

## 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, XTNC 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 and postdocs in nanotechnology cancer research, leading to rich discussions between the trainees and high school student participants about both science and careers in STEM disciplines.

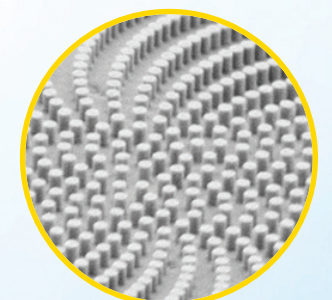
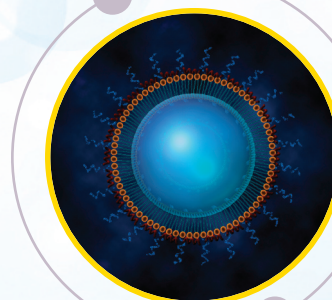
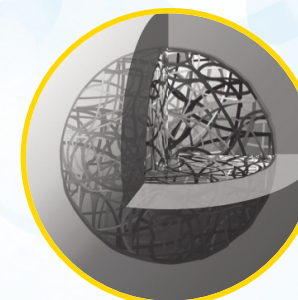
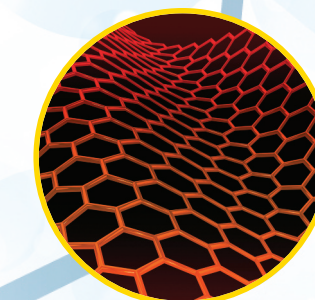
The **Boston University** Nanotechnology Innovation Center (BUnano) is an interdisciplinary collaborative research center that includes 45 faculty members from ten departments from the Colleges of Engineering and Arts and Sciences, and the School of Medicine. BUnano was established in 2004 to foster research and education in nanoscience, nanoengineering, and nanotechnology and to address challenges in medicine, manufacturing, and energy.

## 2015 ACHIEVEMENTS

- Over 200 students and postdoctoral fellows
- 250 Proposal submissions
- \$35.4M in research support

## GOALS

- Educate and support outstanding students and postdoctoral fellows
- Provide seed funding for collaborative research and development
- Develop large, interdisciplinary grant proposals
- 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



## 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 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 nano-technology 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
- Nanoparticle sensors for global health
- Graphene-based nanoscale pressure sensors
- Nanotube spectroscopy
- Carbon nanotubes to improve energy efficiency
- Nanostructure improvements to optics

## OUR FACULTY



*“Where **nanomaterials** intersect medicine and energy through collaborative **interdisciplinary research**”*

## EDUCATION

BUnano supports the undergraduate concentration in nanotechnology and is home to several fellowship opportunities for outstanding BU PhD students and fellows engaged in interdisciplinary research at the nanoscale. The undergraduate concentration increases students' exposure to nanoscience and nanoengineering applications in biomedical, photonic, electronic, and atomic systems.

### XTNC - CROSS-DISCIPLINARY TRAINING IN NANOTECHNOLOGY FOR CANCER

Launched in 2010 with a \$2.1 million grant from the NIH National Cancer Institute, the XTNC program is an interdisciplinary fellowship open to pre- and post-doctoral researchers from science, engineering, and medicine. The program trains young researchers in nanotechnology applications for cancer diagnostics and treatment while strengthening connections across the University's academic disciplines. Each student works with mentors from both science/engineering and medicine, on a collaborative research project. As of 2016, 50 students and post-docs have been trained through the XTNC program.

### TRB - TRANSLATIONAL RESEARCH IN BIOMATERIALS

The TRB program is an NIH-funded T32 training grant that educates young researchers on how best to translate their ideas from the laboratory to the clinic. The core of the TRB program is a curriculum that includes courses focused on biomaterials, clinical trials, entrepreneurship, as well as medical grand rounds and experience in a surgery suite to introduce the critical human component of patient care. The program exposes students to research challenges from the nano to macroscale and promotes interpersonal skills for cross-disciplinary communication.

### MENTORING TRAINING IN THE SCIENCES AND ENGINEERING PROGRAM

The program led by BUnano founder Prof. Bennett Goldberg, provides in-depth, interactive training on mentoring for PhD students and postdoctoral fellows. Through a specially developed workshop, the program assists graduate students and post-doctoral fellows hone their expertise as mentees to faculty and mentors to undergraduates in laboratories.