Water Equipment & Policy
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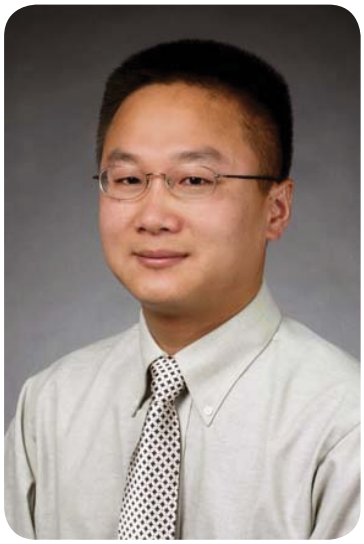
Nanomaterial research focuses on creating real-time sensors for the intelligent water distribution network



Dr. Junhong Chen
UW-Milwaukee

At the University of Wisconsin- Milwaukee, Dr. Junhong Chen's research team is in the process of developing novel real-time water sensors that will detect heavy metal ions and E. coli bacteria. These tiny low-cost sensors will form the fundamental building blocks of the intelligent water distribution network that instantly alerts users and system managers to threats the moment they develop.

His team explores the intersection of fundamental science and industrial applications with opportunities for producing significant new discoveries.

Their research focuses on nanomaterial innovations for sustainable energy and environment, including nanoparticle synthesis, assembly, and nanofabrication; energy conversion, storage, and conservation; nanostructure-based gas sensors, biosensors, and water sensors; carbon nanotubes (CNTs), graphene, and hybrid nanomaterials; pollution control; and corona discharges and plasma reacting flows.

Nanotechnology for Sustainable Energy & Environmental Lab

In his lab on the campus of the University of Wisconsin-Milwaukee, Dr. Chen's research team synthesizes and assembles nanoparticles onto various 1D or 2D nanomaterials, such as carbon nanotubes (CNTs) and graphene-based materials, with considerable control. The work results in advanced technological device applications, particularly in the context of water, environment and sustainable energy. Dr. Chen has developed a simple and versatile mini-arc plasma source for synthesis of nonagglomerated nanoparticles of a variety of materials with controlled size.

Ongoing projects include experimental and numerical studies on plasma synthesis of nanoparticles, nanoparticle assembly, fabrication of nanomaterial-based electronic devices, CNT-nanoparticle and graphene-nanoparticle hybrid structures and their novel applications for water

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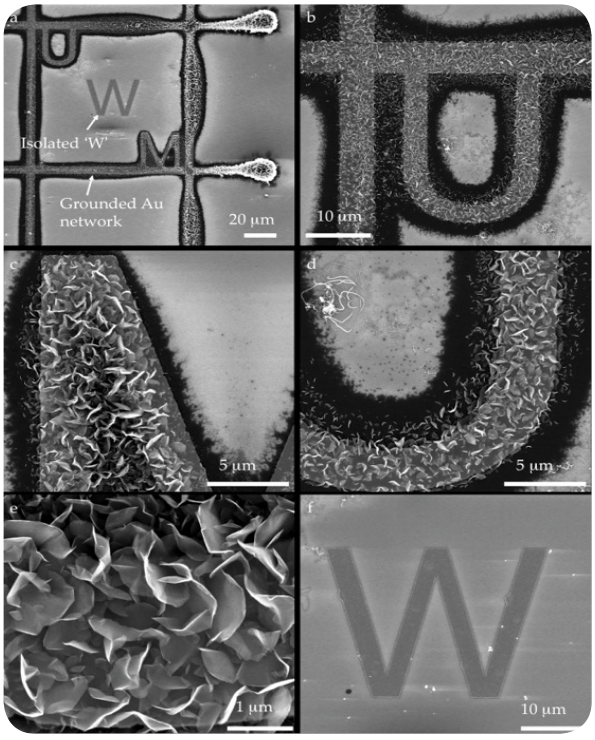
sensors, gas sensors, biosensors, solar cells, lithium-ion batteries, and indoor pollution control. His laboratory has been sponsored by various agencies and industries, such as National Science Foundation, Department of Energy, We Energies, Xerox Corporation, Johnson Controls, and Rockwell Automation.

Junhong Chen is currently a Professor of Mechanical Engineering and a Professor of Materials Science and Engineering at UW-Milwaukee. He is also the Director of the Industry-University Cooperative Research Center (I/UCRC) on Water Equipment and Policy and the founder of NanoAffix Science LLC. Dr. Chen received his B.E. degree (in Thermal Engineering) in 1995 from Tongji University, and his M.S. and Ph.D. degrees (both in Mechanical Engineering) in 2000 and 2002, respectively, from the University of Minnesota. From October 2002 to August 2003, he was a postdoctoral scholar in Chemical Engineering at the California Institute of Technology. In August 2003, he became an Assistant Professor in the Department of Mechanical Engineering at UWM, where he was promoted to tenured Associate Professor and Professor in 2008 and 2011, respectively. He received a joint appointment in the UWM Department of Materials Science and Engineering in January 2013. Dr. Chen is an elected Fellow of American Society of Mechanical Engineers.



Dr. Chen is interested in developing novel nanomaterials beyond what are currently available and then demonstrating their exciting applications. Crumpled graphene oxide (GO)/graphene (CG) is a new type of carbon nanostructure that has drawn growing attention due to its three-dimensional open structure and excellent stability in an aqueous solution.

Representative journal publications:

1. J. B. Chang, S. Mao, Y. Zhang, S. M. Cui, G. H. Zhou, X. G. Wu, C. H. Yang, and J. H. Chen*, "Ultrasonic-assisted Self-assembly of Mono-layer Graphene Oxide for Detection of Escherichia Coli," Nanoscale 5(9), 3620-3626, 2013.
2. K. H. Chen, G. H. Lu, J. B. Chang, S. Mao, K. H. Yu, S. M. Cui, and J. H. Chen*, "Rapid Hg(II) Ion Detection Using Thermally Reduced Graphene Oxide Decorated with Functionalized Gold Nanoparticles," Analytical Chemistry 84(9), 4057-4062, 2012.
3. G. H. Lu, K. H. Yu, L. E. Ocola, and J. H. Chen*, "Ultrafast Room-Temperature NH3 Sensing with Positively-Gated Reduced Graphene Oxide Field-Effect Transistors," Chemical Communications 47(27), 7761-7763, 2011.
4. S. Mao, G. H. Lu, K. H. Yu, Z. Bo, and J. H. Chen*, "Specific Protein Detection using Thermally Reduced Graphene Oxide Sheet Decorated with Gold Nanoparticle-antibody Conjugates," Advanced Materials 22(32), 3521-3526, 2010.
5. G. H. Lu, L. E. Ocola, and J. H. Chen*, "Room-Temperature Gas Sensing through Electronic Transfer between Discrete Tin Oxide Nanocrystal and Multiwalled Carbon Nanotube," Advanced Materials 21(24), 2487-2491, 2009. (Featured as Frontispiece)

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