

**Kailai Cui**  
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## **EDUCATION**

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**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; Expected May 2023

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

## **RESEARCH INTEREST**

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Internet of Things, Applied Machine Learning, Sensor Networks.

## **PUBLICATIONS**

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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.

## **RESEARCH EXPERIENCE**

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**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 user behavior.
- Developed an IoT device recognition system based on the power consumption pattern.
- Recorded and examined the power consumption pattern of multiple IoT devices.
- Examined the power consumption of different states of operation for each device
- Developed 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 leaking 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.
- Read papers on 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

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**William and 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

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**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.

## PROFESSIONAL EXPERIENCE

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**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 MySQL database that stores clients and products data.
- Communicated with front-end developers and developed functionalities as required.

## PROJECTS

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### **MindSinger**

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

### **EmoExpresser**

- Cypher VI Hackathon held by William and 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.

## MEMBERSHIPS

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

## TECHNICAL SKILLS

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