Reethika Ramesh

PhD Candidate, University of Michigan reethika@umich.edu

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Research Interests: Security and Privacy Internet Measurement

https://reethika.info

Education

Ph.D in Computer Science, University of Michigan, 2018–2023
 Dissertation: Investigating the VPN Ecosystem Through the Lens of Security, Privacy, and Usability Advised by Prof. Roya Ensafi, Associate Professor, Computer Science & Engineering, I drove
 research from ideation to completion, and rapidly conceptualized and developed systems
 solutions. I have published seven top-tier security papers (3 NDSS, 3 USENIX Sec, 1 IMC), and
 created real-world impact with 110+ news coverage globally, and 29 responsible disclosures.
 Report resulting from our collaboration with Consumer Reports has been cited by members of
 Congress calling on the FTC for regulation. GPA – 3.90/4.0

B.Tech. in Computer Science and Engineering, VIT University, 2013—2017
 Final semester spent abroad as a research intern at the University of Maryland. CGPA: 9.38/10

Experience

+ Senior Staff Researcher, Palo Alto Networks (Oct 2023–Present)

I work on network security research that helps us build products that protects our customers by preventing and combating various threats and threat actors.

+ Research Intern, Brave Software (Jun 2022–Aug 2022)

Mentor: Dr. Philipp Winter

I rapidly conceptualized, designed, and engineered open-source, browser-based active measurement methods that leverage network latency to detect potentially fraudulent user requests. My solution is being pushed to production to add to their suite of anti-fraud, abuse-prevention techniques.

+ Research Assistant, University of Michigan (2018–2023)

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Advisor: Prof. Roya Ensafi
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I conducted my dissertation research at the Computer Science department at the University of Michigan with my advisor Prof. Roya Ensafi. My research interests are digital security and privacy.

+ Associate Consultant, Microsoft India (Jul 2017–May 2018)

I was as an Associate Consultant in the Apps domain in Microsoft India Global Delivery. I worked on developing applications for our clients that required integrating their business needs with the different technologies in the Microsoft Stack.

+ Research Intern, University Of Maryland (Feb–Jul 2017)

Advisor: Prof. Neil Spring

While interning as an undergraduate researcher in the Systems and Networking Lab at the University of Maryland, College Park, I performed a longitudinal analysis of Internet outages using ThunderPing's data. ThunderPing uses active probing methods from remote vantage points to detect residential Internet connectivity failures during inclement weather conditions.

Publications and Broader Impact

[7] Network Responses to Russia's Invasion of Ukraine in 2022: A Cautionary Tale for Internet Freedom

<u>Reethika Ramesh</u>*, Ram Sundara Raman^{*}, Apurva Virkud, Alexandra Dirksen, Armin Huremagic, David Fifield, Dirk Rodenburg, Rod Hynes, Doug Madory, Roya Ensafi [* denotes co-first authorship] **To Appear In:** 32nd USENIX Security Symposium 2023 (USENIX Sec '23). We open-sourced our measurement tool, GeoInspector, to help measure geoblocking implemented on

the DNS, TCP, and HTTP(S) protocols.

[6] "All of them claim to be the best": Multi-perspective study of VPN users and VPN providers Reethika Ramesh, Anjali Vyas, and Roya Ensafi

To Appear In: 32nd USENIX Security Symposium 2023 (USENIX Sec '23).

I presented this work in the IFF VPN Community gathering and highlighted the need for better user education and the need for industry standards. I also presented it at the 2022 IFF VPN Village, a series of virtual events focused on VPN user education and solidarity.

[5] OpenVPN is Open to VPN Fingerprinting

Diwen Xue, <u>Reethika Ramesh</u>, Arham Jain, Michalis Kallitsis, J. Alex Halderman, Jedidiah R. Crandall, and Roya Ensafi

31st USENIX Security Symposium 2022 (USENIX Sec '22).

P Award: Won USENIX'22 Distinguished Paper Award and First-Place in the 2022 Internet Defense Prize.

[4] VPNalyzer: Systematic Investigation of the VPN Ecosystem

Reethika Ramesh, Leonid Evdokimov, Diwen Xue, and Roya Ensafi

29th Network and Distributed Systems Symposium (NDSS'22), Apr 2022.

Y Award: Won First-Place in the CSAW'22 Applied Research Competition at NYU.

Our testing methodology and the VPNalyzer tool was used by Consumer Reports as the first line of systematic investigation to evaluate a set of popular VPNs. Our work was featured in a white paper and our insights were quoted in two articles written by Consumer Reports [1, 2]. Based on our results from the paper, we filed over 26 responsible disclosures with VPN providers. Our work with Consumer Reports was cited by members of Congress urging the FTC to call for regulation in the VPN ecosystem.

[3] Throttling Twitter: An Emerging Censorship Technique in Russia

Diwen Xue, <u>Reethika Ramesh</u>, ValdikSS, Leonid Evdokimov, Andrey Viktorov, Arham Jain, Eric Wustrow, Simone Basso, and Roya Ensafi

21st ACM Internet Measurement Conference (IMC'21), Nov 2021.

Recognized as the Highest Scoring Short Paper at IMC'21. Our work was reported in over 15 news outlets globally during April 2021 including the front page of New York Times Ars Technica, BBC, and Meduza, after we published our research report detailing the technology used in the throttling of Twitter in Russia in March 2021.

[2] Decentralized Control: A Case Study of Russia

Reethika Ramesh, Ram Sundara Raman, Matthew Bernhard, Victor Ongkowijaya, Leonid

Evdokimov, Anne Edmundson, Steven Sprecher, Muhammad Ikram, and Roya Ensafi 27th Network and Distributed Systems Symposium (NDSS'20), Feb 2020.

Finalist and among the Top 10 papers for the US–Canada region at the CSAW '20 Applied Research Competition. Our work was widely reported in over **85 news outlets globally** during 6-8 November 2019, including Associated Press, NYT, and CPJ.

[1] Measuring the Deployment of Network Censorship Filters at Global Scale

Ram Sundara Raman, Adrian Stoll, Jakub Dalek, <u>Reethika Ramesh</u>, Will Scott, and Roya Ensafi 27th Network and Distributed Systems Symposium (NDSS'20), Feb 2020.

Workshop Publications and Talks

[w2] Investigating the VPN Recommendation Ecosystem

<u>Reethika Ramesh</u>, Armin Huremagic, Chad Sharp, Roya Ensafi *IEEE SPW 6th Workshop on Technology and Consumer Protection* (ConPro 2022), May 2022.

[w1] Building the VPNalyzer System

Reethika Ramesh

Talk given at: *Workshop on Learning from Authoritative Security Experiment Results* (LASER), April 2022.

Research Awards and Honors

P Barbour Scholar, 2023-2024

I was awarded the Barbour Scholar for the 2023-2024 academic year, which is part of the Rackham Predoctoral Fellowship and supports "students working on dissertations that are unusually creative, ambitious, and impactful."

Towner Prize for Distinguished Academic Achievement, March 19, 2023

I was awarded the Richard F. and Eleanor A. Towner Prize for Distinguished Academic Achievement for my department, CSE. This award is presented to the outstanding graduate student in each degree program.

First Place at CSAW'22 Applied Research Competition, November 12, 2022

Our paper: "VPNalyzer: Systematic Investigation of the VPN Ecosystem" won first place at the US-Canada CSAW'22 Applied Research Competition

USENIX'22 Distinguished Paper Award, August 10, 2022 Our paper: "OpenVPN is Open to VPN Fingerprinting" won the USENIX'22 Distinguished Paper Award

First Prize in the 2022 Internet Defense Prize, August 10, 2022 Our paper: "OpenVPN is Open to VPN Fingerprinting" won the first prize in the USENIX 2022 Internet Defense Prize.

Finalist in the CSAW'20 Applied Research Competition, November 6, 2020

Our paper Decentralized Control: A Case Study of Russia was selected as a finalist and was among the Top 10 papers for the US-Canada region at the CSAW '20 Applied Research Competition.

Invited Talks and Speaking Engagements

[T16] Conference Talk: "All of them claim to be the best": Multi-perspective study of VPN users and VPN providers

32nd USENIX Security Symposium (USENIX Sec'23), August 2023

[T15] Conference Talk: Network Responses to Russia's Invasion of Ukraine in 2022: A Cautionary Tale for Internet Freedom

Co-presented the talk at: 32nd USENIX Security Symposium (USENIX Sec'23), August 2023

- [T14] Invited Talk: VPN Community Initiative Village, Internet Freedom Festival Online Seminar, December 2022. Presented my work with VPNalyzer and my insights with our latest VPN user study, at the 2022 VPN Village organized by IFF, that aims to bring together VPN providers, researchers, digital security specialists, and technologists working within and around the VPN ecosystem.
- [T13] Finalist Presentation: VPNalyzer: Systematic Investigation of the VPN Ecosystem CSAW '22 Applied Research Competition, November 2022. I presented my work as a finalist at the CSAW'22 ARC and won first place.
- [T12] Invited Talk: VPN Community Gathering, Internet Freedom Festival Online Talk, September 2022. Presented my research paper, "All of them claim to be the best": A multi-perspective study of VPN users and VPN providers at the September'22 VPN Community Gathering organized by IFF.
- [T11] Workshop Talk: Investigating the VPN Recommendation Ecosystem IEEE SPW 6th Workshop on Technology and Consumer Protection (ConPro 2022), May 2022.
- [T10] Long-Form Workshop Talk: Building the VPNalyzer System Workshop on Learning from Authoritative Security Experiment Results (LASER) 2022, Colocated with NDSS'22, April 2022
- [T9] **Conference Talk: VPNalyzer: Systematic Investigation of the VPN Ecosystem** Network and Distributed System Security (NDSS) Symposium, April 2022
- [T8] **Panelist: Research in Security and Privacy** EECS 183, April 2022. Presented my research at EECS 183 at a session, supported by the Renew CS grant, aimed at encouraging women and non-binary students to major in CS.
- [T₇] **Invited Research Talk: Brave Research** October 28, 2021. Gave an invited talk to the Brave Research team about my work.
- [T6] Panelist: Consumer Reports Workshop Exploring VPNs Virtual Webinar, March 2021. Served as a panelist alongside my advisor, Prof. Ensafi at the webinar with over 1,500 users in attendance
- [T5] Finalist Talk: Decentralized Control: A Case Study of Russia CSAW'20 Applied Research Competition, November 2020. The paper was a finalist and was among the Top 10 papers for the US-Canada region at the CSAW'20 ARC

- [T4] Invited Talk: Decentralized Information Control in Russia and its Broader Impacts Next Generation Democracy Cafe, August 2020.
- [T3] Conference Talk: Decentralized Control: A Case Study of Russia Network and Distributed System Security (NDSS) Symposium, February 2020.
- [T2] **PhD Researcher Lightning Talk** Mozilla Security Research Summit, May 2019.
- [T1] Invited Presentation: Research in Ensafi Lab Research Process Workshop, November 2018. Presented at the Research Process Workshop about the our work in the Ensafi Lab, and served as a panelist for research done in the software lab for an event organized by Girls Encoded.

Posters

 Measuring Last Mile Internet Reliability During Severe Weather AMC Internet Measurement Conference, November 2017.

Research Reports

- VPNalyzer Report: "All of them claim to be the best": A multi-perspective study of VPN users and VPN providers August 09, 2022
- Throttling of Twitter in Russia April 06, 2021
- US Government and military websites are geoblocked from Hong Kong and China August 10, 2020
- Censorship in Russia November 06, 2019

Student Grants and Travel Awards

- PET Symposium Travel Stipend, July 10, 2023
 PET Symposium Travel Stipend to attend FOCI'23 and the PET Symposium 2023 in Lausanne, Switzerland.
- ACM IMC Student Grant, October 24, 2022
 ACM IMC Student Travel Grant to attend the Internet Measurement Conference in Nice, France.
- Selected to the CRA-WP Grad Cohort for Women, April 23, 2021
 Selected for the CRA-WP Grad Cohort for Women with Travel Grant, sponsored by my department and CRA in 2020. (*Postponed to 2021 due to COVID'19*).
- USENIX Security '20 Student Grant, August 12, 2020
 USENIX Security '20 Student Grant, sponsored by USENIX and other donors, attended online.
- NDSS Student Grant, August 12, 2020
 Network and Distributed System Security Symposium (NDSS) Student Travel Grant, sponsored by Internet Society to attend the conference in San Diego, CA.

- Citizen Lab Summer Institute Travel Grant, July 31, 2019
 Citizen Lab Summer Institute Travel Grant, sponsored by Open Technology Fund to attend the event in Toronto, Canada.
- IEEE S&P Student Grant, May 20, 2019
 IEEE S&P Student Travel Grant, sponsored by IEEE to attend the conference in San Francisco, CA.
- IEEE GREPSEC Workshop Travel Grant, May 18, 2019
 IEEE GREPSEC Workshop Travel Grant, sponsored by NSF and industry donors to attend the conference in San Francisco, CA.

Teaching

- Graduate Student Instructor, Computer and Network Security (Fall 2020) EECS 588, University of Michigan

My responsibilities included leading lectures and discussions, inviting and facilitating guest lectures, helping students with their projects, holding office hours, and grading.

Professional Service

Program Committee

- 24th Privacy Enhancing Technologies Symposium (PETS'24)
- ACM SIGCOMM 2021 Workshop on Free and Open Communications on the Internet (FOCI'21)

Organizing USENIX Workshop FOCI'20

- Student Organizer (Aug 11, 2020)

I served as the Student Organizer for the 10th USENIX Workshop on Free and Open Communications on the Internet (FOCI'20) co-located with USENIX Security 20.

ECSEL+

– Treasurer (2019-20, 2020-21)

ECSEL+ is a group to support graduate women students and gender minorities in Computer Science at the University of Michigan. I was elected to the Treasurer position twice: 2019-20, 2020-21.

External Reviewer

- ACM Internet Measurement Conference (IMC'21)
- 30th USENIX Security Symposium (Sec'21)
- ACM Internet Measurement Conference (IMC'20)
- 20th Privacy Enhancing Technologies Symposium (PETS'20)

Explore Computer Science Research

- Panelist (Apr 21, 2021)

I served as panelist on an ExploreCSR program organized by Girls Encoded at the University of Michigan. This event helps undergraduate women students and students from underrepresented minorities explore a potential career path in research in computer science.

FEMMES Explore Event

- Activity Leader (Apr 10, 2021)

I served two weekend sessions as an activity leader for the FEMMES Explore Event organized by CSEG with FEMMES at the University of Michigan. This involved (virtually) interacting with and teaching middle-school students about CS and helping them design an algorithm for a computer game.

References

Roya Ensafi, Assistant Professor, University of Michigan, ensafi@umich.edu