

# Seventeenth Symposium on Usable Privacy and Security (SOUPS 2021)

August 9–10, 2021

## Monday, August 9

### Authentication

**Towards Usable and Secure Location-based Smartphone Authentication** ..... 1  
Geumhwan Cho, *Sungkyunkwan University*; Sungsu Kwag and Jun Ho Huh, *Samsung Research*; Bedeuro Kim, *Sungkyunkwan University*; Choong-Hoon Lee, *Samsung Research*; Hyounghick Kim, *Sungkyunkwan University*

**Please do not use !?\_ or your License Plate Number: Analyzing Password Policies in German Companies** .....17  
Eva Gerlitz, *Fraunhofer FKIE*; Maximilian Häring, *University of Bonn*; Matthew Smith, *University of Bonn, Fraunhofer FKIE*

**Using a Blocklist to Improve the Security of User Selection of Android Patterns** ..... 37  
Collins W. Munyendo and Miles Grant, *The George Washington University*; Philipp Markert, *Ruhr University Bochum*; Timothy J. Forman, *United States Navy*; Adam J. Aviv, *The George Washington University*

**User Perceptions of the Usability and Security of Smartphones as FIDO2 Roaming Authenticators**..... 57  
Kentrell Owens, *Duo Security, University of Washington*; Olabode Anise and Amanda Krauss, *Duo Security*; Blase Ur, *University of Chicago*

### User Attitudes and (Mis)understandings

**Never ever or no matter what: Investigating Adoption Intentions and Misconceptions about the Corona-Warn-App in Germany** ..... 77  
Maximilian Häring, *University of Bonn*; Eva Gerlitz, *Fraunhofer FKIE*; Christian Tiefenau, *University of Bonn*; Matthew Smith, *University of Bonn, Fraunhofer FKIE*; Dominik Wermke and Sascha Fahl, *CISPA, University of Hannover*; Yasemin Acar, *Max Planck Institute for Security and Privacy*

**Understanding Users' Knowledge about the Privacy and Security of Browser Extensions** ..... 99  
Ankit Kariryaa, *University of Copenhagen & University of Bremen*; Gian-Luca Savino and Carolin Stellmacher, *University of Bremen*; Johannes Schöning, *University of Bremen & University of St. Gallen*

**Replication: Effects of Media on the Mental Models of Technical Users** ..... 119  
Khadija Baig, Elisa Kazan, Kalpana Hundlani, Sana Maqsood, and Sonia Chiasson, *Carleton University*

**Comparing Security and Privacy Attitudes Among U.S. Users of Different Smartphone and Smart-Speaker Platforms** ..... 139  
Desiree Abrokwa, Shruti Das, Omer Akgul, and Michelle L. Mazurek, *University of Maryland*

### Perspectives and Policy

**“How I Know For Sure”: People’s Perspectives on Solely Automated Decision-Making (SADM)**..... 159  
Smirity Kaushik, *University of Illinois at Urbana-Champaign*; Yaxing Yao, *University of Maryland, Baltimore County*; Pierre Dewitte, *Katholieke Universiteit Leuven Centre for IT & IP*; Yang Wang, *University of Illinois at Urbana-Champaign*

**A *Fait Accompli*? An Empirical Study into the Absence of Consent to Third-Party Tracking in Android Apps** ... 181  
Konrad Kollnig and Reuben Binns, *University of Oxford*; Pierre Dewitte, *KU Leuven*; Max Van Kleek, Ge Wang, Daniel Omeiza, Helena Webb, and Nigel Shadbolt, *University of Oxford*

**“Whether it’s moral is a whole other story”: Consumer perspectives on privacy regulations and corporate data practices** ..... 197  
Leah Zhang-Kennedy, *University of Waterloo*; Sonia Chiasson, *Carleton University*

**Pursuing Usable and Useful Data Downloads Under GDPR/CCPA Access Rights via Co-Design** .....217  
Sophie Veys, Daniel Serrano, Madison Stamos, and Margot Herman, *University of Chicago*; Nathan Reitingger and Michelle L. Mazurek, *University of Maryland*; Blase Ur, *University of Chicago*

## Inclusive Privacy and Security

- Facial Recognition: Understanding Privacy Concerns and Attitudes Across Increasingly Diverse Deployment Scenarios** ..... 243  
Shikun Zhang, Yuanyuan Feng, and Norman Sadeh, *Carnegie Mellon University*
- “I’m Literally Just Hoping This Will Work:” Obstacles Blocking the Online Security and Privacy of Users with Visual Disabilities** ..... 263  
Daniela Napoli, Khadija Baig, Sana Maqsood, and Sonia Chiasson, *Carleton University*
- WebAlly: Making Visual Task-based CAPTCHAs Transferable for People with Visual Impairments** ..... 281  
Zhuohao Zhang and Zhilin Zhang, *University of Illinois at Urbana-Champaign*; Haolin Yuan, *Johns Hopkins University*; Natã M. Barbosa, *University of Illinois at Urbana-Champaign*; Sauvik Das, *Georgia Tech*; Yang Wang, *University of Illinois at Urbana-Champaign*
- Designing Toxic Content Classification for a Diversity of Perspectives** ..... 299  
Deepak Kumar, *Stanford University*; Patrick Gage Kelley and Sunny Consolvo, *Google*; Joshua Mason, *University of Illinois at Urbana-Champaign*; Elie Bursztein, *Google*; Zakir Durumeric, *Stanford University*; Kurt Thomas, *Google*; Michael Bailey, *University of Illinois at Urbana-Champaign*

## Tuesday, August 10

### Phishing and Account Compromise

- Why They Ignore English Emails: The Challenges of Non-Native Speakers in Identifying Phishing Emails** ..... 319  
Ayako A. Hasegawa, Naomi Yamashita, and Mitsuaki Akiyama, *NTT*; Tatsuya Mori, *Waseda University / NICT / RIKEN AIP*
- SoK: Still Plenty of Phish in the Sea — A Taxonomy of User-Oriented Phishing Interventions and Avenues for Future Research** ..... 339  
Anjuli Franz, Verena Zimmermann, Gregor Albrecht, Katrin Hartwig, Christian Reuter, Alexander Benlian, and Joachim Vogt, *Technical University of Darmstadt*
- Investigating Web Service Account Remediation Advice** ..... 359  
Lorenzo Neil, Elijah Bouma-Sims, and Evan Lafontaine, *North Carolina State University*; Yasemin Acar, *Max Planck Institute for Security and Privacy*; Bradley Reaves, *North Carolina State University*
- Knowledge and Capabilities that Non-Expert Users Bring to Phishing Detection** ..... 377  
Rick Wash, Norbert Nthala, and Emilee Rader, *Michigan State University*

### Security in Practice

- Code Reviewing as Methodology for Online Security Studies with Developers – A Case Study with Freelancers on Password Storage** ..... 397  
Anastasia Danilova, Alena Naiakshina, and Anna Rasgauski, *University of Bonn*; Matthew Smith, *University of Bonn, FKIE Fraunhofer*
- “I have no idea what they’re trying to accomplish:” Enthusiastic and Casual Signal Users’ Understanding of Signal PINs** ..... 417  
Daniel V. Bailey and Philipp Markert, *Ruhr University Bochum*; Adam J. Aviv, *The George Washington University*
- On the Limited Impact of Visualizing Encryption: Perceptions of E2E Messaging Security** ..... 437  
Christian Stransky, *Leibniz University Hannover*; Dominik Wermke, *CISPA Helmholtz Center for Information Security*; Johanna Schrader, *Leibniz University Hannover*; Nicolas Huaman, *CISPA Helmholtz Center for Information Security*; Yasemin Acar, *Max Planck Institute for Security and Privacy*; Anna Lena Fehlhauer, *Leibniz University Hannover*; Miranda Wei, *University of Washington*; Blase Ur, *University of Chicago*; Sascha Fahl, *Leibniz University Hannover and CISPA Helmholtz Center for Information Security*
- Concerned but Ineffective: User Perceptions, Methods, and Challenges when Sanitizing Old Devices for Disposal** ..... 455  
Jason Ceci and Hassan Khan, *University of Guelph*; Urs Hengartner and Daniel Vogel, *University of Waterloo*

## Ubiquitous Computing

- Exploring Authentication for Security-Sensitive Tasks on Smart Home Voice Assistants** ..... 475  
Alexander Ponticello and Matthias Fassl, *CISPA Helmholtz Center for Information Security and Saarland University*;  
Katharina Krombholz, *CISPA Helmholtz Center for Information Security*
- “The Thing Doesn’t Have a Name”: Learning from Emergent Real-World Interventions in Smart Home Security** .. 493  
Brennen Bouwmeester, Elsa Rodríguez, Carlos Gañán, Michel van Eeten, and Simon Parkin, *Delft University of Technology*
- Evaluating and Redefining Smartphone Permissions with Contextualized Justifications for Mobile Augmented Reality Apps** ..... 513  
David Harborth, *Goethe University Frankfurt am Main*; Alisa Frik, *ICSI, University of California Berkeley*
- PowerCut and Obfuscator: An Exploration of the Design Space for Privacy-Preserving Interventions for Smart Speakers** ..... 535  
Varun Chandrasekaran, Suman Banerjee, Bilge Mutlu, and Kassem Fawaz, *University of Wisconsin-Madison*

## Developers

- A Qualitative Usability Evaluation of the Clang Static Analyzer and libFuzzer with CS Students and CTF Players** .. 553  
Stephan Plöger, *Fraunhofer FKIE*; Mischa Meier, *University of Bonn*; Matthew Smith, *University of Bonn, Fraunhofer FKIE*
- Deciding on Personalized Ads: Nudging Developers About User Privacy** ..... 573  
Mohammad Tahaei, *University of Edinburgh*; Alisa Frik, *ICSI and University of California, Berkeley*; Kami Vaniea, *University of Edinburgh*
- Benefits and Drawbacks of Adopting a Secure Programming Language: Rust as a Case Study** ..... 597  
Kelsey R. Fulton and Anna Chan, *University of Maryland*; Daniel Votipka, *Tufts University*; Michael Hicks and Michelle L. Mazurek, *University of Maryland*
- An Analysis of the Role of Situated Learning in Starting a Security Culture in a Software Company** ..... 617  
Anwesh Tuladhar, Daniel Lende, Jay Ligatti, and Xinming Ou, *University of South Florida*

## Work (and Learn) from Home

- Examining the Examiners: Students’ Privacy and Security Perceptions of Online Proctoring Services** ..... 633  
David G. Balash, Dongkun Kim, and Darika Shaibekova, *The George Washington University*; Rahel A. Fainchtein and Micah Sherr, *Georgetown University*; Adam J. Aviv, *The George Washington University*
- Virtual Classrooms and Real Harms: Remote Learning at U.S. Universities** ..... 653  
Shaanan Cohny, *Princeton University / University of Melbourne*; Ross Teixeira, Anne Kohlbrenner, Arvind Narayanan, and Mihir Kshirsagar, *Princeton University*; Yan Shvartzshnaider, *Princeton University / York University*; Madelyn Sanfilippo, *Princeton University / University of Illinois at Urbana-Champaign*
- Challenges and Threats of Mass Telecommuting: A Qualitative Study of Workers** ..... 675  
Borke Obada-Obieh, Yue Huang, and Konstantin Beznosov, *University of British Columbia*
- Understanding Privacy Attitudes and Concerns Towards Remote Communications During the COVID-19 Pandemic** ..... 695  
Pardis Emami-Naeini, Tiona Francisco, Tadayoshi Kohno, and Franziska Roesner, *University of Washington*