UCCS Cybersecurity Programs

UNIVERSITY OF COLORADO
COLORADO SPRINGS

FUTURE FUNDING OF CYBERSECURITY 2024

WHAT IS SB18-086?

Passed in 2018 and renewed in 2021, the $5.1M annually from SB18-086 for 6 Colorado Higher Education Institutions and the National Cybersecurity Center supports cybersecurity workforce development and research.

SB18-086 has established Colorado as a national leader in cybersecurity by fostering an innovative higher education ecosystem that allows all Coloradans the opportunity to participate in the rapidly-expanding cybersecurity economy.

UCCS University of Colorado Colorado Springs

COLORADO STATE UNIVERSITY

COLORADO MESA UNIVERSITY

METROPOLITAN STATE UNIVERSITY OF DENVER

PIKES PEAK STATE COLLEGE

WESTERN COLORADO UNIVERSITY

NCC NATIONAL CYBERSECURITY CENTER

STUDENTS

Robert Drone at UCCS benefited from the articulation agreement between UCCS and PPSC, with the Cyber Programs Office providing structural support, skills, and resources for professional and personal development in cybersecurity. His involvement in various events, training, and competitions, and his presidency of the Mountain Lions Cyber Club, have equipped him with invaluable leadership and technical skills, enhancing his employment prospects in the cyber field.

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Ebisa Dundas acknowledged the Cyber Programs Office at UCCS for guiding her from choosing cybersecurity as a career, obtaining Security+ certification, to leading the Women in Cybersecurity (WiCyS) Chapter. Through these experiences, she acquired marketable technical, leadership, communication, writing, and management skills, enabling personal and professional growth. The office's resources and programs have been indispensable to her development.

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Katrina Rosemond, a Ph.D. student at UCCS, emphasized the unique support from the Cyber Programs Office not available at other universities. This office facilitated her hands-on experience in cyber competitions, acquisition of technical certifications, leadership role in WiCyS Club, and understanding of the cyber professional role, collectively contributing to a well-rounded and invaluable cybersecurity education that has shaped her leadership capabilities.

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Madison Schuster, a UCCS graduate now working at Stephenson Stellar, engages in cybersecurity research, focusing on AI/ML, 5G, and secure space solutions. The resources and guidance at UCCS helped her discover the synergy between cyber and space, secure a pivotal internship, and eventually mentor aspiring cybersecurity students, emphasizing the involvement of young women. Her journey exemplifies the comprehensive support and opportunities provided by UCCS.

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A woman transitioned from being a beautician during the pandemic's challenging times to a cybersecurity career, recently earning her master's in cybersecurity at MSU Denver. This significant career pivot was made possible through scholarship funding via SB18-086, allowing her to acquire the necessary education and credentials to enter the cybersecurity field successfully.

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A former hospitality trade manager at MSU, a young man, successfully transitioned away from his pandemic-affected sector to retrain in cybersecurity. He is now a highly successful Tier 3 SOC Analyst at a multinational company, showcasing the transformative power of retraining and the promising career opportunities available within the cybersecurity industry.

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A severely autistic and financially challenged CSU student could cover expenses, including heating bills, and publish a paper thanks to support from SB18-086. Now a lead employee at a prominent corporation and featured on their webpage, his journey demonstrates overcoming significant obstacles through education and support, leading to noteworthy professional recognition and stability.

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Many students at CSU whose internships were canceled due to the pandemic managed to secure research internships through SB18-086. This opportunity provided immediate alternatives during a challenging job market. It paved the way for these students to eventually land high-paying industry jobs, showcasing the impact of alternative career pathways and support during crises.

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A student at Western, recipient of significant cyber fund scholarships, completed a summer internship at the NSA while studying infosec. Post-graduation, he received five job offers, including three classified positions, highlighting the transformative and empowering impact of scholarships and internships offered to students in the cybersecurity field.

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Western's infosec program has seen its graduates successfully hired at prestigious companies like Raytheon and Lockheed Martin. This highlights the program's effectiveness in preparing students with the necessary skills and qualifications for high-profile cybersecurity positions in the industry, showcasing the direct pipeline from education to prominent employment opportunities.

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Colorado Mesa University's state funds provided students like Drake Cullen unparalleled opportunities, enabling access to a cyber center, scholarships, and certificate programs. These resources allowed Drake to earn vital certifications, negotiate a higher salary, lead clubs, pursue cybersecurity research, and eventually secure a position at Leidos and enroll in Georgia Tech's master's program. These opportunities had a significant impact on his career.

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In 2021, **PPSC Cyber Club's two teams** competed in the virtual Mountain West Cyber Challenge. Competing in a seven-hour round of Capture the Flag, one team placed first out of 19. Team members included Jon McNulty, Ethan Capehart, Jill Magiera, and Vlad Vitmaer.

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In 2023, **PPSC ranked 43rd in the National Cyber League competition**, with over 10,000 students from various institutions participating annually. This ranking reflects the students' ability to perform real-world cybersecurity tasks effectively and competitively.

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Kayla transitioned from driving school buses to studying cybersecurity at CSU Pueblo, thanks to SoC and NSF scholarships. These scholarships allowed her to leave her job, focus on academics, secure a cybersecurity internship, and maintain a solid GPA. Kayla aims to pursue an MS in A.I. and Cyber Security at the University of Arizona, CSU Pueblo's NSF partner.

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Raul Yimar Reyes saved money from fixing machinery to join CSU Pueblo's CIS-Cyber Security program. SoC scholarships allowed him to reduce work hours, focus on studies, and graduate top in CIS. Accepted for an MS in A.I.-Cyber Security at University of Arizona, he's now pursuing a Ph.D. Raul credits the scholarship with life-changing opportunities in cybersecurity.

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Luis Contreras, a CIS major and SOC Cyber scholarship recipient at CSU Pueblo, expressed gratitude for the funds that eased his financial burden, allowing him to concentrate on education, internships, and cybersecurity opportunities like the NCL competitions, enhancing his learning and career preparation in the cybersecurity field.

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Colorado state cyber funds at CSU Pueblo enabled students like Kailee Alvarado, Ryan Riker, and others to engage deeply in cybersecurity coursework and National Cyber League (NCL) competitions. With consistent top 10% national rankings for over eight years, the funding supports students' active participation and success in the field.

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FACULTY

Dr. Sanjay Rajopadhye at CSU received CSI funds to develop a hardware security course, obtaining a $75K grant from CableLabs for the CrySiC: Crypto Silicon Compilation project. This financial support directly facilitated the advancement of cybersecurity education and innovative project development at the institution.

Dr. Indrakshi Ray at CSU welcomed new organizations, including Army Research Laboratory, NewPush Technologies, CyberRisk Research, and Statnett, Norway, to the NSF IUCRC Center for Cybersecurity Analytics and Automation. The Center focuses on Energy, Transportation, IoT Security, and Consumer Security and Privacy, with additional funding from NIST for Smart Grids access control and authentication projects.

Dr. Marc Rubin, an Associate Professor at Western, utilized cyber fund scholarships to complete an MS in Cybersecurity from Georgia Tech online. Completed in August 2023, these scholarships supported his continued education and expertise development in the critical field of cybersecurity, enhancing both his professional development and contribution to the academic community.

Dan Olson of UCCS acknowledged Gretchen for securing two $7,500 grants for the College of Public Service at UCCS. These grants fund research on essential cybersecurity skills for criminal justice professionals, informing future curriculum development for the Criminal Justice major and emphasizing the importance of cybersecurity knowledge across various fields and disciplines.

Assistant Professor Keith Paarporn from UCCS received Cybersecurity State Initiative funds supporting his research on decision-making in cyber networks, also funding an undergraduate student's research. This initiative has contributed to the student's admission into a Ph.D. program and enhanced UCCS's competitiveness in cyber research, as demonstrated by projects like VICEROY.

Dr. James Van Scotter, Associate Professor at UCCS, utilized a CSI-funded grant for faculty development in cybersecurity and space-cyber topics. The funding supported professional development, certification training, and course development. It contributed to establishing a new graduate program in Space Cyber Enterprise Management, fostering expertise and educational advancement in space cyber enterprise management at UCCS.

Drs. Roberto Mejias and **Margie Massey** lead a 5-year, $2.5 million NSF-STEM-HSI grant (Project PUENTE) at CSU Pueblo, aiming to enroll underrepresented students, especially Hispanic/Latino, African American, and females, in I.T. and Cyber Security fields, enhancing diversity in STEM disciplines.

The NSF-STEM-HSI grant, combined with the SoC Cyber Security/Block Chain SB18-086 Fund, enabled CSU Pueblo to award over $110,000 in cybersecurity scholarships, benefiting a significant 40% of Hispanic/Latino and female students.

Dr. Mejias secured a $600K NSF-CISE-MSI grant for a collaborative project with the University of Arizona's esteemed A.I. Cyber Security program. This initiative focuses on developing A.I. and data analytic methods to address cybersecurity vulnerabilities, fostering cybersecurity professional development among underrepresented demographics at two Hispanic Serving Institutions.

Brie Escobedo noted the fruitful partnership between UCCS's Career Center and the Cyber Programs Office, jointly organizing events and initiatives that have benefitted hundreds of cybersecurity students. Through collaborative efforts, they've facilitated students' intentional connection to careers, exposure to employers, and transition into the workplace.

Bobbie Bastian of Adams 12 School District praised UCCS for its substantial contribution to K-12 cyber education. UCCS provided valuable input to Adams 12's Cybersecurity/Networking Pathway, supplied guest speakers, organized camps and conferences, and actively promoted cybersecurity education, playing an instrumental role in introducing and embedding cybersecurity knowledge in K-12 education in Adams County.

Mesa hosted a **GenCyber K-12 teachers camp** in the summer of 2021 with 13 attendees. Teachers received instruction on cybersecurity topics and engaged in hands-on activities like coding for Sphero robots and lock-picking. Each participant developed a lesson plan and received a Sphero robot to facilitate their cybersecurity teaching efforts in their respective classrooms.

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Internal faculty scholarships at Colorado Western for up-skilling, like a $15k grant for an online MS in Cybersecurity at GaTech, are available through an internal grant process for interested faculty members. This scholarship opportunity supports faculty in enhancing their skills and knowledge in the cybersecurity field, promoting professional development and expertise growth.

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State cyber funds significantly contribute to the salaries of cyber-adjacent faculty, helping to afford experienced and valuable staff members in the field. These funds play a crucial role in maintaining high-quality education by supporting the compensation of skilled and knowledgeable faculty in the cybersecurity domain.

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ORGANIZATIONS
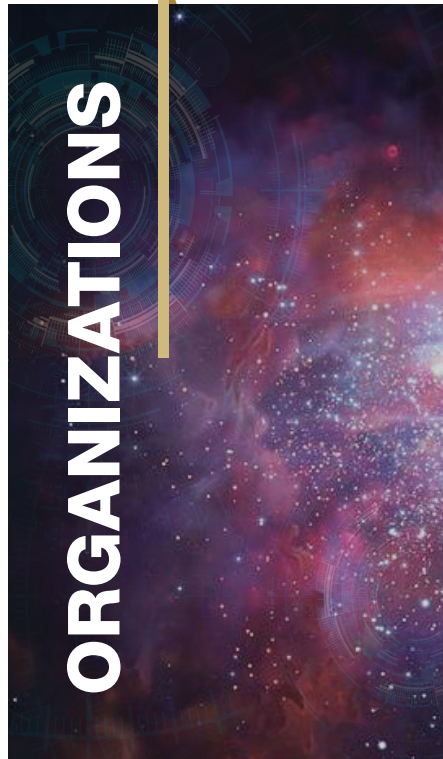
MSU Denver successfully engaged an SME to establish The Cybersecurity Center, incorporating a fully operational Cyber Range for hands-on learning and a client-facing Security Operations Center (SOC) serving a multinational company headquartered in Paris. This initiative has enhanced experiential learning opportunities and global corporate engagement for students.

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MSU Denver collaborated with TACT in a pioneering initiative training neurodiverse students as SOC analysts. This groundbreaking partnership, through which students work on Project PISCES, represents an innovative approach to cybersecurity education and workforce development, catering to the unique strengths and talents of neurodiverse individuals.

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Through a **partnership with ActivateWork**, MSU Denver provided crucial training for "Learners" in The Cyber Range, preparing them for apprenticeships

with Colorado-based companies. This strategic collaboration has facilitated a seamless transition for learners into the workforce, equipping them with the requisite skills and knowledge for success in their apprenticeships.

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An anonymous law enforcement employee trained at UCCS emphasized the integral role of technology in crime investigation, noting that increased technology awareness among officers could enhance evidence collection. Acknowledging that technology like surveillance cameras is ubiquitous, the employee suggested that improved technological literacy could significantly enhance the efficacy of law enforcement practices.

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An anonymous legal official trained at UCCS highlighted the invaluable contribution of having an investigator who comprehends the cyber world's mechanics. This knowledge is instrumental in navigating and understanding the increasingly digital legal landscape, improving the office's ability to handle cyber-related issues and cases effectively.

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CSU developed a comprehensive suite of 13 cybersecurity courses offered at undergraduate and graduate levels across various departments (Pueblo, Math, CS, SYSE). These courses significantly expand the university's cybersecurity education offerings, providing students with diverse and in-depth learning opportunities.

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Colorado Western's InfoSec Computer Science emphasis is undergoing the process for CAE-CD designation, having completed the PoS designation process and awaiting NSA approval. This prospective designation underscores the quality and relevance of Colorado Western's

cybersecurity education, aligning it with national standards and industry expectations.

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Since 2018, **MSU faculty have mentored D'Evelyn Jr. Sr. High's CyberPatriot program**, gaining recognition as Colorado's #1 public high school for four consecutive years. Featured on 9News, our efforts highlight the CyberPatriot national competition's impact, sponsored by Northup Grumman with a curriculum from the Air Force Association, contributing to the school's notable success and curriculum development.

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The National Security Agency and academic peers validated PPSC's Associate of Applied Science Cyber Security program through 2028, recognizing it as a National Center of Academic Excellence in Cyber Defense - Program of Study.

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Aleksandra Scalco, a PhD Systems Engineering student at CSU (2023), collaborates with Professor Steven Simske, contributing significantly to the critical infrastructure cybersecurity plan, DER MOSAICS/CyberSHIELD FY24-25, with Scalco leading as the Lead Systems Engineer for USINDOPACOM theater. Additionally, Scalco and Simske are contracted to author a cybersecurity book titled "Control System Cybersecurity Mitigation – A Systems Engineering Approach," furthering the dialogue and knowledge on imperative cybersecurity topics.

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CSU Pueblo proudly holds the NSA-CAE (National Security Agency-Center of Academic Excellence) designation, a prestigious recognition only given to less than 10% of U.S. colleges and universities, highlighting its commitment and excellence in the cybersecurity education field.

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CSU Pueblo's CyberWolves achieved a remarkable 7th place in the National Cyber League (NCL) Spring 2023 cyber games. State of Colorado Cyber SB18-086 funds supported many participants' registration fees, promoting inclusion by enabling over 30% of participants to be Hispanic/Latino and female students, thereby fostering diversity and inclusivity in national cybersecurity competitions.

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CSU Pueblo's NSF and SoC-backed NCL program has drawn over 60 CSU Pueblo students, plus 74 from Pueblo CC and 125 from Pikes Peak SC, engaging various students including those from Colorado Springs area middle and high schools in the National Cyber League cyber games, promoting widespread participation and interest in cybersecurity from a diverse student body.

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CSU Pueblo consistently hosts the Fall Southern Colorado Regional Cyber Security and I.T. Conference, uniting I.T. and Cyber Security professionals from industry, academia, and the Colorado National Guard's cyber sector for collaborative discussions and knowledge-sharing.

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CSU Pueblo Cyber Security program conducted over 20 Threat Vulnerability Asset (TVA) analysis field studies for Southern Colorado businesses and organizations, with student cyber teams identifying critical assets, cyber threats, current IT safeguards, and potential system and cyber vulnerabilities. These regular studies provide invaluable insights, helping organizations understand and mitigate their cyber risks effectively.

STATE

Through a partnership with NCC, **MSU Denver** brought Project PISCES to Colorado, benefiting state residents. The MSU Denver SOC - PISCES program serves various entities, impacting approximately 480,000 residents. This initiative underscores the university's commitment to providing crucial cybersecurity services to diverse sectors within the state, actively contributing to community safety and security.

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CSU offered cybercamps to K-12 students in Pueblo and Fort Collins, attracting attendees statewide. Although non-residential, these camps have inspired more students to consider cybersecurity as a viable and exciting career option, highlighting the importance of early exposure and education in the field to cultivate future cybersecurity professionals.

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UCCS's Blockframe Research Program, supported by $400,000 in legislative funding over five years, has fostered 320 organizational relationships and facilitated public/private partnerships with applications in various sectors. It

has generated significant in-kind support and additional funding for related research, providing valuable hands-on security job experience for 12 students demonstrating the program's far-reaching impact and success.

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Ryan Freuh from Booz Allen Hamilton emphasized the crucial role of industry-academic partnerships, like the one with UCCS, in developing the future cybersecurity workforce. With a growing demand for skilled cyber professionals, collaborations between industry and academia are vital for shaping and preparing students for successful careers in the rapidly evolving cybersecurity landscape.

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In the summer of 2021, **Colorado Western** hosted a GenCyber Camp with a faculty volunteer and a classroom of students from Gunnison Watershed schools, emphasizing engagement with rural communities. This event provided valuable cybersecurity education and experience to students in rural areas, supporting inclusive and accessible tech education initiatives.

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Colorado Western students actively participate in various cybersecurity competitions. Six students engaged in the Hackazon event, dozens took part in the NSA Codebreakers over time, and many continue to join online platforms like Hack the Box and HackerOne, demonstrating a broad and active participation in the cybersecurity community.

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Faculty from Colorado Western have volunteered as observers and referees in cybersecurity competitions. There's a hope that future state cyber funds could support establishing a cyber competition club at Western, as none currently exists, to organize and formalize student participation in these valuable learning and skill-building opportunities.

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MSU faculty received a two-year, $149,573.16 Hispanic Serving Institution (HSI) grant from the Department of Defense (DoD) and National Centers for Academic Excellence in Cybersecurity (NCAE-C) in October 2020. This grant, part of the MSU Denver Cybersecurity Educational Diversity Initiative (C.E.D.I.), aimed to improve cybersecurity curricula for underserved Colorado students, particularly in Alamosa Valley. The initiative successfully enhanced curricular offerings, leveraging resources from MSU Denver to support Trinidad State College - Alamosa Valley.

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PPSC received a $450,000 NSF Hispanic Serving Institution grant, collaborating with CSU Pueblo and Pueblo Community College to increase diversity in STEM and cybersecurity, to target underrepresented Hispanic/Latino students and females, and to raise awareness of career opportunities.

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In 2023, **PPSC** sponsored over 250 local high school students' National Cyber League (NCL) entry fees, supporting their participation in the competition and promoting engagement and development in cybersecurity education and practice.

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CSU Pueblo's Cyber Security program serves as a pipeline for students into the University of Arizona's rigorous AI-Cyber

Security Master's program. Notably, three out of the five CSU Pueblo students transitioning are Hispanic/Latino, with two currently pursuing Ph.D.s at the University of Arizona.

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CSU Pueblo received a third $100k NSF grant supplementing their current NSF-STEM-HSI grant to provide education about the cyber threats facing the U.S. semiconductor industry. This grant supports the CHIPS Act of 2022, aimed at training a well-prepared, diverse U.S. STEM workforce.

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The NSF-CISE-MSI project with the University of Arizona's AI Cyber Security program allows CSU Pueblo STEM and CIS undergraduates to take a 2-credit Independent Study in AI for Cyber Security and Data Analytics. The course, which has attracted many underrepresented students and females, is led by a guest lecturer who is a CSU Pueblo graduate and current University of Arizona doctoral student.

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On September 22, 2023, **CSU Fort Collins** hosted the largest AIAA Rocky Mountain Annual Tech Symposium in history. The event featured a panel on CyberSecure Aerospace Systems, engaging attendees with crucial discussions on securing aerospace systems in the ever-evolving technological landscape. For details, refer to the event's agenda on the AIAA-RM website.

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VETERANS

MSU Denver successfully leveraged matching funds from the private sector to offer crucial training for ISC2 certifications for veterans. This initiative highlights the university's dedication to supporting veterans in acquiring vital certifications, furthering their education, and enhancing their competitiveness in the cybersecurity job market.

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Levi Francis, a Computer Security student at UCCS, benefited from a cross-discipline in Cybersecurity Management, aiding in the launch of his cyber consulting business for small enterprises. With plans to hire interns from UCCS and high schools, he acknowledges UCCS's interdisciplinary cyber education and hands-on experience as pivotal in his career establishment and contribution to training future cyber experts.

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Haley Huschka, a dedicated UCCS Cybersecurity student, began her journey with determination and found invaluable guidance and mentorship through UCCS's resources, particularly from Mary Ann Tillman. Serving as Treasurer for the Women in Cybersecurity club and participating in networking, competitive events, and specialized study groups, she acknowledges UCCS's robust support system, emphasizing its role in fostering her development and preparedness for a cybersecurity career.

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Colorado Western is currently educating a veteran through its InfoSec emphasis program. The student, a former Combat Engineer in the US Air Force, served in Iraq, Kuwait, and North Africa, bringing valuable real-world experience to cybersecurity studies, underscoring the program's accessibility and appeal to individuals with diverse backgrounds and experiences.

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Veterans Ethan Muhs and Ryan Hilger, enrolled in CSU's Systems Engineering Department, received scholarships for cybersecurity research. Muhs, now Wellington, Colorado's City Clerk, implements city-wide cybersecurity. Hilger, promoted to US Navy Commander, significantly advanced in his career, demonstrating the scholarship's positive impact on career trajectories and contributions in cybersecurity and public service.

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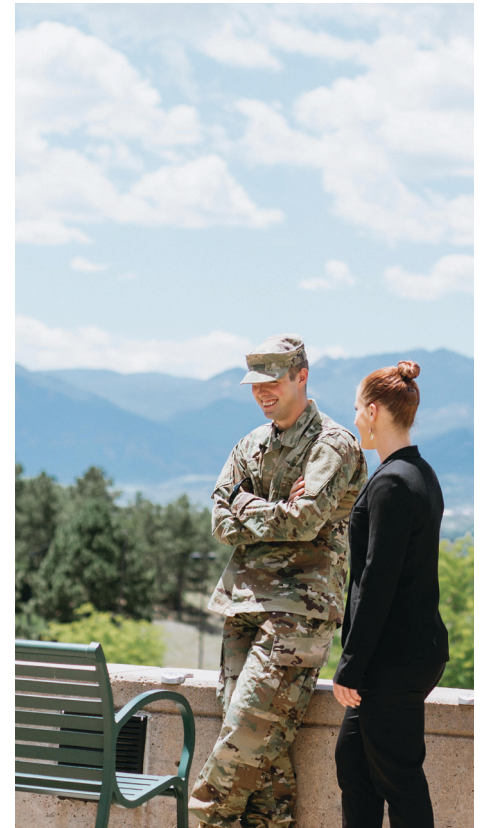
To learn more about the cybersecurity programs at UCCS, contact **Gretchen Bliss, Director of Cybersecurity Programs** at **gbliss@uccs.edu** or **719-351-4910**

About UCCS

University of Colorado Colorado Springs focuses on providing an academically excellent environment at a value to students across the United States, and more than 80 nations. The experience our students gain at UCCS provides an incredible service to our community of Colorado Springs and the greater southern Colorado region as a whole.

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