SANGHO LEE

Postdoctoral Fellow
School of Computer Science, Georgia Institute of Technology
Room 3138, 266 Ferst Dr NW, Atlanta, GA 30332-0765

✉ sangho@gatech.edu
🏠 https://cc.gatech.edu/~slee3036
📞 +1 (678) 469-6810   📠 +1 (404) 894-1155

EDUCATION

Pohang University of Science and Technology (POSTECH), Pohang, South Korea ·················· February 2013

Ph.D. in Computer Science and Engineering

Dissertation: Detection of Web Security Attacks Exploiting URL Redirection (Advisor: Prof. Jong Kim)

POSTECH, Pohang, South Korea ··· February 2008

M.S. in Computer Science and Engineering

Thesis: Redistributing Time-based Rights for Content Sharing in DRM (Advisor: Prof. Jong Kim)

Hongik University, Seoul, South Korea ··· February 2006

B.S. in Computer Engineering

RESEARCH EXPERIENCE

Postdoctoral Fellow, Georgia Institute of Technology, Atlanta, GA, USA ·············· November 2015–Present

Advisors: Prof. Wenke Lee and Prof. Taesoo Kim

Analyzed/enhanced the security of new processor functionalities, Intel SGX and TSX [3, 6, 8]

Developed multi-level host events tracking systems [1, 9]

Developed an automated bug finding mechanism for operating systems [4]

Post-doctoral Research Associate, POSTECH ······································ March 2013–October 2015

Advisor: Prof. Jong Kim

Studied the security of graphics hardware [13]

Analyzed/enhanced the security of web browser standards [7, 11, 12]

Developed a system to detect suspicious behaviors in social media [10]

Research Assistant, POSTECH ··· March 2006–February 2013

Advisor: Prof. Jong Kim

Developed systems to detect suspicious accounts and messages in social media [16, 17, 24, 25]

Detected privacy leakage problems across different online services [15, 22]

Developed user-friendly contents protection systems [19, 28, 29]

RESEARCH INTERESTS

Interested in all aspects of computer security including hardware, system, and web security

PUBLICATIONS

Authorship	Top-tier conferences							Others			
	Oakland	Security	CCS	NDSS	ATC	WWW	Total	Conf/Wksp	Journal	Total	
First author	1	1		3			**5**	2	8	**15**	Citations: 670+
Co-author			3		1	1	**5**	8	2	**15**	h-index: 13

Conference Proceedings

[1] **RAIN: Refinable Attack Investigation with On-demand Inter-Process Information Flow Tracking**.
Yang Ji, **Sangho Lee**, Evan Downing, Weiren Wang, Mattia Fazzini, Taesoo Kim, Alessandro Orso, and Wenke Lee.
In *Proceedings of the ACM Conference on Computer and Communications Security (CCS)*, October–November 2017.

[2] **SGX-Bomb: Locking Down the Processor via Rowhammer Attack**.
Yeongjin Jang, Jaehyuk Lee, **Sangho Lee**, and Taesoo Kim.
In *Proceedings of the Workshop on System Software for Trusted Execution (SysTEX)*, October 2017.

[3] **Inferring Fine-grained Control Flow Inside SGX Enclaves with Branch Shadowing**.
Sangho Lee, Ming-Wei Shih, Prasun Gera, Taesoo Kim, Hyesoon Kim, and Marcus Peinado.
In *Proceedings of the USENIX Security Symposium (Security)*, August 2017.

[4] **CAB-Fuzz: Practical Concolic Testing Techniques for COTS Operating Systems**.
Su Yong Kim, **Sangho Lee**, Insu Yun, Wen Xu, Byoungyoung Lee, Youngtae Yun, and Taesoo Kim.
In *Proceedings of the USENIX Annual Technical Conference (ATC)*, July 2017.
* CVE-2016-7219, CVE-2016-0040, CVE-2015-6098.

[5] **FACT: Functionality-centric Access Control System for IoT Programming Frameworks**.
Sanghak Lee, Jiwon Choi, Jihun Kim, Beumjin Cho, **Sangho Lee**, Hanjun Kim, and Jong Kim.
In *Proceedings of the ACM Symposium on Access Control Models and Technologies (SACMAT)*, June 2017.

[6] **T-SGX: Eradicating Controlled-Channel Attacks Against Enclave Programs**.
Ming-Wei Shih*, **Sangho Lee***, Taesoo Kim, and Marcus Peinado.
In *Proceedings of the Annual Network and Distributed System Security Symposium (NDSS)*, February–March 2017.
* **contributed equally to this study**.

[7] **Inferring Browser Activity and Status Through Remote Monitoring of Storage Usage**.
Hyungsub Kim, **Sangho Lee**, and Jong Kim.
In *Proceedings of the Annual Computer Security Applications Conference (ACSAC)*, December 2016.

[8] **Breaking Kernel Address Space Layout Randomization with Intel TSX**.
Yeongjin Jang, **Sangho Lee**, and Taesoo Kim.
In *Proceedings of the ACM Conference on Computer and Communications Security (CCS)*, October 2016.
* LWN, Hacker News, TechNet.

[9] **RecProv: Towards Provenance-aware User-space Record and Replay**.
Yang Ji, **Sangho Lee**, and Wenke Lee.
In *Proceedings of the 6th International Provenance and Annotation Workshop (IPAW)*, June 2016.

[10] **CrowdTarget: Target-based Detection of Crowdturfing in Online Social Networks**.
Jonghyuk Song, **Sangho Lee**, and Jong Kim.
In *Proceedings of the ACM Conference on Computer and Communications Security (CCS)*, October 2015.

[11] **Identifying Cross-origin Resource Status Using Application Cache**.
Sangho Lee, Hyungsub Kim, and Jong Kim.
In *Proceedings of the Annual Network and Distributed System Security Symposium (NDSS)*, February 2015.

[12] **Exploring and Mitigating Privacy Threats of HTML5 Geolocation API**.
Hyungsub Kim, **Sangho Lee**, and Jong Kim.
In *Proceedings of the Annual Computer Security Applications Conference (ACSAC)*, December 2014.

[13] **Stealing Webpages Rendered on Your Browser by Exploiting GPU Vulnerabilities**.
Sangho Lee, Youngsok Kim, Jangwoo Kim, and Jong Kim.
In *Proceedings of the IEEE Symposium on Security and Privacy (Oakland)*, May 2014.
* Reddit.

[14] **Punobot: Mobile Botnet using Push Notification Service in Android**.
Hayoung Lee, Taeho Kang, **Sangho Lee**, Jong Kim, and Yoonho Kim.
In *Proceedings of the International Workshop on Information Security Applications (WISA)*, August 2013.

[15] **I Know the Shortened URLs You Clicked on Twitter: Inference Attack using Public Click Analytics and Twitter Metadata**.
Jonghyuk Song, **Sangho Lee**, and Jong Kim.
In *Proceedings of the International World Wide Web Conference (WWW)*, May 2013.

[16] **WarningBird: Detecting Suspicious URLs in Twitter Stream**.
Sangho Lee and Jong Kim.
In *Proceedings of the Annual Network and Distributed System Security Symposium (NDSS)*, February 2012.

[17] **Spam Filtering in Twitter using Sender-receiver Relationship**.
Jonghyuk Song, **Sangho Lee**, and Jong Kim.
In *Proceedings of the International Symposium on Recent Advances in Intrusion Detection (RAID)*, September 2011.

[18] **A Batch Rekeying Time Decision Algorithm for IPTV Systems**.
Sangho Lee and Jong Kim.
In *Proceedings of the IEEE Consumer Communications and Networking Conference (CCNC)*, January 2011.

[19] **A Secure and Mutual-profitable DRM Interoperability Scheme**.
Sangho Lee, Heejin Park, and Jong Kim.
In *Proceedings of the IEEE Symposium on Computers and Communications (ISCC)*, June 2010.

[20] **Reducing IPTV Channel Zapping Time based on Viewer's Surfing Behavior and Preference**.
Yuna Kim, Jae Keun Park, Hong Jun Choi, **Sangho Lee**, Heejin Park, Jong Kim, Zino Lee, and Kwangil Ko.
In *Proceedings of the IEEE International Symposium on Broadband Multimedia Systems and Broadcasting (BMSB)*, March-April 2008.

Journal Articles

[21] **Towards Engineering a Secure Android Ecosystem: A Survey of Existing Techniques**.
Meng Xu, Chengyu Song, Yang Ji, Ming-Wei Shih, Kangjie Lu, Cong Zheng, Ruian Duan, Yeongjin Jang, Byoungyoung Lee, Chenxiong Qian, **Sangho Lee**, and Taesoo Kim.
ACM Computing Surveys, 49(2), August 2016.

[22] **Inference Attack on Browsing History of Twitter Users using Public Click Analytics and Twitter Metadata**.
Jonghyuk Song, **Sangho Lee**, and Jong Kim.
IEEE Transactions on Dependable and Secure Computing, 13(3):340–354, May-June 2016.

[23] **Preserving Source- and Sink-location Privacy in Sensor Networks**.
Sangho Lee, Jong Kim, and Yoonho Kim.
Computer Science and Information Systems, 13(1):115–130, January 2016.

[24] **Early filtering of ephemeral malicious accounts on Twitter**.
Sangho Lee and Jong Kim.
Computer Communications, 54:48–57, December 2014.

[25] **WarningBird: A Near Real-time Detection System for Suspicious URLs in Twitter Stream**.
Sangho Lee and Jong Kim.
IEEE Transactions on Dependable and Secure Computing, 10(3):183–195, May-June 2013.

[26] **Fluxing botnet command and control channels with URL shortening services**.
Sangho Lee and Jong Kim.
Computer Communications, 36(3):320–332, February 2013.

[27] **Distance Bounding with Delayed Responses**.
Sangho Lee, Jin Seok Kim, Sung Je Hong, and Jong Kim.
IEEE Communications Letters, 16(9):1478–1481, September 2012.

[28] **DRMFS: A file system layer for transparent access semantics of DRM-protected contents**.
Sangho Lee, Hay-Rim Lee, Seungkwang Lee, and Jong Kim.
Journal of Systems and Software, 85(5):1058–1066, May 2012.

[29] **Redistributing time-based rights between consumer devices for content sharing in DRM system**.
Sangho Lee, Jong Kim, and Sung Je Hong.
International Journal of Information Security, 8(4):263–273, August 2009.

[30] **Security weakness of Tseng's fault-tolerant conference-key agreement protocol**.
Sangho Lee, Jong Kim, and Sung Je Hong.
Journal of Systems and Software, 82(7):1163–1167, July 2009.

Granted Patents

[31] **Methods and apparatuses for providing DRM interoperability**.
Jong Kim, **Sangho Lee**, and Heejin Park.
USA 8,386,799, February 2013.

[32] **Method of distributing time of using contents between personal devices and system based on the same**.
Sangho Lee and Jong Kim.
Korea 10-0951792, April 2010.

[33] **Method and apparatus for rights-preserving interoperability in DRM**.
Heejin Park, **Sangho Lee**, and Jong Kim.
Korea 10-0942992, February 2010.

FELLOWSHIP AND AWARD

Postdoctoral research fellowship, National Research Foundation of Korea ($35,000)	2017–2018
Runner-up prize, Evaluation of ITRC Support Program ($1,000)	2013

PROFESSIONAL ACTIVITIES

Program Committee Member

ACM Asia Conference on Computer and Communications Security (AsiaCCS)	2018
Annual Computer Security Applications Conference (ACSAC)	2016–2017

Journal Reviewer

IEEE Transactions on Computational Social Systems (TCSS)	2017
ACM Transactions on Privacy and Security (TOPS)	2016
IEEE Communications Letters	2010, 2013, 2016
IEEE Transactions on Dependable and Secure Computing (TDSC)	2014–2015
Security and Communication Networks (SCN)	2009, 2014
Journal of Computing Science and Engineering (JCSE)	2011

INVITED TALKS

Practical Concolic Testing Techniques for COTS Operating Systems

Korea University, Seoul, South Korea	July 2017
KAIST, Daejeon, South Korea	June 2017
POSTECH, Pohang, South Korea	June 2017

Inferring Fine-grained Control Flow Inside SGX Enclaves with Branch Shadowing

Intel, Hillsboro, Oregon, USA	February 2017

Detection of Suspicious URLs with Conditional Redirection

ETRI, Daejeon, South Korea	March 2015

Privacy Leakage from GPU Exploits

KAIST, Daejeon, South Korea	March 2015

Web and Browser Security: Attack and Defense

UNIST, Ulsan, South Korea	January 2015

Spam and Browsing Privacy Problems on Twitter

KAIST, Daejeon, South Korea	May 2013

REFERENCES

Wenke Lee

Professor

School of Computer Science, Georgia Institute of Technology

Atlanta, GA, USA

✉ wenke@cc.gatech.edu

Taesoo Kim

Assistant Professor

School of Computer Science, Georgia Institute of Technology

Atlanta, GA, USA

✉ taesoo@gatech.edu

Marcus Peinado

Architect

Microsoft Research

Redmond, WA, USA

✉ marcuspe@microsoft.com

Jong Kim

Professor

Department of Computer Science and Engineering, POSTECH

Pohang, South Korea

✉ jkim@postech.edu

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