ANHAO XIANG (he/him/his)

Ph.D. Candidate in Computer Science, Colorado School of Mines, Golden, CO 80401

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RESEARCH, TEACHING, SERVICE HIGHLIGHTS

- Conducted research on privacy and security in mobile and web applications, with publications in top-tier venues including ACM CCS and IEEE/ACM ICSE.
- Served as a teaching assistant for cybersecurity courses and developed lab exercises on password storage and strength.
- Mentored high school and undergraduate students in privacy and security research projects.

EDUCATION AND CERTIFICATION

Ph.D. in Computer Science**,** Colorado School of Mines (MINES), USA, GPA:3.9/4.0 Expected: 12/2025

Research interest: Security and Privacy, Privacy Regulatory Compliance, App Security Analysis, Human-Computer Interaction

M.S. in Computer Science**,** New Mexico Institute of Mining and Technology (NMT), USA, GPA:3.8/4.0 12/2021

Thesis: Design of Advanced Device Authentication Schemes For Smart Grid

B.S. in Computer Science, New Mexico Institute of Mining and Technology (NMT), USA, GPA:3.3/4.0 05/2020

Graduate Certificate in Cybersecurity, NMT 12/2021

Offensive Security Certified Professional (OSCP), OffSec 04/2021

Security+ SY0-601, CompTIA (expired, currently renewing) 07/2021

WORK EXPERIENCE

Teaching Assistant/Research Assistant, Colorado School of Mines (MINES) 01/2022-Present

- Conducting research on addressing privacy and security problems in mobile and web applications.
- Developed a password storage via secret-sharing lab for the Information Security and Privacy course.
- Developed a password strength lab for the Information Security and Privacy course.
- TA for courses: Information Security and Privacy, Introduction to Cryptography/Theory of Cryptography

Teaching Assistant/Research Assistant, New Mexico Institute of Mining and Technology (NMT) 08/2019-12/2021

- Conducted research on developing authentication protocols for IoT devices.
- TA for courses: Introduction to Database Systems, Introduction to Computer Network.

Web Developer Intern, XiaoYuan Technology Inc., HangZhou, China 05/2018-08/2018

- Worked as a full-stack web developer at a startup, participated in developing a cryptocurrency trading platform.

HIGHLIGHTED RESEARCH PROJECTS

- **Analyzing the feasibility of adopting CSP on The Web (accepted at IEEE/ACM ICSE 2025, second author)**
  Content Security Policy (CSP) is a key security mechanism designed to mitigate injection attacks like XSS. In this project, we developed an automated crawling tool to assess adoption of Google's four nonce-based CSP solutions across the top 10K websites. Our analysis demonstrated that most websites could feasibly adopt nonce-based CSPs. We further analyzed adoption challenges, and provided recommendations to help developers strengthen their websites against injection attacks.
- **Exploring additional dimensions on the Adoption of CSP (to appear in IEEE S&P Magazine 2025, first author)**
  This article builds on the ICSE 2025 study by exploring additional dimensions, particularly developers' perspectives on the adoption of nonce-based CSP solutions, and the applicability of these solutions to websites with diverse architectures and development frameworks. We also explored the LLMs' support for adopting nonce-based CSP solutions.
- **Analyzing the GDPR compliance of mobile apps' privacy policies (accepted at ACM CCS 2023, first author)**
  In this project, we investigated the GDPR compliance of mobile apps' privacy policies. We designed the NLP framework PolicyChecker by taking a rule and semantic role based approach. Using PolicyChecker, we conducted the first large-scale analysis of mobile app privacy policies and found that 99.3% violated at least one requirement. Our analysis further revealed root causes related to developers' limited understanding of GDPR and the widespread reliance on policy generators.
- **Investigating health and fitness app users' privacy risks (Under review in ACM HEALTH, first author)**
  In this project, we investigated the cross-app data sharing implications of an on-device centralized platform that allows users to store various types of health data and share them across apps. We found that health apps can broadly and intensively share data with each other but often fail to adequately disclose their practices. We also found that most users have a limited understanding of the platform's permission model and its implicit cross-app data sharing implications.

- **Investigating app privacy transparency designs (Under review in ACM TOPS, first author)**
  With growing emphasis on privacy transparency under regulations such as GDPR, mobile app users now encounter multiple sources describing apps' privacy practices. In this project, we conducted an interaction study to examine the effectiveness of different transparency designs on users' understanding. Our findings show that while all methods improved participants' comprehension and heightened their concerns about privacy risks, each approach carried distinct strengths and limitations.

PUBLICATIONS

[1] Mengxia Ren, **Anhao Xiang**, and Chuan Yue. "Analyzing the Feasibility of Adopting Google's Nonce-Based CSP Solutions on Websites" in *IEEE/ACM International Conference on Software Engineering (**ICSE**)*, 2025.

[2] **Anhao Xiang,** Mengxia Ren, Chuan Yue, James Crea, Jack Kingham, and Zachary Samuels "Toward Practical and Scalable Adoption of Nonce-Based Content Security Policy on the Web." to appear in *IEEE Security & Privacy* (**S&P**), September 2025 Issue.

[3] **Anhao Xiang**, Weiping Pei, and Chuan Yue. "PolicyChecker: Analyzing the GDPR Completeness of Mobile Apps' Privacy Policies." in proceedings of the *ACM Conference on Computer and Communications Security (**CCS**)*, 2023.

[4] **Anhao Xiang**, and Jun Zheng. "A Lightweight Anonymous Device Authentication Scheme for Information-Centric Distribution Feeder Microgrid." ***Computers, Materials & Continua,*** 2021.

[5] **Anhao Xiang**, and Jun Zheng. "A situation-aware scheme for efficient device authentication in smart grid-enabled home area networks." ***Electronics*****,** 2020.

Under Review

[6] **Anhao Xiang**, Weiping Pei, and Chuan Yue. "Investigating the Effectiveness of Privacy Transparency Methods of Mobile Applications," under review in *ACM Transactions on Privacy and Security* (**TOPS**), 2025.

[7] **Anhao Xiang**, Weiping Pei, Madelyn Swelstad, Andrew Plute, and Chuan Yue. "Investigating the Health Data Sharing Implications", under review in *ACM Transactions on Computing for Healthcare* (**HEALTH**), 2025.

TEACHING AND STUDENT ADVISING EXPERIENCE

Teaching

- **Lab Developer** for CSCI585 Information Security and Privacy, MINES, Fall 2025.
  Developed a password storage via secret-sharing lab for the Information Security and Privacy course.
  Developed a password strength lab for the Information Security and Privacy course.
- **Teaching Assistant** of CSCI474/574 Introduction to Cryptography/Theory of Cryptography, MINES, Spring 2023 and Spring 2025.
  Assisted the instructor in preparing instructional materials for cryptography labs, graded assignments and assisted students.
- **Teaching Assistant** of CSCI585 Information Security and Privacy, MINES, Fall 2022.
  Graded assignments and the final exam, and assisted students with security lab exercises and homework assignments.
- **Teaching Assistant** of Introduction to Database Systems, NMT, Spring 2021.
  Graded assignments and the final course project, and assisted students with learning core database concepts.
- **Teaching Assistant** of Introduction to Computer Network, NMT, Fall 2019.
  Graded assignments and labs, and assisted students with network concepts and using tools such as Wireshark.

Student Advising

- Help advised undergraduate student Andrew Plute for a project on digital identify verification, Summar and Fall 2025.
- Help advised undergraduate students Madelyn Swelstad and Andrew Plute for a project on mobile app user privacy, Fall 2024 and Spring 2025.
- Help advised undergraduate students Lucas Bowar and Brooke Bowcutt for a project on app privacy policy analysis, Fall 2022.
- Help advised a group of high school students including Andrew Plute, Vincent Nguyen, Alexander Bieniek, etc. in MINES DoD CySP Cyber-REACH 2022 Summer Research Camp.

PROFESSIONAL ACTIVITIES

Proposal Writing

- Contributed to an NSF VINES (Track 2) proposal, planned for submission in September 2025.

Public Presentation

- "Analyzing the Feasibility of Adopting Google's Nonce-Based CSP Solutions on Websites", Conference presentation at IEEE/ACM ICSE, May 2025.
- "PolicyChecker: Analyzing the GDPR Completeness of Mobile Apps' Privacy Policies.", Conference presentation at ACM CCS 2023, December 2023.

- Poster Presentations at Computing Mines Affiliates Partnership Program (C-MAPP) Award Event in 2024 and 2025.

Invited Guest Talk/Lecture

- Guest talk on Toward Better Security and Privacy for Web and Mobile Users for Mines C4G program high school students, July 2025.
- Guest lectures on SQL Injection Attacks and Defenses in the CSCI 403 Database Management class, MINES, March 2022.

University Service

- Served as an observer (i.e., competition official) for the Mines team in the Rocky Mountain Collegiate Cyber Defense Competition (RMCCDC), March 2025.
- Served as a white-team member (i.e., competition official) for the Mines team in the RMCCDC, March 2022.

Conference Reviewer

- EMNLP 2022, IEEE TPS 2022, CODASPY 2023, IEEE TPS 2023