

Shravan Ravi Narayan

Education

- 2022–2023 **PostDoc**, *University of California, San Diego*
2016–2022 **Ph.D.**, *University of California, San Diego*
2009–2013 **B.Eng**, *McGill University, Montreal*

Publications

1. S. Narayan, T. Garfinkel, M. Taram, J. Rudek, D. Moghimi, E. Johnson, C. Fallin, A. Vahldiek-Oberwagner, M. LeMay, R. Sahita, D. Tullsen, D. Stefan. [Going Beyond the Limits of SFI: Flexible and Secure Hardware-Assisted In-Process Isolation with HFI](#). Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2023.
2. E. Johnson, E. Laufer, Z. Zhao, S. Narayan, S. Savage, D. Stefan, F. Brown. [WaVe: a verifiably secure WebAssembly sandboxing runtime](#). IEEE Symposium on Security and Privacy (S&P), 2023.
3. H. Yavarzadeh, M. Taram, S. Narayan, D. Stefan, D. Tullsen. [Half&Half: Demystifying Intel's Directional Branch Predictors for Fast, Secure Partitioned Execution](#). IEEE Symposium on Security and Privacy (S&P), 2023.
4. S. Narayan, T. Garfinkel, E. Johnson, D. Thien, J. Rudek, M. LeMay, A. Vahldiek-Oberwagner, D. Tullsen, D. Stefan. [Segue & ColorGuard: Optimizing SFI Performance and Scalability on Modern x86](#). Programming Languages and Analysis for Security (PLAS), 2022.
5. M. Kolosick, S. Narayan, C. Watt, M. LeMay, D. Garg, R. Jhala, and D. Stefan. [Isolation without taxation: Near zero cost transitions for SFI](#). Principles of Programming Languages (POPL), 2022.
6. S. Narayan, C. Disselkoen, and D. Stefan. [Tutorial: Using RLBox to sandbox unsafe C code](#). IEEE Secure Development Conference (SecDev), 2021.
7. S. Narayan, C. Disselkoen, D. Moghimi, S. Cauligi, E. Johnson, Z. Gang, A. Vahldiek-Oberwagner, R. Sahita, H. Shacham, D. Tullsen, D. Stefan. [Swivel: Hardening WebAssembly against Spectre](#). USENIX Security Symposium, 2021.
8. E. Johnson, Y. Alhessi, D. Thien, S. Narayan, F. Brown, S. Lerner, T. McMullen, S. Savage, and D. Stefan. [Доверять, но проверять: SFI safety for native-compiled Wasm](#). Network and Distributed System Security Symposium (NDSS), 2021.
9. T. Garfinkel, S. Narayan, C. Disselkoen, H. Shacham, and D. Stefan. [The road to less trusted code: Lowering the barrier to in-process sandboxing](#). Article in USENIX ;login; journal, Winter 2020.
10. S. Narayan, C. Disselkoen, T. Garfinkel, N. Froyd, E. Rahm, S. Lerner, H. Shacham, and D. Stefan. [Retrofitting fine grain isolation in the Firefox renderer](#). USENIX Security Symposium, 2020.
11. J. Talpin, J. Marty, S. Narayan, D. Stefan, and R. Gupta. [Towards verified programming of embedded devices](#). Invited paper at Design, Automation and Test in Europe Conference, 2019.
12. M. Smith, C. Disselkoen, S. Narayan, F. Brown, and D. Stefan. [Browser history re:visited](#). USENIX Workshop on Offensive Technologies (WOOT), 2018.
13. F. Brown, S. Narayan, Riad S. Wahby, Dawson Engler, R. Jhala, and D. Stefan. [Finding and preventing bugs in JavaScript bindings](#). IEEE Symposium on Security and Privacy (S&P), 2017.

Others

14. Don't Get Owned by Your Dependencies: How Firefox Uses In-process Sandboxing To Protect Itself From Exploitable Libraries. Strange Loop Conference, 2022.
15. Don't Get Owned by Your Dependencies: How Firefox Uses In-process Sandboxing To Protect Itself From Exploitable Libraries. Black Hat USA Conference, 2022.

16. S. Narayan and D. Stefan. [Making software sandboxing practical using language-based techniques](#). Article in SIGPLAN PL Perspectives blog, Jul'21.
17. [RLBox: Retrofitting fine grain isolation in the Firefox renderer](#). IEEE Symposium on Security and Privacy (S&P), 2021. Invited poster.
18. S. Narayan, T. Garfinkel, S. Lerner, H. Shacham, and D. Stefan. [Gobi: WebAssembly as a practical path to library sandboxing](#). In arXiv preprint arXiv:1912.02285, Jan'19, updated Nov'19.

Awards

- 2023 [Distinguished paper award](#) at ASPLOS 2023. *Going beyond the Limits of SFI: Flexible and Secure Hardware-Assisted In-Process Isolation with HFI*.
- 2023 [Distinguished paper award](#) IEEE Symposium on Security and Privacy (S&P), 2023. *WaVe: a verifiably secure WebAssembly sandboxing runtime*.
- 2023 Noteworthy Reviewer Award at USENIX 2023.
- 2022 Mozilla research award. *RLBox v2: Extending RLBox for more performant, ubiquitous sandboxing*.
- 2022 Winner, IEEE Cybersecurity Awards for Practice 2022. *Retrofitting fine grain isolation in the Firefox renderer*.
- 2022 [Honorable mention](#), NSA Best Scientific Cybersecurity Paper. *Retrofitting fine grain isolation in the Firefox renderer*.
- 2022 [Recognized contributor](#) to the Bytecode Alliance's formal verification efforts.
- 2021 Google V8 research award. *Practical, portable, and verified library sandboxing using Wasm*.
- 2021 Fastly's "The edge computer project" award. Verifiable and spectre-safe sandboxing at the edge.
- 2021 [Finalist](#), Applied Research Competition, CSAW 2021. *Доверять, но проверять: SFI safety for native-compiled Wasm*.
- 2020 [Winner](#), Doctoral Award for Excellence in Research, Computer Science and Eng., UC San Diego.
- 2020 [Winner](#), Applied Research Competition, CSAW 2020. *Retrofitting fine grain isolation in the Firefox renderer*.
- 2020 [Distinguished paper award](#) at the USENIX Security Symposium 2020. *Retrofitting fine grain isolation in the Firefox renderer*.

Activities/service

- June'23–June'24 Program committee of the USENIX Security Symposium 2024.
- Aug'23 Program committee of the Kernel Isolation, Safety, and Verification 2023.
- June'22–June'23 Program committee of the USENIX Security Symposium 2023.
- Nov'22 Program committee of the Programming Languages and Analysis for Security (PLAS), 2022.
- Nov'22 Mentor in [GradAMP](#) graduate application mentorship program at UC San Diego.
- Oct'22 Invited participant in Consumer Reports' Memory safety convening.
- Sept'22 Invited external reviewer on IEEE Symposium on Security and Privacy (S&P) 2023.
- Aug'22 Program committee of the Applied Research Competition, CSAW 2022.
- June'22 Program committee of the IEEE Secure Development Conference 2022.
- Sept'21–May'22 Mentor in [Early Research Scholars Program \(ERSP\)](#) undergraduate research program at UC San Diego CSE department.
- 2019–2021 Student reviewer of papers in IEEE Symposium on Security and Privacy (S&P) 2019, ACM Symposium on Operating Systems Principles 2019, USENIX Security Symposium 2020 and 2021.

Talks

- Aug'23 At RISC-V Security meeting and RISC-V Runtime Integrity SIG. Going beyond the Limits of SFI: Flexible and Secure Hardware-Assisted In-Process Isolation with HFI.
- May'23 At KTH Royal Institute of Technology's Software Research Meetup. Retrofitting fast and secure sandboxing in real systems.

- Mar'23 At ASPLOS 2023. Going Beyond the Limits of SFI: Flexible and Secure Hardware-Assisted In-Process Isolation with HFI.
- Mar'23 At Dagstuhl Seminar: [Foundations of WebAssembly](#). Going Beyond the Limits of SFI: Flexible and Secure Hardware-Assisted In-Process Isolation with HFI.
- Dec'22 At the Programming Languages and Analysis for Security (PLAS), 2022. Segue & ColorGuard: Optimizing SFI Performance and Scalability on Modern x86.
- Nov'22 At UBC's graduate security class. Swivel: Hardening WebAssembly against Spectre.
- Nov'22 At CMU's security class. Retrofitting fast and secure sandboxing in real systems.
- Sept'22 At the Strange Loop Conference 2022. [Don't Get Owned by Your Dependencies: How Firefox Uses In-process Sandboxing To Protect Itself From Exploitable Libraries](#).
- Aug'22 At the Black Hat USA Conference 2022. [Don't Get Owned by Your Dependencies: How Firefox Uses In-process Sandboxing To Protect Itself From Exploitable Libraries](#).
- June'22 At UCSD's graduate security class. Retrofitting fast and secure sandboxing in real systems.
- Oct'21 At the IEEE Secure Development Conference 2021. Using RLBox to sandbox unsafe C code.
- Aug'21 At the USENIX Security Symposium 2021. [Swivel: Hardening WebAssembly against Spectre](#).
- Jul'21 At Intel Corp. Swivel: Hardening WebAssembly against Spectre.
- Oct'20 At MIT's CSAIL security seminar. Retrofitting fine grain isolation in the Firefox renderer.
- Oct'20 At the Center for Networked Systems' Research Review. [RLBox: secure sandboxing for buggy application components](#).
- Aug'20 At the USENIX Security Symposium 2020. [Retrofitting fine grain isolation in the Firefox renderer](#).
- Jul'20 At Brave Software, Inc. Retrofitting fine grain isolation in the Firefox renderer.

Software

- [rlbox](#) A general purpose library sandboxing framework that supports sandboxing plugins.
- [rlbox-wasm2c](#) An rlbox plugin that supports using libraries sandboxed with wasm2c.
- [veriwasm](#) Sandbox validator for Cranelift WebAssembly compiler.
- [swivel](#) Spectre-resistant WebAssembly compiler.