

Nanotechnology Research, Education, and Outreach by the Integrated Nanosystems Development Institute (INDI)

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Abstract:

The Integrated Nanosystems Development Institute (INDI), sponsored under the IUPUI Signature Centers Initiative, with a vision of becoming a world-recognized resource for the realization of nanotechnology-based systems, is advancing both nanotechnology research and education on campus. Innovation in nanotechnology requires multidisciplinary approaches and INDI, a collective group of faculty members across departments and schools (including the School of Engineering and Technology, School of Science, School of Dentistry, and School of Medicine), enables interdisciplinary research collaborations and offers nanosystems coursework to students in science and engineering disciplines. Current research efforts span a range of critical issues in nanomaterials, nanodevices, nanosystems, energy, physics, and nanomedicine, and include projects such as the design and characterization of nanoarchitectures for biomedical applications, advancing fuel cell and energy storage technologies, and investigating nanoparticle toxicology. Several members of INDI have externally funded research and outreach projects. The nanotechnology research capabilities within INDI, including of a cluster of analytical equipment and lab resources for nanosystems development and characterization, support local industry needs as well as the research interests of over 30 faculty members and over 100 students (undergraduate, graduate and postdoctoral) on the IUPUI campus. INDI also provides, through the newly developed courses, students with both theory and hands-on experiences involving the fabrication, characterization, and applications of nanosystems. These courses are also part of IUPUI's newly developed Nanotechnology Track in Mechanical Engineering and Electrical and Computer Engineering degree programs, and the Energy Engineering degree program. In addition, INDI's active community outreach activities, including its nanotechnology summer camps for K-12 students and teachers, provide early exposure to nanofabrication techniques and research. These classroom and lab-based experiences are designed to encourage higher education and involvement in academic research in an effort to generate the advanced workforce needed by Indiana and the nation.