ZECHUN CAO, PH.D.

EDUCATION

Ph.D. in Computer Science — University of Houston
Advisor: Dr. Stephen Huang — 2020
Thesis: Detecting Network Intruders Behind Anonymity Networks
and Host Intruders by User Behaviors

M.S. in Computer Science — University of Houston
Thesis: A Methodology for Finding Uniform Regions in Spatial Data — 2013
and Its Application to Analyzing the Composition of Cities

B.E. in Electrical Engineering — China University of Petroleum-Beijing
— 2008

APPOINTMENTS AND AFFILIATIONS

Assistant Professor — 2021 - Present
Department of Computational, Engineering, and Mathematical Sciences, — San Antonio, TX
Texas A&M University-San Antonio

Visiting Assistant Professor — 2021
Department of Computing and Cyber Security, — San Antonio, TX
Texas A&M University-San Antonio

Lecturer — 2019 - 2020
Department of Computing and Cyber Security, — San Antonio, TX
Texas A&M University-San Antonio

REU Program Assistant (NSF-1659755) — 2015 - 2019
Department of Computer Science, — Houston, TX
University of Houston

Software Development Engineer — 2013 - 2015
Baylor College of Medicine — Houston, TX

Graduate Teaching Assistant — 2010 - 2013
Department of Computer Science, — Houston, TX
University of Houston

FUNDING

Awarded

[1] *CAHSI-Google Institutional Research Program: Toward Automatic and Sound Memory Safety Bug Repair*
PI: Xiaoguang Wang
Co-PI: **Zechun Cao**
Sponsor: Google Inc.
Award: $80,000.00
Duration: 2024 - 2025

[2] *NSF Award Number 2334243: AI-Ready Institution Transforming Tomorrow's Research and Education with AI Focused on Health and Security*
PI: Jeong Yang
Co-PI: **Zechun Cao**, Gongbo Liang, Young Lee
Sponsor: National Science Foundation
Award: $385,475.00
Duration: 2024 - 2025

[3] *NSF Award Number 2219588: CISE-MSI Collaborative Research: Privacy Preserving Tutoring System for Health Education of Low Literacy Hispanic Populations*
PI: **Zechun Cao**
Sponsor: National Science Foundation
Award: $113,439.00
Duration: 2022 - 2025

[4] *A&M-SA Research Council Grant: JagCoach: AI-Assisted Coaching Platform to Enhance Oral Communication Skills for College Students*
PI: **Zechun Cao**
Co-PI: Beu Lee
Sponsor: Texas A&M University - San Antonio
Award: $9,999.92
Duration: September 2023 - August 2024

[5] *NSF Award Number 2131193: CISE-MSI: Building a Smart Mobility Network for the San Antonio Transit to Improve Transit Service and Social Impact (SmartSAT)*
PI: Jeong Yang
Co-PI: Izzat Alsmadi, Mohammad Abdel-Rahman, Daniel Delgado, Young Lee
Senior Personnel: **Zechun Cao**
Sponsor: National Science Foundation
Award: $299,897.00
Duration: 2021 - 2023

[6] *ASEE Mini-Grant: Investigating NLP and ML Techniques for Developing a Secure and Privacy-Preserving Health-Centric ITS*
PI: Renu Balyan
Co-PI: Francisco Iacobelli, **Zechun Cao**, Ali Jalooli, Sanaz Rahimi Moosavi
Sponsor: American Society for Engineering Education (ASEE)
Award: $10,000
Duration: May - September 2022

[7] *Funds to Host Visiting Presenters*
PI: Kun Gou
Co-PI: Sukho Lee, Malin Lilley, George Shelton, **Zechun Cao**
Sponsor: College of Arts and Sciences, Texas A&M University-San Antonio
Award: $2,000
Duration: 2021

Under Review

[1] *Collaborative Research: CISE-MSI: RPEP: SaTC: GenSec Alliance: Research Partnership for Advancing Cybersecurity through Generative AI*
PI: **Zechun Cao**
Sponsor: National Science Foundation

Budget: $1,200,000.00

[2] *NSF CISE-MSI: DP: IIS-RI: JagSight: Towards Reducing Roadway Crashes with Calibrated Probabilistic Embedding and Large Language Models*
PI: Gongbo Liang
Co-PI: **Zechun Cao**
Sponsor: National Science Foundation
Budget: $600,000.00

RESEARCH INTERESTS

Security, Privacy, Networks, Graph-Centric Computing, Deep Learning

PUBLICATIONS

* A&M-SA Student Author

Journal Articles

- **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 (IJSWIS)*, vol.20, no.1 2024: pp.1-22. DOI: 10.4018/IJSWIS.342087 (Q1, Impact Factor: 3.2)

- S. S. Huang and **Z. Cao**, "Detecting Malicious Users Behind Circuit-Based Anonymity Networks," in *IEEE Access*, Volume 8, pp. 208610-208622, November 2020. DOI: 10.1109/ACCESS.2020.3038141 (Q1, Impact Factor: 3.9)

- Z. Liang, Y. Huang, **Z. Cao**, T. Liu, and Y. Wang, "Creativity in Trusted Data: Research on Application of Blockchain in Supply Chain," in *International Journal of Performability Engineering*, Volume 15, Issue 2, pp. 526-535, February 2019. DOI: 10.23940/ijpe.19.02.p17.526535

- N. Zhang, R. Liu, A. Zhang, R. Yu, and **Z. Cao**, "Study and Research on Computer Network Based on Plastic Optical Fiber," in *Journal of Optoelectronics Laser*, Volume 18, Issue 9, pp. 1071-1073, 2007.

Refereed Conference Papers

- 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,", accepted at the *2024 8th International Conference on Cloud and Big Data Computing (ICCBDC 2024)*, August 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," accepted at the *2024 46th Annual International Conference of the IEEE Engineering in Medicine & Biology Society*, July 2024.

- **Z. Cao** and S. S. Huang, "Host-Based Intrusion Detection: A Behavioral Approach using Graph Model," in *Proceedings of the 18th International Conference on Information Assurance and Security (IAS)*, December 2022.

- S. S. Huang, **Z. Cao**, C. E. Raines, M. N. Yang, and C. Simon, "Detecting Intruders by User File Access Patterns," in *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`

- **Z. Cao** and S. S. Huang, "Detecting Intruders and Preventing Hackers from Evasion by Tor Circuit Selection," in *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

Refereed Poster

- **Z. Cao**, G. Villafuerte*, R. Balyan, S. Moosavi, A. Jalooli, and F. Iacobelli, "Bridging Language Barriers in Healthcare Education: An Approach for Intelligent Tutoring Systems with Code-Switching Adaptation," accepted at the *2024 ASEE Annual Conference & Exposition*, June 2024.

Refereed Workshop

- **Z. Cao**, S. Wang, G. Forestier, A. Puissant, C.F. Eick, "Analyzing the Composition of Cities Using Spatial Clustering," in *Proceedings of the 2nd ACM SIGKDD International Workshop on Urban Computing (UrbComp'13)*, Chicago, Illinois, pp. 14:1-14:8, August 2013. DOI: `10.1145/2505821.2505827`

Under Review

- Y. Tian, **Z. Cao** and S. S. Huang, "Detecting VPN Traffic Using an Active Probing Method", *The 27th International Symposium on Research in Attacks, Intrusions and Defenses (RAID 2024)*.

Under Preparation

- **Z. Cao**, B. Kishiyama*, and J. Yang, "PrivNN: A Private and Efficient Framework for Spatial Nearest Neighbor Query Processing", *IEEE Transactions on Information Forensics and Security.*

TALKS

- "*Privacy Preserving Tutoring System for Health Education of Low Literacy Hispanic Populations*" at the 2024 NSF CISE-MSI Grantees Meeting, Denver, May 2024.

- Paper presentation at the 18th International Conference on Information Assurance and Security (IAS), December 2022 (virtual).

- Paper presentation at the 13th International Conference on Network and System Security (NSS), Sapporo, Japan, December 2019.

- Paper presentation at 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, August 2018.

- Poster presentation at the PhD Research Colloquium at the University of Houston, Houston, Texas, 2017.

- Research presentation at the Research Showcase at the University of Houston, Houston, Texas, 2013.

TEACHING

Courses Taught

- CSCI 5313 Artificial Intelligence, [Su2022, Su2024], Texas A&M University-San Antonio

- CSCI 4391 Senior Project [S2022, S2023, S2024], Texas A&M University-San Antonio

- CSCI 2322 Discrete Structures for Computing [S2021, S2022, S2023, S2024], Texas A&M University-San Antonio

- CSCI 2436 Data Structures [F2022, S2024], Texas A&M University-San Antonio

- CSCI 1437 Programming Fundamentals II [F2022, F2023], Texas A&M University-San Antonio

- CISA 2306 Computer Networks [F2020, S2021, F2021], Texas A&M University-San Antonio

- CISA 3309 Scripting Languages [Su2022], Texas A&M University-San Antonio

- CISA 3356 Systems Analysis and Design [F2019, S2020, F2020, S2021, F2021], Texas A&M University-San Antonio

- CISA 3358 Management Information Systems [F2019, S2020], Texas A&M University-San Antonio

MENTORING

Master Students

- Brian Kishiyama, Texas A&M University-San Antonio, A&M-SA Security & Privacy Lab Member, 2022 - Present.

- Andrew Trombly, Texas A&M University-San Antonio, Master Thesis Committee Member, 2023.

- Jesse Guerrero, Texas A&M University-San Antonio, Master Thesis Committee Member, 2023.

Undergraduate

- Rudy Ramos, Texas A&M University-San Antonio, A&M-SA Security & Privacy Lab Member, 2023 - Present.

- Jin Seo, Texas A&M University-San Antonio, A&M-SA Security & Privacy Lab Member, 2023 - Present.

- German Z. Villafuerte, Texas A&M University-San Antonio, A&M-SA Security & Privacy Lab Member, 2022 - Present.

- Joseph Almaznaai, Texas A&M University-San Antonio, A&M-SA Security & Privacy Lab Member, 2022 - Present.

- Francisco Vasquez, A&M University-San Antonio, Mentee of the CAHSI LREU Program, 2023.

- Juan Quijano, Texas A&M University-San Antonio, Mentee of the ASEE Mini-Grant, 2022.

- Jared Theis, Texas A&M University-San Antonio, Mentee of the ASEE Mini-Grant, 2022.

- Cristina Gomez, California State University Dominguez Hills Student, Mentee of ASEE Mini-Grant, 2022.

- Daniel Burnett, Hendrix College, Mentee of UH REU Program, 2022.

- Jason Schwartzman, Binghamton University, Mentee of UH REU Program, 2021.

- Ethan Endres, Marshall University, Mentee of UH REU Program, 2021.

- Jerred Chen, Georgia Institute of Technology, Mentee of UH REU Program, 2020.

- Jonathan Lacanlale, California State University Northridge, Mentee of UH REU Program, 2020.

- Mai Nou Yang, University of Wisconsin Oshkosh, Mentee of UH REU Program, 2018. *Completed Master's degree in Computer Science at John Hopkins University in 2023.*

- Camille Simon, Harvey Mudd College, Mentee of UH REU Program, 2018. *Software Engineering at Google since 2021.*

SERVICES

University Service

- Member of College of Arts and Sciences Awards and Nomination Committee [2023 - 2024]

- Member of Department of Computational, Engineering, and Mathematical Sciences Search Committee [2023, 2024]

- Member of Department of Counseling, Health, and Kinesiology Search Committee [2023, 2024]

- Department Representative on Jaguar Day [2021, 2022, 2023]

- Panelist of A&M-SA IBM zSystems Chapter Machine Learning, AI and ChatGPT Panel [2023]

- Faculty Senator [2022 - 2023]

- Hack the Port 22 Coach and Facilitator, Texas A&M University-San Antonio [2022]

- Member of Department of Computing and Cybersecurity Search Committee [2022]

- Mentor of Aggies Invent - Cyber [2019]

Professional Service

- TPC Member, IEEE International Conference on Omni-layer Intelligent Systems Conference, 2022 - Present

- Session Chair, 22nd International Conference on Hybrid Intelligent Systems (HIS), 2022

- Session Chair, 22nd International Conference on Intelligent Systems Design and Applications (ISDA), 2022

- Organization Committee Member, The International Workshop on Real-time Cybersecurity Analysis in the Cloud (RTCAC), 2022

- Reviewer, IEEE International Conference on Advanced Information Networking and Applications (AINA), 2016

- Reviewer, IEEE International Conference on Data Mining (ICDM), 2012 - 2013

Community Service

- Judge of John Jay Science & Engineering Academy Science and Engineering Fair [December, 2021]

CERTIFICATE/TRAINING

- Inclusive Teaching for Equitable Learning Certificate, Association of College and University Educators (ACUE) and the American Council on Education, 2023

- Deep Learning Specialization Certificate, DeepLearning.ai, 2023

- Oracle Certified Professional, Java SE Programmer, 2011

MEMBERSHIPS

- Institute of Electrical and Electronics Engineers (IEEE)

- IEEE AESS Cyber Security Panel

- IEEE Young Professional

- IEEE Computer Society

- Association for Computing Machinery (ACM)

HONORS AND AWARDS

- "Embracing the Future: A&M San Antonio Launches AI Initiative" is featured on *University News* [2023]

- Invited Panelist for NSF Proposal Development Workshop, by American Society for Engineering Education (ASEE) [2022]

- Travel Grant for "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)" [2018]

- Honorable Award, Research Showcase at the University of Houston [2013].

- Graduate Fellowships, University of Houston [2010 - 2013, 2015 - 2017]