

# WORLD HEART CONGRESS

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## Development of nano carriers for medical diagnosis and treatment

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In this presentation, we report the design of a new nanostructure that ideally satisfies the important biomedical requirements in medical diagnosis and treatment. Quantum dots (QDs) were conjugated on magnetic nano spheres (MNS) of polystyrene-Fe<sub>3</sub>O<sub>4</sub> composites. Surface-associated QDs on these MNS exhibited intense visible emissions using fluorescent spectroscopy and successfully facilitated in vivo soft tissue imaging in mice. Furthermore, application of an alternating electromagnetic field effectively induced heating of the MNS into temperature ranges suitable for therapeutic hyperthermia. The magnetic nano spheres were incorporated with PLGA for drug delivery through an emulsion technique. The drug loading efficiency of PLGA-coated MNS were investigated. MNS were also functionalized with antibodies to target a lesion. Experimental results on MNS surface structure development, in vivo imaging, cell targeting, and hyperthermia will be presented. Future requirements, aims, and trends in the development of multi-functional nano particles, including graphene, particularly with intelligent functionalities for fundamental studies, are also given in this presentation.

### Biography

Donglu Shi has received his PhD in Materials Science and Engineering in 1986 from the University Massachusetts at Amherst. He was a PI and Staff Scientist in the Materials Science Division of Argonne National Laboratory between 1988 and 1995. In 1995, he joined the faculty in the Department of Materials Science and Engineering at University of Cincinnati. He is currently the Chair of the Materials Science and Engineering Program at University of Cincinnati. He has so far published 265 refereed SCI journal publications including Physical Review Letters and Nature. He has edited 10 books on superconductivity, functional thin films, nanomaterials, biomaterials, tissue engineering, and nano biomedicine. He is the Editor-in-Chief of Nano LIFE, and Associate Editor of Materials Science & Engineering: C, and J. of Nanomaterials. He has won the Graduate Fellow Award, Excellent Researcher Award, SIGMA XI Research Recognition Award, and Neil Wandmecher Teaching Award.

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