

# A Collaborative Approach to Architectural and Societal Issues in Nanotechnology

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## ABSTRACT

How will nanotechnology affect the way we design, make, and inhabit buildings? In the NanoSTUDIO, interdisciplinary groups of students from Ball State University's Department of Architecture and the Illinois Institute of Technology's Interprofessional Projects Program explored nanotechnology's potential impact on the built environment, as well its social, ethical and environmental consequences. Teams of students designed buildings using nanomaterials including carbon nanotubes, quantum dot displays, and nanosensors to create new kinds of environments not limited by the constraints of traditional materials. The results suggest that these radical materials may fundamentally alter the relationship between building, users, and environment. Teams integrated a detailed examination of the social, ethical and environmental side-effects of nanotechnology's architectural applications into their investigations.

**Keywords:** collaboration, nanotechnology, architecture, social and ethical implications

## 1 THE NANOSTUDIO

Nanotechnology has the potential to transform the built environment dramatically. According to the Interagency Working Group on Nanoscience, Engineering, and Technology, nanotechnology "is likely to change the way almost everything - from vaccines to computers to automobile tires to objects not yet imagined - is designed and made. If nanotechnology is to change how we design and how we live, then a study of nanotechnology's implications for architecture is clearly needed. This project addressed questions about nanotechnology and the built environment at three levels.

First, what role does nanotechnology play today in architecture? Many nano-engineered materials are already available to architects and builders, and are beginning to transform our buildings. Looking further ahead, nanotechnologies now in research and development will likely have a significant impact on building within the next twenty years. For example, carbon nanotubes could bring unprecedented strength and flexibility to our buildings.



Figure 1: Interior, nano-enabled architecture, Adam Buente and Elizabeth Boone

On the far horizon, the full impact of nanotechnology on our lives and our environment into the next century and beyond is impossible to predict but important to consider. The aim of this project was to analyze the architectural impacts of nanotechnology. Its results are intended to help individuals in the academic and professional communities as well as the general public make intelligent choices about the future of our relationship to the built environment.



Figure 2: Exterior, nano-enabled architecture, Adam Buente and Elizabeth Boone

The results proved to be a proactive contribution to the social discussion on this rapidly developing technology. The projects include detailed descriptions of nanomaterials,

their architectural applications in the design of a residence, and architectural renderings and animations, as well as discussion of the specific technical, societal and environmental concerns they raise. They are now available online at [www.nanotechstudio.com](http://www.nanotechstudio.com) and [www.iit.edu/~ipro341f06/](http://www.iit.edu/~ipro341f06/) to stimulate discussion on nanotechnology and its social and environmental consequences.

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Figure 3: Ball State University students and Illinois Institute of Technology students join in partnering exercises

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Figure 4: Ball State University students and Illinois Institute of Technology students collaborate remotely via the Indiana Higher Education Telecommunication System