CS 772/872: Advanced Computer and Network Security
Fall 2022

Course Link:
https://shhaos.github.io/courses/CS872/netsec-fall2022.html

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Instructor – Shuai Hao

• **Ph.D.**, 2017 -- College of William and Mary, Williamsburg, VA

• **Postdoc**, 2018 – 2019 – CAIDA, UC San Diego, La Jolla, CA

• **Research**
  
  • Applying measurement, empirical study, and data-driven approach to (1) understand Internet underlying Infrastructure and (2) to develop enhancement to improve Internet performance, robustness, and security

  • Internet Topology
  • Internet Routing System
  • Domain Name System
  • Content Delivery Networks

  • Web Security and Privacy
  • Online Fraud
  • Underground E-Commerce
  • Cybercrime
What this course is ...

- Graduate-level course
- Study classical and latest relevant research problems
  - Reading Research Papers
  - Reviewing/Presenting papers
- Writing Report

What this course is NOT ...

- Listening-and-learning
- Textbook knowledge
- Knowledge-based Exam
- Fundamental Background will be introduced
Why CS 772/872?

• Credits / Requirements
• Advanced Topics
  • Sitting on the frontier of popular research area
Why CS 772/872?

• Credits / Requirements

• Advanced Topics
  • Sitting on the frontier of popular research area

• Computer and Network Security
  • *Classical* & *Emerging* Research area
  • *Fundamental* & *practical* problems that are related to most areas of development
Resources

- Premier Conferences in Networking & Security

**NETWORKING**
- ACM SIGCOMM
- USENIX NSDI
- ACM IMC
- ACM CoNEXT
- WWW
- IEEE ICNP
- IEEE INFOCOM
- IEEE/ACM IWQoS
- IEEE Globecom
- IEEE ICC

**SYSTEM**
- IEEE SOSP
- USENIX OSDI
- ACM SIGMETRICS
- USENIX ATC
- EuroSys
- NDSS
- PETS
- IEEE/IFIP DSN
- ESORICS
- ACSAC
- RAID
- IEEE SRDS
- ACM ASIACCS
- ACM CODASPY
- DIMVA
- USENIX SOUPS
- IEEE CNS

**SECURITY**
- IEEE S&P (Oakland)
- USENIX Security
- ACM CCS
- NDSS
- PETS
- IEEE/IFIP DSN
- ESORICS
- ACSAC
- RAID
- IEEE SRDS
- ACM ASIACCS
- ACM CODASPY
- DIMVA
- USENIX SOUPS
- IEEE CNS
Course Workloads

- Course Presentations
  - Teach us
- Paper Reviews
  - Gain Insights & practice your duty
- Final Report
  - Write a paper/survey
Paper Review

• Summarize the main idea
  • Problem they solved
  • Approach they took (what’s the novelty)
  • How did they evaluate

• Pros & Cons: Which parts you like & don’t like
  • Methodology? Reasonable Experiment design? Solid results?

• Any ways to improve the work
Paper Review

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• Pros & Cons: Which parts you like & don’t like
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• Any ways to improve the work

• Real public conference reviews
  • ACM IMC 2011 - 2013

Sample1, Sample2
Presentation

• Basic Presentation Structure
  • Motivation of the work
  • Technical background
  • Proposed approaches/Major contribution
  • Evaluation results/discussion
  • Conclusion and Extension

• You could do more
  • History/evolution of relevant techniques
  • Comparison/complementary study
  • Following work
Presentation

• Colloquium-style Presentations
  • ~60 mins + discussion
  • Using your own slides
  • Including course information, original authors, and the presenter in your title page

• Need to see more well-presented seminar talks?
  • Stanford NetSeminar
    • [https://www.youtube.com/channel/UCDjWhwewESyX335Rp6B1PEw](https://www.youtube.com/channel/UCDjWhwewESyX335Rp6B1PEw)
  • Cornell-Princeton Center for Network Programming
    • [https://www.youtube.com/channel/UCCPScZgIFYxuuqj8IsPpgeQ](https://www.youtube.com/channel/UCCPScZgIFYxuuqj8IsPpgeQ)
Final Report

• **A formal technical paper**
  • Using formal IEEE or ACM conference template
  • Writing with Latex!

• **Progress**
  • Define your topic: problem statement
  • Paper structure
  • Preliminary results
  • Final report
  • **A final presentation of your report at last lecture (~5 min)**
Final Report

• Do a research
  • Analysis / Assessment
  • Measurement
  • Prototyping

• Optional: Pursue a joint project with other course
  • Getting approval from the other instructor
  • Schedule a joint meeting with both instructors to present your idea
Final Report

• Examples of projects
  • UC Berkeley CS 261N: Internet/Network Security
    • http://www.icir.org/vern/cs261n/project.html
  • MIT 6.875: Computer and Network Security
    • http://courses.csail.mit.edu/6.857/2016/projects
Final Report

- **Survey Paper**
  - Comprehensive and thoughtful literature survey of a particular topic
  - Touching the State-of-the-art
  - Connecting to your potential research interests
Final Report

• Survey Paper
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  • Touching the State-of-the-art
  • Connecting to your potential research interests

Systematization of Knowledge (SoK)
  • Introduced by IEEE Security and Privacy since 2010
  • Collection of SoK papers from IEEE Security and Privacy
    • https://oaklandsok.github.io/
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