

- j3. *Flow-Sensory Contact Electrification of Graphene*. Xiaoyu Zhang, Eric Chia\*, Xiao Fan\*, **Jinglei Ping**, Nature Communications 12, 1755 (2021). (Reported by media including Nanowerk, phys.org, Science Daily, Institution of Mechanical Engineers, etc.)

### 2020

- j4. *Attomolar detection of ssDNA without amplification and capture of long target sequences with graphene biosensors*. Ramya Vishnubhotla, Adithya Sriram, Olivia Dickens, Srinivas Mandyam, **Jinglei Ping**, Emmeline Adu-Beng, A. T. Charlie Johnson, IEEE Sensors Journal 20, 5720 (2020).

### 2019

- j5. *Characterization of an engineered water-soluble variant of the full-length human mu opioid receptor*. Jin Xi, Jie Xiao, Jose Manuel Perez-Aguilar, **Jinglei Ping**, A.T. Charlie Johnson, Jeffery G. Saven, Renyu Liu, Journal of Biomolecular Structure and Dynamics 38, 4364 (2019).

**2018**

- j6. *DNA nano-tweezers and graphene transistor enable label-free genotyping.*  
Michael T. Hwang\*, Zejun Wang\*, **Jinglei Ping\***, Deependra Kumar Ban\*, Zi Chao Shiah, Leif Antonschmidt, Joon Lee, Yushuang Liu, Abhijith G. Karkisaval, A. T. Charlie Johnson, Chunhai Fan, Gennadi Glinsky, Ratnesh Lal, *Advanced Materials* 30, 18802440 (2018).
- j7. *Detection of sub-fM DNA with target recycling and self-assembly amplification on graphene field effect biosensors.*  
Zhaoli Gao\*, Han Xia\*, Jonathan Zauberman, Maurizio Tomaiuolo, **Jinglei Ping**, Qicheng Zhang, Pedro Ducos, Sheng Wang, Huacheng Ye, Xiping Yang, Fahmida Lubna, Zhengtang Luo, Lawrence F. Brass, A. T. Charlie Johnson, *Nano Letters* 18, 3509 (2018).
- j8. *All-electronic quantification of neuropeptide-receptor interaction using a bias-free functionalized graphene microelectrode.*  
**Jinglei Ping**, Jin Xi, Ramya Vishnubhotla, Pedro Ducos, Jeffery G. Saven, Renyu Liu, A. T. Charlie Johnson, *ACS Nano* 12, 4218 (2018).
- j9. *Single-crystal bilayer graphene with controlled stacking from Ni-Cu gradient alloy.*  
Zhaoli Gao, Qicheng Zhang, Carl H. Naylor, Youngkuk Kim, Irfan Haider Abidi, **Jinglei Ping**, Pedro Ducos, Jonathan Zauberman, Mengqiang Zhao, Andrew M. Rappe, Ying-Jun Wang, Zhengtang Luo, Li Ren, A. T. Charlie Johnson, *ACS Nano* 12, 2275 (2018).

**Previous to 2018**

- j10. *Scalable graphene aptasensors for drug quantification.*  
Ramya Vishnubhotla\*, **Jinglei Ping\***, Abigail Lee, A. T. Charlie Johnson, *AIP Advances* 7, 115111 (2017). (Featured article, highlighted by Scilight)
- j11. *An aptamer-based biosensor for the azole class of antifungal drugs.*  
Gregory Wiedman, Yunan Zhao, Arkadv Mustaev, **Jinglei Ping**, Ramya Vishnubhotla, A. T. Charlie Johnson, and David Perlin, *mSphere* 2, e00274-17 (2017).
- j12. *pH sensing properties of flexible, bias-free graphene microelectrodes in complex fluids: from phosphate buffer solution to human serum.*  
**Jinglei Ping**, Jacquelyn E. Blum, Ramya Vishnubhotla, Amey Vrudhula, Carl Naylor, Zhaoli Gao, Jeffery, G. Saven, A. T. Charlie Johnson, *Small* 13, 1700564 (2017).
- j13. *Structural-functional analysis of engineered protein-nanoparticle assemblies using graphene microelectrode.* (Featured on Chemical Science HOT articles and reported by myScience, Penn News, etc.)  
**Jinglei Ping**, Katherine W. Pulsipher, Ramya Vishnubhotla, Jose A. Villegas, Tacey L. Hicks, Stephanie Honig, Jeffery G. Saven, Ivan J. Dmochowski, A. T. Charlie Johnson, *Chemical Science* 8, 5329 (2017).
- j14. *Quantifying the effect of ionic screening with protein-decorated graphene transistors.*  
**Jinglei Ping**, Jin Xi, Jeffery G. Saven, Renyu Liu and A. T. Charlie Johnson, *Biosensors and Bioelectronics* 89, 689 (2017).
- j15. *Scalable production of sensor arrays based on high mobility hybrid graphene field effect transistors.*  
Zhaoli Gao, Hojin Kang, Carl Naylor, Frank Streller, Pedro Ducos, Madeline D. Serrano, **Jinglei Ping**, Jonathan Zauberman, Rajesh, Robert Carpick, Ying-Jun Wang, Yung W. Park, Zhengtang Luo, Li Ren, A. T. Charlie Johnson, *ACS Applied Materials & Interfaces* 8, 27546 (2016).
- j16. *Scalable production of high-sensitivity, label-free DNA biosensors based on back-gated graphene field-effect transistors.*  
**Jinglei Ping\***, Ramya Vishnubhotla\*, Amey Vrudhula, and A. T. Charlie Johnson, *ACS Nano* 10, 8700 (2016).

- j17. *Quantifying the intrinsic surface charge density and charge-transfer resistance of the graphene-solution interface through bias-free low-level charge measurement.* (Editor's pick)  
**Jinglei Ping** and A. T. Charlie Johnson, *Applied Physics Letters* 109, 013103 (2016).
- j18. *Genetically engineered antibody functionalized platinum nanoparticles modified CVD-graphene nanohybrid transistor for the detection of breast cancer biomarker, HER3.*  
Rajesh, Zhaoli Gao, Ramya Vishnubhotla, Madeline D. Serrano, **Jinglei Ping**, M. K. Robinson, and A. T. Charlie Johnson, *Advanced Materials Interface* 3, 1600124 (2016).
- j19. *Monolayer single-crystal 1T'-MoTe<sub>2</sub> grown by chemical vapor deposition exhibits weak antilocalization effect.*  
Carl H. Naylor, William Parkin, **Jinglei Ping**, Zhaoli Gao, Yu Ren Zhou, Youngkuk Kim, Frank Streller, Robert Carpick, Andrew M. Rappe, Marija Drndic, James M. Kikkawa, and A. T. Charlie Johnson, *Nano Letters* 16, 4297 (2016).
- j20. *Seeded growth of highly crystalline molybdenum disulfide monolayers at controlled locations.*  
Gang H. Han, Nicholas J. Kybert, Carl H. Naylor, Bum S. Lee, **Jinglei Ping**, Joo H. Park, Jisoo Kang, Si Y. Lee, Young H. Lee, Ritesh Agarwal and A. T. Charlie Johnson, *Nature Communications* 6, 6128 (2014).
- j21. *Disorder induced magnetoresistance in a two dimensional electron system.* (Editor's suggestion)  
**Jinglei Ping**, Indra Yudhistira, Navneeth Ramakrishnan, Sungjae Cho, Shaffique Adam, and Michael S. Fuhrer, *Physics Review Letters* 113, 047206 (2014).
- j22. *Carbon impurities on graphene synthesized by chemical vapor deposition on platinum.*  
**Jinglei Ping** and Michael S. Fuhrer, *Journal of Applied Physics*. 116, 044303 (2014).
- j23. *Measuring the thickness of few-layer graphene by laser scanning microscopy.*  
Behnood Ghamsari, Jacob Tosado, A. Zhuravel, Mahito Yamamoto, Daniel Lenski, **Jinglei Ping**, Michael Fuhrer, and Steven Anlage, *IEEE Xplore*, doi:10.1109/CPEM.2012.6251000 (2012).
- j24. *Layer number and stacking sequence imaging of few-layer graphene by transmission electron microscopy.* (Top 20 most downloaded paper of the month)  
**Jinglei Ping** and Michael S. Fuhrer, *Nano Letters* 12, 4635 (2012).

## Invited Presentations

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- t1. *Sensing and Actuation Based on Two-Dimensional Materials*  
Air Force Office of Scientific Research, Fairfax, VA, 2020
- t2. *Contact Electrification at Graphene/Bio Interfaces*  
New Jersey Institute of Technology, Newark, NJ, 2021
- t3. *Multiscale Electrical Mapping of Biosystems*  
Air Force Office of Scientific Research, Fairfax, VA, 2020
- t4. *2D-Materials Biosensors.*  
Amherst College, Amherst, MA, 2019
- t5. *Scalable 2D-Biosensors.*  
University of Massachusetts, Department of Mechanical and Industrial Engineering, Amherst, MA, 2018
- t6. *Spontaneous Faradaic Charge Transfer at Bio-Graphene Interface.*  
University of Massachusetts, Physics Department, Amherst, MA, 2018
- t7. *Electrical Biosensing Devices and Systems Based on 2D Materials.*  
McMaster University, Hamilton, ON, Canada, 2017
- t8. *Electrical Biosensors Based on 2D Materials.*  
Boston College, Boston, MA, 2017

- t9. *Electrical Biosensors Based on Two Dimensional Nanomaterials.*  
BioDirection, Inc., Santa Fe, NM, 2017
- t10. *Electrical Biosensing Science and Technology Based on Two Dimensional Nanomaterials.*  
University of Delaware, Newark, DE, 2017
- t11. *Biosensors and bioelectronics based on two-dimensional nanomaterials.*  
APS March Meeting, Baltimore, MD, 2016
- t12. *Graphene chemical-vapor-deposited on platinum: the glamour of imperfection.*  
Penn State University, University Park, PA, 2013

## Teaching Experience

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### Course Instructor at University of Massachusetts Amherst

- Statics (MI-ENG 210, CE-ENGIN 240), Spring 2022
- Nanomaterials and Sensors (MI-ENG 597NS/697NS, BMED-ENG 597NS), Fall 2021
- Statics (MI-ENG 210, CE-ENGIN 240), Spring 2021
- Mechanical Properties of Materials (MI-ENG 590C, MI-ENG 609, ChE-ENG 590C), Fall 2020
- Statics (MI-ENG 210, CE-ENGIN 240), Spring 2020
- Mechanical Properties of Materials (MI-ENG 590C, MI-ENG 609, ChE-ENG 590C), Fall 2019
- Mechanical Properties of Materials (MI-ENG 609), Spring 2019
- Statics (MI-ENG 210, CE-ENGIN 240), Fall 2018, co-instructed with Prof. Robert Hyers

### Teaching Assistant at University of Maryland–College Park

- Experimental Physics II: Electricity and Magnetism (PHYS276), 2009, with Prof. Hassan Jawahery and Dr. Richard Ellis
- Intermediate Electricity and Magnetism (PHYS411, ENEE680), 2008, with Prof. Edward Ott

## Professional Service

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- Topic Editor, MDPI Biosensors
- Reviewer for journals including IEEE Sensors, Nano Letters, ACS Advanced Materials Interfaces, Applied Physics Letters, Chinese Physics Letters
- Membership: American Physics Society, American Chemistry Society, Materials Research Society
- Chairing & Organizing
  - MIE Departmental Seminar, 2019, 2020, 2021
  - Chair of Session P33 (focused session) of APS March Meeting 2017, New Orleans, LA
  - Chair of Session J1 (focused session) and Y26 of APS March Meeting 2015, San Antonio, TX
  - Chapter Member of EPS Young Minds–Section Maryland 2012
  - Organizer and chair of Chemical Physics Seminar, 2009-2010, University of Maryland, MD

## Academic Service

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- MIE Seminar Committee, 2021–2022

- MIE Department Personnel Committee, 2020–2021
- MIE Graduate Committee, 2019-2020
- BME Faculty Search Committee, 2019-2020
- MIE Graduate Committee, 2018-2019
- Reviewer for journals including IEEE Sensors, Nano Letters, Advanced Materials, ACS Advanced Materials Interfaces, Applied Physics Letters, Chinese Physics Letters
- Membership: American Physics Society, American Chemistry Society, Materials Research Society
- Chairing & Organizing
  - Chair of Session P33 (focused session) of APS March Meeting 2017, New Orleans, LA
  - Chair of Session J1 (focused session) and Y26 of APS March Meeting 2015, San Antonio, TX
  - Chapter Member of EPS Young Minds–Section Maryland 2012
  - Organizer and chair of Chemical Physics Seminar, 2009-2010, University of Maryland, MD

## **Mentorship**

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### **Current**

- m1. Xiao Fan, MIE, PhD candidate
- m2. Xiaoyu Zhang, MIE, PhD candidate
- m3. Huilu Bao, MIE, PhD candidate
- m4. Charlotte LaGasse, BME, undergraduate
- m5. Anisha Prathi, Computer Science, undergraduate
- m6. Cristian Clewis, Physics, undergraduate

### **Alumni**

- m7. Eric Chia, MIE, graduate student
- m8. Sharath Chandan Reddy Patlolla, MIE, MS
- m9. Henry Chow, BME, undergraduate
- m10. Jiahui Zhao, MIE, undergraduate
- m11. Noah Doerr, MIE, undergraduate
- m12. Ashwini Allada, MIE, undergraduate
- m13. Samuel Worrell, ECE, undergraduate

## **Students Awards**

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- s1. Huilu Bao, School Doctoral Fellowship, 2022