



www.bu.edu/BUnano

**BOSTON
UNIVERSITY**

Nanotechnology Innovation Center

OUTREACH

BUnano faculty and graduate students volunteer each summer for BU's Upward Bound Math & Science Program by hosting "Nanocamp Wednesdays." Upward Bound serves low income and potential first-generation college students recruited from public high schools in Boston. Throughout the academic year, BUnano fellows also collaborate with the BU CityLab program, a bio-science-learning laboratory representing a partnership between the Boston University Schools of Medicine and Education. Trainees develop and present a nanomedicine curricula over six evenings, give lectures, and lead 24 high school students in the CityLab Scholars program through laboratory experiments. Over the course of the year, our trainees engage the students in discussions about nanotechnology and medical applications and share their experiences as graduate students.



The **Boston University** Nanotechnology Innovation Center (BUnano) is an interdisciplinary collaborative research center that includes over 60 faculty members from ten departments from the Colleges of Engineering and Arts and Sciences, and the School of Medicine. BUnano was established in 2004 to foster research and education in nanoscience, nanoengineering, and nanotechnology and to address challenges in medicine, manufacturing, and energy.



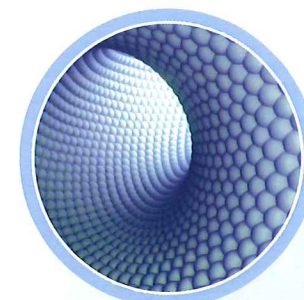
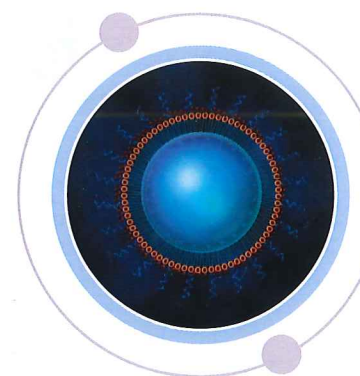
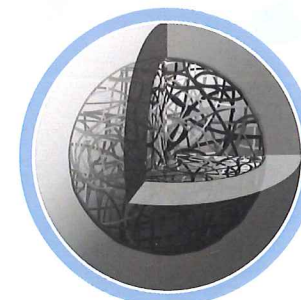
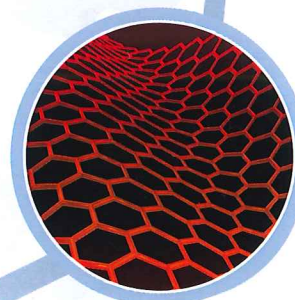
2014-2018 ACHIEVEMENTS

- Over 250 students and postdoctoral fellows
- 285 Proposals submitted
- \$35M in research grants
- BME MS Focus in Nanomedicine



GOALS

- Educate and support outstanding students and postdoctoral fellows
- Support for collaborative research and development
- Organize targeted workshops and symposia
- Outreach to the Boston community



In partnership with Boston Medical Center and BU School of Medicine, BUnano fosters clinician and scientist collaborations through interactions at all stages of research and pre-clinical development. These partnerships expedite translation of nanotechnology laboratory advances into patient care. BUnano supports all facets of nanotechnology and encourages industrial applications and translational activities by awarding research grants to BU faculty teams to seed innovative and exciting new projects that use nanotechnology to address major problems related to health, energy, materials and the environment. - **Mark Grinstaff**, PhD, BUnano Director

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8 St. Mary's Street - 9th Floor
Boston MA 02215
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RESEARCH

The field of nanotechnology is transforming many industries and holds tremendous promise for overcoming some of the important challenges we face as a society. BU's strengths lie in the following areas: engineering, photonics, energy, materials, and medicine with nano at its center. BUnano Center supports collaborative and translational research between scientists, engineers and clinicians. It works in collaboration with the Photonics Center, the Cancer Center, the Evans Center for Interdisciplinary Biomedical Research, CFTCC, the Clinical and Translational Science Institute, and the Fraunhofer Center for Manufacturing Innovations, to deploy nanotechnology innovations that can serve social needs. The Center also serves as focal point for interactions with peer universities, Boston-area hospitals, industry, and government to accelerate advances in the field of nanoscience. Furthermore, BUnano's Entrepreneur-in-Residence program bridges the gap between researchers and external technology commercialization resources, fostering relationships that translate innovative research ideas to the market.

RESEARCH HIGHLIGHTS

- Drug packed nanoparticles to treat cancer
- Human Genome sequencing with nanopores
- Nanophotonics to optimize solar energy use
- Nanowire sensors for biomarker detection
- Nanoelectromechanical systems
- Nanomaterials for neuron regeneration
- Nanoparticle sensors for global health
- Graphene-based nanoscale pressure sensors
- Nanotube spectroscopy
- Carbon nanotubes to improve energy efficiency
- Nanostructure improvements to optics
- Nanotheranostic approaches to clinical needs

OUR FACULTY



EDUCATION

CROSS-DISCIPLINARY TRAINING PROGRAM

BUnano launched a new Cross-Disciplinary Fellowship Program for pre-doctoral fellows as the NIH XTNC training program concluded. Due to the interdisciplinary nature of nanoscience and nanotechnology, this Fellowship offers the opportunity to work across scientific, engineering, and medical research boundaries and is open to doctoral students from scientific, medical, and engineering disciplines.

TRB - TRANSLATIONAL RESEARCH IN BIOMATERIALS

The TRB program is funded by a grant from the NIH; currently in its tenth year. Its rigorous educational curriculum includes biomaterials courses, a clinical trials course, an entrepreneurial/business course, as well as student organized seminars, dinner meetings with clinicians, field trips and professional development activities. The program exposes students to research challenges from the nano to macroscale and promotes interpersonal skills for cross-disciplinary communication.

BIOMEDICAL ENGINEERING MS WITH FOCUS IN NANOMEDICINE

In 2017 BUnano helped start the MS in Biomedical Engineering with a focus in Nanomedicine. This program is BUnano's vision in collaboration with the Department of Medicine's Evans Center for Interdisciplinary Biomedical Research and the College of Engineering. It reflects BUnano's commitment to foster clinician and scientist collaborations through interactions at all stages of research and pre-clinical development. The program offers students a structured path for acquiring the unique interdisciplinary knowledge and skill sets to advance and distinguish themselves in this growing sector.

UNDERGRADUATE CONCENTRATION IN NANOMEDICINE

BUnano also supports the undergraduate concentration in nanotechnology which increases students' exposure to nanoscience and nanoengineering applications in biomedical, photonic, electronic, and atomic systems.