Diwen Xue

PhD Student, *University of Michigan* diwenx@umich.edu

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Research Overview

My research focuses on areas where the privacy, security and availability implications of networked systems affect users in the real world. My interests include network security, Internet measurement, and censorship study.

Education

- Ph.D in Computer Science, University of Michigan, 2020 - Present
  Advisor: Prof. Roya Ensafi

- B.A. in Computer Science, New York University, Spring 2020
  Minor in Mathematics GPA: 3.86/4.00, *magna cum laude*

Refereed Conference Publications

[1] **The Discriminative Power of Cross-layer RTTs in Fingerprinting Proxy Traffic**
Diwen Xue, R. Stanley, P. Kumar, and R. Ensafi
In Submission , (-).

[2] **Fingerprinting Obfuscated Proxy Traffic with Encapsulated TLS Handshakes**
Diwen Xue, M. Kallitsis, A. Houmansadr, and R. Ensafi
To Appear In: USENIX Security Symposium 2024 , (USENIX '24).

[3] **Bridging Barriers: A Survey of Challenges and Priorities in the Censorship Circumvention Landscape**
Diwen Xue*, A. Ablove*, R. Ramesh, G. Kwak-Danciu and R. Ensafi
To Appear In: USENIX Security Symposium 2024 , (USENIX '24).

[4] **Attacking Connection Tracking Frameworks as used by Virtual Private Networks**
B. Mixon-Baca, *J. Knockel*, ***Diwen Xue***, T. Ayyagari, D. Kapur, R. Ensafi, and J. Crandall
To Appear In: 24th Privacy Enhancing Technologies Symposium , (PETS'24).

[5] **The Use of Push Notification in Censorship Circumvention**
Diwen Xue and R. Ensafi
In: Free and Open Communications on the Internet, 2023 , (FOCI '23).

[6] **TSPU: Russia's Decentralized Censorship System**
Diwen Xue, B.Mixon-Baca, ValdikSS, A. Ablove, B. Kujath, J. Crandall, and R. Ensafi
In: Internet Measurement Conference 2022 , (IMC '22).

[7] **OpenVPN is Open to VPN Fingerprinting**
Diwen Xue, R. Ramesh, A. Jain, M. Kallitsis, J. Halderman, J. Crandall, and R. Ensafi
In: USENIX Security Symposium 2022 , (USENIX Security '22).
***Award:* Distinguished Paper Award Winner & First Prize Winner of the 2022 Internet Defense Prize**

[8] **VPNalyzer: Systematic Investigation of the VPN Ecosystem**
R. Ramesh, L. Evdokimov, ***Diwen Xue***, and R. Ensafi
In: Network and Distributed System Security Symposium 2022 , (NDSS'22).
***Award:* Won First Place at the CSAW '22 Applied Research Competition.**

[9] **Throttling Twitter: An Emerging Censorship Technique in Russia**
Diwen Xue, R. Ramesh, ValdikSS, L. Evdokimov, A. Viktorov, A. Jain, E. Wustrow, S. Basso, and R. Ensafi
In: ACM Internet Measurement Conference (IMC) 2021 , (IMC '21).
Recognized as the Highest Scoring Short Paper at IMC'21
Blogpost available at https://censoredplanet.org/throttling

Experience

- **Research Intern, Cloudflare, Inc.** *(Jun 2023 - Oct 2023)*
  I work on exploring QUIC's vulnerabilities to on-path network interference, such as injection attacks. I design and implement a large-scale monitoring system that provides packet-level visibility into QUIC traffic arriving at the CDN. I also develop analysis frameworks that identify several anomaly behaviors in QUIC traffic that potentially indicate attack, scanning, or interference.

- **Research Assistant,, University of Michigan** *(Jun 2020 - Present)*
  I work with my advisor Prof. Roya Ensafi as a Research Assistant. My work centers around digital security, Internet measurement, and censorship study. I am currently working with ISPs to explore practical traffic fingerprinting attacks & defense mechanisms and apply the knowledge to improve proxy/VPN obfuscations adopted in the real world.

Service

Reviewing

- **TPC Member, USENIX Security Symposium 2025 (USENIX'25)**
- **TPC Member, Privacy Enhancing Technologies Symposium 2024 (PETS'24)**
- **TPC Member, Free and Open Communications on the Internet 2024 (FOCI'24)**

Session Chairing

- **Session Chair at Privacy Enhancing Technologies Symposium 2024 (PETS'24)**
- **Session Chair at Free and Open Communications on the Internet 2024 (FOCI'24)**

Speaking

Conference Talks

- **TSPU: Russia's Decentralized Censorship System**
  IMC 2022, Nice, France, October 25, 2022.
- **OpenVPN is Open to VPN Fingerprinting**
  USENIX Security 2022, Boston, MA, August 10, 2022.
- **Throttling Twitter: An Emerging Censorship Technique in Russia**
  IMC 2021, Virtual, October 23, 2021.

Workshop Talks

- **A Decade's Reflection on Russia's Evolving Censorship Landscape**
  SplinterCon, 2023, Montreal, Canada, December 7, 2023.
- **Exploring the Use of Push Notifications in Censorship Circumvention**
  FOCI 2023, Lausanne, Switzerland, July 10, 2023.

Teaching

- **Graduate Student Instructor, University of Michigan** *(Jan 2023 - Apr 2023)*
  EECS-588 Computer & Network Security

- **Teaching Assistant, NYU** *(May 2019 - Jan 2020)*
  CSCI-UA 310 Basic Algorithms, CSCI-UA 480 Introduction to Computer Security

Research Awards and Honors

- **University of Michigan CSE Honors Competition - First Place** *(November, 2023)*
  The annual Honors Competition highlights outstanding research by Ph.D students. My talk, "Measuring and Circumventing Nation-state Network Censorship" was awarded first place for the year 2023.

- **First Place at CSAW'22 Applied Research Competition** *(November, 2022)*
  Our paper: "VPNalyzer: Systematic Investigation of the VPN Ecosystem" won first place at the USCanada CSAW'22 Applied Research Competition

– **First Prize in the 2022 Internet Defense Prize,** *(August, 2022)*
*Our paper: "OpenVPN is Open to VPN Fingerprinting" won the **first prize** in the USENIX 2022 Internet Defense Prize*

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

Broader Impact of Selected Projects

– **VPNalyzer: Crowdsourced Investigation into Commercial VPNs** (2020–present)
I contributed to the project VPNalyzer, a crowdsourced, data-driven investigation into the commercial VPN ecosystem. Our collaboration with Consumer Reports led to a White Paper and an article on the investigation of the security and privacy aspects of VPNs running on Windows 10.

– **Investigating the Throttling of Twitter in Russia** (2021)
I was the lead researcher for the report and IMC paper on the Throttling of Twitter in Russia, which has been highlighted by over 20 press mentions and media coverages, including Ars Technica, Meduza, and the front page of the New York Times. The paper was highlighted in IMC 2021 as the "Highest Scoring Short Paper".