

# Zechun Cao

Department of Computational, Engineering, and Mathematical Sciences  
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## EDUCATION

- Ph.D. Computer Science, University of Houston, 2020
- M.S. Computer Science, University of Houston, 2013
- B.E. Electrical Engineering, China University of Petroleum-Beijing, 2008

## APPOINTMENTS

- 2021– Texas A&M University-San Antonio  
Assistant Professor, Department of Computational, Engineering, and Mathematical Sciences
- 2021 Texas A&M University-San Antonio  
Visiting Assistant Professor, Department of Computing and Cyber Security
- 2019–20 Texas A&M University-San Antonio  
Lecturer, Department of Computing and Cyber Security
- 2015–19 University of Houston  
REU Program Assistant (NSF-1659755), Department of Computer Science
- 2010–13 University of Houston  
Graduate Teaching Assistant, Department of Computer Science

## RESEARCH AREAS

Privacy: privacy-preserving algorithms for foundational computational problems and AI-driven systems  
Security: vulnerability analysis and intrusion detection through graph-centric computing with AI models

## PUBLICATIONS<sup>1</sup>

### Journal Articles

- 2025 Z. Cao, B. Kishiyama, and J. Yang, “PrivNN: A Private and Efficient Framework for Spatial Nearest Neighbor Query Processing”, *IEEE Transactions on Privacy*. Under revision.
- 2024 Z. Cao, G. Villafuerte, and J. Almaznaai, “EPSSNet: A Lightweight Network With Edge Processing and Semantic Segmentation for Mobile Robotics”, *International Journal on Semantic Web and Information Systems*, vol.20, no.1 2024: pp.1-22. doi:10.4018/ijswis.342087
- 2023 Z. Cao and SH. S. Huang, “A Behavioral Graph Model for Host-Based Intrusion Detection”, *Journal of Information Assurance & Security*, vol.18, no.2 2023: pp.48.

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<sup>1</sup>Texas A&M University-San Antonio student author *italicized*.

- 2020 SH. S. Huang and Z. Cao, "Detecting Malicious Users Behind Circuit-Based Anonymity Networks", *IEEE Access*, Volume 8, pp. 208610-208622, November 2020. doi:10.1109/access.2020.3038141
- 2019 Z. Liang, Y. Huang, Z. Cao, T. Liu, and Y. Wang, "Creativity in Trusted Data: Research on Application of Blockchain in Supply Chain", *International Journal of Performability Engineering*, Volume 15, Issue 2, pp. 526-535, February 2019. doi:10.23940/ijpe.19.02.p17.526535
- 2007 N. Zhang, R. Liu, A. Zhang, R. Yu, and Z. Cao, "Study and Research on Computer Network Based on Plastic Optical Fiber", *Journal of Optoelectronics Laser*, Volume 18, Issue 9, pp. 1071-1073, 2007.

### Conference Proceedings

- 2025 D. Deanda, Y. Masupalli, J. Yang, Y. Lee, Z. Cao, G. Liang, "Benchmarking Robustness of Contrastive Learning Models for Medical Image-Report Retrieval", *39th Annual AAAI Conference on Artificial Intelligence (AAAI) Workshop*, March 2025, in press.
- 2024 Y. Tian, Z. Cao, and SH. S. Huang, "Detecting VPN Traffic in Real-Time with Active Probing", *The 22nd International Symposium on Network Computing and Applications (NCA 2024)*, October 2024.
- 2024 H. Wang, J. Yang, G. Liang, Y. Lee, and Z. Cao, "Analyzing the Usability, Performance, and Cost-Efficiency of Deploying ML Models on BigQuery ML and Vertex AI in Google Cloud", *Proceedings of the 2024 8th International Conference on Cloud and Big Data Computing*, 2024. doi:10.1145/3694860.3694863
- 2024 B. Han, C. Moran, J. Yang, Y. Lee, Z. Cao, and G. Liang, "Multi-Scale Self-Supervised Consistency Training for Trustworthy Medical Imaging Classification", *2024 46th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)* (pp. 1-6). IEEE. doi:10.1109/EMBC53108.2024.10782322
- 2024 Z. Cao, G. Villafuerte, A. Jalooli, R. Balyan, S. R. Moosavi, and F. Iacobelli, "Bridging Language Barriers in Healthcare Education: An Approach for Intelligent Tutoring Systems with Code-Switching Adaptation", *2024 ASEE Annual Conference & Exposition*, Portland, Oregon. doi:10.18260/1-2-46776
- 2024 J. Yang, Y. Lee, M. Abdel-Rahman and Z. Cao, "Enhancing Urban Mobility: SmartSAT's Impact on Public Transportation Services and Commuting Experience", *2024 ASEE Annual Conference & Exposition*, Portland, Oregon. doi:10.18260/1-2-46840
- 2022 Z. Cao and SH. S. Huang, "Host-Based Intrusion Detection: A Behavioral Approach using Graph Model", *Proceedings of the 18th International Conference on Information Assurance and Security (IAS)*, Springer, vol 647. December 2022. doi:10.1007/978-3-031-27409-1\_122
- 2019 SH. S. Huang, Z. Cao, C. E. Raines, M. N. Yang, and C. Simon, "Detecting Intruders by User File Access Patterns", *Proceedings of the 13th International Conference on Network and System Security (NSS)*, Sapporo, Japan, pp. 320-335, December 2019. doi:10.1007/978-3-030-36938-5\_19
- 2018 Z. Cao and SH. S. Huang, "Detecting Intruders and Preventing Hackers from Evasion by Tor Circuit Selection", *Proceedings of the 17th IEEE International Conference On Trust, Security And Privacy In Computing And Communications/12th IEEE International Conference On Big Data Science And Engineering (TrustCom/BigDataSE)*, New York, NY, pp. 475-480, August 2018. doi:10.1109/trustcom/bigdatase.2018.00074
- 2013 Z. Cao, S. Wang, G. Forestier, A. Puissant, and C. F. Eick, "Analyzing the composition of cities

using spatial clustering”. *2nd ACM SIGKDD International Workshop on Urban Computing (UrbComp '13)*. Association for Computing Machinery, New York, NY, USA, Article 14, 1–8. doi:10.1145/2505821.2505827

## PRESENTATIONS

- 2024 “Bridging Language Barriers in Healthcare Education: An Approach for Intelligent Tutoring Systems with Code-Switching Adaptation”, 2024 ASEE Annual Conference & Exposition, Portland, Oregon, June 26.
- 2024 “Privacy Preserving Tutoring System for Health Education of Low Literacy Hispanic Populations”, 2024 NSF CISE-MSI Grantees Meeting, Denver, May 23.
- 2024 “Fine Tuning Large Language Models for Research Applications”, TAMUSA Jag-AI Summer Workshop, June 21.
- 2024 “Empowering Research Across Disciplines: Harnessing Large Language Models for Innovative Insights”, TAMUSA Jag-AI Spring Workshop, March 22.
- 2022 “Host-Based Intrusion Detection: A Behavioral Approach using Graph Model”, 18th International Conference on Information Assurance and Security (IAS), virtual, December 11.
- 2019 “Detecting Intruders by User File Access Patterns”, 13th International Conference on Network and System Security (NSS), Sapporo, Japan, December 20.
- 2018 “Detecting Intruders and Preventing Hackers from Evasion by Tor Circuit Selection”, 17th IEEE International Conference On Trust, Security And Privacy In Computing And Communications/12th IEEE International Conference On Big Data Science And Engineering (TrustCom/BigDataSE), New York, August 18.
- 2017 Poster presentation, PhD Research Colloquium, University of Houston, Texas, May 2.

## GRANTS AND AWARDS

### Grants and Fellowships<sup>2</sup>

- 2024–25 Toward Automatic and Sound Memory Safety Bug Repair (\$80,000 + \$10,000 Google Cloud Credit, TAMUSA Site \$35,000). CAHSI-Google Institutional Research Program research grant. co-PI.
- 2024–25 AI-Ready Institution Transforming Tomorrow’s Research and Education with AI Focused on Health and Security (Jag-AI) (\$385,475). National Science Foundation (NSF) research grant. co-PI.
- 2022–25 Collaborative Research: Privacy Preserving Tutoring System for Health Education of Low Literacy Hispanic Populations (\$113,439). National Science Foundation (NSF) research grant. PI.
- 2023–24 JagCoach: AI-Assisted Coaching Platform to Enhance Oral Communication Skills for College Students (\$9,999). Texas A&M University-San Antonio Research Council grant. PI.
- 2021–24 Building a Smart Mobility Network for the San Antonio Transit to Improve Transit Service and Social Impact (SmartSAT) (\$299,897). National Science Foundation (NSF) research grant. Senior Personnel.

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<sup>2</sup>Proposal under review *italicized*.

- 2022      Investigating NLP and ML Techniques for Developing a Secure and Privacy-Preserving Health-Centric ITS (\$10,000). American Society for Engineering Education (ASEE) research grant. co-PI.
- 2021      Funds to Host Visiting Presenters(\$2,000). College of Arts and Sciences, Texas A&M University-San Antonio grant. co-PI.
- 2015-17   University of Houston Graduate Tuition Fellowship (approx. \$2,1000)
- 2010-13   University of Houston Graduate Tuition Fellowship (approx. \$2,4000)

### **Awards and Honors**

- 2025      TAMUSA Most Influential Mentor Award
- 2024      TAMUSA Award for Excellence in Securing Grants and External Funding
- 2024      CoAS Outstanding Faculty Award for Excellence in Scholarship
- 2023      TAMUSA Award for Excellence in Securing Grants and External Funding
- 2023      Research Project Featured on TAMUSA University News
- 2022      Invited Panelist for ASEE NSF Proposal Development Workshop
- 2013      University of Houston Honorable Award at Research Showcase

### **COURSES TAUGHT**

#### **Texas A&M University-San Antonio**

Artificial Intelligence (UG/G)

Senior Project

Discrete Structures for Computing

Data Structures

Programming Fundamentals II

Computer Networks

Scripting Languages

Systems Analysis and Design

Management Information Systems

#### **University of Houston**

Computer Science & Programming - Lab

### **SERVICE**

#### **Conferences Organized**

- 2022      The International Workshop on Real-time Cybersecurity Analysis in the Cloud (RTCAC). San Antonio, Texas. Sep 5-7.

### **Conference Sessions Chaired**

- 2022 International Conference on Hybrid Intelligent Systems (HIS). Virtual, Dec 12–14.  
2022 International Conference on Intelligent Systems Design and Applications (ISDA). Virtual, Dec 12–14.

### **Conference Peer Review**

*IEEE International Conference on Omni-layer Intelligent Systems*  
*IEEE International Conference on Data Mining*  
*IEEE International Conference on Advanced Information Networking and Applications*

### **Service to the Field**

Panelist, DoD National Defense Science and Engineering Graduate (NDSEG) Fellowship, 2024  
Cyber Security Panelist, IEEE Aerospace and Electronic Systems Society, 2024–  
Technical Program Committee, IEEE International Conference on Omni-layer Intelligent Systems, 2022–

### **Service to the University**

TAMUSA IEEE Student Organization (faculty advisor), 2024–  
CEMS Hiring Search Committee (chair), 2024  
TAMUSA Student Research Symposium (faculty judge), 2024  
CoAS Awards and Nomination Committee, 2023–24  
CEMS Hiring Search Committees, 2023–24  
Department of Counseling, Health, and Kinesiology Hiring Search Committee, 2023–24  
TAMUSA IBM zSystems Chapter Machine Learning, AI and ChatGPT Panel (faculty panelist), 2023  
TAMUSA Faculty Senate (senator), 2022–23  
Hack the Port 22 (TAMUSA coach and facilitator), 2022  
Department of Computing and Cybersecurity Hiring Search Committee, 2022  
TAMUSA Jaguar Day (departmental representative), 2021–23  
TAMU Aggies Invent - Cyber (faculty mentor), 2019

### **Service to the Community**

John Jay Science & Engineering Academy Science and Engineering Fair (judge), 2021

### **Master Committees**

Andrew Trombly, TAMUSA, dissertation committee  
Jesse Guerrero, TAMUSA, dissertation committee

### **Students Mentored**

Brian Kishiyama, TAMUSA, graduate  
Andrew Trombly, TAMUSA, graduate

Jesse Guerrero, TAMUSA, graduate  
Yuktha Priya Masupalli, TAMUSA, graduate  
Jorge Munoz, TAMUSA, undergraduate  
Rudy Ramos, TAMUSA, undergraduate  
Jin Seo, TAMUSA, undergraduate  
German Z. Villafuerte, TAMUSA, undergraduate  
Joseph Almaznaai, TAMUSA, undergraduate  
Francisco Vasquez, TAMUSA, undergraduate  
Juan Quijano, TAMUSA, undergraduate  
Jared Theis, TAMUSA, undergraduate  
Yongyi Zhou, Rice University, undergraduate  
Cristina Gomez, California State University Dominguez Hills, undergraduate  
Daniel Burnett, Hendrix College, undergraduate  
Jason Schwartzman, Binghamton University, undergraduate  
Ethan Endres, Marshall University, undergraduate  
Jerred Chen, Georgia Institute of Technology, undergraduate  
Jonathan Lacanlale, California State University Northridge, undergraduate  
Mai Nou Yang, University of Wisconsin Oshkosh, undergraduate  
Camille Simon, Harvey Mudd College, undergraduate  
Edward Hwang, Edward S. Marcus High School, high schooler

## **MEMBERSHIPS**

Institute of Electrical and Electronics Engineers (IEEE)  
IEEE Aerospace and Electronic Systems Society  
IEEE Computer Society  
IEEE Young Professional  
Association for Computing Machinery (ACM)

## **CERTIFICATES AND CREDENTIALS**

Creating and Maintaining Effective Research Teams, Computing Alliance of Hispanic-Serving Institutions (CAHSI)  
Inclusive Teaching for Equitable Learning Certificate, ACUE and the American Council on Education  
Deep Learning Specialization Certificate, DeepLearning.ai  
Oracle Certified Professional, Java SE Programmer

## **PROFESSIONAL EMPLOYMENT**

2013–15    Software Engineer, Baylor College of Medicine, Houston, Texas

Updated September 2025