

Shravan Ravi Narayan

Education

PostDoc, *University of California, San Diego*

Ph.D., *University of California, San Diego*

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. [Hardware-Assisted Fault Isolation: Going Beyond the Limits of Software-Based Sandboxing](#). *IEEE Micro Top Picks*, 2024.
2. 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.
3. 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.
4. 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.
5. 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.
6. 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.
7. S. Narayan, C. Disselkoen, and D. Stefan. [Tutorial: Using RLBox to sandbox unsafe C code](#). *IEEE Secure Development Conference (SecDev)*, 2021.
8. 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.
9. E. Johnson, Y. Alhessi, D. Thien, S. Narayan, F. Brown, S. Lerner, T. McMullen, S. Savage, and D. Stefan. [Доверяй, но проверяй: SFI safety for native-compiled Wasm](#). *Network and Distributed System Security Symposium (NDSS)*, 2021.
10. 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.
11. 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.
12. 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.
13. M. Smith, C. Disselkoen, S. Narayan, F. Brown, and D. Stefan. [Browser history re:visited](#). *USENIX Workshop on Offensive Technologies (WOOT)*, 2018.
14. 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

15. Don't Get Owned by Your Dependencies: How Firefox Uses In-process Sandboxing To Protect Itself From Exploitable Libraries. Strange Loop Conference, 2022.
16. Don't Get Owned by Your Dependencies: How Firefox Uses In-process Sandboxing To Protect Itself From Exploitable Libraries. Black Hat USA Conference, 2022.
17. S. Narayan and D. Stefan. [Making software sandboxing practical using language-based techniques](#). Article in SIGPLAN PL Perspectives blog, Jul'21.
18. [RLBox: Retrofitting fine grain isolation in the Firefox renderer](#). IEEE Symposium on Security and Privacy (S&P), 2021. Invited poster.
19. 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

- 2024 IEEE Micro Top Picks 2024. *Going beyond the Limits of SFI: Flexible and Secure Hardware-Assisted In-Process Isolation with HFI*.
- 2024 Honorable mention, Intel Hardware Security Academic Award 2024. *Going beyond the Limits of SFI: Flexible and Secure Hardware-Assisted In-Process Isolation with HFI*.
- 2023 NSF CCF # 2327338. Collaborative Research: SaTC: CORE: Medium. *Refine the Gap: Establishing Safety for Modern Foreign Function Interfaces*. \$1,200,000 (total), \$300,000 (UT Austin).
- 2023 Most engaging speaker, UT Austin Research Topics Seminar (Course CS398T).
- 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 Security Symposium 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. *Доверяй, но проверяй: 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

- Mar'24–Feb'25 Program committee of the ASPLOS Conference 2025.
- Mar'24–May'24 UT Austin [Coding in the Classroom](#) outreach to introduce Programming Robots (Lego Mindstorm) to 5th grade students.
- Jan'24–Apr'24 PhD admissions committee at UT Austin Computer Science.
- Dec'23 UT Austin [Hour of code](#) outreach to introduce Programming to K12 students.
- Jun'23–Jun'24 Program committee of the USENIX Security Symposium 2024.
- Aug'23 Program committee of the Kernel Isolation, Safety, and Verification 2023.
- Jun'22–Jun'23 Program committee of the USENIX Security Symposium 2023.

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| 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. |
| Sep'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. |
| Jun'22 | Program committee of the IEEE Secure Development Conference 2022. |
| Sep'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

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| Oct'23 | At Wasm Research Day 2023 . Optimizing SFI Performance, Scalability, and Spectre Resistance on Modern CPUs. |
| Sept'23 | At WasmCon 2023. Don't Get Owned by Dependencies: How Firefox Uses Wasm to Protect Itself from Exploitable Libraries . |
| 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. |
| Apr'23 | At Intel Corp. Going Beyond the Limits of SFI: Flexible and Secure Hardware-Assisted In-Process Isolation with HFI. |
| 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. |

Classes

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| Fall 2024 | Theory and Practice of Secure Systems (CS380S) |
| Fall 2023 | Securing real-world systems at UT Austin (CS395T) |

Software

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| 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. |