DAKOTA STATE UNIVERSITY

THE BEACOM COLLEGE OF COMPUTER & CYBER SCIENCES

2022 | A YEAR IN REVIEW

THE BEACOM COLLEGE OF COMPUTER & CYBER SCIENCES

ANNUAL
NEWSLETTER

YEAR IN REVIEW
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INSIDE

DAKOTA STATE
UNIVERSITY

GREETINGS FROM THE BEACOM COLLEGE OF COMPUTER AND CYBER SCIENCES

A Message from the Dean

2022 was an incredible year in The Beacom College.

Our college has been rising, with a record-setting 53% of all Dakota State students now enrolled in a Beacom College program. This growth is expected to continue due to the generous gift of Rising II, a new cyber-research funding initiative designed to expand enrollment and increase the number of Beacom graduates from roughly 200 to 400 in select degrees over the next five years.

We are also excited about the possibility of increased enrollment and workforce development opportunities that will be available through the recently launched Governor's Cyber Academy. This new, dual-credit program will provide cyber-education opportunities for high school students across the state.

The College's outstanding faculty is made up of individuals who have a track record of providing excellence in teaching, research, and service. Andrew Kramer '15, '17 is an example of this, having been named the 2022 winner of the Ernest M. Teagarden Award for Excellence in Teaching. Our college is filled with faculty like Andrew who bring out the best in our students, in the classroom, the research lab, or the competition arena.

Our students and faculty have been well represented at highly prestigious and globally recognized international conferences like Black Hat, DEF CON, and others. Our faculty also remain actively engaged and highly successful in research. This past summer we began working with international partners to form a new cyber + artificial intelligence consortium in collaboration with AI Sweden.

Competitions are another arena where our students really shine. Four of our students and alumni qualified for the newly created U.S. Cyber Team. The team was made up of students from all across the U.S., but we had the largest group. This competition is characterized as the Olympics of cyber, and the team competed in the first International Cyber Competition in Athens, Greece, where they placed third.

For Season II, we again have four students and alumni on the team and one on the pipeline team. And again, this is the largest contingent from any school in the U.S. They will compete in the second International Competition this summer in San Diego. This is incredible, but not unexpected, given the quality of students that enter our programs, and the caliber of faculty who teach, encourage, and mentor them to become the best they can be.

In 2023, we expect to continue to rise in The Beacom College of Computer & Cyber Sciences, as we learn, create, and do even more incredible things.

Thanks for all you do,

Pat Engebretson

Dr. Pat Engebretson, '01, '09
Dean, The Beacom College of Computer & Cyber Sciences

Student News

Gwen Vongkasemsiri (right) and Austen King are two of the DSU members of the U.S. Cyber Team Season II.

DSU is 'absolutely a great option'

To say that Gwen Vongkasemsiri is doing well at DSU would be a gross understatement. It has been a great fit for the Cyber Operations/Network and Security Administration double major, who said "that's why I chose DSU."

The freshman from Tennessee was voted the 2022 Homecoming queen, is a member of the volleyball team, and was named to the Season II U.S. Cyber team that will compete in the second annual International Cybersecurity Competition in July. She was on the U.S. Cyber pipeline team last year as a high school student.

Vongkasemsiri heard about DSU from Cyber Operations alumnus Austen King '22 when they met at a cyber competition called CyberStart. That was her first experience with cyber "and I got super hooked on it." She took second in the competition that summer (Austen got first). When she started looking at colleges, she narrowed her list down to programs with designations as Centers of Academic Excellence (CAE), and volleyball programs, because she wanted to stay active with that sport.

DSU fit both these categories and more. The University has three CAE designations and a volleyball program, plus it is affordable. She came and toured the campus, and really liked it, so she enrolled and started classes this fall.

Vongkasemsiri likes Madison, saying "the people here are really nice." At Dakota State she has found "there are so many opportunities to do whatever you want." Whether you want to start your own club or be a leader for activities, she said the professors are "super supportive."

The University may be a great fit for other prospective students, and she recommends they check it out. "DSU is absolutely a great option, with the amazing cyber program and majors."

20th Nanocon breaks attendance records

After starting as a trial event in 2004, Nanocon has become a growing and popular Dakota State tradition. Over 800 attended the 2022 Con this fall, and many Beacom College students attended the four-day event and/or volunteered to help.

One of those helping put on the game celebration was Games Club Events Coordinator Chad Compton, a sophomore Computer Game Design major from California. With 39 listed events, there was something for everyone, he said, something of "an amusement park of games." A new feature was the Madison Mystery Tournament, a takeoff of the Chicago game convention's "Frosty Faustings." Other games matched the theme "Into the Frozen Wasteland." About 16 vendors from around the state were at the Con, including a local microbrew start-up from Madison, the MadLads, that brought a keg of root beer.

Nanocon comes together through the efforts of Games Club members like Compton, with assistance from other clubs, including esports and the Computer Club. Games Club co-advisor Jason Jenkins, '08, '10 said this becomes a learning experience for the students, who gain skills in project management, teamwork, communication, website design and maintenance, social media marketing, budgeting, and fundraising.

The city of Madison also benefits from the participants who spend money at the city's retail businesses.

Because Nanocon is free, attendees represent many walks of life, including current students, faculty and staff, alumni, community members, and those who have no DSU affiliation. Area high school students also attend, making Nanocon something of a recruiting event.

Games of all types are celebrated at the annual Nanocon events.

Alumnus Logan Stratton, '19, '21 competed in the first ever ICC Competition, as a member of the U.S. Cyber Team.

Student teams excel at competitions

The Season I U.S. Cyber Team, which featured three Dakota State University Trojans, won third place in the first-ever International Cybersecurity Challenge (ICC). The two-day challenge, held in Athens, Greece, tested athletes in cyber categories, including forensics, cryptography, reverse engineering, and attack & defense. Seven teams competed in the challenge: U.S. Cyber Team, Europe, Asia, Canada, Africa, Oceania (Australia and New Zealand), LATAM (Latin America and South America).

The U.S. team was comprised of 20 athletes who represented the United States as the cyber-version of Olympic athletes. Three were from Dakota State University: alumni Logan Stratton, '19, '21 and Josh Klosterman, and senior Austen King. Stratton and Klosterman, '17, '18 competed as starters on the U.S. Team, while King traveled as a reserve player. Student Eric Leslie also qualified, but was unable to participate in the competition due to work conflicts.

The ICC is hosted by the ENISA (European Union Agency for Cybersecurity). Team Asia won second place overall and Team Europe was the overall champion. The U.S. Cyber Team is sponsored by Katzcy, a social impact company specializing in marketing strategy for tech and cybersecurity firms. This completed Season I of the competition; events for ICC Season II are in progress.

Stratton and King are on the Season II team, along with Shane Donahue, '22 and Gwendolyn Vongkasemsiri. Nathan Ord, '22 is on the pipeline team for Season II, which will compete in late summer in the ICC held in San Diego.

Logan Stratton, '19, '21 Austen King, and Josh Klosterman, '17, '18 were on the U.S. Cyber Team Season I.

The Dakota State University CCDC team

National Collegiate Cyber Defense Competition

The Dakota State University team placed second in the National Collegiate Cyber Defense Competition (NCCDC) in San Antonio, Texas in April 2022.

Faculty advisor Dr. Cody Welu, '14, '15, '19 said the team played hard through both days, and was very successful, taking home the second-place trophy.

"Success at competitions like this reflects very well on the university's program and validates DSU as one of the top cyber-security institutions in the country," Hince said.

Moving forward, "we want to build on our success and inspire the next generation of DSU students to compete so DSU can take home the first-place trophy someday," he stated.

The 2022 team members include:

» Shane Donahue, '22 Cyber Operations major, San Diego, Calif.

» Jackson Heiberger, '21, '22 Cyber Operations/Network Security & Administration double major, Beresford, S.D.

» Jake Hince, Computer Science M.S., Buffalo, Minn.

» Austen King, Cyber Operations, Volga, S.D.

» Annabelle Klosterman, Cyber Operations, Brandon, S.D.

» Cody Mayer, '22 Cyber Operations, Sheldon, Iowa

» Gaelin Shupe, Computer Science M.S., Boulder, Colo.

» Tyler Thomas, Cyber Operations, Forest Lake, Minn.

Women in Cyber Security

Three DSU students, Dana Donahue, Annabelle Klosterman, and Austen King, participated in both CTFs and took first place in the Carnegie Mellon CTF. The team of Janessa Palmieri and Alexis Kulm placed second in the Carnegie Mellon event.

"The conference really promoted the diversity of skills and especially gender. I think that is what our team had over the other teams - diversity in experiences and skills," Klosterman said.

Palmieri noted this advantage as well. Her teammate, Alexis Kulm, has a strong background in digital forensics, and she has experience in offensive security.

"We brought our diverse cyber skillsets to the table and solved the challenges from different perspectives."

Klosterman noted that the competition "helps give us more experience with different types of scenarios and problems we could encounter. We were able to develop our technical and problem-solving skills."

Dakota State students took top spots in capture-the-flag (CTF) competitions at the spring Women in Cyber Security (WiCyS) Conference. One CTF competition was sponsored by the Carnegie Mellon Software Engineering Institute, another by Google.
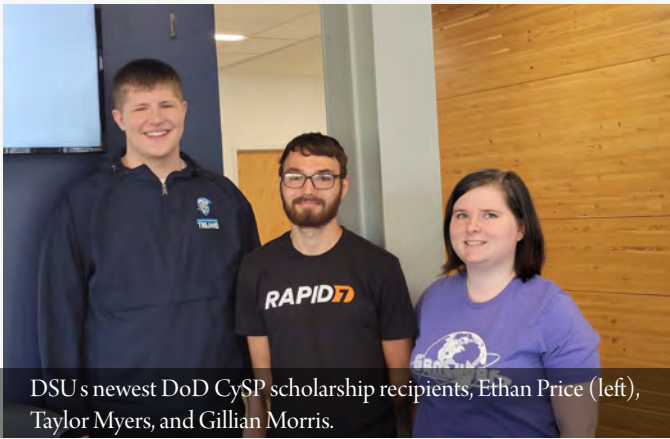
DSUs newest DoD CySP scholarship recipients, Ethan Price (left), Taylor Myers, and Gillian Morris.

Students awarded federal scholarships

Three Dakota State students are now part of the Department of Defense Cyber Scholarship Program (DoD CySP).

This scholarship-for-service program is an effort by the DoD to protect critical services by creating a knowledgeable and skilled DoD cyberspace workforce, individuals who will defend the country's network, information systems, and data.

The students receive paid tuition and fees, a computer and book allowance, internships, and a stipend ($27,000 for undergraduates, $33,000 for graduate students). A major advantage to this scholarship is that students receive a full-time job offer as civilian employees with a DoD Agency upon graduation.

"It's nice to have a job right out of college," said Morris, a Cyber Defense master's degree student from Estelline, S.D.

Nine students have been named to the Dakota State CyberCorps program for 2022-2023, including two graduate students, Max Davis, Cyber Defense master's degree student from Watertown, S.D. and Michael Fahnlander, a Cyber Defense master's degree student from Plymouth, Minn.

A national scholarship for service program through the National Security Agency (NSA), the CyberCorps program has grown steadily on campus since first being offered in 2010. With 25 active members on campus this year, and 122 students who have come through the program over the last 12 years, it is listed as the largest program in the nation.

Dr. Michael Ham, '10, '12, '17 Director of the DSU CyberCorps program, said DSU CyberCorps students have 100% placement in internships and full-time work with government agencies such as the NSA, U.S. Air Force, and national labs around the country.

"We're one of few schools with that good of a track record," said Ham. "The students are constantly pushing that bar, and that's encouraging to see."

CyberCorps was created under the Federal Cyber Service Training and Education Initiative, with the purpose of giving government agencies an advantage in recruiting and training cybersecurity professionals, closing the workforce shortage, and competing with similar positions in the private sector.

The program covers 100% of tuition and fees for the students, provides a stipend ($25,000 for undergraduates and $34,000 for graduate students), and $6,000 for professional development and books. The scholarship recipients also have paid summer internships and are guaranteed security jobs following graduation in federal, state, local or tribal government. Students may renew this scholarship for up to three years.

CyberCorps

Max Davis (back left), Daniel Eager '21; Isabelle Bakker (middle left), Abby Baker, Hannah Droge; Michael Fahnlander (front left), Tyler Thomas. Not pictured are Jackson Heiberger and Jacob Davie.

Faculty News

Beacom faculty attend, present at professional conferences

Last summer, DSU faculty hosted workshops in various locations, including St. Paul, Minn. and Las Vegas, Nevada. The workshops are offered in partnership with the NSA Centers for Academic Excellence Community. As part of the partnership, each workshop offered 120 university faculty from around the nation education-specific trainings to take back to their classrooms and enhance their already existing cybersecurity programs. Dr. Kyle Cronin '09, '11 is the program director.

Erik Pedersen presented at M+DEV Conference in Madison, Wisc. in November. The conference provided a gathering space for game developers in the state, region, and beyond.

Dr. Mark Spanier, Dr. Austin O'Brien, and Jason Mixon attended EAAI-23: The 13th Symposium on Education Advances in Artificial Intelligence and AAAI Conference of Artificial Intelligence in Washington, D.C. in February.

Research and published works include:

» Dr. Meikang Qiu and Michael MacFadden "Performance Impacts of JavaScript-Based Encryption of HTML5 Web Storage for Enhanced Privacy" 7th IEEE International Conference on Smart Cloud. Oct. 2022, virtual presentation

» Dr. Meikang Qiu and Xiangyu Gao "Energy-Based Learning for Polluted Outlier Detection in Backdoor" 7th IEEE International Conference on Smart Cloud. Oct. 2022 virtual presentation

» Dr. Yong Wang, Kai Taylor, Alexandra Smith, Adam Zimmel, Korina Alcantara "Medical Device Security and Assessment Case Studies" 8th National Workshop for REU Research in Networking and Systems, Denver, CO, Oct. 20-22, 2022

» Dr. Yong Wang, Srinivasulu Vuggumundi, '15, '18, '22 Jun Liu, Cherie Noteboom, and Kaushik Ragothaman "A False Sense of Security-Organizations Need a Paradigm Shift on Protecting Themselves against APTs." International Journal of Contemporary Research and Reviews, July 12, 2022

» Dr. Michael Ham, '10, '12, '17 Dr. Kyle Cronin, '09, '11 and Dr. Tom Halverson "Electronic Cyber Badge: An Experiential Teaching Platform for Cybersecurity Concepts." EDSIG Conference on Computing Education (EDSIGCON 2022)

» Dr. Michael Ham and Dr. Kyle Cronin "Teaching Routing Concepts: The Internet of Strings." EDSIG Conference on Computing Education (EDSIGCON 2022)

» Dr. Cody Welu and Kyle Korman "A Reproducible Applied Threat Hunting and Incident Response Lab Environment." EDSIG Conference on Computing Education (EDSIGCON 2022)

$90M cyber-research initiative in the works

Work on the next "big thing" in South Dakota has begun.

Governor Kristi Noem signed SB 54 and SB 130 into law on March 24, 2022, paving the way for a transformative cyber-research initiative in the state through program expansion at DSU (SB 54), and the building of an applied research lab (ARL) in Sioux Falls (SB130), which is an expansion of the similar facility in Madison.

"Now we have the opportunity to do something quite extraordinary," said President José-Marie Griffiths, "something that will establish the cyber-research industry in South Dakota."

In addition to the details authorized in the two legislative bills, the Sioux Falls City Council passed an ordinance on March 15, providing $10 million in support for the applied research lab in Sioux Falls; Forward Sioux Falls group has also committed $250,000.

These entities represent a unique blend of public-private partners who are investing in and committed to this vision, Griffiths said, which gives this project great strength to accomplish great things.

One benefit of this new industry is addressing issues with the state's "brain drain," a definite trend seen with Dakota State's cyber graduates. Around 200 students graduate from Dakota State's Beacom College of Computer and Cyber Sciences each year, with degrees in Computer Science, Cyber Operations, and Network and Security Administration. About 30% of students, particularly those with Cyber Operations degrees, must go to the east or west coasts to find work in their highly specialized, technical fields. By expanding the cyber research workforce opportunities, more graduates could stay in the state.

This cyber-research hub will also create long-term economic development benefits for the Midwest because the unique expertise located here will attract other businesses or entrepreneurs with innovative business ideas in cyber security, cyber health, cyber ag, or cyber manufacturing.

"It has been relatively easy to dream and come up with this plan, but now the real work begins," Griffiths said, including hiring additional faculty and staff for the program expansion in Madison, and planning and design work for the Sioux Falls ARL, which could open as soon as Fall 2024.

DSU on the cutting-edge of Edge Learning

Students participating in the Edge Learning Lab this summer include Jason Mixon (back left), Nikolaos Kakouros, Charles Novak '21; Madeleine Englund, and Viktor Valadi.

"Cutting-edge" is a term often used to describe Dakota State.

Through a new consortium with AI Sweden, Dakota State is now on the cutting edge with a new area of Artificial Intelligence (AI) called edge learning.

Edge devices include smart watches, self-driving cars, or home appliances that connect to the internet. They create huge datasets which can pose collection, storage, and processing challenges. Edge learning will address some of these issues by keeping data at or near the source device, "on the edge," instead of sending it back to a central processor.

As part of a pilot program, five graduate students worked on these issues this summer, three students from Sweden and two from Dakota State. They have been working on an edge learning concept called Federated Learning, which eliminates the need to transfer data by training individual components called edge nodes.

"Federated learning is a method to use information from separate devices to build an AI model," explained Dr. Austin O'Brien, one of the DSU faculty mentors. "With that, the project tries to see how to approach it from a security angle, how can we detect when people may be trying to disrupt the model."

Faculty mentor Dr. Mark Spanier explained that while these projects are theoretical in nature, "they have the potential to have applications in various other sectors."

Along with learning about technology, there is also cultural learning taking place. DSU doctoral student Jason Mixon and master's student Charles Novak '21 spent June in Gothenburg, Sweden.

"We had a blast, and met a lot of great people," Mixon said. "They have a great facility at AI Sweden, and there is a ton of history and things to do in Gothenburg." The three Swedish students spent July in Madison and appreciated seeing life in small-town America.

The professional collaboration has also been very good for all involved. Nikolas Kakouros, originally from Athens, Greece, said research often includes speaking at conferences, "so it's good to be part of an international group where you can learn to communicate and express yourself." Groups like this all start with a concept, but you shouldn't feel like you are being ignored or dismissed. Instead, they should define the goals clearly and work as a team, said Kakouros.

The team's efforts will also have value for their graduate projects. Novak values the new, real-world industry tools he has learned, such as the automation tool (Ansible) that Kakourous taught him. Mixon said he will definitely take things from this experience and apply it to other research. "It's been a great learning experience."

O'Brien said the group plans to publish an article on this summer's work, and work will continue with AI Sweden in the future.

"This is the first step. We want to cement this and make this exchange ongoing and get more students involved."

Awards & Recognitions

Erin Kahler

Dr. Pat Engebretson

Award-winning staff

Members of the administrative staff of The Beacom College have been recognized for their efforts this year. In August, Erin Kahler was named the 2022 CSA Outstanding Contributor, one of the True Trojan awards the University presents to employees nominated for their hard work, dedication, and commitment to the mission of DSU. A nomination letter noted Kahler continually has new ideas to streamline processes. "I do not have enough words for the quality and quantity of work that she takes care of."

Dr. Pat Engebretson '01, '09, Dean of The Beacom College, was nominated for "Boss of the Year" with the Greater Madison Area Chamber of Commerce this fall. This was one of seven new awards instituted by the organization.

Alumni & Philanthropy

Shlanta's impact included DSU

Mark Shlanta played a big role as SDN Communication's CEO. He also played a big role with programs at Dakota State, and those efforts created a philanthropic impact for Dakota State. Shlanta died from cancer in February 2022.

SDN is a broadband service provider that also provides managed cybersecurity products. They and the University have similar goals with technology, so throughout his career, Shlanta directed the company to partner with Dakota State on projects such as expanding 5G in the Madison area. SDN also collaborated on several programs in the Madison Cyber Labs, a partnership he said would support SDN's internal cybersecurity efforts, and those of their customers.

Shlanta also kept workforce development as a priority. He felt that supporting MadLabs® would bring talent into the state, or back to South Dakota. SDN also funded GenCyber Girls camps and provided apprenticeships and employment for Dakota State graduates.

DSU reciprocated with support of SDN's events, participating in and providing speakers for the annual Cybersecurity Conference in Sioux Falls, for which SDN was a lead sponsor. Shlanta also came to campus to serve as a witness in Senate Commerce, Science, and Transportation Committee field hearings hosted by Senator John Thune.

Department & Program Updates

DakotaCon may have new life! Look for more information March 24-26.

STAY TUNED
COMING SOON

Majors/Programs

Bachelor

Artificial Intelligence (BS)
Computer Game Design (BS)
Computer Science (BS)
Artificial Intelligence/Machine Learning (BS)
Software Engineering (BS)
Cyber Operations (BS)
Network and Security Administration (BS)

Associate

Network and Security Administration (AS)
Software Development (AS)

Certificate

Creative Coding Certificate
Cybersecurity Certificate
High-Performance and Research Computing Certificate
Network and Telecommunications Administration Certificate
Network Services Certificate
Object Oriented Programming Certificate
Software Development Certificate

Doctoral

Doctor of Philosophy in Cyber Defense (PhDCD)
Doctor of Philosophy in Cyber Operations (PhDCO)
Doctor of Philosophy in Computer Science (PhDCS)

Master

Master of Science in Computer Science (MSCS)
Master of Science in Cyber Defense (MSCD)

Graduate Certificates

Banking Security Graduate Certificate
Cyber Security Graduate Certificate
Data Privacy Graduate Certificate
Ethical Hacking Graduate Certificate

Minors

Artificial Intelligence & Machine Learning Minor
Computer Forensics Minor
Computer Science Minor
Cyber Operations Minor
High-Performance Computing Minor
Mobile Application Development Minor
Network Security Administration Minor

By the Numbers

1285
total enrollment

Students of this college make up 53% of the whole university

54 SD counties
26 countries
48 states

168
student athletes in 13 sports

AVERAGE ACT SCORE
24.89

PLACEMENT RATE
98%
undergraduate students
100%
graduate students

27/7
faculty/adjuncts
3
Staff
23 + 7
grad assistants
student employees

$8.9M
in FY22 for research expenditures from sponsored grants and contracts

Accreditation Information

Dakota State University is accredited by the Higher Learning Commission (HLC).

DSU's undergraduate and graduate Cyber programs are accredited by the National Security Agency (NSA). NSA leads the U.S. Government in cryptology that encompasses signals intelligence (SIGINT) insights and cybersecurity products and services and enables computer network operations to gain a decisive advantage for the nation and our allies.

DSU is designated as the Center of Academic Excellence in Cyber Operations (CAE-CO), Center of Academic Excellence in Research (CAE-R), and Center of Excellence in Cyber Defense (CAE-CD). Universities designated as National Centers of Academic Excellence are eligible to apply for scholarships and grants through the Federal and Department of Defense Information Assurance Scholarship Programs.

The Beacom College of Computer and Cyber Sciences
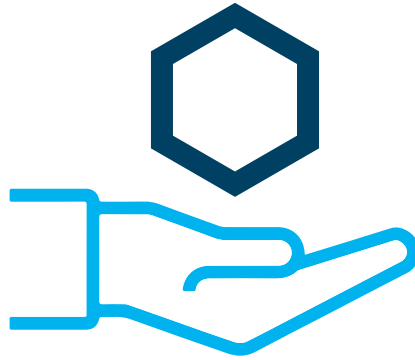820 North Washington Avenue - The Beacom Institute of Technology
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Every gift helps our work continue to rise.

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