

**Wise Minds at Work:  
Cybersecurity Experiential Learning through Team Internships**

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University of Virginia's College at Wise



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**Background:** Cybersecurity programming at the University of Virginia's College at Wise (UVA Wise) continues to grow. Beginning in the summer of 2017, UVA Wise expanded the College's capacity by adding cybersecurity expertise through faculty and including new courses within the existing technical degree programs. Since that time, the College has launched a portfolio of activities including competitions, a cybersecurity club, and an annual symposium.

Additionally, the UVA Wise Works internship program has attracted the attention of technology companies from outside the coalfield region to create internships for students, particularly those pursuing degrees in software engineering, computer science, and management information systems. These internships have resulted in post-graduation full-time employment for the majority of the students who participated. Wise Works has demonstrated that Southwest Virginia can leverage significant investments in broadband throughout the region and the creation of coworking locations such as the Oxbow Center in St. Paul, Virginia, to create meaningful work experiences for technology students.

**Project Overview:** UVA Wise proposes the creation of Wise Minds at Work (WMAW), an intensive in-the-field learning experience that brings together students in cross-disciplinary teams to address cybersecurity challenges of for-profit businesses and other organizations. Technology majors will anchor these teams. Teams may also include students majoring in criminal justice, psychology, sociology, etc., based upon the needs of the specific industry partner and as dictated by the needs of the project.

**Benefits:** In today's digital space, private industries, non-profit organizations, governments, and individuals own and/or manage data, including information that is confidential and/or proprietary. Examples of these types of data include personal health details, financial information, strategic business plans, logistics, and trade secrets. It is more important than ever to develop a workforce that has the expertise to provide security for digital information. UVA Wise intends to expand that cybersecurity workforce through innovative taskforce-related experiential learning activities. Wise Minds at Work would offer a 360-degree benefit, which would include the possibility of full-time employment for Virginia's college graduates, an opportunity for employers to sample the talent of rural Southwest Virginia, and a stronger relationship between UVA Wise and employers inside and beyond the borders of Southwest Virginia. Additionally, this project would position Southwest Virginia as a permanent technology recruitment pipeline for employers throughout the Commonwealth.

Often, businesses face security limitations due to personnel, bandwidth, and other deficiencies. Examples of these limitations include the continued use of outdated technology, legacy applications, suboptimal workflows, and incomplete or outdated documentation. Business owners and managers may push security-focused tasks to the bottom of an ever-growing to-do list where they linger behind higher priority tasks. Wise Minds at Work will address these security deficiencies with a low-risk, low-cost solution while ensuring that UVA Wise students have opportunities to enhance their skillsets outside the classroom.

**Process:** UVA Wise will issue an annual "Call for Projects" to businesses and non-profit organizations. Ideally, organizations that are highly vulnerable to cybersecurity threats will respond. Such organizations may include small businesses, healthcare systems, transportation providers, manufacturers, financial service institutions, energy companies, public school systems, media, law enforcement and first responders, and activist/awareness groups (political, environmental, social, etc.).

Organizations located anywhere within Virginia may submit project proposals. Winning proposals will be selected with the objective to strengthen team member skills in areas such as programming/application development, web development, database administration and development, requirement development, software design and testing, communication, reporting, graphic design, and digital imaging. Examples of ideal projects include software development, modernization of legacy applications, system upgrades and migrations, source code review and audit, software testing workflow improvement, user interface development, cloud solution implementation & deployment, documentation review.

The goal is to select two to three projects annually. Teams of two-to-four students will assemble based upon the needs of each project. The primary target participants will be students with majors in Computer Science, Software Engineering, Math, or Management Information Systems. The secondary target participants will be students with majors in disciplines that will provide supplementary/complementary support of holistic teams, including (but not limited to) majors in Communication Studies, Business Administration, Accounting, Sociology, Psychology, Government, and Administration of Justice. Prerequisites for students to be eligible for Wise Minds at Work include the following: completion of at least one semester at UVA Wise, full-time enrollment in a degree-seeking program, an overall GPA of 2.5 (exceptions considered if student has a recommendation letter from faculty member from student's area of study), good standing with UVA Wise, and ability to meet health, age, academic, security, and/or related internship criteria of the internship provider (employer). International students must be "employment authorized" by holding a valid F-1 Visa.

Methods to recruit and ensure successful participation of students will include information sessions, email blasts, poster placements, classroom presentations, sidewalk chalk messages, faculty promotion, club presentations, college newsletter/newspaper articles, website messages, resident advisor presentations, and social media messages. The Office of Career Discovery and Planning will partner with the following organizations to ensure that under-represented students are aware of, and participate in, opportunities afforded by the Commonwealth Cyber Initiative: Office of Compliance and Inclusion, Disability Support Services, Office of Multicultural Affairs, LGBTA, Lovelace Society (a student organization that strives to gain women's interest in STEM), Multicultural Alliance, and Women in STREAM (Science, Technology, Research, and Math).

**Measurement and Assessment:** UVA Wise will use a 360 assessment process to evaluate the effectiveness of this initiative. The success of Wise Minds at Work will be tracked by the employer's performance evaluation of the team's ability to meet the expected outcomes of the project. Additionally, metrics will be tracked as to the number of post-internship employment offers (applies to graduating team members) and the employer's desire to continue participating in the program for future projects. At project completion, student team members will have the opportunity to evaluate their employers as well as their teammates. Faculty mentors will use information about the students' individual experiences and team experiences to debrief on lessons learned and what processes and outcomes could have been improved throughout the life of the project.

Multi-discipline faculty mentors and an internship program coordinator will support Wise Minds at Work initiatives. Faculty mentors will help manage teams and mentor students to meet project objectives. Serving in a direct support role for interns, they will offer direction on specific project pieces based on their fields of study. The program coordinator will recruit students and businesses to participate in the program. The coordinator will be responsible for facilitating the

orientation of projects with companies as well as handling all post-project evaluations. These roles will be crucial for the success of the program.

**Summary:** Based on its success with the Wise Works Technology Internship program, UVA Wise anticipates positive outcomes for students as well as benefits for Virginia businesses. Wise Minds at Work will offer a cost-efficient cybersecurity solution to for-profit and not-for-profit organizations in the Commonwealth. Also, it will enable students to develop essential work-ready soft skills and enhance their hard technical skills.

In conclusion, this type of hands-on learning opportunity through team internships provides a significant contribution to the development of Virginia's workforce. With a focus on cybersecurity, Wise Minds at Work aligns perfectly with the objective of the CCI to create a statewide ecosystem of innovation excellence in cyber-physical systems. This program can be part of a robust recruiting strategy for Virginia businesses with significant technology needs.

The Commonwealth Cyber Initiative Team can rest assured that UVA Wise's track record in technology internships will serve as a solid foundation for a successful, scalable pilot program for experiential learning.