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Frank J. Derbyshire Professor of Materials Science
Professor of Physics and Astronomy (joint appointment)

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Education History

Physics, Peking University, 1978-1980
B.S., Physics and Mathematics (with Honor), Caltech, 1982
M.S., Applied Physics, Caltech, 1983
Ph.D., Applied Physics, Caltech, 1987
Thesis title: "Ion-beam mixing and the formation of amorphous alloys"
Thesis advisors: W. L. Johnson and M.-A. Nicolet

Work History

General Motors R&D Center
Senior Research Scientist, 1987-1992
Staff Research Scientist, 1992-2001
Senior Staff Research Scientist, 2001-2004
GM Technical Fellow, 2004- July 2008
Laboratory Group Manager, Engineered Surfaces and Tribology, 1999-2003
Laboratory Group Manager, Engineered Surfaces and Functional Materials, 2003-Dec. 2006

Guest Professor, Institute of Mechanics, Chinese Academy of Sciences, December 2004-present
Adjunct Professor, Department of Mechanical, Automotive and Materials Engineering, University of Windsor, 2002-2009
Visiting Professor, Division of Engineering, Brown University, 2003-2007
Professor of Industrial Engineering and Materials Engineering, Purdue University, January - May 2007

Professor of Materials Engineering, August 2008 - present
Frank J. Derbyshire Professor of Materials Science, Department of Chemical and Materials Engineering, University of Kentucky, June 2011 - present
Professor (joint appointment), Department of Physics and Astronomy, University of Kentucky, June 2015 - present

Summary of Research and Accomplishments

Nano- and micro-meter scale properties of materials and their applications: nanoindentation modeling and measurements of mechanical properties; growth, structure, and properties of nanostructured materials (e.g., amorphous materials, nano-composites, epitaxial single crystals, single crystal nanowires); microscopic shape memory and superelastic effects; magnetorheological fluids; superhydrophobic and superhydrophilic surfaces; ion-solid interactions and ion beam modification of materials; automotive applications of new materials and processes, including electrical contacts, high power-density engines and transmissions, environmentally friendly machining processes, hydrogen sensors, fuel cells, metal hydride batteries, and lithium ion batteries.

The research activities have helped create knowledge, deepen understanding, and solve a few challenging materials-related industrial problems as documented in

- 8 edited books and special volumes
- 180 publications found in the ISI Web of Knowledge; Sum of times cited: 8207; h-index: 48 as of December 1, 2018
- Google Scholar Citations: 12980; h-index: 58; i10-index: 167 as of December 1, 2018
- 48 issued US patents

Honors and Awards

- Fellow, National Academy of Inventors (2017)
- Fellow, Materials Research Society (2013)
- Materials Engineering Outstanding Teacher Award, University of Kentucky (2012)
- Frank J. Derbyshire Professorship (2011-)
- Fellow, American Physical Society (2005)
- John M. Campbell Award, GM R&D Center, “Modeling Micro- and Nano-indentation Measurements” (2005)
- Charles L. McCuen Award, GM R&D Center, “Hard Coatings for High Power Density Transmission Gears” (2005)
- R. F. Bunshah Award, American Vacuum Society, for best paper on “What is indentation hardness?” presented at the International Conference on Metallurgical Coatings and Thin Films (2001)
- John M. Campbell Award, GM R&D Center, “Synthesis and Theory of Novel Surface-Modified Materials” (1995)
- Graduate Student Award, Materials Research Society (1987)