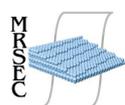




NanoFabulous Exhibition: A Strategic Partnership



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In 2008, the University of Maryland Materials Research Science and Engineering Center (MRSEC) and the Port Discovery Children's Museum (PDCM) established a partnership to enhance Science, Technology, Engineering, and Math (STEM) learning for PDCM visitors. "We believe you are never too young to start learning about STEM, and the earlier we can engage children, the more likely they are to develop a life-long interest in STEM," says Nora Moynihan, Port Discovery Children's Museum's Director of Education.

The goals of this partnership encompass a wide range of objectives that require a long-lasting and resilient partnership. Starting with programming activities for NanoDays and hands-on science for PDCM's Discovery Days, the partnership has taken on increasingly ambitious projects, leading to the creation of NanoFabulous. Donna Hammer, MRSEC Associate Director, described the partnership between the UMD MRSEC and PDCM by saying, "Our partnership is built on common goals, mutual respect, realistic expectations, flexibility, and open communication. From these qualities, we have built trust, which has blossomed into a synergy between the two institutions that has seeded a long and fruitful partnership."

NanoFabulous is co-exhibited at PDCM with the Nano mini-exhibition developed by the NISE Network. Moynihan notes, "One of our primary goals with Nano is to present nanoscience to children in a fun and engaging way that they can understand, and the UMD MRSEC team has helped us achieve that."

The NanoFabulous team was made up of twenty-three members including UMD MRSEC staff, faculty, research scientists, postdoctoral students, graduate students, and undergraduate students from the departments of physics, chemistry, and engineering. Within the team, interdisciplinary groups were created to provide the best technical and scientific expertise for each exhibit component. The team worked for a period of seven months from inception to

NanoFabulous
 Developed by the
 University of Maryland, College Park
 Materials Research Science & Engineering Center



A MRSEC graduate student works with a 3rd grader at the Probes Table.

exhibit installation. Major funding for *NanoFabulous* was provided by the National Science Foundation, with additional funding from University of Maryland, College Park Departments of Physics and Chemistry & Biochemistry, and contributions from National Institute of Standards and Technology (NIST).



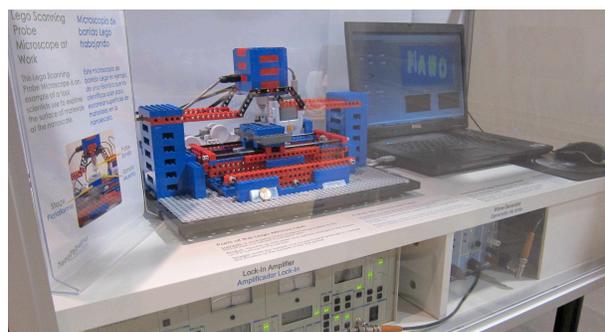
UMD MRSEC campers explore the Cleanroom.

NanoFabulous is a 300 sq. ft. interactive exhibition designed to help children and their families understand how scientists and engineers discover and invent things they cannot see. Hammer explains, “*NanoFabulous* is designed to share with Port Discovery visitors what happens way down at a billionth of a meter and how nano scientists and engineers learn about these phenomena when their eyes can’t see and their hands can’t touch the things they want to explore.” *NanoFabulous* includes five exhibit components that invite visitors to explore the processes and instruments that make nanotechnology a reality. The exhibit features a **Magnification Table**, where visitors discover the microscopic secrets

on the surfaces of objects by using magnifiers of different strengths; a **Cleanroom**, where visitors enter the controlled environment of a simulated high-tech cleanroom and learn how researchers fabricate the nano-devices of tomorrow; a **Probes Table**, where visitors have fun understanding how nano-probes function and are used to measure the surface of materials at the nanoscale; **Lego Scanning Probe Microscope Station**, where visitors see how a scanning probe microscope (made of LEGOs!) creates a nano image; and a **Nearfield Scanning Optical Microscope Station**, where visitors see a microscope that uses light with a scanning probe to image objects at the nanoscale.

Since opening on April 12, 2012, over a hundred thousand visitors have had a *NanoFabulous* experience. The UMD MRSEC and PDCM have developed and implemented successful programming activities to enhance visitors’ experiences with *NanoFabulous*. These include family scavenger hunts, school groups, summer camp programs, Meet a Scientist, museum educator workshops, Discovery Days, NanoDays activities, and conversations about nano and society.

The strong university-museum collaboration is now expanding to include new partners as well. The National Electronics Museum and Vorbeck Materials are joining forces with them for their 2013 NanoDays “Nanovention Convention.” PDCM, in partnership with UMD MRSEC as well as the Environmental Protection Agency, was also awarded a 2013 mini-grant from the NISE Network to create “How Do You Nan-Know,” a new interactive experience where visitors can learn about nanotechnology in their neighborhood, consider the values implicit in our choices about new technologies, and voice their opinions about new products being developed. With these new initiatives, PDCM and the UMD MRSEC hope to build a broader network of local partners to support STEM education in the Baltimore area.



Like the *Nano* mini-exhibition, the *NanoFabulous* exhibition has been developed with bilingual signage to reach PDCM’s diverse audience.