

May 4, 2012

Lab tour to "Microelectronics Research Center (MRC)" at U.T. Austin:

On 5/4/12, the NVC Nanotechnology Club toured MRC cleanroom facilities at the University of Texas at Austin to observe how it carries out its mission in education and microelectronics research and development. The facility was completed in 1993. The tour began down the central corridor of the MRC, where glass walls to the left offer complete visualization of the 14,000 square feet of class 100 cleanroom space, where the crystal-growth and device processing is performed, and the 15,000 square feet of characterization laboratories. The cleanroom contains complete silicon complementary metal oxide semiconductor (CMOS) processing capability, including fine-line lithography, sputter deposition, reactive-ion etching, and low pressure chemical vapor deposition (CVD) equipment. The cleanroom also contains reactors for silicon and group III-V element epitaxial crystal-growth techniques, such as molecular beam epitaxy (MBE) and CVD processes, including metalorganic, remote plasma, rapid thermal, and ultrahigh vacuum. The characterization laboratories contain equipment for comprehensive optical and electrical measurements. During the walk down the central corridor, the group was able to observe researchers using some of the above equipment.

The club members also entered the changing area to suit up for the cleanroom. The MRC is well prepared for visitors and has shoe coverings, caps, gowns, gloves, and goggles in a wide range of sizes to fit anyone who visits. After donning the cleanroom garb, the group went to the characterization area to obtain hands-on experience with the optical and electronic equipment. The group used visual microscopy to view a patterned silicon wafer, and then used a Scanning

Electron Microscope (SEM) to view the same wafer at higher magnification. The tour then proceeded to the processing area to get a close-up view of the silicon wafer processors. The tour ended by viewing the MBE apparatus. The group members had seen schematics of the MBE process during the degree study in nanotechnology, but were all surprised at the size and complexity of the apparatus.

The group enjoyed the MRC tour and gained an understanding of its importance in education and research and development. With a staff of permanent and affiliated faculty and research scientists numbering 40 and graduate research assistants numbering 150, giving a faculty/student ratio of about 1:4, it is easy to imagine that the training and experience students obtain at the MRC can lead to successful pursuit of a career in microelectronics. The MRC's stated goals are to offer opportunities for research in novel materials, electronic devices, and nanostructures for academic as well as industrial users and to contribute to advancements in microelectronic devices, integrated circuits, and optoelectronic components. The NVC Nanotechnology Club members were all impressed by the MRC's facility and research and educational efforts, and recommend this tour for anyone interested in the field of microelectronics and/or nanotechnology.

Drafted by: Richard Havel