Dhruv Kuchhal

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February 3, 2024
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About Me

I specialize in large-scale investigations of Web-based security and privacy issues. Using data-driven approaches, my work reveals the impact of real-world systems on end user security, and leads to designing better solutions. My methods include Internet/Web-wide measurements, network traffic analysis, and large-scale data mining.

Industry Work Experience

- **PayPal, Inc.** — Scottsdale, AZ
  Senior Research Scientist, Manager: Dr. Adam Oest. — *August 2023 - Present*
  - Developing capabilities for risk monitoring, such as passkey fraud trends.
  - Building data pipelines for scam merchant detection. Established a strategic collaboration with GASA.
  - Designing solutions for early fraud alerting based on threat intelligence from Telegram.
  - SME on policy issues such as Authentication and related Anti-Trust legislation in the EU.
- **PayPal, Inc.** — Scottsdale, AZ
  Information Security PhD Intern, Manager: Dr. Adam Oest. — *Summers of 2021 and 2022*
  - Measured security characteristics of FIDO2 deployments across the Web, and combined it with internal measurements of auth systems at PayPal, to study practical risks to FIDO2 (attacks & defenses).
  - Reported a bug in Google Chrome that could be exploited to trick a user enrolled in WebAuthn into authenticating an attacker-controlled sensitive action on their account. [Chromium Issue 1341134].
  - Socialized findings with the various affected deployments, and received recognition from the FIDO Alliance, in terms of a security bulletin attributing the attack to our work.
  - Full paper accepted and presented at ACM CCS 2023.

Academic Work Experience

- **Georgia Institute of Technology (GT)** — Atlanta, GA
  PhD Candidate, Advisor: Prof. Frank Li. — *2019 - 2023*
  - (Web Privacy) Investigated privacy-invasive local network communication by websites. Identified unique anti-bot and anti-fraud behavior in the top 100K websites.
  - (Web Abuse) Studied dynamics of real-world view fraud campaigns. Deconstructed and analyzed the working of a complex network of ad aggregators enabling the fraud.
  - (Web Security) Analyzed practical security of real-world FIDO2 deployments. Identified weaknesses in several real-world deployments, and notified the stakeholders.
  - (Web Privacy) Identified the unsafe usage of WebViews to display 3rd-party web content in Android apps.
- **University of Maryland, College Park** — College Park, MD
  Research Assistant, Advisor: Prof. Michelle Mazurek. — *2018 - 2019*
  - Evaluated response biases in security user studies.
  - Developed tools to measure the readability of security advice.
- **Indraprastha Institute of Information Technology** — Delhi, India
  Research Associate, Advisor: Prof. Ponnurangam Kumaraguru. — *2017 - 2019*
  - Analyzed misinformation on end-to-end encrypted platforms such as WhatsApp.
  - Characterized spam campaigns abusing phone numbers on online social networks.

Highest Education

- **Georgia Institute of Technology** — Atlanta, GA
  Doctor of Philosophy in Computer Science. Advised by Prof. Frank Li. — *2019 – 2023*

Selected Publications

Conference

- **Kuchhal, D.**, Ramakrishnan, K., and Li, F.,
  Whatcha Lookin' At: Investigating Third-Party Web Content in Popular Android Apps.
  Currently under review.

- **Kuchhal, D.**, Saad, M., Oest, A., and Li, F.,
  Evaluating the Security Posture of Real-World FIDO2 Deployments.
  ACM Conference on Computer and Communications Security (**CCS**), 2023.
  Acceptance Rate: 19.1% (234/1222) [dl.acm.org][pdf]

- **Kuchhal, D.** and Li, F.,
  A View into YouTube View Fraud.
  ACM Web Conference **(WWW)**, 2022.
  Acceptance Rate: 17.7% (323/1822) [dl.acm.org] [pdf] [video]

- **Kuchhal, D.** and Li, F.,
  Knock and Talk: Investigating Local Network Communications on Websites.
  ACM Internet Measurement Conference **(IMC)**, 2021.
  Acceptance Rate: 27% (53/196) [dl.acm.org] [pdf] [video]

- Gupta, S., **Kuchhal, D.**, Gupta, P., Ahamad, M., Gupta, M. and Kumaraguru, P.,
  Under the Shadow of Sunshine: Characterizing Spam Campaigns Abusing Phone Numbers Across Online Social Networks*.
  ACM Conference on Web Science (**WebSci**), 2018.
  Acceptance Rate: 27% (30/113) [dl.acm.org] [pdf]
  Award: **Runner up for Best Student Paper**

Achievements/Honors

- **Y Combinator 2023**: Admitted to the Summer 2023 batch (USD 500k pre-seed investment), to innovate on a GenAI-hardened replacement for CAPTCHAs on the Web.
- **RSAC Security Scholar 2023**: Selected among 50 cybersecurity students across US to attend the RSA Conference.
- **Conference Travel Grants**: Awarded funds to travel to and attend ACM CCS 2018 and PETS 2022.
- **USC Annenberg Fellowship, 2019**: Received a 4-year top-up fellowship to pursue a PhD in CS at USC.
- **Smart India Hackathon, 2017**: Our team of 6 members, advised by Dr. Sambuddha Roy won the first prize at India's national hackathon (10k+ students), with a cash prize of Rs. 1 lakh awarded by Government of India. [GitHub]
- **Recognition of Service Award - ACM, 2016**: For serving as founding Chair for ACM-MAIT Student Chapter.

Service

- **PETS**: External Reviewer, 2022-2023. Publication Co-Chair, 2023 and 2024. PC Member, 2024.
- **ACM WebConf (WWW)**: PC Member, 2024.
- **ACM IMC**: PC Member, 2024.
- **Georgia Tech School of Cybersecurity and Privacy**: Member, Faculty Recruiting Committee, 2022.
- **Georgia Tech Student Employee Advisory Board**: Board Member, 2021-22 AY.
- **Georgia Tech School of Computer Science**: Founding Communications Chair of GSA, 2021-22 AY.

Technologies

Python, MongoDB, BigQuery, Wireshark, mitmproxy, ChromeDevTools, C++.

References

Dr. Adam Oest (Manager, PayPal; aoest@asu.edu), **Prof. Frank Li** (PhD Advisor, GT; frankli@gatech.edu).