

CURRICULUM VITAE

NAME: Carlson, Albert H.

DATE: January 28, 2025

EDUCATION BEYOND HIGH SCHOOL:

Degrees:

Ph.D., Computer Science, August 2012, University of Idaho, Moscow, Idaho

M.S., Computer Science, May 2003, University of Idaho, Moscow, Idaho

B.S. Computer Engineering, August 1981, University of Illinois, Urbana, Illinois

Certificates and Licenses:

None

EXPERIENCE:

Teaching and Research Appointments:

Graduate Teaching Assistant, University of Idaho, August 2002-May 2009

Graduate Research Assistant, University of Idaho, August 2002-August 2003

Teaching Assistant, University of Illinois, May 1981-August 1981

Asst. Professor of Math and Cybersecurity, Fontbonne University, August 2013 – May 2016

Professor, CIT, (Level V, Step 15) Austin Community College, August 2021 – (2022 promoted to Professor) – August 2024

Adjunct Professor, CS, TX State University, 2022

Associate Professor, CS, National University, April 2025 - Present

Non-Academic Employment including the Armed Forces:

Chief Scientist/Chief Technology Officer, Member of the Board (2017 – 2019) – Research and Development, CipherLoc Corporation, Manchaca, TX, 2016 – 2020. Lead research and development department, supervising up to 9 engineers. Designed new products, filed 11 patents, Created hardware encryption and obscuring solutions and designed algorithms for decryption of different ciphers, such as CBC. Represented the company in conferences and college outreach programs.

Chief Scientist/Chief Technology Officer, Member of the Board, Consultant – Xsette Corporation, Las Vegas, NV (2011 – Present). Design new products, filed 5 patents (2 granted to date), based on node pairing technology, invisible watermarking, and geometric encryptions.

Sr. Research Mathematician – Research and Development, Validus Technologies/Orions Digital Technologies/Dameratech, Concord, CA, 2010-2011. Responsible for researching and the design of new product algorithms, consulting on projects requiring set method mathematics, and the evaluation of technology used in products.

Sr. Project Engineer II – Critical Infrastructure Protection Security, POWER Engineers, Inc, Clarkston, WA, 2008-2010. Responsible for developing the CIP program for the company, facility security audits, designing security systems to meet federal CIP standards, and developing the CIP market.

Technical Team Leader – Integrated Circuit and Software Development, Charles Industries, Inc., Rolling Meadows, Illinois, 1997-2002. Managed the development of software and integrated circuits for all company products. Responsible for the selection and purchase of all tools related to the development effort. Direct supervision of 5 Integrated Circuit Designers and 5 Software Designers. Also responsible for Engineering Department purchasing, annually directing \$10 million in service and product purchases.

Sr. Project Engineer – Research and Development, Zenith Electronics, Corp, Glenview, IL, 1995-1997. Responsible for the integrated circuit development of HDTV. Assisted R&D engineers in partitioning and implementing designs in chip form, researched and selected IC design software for use by the company, and led the effort to standardize software used by the company. Direct supervision of two engineers. Advisor to the CTO on integrated circuits and semiconductor technology.

Project Engineer – (Level 35) Train Transit Division, Vapor Corporation, Niles, IL, 1993-1995. Led the design of the first integrated circuit based train and bus door openers used in the industry. Responsible for the project, start to finish, including developing the extensible architecture, platform, and integration of the product with existing equipment. Interfaced with customer to

- ensure first article approval and first article installation at customer facilities for testing. Direct supervision of 2 software engineers, 1 hardware engineer, and a technician.
- Sr. Digital Engineer - Integrated Circuit Development, Monolithic Sensors, Inc, Rolling Meadows, IL, 1991-1993. Responsible for leading the digital design effort for digitally controlled and programmed pressure sensors, volume controls for hearing aids, and other related functions. Direct supervision of one technician.
- Sr. Field Application Engineer – Integrated Circuits, NEC Corp, Arlington Heights, IL, 1989-1991. Responsible for converting customer circuits into integrated circuits, delivering completed and tested chips for customer approval. Provided technical expertise in selecting the proper technology, package, and optimization techniques for fast, error-free implementation of circuitry in available chip families.
- Sr. Research Engineer – Research and Development, Du Kane Corp, St. Charles, IL, 1987-1989. Responsible for the design of integrated circuits for 802.5 Token Ring communication systems. Acted as a consultant on any project that required circuit integration to meet size or speed constraints.
- Sr. Engineer – TS3 Project, Northrop Defense Systems Division, Arlington Heights, IL, 1985-1987. Responsible for design work on classified projects. TS+ clearance, presently in abeyance.
- Sr. Engineer – Manufacturing, Pall Pneumatic Products Division, Ocala, FL, 1984-1985. Responsible for coordination of manufacturing electronics and the design of digital control circuitry for industrial gas dehydrators. Created and implemented an anti-static program. Advised manufacturing on state-of-the-art fabrication processes.
- Engineer II – Cellular Phones, E. F. Johnson, Co, Waseca, MN, 1983-1984. Responsible for the design of peripherals for an early cellular phone system. Designed an intelligent battery charger, remote handset, and phone simulator.
- Asst. S-3 Officer – Electronic Warfare, US Army, 1981-1983. Responsible for coordinating training for the 105th MI Bn (CEWI), training for unit personnel, and classified intelligence functions. Served as Division Classified TSO and as staff officer on multiple exercises at Division and Corps levels. Cross trained as an Air Force EW Officer. Exceeded course standards in Officer Basic and Advanced Trainings. TS+ clearance with SCI, now in abeyance.

Consulting:

- Cloud MDS/Cipherloc: 2012 – 2016. Design and implementation of Polymorphic Key Progression Algorithms, along with Time Domain Multiplexing hardware to reduce overhead and latency.
- TechCrowd: 2010 – 2020. Help to design personnel and engineering processes. Recruit engineers and act as software architect.
- XSette Corporation: 2010 – Present. Design of Node Pairing and related digital security measures, including a geometrical n-dimensional encryption algorithm.
- CleverArium: 2016 – Present. Design of hardware and software for aquarium control.
- Entrokey Labs: 2025 – Present. Projects related to entropy, cryptography, and information theory.

Professional Titles and Certifications:

- Quantum Security and Resilience Expert (From Quantum Security Alliance [QSA]) (QuaSaR) 2022

TEACHING ACCOMPLISHMENTS:

Areas of Specialization:

- Set Methodology, Cryptography, Critical Infrastructure Protection (CIP), Electrical Utility Security, Digital Design, Embedded Systems, and Computer Organization and Architecture.

Courses Taught:

- BCIS 1305: Business Computer Applications, Spr 23 (2 sections)
- CS 101: Introduction to Computer Science for Non-Majors, F02 and S03 (3 sections), F03, F05-S08
Lead Instructor with 2 lectures and 6 lab sections in F and S, 1 section in Su06 and Su07. Direct Supervision of 2 – 3 Teaching Assistants during the Fall and Spring semesters.
- CS 120: C++, F04
- CS 213: Data Structures, F03
- CS 245: Computer Organization and Architecture, S04, F04 (2 sections each semester)
- CS 4371: Introduction to Cybersecurity, S22
- CS 7341: Introduction to Cybersecurity (Graduate level), S22
- CIS 100: Introduction to MS Office, S14, S15

CIS 111: Introduction to Access, F13, F14
 CIS 120: Introduction to Computer Science, F15
 CIS 160: Computer Science I, C, F13, F14
 CIS 161: Computer Science II, C++, S14, S15
 CIS 281: Undergraduate Research, Cryptography, S16, F16
 CIS 225: Cybersecurity Policy Analysis and Implementation, F14, F15
 CIS 310: Computer Organization and Architecture, S15
 CIS 340: Principles of Telecommunications and Networking, F13, F15
 CIS 350: Programming Languages and Compiler Theory, S14, S16
 CIS 390: PC Maintenance and Security, S16
 CIS 481: Undergraduate Research, Cryptography, S16, F16, S17
 CIS 494: Special Topics in Computer Science: Abstract Algebras, Su15
 CIS 495: Senior Project, S14, F14, S15, F15, S16
 CIS 535: Principles of Cryptography, S16 (2 sections)
 CIS 594: Graduate Research Colloquium, F15
 COSC 1336: Fundamentals of Programming I, Python, F21 (3 sections), S22 (3 sections), Su22, F22 (2 sections), Spr 23, F23 (3 sections)
 ITNW 1325: Fundamentals of Networking, Spr 23 (2 sections), F23 (2 sections), F23, S24 (2 sections), Su24
 ITSC 1307: UNIX OS, S24
 ITSY 1300: Fundamentals of Information Security: Cybersecurity, F21, S22 (2 sections), Su22, F22 (2 sections), F23, S24, Su24
 ITSY 2300: UNIX System Security, S24
 CS4371: Advanced Computer Security, Texas State University, S22 (2 sections)
 TIM-8102 Principles of Computer Science, National University, Su25 (6 sections), F25, S26
 TIM-8301 Principles of Cybersecurity, National University, Su25 (3 sections), F25 (6 sections), S26 (5 sections)
 9001 Thesis Preparation I, F25

Total Sections: 136

Students Advised:

Undergraduate Advising:

15

Graduate Students Major Professor:

10

Graduate Committees:

Indira Dutta, Doctorate Co-Major Professor and Outside Professor, University of Louisiana, Lafayette, Graduated August, 2021 (Now at Arkansas Tech University)

Haytham Idriss, Outside Professor, University of Louisiana, Lafayette, Graduated August, 2021 (Now at Purdue University, Fort Wayne)

Bhaskar Ghosh, Outside Committee Member, University of Louisiana, Lafayette, Graduated December 2021 (Now at Arkansas Tech University)

Pablo Rojas, Outside Committee Member, University of Louisiana, Lafayette, Graduated Fall 2024

Shivanjali Khare, Outside Committee Member, University of Louisiana, Lafayette, November, 2021 Graduated December, 2021 (Now at New Haven University)

Sai Mikkilineni, Outside Committee Member, University of Louisiana, Lafayette, Graduated May, 2023 (Now at Delaware State University)

Ayodeji S Adeyemo, Supervising Professor, Outside Committee Member, University of Louisiana, Lafayette, Graduation anticipated Fall 2024

Nabanita Das, Subject Matter Expert, National University, Graduation anticipated Fall 2026

Mandeep Singh

(9 PhD committees, 1 Thesis Committee)

Courses Developed:

CIS 225: Cybersecurity Policy Analysis and Implementation

CIS 281/481: Undergraduate Research, Cryptography
CIS 390: PC Maintenance and Security
CIS 535: Principles of Cryptography
CIS 594: Graduate Research Colloquium

Materials Developed:

None to date.

Honors and Awards:

Outstanding Graduate Student Teacher Award, University of Idaho, May 2007.
Graduate Student Justice Award, Graduate and Professional Student Association, University of Idaho, May 2008.
Reviewers Choice for Best Paper in Network Security, "Key Space Reduction Using Isomorphs," IEMCon 2021
Best Presenter, "Key Space Reduction Using Isomorphs," IEMCon 2021
Received best paper in conference, Cryptography and Applied Mathematics, "Evaluating True Cryptographic Key Space Size," UEMCON 2021
Received best paper in conference, Cryptography and Applied Mathematics, "Watermarking Using Polymorphic Algorithms for Increased Data Security," AIIoT 2024
Received best paper in conference, Cryptography, "Using the y-intercept in Collision Attacks for Encryption," CCWC 2025
Received best presenter, "The Value of Information," CCWC 2025, "Permuting the Outputs of RNGs is Not Secure," CCWC 2026

SCHOLARSHIP ACCOMPLISHMENTS:

Refereed Publications:

Textbooks:

Carlson, A. H., "Principles of Electrical Utility Security, vol. 1, Physical Security," Portland:ChairSeven, 2015.
Carlson, A. H., "Principles of Electrical Utility Security, vol. 2, Electronic Security," Portland:ChairSeven, (in final edit).
Carlson, A. H., "Principles of Electrical Utility Security, vol. 3, Managing Security," Portland:ChairSeven, (in final edit).
Carlson, A. H. and Le Blanc, R., "Basics of Medieval Machines and Technology or First You Make a Fire, and Then?," Portland:ChairSeven, (accepted and in edit)
Carlson, A. H., Williams, Benjamin, and Carlson, Robert W., "Napa Don is a Goat Head: Instructive Physical Security Images from Real-life Experience," in edit

Refereed Open Literature/Journals:

Carlson, A. H., Hiromoto, R. E., and Wells, R. B., "Breaking Block and Product Ciphers," *International Journal of Computing*, v. 12 no. 3, 2013, pp. 256-263.

Singh, M. and Carlson, A. H., "An Introduction to Quantum Computing and Its Applications," *The Cyber Defense Review*, v. 9 no. 2, Summer 2024, pp 73 – 91

Peer-Reviewed Conference Proceedings:

Carlson, A. H, Wells, R. B., and Hiromoto, R. E., "Using Set Theoretic Estimation to Implement Shannon Secrecy Theory," *Proc of the Third IEEE Workshop on Intelligent Data Acquisition and Advanced Computing Systems: Technology and Applications*, Sofia, Bulgaria, Sep 5-7, 2005, pp. 435 - 438.

Hiromoto, R. E., Carlson, A. H., and Wells, R. B., "An Information Based Approach to Cryptography," *The 6th Computer Information Systems and Industrial Management Applications*, Elk, Poland, Jun 28 – 30, 2007.

Carlson, A. H., Hiromoto, R. E., Wells, R. B., "Breaking Block and Product Ciphers Applied Across Byte Boundaries," *The 6th IEEE International Conference on Intelligent Data Acquisition and Advanced Computing Systems: Technology and Applications 15 -17 September 2011*, Prague, Czech Republic, pp. 733 – 736.

Refereed Conference Papers:

- Carlson, A. H., Frincke, D., and Laude, M., "Railway Security Issues: A Survey of Developing Railway Technology," *Proc. Intl. Conf. Comput., Commun., Control Technol. (CCCT 2003)*, pp. 1-6, July 1-August 1, Orlando, Florida.
- Carlson, A. H., "Defense in Depth: Perspectives on utility security from a Military Intelligence Viewpoint," *The 6th Western Power and Delivery Conference*, Spokane, WA, April, 2009
- Carlson, A. H., Doherty, P., Gall, J., Eichen, I., Arp, B., "Breaking CBC, or Randomness Never Was Happiness," *Village Talk Track, DefCon 23*, Las Vegas, NV, August 2015,
<http://www.youtube.com/watch?v=v0IsYNDMV7A>
- Carlson, A. H. Doherty, P., Gall, J., Eichen, I., "Using Collisions to Break CBC," Show Me Con, St. Charles, MO, June 2016,
<http://www.irongeek.com/i.php?page=videos/showmecon2016/ba02-the-collision-attack-attacking-cbc-and-related-encryptions-fontbonne>
- Booher, D., Cambou, B., Carlson, A., Philabaum, C., "Dynamic Key Generation for Polymorphic Encryption" IEEE CCWC 2019, pp. 482 – 487, Las Vegas, NV, January 7, 2019 (Best Presentation in Track)
- Dutta, I, Ghosh, B., Bayoumi, M., Carlson, A., "Lightweight Polymorphic Encryption for the Data Associated with Constrained Internet of Things Devices," IEEE World Forum on the Internet of Things, New Orleans, LA, June, 2020
- Ghosh, B. Dutta, I., Totaro, M., Carlson, A., "Mathematical Modeling and Prediction of Neural Network Training based on RC Circuits," ISNCC 2020
- Ghosh, B. Dutta, I., Totaro, M., Carlson, A., "An Empirical Analysis of Generative Adversarial Network Training Times with Varying Batch Sizes," The 11th IEEE Annual Ubiquitous Computing, Electronics and Mobile Communication Conference, Oct. 2020
- Dutta, I., Ghosh, B. Totaro, M., Carlson, A., Bayoumi, M., "Generative Adversarial Networks in Security: A Survey," The 11th IEEE Annual Ubiquitous Computing, Electronics and Mobile Communication Conference, Oct. 2020
- Ghosh, B., Dutta, I., Khare, S., Carlson, A., and Totaro, M., "Isomorphic Cipher Reduction," IEMCon 2021, October 2021
- Ghosh, B., Dutta, I., Khare, S., Carlson, A., and Totaro, M., "Key Space Reduction Using Isomorphs," IEMCon 2021, October 2021. Received Reviewers Choice for Best Paper in Network Security Award.
- Carlson, A., Dutta, I., Ghosh, B., and Totaro, M., "Modeling Polymorphic Ciphers," FCST 2021, 6 – 9 December 2021.
- Carlson, A., Gang, T., Gang, G., Ghosh, B., and Dutta, I., "Evaluating True Cryptographic Key Space Size," UEMCON 2021, 1 – 4 December 2021.
- Khare, S., Carlson, A., Totaro, M., Hiromoto, R., and Wells, R. B., "Space Selection and Abstraction in Set Theoretic Estimation," CWCC 2022, 26 – 28 January, 2022.
- Idriss, H., Rojas, P., Alahmadi, S., Idriss, T., Carlson, A., Bayoumi, M., "Shadow PUFs: Generating Temporal PUFs with Properties Isomorphic to Delay-Based APUFs", ICAS2022, 28 May – 1 June, 2022

- Carlson, A., Mikkilineni, S., Totaro, M., and Briscoe, C., "A Venona Style Attack to Determine Block Size, Language, and Attacking Ciphers." ISNCC-2022, July 19 – 22, 2022
- Carlson, A., Hiromoto, R., Mikkilineni, and Totaro, M., "Equivalence of Product Ciphers to Substitution Ciphers and their Security Implications," ISNCC-2022, July 19 – 22, 2022
- Carlson, A., Mikkikineni, S., Hiromoto, R., Totaro, M., "An Intro to Local Entropy and Local Unicity," ISNCC-2022, July 19 – 22, 2022
- Idriss, H., Rojas, P., Alahmadi, S., Carlson, A., Idriss, T., and Bayoumi, M., "Shadow PUFs: Generating Temporal PUFs with Properties Isomorphic to Delay-based PUFs," ISCAS 2022, May 28 – June 1, 2022
- Carlson, A., Mikkilineni, S. R., Totaro, M. W., and Briscoe, C., "A Venona Style Attack to Determine Block Size, Language, and Attacking Ciphers," ISNCC 2022, July 19 – 22, 2022
- Carlson, A., Mikkilineni, S. R., Totaro, M. W., Wells, R. B., and Hiromoto, R. E., "Equivalence of Product Ciphers to Substitution Ciphers and their Security Implications," ISNCC 2022, July 19 – 22, 2022
- Carlson, A., Mikkilineni, S. R., Totaro, M. W., Wells, R. B., and Hiromoto, R. E., "An Intro to Local Entropy and Local Unicity," ISNCC 2022, July 19 – 22, 2022
- Carlson, A., Ghosh, B., and Dutta, I. K., "Using the Collision Attack for Breaking Cryptographic Modes," 13th ICCNT, Oct. 3 – 5, 2022
- Williams, B., Carlson, A., Hiromoto, R., "Novel Innovations for Improving the Quality of Weak PRNGs," 13th ICCNT, Oct. 3 – 5, 2022
- Williams, B., Carlson, A., Hiromoto, R., "Novel Innovations that Failed to Improve the Quality of Weak PRNGs," 13th ICCNT, Oct. 3 – 5, 2022
- Carlson, A., Ghosh, B., Dutta, I. K., and Hiromoto, R. E., "The Problem With Regular Multiple Byte Block Boundaries in Encryption" 13th IEEE IEMCON, Oct. 12 – 15, 2022, Vancouver, Canada
- Ghosh, B., Carlson, A., and Dutta, I., "A Demonstrable Break of PCBC Mode," 2023 International Symposium on Networks, Computers and Communications (ISNCC): Trust, Security and Privacy (ISNCC 2023), October 23 – 26, 2023, Dohar, Qatar
- Williams, B., Hiromoto, R. E., and Carlson, A., "Analysis of a Cryptographically Secure Pseudo Random Number Generator," The 11th IEEE International Conference on Intelligent Data Acquisition and Advanced Computing Systems: Technology and Applications, 7-9 September, 2023, Dortmund, Germany
- Singh, M. and Carlson, A., "Exploring Polymorphic Algorithms and Their Use in Cryptography," 14th Annual Computing and Communication Workshop and Conference (CCWC), 8 – 10 January, 2024, Las Vegas, NV
- Singh, M., and Carlson, A., "Watermarking Using Polymorphic Algorithms for Increased Data Security," 2024 IEEE World AI IoT Congress (AIoT), 29 – 31 May, 2024, Seattle, WA
- Carlson, A., Williams, B., and Mikkilineni, S. R., "Is Everlasting Security Necessary?" UEMCON 2024: IEEE Annual Ubiquitous Computing, 17 - 19 October, 2024, New York, NY

- Singh, M., Carlson, A. H., Hiromoto, R. E., and Williams, B., "Is Internet Traffic Really Random?," 2025 IEEE 15th Annual Computing and Communication Workshop and Conference (CCWC), 6 – 8 January, 2025, Las Vegas, NV
- Singh, M., Carlson, A., and Briscoe, C., "Using the y-intercept in Collision Attacks for Encryption" 2025 IEEE 15th Annual Computing and Communication Workshop and Conference (CCWC), 6 – 8 January, Las Vegas, NV
- Carlson, A., Williams, B., Mikkilineni, S. R., and Singh, M., "The Value of Information," 2025 IEEE 15th Annual Computing and Communication Workshop and Conference (CCWC), 6 – 8 January, 2025, Las Vegas, NV
- Hiromoto, R. E., Carlson, A., Singh, M., "Breaking the Counter (CTR) Mode," 2025 IEEE 15th Annual Computing and Communication Workshop and Conference (CCWC), 6 – 8 January, 2025, Las Vegas, NV
- Adeyemo, A., Carlson, A., and Totaro, M., "Sexing Orcas: Classification Using Convolution Neural Networks," 2025 IEEE Conference on Artificial Intelligence IEEE CAI 2025, May 5 – 7, Santa Clara, CA
- Carlson, A. H., Williams, B., Mikkilineni, S., Singh, M. and Carlson, A., "Identifying the Factors in Reporting the Cost of a Hack," 2025 IEEE World AI IoT Congress (AIIoT), 28 – 30 May, 2025, Seattle, WA. Earned best presenter award for M. Singh.
- Carlson, A., Singh, M., and Williams, B., "Basics of Polymorphism in Encryption," 2025 IEEE World AI IoT Congress (AIIoT), 28 – 30 May, 2025, Seattle, WA
- Singh, M., Carlson, A., and Briscoe, C., "Verifying Isomorphic Cipher Reduction Using the y-Intercept from Collision Plots," 2025 IEEE World AI IoT Congress (AIIoT), 28 – 30 May, 2025, Seattle, WA
- Carlson, A., Williams, B., Mikkilineni, S. R., Singh, M., "Proof of Increased Security of Polymorphism," IEEE 16th Annual Ubiquitous Computing, Electronics, & Mobile Communications Conference, 22 - 24 October, 2025, New York
- Carlson, A., Williams, B., Mikkilineni, S. R., Singh, M., "Calculating the Increased Speed of Polymorphic Encryption," IEEE 16th Annual Ubiquitous Computing, Electronics, & Mobile Communications Conference, 22 - 24 October, 2025, New York
- Williams, B., Carlson, A., Carlson, R., Mikkilineni, S. R., "Polymorphic Security for Databases," IEEE 16th Annual Computing and Communication Workshop and Conference (CCWC 2026), 5 – 7 January, 2026, Las Vegas, NV
- Hiromoto, R. E., Carlson, A., Carlson, R., Williams, B., "Polymorphic Hashing to Obscure the 1:1 Principle," IEEE 16th Annual Computing and Communication Workshop and Conference (CCWC 2026), 5 – 7 January, 2026, Las Vegas, NV
- Carlson, Albert, Williams, B., Mikkilineni, S. R., Singh, M., and Carlson, Ariana, "Examples of Calculating Indirect Costs of a Hack," IEEE 16th Annual Computing and Communication Workshop and Conference (CCWC 2026), 5 – 7 January, 2026, Las Vegas, NV
- Williams, B., Carlson, A., and Mikkilineni, S. R., "Permuting the Outputs of RNGs is Not Secure," IEEE 16th Annual Computing and Communication Workshop and Conference (CCWC 2026), 5 – 7 January, 2026, Las Vegas, NV

Refereed Publications (currently scheduled or submitted):

Refereed Open Literature:

Submitted to Journal of Mathematics

Ghaffar, A., Thiele-Passini, J., Newell, M., Carlson, A., and Briscoe, C., “The Birthday Paradox, Revisited”

Submitted to AIIoT 2026

Ghaffar, A., Thiele-Pissini, J., A., Briscoe, C., Carlson, A., and Mikkilineni, S. R., “Algebra of Cryptographic Collisions,” IEEE 7th Annual World AIIoT Congress AIIoT 2026), 20 – 22 May, 2026, Seattle, WA

Peer Reviewed/Evaluated (Refereed Proprietary Literature):

None to date.

Track Chairman: Stream B: Quantum Encryption and Networking, Quantum Technology Congress, September 2019, Boston, MA

Session 12: Software Engineering – Distributed Systems, 13th Annual Information Technology, Electronics and Mobile Communications Conference (IEEE IEMCon 2022), Virtual, October, 2022

Member of Technical Committee

IEEE UEMCon 2021- 2026

IEEE CCWC 2021 - 2026

IEEE IEMCON 2022 - 2024

IEEE ICSC 2023 - 2024

AIIoT 2024

Other:

Carlson, A., “Everybody Talks About Lightning, and Yes, There Are Things You Can Do About It,” *Backwoods Home Magazine*, Issue #37, January 1996.

Schweller, E., Hiromoto, R., and Carlson, A., “Character Streams to Word Streams Using a Set Theoretic Approach,” *University of Idaho McNair Research Journal*, v1, pp 51 – 57, Summer 2005.

Park, S., Hiromoto, R., and Carlson, A., “Cryptographic Key Probability for Substitution Ciphers,” *University of Idaho McNair Research Journal*, v2, pp 53 – 57, Spring 2006.

White Papers:

Carlson, A. H., Mumm, H. C., Sharkey, K. L., Watchorn, M. S., “Quantum Chemistry for Detecting Cybersecurity Threats to Information Systems,” Quantum Security Alliance, 2022

Carlson, A. H., “Quantum Security Alliance (QSA) NIST Quantum Proof Algorithm Analysis,” Quantum Security Alliance, 2022

Carlson, A. H., “Standard Password Practices for Organizations: Relative Theory and Recommendations,” Quantum Security Alliance, 2022

Total Papers: 54

Other (currently scheduled or submitted):

Technical Reports Involving Funded Research:

No funded research to date

Dissertation:

Carlson, Albert H., *Set Theoretic Estimation Applied to the Information Content of Ciphers and Decryption*. Ph.D. Dissertation, University of Idaho, 2012.

Presentations and Other Creative Activities:

Carlson, A. H., "Decryption by Description," University Colloquium, University of Idaho, April 2007

Carlson, A. H., "Cyber Security," Clayton, MO Chamber of Commerce, January 2014

Registered Copyrights:

None to date.

Professional Meeting Papers:

None to date.

Patents:

Carlson, A., Cohen, S., duBoef, L., and Johnson, H., Digital watermarking for secure transmission between a source component and a node device, December 30, 2014, Patent Number 8,924,730.

Carlson, A. and Le Blanc, R., Polymorphic Encryption Engine, November 3, 2015, Patent Number 9,178,514.

Carlson, A., Cohen, S., duBoef, L., and Johnson, H., Block Management Unification System and Method, April 26, 2016, Patent Number 9,436,815.

Carlson, A., Le Blanc, R., Carlson, R., Doherty, P., and Gonzales, C., Polymorphic One Time Pad Matrix, September 4, 2018, Patent Number 10,069,805

Carlson, A., Le Blanc, R., Local Area Network Electronic Perimeter Security, November 6, 2018, Patent Number 10,122,684

Carlson, A., Le Blanc, R., Virtual Polymorphic Hardware Engine, December 25, 2018, Patent Number 10,162,985

Carlson, A., Le Blanc, R., Virtual Polymorphic Hardware Engine, Divisional 1, December 25, 2018, Patent Number 10,482,290

Carlson, A., Le Blanc, R., Carlson, R., Doherty, R., Gonzalez, C., One Time Pad Matrix Divisional 1, November 19, 2019, Patent Number 10,567,351

Carlson, A., Le Blanc, R., Carlson, R., Doherty, R., Gonzalez, C., One Time Pad Matrix Divisional 2, February 18, 2020, Patent Number 10,567,351

Carlson, A., Le Blanc, R., Carlson, R., Gonzalez, C., Dynamic Pin Configurator, March 30, 2021, Patent Number 10,965,710

Copyrighted Software:

XSette Node Pairing suite, XSette Corp. 2014

Block Management Unification System (BMUS), XSette Corp., 2015

Cipherloc PKPA software suite, Cipherloc Corp. 2015

Grants and Contracts Awarded:

None to date.

Honors and Awards:

None to date.

Orchid Number: 0000-0002-0087-6066

SERVICE:

Major Committee Assignments:

Graduate and Professional Student Association

GPSA Travel Committee, August 2003-August 2004

University Intellectual Property Policy Committee, October 2006-May 2007

Computer Science Department:

Tenure Committee, Student Representative, February 2006-May 2006

McNair Scholars:

McNair Scholar Mentor,

Eric Schweller, 2003 – 2004, Research in Cryptography and Stylometry

Sarah Mitchell, 2004 – 2005, Research in Cryptography and Language Statistics

Fontbonne University:

Fontbonne Day Committee, 2013 – 2015

Library Committee, 2014 -2015

Search Committees:

Computer Science/Math Faculty: 2013, 2014, 2015, 2016

Dean Arts and Sciences: 2015

Cyber Security Board: 2013 – 2016

Dedicated Semester: Privacy and Security 2016

Texas State University:

Computer Science Industrial Advisory Board: 2017 - Present

Department Committees:

ABET Accreditation: 2013 – 2016

MSCS Program Creation and Steering: 2014 – 2016

Cyber Security Month: 2014 – 2015

BS Cybersecurity Curriculum Committee, ACC: 2022

Professional and Scholarly Organizations:

Association of Computing Machines (ACM), both Professional and Student Societies.

IEEE, both Professional and Student Societies.

Association of Old Crows (AOC), while working in Electronic Warfare positions.

Golden Key

Professional Service:

Association of Computing Machinery (ACM) Faculty Advisor, 2014 – 2017

Reviewer, DefCon Crypto and Privacy Village (CPV), 2016

Chairman, Quantum Encryption Committee, Quantum Security Alliance, 2019 – Present

Member, IEEE Quantum Security Standards Work Group SC10, 2022 – Present

Member, IEEE Standards Committee P1947, 2025 – Present

Co-Chair, IEEE 1947 Cryptography sub-committee, 2025 – Present

Outreach Service/Talks:

Engineering Outreach Service:

None to date.

Outreach Invited Talks:

Clayton Chamber of Commerce, “*Jobs Prospects in Cybersecurity*,” Jan. 28, 2014

University City Chamber of Commerce, “*Cybersecurity – Protecting Your Business and Yourself from Hacking*,” June 3, 2014

HTCIA, “*An Overview of Cybersecurity*,” June 19, 2014

Radio Appearances:

Cardinal Hacking, Lunchtime Live, KXFN, St. Louis, MO, 17 June, 2015

TV Segments:

“*Local students learning cyber security*,” KDSK (Channel 5), St. Louis, MO, 4 May, 2014, <http://www.ksdk.com/story/news/local/2014/05/05/students-learn-cyber-security/8746279/>

“*MasterCard playing role in bringing 'smart cards' to US*,” KDSK (Channel 5), St. Louis, MO, 14 May, 2014, <http://www.ksdk.com/story/news/local/5-on-your-side/2014/05/14/mastercard-smart-chip/9098653/>

“*Cybercrime, Who's at Risk?*” Pulse of St. Louis, KPLR (Channel 11), St. Louis, MO, 13 June, 2015, <http://kplr11.com/2015/06/13/cybercrime-whos-at-risk/>

“*Cardinal Hacking*” KDSK (Channel 5), St. Louis, MO, 17 June, 2015

Podcasts

Powershell Podcast, 2025, Cryptography, Cracking Codes, and Breaking CBC, with Dr. Al Carlson, <https://powershellpodcast.podbean.com/e/cryptography-cracking-codes-and-breaking-cbc-with-dr-al-carlson/>

Community Service:

Unit Commissioner, Assistant District Commissioner, and Assistant Council Commissioner, Boy Scouts of America, 1990 – 2013. District Award of Merit, Silver Beaver, Distinguished Commissioner, and various other awards.

Chapter President, State Membership Chair, Commander of the State Color Guard, American Bicentennial Chapter, Lake Defiance! Chapter, ILSSAR, 1992-2002.

PROFESSIONAL DEVELOPMENT:

Teaching:

ODC 999, "Developing and Teaching Online Courses," Fontbonne University, S14, A.
Quality Matters Basic Badge, Austin Community College, F21
Equity Certificate: Grow an Anti-Racist Environment: From Conversation to Action, Austin Community College, F21
Equity Certificate: Discover Your Blind Spots, Austin Community College, F21
Equity Certificate: Sustain the Conversation, Austin Community College, F21
Equity in Hiring, Annual Training, S22
Inclusive Communication with the 3C's, Summer 22
Student Organization Advisor Training, Summer 22
Empowering All Students: Using Your Strengths for Diversity and Inclusion, Summer 22
Equity Certificate, ACC, F22

Scholarship:

Verilog, San Jose, CA, 1987
Integrated Circuit Training, NEC Corporation, Kanagawa, Japan, 1989
Six Sigma Quality, Arlington Heights, IL, 1992
Television Transmission with HDTV, Glenview, IL 1996
Hands On Network Training, Rolling Meadows, IL 1999
Effective VHDL Programming, Rolling Meadows, IL, 2000
Cellular Phone Operation, Rolling Meadows, IL, 2000
Network Communications, Rolling Meadows, IL 2001
CIP Seminars, WECC, 2006
 Physical Security CIP-005, San Diego, CA, 2006
 Cyber Security CIP-007, Albuquerque, NM 2006
CIP Auditor Training, WECC, Seattle, WA, July, 2007
CTL-5003, Doctoral Student Experience, NU, July 2025

Administration/Management:

Time Management, Arlington Heights, IL 1993
Effective Grant Writing Workshop, Moscow, Idaho, 2006