I want to begin by thanking the classes of 1934 and 1940, which have provided us with the means to honor and reward outstanding performances by the Georgia Tech faculty. As our alumni see the value of their Georgia Tech education demonstrated in their careers, they invariably pay tribute our superb and hard-working faculty as the critical factor in that education. The classes of 1934 and 1940 understood how important it was to encourage and recognize excellence demonstrated by the faculty, and the endowments they created are what make Georgia Tech’s top faculty awards possible.

With so many excellent faculty to choose from, narrowing the field down to one person to receive Georgia Tech’s highest faculty honor is always a difficult task. But each year, the committee sorts through the many outstanding nominations and comes up with just the right recommendations for the Distinguished Professor Award.

This year is certainly no exception. Dr. Thomas K. Gaylord is a Regents’ Professor who holds the Julius Brown Chair in Electrical and Computer Engineering. And he is the human embodiment of Georgia Tech’s goal to intertwine research and education as inter-related components of the discovery and learning process.

Tom is an expert in optical digital parallel processing, which explores ways to use light to bypass the mechanical limitations of today’s electronic computers, creating a new generation of computers that are faster and capable of storing extraordinary amounts of data. For example, we tend to think of holograms as fun artwork or as a counterfeit prevention device. But for Tom Gaylord, holography holds tremendous potential as means of storing and retrieving information. While the computer on your desktop retrieves and moves data one bit at a time using tiny electrical switches, holographic techniques can process entire images, called pages, at a time. They can retrieve in one second what would take a magnetic disk drive five hours. They are also very fast at matching images, which offers tremendous potential for identifying objects or signatures in data processing. So Tom Gaylord experiments with placing holograms inside crystals to see how they affect each other and how stable their information remains over time.

However, using photons instead of electrons for computing has its drawbacks. Since photons do not interact with each other like electrons do, you can’t make them trip a switch. So Tom is working on this problem, too. He is developing optical gratings, which are patterns of lines that bend the light pulses that pass through them. Gratings can be used to steer light pulses to specific locations or even to block certain wavelengths. He is also working on making switching tools from ferroelectric liquid crystals, which we mere mortals are familiar with from their use in electronic displays.

In other experiments, Tom takes electronics down to the nano-level, where electrons behave like waves. Quantum electron wave-based lasers, which are not only cheaper and more versatile than
conventional lasers but also much tinier, have the potential to produce the next generation of integrated circuits, with a powerful computer on a single quantum semiconductor chip.

Dr. Gaylord’s research in fields like these has resulted in some 170 technical journal publications. And if you look at the patents that the Georgia Tech Nanostructure Optoelectronics Group lists as its most significant, his name is on every one. Not surprisingly, he had received the Curtis W. McGraw Research Award from the American Society of Electrical Engineers, the Georgia Tech Outstanding Faculty Research Author Award, and seven Sigma Xi research awards.

But he is also fully engaged with his students. His students have tremendous respect for him as a teacher and advisor. In addition, he serves on the executive committee of the Nanoscience and Technology Certificate Program, which began last year. This program enables Tech students to earn a special certificate by taking 12 credit hours of coursework specifically focused on nanoscience and nanotechnology. The program also offers graduate research fellowships in nanoscience and nanotechnology. The cumulative impact is better communication and collaboration across campus among those who are working in these emerging fields.

So it is also no surprise that Tom Gaylord has also won the Georgia Tech Outstanding Teacher Award and the Georgia Tech Outstanding Doctoral Advisor Award.

Dr. Gaylord holds a bachelor’s degree in physics and a master’s degree in electrical engineering from the University of Missouri – Rolla, which has also presented him with an honorary degree. He earned his Ph.D. in electrical engineering from Rice University. He is a fellow of the Institute of Electrical and Electronics Engineers, better known as IEEE, and of the Optical Society of America.

At this time I am proud to present Georgia Tech’s highest honor, the Distinguished Professor Award, to Tom Gaylord.