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**Research Interests**

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Printable inks, paper-based devices, nanostructured materials and devices, conductive fibers and composites, sensors and actuators, thin film electrodes, electronic textiles, structural and chemical characterizations.

**Education**

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**Shinshu University (Japan)** (Oct. 2008-Sep. 2011, Ueda, Japan)

Ph.D in Bioscience and Fiber engineering, Thesis: Electromechanical properties of conductive polymer-coated papers

**Soochow University (China)** (Sep. 2005-Jun. 2008, Suzhou, China)

M.S in Materials Science, Thesis: Self-crosslinking Polypropylene in Room Temperature

**Wuhan University of Technology (China)** (Sep. 2001-Jun. 2005, Wuhan, China)

B.S in Materials Chemistry, Thesis: Simulation of Injection Molding Process by using Moldflow

**Research Experiences and Activities**

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**King Abdullah University of Science and Technology (Saudi Arabia)** Apr. 2012 till now

Postdoctoral Fellow in COHMAS Lab

Supervisor: Prof. Gilles Lubineau

**Projects:**

(1) Electrical, mechanical, thermal properties of multifunctional nanocomposites for airplane interiors (support by Boeing and SABIC).

- *Develop expertise in measurement of surface resistivity and volume resistivity or even thermal conductivity of materials.*
- *Develop conductivity tunable nanocomposites while maintaining its mechanical and thermal properties.*
- *Create a general framework for modeling of electrical properties of polymers. To develop the electrical model, the investigated material configurations are characterized from the electrical point of view.*

(2) Development of highly conductive polymer nanofilms for next generation electrodes to replace ITO

- *Investigation on temperature-dependent microstructure of PEDOT/PSS films: insights from morphological, mechanical and electrical analyses.*
- *Investigation of conductivity improvement mechanism by transmission electron microscope.*

(3) Wetspinning of strong, highly conductive polymer fibers/wires with and its application in wearable electronics.

- *Develop a hot-drawing-assisted wetspinning process which can obtain conductive polymer fibers with a high stiffness and record conductivity*
- *Construct conductive polymer webs to achieve high transparency and low sheet resistance by 2D wet-spinning.*
- *Develop the applications of conductive polymer fibers as wearable heaters and electromechanical actuators*

(4) Record high gauge factor strain sensors based on carbon nanotube (CNT) assemblies

- *Develop a wetspinning process which can obtain CNT wires with random distributed CNTs.*
- *Construct resistance-recoverable conductors based on CNT wires*

- *Demonstration of strain sensitive and temperature sensitive CNT wire conductors*
- *Develop applications of piezoresistive strain sensors with high gauge factor from CNT papers or wires*

### **Shinshu University(Japan)**

Oct. 2008-Sep. 2011

Global COE Research Assistant

Advisor: Prof. Mutsumi Kumura

#### **Projects:**

(1) Electromechanical properties of flexible, conductive paper.

- *I assembled a four-point probe system for measuring conductivity of conductive polymers and developed a measurement system for evaluating electromechanical properties of conductive polymer. I adjusted the voltage control system by a self-made software.*
- *A electroactive paper was fabricated by coating PEDOT/PSS dispersion on cellulose papers. The electroactive papers displayed a contractile stress when an external voltage was applied. I also demonstrated that a butterfly-like biomimetic motion of the conductive paper occurred when the voltage switching between on and off.*

(2) High strength, highly conductive polymer microfibers by wet-spinning.

- *Wet-spinning of PEDOT/PSS/PVA composite microfibers.*
- *Evaluating the electromechanical properties of conductive polymer microfibers: Low applied voltage (~8 V), high generated stress (>11MPa).*

(3) Construction of macroporous conductive polymer with channels by electrospun nanofiber templates:

- *Control the wettability of nanofiber templates to a hydrophilic state by co-electrospinning PVP and PMMA (Poly vinylpyrrolidone and Poly (methyl methacrylate)).*
- *Diameter and alignment controllable macroporous PEDOT/PSS films by different nanofiber templates.*
- *Evaluation of anisotropic wetting property of aligned PVP/PMMA nanofibers.*
- *Synthesis of water-dispersible polypyrrole nanospheres and construction of hierarchically-structured macroporous polypyrrole.*

### **Soochow University(China)**

Sep. 2005-Jun. 2008

Research Assistant

Advisor: Prof. Dijiang Wen

**Projects:** (1) Fabrication of silane self-crosslinked Polyolefins in room temperature, study on crystallization of polymeric materials. (2) Fabrication of fluoride graft PP, study on surface and mechanical properties of fluoropolymer. (3) Study on microstructure of inorganic materials by X-ray absorption fine structure(XAFS).

#### **Publications** (# equal contribution, \* corresponding author)

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1. **Zhou, J\***; Yu, H.; Xu, X.; Li, E. Q.; Thoroddsen, S. T.; Lubineau, G\*, Fragmentation enabled high gauge factor strain sensors based on SWCNT fibers. **2016**, In preparation
2. **Zhou, J\***; Yu, H.; Xu, X.; Lubineau, G\*, Record high gauge factor strain sensor based on low-stiffness SWCNT papers. **2016**, In preparation
3. Xu, X.; **Zhou, J.**; Jiang, L.; Chen, L.; Anjum, D. H., Lubineau, G., Cellulose nanopaper-substrating transparent and conductive Silver Nanowire Electrode. **2016**, Submitted
4. **Zhou, J\***; Mulle, M.; Zhang, Y.; Xu, X.; Li, E. Q.; Han, F.; Thoroddsen, S. T.; Lubineau, G\*, High-ampacity conductive polymer microfibers as fast response wearable heaters and electromechanical actuators. *Journal of Materials Chemistry C* **2016**, DOI: 10.1039/C5TC03380B

5. Aguilar Ventura, I.; **Zhou, J.**; Lubineau, G\*, Investigating the Inter-Tube Conduction Mechanism in Polycarbonate Nanocomposites Prepared with Conductive Polymer-Coated Carbon Nanotubes. *Nanoscale research letters* **2015**, 10:485
6. Wang, Y.; **Zhou, J.**; Jiang, L.; Ulven, C.; Lubineau, G.; Liu, G. Development of Low-Cost DDGS-Based Activated Carbons and Their Applications in Environmental Remediation and High- Performance Electrodes for Supercapacitors. *Journal of Polymers and the Environment* **2015**, 23, 595-605
7. **Zhou, J\***; Anjum, DH.; Lubineau, G\*, Li, E. Q.; Thoroddsen, S. T., Unraveling the Order and Disorder in Poly(3,4-ethylenedioxythiophene)/Poly(styrenesulfonate) Nanofilms. *Macromolecules* **2015**, 48, 5688–5696
8. Aguilar Ventura, I.; **Zhou, J.**; Lubineau, G\*, Drastic modification in the piezoresistive behavior of polymer nanocomposites by using of conductive polymer coatings. *Composite Science and Technology* **2015**, 117, 342-350
9. Xu, X#.; **Zhou, J#.**; Nagaraju, D. H.; Jiang, L\*.; Lubineau, G\*.; Alshareef, H. N.; Marinov, V. R.; Oh, M.; Catalyst-free, Flexible, Mesoporous and Highly Graphitized Carbon Aerogels Derived from Lignin-modified Bacterial Cellulose: Effective Pore Utilization in Supercapacitors. *Advanced Functional Material* **2015**, 25, 3193-3202
10. **Zhou, J.**; Zhang, Y.; Mulle, M.; Lubineau, G\*, Temperature sensing of micron scale polymer fibers using fiber Bragg gratings. *Measurement Science and Technology*, **2015**, 26, 085003
11. **Zhou, J#.**; Li, E. Q#.; Li, R.; Xu, X.; Aguilar Ventura, I.; Moussawi, A.; Anjum, D. H.; Hedhili, M. N.; Smilgies, D. M.; Lubineau, G\*.; Thoroddsen, S. T\*, Semi-metallic, Strong and Stretchable Wet-spun Conjugated Polymer Microfibers. *Journal of Materials Chemistry C* **2015**, 3, 2528-2538.
12. **Zhou, J.**; US patent, patent NO. US 62/086, 885, **2014/12 Applied.**
13. **Zhou, J\***; Anjum, D. H.; Chen, L.; Xu, X. Z.; Ventura, I. A.; Jiang, L.; Lubineau, G\*, The temperature-dependent microstructure of PEDOT/PSS films: insights from morphological, mechanical and electrical analyses. *Journal of Materials Chemistry C* **2014**, 2 (46), 9903-9910.
14. Xu, X.; **Zhou, J.**; Jiang, L\*.; Lubineau, G\*.; Payne, S. A.; Gutschmidt, D., Lignin-based carbon fibers: Carbon nanotube decoration and superior thermal stability. *Carbon* **2014**, 80, 91-102.
15. **Zhou, J.**; Ventura, I.; Lubineau, G\*, Probing the Role of PEDOT/PSS in Thermal and Mechanical Properties of Polycarbonate Nanocomposites Containing Conductive Polymer Coated on MWCNTs. **2014**, *Industrial Engineering & Chemistry Research* **2014**, 53 (9), 3539–3549.
16. Miura, H.; Fukuyama, Y.; Sunda, T.; Lin, B.; **Zhou, J.**; Takizawa, J.; Ohmori, A.; Kimura, M\*. Foldable Textile Electronic Devices Using All Organic Conductive Fibers. *Advanced Engineering Materials* **2014**, 16 (5), 550-555.
17. **Zhou, J.**; Lubineau, G\*, Improving Electrical Conductivity in Polycarbonate Nanocomposites Using Highly Conductive PEDOT/PSS Coated MWCNTs. *ACS Applied Materials & Interfaces* **2013**, 5 (13), 6189–6200.
18. Xu, X.; **Zhou, J.**; Chen, W.; Jiang, L\*.; Lubineau, G\*, Chen, Y.; Zhu, ZY.; Porous Core-Shell Carbon Fibers Derived from Lignin and Cellulose Nanofibrils *Materials Letter* **2013**, 109, 175-178.
19. **Zhou, J.**; Fukawa, T.; Kimura, M\*, Directional Electromechanical Properties of PEDOT/PSS Films Containing Aligned Electrospun Nanofibers. *Polym Journal* **2011**, 43 (10), 849-854.

20. **Zhou, J.**; Gao, Q.; Fukawa, T.; Shirai, H.; Kimura, M\*, Macroporous Conductive Polymer films Fabricated by Electrospun Nanofiber Templates and Their Electromechanical Properties. *Nanotechnology* **2011**, 22 (27).
21. **Zhou, J.**; Kimura, M\*, Electromechanical Actuation of Highly Conductive PEDOT/PSS-coated Cellulose Papers. *Sen-I Gakkaishi* **2011**, 67 (6), 125-131.
22. **Zhou, J.**; Fukawa, T.; Shirai, H.; Kimura, M\*, Anisotropic Motion of Electroactive Papers Coated with PEDOT/PSS. *Macromol Mater Eng* **2010**, 295 (7), 671-675.
23. Zhang, Y.; Wen, D. J\*.; **Zhou, J.**; Gan, J. H., Structure and infrared radiation property of Co<sub>1-x</sub> Zn (x) Fe<sub>2</sub>O<sub>4</sub> ferrites by XAFS analysis. *Journal of Wuhan University of Technology* **2009**, 24 (6), 907-91
24. **Zhou, J.**; Ding, G.; Wen, D.; A Fabrication Method of Self-crosslinking of Polypropylene at Room Temperature. Chinese patent application, Patent number CN101173053A, **2008** (In Chinese)
25. **Zhou, J.**; Ding, G.; Wen, D.; Self-crosslinking of Polypropylene at Room Temperature and Its Crystallization Behavior, *Materials Science and Engineering* **2008**, 26, 914. (In Chinese)
26. **Zhou, J.**; Wen, D.; A Study on Self-crosslinking of Polypropylene, *Plastic processing* **2007**, 4, 11-14. (In Chinese)

### **International Conferences**

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1. **Zhou, J.**; Li, E. Q.; Lubineau, G.; Thoroddsen, S. T., Semi-metallic, Strong and Stretchable Wet-spun Conjugated Polymer Microfibers. Poster presentation on 12th International Conference on Materials Chemistry, York, United Kingdom, 20-23 July 2015.
2. **Zhou, J.**; Li, E. Q.; Lubineau, G.; Thoroddsen, S. T., Wet-spun conductive polymer microfibers and its metallic behavior. Oral presentation on 7th International Symposium on Flexible Organic Electronics (ISFOE14) Thessaloniki, Greece, 9-12 July 2014.
3. Xu, X.; **Zhou, J.**; Jiang, L.; Lubineau, G., Synthesis of Bio-based Carbon Nanofibers. Poster presentation on ND EPSCoR/IDeA Conference - Innovations & Expressions - Grand Forks, USA, April 2014.
4. **Zhou, J.** Lubineau, G. Tailoring Electrical Conductivity in Polycarbonate Nanocomposites Using Highly Conductive PEDOT/PSS Coated MWCNTs. Computational and Experimental Mechanics of Advanced Materials (CEMAM) workshop, KAUST, Saudi Arabia, July 2013.
5. **Zhou, J.** Kimura, M. Macroporous Conductive Polymer Films with Channels and Its Application. *International Conference on Materials for Advanced Technologies (ICMAT 2011)*, Singapore, June 2011.
6. **Zhou, J.** Kimura, M. Construction of Conductive Polymer Channels. *The 5<sup>th</sup> Nagoya University-UCLA International Symposium (Global COE Joint Symposium)*, Ueda, Japan, August 2010.
7. **Zhou, J.** Kimura, M. Construction of Three-dimensional Nanochannels in PEDOT/PSS Film. *The 10<sup>th</sup> International Conference of Future Textile*, Ueda, Japan, July 2010.
8. Kimura, M. Lin, B. J. **Zhou, J.** Foldable Textile Electronic Devices Using All-organic Conductive Fibers. *The 10<sup>th</sup> International Conference of Future Textile*, Ueda, Japan, July 2010.
9. **Zhou, J.** Kimura, M. Porous Conductive Polymer Materials Having Continuous Nanochannels. *International Symposium on Polymer Chemistry*, Suzhou, China, June 2010.
10. **Zhou, J.** Kimura, M. Electroactive EG-treated PEDOT/PSS Paper Actuator Working in Air. *The 1<sup>st</sup> FAPS Congress*, Nagoya, Japan, October 2009.
11. **Zhou, J.** Kimura, M. Electroactive PEDOT/PSS-coated Cellulose Paper Actuator Working in Air. *The 10<sup>th</sup> Asian Textile Conference*, Ueda, Japan, July 2009.

## **Experimental Skills**

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- Strong experiences on electrical property measurement: Two-point/Four-point probe methods, surface/volume resistivity measurement, nanoscale out of plane conductivity measurement by AFM, damage detection of composites by electrical resistance change method and electromechanical evaluation of actuators.
- Fiber making techniques: electro-spinning polymer nanofibers, wet-spinning of conductive polymer micro/nanofibers.
- Polymer and composite fabrication techniques: twin-crew extrusion, compression molding, composite and laminate preparation.
- Thin film making techniques: sputtering, roll-to-roll coating, blade coating, spin-coating and inkjet printing.
- Clean room experiences: qualified user of photolithography, electroplating, DRIE, spin/bake hood, Zygo and dektak profiler.
- Characterization techniques: qualified user of TG, DSC, DMA, FTIR, Raman, XRD, AFM, FESEM and HRTEM.

## **Teaching or guiding experience**

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Supervised 3 master and 3 PhD students from Kaust, 2 visiting students from Shanghai Jiao-tong University, China

## **Paper review experience**

Reviewer of *Nanoscale*, *ACS Applied Materials and Interfaces*, *Carbon*, *Journal of Composite materials*, *Journal of Applied Polymer Science*, *Macromolecular Chemistry and Physics. Composite Part A*.

## **Honor and Awards**

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**2002 and 2003** Honor Student in **WHUT**

**2004** Excellent League Member in **WHUT**

**2005** Excellent Graduate in **WHUT**

**2008-2011** 21<sup>st</sup> Century GCOE Fellowship from Ministry of Education, Culture, Sports, Science and Technology in Japan

**2012-2015** Postdoctoral Fellowship from **KAUST**

## **Reference Contacts**

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*Professor Gilles Lubineau*

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