Kailai Cui
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EDUCATION

College of William and Mary, Williamsburg, VA
Bachelor of Science, Mathematics; Bachelor of Science, Computer Science
GPA: 3.94, Dean's List for all semesters, Phi Beta Kappa honor society; Expected May 2023

Beijing Normal University (Study Abroad), Beijing, China
School of Mathematical Sciences; September 2020 - January 2021

RESEARCH INTEREST

Embedded & mobile computing, Internet of Things security, Applied machine learning.

PUBLICATIONS

Woosub Jung, **Kailai Cui**, Kenneth Koltermann, Junjie Wang, Chunsheng Xin, Gang Zhou, "Light Auditor: Power Measurement can tell Private Data Leakage through IoT Covert Channels," ACM SenSys 2022, Boston, MA, November 2022.

SERVICES

Student Volunteer, ACM SenSys 2022, Boston, MA, November 2022.

RESEARCH EXPERIENCE

College of William and Mary, Undergraduate Honor Thesis, August 2022 – present
Independent Researcher, supervised by Dr. Gang Zhou

- Smart plugs, if mounted with power sensing ability, can be used to infer device behavior.
- Developed a power sensor-based system that infers smart home devices' behavior.
- Formulated two classification problems: device type and device behavior.
- Recorded and examined the power consumption pattern of smart cameras and voice assistants as they perform different tasks.
- Designed and tested a multi-task machine learning model; A research paper is going to appear in early 2023.

College of William and Mary, March 2021 – present
Research Intern at LENS lab, Dr. Gang Zhou

- A novel covert channel attack leaks user's private data by encoding and transmitting them through smart bulb's infrared emission.
- Focused on the power consumption pattern of the bulb instead of monitoring the bulb's infrared emission.
- Designed and developed a power-auditing system and a CNN model that identifies the smart bulb's leakage of private data.
- Wrote and revised a research paper which was accepted to ACM SenSys 2022.

College of William and Mary, Computational Group Theory, June 2021 – May 2022
Independent Researcher, supervised by Dr. Eric Swartz

- Studied graduate-level permutation group theory and computational group theory.

- Read papers on computer algorithms that find group subsets, order of group elements and graph isomorphisms.
- To approximate a subgroup with computer program, algorithms define different graphs and compare the actions of different group elements.
- Revised and implemented such algorithms with the GAP language.

PRESENTATIONS

William & Mary Undergraduate Research Symposium, "Light Auditor: Power Measurement can tell Private Data Leakage through IoT Covert Channels", College of William and Mary, Sep 2022.

RELEVANT COURSEWORKS

Computer Science: Data Structures, Algorithms, Computer Organization, Software Development, Programming Language, Performance of System, Network Systems, Computer and Network Security, Computer Architecture, Machine Learning, Mobile Application Security.

Mathematics: Linear Algebra, Multivariable Calculus, Real Analysis, Complex Analysis, Algebra, Algebra II, Topology, Combinatorics, Operations Research.

PROJECTS

Security Analysis of Android Apps

- Project from William & Mary course *Mobile Application Security*.
- Analyzed 100 Android apps for permission misuse, SSL misuse and interface vulnerabilities.
- Wrote scripts for automated static analysis, looking for the vulnerabilities.
- Conducted dynamic analysis on a smaller set of apps to confirm interface vulnerabilities such as accessing sensitive sensors upon receiving broadcasted intent.

MindSinger

- *Cypher VII Hackathon* held by William & Mary.
- Using NLP processing techniques and model, developed a program that infers the user's emotion based on text input.
- The program recommends a song relevant to the user's emotion through Spotify API.
- Grand Prize Winner of the Hackathon.

EmoExpresser

- *Cypher VI Hackathon* held by William & Mary.
- Developed a real-time facial expression detector and recommendation app using OpenCV and TensorFlow.
- Wrote a program that selects one from a pool of emoji based on the emote detected.
- Winner of the Hackathon.

PROFESSIONAL EXPERIENCE

Sinosoft Company, Shanghai, China**, June 2020 – August 2020**
Software Development Intern

- Designed and developed a mobile app that processes transactions, demonstrates products, and supports instant messaging between clients and the insurance company.
- Maintained a MySql database that stores clients and products data.
- Communicated with the front-end developers and developed functionalities as required.

MEMBERSHIPS

Association for Computing Machinery at W&M (2019 - present)

TECHNICAL SKILLS

Proficiency in MATLAB, Python, C, C++, Java, Git