Dr. Michael J. Ham
820 N. Washington Ave.
Madison, SD 57042
Work: (605) 256-5838
Email: Michael.Ham@dsu.edu

EDUCATION:

Dakota State University | Madison, SD
Doctor of Science in Cyber Security **2017**

Dakota State University | Madison, SD
Master of Science in Applied Computer Science **2015**

Dakota State University| Madison, SD
Master of Science in Information Assurance **2012**

Dakota State University | Madison, SD
Bachelor of Science in Computer and Network Security **2010**

ACADEMIC EXPERIENCE:

Associate Professor of Computer and Cyber Sciences **August 2022**
Dakota State University | Madison, SD August

Assistant Professor of Computer and Cyber Sciences **2016-2022**
Dakota State University | Madison, SD

- Developed courses and taught advanced cybersecurity topics to upper-level undergraduate and doctoral students. Primary teaching areas include software reverse engineering, cyber operations, and routing and switching. These focus areas encompass several knowledge areas of cyber operations such as assembly, C, Python, vulnerability analysis, software exploitation, network protocol analysis, enterprise networking, offensive security, and security first principles. Courses were designed to meet the National Security Agency's Cyber Operations (CAE-CO) and Cyber Defense (CAE-CD) designation requirements.
- Lead faculty for Dakota State University's NSA Center of Academic Excellence in Cyber Operations (CAE-CO) designation. Duties include applying for the designation renewal, annual reporting, organizing faculty, reviewing curriculum, and actively supporting the CAE Cyber Operations community efforts. I also supported the CAE-CD and CAE-R teams at DSU with reporting and curriculum development for those designations.
- Grant attainment and administration for cybersecurity-related initiatives. Principal investigator for CyberCorps Scholarship for Service (SFS), funded by the National

Science Foundation. Co-PI on other grants, including the DoD Cyber Scholarship Program (CySP) and GenCyber. Additionally, I secured funded research and development from DoD partners through ongoing agreements.

- Program coordinator for DSU's Cyber Operations bachelor's program and graduate-level Ethical Hacking Certificate. I also work closely with our Ph.D. Cyber Operations coordinator for the continued development of that program. I maintain and develop articulation agreements between DSU and the NSA's National Cryptologic University (NCU).
- Academic advisor for approximately 140 undergraduate and graduate students enrolled in Cyber Operations, Computer Science, Network and Security Administration, and Ethical Hacking programs. As an advisor, I work to ensure student success through scheduling, degree audits, career advice, retention, persistence, and student placement.
- Dissertation chair and dissertation committee member for several students enrolled in DSU's Cyber Operations Ph.D. program.

Instructor of Information Security **2013-2016**
Dakota State University | Madison, SD

- Developed and delivered courses in the B.S. Cyber Operations, B.S. Network Security Administration, M.S. Information Assurance and Computer Security programs. Content areas included C programming, Windows administration, Linux administration, offensive network security, routing and switching, networking, virtualization, and computer hardware. Curriculum centered around NSA Centers of Academic Excellence in Cyber Operations (CAE-CO) and Cyber Defense (CAE-CD) destination requirements.
- Academic advising for around 80 students enrolled in DSU's Cyber Operations, Computer Science, and Network and Security Administration degree programs. Advising responsibilities include new student orientation, recruiting, scheduling, degree audits, placement assistance, and supporting university retention/persistence efforts.
- Co-PI on several cybersecurity grant applications, several of which were funded. Such grant efforts include CyberCorps SFS, GenCyber, and the Cybersecurity National Action Plan curriculum development. Additionally, I was the co-administrator of DakotaCon, a sizeable technical cybersecurity conference in South Dakota. Alongside of conferences, I coached student cybersecurity competition teams and was the North Central Collegiate Cyber Defense Competition (CCDC) Red Team lead.
- Collaboration with the DSU Information Technology Services (ITS) department in a lead role in architecting the campus routing and switching infrastructure to allow for a more secure, faster, and more flexible environment within the university.

INDUSTRY EXPERIENCE:

Independent Security Consultant **2013-Present**
Madison, SD

Since relocating to the field of academia, I have maintained a security consulting practice. I have performed network and software penetration testing and physical security assessments for various clientele in this practice. I also serve clients as an industry expert to make recommendations on infrastructure, vulnerability remediation, and policy. This venture develops and maintains industry relationships while continuing to build my current skillsets and viewpoints requisite of an industry professional.

Security Consultant **June 2011 to August 2013**
Eide Bailly | Fargo ND

During this time, I worked as the lead cyber security consultant for Eide Bailly. My primary client-facing responsibilities included leading penetration testing efforts on external networks, internal networks, wireless networks, physical site assessments, social engineering, reporting, and making recommendations for improving an organization's security posture. In addition, I administered the internal infrastructure that supported penetration testing and security practices at Eide Bailly. Other responsibilities included supporting sales efforts, developing new strategies, and refining existing security consulting services. Lastly, I led both internal and external cyber security training engagements.

Communications Network Specialist **April 2008 – May 2011**
South Dakota K-12 Data Center | Madison, SD

I began my employment at the K-12 data center as a student laborer whose focus was on web and software development, database management and design, statistical data reporting and presentation, and system training. Upon moving to a full-time role, my duties expanded into monitoring server hardware, software health, system maintenance, policy development, internet-based services such as FTP/email/web, product testing, and implementing new systems and services. In this role, I continually developed the essential competencies of a successful network administrator.

RESEARCH GRANTS AND PUBLICATIONS:

Publications

1. **M. Ham**, A. Kramer. (2023, September 27). *Preventing Ransomware and Malware Starts with Good Cyber Hygiene*. Infosecurity Magazine. https://www.infosecurity-magazine.com/blogs/preventing-ransomware-with-cyber/
2. **M.Ham**, A.Kramer. "Hardware Reverse Engineering Platform: An Open-source Educational Tool." Computing Education + Information Systems Applied Research (ISCAP) 2023.
3. S. Zwach, **M. Ham**. " ICT: Attendance & Contact Tracing During a Pandemic." International Conference on Information Technology (ITNG). April 2023, Virtual Conference.
4. C. Welu, K. Cronin, and **M. Ham**. "Verifying X.509 Certificate Extensions." International Conference on Information Technology (ITNG). April 2023, Virtual Conference.
5. **M. Ham**, K. Cronin, and T. Halverson. "Electronic Cyber Badge: An Experiential Teaching Platform for Cybersecurity Concepts." EDSIG Conference on Computing Education (EDSIGCON) 2022.
6. K. Cronin, **M. Ham**. "Teaching Routing Concepts: The Internet of Strings." EDSIG Conference on Computing Education (EDSIGCON) 2022.
7. **M. Ham**, K. Cronin, and T. Halverson. "Wireless Security: Learning by Hacking with Software Defined Radios." Midwest Instruction and Computing Symposium (MICS) 2022.
8. K. Cronin, **M. Ham,** and T. Halverson. "Internet of Strings: Introducing Routing Concepts to Kids." Midwest Instruction and Computing Symposium (MICS) 2022.
9. **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.
10. K. Cronin, **M. Ham** (2021). "Using Python for teaching 802.11 security and intrusion detection". Paper presented at EDSIGCON in Washington, D.C.
11. 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).
12. 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.
13. Dissertation: **Ham, M**., "BGP Route Attestation: Design and Observation Using IPv6 Headers" (2017). *Masters Theses & Doctoral Dissertations. 308.* https://scholar.dsu.edu/theses/308
14. K. Cronin, W. Pauli, **M. Ham**. (2012). Using the Cloud: The Cost of Encryption in IaaS. Paper presented at Conference on Information Systems Applied Research in New Orleans, LA.
15. K. Cronin, W. Pauli, and **M. Ham**. Using the Cloud: Keeping Enterprise Data Private, Journal of Information Systems Applied Research (JISAR 2012), Issue 3, Volume 5, 212
16. K. Cronin, W. Pauli, **M. Ham**. (2011). Using the cloud: Keeping Enterprise Data Private. Paper presented at Conference on Information Systems Applied Research in Wilmington, NC.

17. Pauli, **M. Ham**, M. Zautke, and P. Engebretson. "CookieMonster: Automated Session Hijacking Archival and Analysis". Proc. of the 7th International Conference on Information Technology: New Generations (ITNG 2011). April 2011, Las Vegas, NV, USA

Grants

1. Dakota State University CyberCorps SFS (PI), Supplement
   - Funding Agency: National Science Foundation
   - Total Awarded: $571,400
   - Period of Performance: 09/11/2023-06/30/2025
2. Department of Defense Cyber Scholarship Program (CO-PI)
   - Funding Agency: National Security Agency
   - Total Awarded: $115,961
   - Period of Performance: 08/10/2021-12/31/2022
3. DSU GenCyber Co-Ed (Co-PI)
   - Funding Agency: National Science Foundation and the National Security Agency
   - Total Awarded: $149,986
   - Period of Performance: 03/01/2020-03/01/2022
4. Dakota State University CyberCorps SFS Expansion (PI)
   - Funding Agency: National Science Foundation
   - Total Awarded: $560,321
   - Period of Performance: 06/22/2020-08/21/2021
5. Dakota State University CyberCorps SFS Renewal (PI)
   - Funding Agency: National Science Foundation
   - Total Awarded: $5,499,908
   - Period of Performance: 07/01/2019-06/30/2024
6. DSU and NDSU GenCyber Partner Camp (Co-PI)
   - Funding Agency: National Science Foundation and the National Security Agency
   - Total Awarded: $139,468.03
   - Period of Performance: 04/01/2019-03/31/2020
7. DSU GenCyber Co-Ed (Co-PI)
   - Funding Agency: National Science Foundation and the National Security Agency
   - Total Awarded: $260,425.46
   - Period of Performance: 04/01/2019-03/31/2020
8. DSU and NDSU GenCyber Partner Camp (PI)
   - Funding Agency: National Science Foundation and the National Security Agency
   - Total Awarded: $116,617.50
   - Period of Performance: 04/01/2018-03/31/2019
9. DSU GenCyber Co-Ed (Co-PI)
   - Funding Agency: National Science Foundation and the National Security Agency
   - Total Awarded: $268,023.70
   - Period of Performance: 04/01/2018-03/31/2019
10. CNAP Curriculum Development (Co-PI)
    - Funding Agency: National Security Agency

- Total Awarded: $ 490,507.13
- Period of Performance: 09/1/2017-08/31/2018

11. DSU GenCyber Co-Ed (Co-PI)
    - Funding Agency: National Science Foundation and the National Security Agency
    - Total Awarded: $335,843
    - Period of Performance: 03/01/2017-02/28/2018
12. DSU GenCyber Co-Ed (Co-PI)
    - Funding Agency: National Science Foundation and the National Security Agency
    - Total Awarded: $280,583.35
    - Period of Performance: 04/01/201-03/31/2017
13. DSU GenCyber Co-Ed (Co-PI)
    - Funding Agency: National Science Foundation and the National Security Agency
    - Total Awarded: $ 141,256
    - Period of Performance: 04/01/2015-03/31/2016
14. Dakota State University NSF-SFS Cyber Corps Renewal (Co-PI)
    - Funding Agency: National Science Foundation
    - Total Awarded: $4,594,212
    - Period of Performance: 08/15/2014-07/31/2019

Invited Presentations

1. **M.Ham**, K.Cronin. 20 Years of CAE: Was the Juice Worth the Squeeze?. National Cybersecurity Education Colloquium (NCEC); September 20, 2023, Chicago, IL.
2. **M.Ham**. Leading a Successful SFS Program. Marquette University Colloquium; April 3, 2023, Milwaukee, WI.
3. **M.Ham**, K.Cronin. Camp Activity – Electronic GenCyber Badge. GenCyber 2022 Fall Meeting; October 21, 2022; Virtual.
4. **M.Ham**. Student success = Your success. SFS New PI Bootcamp; April 28, 2022; Arlington, VA.

RELEVANT COURSES TAUGHT

Presented in reverse chronological order:

- Associate Professor, Dakota State University: CSC846 Advanced Malware Analysis
  This course covers advanced techniques used in malware analysis. Topics will focus heavily on static analysis of unknown binaries utilizing reverse engineering tools and procedures. The course will also cover advanced anti-malware analysis processes such as: Anti-reverse engineering methods and advanced obfuscation practices employing packers and anti-debugging processes.
- Associate Professor, Dakota State University: CSC432 Malware Analysis
  This course provides fundamental knowledge of Malware analysis. Topics include an introduction to both static and dynamic techniques for analyzing unknown binaries. Students will be exposed to advanced malware concepts including malware

detection as well as the utilization of industry standard tools to analyze, debug, and reverse engineer unknown binaries.

- Associate Professor, Dakota State University: CSC840 Cyber Operations I
  This course covers areas related to the following knowledge units/objectives: principles of Security such as general fundamental design, security design, and methods for reducing complexity; legal Issues surrounding international and US laws; networking protocols, architectures, security, analysis, and mapping; and offensive Cyber Operations as they relate to the cyber kill chain, mission planning/execution, mission objectives, and the different phases of cyber ops.

- Assistant Professor, Dakota State University: CSC428 Reverse Engineering
  This course provides fundamental knowledge of secure software development methodologies and applied security topics related to compiled programs. In-depth coverage of source code auditing, fuzzing, introduction to reverse engineering, and exploitation are emphasized. Additional focus areas include static/dynamic malware analysis, disassembler scripting, and operating system internals.

- Assistant Professor, Dakota State University: CSC407 Advanced Routing & Switching
  This course covers many advanced topics that a network communications administrator may encounter. Topics include advanced routing protocols and security implications, VPNs, firewalls, IDS/IPS, quality of service, multi-vendor internetworking, VoIP, the Border Gateway Protocol (BGP), and automated device provisioning. This class is highly hands-on, and students learn through practical lab work.

- Assistant Professor, Dakota State University: CSC163 Hardware, Virtualization, and Data Communications
  Students learn about consumer-grade and enterprise-level hardware from multiple angles. Focus areas include how data moves through a computer system, architecture, and its impact on security. Additional topic areas expose students to server room environments, enterprise routing and switching equipment, and virtualization in user and large-scale scenarios.

- Assistant Professor, Dakota State University: CSC387 Routing and Switching
  A core routing and switching course that covers essential topics, protocols, hardware, implementation, and troubleshooting skills necessary for network communications. Students focus on network segmentation, OSI layers, routing protocols, shortest path algorithms, switching, traffic encryption, and traffic routing. The course delivery methods encompass a variety of vendors in a physical and virtual lab setting for hands-on practice and the application of course materials.

- Assistant Professor, Dakota State University: CSC436 Offensive Network Security
  An upper-level security course that provides theoretical and practical aspects of penetration testing, social engineering, and exploitation. Students learn through five phases of penetration testing: reconnaissance, scanning/vulnerability assessment, gaining access and exploitation, maintaining access, and covering tracks. These concepts are taught in an

applied method and closely guided by the ever-evolving methodologies used by professionals.

- Instructor, Dakota State University: INFA736 Offensive Network Security
  A master's course that continues the undergraduate Offensive Network Security course. Students look at the five distinct phases of ethical hacking, including reconnaissance, scanning and vulnerability assessment, gaining access and exploitation, maintaining access, and covering tracks. A strong emphasis is placed upon exploit development, research, and writing custom tools. Hands-on labs are used to provide students with practical experience.
- Instructor, Dakota State University: CIS383 Networking I
  Networking I covers a variety of introductory networking topics for beginning students. This class covers LAN topologies, media choices, protocols, transmission techniques, and equipment overviews. Additionally, software offerings and problem determination procedures are presented. This gives students a foundation for developing different networking skills and viewpoints professionals need.
- Instructor, Dakota State University: CIS460 Windows Administration
  Students are given a foundation in Windows-based network's day-to-day administration and operation tasks in this class. Topics related to the administration of a Windows network include Active Directory, DHCP, DNS, IIS, routing, security templates, group policy, troubleshooting, and security best practices. Students practice hands-on skills in a virtual environment composed of systems representative of a typical Windows network found in a small to enterprise-level business.
- Instructor, Dakota State University: CSC150 Computer Science I
  Students are exposed to an introductory level of C programming. Primary concepts include programming logic, data types, loops, conditional operators, functions, prototyping, and best practices. Natural areas of this hands-on exploration include compiling, troubleshooting, and critical thinking. A crucial implementation of this course is the development of secure coding concepts and the potential outcomes of those practices. Students are offered challenges and sample problem sets to develop these foundational skills.
- Instructor, Dakota State University: CIS462 UNIX/Linux Administration
  This course exposes and prepares students for basic administration, networking, and security-oriented tasks in professional UNIX/Linux-based servers. Students are taught to manage services and processes, write shell scripts, manage the file system, provide DHCP/FTP/DNS services, manage accounts, and troubleshoot networks. The course engages students in a realistic environment where students may directly see the impacts and benefits of their configuration from a server/client standpoint.

ADDITIONAL ACTIVITIES

National Security Agency Center of Academic Excellence in Cyber Operations Principal
Dakota State University holds several Center of Academic Excellence (CAE) designations, including the most prestigious for Cyber Operations (CAE-CO). As the Bachelor of Science in Cyber Operations Program Coordinator, I serve as the principal for maintaining the degree's CAE-CO designation status. Designated programs are highly technical, inter-disciplinary, and firmly grounded in computer science disciplines. Responsibilities of this role include driving curriculum development to maintain NSA standards, participating in working groups to further mature designation standards, mentoring fellow institutions applying for the designation, annual reporting, and redesignation processing.

National Security Agency Articulation Agreements
Dakota State University was the first academic institution of higher education to form a cybersecurity articulation agreement with the National Security Agency's (NSA) National Cryptologic University (NCU), formerly known as the National Cryptologic School (NCS). Under the agreement, NSA military and civilian employees may transfer NCS coursework to DSU's bachelor's in Cyber Operations and master's Computer Science degree programs. I am the primary person responsible for maintaining and developing this articulation at the undergraduate level and providing support in a similar facet for the graduate program.

Department of Defense Applied Research and Development
As part of my scholarly activities, I have secured more than 1,500 hours of externally funded projects from the Department of Defense (DoD) to perform applied research and development in the cybersecurity field. My primary areas of contribution include software reverse engineering, vulnerability analysis, and exploit development. This work is performed in both classified and unclassified settings.

CyberCorps Scholarship for Service Principal Investigator
I serve as the Principal Investigator 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. 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. At DSU, we run the DoD Cyber Scholarship Program (CySP) in concert with CyberCorps, and I serve as the Co-PI of that grant. I also administer DSU's CyberCorps Alumni scholarship, a program that engages past scholarship recipients to create scholarships for rising students through direct donations and an endowment.

Other

- Maintain security clearance.
- Support the DSU Applied Research Lab (ARL) ISSO/SSO team with operations and maintain the security of the lab
- National Science Foundation grant application reviewer: SFS CyberCorps and Secure and Trustworthy Cyberspace (SaTC).
- Technology outreach to regional K-12 institutions. Building relationships with K-12 partners to offer classroom instructional demos and recruiting events.
- Beacom Institute of Technology design and construction of Academic Server Room (ASR).
- Institutional hiring and search committees.
- Participation in university committees, including the University Research Committee, Scholarship Committee, Human Subjects Committee, and the Bookstore Users Committee