Pengyu Chen

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Materials Engineering
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Education: Ph.D., Clemson University, Materials Science and Engineering, 2012
M.S., Clemson University, Materials Science and Engineering, 2009
B.S., Nanjing University, Materials Science and Engineering, 2006

Experience: Assistant Professor, Materials Engineering, Auburn University, Present

- Advancing nanomaterial based optofluidic biosensors for biomarker detection, food safety, enviromental sensing, and precision medicine.
- Extrapolating the biological fate of nanomaterials by evaluating the unknown interactions of NPs and proteins to understand the transformation of NPs by ligands in ecological systems.
- Real-time mapping cytokine secretion for single cell immunoanalysis, cell-to-cell communication.

Research Fellow, March 2013- July 2016
Department of Mechanical Engineering, University of Michigan, Ann Arbor

- Employed integrated optofluidic biosensor for rapid screening and diagnosis of pediatric sepsis and immunoparalysis **(Funded by NIH $3,440,000)**
- Developed multiplex, high throughput, ultra-sensitive LSPR barcode immunoassay towards personalized medicine **(Funded by NSF $370,000 and Coulter Foundation $100,000)**
- Utilized the LSPR barcode immunoassay to successfully guided the CAR T-cell cancer therapy in a clinical trial under the US FDA's "emergency use" program
- Developing nanoplasmonic ruler for profiling single-cell cytokine secretion

Research Assistant, January 2010 – December 2012
Nano-Biophysics and Soft Matter Laboratory, Clemson University

- Developed an ultra-sensitive sensor using induced surface plasma resonance of gold nanowires-dendrimer complex for the detection of environmental pollutant Cu(II)
- Employed a versatile Tris-PAMAM dendrimer as effective agent for removing and sensing major environmental pollutants: transition metal ion Cu(II), nitrate, and PAH in waste water **(Funded by EPA $500,000)**
- Utilized Amine-PAMAM dendrimer to remove discharged nanoparticles fullerene for environmental remediation and drug delivery

- Demonstrated the adaptive interaction between ZnO nanstructures and algal cells through ion release and exudation for environmental remediation **(Funded by NSF $300,000)**

Research Assistant, May 2008 - December 2009
Electrical and Computer Engineering, Clemson University

- Demonstrated the role of the near field surface plasma resonance in light beaming using COMSOL Multiphysics
- Studied the interaction between spoof surface plasma and metal thin films with periodic gratings in mid-infrared using COMSOL Multiphysic

Honors and Awards:

- Student Poster Award, 37th FACSS International Annual Conference, 2010
- Student Poster Award, International Conference on Sustainable Remediation, 2010
- EPA NRC Fellow, US Environmental Protection Agency, Atlantic Ecology Division, 2013 (declined due to availability)
- Best Annual Speaker, Microfluidics in Biological Science Training Program Seminar Series, University of Michigan, 2014

Publications

Refereed Journal Papers:

1. Y. J. Song*, P. Chen* , M. T. Chuang, R. Nidetz, and K. Kurabayashi, "ACEO assisted LSPR Barcode Biosensor for Ultra-sensitive Biomarker Detection," ***Nano. Lett.*** (submitted)

2. B.-R. Oh, P. Chen, R. Nidetz, W. McHugh, J. Fu, T. P. Shanley, T. T. Cornell, K. Kurabayashi, Multiplexed Nanoplasmonic Temporal Profiling of T-Cell Response under Immunomodulatory Agent Exposure. ***ACS Sensors***, 1 (2016), 941.

3. E. N. Gurzov, B. Wang, E. H. Pilkington, P. Chen, A. Kakinen, W. J. Stanley, S. A. Litwak, E. G. Hanssen, T. P. Davis, F. Ding, P. C. Ke, "Inhibition of hIAPP Amyloid Aggregation and Pancreatic β-Cell Toxicity by OH-Terminated PAMAM Dendrimer," ***Small*** 12 (2016), 1619.

4. M. Chen, H. Nam, H. Rokni, S. Wi, J. S. Yoen, P. Chen, K. Kurabayashi, W. Lu, and X. Liang, "Nanoimprint-Assisted Shear Exfoliation (NASE) for Producing Multilayer Transition Metal Dichalcogenide Device Arrays," ***ACS Nano*** 9 (2015), 8773.

5. P. Chen, N.-T. Huang, M. T. Chuang, T. T. Cornell, and K. Kurabayashi, "Label-free Cytokine Micro- and Nano-biosensing towards Personalized Medicine of Systemic Inflammatory Disorders," ***Adv. Drug Deliv. Rev.*** 95 (2015), 90.

6. P. Chen, M. T. Chung, W. McHugh, R. Nidetz, Y. Li, J. Fu, T. T. Cornell, T. P. Shanley, and K. Kurabayashi, "Multiplex Serum Cytokine Immunoassay Using Nanoplasmonic Biosensor Microarrays," ***ACS Nano*** 9 (2015), 4173. (**Featured by GenomeWeb, MICHR; Highlighted in *Integrative Biology***)

7. H. Nam, B.-R. Oh, P. Chen, J. S. Yoen, S. Wi, M. Chen, K. Kurabayashi, and X. Liang, "Two Different Device Physics Principles for Operating MoS_2 Transistor Biosensors with Femtomolar-Level Detection Limits," ***Appl. Phys. Lett.*** 107 (2015), 012105.

8. H. Nam, B.-R. Oh, P. Chen, M. Chen, S. Wi, W. Wan, K. Kurabayashi, and X. Liang, "Multiple MoS_2 Transistors for Sensing Molecule Interaction Kinetics," ***Scientific Reports*** 5 (2015), 10546.

9. B. Wang, S. A. Seabrook, P. Nedumpully-Govindan, P. Chen, H. Yin, L. Waddington, V. C. Epa, D. A. Winkler, J. K. Kirby, F. Ding, and P. C. Ke, "Thermostability and Reversibility of Silver Nanoparticle–Protein Binding," ***Phys. Chem. Chem. Phys.*** 17 (2015), 1728.

10. P. Chen, S. A. Seabrook, V. C. Epa, J. Newman, K. Kurabayashi, A. S. Barnard, D. A. Winkler, J. K. Kirby, and P. C. Ke, "Contrasting Effects of Nanoparticle Binding on Protein Denaturation," ***J. Phys. Chem. C*** 118 (2014), 22069.

11. B.-R. Oh, N.-T. Huang, W. Chen, J.H. Seo, P. Chen, T.T. Cornell, T.P. Shanley, J. Fu, and K. Kurabayashi, "Integrated Nanoplasmonic Sensing for Cellular Functional Immunoanalysis Using Human Blood," ***ACS Nano*** 8 (2014), 2667.

12. Y. Wen, N.K. Geitner, R. Chen, F. Ding, P. Chen, R. E. Andorfer, P. N. Govindan, and P. C. Ke, "Binding of Cytoskeletal Proteins with Silver Nanoparticles" ***RSC Advance*** 3 (2013), 22002.

13. R. Li, R. Chen, P. Chen, Y. Wen, P. C. Ke, and S. S. Cho, "Computational and Experimental Characterizations of Silver Nanoparticle–Apolipoprotein Biocorona" ***J. Phys. Chem. B***, 117 (2013), 43.

14. S. Radic, N.K. Geitner, R. Podila, A. Kakinen, P. Chen, P. C. Ke, and F. Ding, "Competitive Binding of Natural Amphiphiles with Graphene Derivatives", ***Scientific Reports*** 3 (2013), 2273.

15. A. Kakinen, Ding F, P. Chen, Mortimer M, A. Kahru, and P. C. Ke, "Interaction of Firefly Luciferase and Silver Nanoparticles and Its Imapct on Enzyme Activity", ***Nanotechnology***, 24 (2013), 34.

16. F. Ding, S. Radic, R. Chen, P. Chen, N.K. Geitner, J.M. Brown, and P.C. Ke*, "Direct Observation of a Single Nanoparticle-Ubiquitin Corona Formation"

Nanoscale 5 (2013), 9162.

17. R.N. Urankar, R.M. Lust, E. Mann, P. Katwa, X. Wang, R. Podila, S.C. Hilderbrand, B.S. Harrison, P. Chen, P.C. Ke, A.M. Rao, J.M. Brown and C.J.Wingard, "Expansion of Cardiac Ischemia/Reperfusion Injury After Instillation of Three Forms of Multi-Walled Carbon Nanotubes", ***Particle and Fibre Toxicology*** 9 (2012), 38.

18. P. Chen, B. Powell, M. Mortimer, and P.C. Ke, "Adaptive Interactions between Zinc Oxide Nanoparticles and *Chlorella* sp." ***Environ. Sci. Technol.*** 46 (2012), 12178.

19. P. Bhattacharya, S.H. Kim, P. Chen, R. Chen, A.M. Spuches, J.M. Brown, M.H. Lamm, and P.C. Ke, "Dendrimer - Fullerenol Soft-Condensed Nanoassembly", ***J. Phys. Chem. C*** 116 (2012), 15775.

20. X. Wang, P. Katwa, R. Podila, P. Chen, P.C. Ke, A.M. Rao, D.M. Walters, C.J. Wingard, and J.M. Brown, "Multi - Walled Carbon Nanotube Instillation Impairs Pulmonary Function in C57BL/6 Mice", ***Particle and Fibre Toxicology*** 8 (2011), 24.

21. P. Chen, Y. Yang, P. Bhattacharya, P. Wang and P.C. Ke, "A Tris-Dendrimer for Hosting Diverse Chemical Species", ***J. Phys. Chem. C*** 115 (2011), 12789.

22. K. Lingam, R. Podila, C. Loebick, P. Chen, P.C. Ke, B. Powell, L. Pfefferle and A. M. Rao, "Effect of Bundling on the Pi-Plasmon Energy in Sub-Nanometer Single Walled Carbon Nanotubes", ***Carbon*** 49 (2011), 3803.

23. I. Huizar, A. Malur, Y.A. Midgette, C. Kukoly, P. Chen, P.C. Ke, R. Podia, A. M. Rao, C.J. Wingard, L. Dobbs, B.P. Barna, M.S. Kavuru, and M.J. Thomassen, "Novel Murine Model of Chronic Granulomatous Lung Inflammation Elicited by Carbon Nanotubes", ***Am. J. Respir. Cell Mol. Biol.*** 45 (2011), 858.

24. R. Podila, P. Chen, J. Reppert, A.M. Rao, and P.C. Ke, "Biomolecular Sensing Using Gold Nanoparticle-Coated ZnO Nanotetrapods", ***J Mater. Research*** 26 (2011), 2328.

25. P. Bhattacharya, P. Chen, M. N. Spano, L. Zhu, and P. C. Ke, "Copper Detection Utilizing Dendrimer and Gold Nanowire-Induced Surface Plasmon Resonance" ***J. Appl. Phys.*** 109 (2011), 014911.

26. P. Chen, Q. Gan, F. Bartoli, and L. Zhu, "Spoof Surface Plasmon Assisted Light Beaming in Mid-infrared", ***J. Opt. Soc. Am. B*** 27, (2010) 685.

27. P. Chen, Q. Gan, F. Bartoli, and L. Zhu, "Near Field Resonance Enhanced Plasmonic Light Beaming", ***IEEE Photonics J.*** 2, (2010) 8.

US Patent:

- P. Chen, K. Kurabayashi, T. T. Cornell, and T. P. Shanley, "Systems and Methods for Performing Immunoassays," Filed 02/16/2015, US Patent Application 62/116,741

Membership:

- American Heart Association, 2014-Present.
- American Chemical Society, 2013-Present.
- Institute of Electrical and Electronics Engineers, 2016-Present.