JANE WANG

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REASERCH INTEREST

My primary research interest is in the combination of polymer chemistry and tissue engineering to solve problems in biodegradable polymer synthesis, nanotopography-tissue interaction, and organ regeneration. The work will be carried out on biological samples through nanotechnology such as the study for biological degradable membranes and the development for devices for drug delivery, polymeric medical implants, as well as biodegradable material applied in tissue engineering.

EDUCATION:

- *Massachusetts Institute of Technology*, Cambridge, MA, Ph. D in Material Science and Engineering (Program of Polymer Science and Technology), Sep 2007 to Feb 2013. GPA:4.10/5.0
- *University of Illinois at Urbana-Champaign*, Urbana, IL, B.S. in Chemistry, Sep 2003 to May 2007. GPA:3.76/4.0

PROFESSIONAL EXPERIENCE:

Assistant Professor, Department of Chemical Engineering, National Tsing-Hua University, Taiwan, Feb 2013-present

- Design and Synthesis of Biodegradable Polymer for Biomedical Applications.
- Regeneration and Vascularization of Hepatic Tissue via Tissue Engineering.
- Synthesis of 3D Printable Biodegradable Polymeric Materials
- Design and Fabrication of Bioresorbable Drug Delivery Devices.
- Teach graduate level course “Macromolecules as Biomaterials,” and undergraduate level Physical Chemistry I and II.

Draper Fellow, Biomedical Engineering Center, Charles Start Draper Laboratory, Dr. Jeffery T. Borenstein, Jun 2008- Feb 2013

- Garnered Draper Laboratory Fellowship for excellent performance in MEMS research.
- Demonstrated innovative thinking in designing and troubleshooting electrical property measurements for biodegradable polymer and Micro-Electro-Mechanical Systems (MEMS) design using software including SolidWork, autocad, and L-LED.
- Identified new liver regeneration and tissue engineering opportunities by designing, synthesizing, molding, and characterizing biodegradable polymers.
- Microfabrication for polymer scaffolds, including poly(dimethyl siloxane), amino alcohol-based poly(ester amide) elastomer, APS, and poly(glycerol sebacate), PGS, with nanotopography for human umbilical vein endothelial cell culture.
- Build microfluidic systems mimicking blood vessel using biocompatible and

biodegradable polymers.

Research Assistant, Department of Material Science and Engineering, Massachusetts Institute of Technology, Dr. Robert S. Langer, Jun 2008- Feb 2013

- Design, synthesize, mold, and mechanically test biodegradable polymers PGS, and APS for tissue engineering.
- Polymer modulus characterization using ElectroForce Fatigue Testers and molecular weight measurement including gel permeation chromatography, Franz Cell, high performance liquid chromatography, and Ubbelohde Capillary Viscometer.

Teaching Assistant, Department of Material Science and Engineering, MIT, Sep 2007-May 2008 and Sep 2011-Dec 2011

- Served as recitation instructor and grader for organic and biomaterials chemistry, a junior requirement, by Professor Michael Rubner and Angela Belcher. Participated in homework and exam design.
- Served as recitation instructor and grader for freshman required course, solid state chemistry, by Professor Donald R. Sadoway and David Paul.

Senior Thesis Researcher, UIUC, Dr. Jonathan V. Sweedler, May 2004-May 2007

- Developed Capillary Electrophoresis method for separation of chiral peptides.
- Developed enzyme digestion method using microsomal Alanyl Aminopeptidase (mAAP) on Matrix Assisted Laser Desorption Ionization Mass Spectrometry (MALDI) and Liquid Chromatography Coupled With Mass Spectrometry (LC-MS).
- Investigated novel D-amino acid-containing peptides (DAACPs) in *Aplysia californica* using mAAP through MALDI, LC-MS, as well as other instrumentations including Electrospray Ionization Mass Spectrometry, Reverse Phase High Performance Liquid Chromatography, and Capillary Liquid Chromatography.
- Computer programming using C and Matlab and softwares including Xcalibur, ImageJ, and Microsoft Office for data analysis.

Teaching Assistant, Department of Chemistry, UIUC, Jan 2007-May 2007

- General chemistry lab instructor and grader for class of 80.

PUBLICATIONS:

Journal Articles

- Hsiao,M.-H., Ye,H.-F., Liu, T.-J., and **Wang, J. *, "**Drug Loading on Microneedles," *Advances in Chemical Engineering and Science*, 2019, In Press.
- Chen,J.-Y., Hwang,J. V., Ao-Ioeng,W.-S., Lin,Y.-C., Hsieh,Y.-K., Cheng,Y.-L., **Wang**,**J. *,** "Study of physical and degradation properties of 3D-printed biodegradable, photocurable copolymers, PGSA-co-PEGDA and PGSA-co-PCLDA," *Polymers*, **2018**, 10, 1263.
- Lin, L.-K., **Wang**, **J. ,** Liu*,Y.-L., "Effective Synthesis Route for Linear and Cross-Linked Biodegradable Polyesters Using Aliphatic Meldrum's Acid Derivatives as Monomers," ACS Omega, **2018**, 3(4), 4641-4646
- Sung,Y.-C., Liu,Y.-C. , Chao,P.-H. , Chang, C.-C., Jin, P.-R., Lin,T.-T., Lin,J.-A.,

Cheng,H.-T., **Wang,J.,** Lai,C. P., Chen,L.-H., Wu,A.-Y., Ho,T.-L., Chiang,T., Gao,D.-Y., D. Duda,G. , Chen*,Y. ,"Combined delivery of sorafenib and a MEK inhibitor using CXCR4-targeted nanoparticles reduces hepatic fibrosis and prevents tumor development," Theranostics, **2018**, 8(4), 894-905

- Hsieh, Y.-K., Kaiser, G., Hsiao, S.G., Hsu, K.-P., Wang, T.-H., **Wang, J.***, "Contact Guidance on Laser-Patterned Biodegradable Polymeric Material", *Journal of Materials Chemistry B* **2018,** *6*, 3684-3691
- Hsieh, Y.-K., Chang, C.-T., Jen, I.-H., Pu, F.-C., Wan, D. and **Wang, J.***, "Using Gold Nanoparticles (AuNPs) as an Additive to Investigate the Drug Embedding and Releasing Performance in Poly(Glycerol Sebacate)," *ACS Applied Nano Materials*, **2018**, *1(9),* 4474-4482
- Hsieh, Y.-K., Chen, H.-C., Huang, W.-L., Hsu,K.-P., Kaiser, G., Wang, T.-H., **Wang, J.***, "Fabrication of Biodegradable Microfluidic Scaffolds Using Laser Ablation", *Polymers*, **2017**, 9(7):242.
- Wang, F.-S., Wang,T.-F., Lu,H.-H., Ao-Ieong,W.-S., **Wang, J.**, Chen,H.-L., Peng*,C.-H., "Highly Stretchable Free-Standing Poly(acrylic acid)-block-poly(vinyl alcohol) Films Obtained from Cobalt-Mediated Radical Polymerization," *Macromolecules*, **2017**, 50(16), 6054-6063
- Yeh, C. W., Wang, L. W., Wu, H. C., Hsieh, Y.-K., **Wang, J.**, Chen, M. H., Wang, T. W. "Development of biomimetic micro-patterned device incorporated with neurotrophic gradient and supportive Schwann cells for the applications in neural tissue engineering," *Biofabrication*, **2017**, 9(1):015-024.
- Wang, T.H., Yen, Y.-J., Dong, Y.C., Hsieh, Y.-K., **Wang, J.***, "Size effect of calcium-humic acid non-rigid complexes on the fouling behaviors on NF membrane: An LA-ICP-MS study", *Colloids Surf. A*, **2017**, 513: 335-347.
- Cheng, J.-Y., Feng, M.-J., Wu, C.-C., **Wang, J.,** Chang, T.-C., Cheng*, C.-M., "Development of a Sampling Collection Device with Diagnostic Procedures," *Analytical Chemistry*, **2016**, 88(15), 7591-7596
- Lee, E.-S., Park, J., **Wang, J.**, Lee, H., Hwang, N. S., "Osteogenic commitment of human induced pluripotent stem cell-derived mesenchymal progenitor-like cells on biomimetic scaffolds," *Journal of Industrial and Engineering Chemistry*, **2016**, 37:147-155.
- **J. Wang**, K. G. Boutin, L. D. Personnat, R. Langer, C. L. Channick, J. T. Borenstein, "Fabrication of Fully Biodegradable Airway Stents Using Amino Alcohol-based Poly(ester amide) Elastomers," *Adv. Healthcare Mat., **2013***, 2: 1329–1336. doi:10.1002/adhm.201200348
- **J. Wang**, R. Langer, J. T. Borenstein, "Chapter 22: Micro- and Nano-Technology in Tissue Engineering," In: The Nanobiotechnology Handbook (Y. Xie ed.). Boca Raton, FL, CRC Press (2012), pp501-518.
- **J. Wang**, T. Kniazeva, C. F. Campbell, R. Langer, J. S. Ustin, J. T. Borenstein, "Biodegradable Microfluidic Scaffolds with Tunable Degradation Properties from

Amino Alcohol-based Poly(ester amide) Elastomers," *Mater. Res. Soc. Symp. Proc.,* **2011**, 1299, mrsf10-1299-s11-02

- **J. Wang**, C. J. Bettinger, R. S. Langer, J. T. Borenstein, "Biodegradable Microfluidic Scaffolds for Tissue Engineering from Amino Alcohol-based Poly(ester amide) Elastomers," *Organogenesis,* **2010**, 6:4, 1-5.
- M. A. Ewing, **J. Wang**, S. A. Sheeley, and J. V. Sweedler, "Detecting D-Amino Acid-Containing Neuropeptides using Selective Enzyme Digestion," *Anal. Chem.*, **2008**, 80, 2874-2880.

Book Chapters

- **Wang, J.**, Borenstein, J. T. "Chapter 28: Micro and Nano Patterning Technologies," In: Biology and Engineering of Stem Cell Niches (A. Vishwakarma & J. Karp ed.). Boston, MA, Academic Press (2017), pp375-390.
- **Wang, J.**, Langer, R., Borenstein, J. T. Chapter 22: Micro- and Nano-Technology in Tissue Engineering. In "The Nanobiotechnology Handbook" (Xie, Y.). Taylor & Francis/CRC Press. p.501-518. (ISBN: 1439838690)

Patents

- 王潔、周更生、徐松年"生物可分解的聚酯型彈性體之製備方法", **中華民國發明專利 I 568768.** (專利有效期間: 2017/02~2035/12)
- 王潔、鄭逸琳、陳怡文、謝明佑"可積層製造的生物可降解光聚合高分子複合材料及其應用", **中華民國發明專利 I 644801.** (專利有效期間: 2018/12~2037/08)
- 鄭逸琳、陳怡文、謝明佑、王潔、陳定閒、許家寧"光固化裝置使用之可調波長曝光模組", **中華民國新型專利 M 565120.** (專利有效期間: 2018/08~2028/05)

PRESENTATIONS

Plenary/Invited Speaker at International conferences

1. The 24th Symposium of Young Asian Biological Engineer's Community, YABEC 2018, Taipei City, Taiwan, Nov 2018, Invited Talk "The Fabrication of Glycerol-Based Biodegradable Polymeric Tissue Engineering Scaffolds via Additive Manufacturing"
2. 18th International Union of Materials Research Societies-International Conference in Asia, IUMRS-ICA 2017, Taipei City, Taiwan, Nov 2017, Invited Talk "The Investigation the Releasing Profile of Gold Nanoparticles (AuNPs) Embedded in Biodegradable Polymeric Scaffolds"
3. The 9th Sino-US Joint Conference on Chemical Engineering (SUCE 2017), Beijing, China, Oct 2017, Invited Talk "The Synthesis of Biodegradable Polymer-Mineral Composite and Design of Porous Bone Substitute"

4. International Symposium of Additive Manufacturing, Taipei City, Taiwan, Sept 2017, Invited Talk “3D Printing for Soft Tissue Engineering—Biodegradable Elastomers”
5. 2017 International Symposium of Biotechnology on Biomaterials, Stem cells and Tissue Engineering (ISBBST 2017), New Taipei City, Taiwan, Aug 2017, Invited Talk “Laser Ablation of Biodegradable Polymer for the Study of Cell Contact Guidance Behavior in Skin and Vasculature Regeneration”
6. The 6th International Conference on Bio-based Polymers (ICBP2017), Taoyuan, Taiwan, May 2017, Invited Talk “Synthesis of Glycerol-Based Biodegradable Polymer for Tissue Engineering”
7. 2017 International Symposium on Regenerative Medicine, Seoul, South Korea, Jan 2017, Invited Talk “Surface Modification of Biodegradable Polymeric Material via Laser Ablation for Vasculature Regeneration.”
8. 14th International Conference on Frontiers of Polymers and Advanced Materials (ICFPAM 2016), Nov 2016 “The Application of a Photocurable, Biodegradable Polymer in Additive Manufacturing.”
9. Taiwan-Japan Bilateral Polymer Symposium 2016 Hsinchu, Taiwan, Sep 2016 “Glycerol-Based Photocrosslinkable Biodegradable Polymeric Material for 3D Printing and Additive Manufacturing.”
10. 2016 Tissue Engineering and Regenerative Medicine International Society-AP New Taipei City, Taiwan, Sep 2016 “Surface Modification with Laser Ablation for the Study of Cell Contact Guidance Behavior in Skin and Vasculature Regeneration.”
11. 14th International Union of Materials Research Society-International Conference on Advanced Materials Jeju Island, South Korea, Oct 2015 “Synthesis and Construction of Glycerol-Based Biodegradable Composite Bone Substitute for Bone Tissue Engineering.”
12. 8th NAMIS International School Hsinchu, Taiwan, Sep 2014 “Biodegradable Microfluidic Systems—Fabrication and Material Selection”
13. Annual Junior Chemist Meeting on Frontier Molecular Science Yi-Lan, Taiwan, Jan 2014, “The Design and Prototyping of Biodegradable Polymeric Drug Delivery Device for Inner Ear Disease Treatment.”
14. The 60h Annual Meeting of the Taiwan Institute of Chemical Engineers Taipei, Taiwan, Nov 2013, “The Design and Prototyping of Biodegradable Polymeric Drug Delivery Device for Inner Ear Disease Treatment.”
15. The 13th Pacific Polymer Conference Kaohsiung, Taiwan, Nov 2013, “Development of Novel Micro- and Nano-Patterning Methodology for Biocompatible/Biodegradable Polymeric Materials.”
16. 7th Science and Technology for Advanced Ceramics, Yokohama, Japan Jun 2013, Invited Talk “Fully Biodegradable Medical Devices for Implantation.”

<u>International conference/seminar</u>

1. International Symposium on Precision Engineering and Sustainable Manufacturing (PRESM2018), Sapporo, Japan, Jul 2018, “The Fabrication of Glycerol-Based Biodegradable Polymeric Scaffolds for Liver Regeneration via Additive Manufacturing”
2. Materials Research Society Fall Conference, Boston, MA, USA, Nov 2017, The Study of Phorocurable, Biodegradable Polymeric Materials and the Effects of 3D Printing toward the Mechanical Properties.
3. 6th Int'l Conference on Tissue Engineering in conjunction with the 3rd Int'l Conference on Regenerative Biomedical Materials, Crete, Greece, Jun 2017, “The Synthesis of Glycerol-Based Photocrosslinkable Biodegradable Polymers and the Applications via Additive Manufacturing”
4. Taiwan-Japan Bilateral Polymer Symposium 2016 Hsinchu, Taiwan, Sep 2016 “Glycerol-Based Photocrosslinkable Biodegradable Polymeric Material for 3D Printing and Additive Manufacturing.”
5. 2015 4th TERMIS World Congress Boston, MA, Sep 2015, Poster Presentation “Using Laser Ablation to Fabricate Fully Biodegradable Microfluidic Devices for the Regeneration of Vasculature”
6. 250th American Chemical Society National Meeting & Exposition Boston, MA, Aug 2015, Nominated Best Poster Presentation “Surface Modification for Microfluidic Devices Fabrication of Biodegradable Polymeric Materials via Laser Ablation”
7. 250th American Chemical Society National Meeting & Exposition Boston, MA, Aug 2015, Oral Presentation “Design and Prototyping of Biodegradable Polymeric Drug Delivery Device for Inner Ear Disease Treatment”
8. Biomaterials International 2015 (BMI-2015) Kenting, Taiwan, Jun 2015, Oral Presentation “Synthesis and Fabrication of Biodegradable Medical Devices for Tissue Regeneration”
9. 2014 Tissue Engineering and Regenerative Medicine International Society-Asian Pacific Congerence Daegu, Korea, Sep 2014, SYIS Talk “Laser Ablation for the Fabrication of Biodegradable Microfluidic Systems for the Regeneration of Vasculature”
10. Advances in Microfluidics and Nanofluidics 2014 Conference Taipei, Taiwan, May 2014, Talk Titled “Fabrication of Biodegradable Microfluidic Scaffolds with Tunable Degradation Properties”
11. The Association for Research in Otolaryngology 36th Annual MidWinter Meeting Baltimore, MD, Feb 2013, Poster Titled “A Biodegradable Drug Delivery Microdevice for Tinnitus”
12. ASME 2013 2nd Global Congress on NanoEngineering for Medicine and Biology Boston, MA, Feb 2013, “A Biodegradable Microfluidic Device for Drug Delivery in Tinnitus Treatment”
13. Material Research Society Fall 2012 Conference Boston, MA, Nov 2012, “Membrane Properties for Implantable Drug Delivery Device with Triggered Degradation from Poly(ester amide) Elastomers”
14. Material Research Society Fall 2010 Conference Boston, MA, Dec 2010, “Biodegradable

Microfluidic Scaffolds with Tunable Degradation Properties from Amino Alcohol-based Poly(ester amide) Elastomers”

15. IEEE-NIH Life Science Systems and Application (LISSA’09) Bethesda, MD Apr 2009, “Engineered Nanotopographic Structures for Applications in Tissue Engineering and Regenerative Medicine”
16. Material Research Society Fall 2008 Conference Boston, MA, Dec 2008, “Biodegradable Microfluidic Scaffolds for Tissue Engineering”
17. WCC Undergraduate Research Symposium Oral Presentation Urbana, IL, Apr 2007, “The Determination of Chirality of Residues in Neuropeptides”
18. WCC Undergraduate Research Symposium Poster Presentation Urbana, IL, Sep 2006, “The Determination of Chirality of Residues in Neuropeptides”
19. American Society for Mass Spectrometry, Seattle, WA, May 2006, “The Determination of Chirality of Residues in Neuropeptides”
20. UIUC Hughes Undergraduate Research Fellows Oral Presentation, Urbana, IL, Apr 2005, “Using microsomal Alanyl Aminopeptidase for D-amino Acid-Containing Peptide Discovery”
21. UIUC Hughes Undergraduate Research Fellows Poster Session, Urbana, IL, Sep 2004, “Using microsomal Alanyl Aminopeptidase to Find Novel D-Amino Acid-Containing Peptides”

LANGUAGE SKILLS:

- Read and write Mandarin Chinese fluently.
- Read and write English fluently.

CERTIFICATION:

- **MIT Graduate Student Teaching Certificate**, Jun 2011
- **American Red Cross First Aid Certificate**, Jan 2011
- **Mediation Skills Training Certificate**, Sep 2010

HONORS AND AWARDS:

2019-2022 Career Development Grant, National Health Research Institute, Taiwan

2018-2019 Outstanding Teaching Award, NTHU (fall & spring semester)

2017-2018 Outstanding Teaching Award, NTHU (fall & spring semester)

2016-2017 Excellent Teaching Award in School of Engineering, NTHU

2016-2017 Outstanding Teaching Award, NTHU (fall & spring semester)

2015-2016 Outstanding Teaching Award, NTHU (fall & spring semester)

2014-2015 Outstanding Teaching Award, NTHU (fall semester)

2013-2014 Outstanding Teaching Award, NTHU (spring semester)

2013-2015 Recruitment of Talented Professionals Award, Ministry of Science and Technology, Taiwan

Second Place Winner of Best Oral Presentation at 2012 Fall MRS Membrane

Symposium, Boston, MA, Dec 2012

First Place Winner of the MIT vs. Harvard Case Competition, Cambridge, MA, Aug 2010

Charles Stark Draper Laboratory Fellowship, Cambridge, MA, Jun 2008

James Scholar Honor Program, UIUC, Aug 2004-May 2007

Timothy A. Nieman Memorial Scholarship, Urbana, IL, Apr 2007

WCC Undergraduate Research Symposium First Prize for Oral Presentation, Urbana, IL, Apr 2007, "The Determination of Chirality of Residues in Neuropeptides"

2006 McKnight Prize Semifinalist, UT Southwestern, Nov 2006

ACS-Division of Analytical Chemistry Undergraduate Award, UIUC, Oct 2006

Hughes Undergraduate Research Fellowship Travel Award, UIUC, May 2006

James Scholar Research Award, UIUC, May 2006

Hughes Undergraduate Research Continuation Fellowship, UIUC, Aug 2004

Hughes Undergraduate Research Fellowship, UIUC, May 2004

Sloan Prize for Best First Year G.P.A., UIUC, May 2004

ACTIVITIES:

Graduate Residence Tutor, MIT McCormick Residence Hall, Aug 2008-Jan 2013

- Built relationship with undergraduate residence to care for their need both academically and personally.
- Held study break every week to build sense of community and stress relieve.
- Resolved conflict between residents, house teams, and house governments.

Co-President and Co-Founder of PPST Graduate Student Association, Sep 2010-Aug 2012

- Co-Founded PGSA (PPST Graduate Student Association) with two three other PPST graduate students in 2010.
- Planned and hosted the 1st and 2nd MIT Polymer Day in the spring of 2011 and 2012.
- Hosted recruiting session for PPST incoming graduate students.

Real Time Oral English-Mandarin Interpreter, Sep 2008-Aug 2012

- Served for Taiwanese media Reebok International interview
- Served for Taiwanese and Chinese buyers at the 2010 and 2011 International Boston Seafood Show.
- Served for New Hampshire Department of Resources and Economic Development Commisioner George Bald, International Trade Resources Center Director Wivell, and Taiwan Importers & Exporters Chamber of Commerce Chairman Chin-Chao Lin

Program MC, Publicity Vice Chair, Company Contact Chair, Feb 2008