



# Master of Science in Computer Science Self-study Report

December 2023

The Beacom College of Computer and Cyber Sciences

## Table of Contents

Part 1: Institutional History.....	1
1.1 Heritage: 1881 to 1982.....	1
1.2 Mission Change: 1983 to 1984.....	1
1.2.1 Mission Statement by South Dakota Codified Law §13-59-2.2.....	2
1.2.2 Mission Statement by South Dakota Board of Regents, Policy 1:10:5.....	2
1.2.3 DSU Institution Mission, Vision, & Values.....	2
1.2.4 Strategic Plan DSU ADVANCE 2027.....	3
1.3 DSU Initiatives.....	4
1.3.1 DSU Rising Initiative.....	4
1.3.2 DSU Rising II.....	4
1.4 University Student Demographics.....	5
1.5 Computing Environment Changes.....	5
1.6 Accreditation History.....	5
1.7 College Mission – The Beacom College of Computer and Cyber Sciences.....	5
Part 2: Trends in the Discipline.....	6
2.1 Alignment of MSCS with Industry Trends.....	6
2.2 Alignment of MSCS with Computer Science Curriculum 2023.....	6
Part 3: Academic Programs and Curriculum.....	8
3.1 Mission Statement for the MSCS Program.....	8
3.2 Academic Degrees Offered within the MSCS Program.....	8
3.3 Admission Requirements.....	9
3.4 Graduation Requirements.....	10
3.5 Curricular Options within the MSCS Program.....	10
3.5.1 Program Curriculum.....	10
3.5.2 Plan of Study.....	11
3.6 Curriculum Management.....	11
3.6.1 Program Constituencies.....	11
3.6.2 Course Grades.....	12
3.6.3 Transfer Credits.....	13
3.6.4 Advising.....	13
3.6.5 Hiatus Status.....	14
3.6.6 Suspension.....	14
3.7 Program Modification.....	15
Part 4: Program Enrollments and Student Placement.....	15
4.1 MSCS Program Enrollments.....	15
4.7 Student Placements.....	16
Part 5: Faculty Credentials.....	17
5.1 Program Faculty.....	17
5.2 Faculty Workload.....	18
5.3 Faculty Development.....	18
5.3.1 The Center for Teaching and Learning.....	18
5.3.2 Funding for Faculty Research and Travel.....	19
5.3.3 Faculty Sabbaticals.....	19

Part 6: Academic and Financial Support.....	20
6.1 Beacom College of Computer and Cyber Sciences .....	20
6.2 Graduate Programs and Research Support Services .....	20
6.3 Library Resources and Services.....	21
6.4 Online@DSU Support Services.....	22
6.5 Information Technology Services .....	23
6.6 Administrative Support .....	23
6.7 Financial Support for Students.....	24
Part 7: Facilities and Equipment.....	24
7.1 Information Assurance Lab.....	24
7.2 MadLabs® .....	25
7.3 MadLabs Research Environment and Network .....	27
Part 8: Assessment and Strategic Plans.....	27
8.1 MSCS Assessment .....	27
8.2 Strategic Plan .....	28
APPENDIX A: Faculty Resumes.....	30
Andrew Kramer .....	30
Austin F. O'Brien .....	31
Jason Mixon.....	33
Jihene Kaabi.....	35
John D Hastings .....	37
Mark Spanier.....	39
Michael J. Ham .....	41
Stephen Krebsbach.....	43
Tom Halverson.....	45
Yong Wang.....	47

## LIST OF TABLES

Table 1. MSCS: Competency Areas and Knowledge Areas .....	8
Table 2. MSCS vs. Knowledge Areas .....	8
Table 3. MSCS Program Curriculum (R: Required, E: Elective, SE: Selected Elective).....	11
Table 4. An Example Plan of Study .....	11
Table 5. Graduate Letter Grades Used at DSU and The Beacom College.....	12
Table 6. MSCS Enrollment and Graduation Numbers 2013 to 2022 .....	16
Table 7. Program Faculty (AST: Assistant Professor, ASC: Associate Professor, P: Professor) ..	18
Table 8. The Beacom College Administration and Support Staff.....	20
Table 9. The Office of Graduate Studies Administration and Support Staff .....	21
Table 10. Research and Economic Development Administration and Support Staff .....	21
Table 11. Karl E. Mundt Library Administration and Support Staff.....	22
Table 12. Online@DSU Administration and Support Staff.....	23
Table 13. Information Technology Services Administration and Staff.....	23
Table 14. Administrative Support .....	24
Table 15. Financial Aid Administrator and Support Staff.....	24
Table 16. MSCS Program Learning Outcomes.....	27
Table 17. MSCS Course Mapping to PLOs .....	28
Table 18. Strategic Plan Foundational Goals and the MSCS Program.....	28
Table 19. DSU Strategic Plan Pillars and the MSCS.....	29

## LIST OF FIGURES

Figure 1. MSCS Sunflower Model of Core Topics and Knowledge Areas .....	7
Figure 2. Total Enrollment and Number of Graduates by Year Since 2013 .....	16
Figure 3. Madison Cyber Labs.....	26

## **Part 1: Institutional History**

### **1.1 Heritage: 1881 to 1982**

Dakota State University (DSU) was established in 1881 as the first teacher education institution in Dakota Territory. Teacher education remained the primary mission of the institution through the 1950s. However, in response to the changing needs of South Dakota in the 1960s, the university began to expand its role to include degree programs in liberal arts and business. In 1980, South Dakota welcomed a major new industry into the state: the banking and credit card industry. The success and growth of this new industry, as well as the success of other information oriented, computer-based industries in the state, prompted the state's leadership to carefully examine the degree programs offered at the public institutions of higher education within the state.

Throughout its 143 years, Dakota State University has had a proud heritage of preparing graduates to meet the needs of a changing society. Since 1881, the university has provided challenging academic programs in one of the best educational environments in the state. The continuation of this tradition of service is of prime importance to the faculty, students, staff, and administration of DSU.

### **1.2 Mission Change: 1983 to 1984**

In 1984, the Legislature of the State of South Dakota (South Dakota Codified Law §13-59-2.2) assigned Dakota State University the role and mission of developing technology-based degree programs in information systems, business, teacher education, and allied health care services at both the undergraduate and graduate levels. The Legislature provided \$2.6 million in additional operating funds to support a three-year mission change at DSU.

During the initial phase of the transition, the academic programs of the institution were reviewed. Degree programs were phased out if they were duplicated at the other five regental institutions or if graduates would enter an over-supplied marketplace. The South Dakota Board of Regents (SDBOR) approved new information systems programs, computer equipment, and facilities for DSU. During the transition, special attention was given to ensure that all students in programs slated for phase out received a full opportunity to complete those programs. To ensure the continuation of education quality, when the number of students continuing in a program became exceedingly small, a special faculty mentoring program was developed.

The second phase of the transition began in August 1984, with the development of degree programs that integrated computers and information technologies into traditional academic subjects and added coursework specific to the computer and information systems areas. The University hired new faculty and retrained existing faculty.

Realizing that the innovative programs being developed at DSU were expensive, private industry and state government provided the University with additional financial resources. Consultants from state agencies and from national corporations also provided assistance and guidance that contributed greatly to the success of the mission change.

### ***1.2.1 Mission Statement by South Dakota Codified Law §13-59-2.2***

The primary purpose of Dakota State University in Madison is to provide instruction in computer management, computer information systems, electronic data processing, and other related undergraduate and graduate programs. The secondary purpose is to offer two-year, one-year and short courses for application and operator training in the areas authorized by this section.

This authorization includes the preparation of elementary and secondary teachers with emphasis in computer and information processing.

Except for degree programs in existence during the 1983-84 academic year, the unique baccalaureate programs authorized for Dakota State University shall not be duplicated by the Board of Regents.

### ***1.2.2 Mission Statement by South Dakota Board of Regents, Policy 1:10:5***

DSU is a special focus STEM university with an emphasis in computing information technologies and cybersecurity. The South Dakota Board of Regents regards the special focus universities of South Dakota as valuable contributors to the state's system of higher education. Special focus universities have a high concentration of degrees in a single field or set of related fields. Special focus universities offer master's and doctoral programs within their special focus area.

Universities operating within this sector are nationally recognized to promote research activities of their faculty, staff, and students. Dakota State University's research is propelling the workforce, economy, and student experience. The Board of Regents recognizes that special focus universities have unique characteristics and are critical to the success of the South Dakota system of higher education.

Students who attend Dakota State University pursue highly technical degrees with a broad focus in current and emerging computing and information technologies/cyber security that emphasize innovation, leadership, application, and research. DSU has the authority to credential certificates, associate degrees, baccalaureate degrees, master's degrees and doctoral degrees provided formal approval by the Board of Regents. The Board of Regents may authorize academic programs outside of the statutory mission as identified by the Regents due to workforce needs, strategic needs of the state, or other factors.

### ***1.2.3 DSU Institution Mission, Vision, & Values***

**Mission.** DSU's mission is to prepare cyber-savvy graduates who are lifelong learners, problem solvers, innovators, and leaders to live lives of positive purpose and consequence.

**Vision.** Innovative, entrepreneurial, and resilient since 1881, DSU will continue to rise through short - and long-term success of our students and graduates, increased strength in applied research and athletics, and deep engagement with our stakeholders, in an environment infused with quality improvement.

**Values.** DSU adheres to the following values:

- Distinguished and effective teaching
- Integrity
- Clear communication
- Innovation
- Inclusion
- Quality

#### ***1.2.4 Strategic Plan DSU ADVANCE 2027***

Dakota State University's strategic plan begins with its mission, vision, and values that create a framework for University strategic goals. The strategic plan is built on the University's strengths and focuses attention and commitment on the most pressing issues DSU is distinctively positioned to address while seeking to advance student success through highly engaged, high-impact educational practices.

The current Strategic Plan *DSU ADVANCE 2027*<sup>1</sup> began in 2022 and will continue to evolve through 2027 and beyond. The Strategic Plan outlines a path to more direct scholarship, research, intellectual property, and economic development through solutions to all varieties of cyber threats to computing and information devices, networks, and their users. Both foundational goals and the five Pillars further frame actions, resources, and measures.

Foundational goals support strategic goal success:

- Ensure Financial Stability
- Strengthen Regional and National Relevance
- Enhance Ability to Recruit and Retain Talent
- Increase Student Enrollment
- Enhance Student Success
- Maintain Higher Learning Commission Accreditation
- Ensure Responsible Stewardship of State Resources
- Strengthen Risk Management Process

Five Pillars frame the focus of strategic goals and milestones (benchmarks):

- Pillar 1: Increase Student Success
- Pillar 2: Improve Engagement, Governance, & Communication
- Pillar 3: Grow Scholarship, Research, Intellectual Property, & Economic Development
- Pillar 4: Elevate Athletics
- Pillar 5: Increase Sustainability & Resilience

---

<sup>1</sup> [DSU ADVANCE Strategic Plan 2022-27](#)



Mission and strategic plan alignment gave DSU its first graduate degree programs when authority was received from the South Dakota Board of Regents to offer a Master of Science in Information Systems (1998). A year later, the Master of Science in Educational Technology was offered on campus (1999). In 2004, DSU received authorization for its first doctoral program, offered in Information Systems. DSU now offers four doctoral degrees, seven master's degrees, and ten graduate certificates. As the institution endeavors to articulate its mission in the fullest way, degree programs are scrutinized each year to ensure they remain on the forefront relative to technology to enhance and support instruction and address work force demands.

DSU currently holds three prestigious designations from the National Security Agency (NSA) and the Department of Homeland Security (DHS) as National Centers of Academic Excellence (CAE) in Cyber Defense, Research, and Cyber Operations. DSU received its first CAE distinction in Information Assurance Education in 2004, one of 50 programs recognized. DSU was named as a National Center of Academic Excellence in Cyber Operations (CAE-CO) in 2012, one of the first four schools to receive the CAE-CO designation for the 2012-2013 academic year. As of December 2023, there are currently 436 institutions with a designation, including CAE-CD, CAE-R, and CAE-CO, from the National Security Agency<sup>2</sup>. There are only 20 institutions which receive CAE-CO designations. DSU is one of only ten universities in the U.S. that holds all three National Security Agency Center for Academic Excellence in Cybersecurity Designations in Cyber Operations, Cyber Defense, and Cyber Research (CAE-CO, CAE-CD, and CAE-R).

### **1.3 DSU Initiatives**

#### ***1.3.1 DSU Rising Initiative***

In 2017, Dakota State University began a transformational five-year capital investment initiative called DSU Rising. The initiative was the result of a \$30 million donation from philanthropists Miles and Lisa Beacom and Denny T. Sanford. The donation allowed for the construction of an \$18 million, 40,000 square foot research and development building for the Madison Cyber Labs (MadLabs). The funds also provided for additional scholarships, new program development, hiring of more faculty and staff, and support the university's intent to bring 5G network capabilities to Madison, the region, state, and eventually the nation.

#### ***1.3.2 DSU Rising II***

The DSU Rising II project (2022) created a funding consortium to provide \$90 million to fund new components to the cyber research and education environment: a 100,000 square foot facility to house the expanded DSU Applied Research Lab (ARL) in Sioux Falls, S.D., the support required to double the DSU cyber graduates, authority to expand DSU ARL Management and Security, to expand merit based student scholarships in cyber education, and to launch the Governor's Cyber Academy (a statewide K-12 cyber education program).

---

<sup>2</sup> [CAE Institution Map](#)

## **1.4 University Student Demographics**

The total headcount for Fall 2023 was 3,509, an 8.3% increase from 3,241 in Fall 2022. The number of graduate students for Fall 2023 was 558, an increase of over 15% from Fall 2022. Section 4.2 contains additional demographic information that contains a breakdown of students by gender and ethnicity for the BSCS program, The Beacom College, and the University.

## **1.5 Computing Environment Changes**

Students at DSU enjoy unique access to technology. In 2005, all students were provided fully functional portable computers (tablets) that included digital inking capabilities and voice-to-text translation. Currently, DSU provides students with the latest Lenovo ThinkPad X1 Yoga, a 2-in-1 Laptop configured specifically for DSU academic programs.

For degree programs emphasizing information assurance, security issues, and digital design, additional lab facilities featuring computers with high end functionality have been added to the campus technology infrastructure.

## **1.6 Accreditation History**

Dakota State University is accredited by the Higher Learning Commission (HLC), founded in 1895, and is one of several institutional accreditors in the United States. HLC accreditation indicates that DSU has the standards, processes, and assurance that it delivers quality educational experiences. DSU must meet 18 core components within the five HLC Criteria for Accreditation.

The University completes periodic reviews for reaffirmation of accreditation through HLC's Open Pathway, a ten-year cycle with an assurance review in year four and a comprehensive evaluation in year ten. The Open Pathway also includes an improvement component, the Quality Initiative, between years four and ten, that provides DSU the opportunity to pursue improvement projects that meet institutional needs.

The institution's most recent comprehensive visit, in October 2018, resulted in a positive review without any requirement for monitoring reports. In October 2022, DSU also met all 18 core components during its mid-cycle assurance review.

## **1.7 College Mission – The Beacom College of Computer and Cyber Sciences**

The mission of The Beacom College of Computer and Cyber Sciences is to educate and prepare students to be lifelong learners and professionals in Computer and Cyber Sciences. We seek to challenge students to develop skills in computer and cyber sciences, to think logically, and to make sound decisions through our five major academic programs: Artificial Intelligence, Computer Game Design, Computer Science, Cyber Operations, and Network and Security Administration.

Aligned with its mission, The Beacom College offers Ph.D.'s in Cyber Operations, Cyber Defense, and Computer Science; master's degrees in Computer Science and Cyber Defense; and baccalaureate degrees in Artificial Intelligence, Computer Game Design, Computer Science,

Cyber Operations and Network and Security Administration. Also, the college offers an Associate of Science degree in Network and Security Administration and Software Development which articulates with the related four-year degree.

In addition to course work in the academic setting, The Beacom College provides opportunities for students to learn through work and consulting experience. Internships and supervised professional practices are available in most programs.

## **Part 2: Trends in the Discipline**

### **2.1 Alignment of MSCS with Industry Trends**

The median annual salary for computer scientists with a master's degree, as reported by the US Bureau of Labor Statistics (BLS), is \$136,620, equivalent to \$65.69 per hour. The lowest 10 percent earned less than \$78,190, while the highest 10 percent earned more than \$232,010. Additionally, there is a projected job growth of 23 percent for Computer and Information Research Scientists between 2022 and 2032<sup>3</sup>, significantly outpacing the average growth rate for all occupations (0.3 percent annually).

Moreover, cybersecurity roles offer salaries that surpass the average. Information security analysts holding bachelor's degrees and above received a median annual salary of \$112,000, translating to \$53.85 per hour. The lowest 10 percent earned less than \$66,010, while the highest 10 percent earned more than \$174,540<sup>4</sup>. The projected job growth for information security analysts is anticipated to be 32 percent between 2022 and 2032<sup>5</sup>.

There is currently no salary data available for AI engineers from the US BLS. However, Glassdoor reports the estimated total pay for an AI Engineer as \$154,104 per year in the United States area, ranging from \$124,000 to \$193,000<sup>6</sup>.

Our graduates from the MSCS program are suitable for computer scientists, information security analysts, and AI engineers. The MSCS program aligns with industry trends as projected by the US BLS between 2022 and 2032.

### **2.2 Alignment of MSCS with Computer Science Curriculum 2023**

The Joint Task Force on Computing Curricula, comprising the Association for Computing Machinery (ACM), IEEE-Computer Society (IEEE-CS), and the Association for the Advancement of Artificial Intelligence (AAAI), revises computer science curriculum guidelines for colleges and universities approximately every ten years. A beta version of the Computer Science Curricular Guidelines was released in March 2023 (The Joint Task Force on Computing Curricula Association for Computing Machinery (ACM) IEEE-Computer Society (IEEE-CS)

---

<sup>3</sup> [Occupational Outlook Handbook, Computer, and Information Research Scientists](#)

<sup>4</sup> [Occupational Outlook Handbook, Information Security Analysts](#)

<sup>5</sup> [Employment Projections: 2022-2032 Summary](#)

<sup>6</sup> [Glassdoor - AI Engineer Salaries](#)

Association for Advancement of Artificial Intelligence (AAAI), 2023). The 2023 guidelines identified 17 knowledge areas, which are further divided into four competency areas: software, systems, applications, and theoretical foundation (0). These guidelines play a crucial role in maintaining the relevance of computer science education, aligning it with industry needs, and ensuring consistency across institutions.

The MSCS program at DSU is aligned with the 2023 guidelines. 0 illustrates a sunflower model depicting core topics and knowledge areas within the MSCS program. The MSCS core encompasses the design and analysis of computer algorithms, data structures, theory of computation, machine learning fundamentals, and cyber problems. It is a requirement for every graduate student in the MSCS program.

The MSCS program offers two specializations (knowledge areas): Artificial Intelligence and Cyber Operations. Cyber Operations is a highly focused area within Security (SEC). In Artificial Intelligence, the core topics include mathematical foundations and artificial intelligence. For Cyber Operations, the core topics encompass network security and software exploitation.

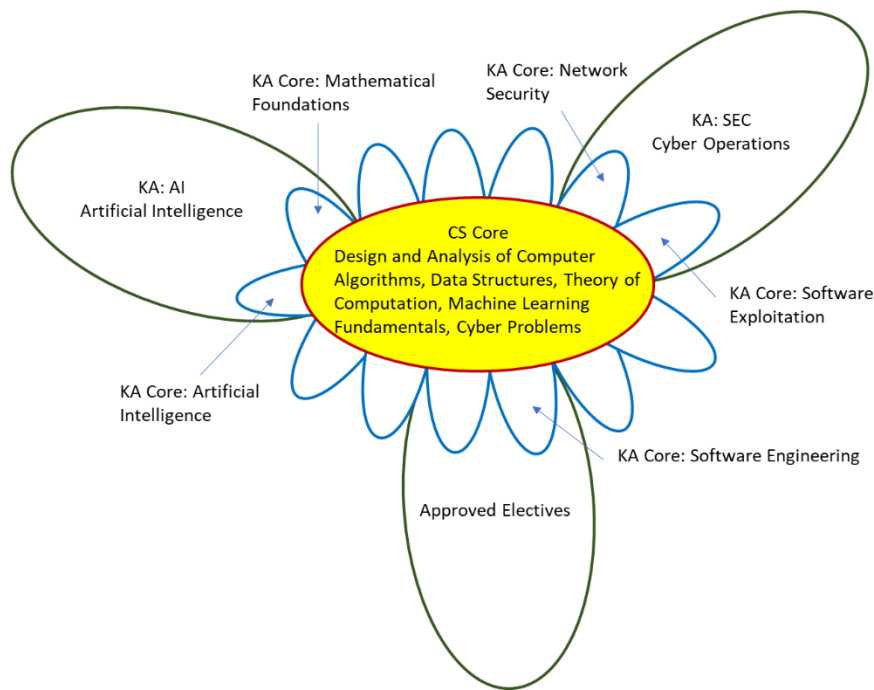


Figure 1. MSCS Sunflower Model of Core Topics and Knowledge Areas

Table 10 includes a mapping of competencies, knowledge areas, and courses offered in the MSCS program. Table 2 summarizes the competency areas covered by the CS core and specializations in the MSCS program. As shown in Table 1 and Table 2, the MSCS CS core encompasses all competency areas. Our specializations offer essential topics in the corresponding knowledge areas. The MSCS program also provides an elective option for students to develop their own specialties. The CS core ensures that students selecting the elective option also demonstrate essential competencies upon graduation.

Competency Area	Knowledge Area	DSU MSCS
Software	Software Development Fundamentals (SDF)	
	Algorithms and Complexity (AL)	CSC 705
	Foundations of Programming Languages (FPL)	CSC 720
	Software Engineering (SE)	CSC 770
Systems	Systems Fundamentals (SF)	
	Architecture and Organization (AR)	
	Operating Systems (OS) - CSC 718	CSC 718
	Parallel and Distributed Computing (PDC)	CSC 718
	Networking and Communication (NC)	CSC 773
	Security (SEC)	INFA 723, CSC 723, CSC 748, CSC 773
Data Management (DM)	CSC 712	
Applications	Graphics and Interactive Techniques (GIT)	
	Artificial Intelligence (AI)	CSC 547
	Specialized Platform Development (SPD)	
	Human-Computer Interaction (HCI)	
	Security (SEC)	INFA 723, CSC 723, CSC 748, CSC 773
	Data Management (DM)	CSC 712
Theoretical Foundations	Theory of Computation	CSC 720
	Machine Learning Fundamentals	CSC 722

Table 1. MSCS: Competency Areas and Knowledge Areas

MSCS	Software	Systems	Applications	Theoretical Foundations
CS Core	CSC 705	CSC 712	CSC 786	CSC 720, CSC 722
Artificial Intelligence Specialization			CSC 547, 9 credits in AI	CSC 502
Cyber Operations Specialization		CSC 718, CSC 773	CSC 723, CSC 748	INFA 723
Approved Electives	CSC 770	CSC 718		

Table 2. MSCS vs. Knowledge Areas

### Part 3: Academic Programs and Curriculum

#### 3.1 Mission Statement for the MSCS Program

The mission of the MSCS program is to equip individuals holding a Bachelor's degree in Computer Science or a closely related field with the knowledge and expertise needed to resolve issues of national significance arising from advancements in computer science. The MSCS program includes a 15-credit core curriculum designed to assist students in developing theoretical aspects of computer systems and computability, as well as the ability to solve real-world problems. Our program is unique in the way it enables students to apply this core knowledge in pre-designed specializations, such as Cyber Operations and Artificial Intelligence, through 15-credit electives. Additionally, students have the option to design their own plan of study without specialization, aligning with their current interests, responsibilities, and skills.

#### 3.2 Academic Degrees Offered within the MSCS Program

Students in the MSCS program are required to take five core courses and have the option to complete either the Cyber Operation Specialization or the Artificial Intelligence Specialization.

Alternatively, a student may opt for approved electives that complement his or her background or career goals without specialization.

- **Artificial Intelligence Specialization:** This includes mathematics, statistics, machine learning, and deep learning. Students will build a foundation in artificial intelligence, equipping them to apply their knowledge to solve real-world problems.
- **Cyber Operations Specialization:** Students will acquire essential cybersecurity skills, including network security and software exploitation, to deter, protect, detect, and respond to cyber threats.

**Approved Electives:** Students will work with their advisor to choose electives that complement their career goals. Options include traditional computer science electives or courses offered in related master's programs at DSU.

### 3.3 Admission Requirements

The MSCS program seeks highly motivated individuals with education and professional credentials that will enable them to be successful graduate students. Admission to the program is based upon a combination of the following requirements:

- A baccalaureate degree in computer science (or closely related field) from an institution of higher education with full regional accreditation for that degree. International students must have an undergraduate (bachelor's) degree that is the equivalent to a four-year undergraduate degree in the U.S.
- Students who have not earned a baccalaureate degree in computer science (or closely related field) from an institution of higher education with full regional accreditation for that degree are required to take the GRE.
- Minimum undergraduate grade point average of 3.0 on a 4.0 scale (or equivalent on an alternative grading system).
- Students who are accepted into the program but do not hold a B.S. in Computer Science may be required to show competency areas such as Data Structures, Assembly Language, Operating Systems, Language Processing, Programming Languages, Discrete Mathematics. These competencies may be met with transcribed coursework or less-formal means such as experiences which demonstrate to the Admissions Committee gained competence in a knowledge area. Any remaining knowledge deficiency requirements will be included as part of the student's formal Plan of Study (POS) as additional required credits.

Students are admitted to the MSCS program in the fall, spring, and summer semesters.

In addition, DSU has an articulation agreement with the National Cryptologic University (NCU) that allows students to take a flexible approach, enabling them to apply specific work-related training as equivalent credits toward MSCS degrees at DSU.

### 3.4 Graduation Requirements

The MSCS program requires a total of 30 credit hours beyond the baccalaureate. Students in the MSCS program must meet the following graduation requirements to receive MSCS degrees:

- Successful completion of all courses listed on an MSCS Plan of Study within the five-year time limit
- Achievement of a GPA of at least 3.0 (a "B" average), with no more than 6 credit hours of a "C" grade and no grade below a "C" in the courses
- Satisfaction of Regental standards for residency, this is satisfied by completing all but a maximum of nine credit hours of coursework at DSU (distance courses count as "at DSU")
- 15 credit hours of core courses
- 15 credit hours of specialization coursework
- A comprehensive exam

### 3.5 Curricular Options within the MSCS Program

#### 3.5.1 Program Curriculum

Table 3 includes the courses required to fulfil the program requirements and specifies the terms in which the courses are offered.

Course	Required (R/E/SE)	Credits	Prerequisite(s)	Terms
<b>Required Courses (15 credits)</b>				
CSC 705 - Design and Analysis of Computer Algorithms	R	3 credits		Summer
CSC 712 - Data Structures	R	3 credits		Summer
CSC 720 - Theory of Computation	R	3 credits		Spring
CSC 722 - Machine Learning Fundamentals	R	3 credits		Fall
CSC 786 - Cyber Problems	R	3 credits		Spring, Fall
<b>Artificial Intelligence Specialization (15 credits)</b>				
CSC 502 - Mathematical Foundations of Artificial Intelligence	SE	3 credits	CSC250, MATH123, MATH281	Fall
CSC 547 - Artificial Intelligence	SE	3 credits		Fall
Choose three courses from the following: 9 credits				
CSC 578 - Generative Deep Learning	E	3 credits		Fall
CSC 579 - Reinforcement Learning	E	3 credits		Spring
CSC 723 - Machine Learning for Cyber Security	E	3 credits	CSC722	Spring
INFS 768 - Predictive Analytics for Decision Making	E	3 credits		Fall
INFS 772 - Programming for Data Analytics	E	3 credits		Spring
INFS 778 - Deep Learning	E	3 credits	INFS768, INFS772	Summer
INFS 784 - Artificial Intelligence Applications	E	3 credits	INFS772	Spring
CSC/INFA/INFS 791 Independent Study	E	3 credits		
CSC/INFA/INFS 792 Topics	E	3 credits		
CSC/INFA/INFS 794 Internships	E	3 credits		
<b>Cyber Operations Specialization (15 credits)</b>				
CSC 718 - Operating Systems & Parallel Programming	SE	3 credits		Fall

Course		Required (R/E/SE)	Credits	Prerequisite(s)	Terms
	CSC 723 - Machine Learning for Cyber Security	SE	3 credits	CSC722	Spring
	CSC 748 - Software Exploitation	SE	3 credits		Fall, Spring
	CSC 773 - Mobile Communication and Advanced Network Security	SE	3 credits	INFA723	Summer
	INFA 723 - Cryptography	SE	3 credits		Spring
Approved Electives (15 credits)					
	CSC 718 - Operating Systems & Parallel Programming	SE	3 credits		Spring
	CSC 770 Software Engineering Management	SE	3 credits		Spring
	CSC/INFA/INFS 500-799 courses	E	9 credits		

Table 3. MSCS Program Curriculum (R: Required, E: Elective, SE: Selected Elective)

### 3.5.2 Plan of Study

Table 4 shows an example of a study plan for MSCS students specializing in cyber operations.

Course			Cr.Hrs	Req.	Grade	Year 1			Year 2		
						FL	SP	SU	FL	SP	SU
<b>Core Courses (15 credits)</b>											
CSC	705	Design and Analysis of Computer Algorithms	3	R			3				
CSC	712	Data Structures	3	R			3				
CSC	720	Theory of Computation	3	R		3					
CSC	722	Machine Learning Fundamentals	3	R	3						
CSC	786	Cyber Problems	3	R					3		
<b>Cyber Operations Specialization (15 Credits)</b>											
CSC	718	Operating Systems & Parallel Programming	3	SE	3						
CSC	723	Machine Learning for Cyber Security	3	SE		3					
CSC	748	Software Exploitation	3	SE					3		
CSC	773	Mobile Communication and Advanced Network Security	3	SE				3			
INFA	723	Cryptography	3	SE		3					
Total Cr.Hrs			30			6	9	9	6		
Overall Hours			30			6	9	9	6		

Table 4. An Example Plan of Study

## 3.6 Curriculum Management

### 3.6.1 Program Constituencies

The MSCS program constituencies include faculty, students, alumni, and industry representatives. The program faculty include Austin O'Brien, Tom Halverson, Michael Ham, Stephen Krebsbach, Andrew Kramer, Jason Mixon, John Hastings, Kaabi Jihene, Mark Spanier, and Yong Wang. Dr. Austin O'Brien is the program coordinator of the MSCS program. The Beacom College has an Industry Advisory Board (IAB). The advisory board currently includes 16 members from companies such as VantagePoint, Midco, SBS CyberSecurity, and First Premier Bank in South Dakota. The advisor board meets two times each year.



### 3.6.2 Course Grades

Course Grades are used as an indirect measure of student attainment of specific program goals and objectives. DSU Program Guidelines require students to maintain a 3.0 GPA in the program, receive no grades below a C, and have no more than 2 grades of a C. If students do not maintain the required “B” average, they are placed on academic probation and given the opportunity to raise their GPA to 3.0 within the next nine credit hours. If students failed to meet any of the criteria of good academic standing, they are suspended from the program for two consecutive terms. Students may submit an early readmission petition to the Graduate Dean under extenuating circumstances.

Course grades are issued to MSCS students according to SDBOR Policy 2.8.1<sup>7</sup>. Graduate Grades will be assigned to the Graduate Academic Level and sections with course numbers 500 or greater. Plus and minus grades are not used. Table 5 lists the letter symbols that indicate the quality of student academic achievement in MSCS courses at DSU and The Beacom College.

Letter	Grade Meaning	GPA Implication
A	Exceptional	4.00 grade points per semester hour
B	Above Average	3.00 grade points per semester hour
C	Average	2.00 grade points per semester hour
D	Lowest Passing Grade	1.00 grade points per semester hour
F	Failure	0.00 grade points per semester hour
S	Satisfactory	Does not calculate into any GPA
U	Unsatisfactory	Does not calculate into any GPA
W	Withdrawal	Does not calculate into any GPA, no credit granted
AU	Audit	Does not calculate into any GPA
I	Incomplete	Does not calculate into any GPA
IP	In Progress	Does not calculate into any GPA
NG	No Grade	0 credit tracking course
NP	Normal Progress	Does not calculate into any GPA
NR	Grade not Reported by instructor	Does not calculate into any GPA
EX	Credit by Exam	Does not calculate into any GPA
CR	Credit	Does not calculate into any GPA
LR	Lab grade linked to Recitation Grade	0 credit course

*Table 5. Graduate Letter Grades Used at DSU and The Beacom College*

---

<sup>7</sup> SDBOR Policy 2.8.1 Grades and Use of Grade Point Averages (GPA)

### ***3.6.3 Transfer Credits***

Academic courses will be transferred as meeting graduation requirements if the courses parallel the scope and depth requirements for the degree or if the courses meet electives required for the degree.

The following minimum conditions must be met before graduate-level credit can be accepted:

- The institution from which credit is transferred is regionally accredited at the master's level.
- The student must have been in good standing at the institution from where the credit is transferred.
- The grades in courses transferred are "B" or better.
- The transfer credits must have been completed no more than five years prior to commencement of the DSU graduate degree program.
- No more than 9 credits may be applied to another master's degree. The program committee for each degree program may establish specific program level processes and criteria for course evaluation.

### ***3.6.4 Advising***

A two-tier approach to advising MSCS students is employed. After hearing from the Graduate Dean on their acceptance to the program, graduate enrollment counselors will reach out to new students to coordinate student on-boarding activities including admissions, orientation, and academic advising. The graduate enrollment counselors support graduate students in every stage of their graduate program, helping to provide information, access resources, register for classes, alleviate administrative and technological barriers, and promote student success. Other key roles for graduate enrollment counselors include:

- Advising and assisting students with the development of their Plan of Study and recommending it to the respective program coordinator for approval.
- Completing course substitutions and credit transfer forms.
- Maintaining up-to-date, accurate and detailed documentation on student interactions, progress, and meetings.
- Recommending appropriate resources for students who need additional academic support to improve student success.
- Collaborating with appropriate departments (Registrar, Financial Aid, Cashier, Disabilities Services, Counseling Services, Veterans Services, etc.) to resolve individual student issues and ensure positive student experiences.

New graduate students are also assigned a graduate faculty advisor. Program Coordinator Dr. Austin O'Brien serves as an academic advisor for each student upon entry to the MSCS program. Other roles for graduate faculty advisors include:

- Discussing skill development and specializations
- Career planning

- Transitioning students to dissertation chair and committees
- Guide students through the program assessment process (comprehensive exams)

### ***3.6.5 Hiatus Status***

Continuous enrollment is defined as registering for at least one course per academic term. A student can take a hiatus for a term if taking no credit. A graduate student can take max two hiatus terms during plan of study.

### ***3.6.6 Suspension***

All graduate students are expected to maintain a Plan of Study grade point average of 3.0 (“B” average) throughout their graduate program. Failure to maintain the “B” average places the student on academic probation. Students on academic probation may register for an additional 9 credit hours of coursework and must raise their Plan of Study GPA to a 3.0 (“B” average) after completion of the 9 credits. If this is not accomplished, the student will be suspended from the program. A student who receives more than 6 credits of “C” or any grade lower than a “C” is suspended from the program.

Should it be necessary to suspend a graduate student for academic reasons, the student may apply for readmission to the Office of Graduate Studies after two semesters (summer is considered a semester term). The student must demonstrate an adequate reason for readmission.

A grievance procedure has been established for students wishing to contest probation or suspension. The Graduate Council will hear all grievances, following the procedure established in DSU Policy 03-30-00 *Appealing Academic and Administrative Decisions*<sup>8</sup>.

Graduate students who have been officially suspended and who seek reinstatement shall submit a formal request for reinstatement, along with a supporting statement of explanation, to the Office of Graduate Studies. Requests shall be acted upon according to the established procedure for application to the program.

Students wishing to contest probation or suspension may appeal the decision, following the grievance procedure established by DSU: *Appealing Academic and Administrative Decisions 03-30-00* <https://dsu.edu/root-files/03-30-00.pdf>. Graduate Council will hear all grievances.

Students should consult the Office of Graduate Studies for details.

Students suspended for academic reasons may seek reinstatement after two academic terms by submitting a formal request for reinstatement, along with a supporting statement of explanation to the Office of Graduate Studies. The request shall be acted upon according to the established procedure for application to the program.

---

<sup>8</sup> *DSU Policy 03-30-00 Appealing Academic and Administrative Decisions*

### **3.7 Program Modification**

DSU obtained authorization to introduce the MS in Applied Computer Science (MSACS) in 2012, with the program officially commencing in Fall 2013. In 2017, DSU submitted a proposal to change the program's name from MS in Applied Computer Science to MS in Computer Science, and the name modification received approval in 2018. Since that approval, the program has been officially known as MSCS.

The MSCS program has undergone a few major modifications since its inception. These major modifications are summarized below:

- CS core modifications: Initially, four courses were included in the core: CSC 705 - Design & Analysis of Algorithms, CSC 710 - Structure & Design of Programming Languages, CSC 714 - Database Systems, and CSC 718 - Operating Systems and Parallel Programming. In 2017, the program eliminated CSC 714 and introduced CSC 720 - Theory of Computation and CSC 722 - Machine Learning Fundamentals. In Spring 2022, another course, CSC 712 - Data Structure, was added to the core, and CSC 710 was removed.
- Cyber Operation Specialization modifications: Initially, four courses were required for students with a cyber operation specialization: INFA 723 - Cryptography, INFA 725 - Advanced Network Hacking, INFA - 729 Advanced Web Hacking, and INFA 751- Wireless Security. In 2018, three new courses were added to the specialization: CSC 748 - Software Exploitation, CSC 772 - Mobile Computing and Advanced Network Security, and CSC 786 - Cyber Problems. INFA 725 and INFA 729 were subsequently removed.
- Artificial Intelligence specialization: The Artificial Intelligence specialization was proposed and approved in 2021. It includes two selected electives: CSC 502 - Mathematical Foundations of Artificial Intelligence, and CSC 547 - Artificial Intelligence. Students are also required to take an additional 9 credits of electives in artificial intelligence to meet the specialization requirements.
- A major modification was proposed and approved in Spring 2022, bringing the program to its current status (Table 3). A new course, CSC 770 - Software Engineering Management, was added later in Spring 2023 for students in the MSCS program with no specialization.

DSU is committed to continuously improving the MSCS program to ensure its alignment with industry requirements and to provide an enhanced educational experience for our students.

## **Part 4: Program Enrollments and Student Placement**

### **4.1 MSCS Program Enrollments**

DSU received authorization from the SD Board of Regents and the Higher Learning Committee to offer a Master of Science in Computer Science in Spring 2012. DSU admitted four students in the Fall 2013. Table 6 shows the MSCS enrollment and graduation numbers since the program's inception. Figure 2 displays the total enrollment and total number of graduates by year since 2013.

Academic Year	Enrollment			Degrees Awarded		
	Online	On-Campus	Total Enrolled	Applied Computer Science (MS)	Computer Science (MS)	Total MS in Computer Science Degrees
2013	2	2	4	0	0	0
2014	11	5	16	9	0	9
2015	13	10	23	6	0	6
2016	14	8	22	13	0	13
2017	16	10	26	17	0	17
2018	35	12	47	7	5	12
2019	37	22	59	4	25	29
2020	53	14	67	0	33	33
2021	39	16	55	0	25	25
2022	52	17	69	0	34	34

Table 6. MSCS Enrollment and Graduation Numbers 2013 to 2022

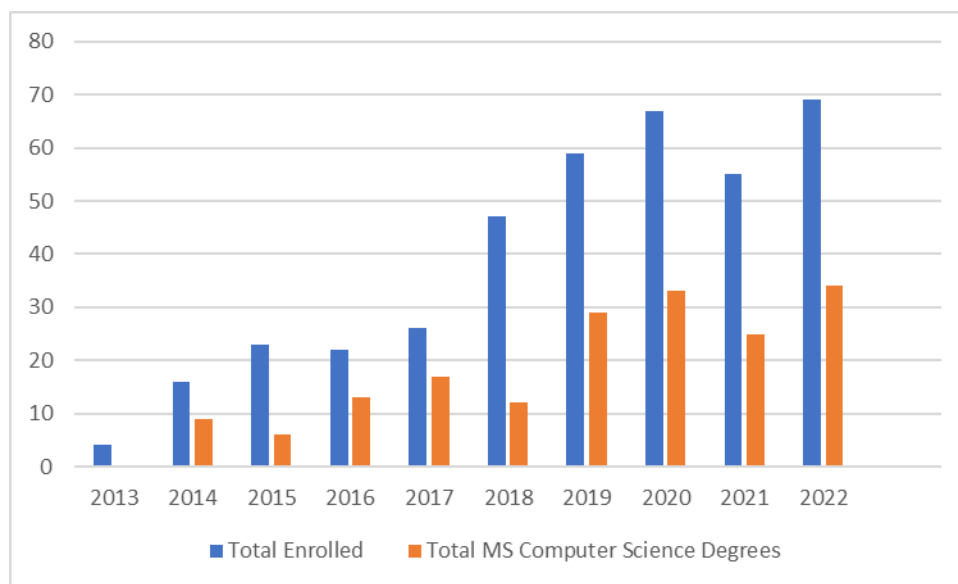


Figure 2. Total Enrollment and Number of Graduates by Year Since 2013

#### 4.7 Student Placements

A graduate from the program can choose a career path including cyber operations, artificial intelligence, software development, or computer and information research scientists. The following is a list of employers for graduates in our program:

- NSA
- US Army
- Idaho National Laboratory, Idaho Falls, ID
- Johns Hopkins University Applied Physics Laboratory, Laurel, MA
- MITRE, Washington DC-Baltimore Area
- Symantec, Dallas, TX

- Raytheon, Tucson, AZ
- General Atomics Aeronautical Systems, San Diego, CA
- Airlines Reporting Corporation (ARC), Arlington, VA
- Expel, Herndon, VA
- Woodridge Software, Denver, CO
- DigiKey, Thief River Falls, MN
- Minnkota Power Cooperative, Grand Forks, ND
- Lincoln Financial Group, Sioux Falls, SD
- Dakota State University, Madison, SD

## Part 5: Faculty Credentials

### 5.1 Program Faculty

A list of the faculty who teach in the MSCS program and their credentials are included in Table 7. Current vitae for the faculty listed in Table 6 are included in Appendix A.

Faculty	Highest Degree Earned- Field and Year	Rank	Research Interests	Related Courses
Andrew Kramer	M.Sc. Computer Science, 2017	AST	reverse engineering, binary exploitation	CSC 748 - Software Exploitation
Austin O'Brien	Ph.D. Computer Science, 2017	ASC	machine learning, AI, reinforcement learning in various applications	CSC 579 - Reinforcement Learning CSC 705 - Design and Analysis of Computer Algorithms CSC 722 - Machine Learning Fundamentals
Jason Mixon	M.Sc. Computer Science, 2022	AST	data analytics and governance, artificial intelligence, machine learning	CSC 547 - Artificial Intelligence CSC 578 - Generative Deep Learning CSC 712 - Data Structures
John Hastings	Ph.D. Computer Science, 1996	ASC	machine learning algorithms, computer vision, software engineering, Artificial Intelligence, generative AI	CSC 786 - Cyber Problems
Jihene Kaabi	Ph.D. Computer Science, 2005	ASC	scheduling, machine learning	CSC 786 - Cyber Problems
Mark Spanier	Ph.D. Mathematics, 2015	ASC	approximation and optimization theory with applications to analytic number theory and signal processing	CSC 502 - Mathematical Foundations of Artificial Intelligence
Michael Ham	D.Sc. Cyber Operations, 2017	ASC	software reverse engineering, software security, BGP, networking secure protocol design	CSC 846 - Advanced Malware Analysis
Stephen Krebsbach	Ph.D. Computer Science, 2005	P	advanced database, cyber education	CSC 712 - Data Structures
Tom Halverson	Ph.D. Computer Science, 1999	P	software development, computer science education, faculty/student engagement, technology innovation	CS courses in undergraduate programs

Faculty	Highest Degree Earned- Field and Year	Rank	Research Interests	Related Courses
Yong Wang	Ph.D. Computer Science, 2004	P	security and privacy in IoT, mobile devices, cloud, and cyberinfrastructure; network security in general	CSC 718 – Operating Systems & Parallel Programming CSC 720 – Theory of Computation CSC 773 – Mobile Communication and Advanced Network Security INFA 723 – Cryptography

Table 7. Program Faculty (AST: Assistant Professor, ASC: Associate Professor, P: Professor)

## 5.2 Faculty Workload

The current faculty workload document of Dakota State University was effective May 1, 2021. While the standard workload is 30 workload units per academic year, reasonable time is allocated to faculty members who hold professorial rank and who actively engage in research, scholarship, or creative artistic activity or who actively pursue professional service activities related to their disciplines. Ordinarily, reasonable allocated time is equivalent of six workload units of instruction, or its equivalent per academic year and, if assigned, the faculty member must be actively engaged in productive scholarship. The institution may adjust this workload requirement to ensure faculty members have adequate time for research and scholarship or service or as deemed necessary by the institution.

The typical full time teaching load for tenured or tenure track faculty is 24 semester credit hours for each academic year (fall and spring). Faculty whose teaching load exceeds that requirement (and who are actively engaged in research, scholarship, or creative artistic activity and who actively pursue professional service activities related to their disciplines) may qualify for overload pay when the teaching load exceeds the 24-credit requirement in any given academic year. Faculty holding professorial rank but located off campus are required to provide service to the university, service to the discipline, and to actively engage in research, scholarship, or creative artistic activity.

Academic advising is recognized as part of a faculty member's teaching workload and generally will not exceed an assignment as primary adviser of more than 50 students for faculty members with professorial rank and more than 30 students for faculty members with lecturer rank. An unusually heavy advising load can be offset by a reduction in the faculty member's committee or other college assignments and/or a reduction in teaching load for faculty members holding lecturer rank.

## 5.3 Faculty Development

### 5.3.1 The Center for Teaching and Learning

In July 2018 Dakota State University established its Center for Teaching and Learning (CTL) to serve as the university hub of teaching support and innovation. Prior to the establishment of the

CTL, a single university committee was charged with identifying instructional development topics and implementing faculty workshops/events. That committee is now an advisory group to the CTL, which is directed by a senior faculty (1/2 time, by application) and includes an instructional design and technology specialist (full time) and clerical support. The CTL is also assisted by four faculty associates (one from each of the four colleges at DSU) who are among the university's most accomplished instructors with strengths in course development, learner engagement, and assessment. The CTL faculty associates provide mentoring and consultation with individual faculty when time permits. Additionally, the CTL identifies, coordinates, and provides professional and academic development activities for faculty and staff. The CTL works with academic administrators and faculty to identify instructional priorities and develop programming to address those priorities.

The CTL not only supports teaching and learning traditional classroom environments but is especially focused on providing pedagogical and technology development in online environments. This support has included the creation of instructional aids, materials, and media that are accessible online to assist faculty in improving teaching and student interaction skills. The CTL has also initiated peer review of all online courses using the state mandated Quality Assurance (rubric). For graduate students, the CTL provides expertise to support the goals of the university, including assisting in the production of quality thesis, dissertations, presentation, grant writing, and understanding of compliance issues. For undergraduates, engagement objectives include topics on mentored research, integrity (plagiarism, and copyright), and student service/government.

### ***5.3.2 Funding for Faculty Research and Travel***

Examples of funds available for faculty research and travel include:

- DSU supports a Faculty Research Initiative (FRI) intended to encourage and facilitate faculty research and creative activity. The competitive grants offer up to \$3,000 for individual faculty or up to \$5,000 for collaborative teams.
- The Supporting Talent for Research Trajectories (START) internal funding program was launched in 2018. This seed fund offers faculty support for preliminary work on research that will result in proposals for externally funded research grants.
- DSU also routinely sets aside significant funding for instructional and professional travel and for faculty training. Individual faculty can qualify for up to \$1,200 for travel and training at qualifying events.

### ***5.3.3 Faculty Sabbaticals***

In 2023, DSU issued a new policy on Faculty Sabbaticals<sup>9</sup>. A faculty member may apply for sabbatical leave after six or more consecutive years of full-time teaching at DSU. With approval

---

<sup>9</sup> [DSU Policy 1.19 Faculty Sabbaticals](#)



from the Dean, faculty can apply for a one semester research sabbatical. Applications are reviewed by the university Promotion and Tenure Committee.

## **Part 6: Academic and Financial Support**

### **6.1 Beacom College of Computer and Cyber Sciences**

The Beacom College of Computer and Cyber Sciences office is the central point of support for all undergraduate and graduate students with majors within this college. The central office is located in the Beacom Institute of Technology Building. The office is also provided with several work study positions that are tasked with helping faculty whenever help is requested. Table 8 includes the administration and staff who work in The Beacom College.

<b>Name</b>	<b>Title</b>
Dr. Mary Bell	Dean
Dr. Tom Halverson	Associate Dean of Beacom Undergraduate Programs
Dr. Yong Wang	Associate Dean of Beacom Graduate Programs
Erin Kahler	Administrative Assistant II
Kathy Engbrecht	Retention Specialist
Eric Holm	Systems Architect (IA Lab)

*Table 8. The Beacom College Administration and Support Staff*

### **6.2 Graduate Programs and Research Support Services**

The Office of Graduate Studies was established to promote and support graduate education at DSU. The Dean of Graduate Studies collaborates with and supports the functions and responsibilities of the Graduate Council and the graduate program committees within each college and serves as the advocate for graduate education and graduate student support at DSU. The Office of Graduate Studies administration and staff is included in Table 9 below. The day-to-day operations and services provided by the Office of Graduate Studies are client centered. The office offers guidance and help to students from the first inquiry to graduation. This includes providing accurate and timely program information and maintaining the graduate programs website with current information for degree seeking students (<https://dsu.edu/admissions/graduate/>). The office also facilitates the recruitment of prospective students, the application process, assisting in setting up interactive audio/video for remote sites in South Dakota and online for distance students. Other services provided by the Office of Graduate Studies include:

- assisting with course scheduling and course rotations
- making students aware of changes in schedules, rotations, and graduate policies
- assisting with registration
- supporting the assistantship committees
- monitoring student progress toward graduation
- serving as a liaison among other support staff, faculty, and administrators

- processing Fast Track (4+1) Program<sup>10</sup> applications, which many BSCS students take advantage of to take courses towards an MS Computer Science degree

<b>Name</b>	<b>Title</b>
Dr. Mark Hawkes	Dean
Erin Blankespoor	Administrative Assistant
Abby Chowing	Graduate Enrollment Specialist
Brianna Mae Feldhaus	Graduate Enrollment Specialist

*Table 9. The Office of Graduate Studies Administration and Support Staff*

On July 1, 2018, the new role of Vice President of Research and Economic Development was developed at DSU. This position was created to address unprecedented growth in student numbers, employee numbers, academic programs, research activity, to further formalize the research processes campus wide, and coordinate efforts between faculty and campus departments for increased efficiency. The university's awarded grant monies have been increasing substantially since 2018. The award total increased \$2,396,866 in 2018 to \$6,493,257 in 2019 and \$5,923,216 in 2020. With the CyberHealth Strategic Alliance with Sanford Health and the \$90 million initiative to expand DSU's Applied Research Lab, these numbers will likely continue to grow. Table 10 includes the administration and staff in the Research and Economic Development Office.

<b>Name</b>	<b>Title</b>
Dr. Ashley Podhradsky	Vice President for Research and Economic Development
Dr. Peter Hoelsing	Associate Vice President for Research & Economic Development
Dr. Stacey Berry	Coordinator of Undergraduate Research/ IRB Chair
Katherine Cota	Director of Economic Development
Teresa Maier	Sponsored Program Analyst
Beth Delzer	Administrative Assistant

*Table 10. Research and Economic Development Administration and Support Staff*

### **6.3 Library Resources and Services**

Since Dakota State University received its current focused mission in the 1980s, the Karl E. Mundt Library's mission has been to expand its collection of materials on computers, technology, and information systems. To that end, the library has subscribed to an ever-widening number of databases and eBooks that support this emphasis. The physical and electronic collections continue to be built through faculty recommendations and requests, as well as from librarian selection based upon their knowledge of the curriculum and its needs. The journal collection is also based on faculty requests and is fine-tuned by means of an annual analysis of journal use. This analysis helps the library focus its expenditures (and finite budget) on those journals that are regularly needed and used by the institution's students. The collections have been enriched with digital information. The library subscribes to numerous online databases including the Association for Computing Machinery (ACM) Digital Library, ProQuest Research Library, ABI-

---

<sup>10</sup> [Fast Track \(4+1\) Programs](#)

Inform, IEEE, Lexis Nexis and over 100 others. Most of the material indexed in these databases includes direct access to the full text of the articles indexed. For those articles not available in full text, the library provides speedy interlibrary loan service at no extra cost to all DSU students, faculty, and staff.

The library holds an extensive collection of electronic books on computer security and information assurance, which are discoverable via the library catalog. In addition, the library subscribes to Safari Tech Books Online, which provides access to 150 titles that provide hands-on training in many areas of technology. The library also provides access to LyndaCampus.com, which provides digital tutorials in almost every area of technology, marketing, education, and career planning. The Karl E. Mundt Library is also a member of several library consortiums and maintains borrowing and lending agreements with academic libraries across the country and around the world. As such, the library can attain materials in digital and/or physical formats for any scholarly need. The professional library administration and staff are listed in Table 11 below.

Name	Title
Dr. Mary Francis	Director of the Library
Abbie Steuhm	Reference and Scholarship Librarian
Ellen Hoff	Librarian
Taylor Cline	Library Associate

*Table 11. Karl E. Mundt Library Administration and Support Staff*

#### **6.4 Online@DSU Support Services**

The Office of Online Education is responsible for program planning, marketing, program implementation and overall management of courses and programs offered by alternative delivery at Dakota State University. Working in partnership with the colleges and the institution's academic support areas, the Office of Online Education works to design and develop active and collaborative degree programs at a distance.

The Office of Online Education is staffed with the Director of Online Education and the State Authorization Coordinator shown in Table 12 below. This team serves the needs of students who are enrolled in the online and videoconferencing courses at DSU. The office is the mainstay of distance services to students, working with the administrative offices of DSU to provide these services. The staff also serves the website needs of faculty, staff, and students at DSU. The office staff assists faculty in the design and implementation of courses delivered by various forms of technology.

<b>Name</b>	<b>Title</b>
Sarah Rasmussen	Director of Online Education
Annette Miller	State Authorization Coordinator

*Table 12. Online@DSU Administration and Support Staff*

## 6.5 Information Technology Services

DSU has a comprehensive technology infrastructure supporting universal (on and off campus) access to computing resources. The Information Technology Services administration and staff listed in Table 13 below provide technology support to faculty, staff, and students.

<b>Name</b>	<b>Title</b>
Shawn Jaacks	Chief Information Officer
Brent Van Aartsen	Chief Technology Officer
Stephanie Baatz	Director of Support Services
Bryon Olson	Director of Technical Operations
Pat Huntimer	Assistant Chief Information Officer, Director of Business Intelligence
Tyler Steele	System Administration Manager
Brett McKeown	System Administration Manager
Marie Millage	IT Procurement & Asset Management Administrator
Kim Wermers	Card Services Administrator
Scott Allbee	Systems Integration Engineer
Coby Cochran	Web Applications Developer
AJ DeGroot	Cybersecurity Analyst
Tess Eflin	Support Services Technician
Eric Holm	Systems Architect
Britney Jencks	Associate Integrations and Web Developer
Joelle Johnson	Senior Web Applications Analyst
Drew Jones	System Engineer
Kip Kinnunen	Network Architect
Braden Madison	Cybersecurity Analyst
Steve Millage	Systems Engineer
Nolan Moser	Multimedia Support Service Analyst
Amy Olson	Software Engineer
David Turner	IT Developer

*Table 13. Information Technology Services Administration and Staff*

## 6.6 Administrative Support

Current administrative staff will provide the academic support services to deliver academic programs at DSU. The administrative support personnel who are particularly critical to the delivery of the academic programs are included in Table 14 below.

<b>Name</b>	<b>Title</b>
Corey Braskamp	Director of Facilities Management
Kathy Callies	Registrar
Amy Crissinger	Vice President for Student Affairs and Enrollment Management
Amy Dockendorf	Controller
Denise Grayson	Director of Financial Aid

<b>Name</b>	<b>Title</b>
Sara Hare	Director of Budget & Grants Administration
Jeanette McGreevy	Director of Institutional Effectiveness, Assessment, and Policy
Laura Cross	Director of Institutional Research
Deb Roach	Vice President for Human Resources
Kelly Greene	Director of Career and Professional Development
Sarah Olson	Course Materials Specialist
Donna Fawbush	Director of the Trojan Zone and University Events
Nicole Claussen	Director of International Programs

*Table 14. Administrative Support*

## **6.7 Financial Support for Students**

Financial aid opportunities are expected to come from institutional and private sources. Financial aid policies and procedures for application, award, and distribution have already been developed to support academic programs at DSU. DSU has also certified alternative loan eligibility for enrolled students (based on their educational costs) to regional and national lenders. Table 15 lists the administrator and support staff in DSU's Financial Aid Office.

<b>Name</b>	<b>Title</b>
Denise Grayson	Director of Financial Aid
Melinda Fedeler	Assistant Director of Financial Aid
Jill Corbin	Scholarship Coordinator
Laura Reed	Financial Aid and Scholarship Advisor
Amy Townsend	Administrative Assistant I

*Table 15. Financial Aid Administrator and Support Staff*

The DSU Financial Aid Office, as a member of the National Association of Student Financial Aid Administrators (NASFAA), complies with the NASFAA Ethical Principles and Code of Conduct for Institutional Financial Aid Professionals.

## **Part 7: Facilities and Equipment**

With DSU's 1:1 portable computing environment requiring students to have a Windows or Mac laptop and its expansive secure wireless network, the need for dedicated computer labs is not as prevalent as it has been in the past. Classroom space on campus was significantly increased with the Fall 2017 opening of the Beacom College of Computer and Cyber Sciences, the first LEED version 4 building in South Dakota, and the renovations of East Hall in 2019 and 2021. Dedicated research facilities are available in the Madison Cyber Labs (MadLabs®). Students at DSU are given access to industry standard software and a virtual Information Assurance Lab to meet all their computing needs.

### **7.1 Information Assurance Lab**

DSU's Information Assurance (IA) Lab is a cloud-based solution to the problems of technology education. The IA Lab was designed and implemented in 2009 and its use has continually grown ever since with the additions of new classes plus growing enrollment. The IA Lab allows an

instructor to focus their time on creating and testing their lab. Once the lab is finalized, the lab administrator can copy unique instances of the lab to all students within the class. This process takes approximately 20 minutes total, depending on the size of the class. The lab can run any platform (Windows, MacOS, FreeBSD, or Linux), in addition to popular firewall and router distributions. These labs are all safely contained so that students are safe when practicing any cybersecurity concepts. Due to the self-service nature of lab implementation, it can be used for projects far beyond the classroom. The IA Lab hosts research projects for undergraduate and graduate students, in addition to housing research projects for faculty members. Due to the safe/secure nature of the lab, it also houses DSU's High Performance Computing/Hadoop environment. The lab users vary from semester to semester, but largely include students from programs including Information Systems, Cyber Operations, Computer Science, Network Security Administration, etc.

## 7.2 MadLabs®

On Jan. 31, 2018, Governor Dennis Daugaard signed House Bill 1057 into legislation which permitted the demolition of DSU's Lowry Hall and construction of the Madison Cyber Labs, or MadLabs®. The Madison Cyber Labs build on DSU's expanding capabilities and strengths to establish a hub of cybersecurity and cyber operations expertise, research, and economic development in South Dakota. As of December 2023, DSU faculty has established 16 MadLabs. Construction of the \$18 million, 40,000 square foot MadLabs building, located on the southwestern edge of campus, was completed in Fall 2019. It is the first research facility of its kind in the Upper Great Plains region.

There are five components to MadLabs® game-changing plan to reshape the cyber field in South Dakota, including:

- 1) **Resources:** a winning combination of laboratory research space, state-of-the-art hardware and software, faculty expertise, and growing institutional relationships with a wide variety of public and private agencies
- 2) **People:** undergraduate and graduate students, faculty, researchers, interns, and other collaborators
- 3) **Programs:** nationally recognized cyber degrees from the associate to doctoral level, along with other professional development opportunities
- 4) **Research areas and institutes:** focus areas in defined interdisciplinary and multidisciplinary regions, that draw from every college on campus
- 5) **REED Connection:** DSU is connected to the South Dakota Research, Education, and Economic Development Network (REED) via a 100 Gbps connection. Providing the campus with connectivity to Internet2, the Great Plains Network, and other research networks.

MadLabs® drives innovation and ideas from DSU into the South Dakota economy, the Great Plains, and the nation. At the same time, it draws new talent to the state and the region. The facility and its programs attract elite scholars, researchers, professionals, and partnerships with government, businesses, nonprofits, and other higher education institutions.

Researchers within MadLabs® primarily focus on projects exploring and advancing technology application, information and quality assurance, business adverse event planning, economic growth, and policy improvement across multiple disciplines and fields. MadLabs® focus areas include cybersecurity, digital forensics, cyber defense, Artificial Intelligence (AI) and machine learning, reverse engineering, and malicious digital artifacts. MadLabs® also fosters partnerships with the public and private sectors to cultivate ideas and transform their research to make a difference in the world.

MadLabs® currently includes 16 labs<sup>11</sup>:

- AdapT Lab
- AI Lab
- CAHIT
- CBAR Lab
- CLASSICS Institute
- Cyber Education and Professional Development Lab
- CybHER® Security Institute
- Deep Red Lab
- DigForCE Lab
- IT Living Lab
- MADRID Lab
- PATRIOT Lab
- Pri Lab
- Smart Home Lab
- Success Lab
- VERONA Lab



*Figure 3. Madison Cyber Labs*

---

<sup>11</sup> [Madison Cyber Labs - Dakota State University](#)

### 7.3 MadLabs Research Environment and Network

The computing resources are available through the MadLabs Research Environment and Network (MADREN) at DSU. MADREN is an extensive technology infrastructure dedicated to cybersecurity research. The MADREN includes 10 Lenovo SR630s servers, each with dual Intel Xeon Gold 5118 Processors, for a total of 240 cores @ 2.3 GHz. This is supported by 2.56TB of TruDDR4 @ 2666MHz RAM available and a 126TB HPE Nimble Storage Adaptive Flash Array. These resources are accessible through virtualization via VMware Director. The MADREN also contains a large GPU cluster accessible through VMware View. It includes 5 Lenovo SR670s servers, each with dual Intel Xeon Gold 6242 Processors, for a total of 160 Cores @ 2.8 GHz each, and 1.92TB of TruDDR4 Performance+ RAM @ 2933MHz. The cluster has 40 NVIDIA Tesla T4 16GB cards, with 12,800 Turing Tensor Cores and 102,400 CUDA Cores. The total GPU capacity represents 324 Teraflops, 2.6 Petaflops, 5,200 TOPS (INT8), or 10,400 TOPS (INT4). All MADREN resources have access to Internet2, with a max data transfer of 100 Gbps.

## Part 8: Assessment and Strategic Plans

### 8.1 MSCS Assessment

The MSCS Program Learning Outcomes (PLOs) are summarized in Table 16.

PEO Identifier	Program Educational Outcome
<b>PLO1</b>	Possess a deep knowledge of and understanding of computer science core areas providing them the ability to create and implement solutions across a broad spectrum of computer application areas.
<b>PLO2</b>	Possess the ability to analyze complex computer science problems and obtain relevant knowledge and information to contribute to the understanding of the problem and/or propose new solutions.
<b>PLO3</b>	Cyber Operations Specialization PLO: be prepared to take on the advanced challenges in this focused security area and will help meet the critical demand for expert knowledge in support of federal, state, and private actors.
<b>PLO4</b>	Artificial Intelligence Specialization PLO: Students will possess knowledge of core modern AI algorithms and techniques along with advanced concepts in chosen topics to help them meet the need of domain knowledge required by industry and government entities.

*Table 16. MSCS Program Learning Outcomes*

The MSCS PLOs are accessible through the Trojan Assessment Profile (TAP) (<https://solutions.nuventive.com/>). Course Mapping to PLOs is shown in Table 17.

Course	PLO1	PLO2	PLO3	PLO4
*CSC 705 - Design and Analysis of Computer Algorithms (R)	Developing	Developing		
*CSC 712 - Data Structures (R)	Developing	Developing		
*CSC 720 - Theory of Computation (R)	Developing	Developing		
*CSC 722 - Machine Learning Fundamentals (R)	Developing	Developing		
*CSC 786 - Cyber Problems (R)	Developing	Developing	Developing	Developing
CSC 502 - Mathematical Foundations of Artificial Intelligence (SE)			Developing	
CSC 547 - Artificial Intelligence (SE)			Developing	
CSC 578 - Generative Deep Learning (E)			Developing	
CSC 579 - Reinforcement Learning (E)			Developing	
CSC 723 - Machine Learning for Cyber Security (E)			Developing	



Course	PLO1	PLO2	PLO3	PLO4
INFS 768 - Predictive Analytics for Decision Making (E)			Developing	
INFS 772 - Programming for Data Analytics (E)			Developing	
INFS 778 - Deep Learning (E)			Developing	
INFS 784 - Artificial Intelligence Applications (E)			Developing	
CSC 718 - Operating Systems & Parallel Programming (SE)				Developing
CSC 723 - Machine Learning for Cyber Security (SE)				Developing
CSC 748 - Software Exploitation (SE)				Developing
CSC 773 - Mobile Communication and Advanced Network Security (SE)				Developing
INFA 723 – Cryptography (SE)				Developing
CSC 718 - Operating Systems & Parallel Programming (SE)	Developing	Developing		
CSC 770 Software Engineering Management (SE)	Developing	Developing		

Note: Courses marked with an asterisk (\*) have been selected for the assessment of PLOs.

Table 17. MSCS Course Mapping to PLOs

The MSCS Program Learning Outcomes (PLOs) are assessed through comprehensive exams. MSCS students must successfully complete a comprehensive exam covering the five required core courses to meet program requirements. The exam is generally taken during the final semester of their program. All five parts of the exam must receive a passing grade. Students can retake any of the five parts of the exam that are not passed. Each student has a maximum of two attempts to pass all five parts of the comprehensive exam.

## 8.2 Strategic Plan

The MSCS program will contribute to the following foundational goals in Table 18, as defined in the Strategic Plan *DSU ADVANCE 2027*.

Foundational Goal	MS in Computer Science
Strengthen Regional and National Relevance	The MSCS program includes two specializations: cyber operations and Artificial Intelligence, both of which are high priority areas.  The MSCS program has many CyberCorps scholarship recipients. These CyberCorps graduates often develop careers at government agencies, including the NSA, APL, national laboratories, etc.
Increase Student Enrollment	The MSCS program is available both in-person and online. We will work closely with the Graduate Office to expand the MSCS program.  We have dedicated faculty and staff who continuously enhancing the program to stay current with technology trends.
Enhance Student Success	Continuously improving curriculum to equip students for careers in computer science.  Faculty-led research creating more research opportunities for students.
Maintain Higher Learning Commission Accreditation	Continuously conduct program assessment using Trojan Assessment Profile to ensure the program meets Higher Learning Commission Accreditation requirements.

Table 18. Strategic Plan Foundational Goals and the MSCS Program

The MSCS program will strive to support two Pillars as identified in the Strategic Plan *DSU ADVANCE 2027* as shown in Table 19.

<b>Pillar</b>	<b>MS in Computer Science</b>
Pillar 1: Increase Student Success	<p>Improve student preparedness in computer science and assist them in achieving their degree and career goals.</p> <p>Build a community that works together to address problems of national interest.</p>
Pillar 3: Grow Scholarship, Research, Intellectual Property, & Economic Development	<p>Promote scholarship through CSC786.</p> <p>Encourage students to participate in sponsored research both internally and externally.</p> <p>Collaborate with the DSU Research and Economic Development Office to create intellectual property.</p>

*Table 19. DSU Strategic Plan Pillars and the MSCS*

## APPENDIX A: Faculty Resumes

### Andrew Kramer

#### *Education*

Ph.D., ABD, Computer Science, Dakota State University, 2024 (expected)

MS., Applied Computer Science, Dakota State University, 2017

BS., Cyber Operations, Dakota State University, 2015

AA., Liberal Arts and Sciences, College of the Redwoods, 2011

#### *Academic experience*

Dakota State University, Assistant Professor, 2022 – Present, full time

Dakota State University, Instructor of Computer Science, 2017-2022, full time

Madison Cyber Labs (MadLabs), Deep Red Lab Director, 2018- 2021, full time

#### *Non-academic experience*

Johns Hopkins Applied Physics Lab, Cyber Security Internship, 2015-2016, part time

Secure Banking Solutions, Penetration Test Engineer, 2014-2014, part time

#### *Certifications or professional registrations*

None

#### *Current membership in professional organizations*

None

#### *Honors and awards*

DEFCON OpenSOC CTF 2020 - 1st Place Team

Wild West Hackin' Fest CTF 2019 - 1st Place Team

#### *Service activities (within and outside of the institution)*

Served as a co-PI on DSU's CyberCorps Scholarship for Service grant from the National Science Foundation.

Teach summer crash-courses for other CAE university faculty, including topics such as stack and heap overflow exploitation, ROP, ALSR bypasses, browser exploitation, kernel exploitation, debugging and fuzzing.

Regularly assist with summer GenCyber camps at DSU, including GenCyber Coed, GenCyber Girls, and GenCyber Teachers camps. Teach a variety of topics, including networking, wireless security, C programming, and electronics

#### *Publications and presentations (selected, from the past five years)*

None

#### *Professional development activities*

None

## **Austin F. O'Brien**

### ***Education***

Ph.D., Computational Statistics, South Dakota State University, 2017  
M.S., Computer Science, South Dakota State University, 2009  
B.Sc., Computer Science, South Dakota State University, 2007

### ***Academic experience***

Dakota State University, Associate Professor, Program Coordinator for M.S. in Computer Science, 2021-Present, full time  
Dakota State University, Assistant Professor, 2015-2021, full time  
South Dakota State University, Research Assistant, Department of Statistics, 2012 – 2015, full time  
South Dakota State University, Teaching Assistant/Instructor, Department of Statistics, 2010 – 2015, full time  
South Dakota State University, Instructor, Department of Computer Science, 2009, full time  
South Dakota State University, Teaching Assistant, Department of Computer Science, 2007 – 2009, full time

### ***Non-academic experience***

The Mitre Corporation, Statistical Research/Programmer, 2013, full time

### ***Certifications or professional registrations***

None

### ***Current membership in professional organizations***

None

### ***Honors and awards***

Ernest M. Teagarden Award for Excellence in Teaching. Dakota State University. 2020

### ***Service activities (within and outside of the institution)***

DSU Committees  
Faculty Hiring Committees  
K/12 & Teacher Camps  
Clubs – Coaching  
Recruiting  
Research Mentor

### ***Publications and presentations (selected, from the past five years)***

Nelson, T. O'Brien, A. Noteboom, C. (2023). Machine Learning Applications in Malware Classification: A Meta-analysis Literature Review. International Journal on Cybernetics & Informatics, Vol. 12, No. 1, February 2023.  
Ofori, M., El-Gayar, O., O'Brien, A. and Noteboom, C., (2022). A deep learning model compression and ensemble approach for weed detection. Hawaii International Conference on System Sciences.

Stroschein, J., Tools, I.A.U.O.S., Garnet, J., Kulm, A., Nelson, T.J., O'Brien, A., Pauli, W.E., Miller, M., Cybercrime, T.P.P., Opoku-Boateng, F. and Jones, T., (2020). CLEAR CONFERENCE COMPUTER SCIENCE ACADEMIC PAPERS. South Dakota Law Review, 65(3).

Chadhary, S., O'Brien, A., Xu, S. (2020) Automated Post-Breach Penetration Testing through Reinforcement Learning. 2020 IEEE Conference on Communications and Network Security, Avignon, France, pp. 1-2.

Dangi, B., Gamet, J., Kulm, A., Nelson, T., O'Brien, A., Pauli, W. (2019). Alert Prioritization and Strengthening: Towards an Industry Standard Priority Scoring System for IDS Analysts Using Open Source Tools and Models of Machine Learning. South Dakota Law Review Journal.

***Professional development activities***

Bachelor of Science in Artificial Intelligence. Dakota State University. 2021.

NCAE-C Cyber Workforce Development and Curriculum; Artificial Intelligence. 2020-2021.

Minor in Artificial Intelligence. Dakota State University. 2020.

Course development for CTE CyberNet Summer Academy. 2020-2021.

Course development for NSF CyberTraining Summer Course. 2020.

## **Jason Mixon**

### ***Education***

PhD, Computer Science, Dakota State University, (In Progress/ABD), 2022  
M.S., Computer Science, Dakota State University, 2022  
M.B.A., General Business, West Texas A&M University, 2013  
B.B.A., Computer Information Systems, West Texas A&M University, 2010

### ***Academic experience***

Dakota State University, Assistant Professor of Computer and Cyber Sciences, 2023 – Present, full time  
Dakota State University, Instructor of Computer and Cyber Sciences, 2021 – 2023, full time

### ***Non-academic experience***

Avanade/Accenture, Data Architect (contractor), 2020 –2021, full time  
Capco, Principal Consultant, 2019 – 2020, full time  
Clarity Insights, Sr. Consultant, 2019 – 2019, full time  
Accenture, Associate Manager/Sr. Data Architect, 2016 – 2019, full time  
General Motors, Sr. Data Architect, 2015 – 2016, full time  
Sense Corp, Management Consultant Technical Architect, 2014 – 2015, full time  
General Motors, Sr. Data Integration Developer, 2013 – 2014, full time  
B & W Pantex, Data Architect, 2011 – 2013, full time  
CA Technologies, Associate Software Engineer, 2011 – 2011, full time  
B & W Pantex, Programmer/Analyst, 2010 – 2011, full time  
Booker Transportation, IT Manager, 2005 – 2010, full time

### ***Certifications or professional registrations***

MIT Professional Education - Data Architecture Certification  
Coursera - University of Colorado - Data Warehousing for Business Intelligence Specialization

### ***Current membership in professional organizations***

Association for the Advancement of Artificial Intelligence  
Association for Computing Machinery

### ***Honors and awards***

None

### ***Service activities (within and outside of the institution)***

Beacom ABET Committee – Member  
Antigua Ministry of Education STEM Camp – Instructor  
Gen-Cyber Teachers Camp – Instructor  
Gen-Cyber STEM Camp – Instructor

### ***Publications and presentations (selected, from the past five years)***

None

***Professional development activities***

Research – Mitigating data poisoning in Federated Learning models

Research – Expanding image datasets with Generative AI

Creative AI Across Modalities – 37th AAAI Conference on Artificial Intelligence, 2023,  
Workshop

2023 ABET Symposium – Accreditation Track

## **Jihene Kaabi**

### ***Education***

Ph.D., Computer Science, University of Franche-Comté, Besancon-France, 2004  
M.Sc., Computer Science, University of Franche-Comté, Besancon- France, 2001  
M.Sc., Operational Research, Polytechnic National Institute: Grenoble-France, 2000  
BSc in Applied Mathematics, University of Science, Monastir-Tunisia, 1999  
Secondary School, High school Certificate in Mathematics, Sfax-Tunisia, 1994

### ***Academic experience***

Dakota State University, Associate Professor, Beacom College of Computer and Cyber Sciences, 2023-Present, full time  
Kingdom University-Bahrain, Associate Professor, Computer Science (Chair of the department of Computer Science), 2023-2023, full time  
University of Bahrain, Associate Professor, Computer Science, (Operations Research), 2021-2022, full time  
University of Bahrain, Associate Professor, Computer Science, (Operations Research), 2010-2020, full time  
University of Hail-KSA, Assistant Professor, Computer Science, 2007-2010, full time  
University of Hail-KSA, Lecturer in Mathematics Department, 2006-2007, full time  
Arab Open University, Assistant Professor in Computer Science and Applied mathematics, 2005-2006, full time  
Polytechnic National Institute, Nancy-France, Assistant Professor in Operational Research, 2004-2005, full time  
University of Science & Technique, Besancon-France, Teaching Assistant in Computer Science, 2002-2003, full time  
University of Science & Technique, Besancon-France, Teaching Assistant in Computer Science, 2001-2002, full time

### ***Non-academic experience***

None

### ***Certifications or professional registrations***

None

### ***Current membership in professional organizations***

Society member, Bahraini Academician, 2019 – Present  
Society member, INFORMS Optimization, 2019 – Present  
IEEE member, 2017 – Present  
IEEE Senior member, 2019 – Present

### ***Honors and awards***

Best student GPA in master's degree, University of Science & Technique, Besancon-France, 2001  
Ph.D. scholarship from the Ministry of Higher Education of France for getting the best Master GPA, 2001 – 2004



University of H'ail (Saudi Arabia) award for serving the university as a coordinator of the Computer Science department (Girl's branch), 2008 – 2009

***Service activities (within and outside of the institution)***

Member of the Technical Program Committee of the 8th International Conference on Modeling Simulation and Applied Optimization (ICMSAO'19), <http://icmsao.uob.edu.bh/>, Kingdom of Bahrain, April 15-17, 2019.

Member of the Public Relations Committee of the 1st International Conference on Information Systems and Applications, ICISA2016, <http://icisa.uob.edu.bh/>, University of Bahrain, Kingdom of Bahrain

Member of the scientific committee of the Palestinian International Conference on Information and Communication Technology, PICICT 2013, <http://fit.iugaza.edu.ps/picict/ie/index.html>, Gaza –Palestine.

Member of the organizing committee of the French-Japanese international congress, MECASTRONICS2001, Besançon – France

***Publications and presentations (selected, from the past five years)***

Jihene Kaabi, Youssef Harrath, Amine Mahjoub, Nabil Hewahi, Khadija Abdulsattar, A 2-phase approach for planning of hazardous waste collection using an Unmanned Aerial Vehicle, 4OR - A Quarterly Journal of Operation Research, DOI: <https://doi.org/10.1007/s10288-022-00526-0>, 2022

Zahra Mohammed, Riadh Ksantini, Jihene Kaabi, Convolutional dynamic auto-encoder: a clustering method for semantic images, Neural Computing and Applications 34.19 (2022): 17087-17105

Mahjoub, Amine, Jihene Kaabi, and Youssef Harrath. Absolute bounds of list algorithms for parallel machines scheduling with unavailability periods." International Transactions in Operational Research 28.3 (2021): 1594-1610

Jihene Kaabi, Modeling and Solving a Scheduling Problem with m Uniform Parallel Machines Subject to Unavailability Constraints, Algorithms. Vol. 12, No. 12, doi: 10.3390/a12120247, 2019

Jihene Kaabi, Youssef Harrath, Permutation Rules and Genetic Algorithm to solve the Traveling Salesman Problem, Arab Journal of Basic and Applied Sciences. Vol. 26, No. 1, pp. 283-291, 2019

Youssef Harrath, Amine Mahjoub, Jihene Kaabi, A multi-objective genetic algorithm to solve a scheduling problem on a single machine with setup-times, International Journal of Services and Operations Management. Vol. 33, No. 4, pp. 494-511, 2019.

Jihene Kaabi, Youssef Harrath, Scheduling of uniform parallel machines under availability constraints, International Journal of Production Research, Vol. 57, No. 1, pp. 216-227, 2019.

Youssef Harrath, Jihene Kaabi, New Method to Generate an Initial Basic Feasible Solution to the Balanced Transportation Problem, International Journal of Industrial and Systems Engineering, Vol. 30, No. 2 pp. 193-204, 2018.

***Professional development activities***

None

## **John D Hastings**

### ***Education***

Ph.D., Computer Science, University of Wyoming, 1996

M.S., Computer Science, University of Wyoming, 1991

B.S. with Honors, Computer Science, University of Wyoming, 1989

### ***Academic experience***

Dakota State University, Visiting Associate Professor, The Beacom College of Computer and Cyber Sciences, 2023 - Present, full time.

University of Nebraska at Kearney (UNK), Professor, Department of Computer Science & Information Systems (CSIS), 2011 – 2023, full time.

UNK, Associate Professor, Department of CSIS, 2006 – 2011, full time.

UNK Associate Professor, Department of CSIS, 2001 – 2006, full time.

DSU, Asst. Professor, College of Business & Information Systems, 2000 - 2001, full time.

South Dakota State University, Asst. Professor, Dept. of Computer Science, 1998 – 2000, full time.

### ***Non-academic experience***

21st Century Systems Inc, Researcher (AI/ML), 2009 – 2009, full time.

USDA-APHIS, Contract, AI/ML Engineer 2007 – 2009, part time.

USDA-APHIS, Contract, AI/ML Engineer, 2003 – 2005, part time.

Hastings Consulting Services, Business Owner, AI/ML Consultant, 1999 – 2001, part time.

Berkley Information Services, Software Engineer (AI), 1997 – 1998, full time.

### ***Certifications or professional registrations***

None

### ***Current membership in professional organizations***

Association for Computing Machinery (ACM) (2000–2007, 2010–present).

### ***Honors and awards***

International IPM (Integrated Pest Management) Award for Excellence, 2012.

Best Paper Award, 42nd Hawaii International Conference on System Sciences, 2009.

Faculty Mentoring of Undergraduate Student Research Award, 2004.

Innovative Applications of Artificial Intelligence (IAAI) award, 2001.

### ***Service activities (within and outside of the institution)***

Nebraska Hall of Computing Awards Selection Committee, 2014 – 2023.

Member, Dean's Advisory Committee, CBT, UNK, 2022 -2023.

Member, UNK General Studies Committee, 2022 - 2022.

Member, Faculty Affairs Committee (Promotion & Tenure), CBT, UNK, 2018 - 2022.

Chair, Search Committee, Asst Professor, Dept of Cyber Security, UNK, 2020 - May 2021.

Chair, Search Committee, Asst Professor, Dept of Cyber Security, UNK, 2020 – 2020.

Member, CBT/CNSS Adhoc Promotion/Tenure Committee, UNK, 2019 - 2020.

Chair, CSIS Writing Assessment Coordinator, UNK, 2018 - 2019.

Member, Search Committee, Dept Chair, Dept of Cyber Security, UNK, 2018 - 2019.  
Member, UNK Assessment Committee, 2018 - 2019.  
Member, Cyber Systems Merger Committee, UNK, 2017 - 2019.  
Graduate Faculty, University of Nebraska, 2005 – 2023.

***Publications and presentations (selected, from the past five years)***

S. Weitzl-Harms, A. Spanier, John Hastings, and M. Rokusek, Framing Gamification in Undergraduate Cyber Security Education, *Journal of the Colloquium on Information Systems Security Education (CISSE)*, 10(1):1–7 (2023).  
S. Weitzl-Harms, A. Spanier, John Hastings, and M. Rokusek, A Systematic Mapping Study on Gamification for Undergraduate Cyber Security Education, *Journal of Cybersecurity Education, Research and Practice (CCERP)* (2023).  
S. Weitzl-Harms, A. Spanier, John Hastings, and M. Rokusek, Assessing User Experiences with ZORQ: A Gamification Framework for Computer Science Education, 56th Hawaii International Conference on System Sciences (HICSS-56), 2023.  
John Hastings, S. Weitzl-Harms, A. Spanier, M. Rokusek, and R. Hensey, ZORQ: A Gamification Framework for Computer Science Education, IEEE 2022 Frontiers in Education Conference (FIE-22), Sweden, 2022, IEEE Computer Society.  
A. Spanier, S. Weitzl-Harms & John Hastings, A Classification Scheme for Gamification in Computer Science Education: Discovery of Foundational Gamification Genres in Data Structures Courses, Proceedings of the 2021 Frontiers in Education Conference (FIE-21), Lincoln, NE, USA, October 13–16, 2021, IEEE Computer Society.

***Professional development activities***

Webinar, Programming with Generative AI, Aug 10, 2023.  
Webinar, Use Gen AI to Build AI Systems at Scale, Aug 8, 2023.  
Webinar, Exploring the Impact of AI on Student Connection & Belonging, Aug 2, 2023.  
3rd Annual Great Plains Interoperability Conference: Interoperating with AI: How to Manage Data Standards in the 21st Century, Aug 1, 2023.  
Webinar, ML Monitoring: Data Drift, Quality, Bias & Explainability, Aug 1, 2023.  
Webinar, Cracking the Code: Addressing Bias in AI, July 28, 2023.  
Webinar, What startups need to know about AI, July 28, 2023.  
Webinar, The impact of generative AI on creative entrepreneurs, July 27, 2023.  
Webinar, Understanding Generative AI & the Biggest Disruptions in the Next 3-5 Years, July 27, 2023.  
Webinar, Revolutionizing Knowledge with Generative AI, July 26, 2023.  
Webinar, ChatGPT & the Future of Generative AI, July 26, 2023.

## **Mark Spanier**

### ***Education***

Ph.D., Mathematics, North Dakota State University, 2015  
College Teaching Certificate, North Dakota State University, 2015  
B.Sc., Mathematics, North Dakota State University, 2010

### ***Academic experience***

Dakota State University, Interim Dean, College of Arts and Sciences, 2023-Present, full time  
Dakota State University, Associate Professor, Beacom College of Computer and Cyber Sciences, 2022 - present, full time  
Dakota State University, Assistant Professor, 2017 - 2022, full time  
Dakota State University, Instructor, 2015 – 2017, full time  
North Dakota State University, Mathematics Department Teaching Fellow, 2014 – 2015, full time  
West Fargo Public School District, Curriculum Consultant, 2014 – 2015, full time  
North Dakota State University, College of Science and Mathematics Research Fellow, 2013 – 2014, full time  
West Fargo Public School District, GraSUS K-12 Teaching Fellow, 2012 – 2014, full time  
West Fargo Public School District, GraSUS K-12 Teaching Fellow, 2011 – 2012, full time  
North Dakota State University, Graduate Mathematics Instructor, 2011 – 2014, full time  
Carnegie Mellon University, Teaching Assistant, 2010, full time  
North Dakota State University, Teaching Assistant, 2007 – 2010, full time

### ***Non-academic experience***

None

### ***Certifications or professional registrations***

None

### ***Current membership in professional organizations***

Mathematical Association of America Communication Co-Officer (Nebraska/SE South Dakota Section). Elected position charged with updating section website and sending section information, 2022 – present.  
Section Chair (Nebraska/SE South Dakota Section). Elected position charged with hosting, planning, and running the spring sectional meeting, 2021 - 2022  
Section Chair Elect (Nebraska/SE South Dakota Section). Elected position charged with assisting the Section Chair to plan and run sectional meeting, 2019 – 2022  
Communication Officer. Elected position charged with updating section website and sending section information, 2022 – present  
Leader. Elected position charged with planning and developing SINE COMMIT events, 2021 – present  
SINE COMMIT: South Dakota, Iowa, and NEbraska (SINE) COMmunity for Mathematics Inquiry in Teaching (COMMIT)

### ***Honors and awards***

2023, Dr. Ernest Teagarden Award for Excellence in Teaching  
2015, NDSU Mathematics Department Graduate Student Teaching Award  
2015, NDSU College of Science and Mathematics Graduate Student Travel Grant  
2014, NDSU Mathematics Department Graduate Student Research Award  
2014, NDSU College of Science and Mathematics Graduate Student Travel Grant

### ***Service activities (within and outside of the institution)***

2022 – Present, Artificial Intelligence (AI) Club Advisor  
2019 – Present, Honors Committee  
2019 – Present, Gaming Club Advisor  
2019 – Present, Title IX Investigator  
2018 – Present, Faculty Development Committee  
2022 – 2023, Shared Governance Committee  
2022 – 2023, General Faculty President  
2022 – 2023, Faculty Advisory Committee  
2022 – 2023, Implementation Council  
2022, Faculty Search Committee, Assistant Professor(s) of Computer Science (AI Focused)  
2021 – 2022, Faculty Search Committee, Assistant Professor of Mathematics  
2021, Faculty Search Committee, Assistant Professor(s) of Computer Science  
2021, Faculty Search Committee, Instructor(s) of Computer Science  
2021, Faculty Search Committee, Assistant Professor of Mathematics  
2020, Faculty Search Committee, Assistant Professor(s) of Computer Science  
2020, Faculty Search Committee, Instructor(s) of Computer Science  
2016 – 2020, Student Success Committee  
2019 – 2020, Faculty Game Producer, Expedition  
2018 – 2020, Organizer for Mathematics Seminar and Speaker Series  
2018 – 2019, Faculty Game Producer, Kingdom Cleanup  
2017 – 2019, Curriculum Committee  
2019, Faculty Search Committee, Assistant Professor of Mathematics  
2018, Quality Assurance (Online) Reviewer  
2018, Faculty Search Committee, Visiting Assistant Professor of Biology  
2018, General Education Math Summit

### ***Publications and presentations (selected, from the past five years)***

Weighted Uniform Convergence of Entire Grunwald Operators on the Real Line. *Comput. Methods Funct. Theory* (2021). <https://doi.org/10.1007/s40315-021-00408-2>  
Extremal Signatures, with F. Littmann, *Constr. Approx.* 47, no. 2 (2018), 339–356.  
<https://doi.org/10.1007/s00365-017-9373-7>

### ***Professional development activities***

AI and Cybersecurity Workshop, Lead Facilitator, May 2023  
AI and Cybersecurity Workshop, Lead Facilitator, May 2023  
AI and Cybersecurity Workshop, Lead Facilitator, August 2023

## **Michael J. Ham**

### ***Education***

D.Sc., Cyber Security, Dakota State University, 2017  
M.S., Applied Computer Science, Dakota State University, 2015  
M.S., Information Assurance, Dakota State University, 2012  
B.S., Computer and Network Security, Dakota State University, 2010

### ***Academic experience***

Dakota State University, Associate Professor of Computer and Cyber Sciences, 2022, full time  
Dakota State University, Assistant Professor of Computer and Cyber Sciences, 2016-2022, full time  
Dakota State University, Instructor of Information Security, 2013-2016, full time

### ***Non-academic experience***

Madison, Independent Security Consultant, 2013-Present, full time  
Eide Bailly, Security Consultant, 2011-2013, full time  
South Dakota K-12 Data Center, Communications Network Specialist, 2008-2011, full time

### ***Certifications or professional registrations***

None

### ***Current membership in professional organizations***

None

### ***Honors and awards***

None

### ***Service activities (within and outside of the institution)***

National Security Agency Center of Academic Excellence in Cyber Operations Principal  
CyberCorps Scholarship for Service Principal Investigator  
Program Coordinator, B.S. Cyber Operations  
Program Coordinator, Ethical Hacking Graduate Certificate program

### ***Publications and presentations (selected, from the past five years)***

S. Zwach, M. Ham. "ICT: Attendance & Contact Tracing During a Pandemic." International Conference on Information Technology (ITNG). April 2023, Virtual Conference.  
C. Welu, K. Cronin, and M. Ham. "Verifying X.509 Certificate Extensions." International Conference on Information Technology (ITNG). April 2023, Virtual Conference.  
M. Ham, K. Cronin, and T. Halverson. "Electronic Cyber Badge: An Experiential Teaching Platform for Cybersecurity Concepts." EDSIG Conference on Computing Education (EDSIGCON) 2022.  
K. Cronin, M. Ham. "Teaching Routing Concepts: The Internet of Strings." EDSIG Conference on Computing Education (EDSIGCON) 2022.  
M. Ham, K. Cronin, and T. Halverson. "Wireless Security: Learning by Hacking with Software Defined Radios." Midwest Instruction and Computing Symposium (MICS) 2022.

K. Cronin, M. Ham, and T. Halverson. "Internet of Strings: Introducing Routing Concepts to Kids." Midwest Instruction and Computing Symposium (MICS) 2022.

M. Ham, K. Cronin, and T. Halverson. "IPv6 RPKI Implementation Validator: A Security Utility for BGP Administrators". Conference on Information Systems Applied Research (CONISAR) 2021.

K. Cronin, M. Ham (2021). "Using Python for teaching 802.11 security and intrusion detection." Paper presented at EDSIGCON in Washington, D.C.

K. Cronin, M. Ham (2020). "Open Source Capture and Analysis of 802.11 Management Frames." Proc. of the 17th International Conference on Information Technology: New Generations (ITNG: 2020). April 2020, Las Vegas, NV USA (virtual conference).

K. Cronin, M. Ham (2020). "A python tool for rogue 802.11 hunting." Paper presented at Central Area Networking and Security Workshop (CANSec) in Ames, IA.

***Professional development activities***

DEF CON Security Conference, Las Vegas, NV, August 2023

Black Hat Training, Reverse Engineering Firmware with Ghidra, Las Vegas, NV, August 2023

Center of Academic Excellence Symposium, Seattle, WA, June 2023

Invited Presentation at Marquette University, Milwaukee, WI, April 2023

Scholarship For Service Principals Meeting, Washington, D.C., January 2023

GenCyber Fall Meeting presentation, Online, October 2022

Center of Academic Excellence Northwest Hub, Denver, CO, September 2022

DEF CON Security Conference, Las Vegas, NV, August 2022

Black Hat Training, Advanced Threat Emulation, Las Vegas, NV, August 2022

Center of Academic Excellence Symposium, Atlanta, GA, June 2022

GenCyber Spring Meeting, Arlington, VA, May 2022

Scholarship For Service New Principal Investigator Workshop presentation, Arlington, VA, April 2022

Center of Academic Excellence Program Assistance Workshop, Online, January 2022

Cybersecurity Program Development Workshop, Online, January 2022

Center of Academic Excellence Peer Review Workshop, Online, January 2022

DEF CON Security Conference, Las Vegas, NV, August 2021

Center of Academic Excellence Principals, Columbia, MD, November 2021

Black Hat Briefings, Las Vegas, NV, August 2021

## **Stephen Krebsbach**

### ***Education***

Ph.D., Computer Science, North Dakota State University, 2005

M.S., Computer Science, Moorhead State University, 1990

B.Sc., Computer Science, Moorhead State University, 1986

### ***Academic experience***

Dakota State University, Professor of Computer Science, 2016 - Present, full time

Dakota State University, Associate Professor of Computer Science, 2006 - 2016, full time

Dakota State University, Assistant Professor of Computer Science, 2000 - 2006, full time

South Dakota State University, Assistant Professor of Computer Science, 1998 - 2000, full time

North Dakota State University, Teaching Fellow, Computer Science, 1997 – 1998, full time

North Dakota State University, Research Assistant, Computer Science, 1997 – 1998, full time

South Dakota State University, Instructor of Computer Science, 1988 - 1997, full time

Dakota State University, Coordinator in Doctor of Philosophy Computer Science, 2020 – Present, full time

Dakota State University, Coordinator in Master of Computer Science, 2015 – 2020, full time

Dakota State University, Academic Coordinator of Computer Science, 2003-2007, full time

### ***Non-academic experience***

None

### ***Certifications or professional registrations***

None

### ***Current membership in professional organizations***

ACM Member

SIGCSE – ACM Special Interest Group in Computer Education Member

IEEE Member

IEEE Computer Society Member

### ***Honors and awards***

2016 – The Alexander "Sandy" Davidson Award of Excellence in Advising – DSU

PI: \$75,588 (2009), as part of the State of South Dakota EPSCoR RII Track 1 proposal, for plan the vDUSEL/vSURF E&O project as South Dakota continues to partner on the DUSEL (vSURF) project. This EPSCoR participation in a major grant for DSU helped build our research presence in that organization. It also included funding to support State research communication infrastructure.

+ additional ~ \$5000 for Governor's PBS Documentary video

+ additional ~ \$2000 for additional vDusel work

+ additional ~\$1500 for VDUSEL Teaser Video

PI: \$5000 (2008) "Virtual SUSEL/DUSEL" SDBOR Mini Grant – This was pre EPSCoR vDUSEL and helped lay the groundwork for inclusion in that major grant.

Co-Principal Investigator Approx \$400,000 over 4 years (2002-2005) NSF - 02-006 CSEMS – CS, ENG & MATH SCHOLARSHIPS MACSTECH Scholars: A Mathematics and Computer



Science Technology Scholarship Program. Continued to serve as CO-PI and was awarded an additional ~ \$83,640 over the FY06-08 period.

***Service activities (within and outside of the institution)***

2008 – 2014, DSU EPSCoR Coordinator  
2005 – 2012, Governor's State IT Discipline Council (President 2006-07)  
2008 – 2012, VDUSEL/VSURF Project Leader – Sanford Underground Lab  
2009 – 2012, Sanford Center of Science Education (SCSE) Project Design Team  
2010 – 2013, SD EPSCoR Advisory Committee  
2022 – Present, Beacom ABET Taskforce  
2019 – Present, Academic Assessment Coordinating Committee  
2020 – Present, Joint DSU/SDSU CSC Doctorate Advisory Committee  
2015 – Present, University Graduate Coordinators  
2012 – Present, MSCS / PhD CSC Admissions  
2000 – Present, Graduate Council  
2020 – 2021, University Promotion and Tenure  
2008 – 2022, University Curriculum  
2018 – 2021, University Hall of Fame Committee  
2016 – 2018, College of Computing Dean's Advisory  
2016 – 2019, University Faculty Academic Integrity Board (chair)  
2016 – 2017, University Promotion and Tenure (President 2017)  
2016 – 2018, University General Education Review  
2008 – 2016, University Assessment  
2015 – 2016, Graduate Program Review  
2014 – 2016, Faculty/Admissions working group  
2014 – 2015, BIS Taskforce  
2006 – 2013, University Research  
2011 – 2012, President's Publication Taskforce (P&T related)

***Publications and presentations (selected, from the past five years)***

None

***Professional development activities***

"Sanford Underground Research Facility Website Enables Users to Explore Virtual Underground Environment Online" - SD EPSCoR UPDATE- Winter 2012 Edition – Authored by Dr. Stephen Krebsbach – 2012

"DSU website taking a closer look at Sanford lab in Lead" – Rapid City Journal – September 27, 2011

State of South Dakota Featured Researcher Profile – Dr. Stephen Krebsbach, Research, Education, & Economic Development Network (REED) Brochure/Booklet, SDBOR - 2009

"Virtual DUSEL to be major educational component for lab" – Wendy Pitlick; Black Hills Pioneer & The Rapid City Weekly News – October 21, 2008

## **Tom Halverson**

### ***Education***

Ph.D., Computer Science, The University of Iowa, 1999  
M.S., Computer Science, The University of Iowa, 1992  
B.A., Computer Science, University of Minnesota, 1990

### ***Academic experience***

Dakota State University, Professor Computer Science, Beacom College of Computer and Cyber Sciences, 2023-Present, full time

Dakota State University, Associate Dean for Undergraduate Programs, Beacom College of Computer and Cyber Sciences, 2022 - Present, full time

Dakota State University, Associate Professor, Beacom College of Computer and Cyber science 2005 - 2022, full time

Dakota State University, Academic Coordinator, Undergraduate Computer and Cyber Sciences programs 2000 – 2004, 2016 – 2022, full time

Dakota State University, Dean, College of Business and Information System, 2003 – 2014

Dakota State University, Assistant Professor, 1999 – 2005, full time

### ***Non-academic experience***

None

### ***Certifications or professional registrations***

None

### ***Current membership in professional organizations***

ACM

### ***Honors and awards***

None

### ***Service activities (within and outside of the institution)***

Serve as a co-PI for Dakota State University's CyberCorps Scholarship for Service (SFS) program. DSU's program is one of the nation's largest in providing full ride scholarships and has supported 113 students since its inception. The scholarship program places graduates into full-time positions within the government (federal, state, local, or Tribal), to help meet the need for qualified, technically capable cybersecurity professionals.

Served as co-PI on the grant to include undergraduate students in the research project. This was part of the national collaboration involving over 10 universities and several federal agencies.

### ***Publications and presentations (selected, from the past five years)***

M. Ham, K. Cronin, and T. Halverson. "Electronic Cyber Badge: An Experiential Teaching Platform for Cybersecurity Concepts." EDSIG Conference on Computing Education (EDSIGCON) 2022.

M. Ham, K. Cronin, and T. Halverson. "Wireless Security: Learning by Hacking with Software Defined Radios." Midwest Instruction and Computing Symposium (MICS) 2022.

K. Cronin, M. Ham, and T. Halverson. "Internet of Strings: Introducing Routing Concepts to Kids." Midwest Instruction and Computing Symposium (MICS) 2022.

M. Ham, K. Cronin, and T. Halverson. "IPv6 RPKI Implementation Validator: A Security Utility for BGP Administrators". Conference on Information Systems Applied Research (CONISAR) 2021.

***Professional development activities***

None

## **Yong Wang**

### ***Education***

Ph.D., Computer Science, University of Nebraska-Lincoln, 2007

M.Eng., Computer Science, Wuhan University, 1998

B.Sc., Computer Science, Wuhan University, 1998

### ***Academic experience***

Dakota State University, Professor, Associate Dean of Beacom Graduate programs, 2022-Present, full time

Dakota State University, Associate Professor, Program Coordinator of the Ph.D. Cyber Operations Program, 2017-2022, full time

Dakota State University, Assistant Professor, 2012-2017, full time

### ***Non-academic experience***

Calient Networks, Santa Barbara, CA, Senior Software Engineer/Manager, 2007-2011, full time

UTStarcom R&D Center, Shenzhen, China, Senior Software Engineer, 2002-2003, full time

ZTE Corporation, Shenzhen, China, Senior Software Engineer, 1998-2000, full time

### ***Certifications or professional registrations***

None

### ***Current membership in professional organizations***

Senior Member, IEEE, 2004 – Present

PEV, Commissioner, ABET CAC, 2018 - Present

### ***Honors and awards***

2015 Merrill Hunter Award for Excellence in Research at Dakota State University.

2007 Outstanding graduate teaching assistant awarded by the Department of Computer Science and Engineering, University of Nebraska-Lincoln.

2003-2007 Full scholarships for doctoral study at University of Nebraska-Lincoln.

1997 Outstanding graduate student scholarship awarded by the Wuhan University.

1994 Outstanding undergraduate research student awarded by the Wuhan University.

1992 Outstanding undergraduate student scholarship awarded by the Wuhan University.

### ***Service activities (within and outside of the institution)***

A member of DSU Graduate Council, Institutional Review Board, MSCS Admission Committee, MSCD Admission Committee, Ph.D. in Cyber Operations Admission Committee.

ABET Computing Accreditation Commission (CAC) Program Evaluator, since 2018

Served as a Co-chair for the Cybersecurity and big data working group in the Middle West Big Data Hub.

Served as Technical Program Committee member for over 40 conferences/workshops including IEEE ICC, IEEE Globecom, and ICNC.

Served as reviewer for over 10 journals including IEEE Transactions on Computational Social Systems, IEEE Transactions on Industrial Informatics, IEEE Access, and IEEE Computer.

Served as a reviewer/panelist for the US National Science Foundation (NSF).

Served as a proposal reviewer for Loire Valley Institute for Advanced Studies, France  
Served as poster co-chair for the 15th IEEE International Conference on Mobile Ad-hoc and Sensor Systems (MASS) in 2018.

***Publications and presentations (selected, from the past five years)***

Carson Koball, Bhaskar P Rimal, Yong Wang, Tyler Salmen, Connor Ford, IoT Device Identification Using Unsupervised Machine Learning, *Information* 2023, 14(6), 320; <https://doi.org/10.3390/info14060320>.

Kaushik Muthusamy Ragothaman, Yong Wang, Bhaskar Rimal, and Mark Lawrence, Access Control for IoT: A Survey of Existing Research, Dynamic Policies and Future Directions, *Sensors*, 23, no. 4: 1805 (2023). <https://doi.org/10.3390/s23041805>

Bhaskar Rimal, Cuiyu Kong, Bikrant Poudel, Yong Wang, Pratima Shahi, Smart Electric Vehicle Charging in the Era of Internet of Vehicles, Emerging Trends, and Open Issues. *Energies*. 2022; 15(5):1908. <https://doi.org/10.3390/en15051908>

Kai Taylor, Alexandra Smith, Adam Zimmel, Korina Alcantara, and Yong Wang, Medical Device Security Regulations and Assessment Case Studies, the 8th National Workshop for REU Research in Networking and Systems (REUNS 2022), Denver, Colorado, October 20 - 22, 2022. (Best Paper Runner Up Award)

Yong Wang, Bhaskar P. Rimal, Mark Elder, Sofia I. Crespo Maldonado, Helen Chen, Carson Koball, and Kaushik Ragothaman, IoT Device Identification Using Supervised Machine Learning, 2022 IEEE International Conference on Consumer Electronics (ICCE), Jan 7-9, 2022.

Mohammad Nur and Yong Wang, Identity Relationship Management for Internet of Things: A Case Study, 2022 IEEE International Conference on Consumer Electronics (ICCE), Jan 7-9, 2022.

Mohammad Nur and Yong Wang, An Overview of Identity Relationship Management in the Internet of Things, 2021 IEEE International Conference on Consumer Electronics (ICCE), Jan 10-12, 2021.

Yong Wang, Kaushik Muthusamy Ragothaman, and Bijay Shakya, Towards Trusted Data Processing for Information and Intelligence Systems, Hawaii International Conference on System Sciences (HICSS-54), Kauai, Hawaii, January 5-8, 2021.

Sulabh Bhattarai and Yong Wang, End-to-End Trust and Security for Internet of Things Applications, *IEEE Computer*, April 2018.

***Professional development activities***

Principle Investigators: NSF CNS 1123220, NSF CNS 1200648, NSF CNS 1337529, NSF CNS 1852145, and NCAE-C-001-2021 H98230-21-1-0164; Co-PI: NSF OAC 1730105. Total: \$2.3MM.