Testimony of Qimonda North America Corp., by
Henry Becker, President

The Committee on Science and Technology
Subcommittee on Technology and Innovation
U.S. House of Representatives
November 6, 2007

The Globalization of R&D and Innovation, Pt. IV:
Implications for the Science and Engineering Workforce

Good afternoon Committee Chairman Wu, Ranking Member Hall and the other distinguished members of the Committee. Thank you for the opportunity to offer the views of Qimonda on the globalization of the technology sector and the consequent impact on the U.S. science and engineering workforce.

Qimonda is a global semiconductor company that designs, manufactures and sells memory products - DRAM for use in computing, graphics, networking and mobile applications. We employ about 13,000 people worldwide, and had revenue of $4.9 billion in fiscal year 2006. We made our initial investments in the United States in 1996 when we were Siemens Semiconductor. To date we have invested more than $3 billion in two advanced manufacturing lines, two design centers, and a sales/marketing operation. In total we employ about 3,000 people in the U.S. with a range of skills but tilted heavily toward those with strong science and math skills, and degrees in engineering.

Our manufacturing operations are located in the White Oak technology park in Sandston, Virginia, just outside of Richmond, where we employ 2400 people in the production or wafer fabrication of DRAM. We have a design center in Burlington, Vermont employing approximately 125 professionals to develop products for mobile applications, and a second design center in Cary, North Carolina employing 200 plus to develop products for server and graphics applications. We employ an additional approximately 75 professionals focused on supporting the North American region in such areas of information technology, logistics and general administration. Finally, we have 85 plus professionals in sales and marketing in San Jose, California, as well as smaller groups of employees in Texas and elsewhere in the U.S. to serve our customer's operations.

Qimonda's North American operations support our U.S. and worldwide customer base, including companies like AMD, Cisco, Sony, Dell, HP, IBM, Microsoft, Motorola, Nvidia, Scientific Atlanta and Sun Microsystems to mention a few. We also participate in several R&D consortiums here in the U.S. working with other companies to develop advanced technology.

Our initial investment in 1996 was a result of our seeking a manufacturing presence close to many of our customers' operations. Today, forty percent of our revenues continue to come from the U.S. market for DRAM memory, and so our investment in manufacturing and design has grown significantly in the past ten years. More importantly some our of industry's key enablers

call the US home. Intel and AMD for computing chip sets, Nvidia for graphics, Apple and Motorola for wireless and handheld applications, as well as some of the largest server farm users such as Google. Finally the US is home to JEDEC, where our industry debates and adopts standards for our market place.

When we looked at possible locations across the United States to set up our fabrication plant, we selected Virginia because of its positive business climate and the state and local government's strong commitment to partner with us to develop a skilled workforce to support our business. This commitment included financial incentives for the worker training we provided, cooperation on developing more technical training in community colleges, and establishing a Microelectronics Center and an advanced degree program at the Virginia Commonwealth University School of Engineering. We are proud to say that in the past 12 years, semiconductors in Virginia went from literally non-existent to the state's largest export item today.

Our design centers were located in Vermont and North Carolina because that is where we found the properly trained resources. In Vermont, we had a research partnership with IBM that ultimately led to us establishing, and then significantly growing, our own design center. In North Carolina, our presence was established first by a small team of engineers already doing DRAM designs in the Research Triangle Park supporting the many customers that were also located there. The combination of access to skilled workers followed by customer location, quality of life and reasonable cost of living in Vermont and North Carolina has produced significant growth in both of these research operations.

Qimonda is a classic example of a global company: our headquarters and roots are in Germany, we are publicly traded on the New York Stock Exchange, and our CEO is Malaysian. If you refer to Figure 1, you will see our globally based manufacturing and design footprint. We design, manufacture and ship products around the world. We do not have a geographic division of labor by worker roles, but have manufacturing, design and sales in each major global region (North America, Europe and Asia) to support the changing supply chain needs of our customers as well as to gain access to workers and better serve markets in all regions of the world.

Figure 1

That said, cost competitiveness and talent availability are ever growing issues for our manufacturing and design operations in the United States. Aside from U.S.-based Micron Technologies, our primary competitors in the market are located in Asia where labor rates are significantly lower and the education and skill level is constantly improving. Labor is a key element of our cost structure in the U.S., and we remain competitive here only with constant increases in productivity. Pressure to shift more of our investment resources from the U.S. and into Asian-based fabrication plants and design centers is acute. DRAM is a commodity product that is very cost sensitive and demands a 30 percent cost reduction or productivity improvement annually to remain competitive. Constant investment in new technology and equipment are required to continue competing.

In addition to higher costs for labor, we face a continuing shortage of workers with adequate science and math education to be able to support our manufacturing and design operations in the United States. A true skill shortage exists in both engineers for design work, and manufacturing associates with the adequate education foundation to work in the highly automated technical environment of our fabs. The United States is just not producing enough workers skilled to support the semiconductor industry. Many of our new hires come from other semiconductor companies or are immigrants to the United States. We are currently sponsoring more than 175 workers for visas and we would hire more immigrants if we were able to get more visas.

However more visas are not the answer. It would be our strong preference to see a larger pool of skilled workers here in the United States. We work continually to develop our own workforce, but that is not enough. Since we originally established our fab in Virginia, we have invested constantly in building technology education partnerships and initiatives region-wide. In cooperation with the Virginia Community College System, we supported the curriculum development for a 2-year associate degree in microelectronics technology. Together with the state, we worked to mold the Virginia Microelectronics Consortia to develop engineering graduates for the semiconductor industry throughout Virginia's engineering colleges, and at Virginia Commonwealth University, we have supported curriculum development, funded professorships and student scholarships as well as provided operational expertise to start the Microelectronics Center in the beginning.

Following are just a few good examples of how we work with localities to develop the regional workforce to support our operational needs. Specific community education programs have grown from these advanced education investments. Henrico County's High Tech Academy is a science and technology based study program that showcases what can be done when the public and private sectors decide to cooperate on a critical need. The program sponsored by Qimonda and VCU exposes students to science and technology hoping to capture that area for further study and a profession someday. It is a 2-year program for Henrico County Public School juniors and seniors that provide 32 transferable college credits for coursework, and an internship at Qimonda.

Another notable program, our Technician Academy, is an internal education program that in partnership with the community college system brings instructors onsite to train our associates and allow them to earn a semiconductor associate degree. In addition to these formal programs, Qimonda sponsors the First Robotics competition by offering mentors, resources and financial support to help local teams participate in this national program that also exposes students to science and technology through the building of robots that compete in regional and national cooperative competitions or "co-opititions."

In Vermont, we have partnered with the Engineering School at the University of Vermont to sponsor a Senior Design Project in microelectronics.

I believe that most technology companies have their own home-grown programs primarily to meet their need for technology-based skilled workers.

However, unless the United States actively develops more home-grown engineering talent, it is just a matter of time until development, high tech manufacturing and design work shifts away from this country. It seems to us that producing more qualified U.S. engineering and science graduates is a better medium and long-term solution to the skill shortage we face than increasing the number of visas needed to maintain the skilled data pool supporting the technology industry here. And, for companies like ours, it costs thousands of dollars per worker in fees and human resources to obtain visas.

The United States is competing with countries that offer significant incentives for technology based manufacturing and product development, and have adopted strategies to produce a growing pool of talented labor. Most of these competitor nations treat technology in general, and semiconductors specifically, on the level of a national strategic interest and as such, have embraced it to the full extent they can – sometimes beyond World Trade Organization norms. My company and I believe that the United States needs a fundamental investment in science and math education, starting at a young age, to produce a workforce that keeps manufacturing and design work here in the United States. In addition, we need to find a way to attract the most talented students into engineering schools and technology professions.

Thank you for the opportunity to offer testimony to this Committee and I look forward to answering your questions.