

**Title:** Exploring the Cookieverse: A Multi-Perspective Analysis of Web Cookies

**Theme of the Talk:** Cyber Security, Network Security

**Speaker:** Dr. Devashish Gosain

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**Abstract:**

Web cookies serve various purposes, like keeping the user logged in or storing a user's preferences for multiple visits to the same website. However, besides their originally intended use, cookies have been exploited for commercial activities like user tracking and targeted advertisement. Thus, web cookies have been extensively studied over the last few years. However, most existing research does not consider multiple crucial perspectives that can influence the cookie landscape and may lead to incorrect inferences. These perspectives include the client's location and operating system, landing vs. inner web pages, desktop vs. mobile phone, and cookie banner interaction. In this talk, I will present the challenges in analyzing the cookie landscape due to these perspectives and elaborate on the methods we use to study them through our measurement research.

Our research demonstrates that "cookie banners" (or cookie notices) are one of the most crucial factors influencing the cookie ecosystem. They are essentially alert messages on the website allowing users to "accept" or "reject" cookies. Thus, we developed the first tool, BannerClick, to automatically detect, accept, and reject cookie banners with an accuracy of 99%. By using BannerClick on the Tranco top-10k websites from different geographic locations, we observe that websites send, on average, 5.5x more third-party cookies after clicking "accept," underlining that it is critical to interact with banners when performing Web measurement. Interestingly, we also found that a new form of paywall-like cookie banner has taken hold on the Web, allowing users to either accept cookies (and consequently user tracking) or buy a paid subscription for a tracking-free website experience. Thus, we performed the first completely automated analysis of cookiewalls, i.e., cookie banners acting as a paywall. We find cookiewalls on 0.6% of all queried 45k websites. Moreover, cookiewalls are deployed to a large extent on European websites, e.g., for Germany, we see cookiewalls on 8.5% of the top 1k websites.

**Speaker Bio:**

Dr. Devashish Gosain completed his Ph.D. in 2020 from IIIT Delhi in Network Security. In his research, he studied how the knowledge of Internet structure (and maps) can be used to achieve efficient nation-scale traffic filtering. The research involved collecting actual network traces from different Indian ISPs and studying the filtering policies and websites blocked by them. After completing his Ph.D., he worked as a postdoctoral researcher in the INET research group at Max Planck Institute of Informatics, followed by a year postdoc at the COSIC research group at KU Leuven. During his postdoc, he worked on network security problems like measuring the anonymity of peer-to-peer networks, mitigating MITM attacks in end-to-end encrypted protocols (e.g., Signal), and measuring the impact of privacy laws like GDPR on user tracking, etc. His research has been published in the reputed security and networking venues like CCS, NDSS, INFOCOM, IMC, PETS, Usenix Security, ACSAC, PAM, etc.