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## Building the Next Generation of Defense Innovators through Experiential Learning and Semiconductor Research

October 2024 | By Melissa Tallman, Chief Brand Officer, Griffiss Institute

The Northeast Regional Defense Technology Hub (NORDTECH), in partnership with Griffiss Institute and the Air Force Research Laboratory Information Directorate (AFRL/RI), is at the forefront of advancing defense-related technologies and cultivating a highly skilled workforce. This collaboration brings together top-tier companies and academic institutions—including NY CREATES, UAlbany, RPI, Cornell University, and IBM. Headquartered at the Albany NanoTech Complex, leveraging the distributed expertise of its partner organizations, and supported by \$40 million from the U.S. CHIPS & Science Act, NORDTECH bolsters U.S. semiconductor capabilities through cutting-edge research, educational programs, and startup incubation. Its emphasis on lab-to-fab prototyping directly aligns with the Department of Defense's (DoD) strategic goals.

### A Unique Internship Program

Griffiss Institute's internship program, developed in partnership with the Air Force Research Laboratory's Information Directorate in Rome, New York, offers students unparalleled opportunities to work on defense-related projects that push the boundaries of technology. A key advantage is the Institute's ability to secure security clearances for interns, enabling them to participate in classified research—an experience rarely offered at the collegiate level. In the past year alone, Griffiss Institute received more than 650 applications for its summer internships, which offer participants the chance to collaborate closely with AFRL/RI scientists, often extending beyond the summer session due to the impact and quality of their work.

Among the standout examples is Brandon Rozner, a Computer Engineering major at Clarkson University. During his internship, he collaborated with AFRL researcher Qing Wu to design a printed circuit board (PCB) capable of manipulating electromagnetic fields for applications in focused beaming, diffuse



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reflection, and beam splitting. His exceptional contributions led to an extension of his internship through fall 2024, where he will continue testing and evaluating the PCB in both laboratory and field settings. “During my internship at Griffiss Institute, I gained valuable hands-on experience in a crucial area of defense technology. It's truly incredible to witness the direct impact of my work on real-world solutions,” said Rozner.

Similarly, Vlad Verenich, a student from SUNY Polytechnic Institute, worked alongside Dr. Kang Jun Bai of AFRL/RI, using devices fabricated by Professor Nate Cady at UAlbany’s College of Nanotechnology, Science & Engineering under the AFRL-sponsored NeuroPipe Applied Research Agreement Program (ARAP). Verenich's research focused on investigating memristor devices for neuromorphic computing applications, specifically exploring in-memory computing and vector-matrix multiplication. His work feeds directly into NORDTECH’s mission of advancing semiconductor research to meet DoD goals for enhancing U.S. microelectronics capabilities. Reflecting on his experience, Verenich stated, “This internship not only gave me technical skills but also a deeper understanding of how research can address national security challenges.”

### **Mentorship and Experiential Learning**

The partnership between NORDTECH, Griffiss Institute and AFRL/RI is more than just an internship program—it is a mentorship-driven experience allowing students to work closely with top defense scientists. One of the key mentors is Dr. Kang Jun Bai, an AFRL/RI senior researcher with expertise in nanoelectronic devices and mixed-signal integrated circuits. Dr. Bai’s mentorship is instrumental in guiding interns, helping them connect their technical work to broader national security objectives.

“The research's collaborative nature ensures that interns not only develop their technical abilities but also understand the strategic importance of their work for the DoD,” said Dr. Bai. His leadership has fostered an environment where students gain practical insights and develop the expertise needed to solve complex defense problems.



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### **Building a Pipeline of Defense Innovators**

NORDTECH is building a robust pipeline of future defense innovators, scientists, engineers, and technicians who will drive forward innovation in critical defense technologies. NORDTECH's focus on semiconductor research and Griffiss Institute's workforce development efforts to provide experiential learning underscores a renewed commitment to strengthening the U.S. microelectronics industry.

### **Supporting Veterans in Semiconductor Careers**

NORDTECH also prioritizes empowering veterans through specialized programs. For instance, the Warrior-Scholar Project (W.S.P.) and NY CREATES-led and NORDTECH-supported Veterans Semiconductor Training and Experience Program (Vet S.T.E.P.) aim to equip veterans with the skills needed for careers in the semiconductor industry. These initiatives reflect NORDTECH's broader goal of ensuring a skilled workforce ready to meet the growing demands of this vital sector. [Learn more about how NORDTECH supports veterans in transitioning to semiconductor careers.](#)

### **Shaping the Future of National Security**

NORDTECH's initiatives, in partnership with Griffiss Institute's programs, supported by its close relationship with AFRL, provide much more than technical training. They cultivate a deep understanding of how advanced technologies, such as semiconductors and neuromorphic computing, can support our national security. By fostering a blend of experiential learning, mentorship, and hands-on research, the Institute is preparing the next generation of innovators to tackle the complex challenges of the defense industry.

Through the NORDTECH strategic initiative, Griffiss Institute is laying the groundwork for a future where emerging technologies enhance national security. By empowering students with real-world experience, professional mentorship, and opportunities for extended work in critical defense projects, Griffiss Institute is ensuring that the U.S. remains at the forefront of technological innovation.



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These efforts are not only building a stronger workforce but are also crucial to securing the country's technological leadership in key defense sectors.

As the U.S. focuses on revitalizing its microelectronics industry, initiatives like NORDTECH are crucial to maintaining competitiveness in this rapidly evolving field. The collaboration between high-tech companies, academic institutions, and the Department of Defense ensures a steady pipeline of talent ready to tackle the complex challenges of modern warfare and cybersecurity. Through its innovative approach to workforce development, Griffiss Institute is playing an indispensable role in securing the future of U.S. national security, ensuring that the brightest minds are equipped to lead in the most critical sectors of defense technology.



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