

# Ramakrishnan Sundara Raman

PhD Candidate, University of Michigan

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🔗 <https://ramakrishnansr.com/>

🌐 [ramakrishnansundararaman](#)

📅 Updated: 22 September 2023

I am a PhD candidate with 5+ years of experience in computer security and networking research, with expertise in using Internet measurement methods to detect, analyze and prevent large-scale threats to Internet users' security and privacy. My research involves longitudinally measuring Internet censorship and network interference at global scale, and examining the technologies that enable censorship. I lead work on the [Censored Planet Observatory](#), which is a platform for measuring various types of network interference continuously around the world, and I am the recipient of a FOCI Rising Star Award, an OTF Information Controls Fellowship, a Rackham Predoctoral Fellowship, and an IRTF Applied Networking Research Prize.

## Education

- 2018 – Present     📌 **PhD Candidate, University of Michigan** in Computer Science and Engineering  
**Advisor:** Prof. Roya Ensafi  
**Thesis title:** Global, Longitudinal, and Data-Driven Investigation of Network Censorship  
**CGPA:** 3.95 out of 4
- 2013 – 2017     📌 **Bachelor of Technology, Vellore Institute of Technology** in Computer Science and Engineering  
**Project Title:** Measuring Last-Mile Internet Reliability During Severe Weather  
**CGPA:** 9.69 out of 10  
**Rank in CSE:** 2 out of 648

## Conference Publications

- **Modeling and Detecting Internet Censorship Events**  
**E. Tsai, R. Sundara Raman**, A. Prakash, R. Ensafi  
Network and Distributed System Security Symposium (NDSS), February 2024
- **Global, Passive Detection of Connection Tampering**  
**R. Sundara Raman**, L.H. Merino, K. Bock, M. Fayed, D. Levin, N. Sullivan, L. Valenta  
ACM SIGCOMM, September 2023  
🔗 <https://ramakrishnansr.com/assets/passive.pdf>
- **Network Responses to Russia's Invasion of Ukraine in 2022: A Cautionary Tale for Internet Freedom**  
R. Ramesh\*, **R. Sundara Raman\***, A. Virkud, A. Dirksen, A. Huremagic, D. Fifield, D. Rodenburg, R. Hynes, D. Madory, R. Ensafi  
USENIX Security Symposium, August 2023  
🔗 <https://ramakrishnansr.com/assets/russia-ukraine-invasion.pdf>
- **Detecting DNS Manipulation using TLS Certificates**  
E. Tsai, D. Kumar, **R. Sundara Raman**, G. Li, Y. Eiger, R. Ensafi  
Privacy Enhancing Technologies Symposium (PETS), July 2023  
🔗 <https://ramakrishnansr.com/assets/certainty.pdf>
- **Network Measurement Methods for Locating and Examining Censorship Devices**  
**R. Sundara Raman\***, M. Wang\*, J. Dalek, J. Mayer, and R. Ensafi  
ACM Conference on emerging Networking EXperiments and Technologies (CoNEXT), December 2022  
🏆 IRTF Applied Networking Research Prize  
🔗 [https://ramakrishnansr.com/assets/censorship\\_devices.pdf](https://ramakrishnansr.com/assets/censorship_devices.pdf)
- **A Large-scale Investigation into Geodifferences in Mobile Apps**  
R. Kumar, A. Virkud, **R. Sundara Raman**, A. Prakash, and R. Ensafi  
USENIX Security Symposium, August 2022  
🔗 <https://ramakrishnansr.com/assets/appmap.pdf>

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\*Both authors contributed equally to this research

- **Lost in Transmission: Investigating Filtering of COVID-19 Websites**  
A. Vyas, **R. Sundara Raman**, N. Ceccio, P. Lutscher, and R. Ensafi  
Financial Cryptography and Data Security (FC), March 2021  
[🔗 https://ramakrishnansr.com/assets/covid.pdf](https://ramakrishnansr.com/assets/covid.pdf)
- **Censored Planet: An Internet-wide, Longitudinal Censorship Observatory**  
**R. Sundara Raman**, P. Shenoy, K. Kohls, and R. Ensafi  
ACM Conference on Computer and Communications Security (CCS), November 2020  
[🔗 https://ramakrishnansr.com/assets/censoredplanet.pdf](https://ramakrishnansr.com/assets/censoredplanet.pdf)
- **Investigating Large Scale HTTPS Interception in Kazakhstan**  
**R. Sundara Raman**, L. Evdokimov, E. Wustrow, A. Halderman, and R. Ensafi  
ACM Internet Measurement Conference (IMC), October 2020  
🏆 Best Paper Award Nominee  
[🔗 https://ramakrishnansr.com/assets/Kazakhstan.pdf](https://ramakrishnansr.com/assets/Kazakhstan.pdf)
- **Measuring the Deployment of Network Censorship Filters at Global Scale**  
**R. Sundara Raman**, A. Stoll, J. Dalek, R. Ramesh, W. Scott, R. Ensafi  
Network and Distributed System Security Symposium (NDSS), February 2020  
[🔗 https://ramakrishnansr.com/assets/filtermap.pdf](https://ramakrishnansr.com/assets/filtermap.pdf)
- **Decentralized Control: A Case Study of Russia**  
R. Ramesh, **R. Sundara Raman**, M. Bernhard, V. Ongkowijaya, L. Evdokimov, A. Edmundson, S. Sprecher, M. Ikram, R. Ensafi  
Network and Distributed System Security Symposium (NDSS), February 2020  
🏆 CSAW'20 Applied Research Competition North America Top 10 Paper  
[🔗 https://ramakrishnansr.com/assets/russia.pdf](https://ramakrishnansr.com/assets/russia.pdf)

## Workshop Publications

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- **Advancing the Art of Censorship Data Analysis**  
**R. Sundara Raman**, A. Virkud, S. Laplante, V. Fortuna, R. Ensafi  
Free and Open Communications on the Internet (FOCI), February 2023  
[🔗 https://ramakrishnansr.com/assets/censorship-data-analysis.pdf](https://ramakrishnansr.com/assets/censorship-data-analysis.pdf)
- **A Multi-Perspective View of Internet Censorship in Myanmar**  
R. Padmanabhan, A. Filastò, M. Xynou, **R. Sundara Raman**, K. Middleton, M. Zhang, D. Madory, M. Roberts, and A. Dainotti  
Free and Open Communications on the Internet (FOCI), August 2021  
[🔗 https://ramakrishnansr.com/assets/myanmar.pdf](https://ramakrishnansr.com/assets/myanmar.pdf)

## Awards

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|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Research | <ul style="list-style-type: none"> <li>📖 <b>FOCI'23 Rising Star Award</b><br/>July 2023<br/><a href="https://ramakrishnansr.com/images/foci-rising-star.jpeg">🔗 https://ramakrishnansr.com/images/foci-rising-star.jpeg</a></li> <li>📖 <b>IRTF Applied Networking Research Prize (ANRP) 2023</b><br/>January 2023<br/><a href="https://www.ietf.org/blog/anrp-2023/">🔗 https://www.ietf.org/blog/anrp-2023/</a></li> <li>📖 <b>HotPETs 2022 Best Talk Award</b><br/>July 2022<br/><a href="https://petsymposium.org/best-hotpets-talks.php">🔗 https://petsymposium.org/best-hotpets-talks.php</a></li> <li>📖 <b>University of Michigan CSE Graduate Student Honors Runners Up Award</b><br/>November 2020<br/><a href="https://cse.engin.umich.edu/stories/2020-cse-graduate-student-honors-competition-highlights-outstanding-research">🔗 https://cse.engin.umich.edu/stories/2020-cse-graduate-student-honors-competition-highlights-outstanding-research</a></li> <li>📖 <b>ACM IMC 2020 Best Paper Award Nominee</b><br/>October 2020</li> </ul> |
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|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fellowships        | <div> <div></div> <div> <b>Rackham Predoctoral Fellowship</b><br/> March 2023<br/> <a href="https://cse.engin.umich.edu/stories/ram-sundara-raman-earns-rackham-predoctoral-fellowship">https://cse.engin.umich.edu/stories/ram-sundara-raman-earns-rackham-predoctoral-fellowship</a> </div> </div> |
|                    | <div> <div></div> <div> <b>OTF Information Controls Fellowship (ICFP) Award</b><br/> November 2021<br/> <a href="https://www.opentech.fund/about/people/ramakrishnan-sundara-raman/">https://www.opentech.fund/about/people/ramakrishnan-sundara-raman/</a> </div> </div>                            |
| Teaching & Service | <div> <div></div> <div> <b>North Campus Deans' MLK Spirit Award 2023</b><br/> January 2023<br/> <a href="https://culture.engin.umich.edu/2023-nominees-recipients/">https://culture.engin.umich.edu/2023-nominees-recipients/</a> </div> </div>                                                      |
|                    | <div> <div></div> <div> <b>University of Michigan CSE GSI Honorable Mention Award</b><br/> August 2021<br/> <a href="https://ramakrishnansr.com/images/honorable_mention_award.pdf">https://ramakrishnansr.com/images/honorable_mention_award.pdf</a> </div> </div>                                  |
| Grants             | <div> <div></div> <div> <b>ACM IMC 2022 Travel Grant</b><br/> October 2022 </div> </div>                                                                                                                                                                                                             |
|                    | <div> <div></div> <div> <b>DARPA MICE Grant</b><br/> <b>Title: Leveraging machine learning to build an intelligent Censored Planet observatory</b><br/> August 2021 </div> </div>                                                                                                                    |
|                    | <div> <div></div> <div> <b>USENIX Security 2020 Student Grant</b><br/> August 2020 </div> </div>                                                                                                                                                                                                     |
|                    | <div> <div></div> <div> <b>Citizen Lab Summer Institute (CLSI) 2019 Travel Grant</b><br/> August 2019 </div> </div>                                                                                                                                                                                  |

## Teaching

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|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| March 2023                  | <div> <div></div> <div> <b>Guest Lecturer, CS 4973, Northeastern University</b><br/> Topic: Censorship and Circumvention </div> </div>                                                        |
| January 2023 – April 2023   | <div> <div></div> <div> <b>Substitute Instructor, EECS 588, University of Michigan</b><br/> Topic: Computer and Network Security </div> </div>                                                |
| March 2022                  | <div> <div></div> <div> <b>Guest Lecturer, EECS 588, University of Michigan</b><br/> Topic: Censorship and Circumvention </div> </div>                                                        |
| August 2020 – December 2020 | <div> <div></div> <div> <b>Graduate Student Instructor (GSI), EECS 588, University of Michigan</b><br/> Topic: Computer and Network Security<br/> 🏆 GSI Honorable Mention Award </div> </div> |

## Work Experience

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| July 2022 – September 2022 | <div> <div></div> <div> <b>Research Intern, Cloudflare Inc.</b> <ul style="list-style-type: none"> <li>Designed and implemented a large network monitoring system that identifies anomalous network events such as connection tampering attacks in large-scale network traffic at the rate of millions of packets per second.</li> <li>Developed network data analysis methods and tools for detecting large-scale traffic tampering passively from an operator's point of view.</li> <li>Built production dashboards and reports showcasing significant network events such as the effects of the protests in Iran on Internet traffic.</li> </ul> </div> </div> |
| November 2021 – July 2022  | <div> <div></div> <div> <b>OTF Senior ICFP Fellow in Information Controls, The Citizen Lab</b> <ul style="list-style-type: none"> <li>Researched novel measurement methods for locating and examining network devices that performed surveillance and censorship.</li> <li>Collaborated with the expert team at the Citizen Lab, a research group focused on network forensics.</li> <li>Published several open-source tools and fingerprint datasets for identifying censorship devices.</li> </ul> </div> </div>                                                                                                                                                |

- July 2017 – May 2018

**Associate Consultant, Microsoft Global Delivery**

Contributed to large enterprise systems for business applications that can deliver value to large organizations around the world.
- March 2017 – July 2017

**Research Intern, University of Maryland**

**Advisor:** Prof. Neil Spring

  - Facilitated a measurement platform and analysis tools that identifies last-mile residential Internet outages in areas affected by severe weather conditions in real-time.
  - Poster presented at ACM Internet Measurement Conference 2017: "Measuring Last-Mile Internet Reliability During Severe Weather"
- May 2016 – July 2016

**Intern, Microsoft Global Delivery**

Integrated data analytics into Microsoft's project management tool, built on ASP.NET. Microsoft's Power BI tool was utilized to make interactive reports that provided valuable insight to the users.

## Mentoring

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- **Undergraduate Students:** Nadav Oren (2023), Gavin Li (2021 - 2023), Apurva Virkud (2020 - 2022), Anjali Vyas (2020 - 2021), Rose Ceccio (2020 - 2021), Prerana Shenoy (2019 - 2020)
- **Graduate Students:** Kevin Wang (2023), Elisa Tsai (2020 - 2023)

## Talks

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- **Workshop Talk: Advancing the Art of Censorship Data Analysis**  
Free and Open Communications on the Internet (FOCI), February 2023
- **Lightning Talk: Exploring Internet censorship through the Censored Planet Dashboard**  
Open Technology Fund (OTF), January 2023
- **Conference Talk: Network Measurement Methods for Locating and Examining Network Censorship Devices**  
Conference on emerging Networking EXperiments and Technologies (CoNEXT 2022), December 2022
- **Workshop Talk: Improving Usability of Internet Censorship Data through a Censorship Dashboard**  
15th Workshop on Hot Topics in Privacy Enhancing Technologies (HotPETs), July 2022  
🏆 Best Talk Award
- **Tech Demo: Exploring Internet censorship with the Censored Planet Dashboard**  
RightsCon 2022, June 2022  
🔗 <https://youtu.be/j1sLWAmOnMA>
- **Symposium Talk: Censored Planet: An Internet-wide, Longitudinal Censorship Observatory**  
The 5th Annual Data for Public Good Symposium, March 2022  
🔗 <https://midas.umich.edu/2022-d4pg/research-talks/#research-talks>
- **Invited Talk: Censored Planet Community Webinar 2021**  
Censored Planet, October 2021  
🔗 [https://youtu.be/v5G\\_nUUzVv8](https://youtu.be/v5G_nUUzVv8)
- **Invited Talk: Censored Planet: An Internet-wide Longitudinal Observatory**  
NDSS DNS Privacy Workshop (DNSPriv), February 2021
- **Conference Talk: Censored Planet: An Internet-wide Longitudinal Observatory**  
ACM Conference on Computer and Communications Security (CCS), November 2020  
🔗 <https://youtu.be/8dwZdNkJ508>
- **Conference Talk: Investigating Large Scale HTTPS Interception in Kazakhstan**  
ACM Internet Measurement Conference (IMC), October 2020  
🔗 <https://youtu.be/RoYWsfNOCr4>
- **Invited Talk: Censored Planet: Measuring Internet censorship remotely**

OONI Internet Measurement Village (IMV), June 2020

🔗 <https://youtu.be/5IgvR42cMQ>

- **Conference Talk: Measuring the Deployment of Network Censorship Filters at Global Scale**  
Network and Distributed System Security Symposium (NDSS), February 2020

🔗 <https://youtu.be/R8VlH0wakQk>

## Reports and Blogposts

- **Measuring Connection Tampering Around the World**  
Internet Society Pulse Blog, October 2023  
🔗 <https://pulse.internetsociety.org/blog/measuring-connection-tampering-around-the-world>
- **Making Censorship Data More User Friendly**  
Internet Society Pulse Blog, May 2023  
🔗 <https://pulse.internetsociety.org/blog/making-censorship-data-more-user-friendly>
- **Profiling Internet Censors: Methods to Measure and Locate Censorship Devices**  
Open Technology Fund (OTF), December 2022  
🔗 <https://www.opentech.fund/news/profiling-internet-censors-methods-to-measure-and-locate-censorship-devices/>
- **An analysis of a large-scale HTTPS interception**  
APNIC Blog, February 2021  
🔗 <https://blog.apnic.net/2021/02/15/an-analysis-of-a-large-scale-https-interception/>
- **US Government and military websites are geoblocked from Hong Kong and China**  
Censored Planet, August 2020  
🔗 <https://censoredplanet.org/hongkong>

## Posters

- **Censored Planet: An Internet-wide, Longitudinal Censorship Observatory**  
Midwest Security Workshop, April 2019
- **Measuring Last Mile Internet Reliability During Severe Weather**  
ACM Internet Measurement Conference (IMC), November 2017

## Certifications

- **2023 Rackham-CRLT Preparing Future Faculty Seminar**  
University of Michigan, June 2023  
🔗 <https://ramakrishnansr.com/assets/pff2023.pdf>
- **Introduction to Data Science in Python**  
University of Michigan Coursera, June 2023  
🔗 <https://ramakrishnansr.com/assets/coursera-intro-data-science-python.pdf>

## Service

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| Chairing  | ■ <b>Session Chair at FOCI'21</b><br>🔗 <a href="https://conferences.sigcomm.org/sigcomm/2021/workshop-foci.html">https://conferences.sigcomm.org/sigcomm/2021/workshop-foci.html</a>        |
| Reviewing | ■ <b>TPC Member, IEEE Symposium on Security and Privacy (S&amp;P) 2024</b><br>🔗 <a href="https://sp2024.ieee-security.org/cfpapers.html">https://sp2024.ieee-security.org/cfpapers.html</a> |
|           | ■ <b>TPC Member, Free and Open Communications on the Internet (FOCI) 2024</b><br>🔗 <a href="https://foci.community/foci24.html">https://foci.community/foci24.html</a>                      |
|           | ■ <b>Reviewer, 6th International Conference on Computer Science and Application Engineering (CSAE) 2022</b>                                                                                 |

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| External Reviewing | <ul style="list-style-type: none"> <li> <b>TPC Member, ACM SIGCOMM 2021 Workshop on Free and Open Communications on the Internet (FOCI)</b><br/> <a href="https://conferences.sigcomm.org/sigcomm/2021/workshop-foci.html">https://conferences.sigcomm.org/sigcomm/2021/workshop-foci.html</a> </li> </ul>                                                                                                                                                                                             |
|                    | <ul style="list-style-type: none"> <li><b>USENIX Security Symposium 2022</b></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                |
|                    | <ul style="list-style-type: none"> <li><b>ACM Internet Measurement Conference (IMC) 2021</b></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                |
|                    | <ul style="list-style-type: none"> <li><b>USENIX Security Symposium 2021</b></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                |
|                    | <ul style="list-style-type: none"> <li><b>ACM Internet Measurement Conference (IMC) 2020</b></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                |
|                    | <ul style="list-style-type: none"> <li><b>IEEE Symposium on Security and Privacy (S&amp;P) 2020</b></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                         |
|                    | <ul style="list-style-type: none"> <li><b>Privacy Enhancing Technology Symposium (PETS) 2020</b></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                            |
|                    | <ul style="list-style-type: none"> <li><b>USENIX Security Symposium 2019</b></li> <li><b>IEEE Symposium on Security and Privacy (S&amp;P) 2019</b></li> </ul>                                                                                                                                                                                                                                                                                                                                          |
| Leadership         | <ul style="list-style-type: none"> <li> <b>Outreach Chair at CSEG, UM CSE graduate student organization</b><br/> June 2020 – May 2022<br/> My responsibilities included arranging and managing outreach events throughout the year that aimed at spreading knowledge about computer science research in various schools, colleges and groups. I also participated as the DEI committee student representative of CSEG in the first few months of 2022.<br/> 🏆 Deans' MLK Spirit Award 2023 </li> </ul> |
|                    | <ul style="list-style-type: none"> <li> <b>Administrator of the Security Reading Group (SECRIT) in UM CSE</b><br/> June 2019 – June 2021 </li> </ul>                                                                                                                                                                                                                                                                                                                                                   |