CS 315: Computer Security
Team/Term Project

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General Information

- A research project with 2-5 individuals
  - Building a new system
  - Improving/Re-showing an existing technique/attack
  - Performing a large case study
- Deadlines
  - Project proposals due on Oct 9
  - Project discussion on Oct 10
  - Project presentations are on December 26
  - Project final reports due on December 26

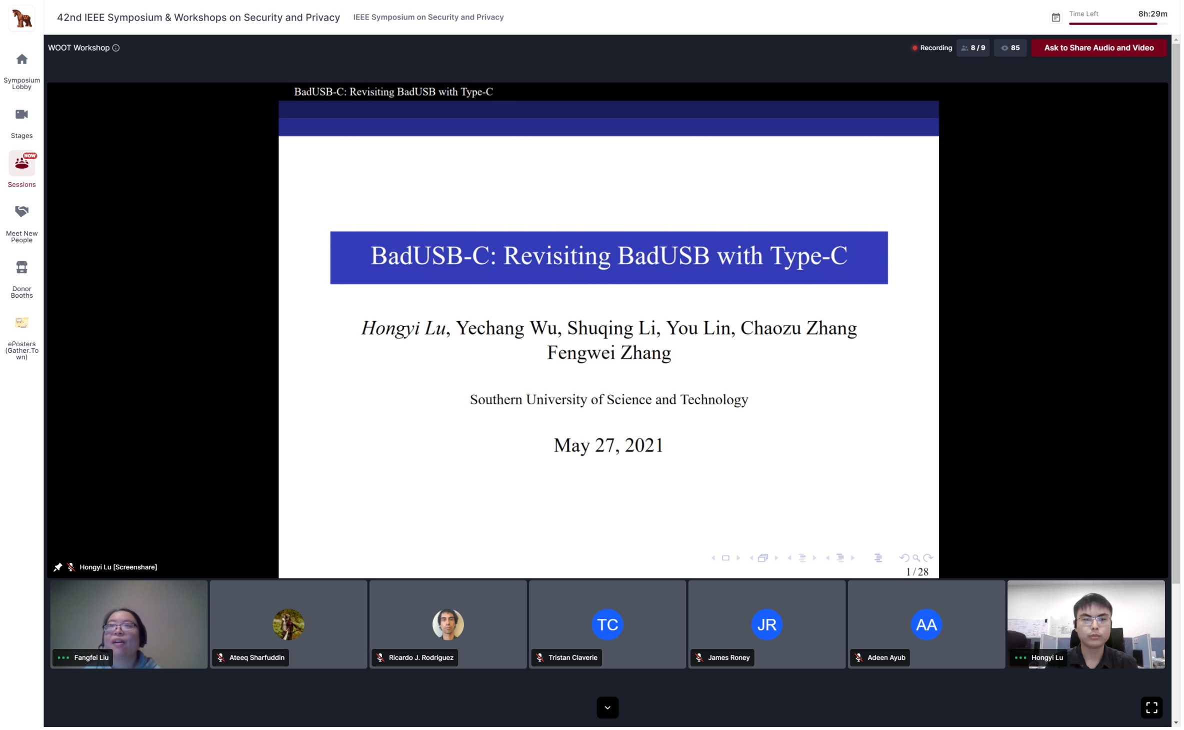
Grading

- Term Project Proposal: 60 points
- Term Project Presentation: 80 points
- Term Project Report: 100 points

Project Topic Examples

http://cse.sustech.edu.cn/cn/news/view/id/845

华为采用南科大计算机本科生的成果封堵手机漏洞



BadUSB-C: Revisiting BadUSB with Type-C

Hongyi Lu, Yechang Wu, Shuqing Li, You Lin, Chaozu Zhang
Fengwei Zhang

Southern University of Science and Technology

May 27, 2021

Project Topic Examples

- Cold boot attack on Arm architecture (hard)

  https://citp.princeton.edu/our-work/memory/

- Single-instruction stepping of Ninja (medium+)
  - 忍者论文：https://fengweiz.github.io/paper/ninjausenixsecurity17.pdf
  - 忍者期刊：https://fengweiz.github.io/paper/ninja-tifs19.pdf
  - 复现论文，研究Instruction Skid问题，尝试用LAPIC来缓解。

Project Topic Examples

Building an Encalve in normal world via TZASC and Stage-2 on Arm (hard)

- COMPASS工业界项目，双周会周四上午9点半

Hacking System Management Mode on x86 (medium-)

- 微笑论文：https://cse.sustech.edu.cn/faculty/~zhangfw/paper/smile-sp22.pdf
- Intel DCI-based debugging facility: https://www.ptsecurity.com/ ww-en/analytics/where-theres-a-jtag-theres-a-way

Building a kernel debugging tool in EL1 via Arm CoreSight (hard)

- 钉枪期刊论文：https://cse.sustech.edu.cn/faculty/~zhangfw/paper/nailgun-tdsc22.pdf
- 手册：https://developer.arm.com/documentation/ddi0314/h

Project Topic Examples

RISC-V TEE systematization of knowledge (SoK) paper (medium+)

- Penglai: https://penglai-enclave.systems/
- Cure: https://www.usenix.org/system/files/sec21summer_bahmani.pdf
- Keystone: https://keystone-enclave.org/
- Comparison in terms of performance, security, etc.

Your own idea

- WOOT BadUSB-C: https://fengweiz.github.io/paper/badusbc-woot21.pdf
- Keynote BadUSB-C: https://fengweiz.github.io/paper/badusbc-asss21.pdf

Project Topic

- Your own ideas (highly recommended)

Project Proposals

- A two-page description
- Title and author list
- Problem statement
  - Describe what the problem is and why it is important
- Related work
  - Write about state-of-the-art solutions to the problem
- Proposed new solution
  - Describe the plan of your proposed approach. Use diagrams or figures if needed
- Evaluation plan
  - Describe your evaluation plan. Effectiveness and performance. What tools/benchmarks/attacks/experiments? What deliverables?

Project Presentation

- Each project has 30 minutes

- Each Project has 10+ minutes Q&A

- Presentation format may include slides or demo

- Presentation schedule

Project Final Report

- 8 pages and more, use IEEE Latex format:
  - https://www.ieee.org/conferences/publishing/templates.html
  - Download by clicking on Template (ZIP, 700 KB)
  - http://mirrors.cqu.edu.cn/CTAN/macros/latex/contrib/IEEEtran/IEEEtran_HOWTO.pdf

- May contain the following sections
  - Introduction
  - Related work
  - Background
  - System architecture/System design/Technical approach
  - Implementation
  - Evaluation results
  - Discussion (e.g., limitations)
  - Conclusion and future works
  - References

Bonus

- If your team can submit a paper
- Points: TBA