

# Luke Nelson

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## Education

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**University of Washington**, Ph.D. Candidate, Computer Science 2021 – Present  
Advisor: Xi Wang  
**University of Washington**, M.S., Computer Science 2017 – 2021  
**University of Washington**, B.S., Computer Science – *Cum Laude* 2013 – 2017

## Employment

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**University of Washington**, Graduate Research Assistant 2017–present  
**University of Washington**, Undergraduate Research Assistant 2016–2017  
**Facebook, Inc.**, Software Engineer Intern Jun. 2016 – Sept. 2016  
**University of Washington**, Undergraduate Research Assistant 2015–2016  
**Delphix, Inc.**, Software Engineer Intern Jun. 2015 – Sept. 2015

## Publications

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- [1] Sorawee Porncharoenwase, Luke Nelson, Xi Wang, and Emina Torlak. A formal foundation for symbolic evaluation with merging. In *Proceedings of the 49th ACM Symposium on Principles of Programming Languages (POPL)*, Philadelphia, PA, January 2022.
- [2] Luke Nelson, Jacob Van Geffen, Emina Torlak, and Xi Wang. Specification and verification in the field: Applying formal methods to BPF just-in-time compilers in the Linux kernel. In *Proceedings of the 14th USENIX Symposium on Operating Systems Design and Implementation (OSDI)*, pages 41–61, Virtual conference, November 2020.
- [3] Luke Nelson, James Bornholt, Arvind Krishnamurthy, Emina Torlak, and Xi Wang. Noninterference specifications for secure systems. *ACM SIGOPS Operating Systems Review*, 54(1):31–39, August 2020.
- [4] Jacob Van Geffen, Luke Nelson, Isil Dillig, Xi Wang, and Emina Torlak. Synthesizing JIT compilers for in-kernel DSLs. In *Proceedings of the 32nd International Conference on Computer Aided Verification (CAV)*, pages 564–586, Los Angeles, CA, July 2020.
- [5] Luke Nelson, James Bornholt, Ronghui Gu, Andrew Baumann, Emina Torlak, and Xi Wang. Scaling symbolic evaluation for automated verification of systems code with Serval. In *Proceedings of the 27th ACM Symposium on Operating Systems Principles (SOSP)*, pages 225–242, Huntsville, Ontario, Canada, October 2019.
- [6] Helgi Sigurbjarnarson, Luke Nelson, Bruno Castro-Karney, James Bornholt, Emina Torlak, and Xi Wang. Nickel: A framework for design and verification of information flow control systems. In *Proceedings of the 13th USENIX Symposium on Operating Systems Design and Implementation (OSDI)*, pages 287–306, Carlsbad, CA, October 2018.
- [7] Luke Nelson, Helgi Sigurbjarnarson, Kaiyuan Zhang, Dylan Johnson, James Bornholt, Emina Torlak, and Xi Wang. Hyperkernel: Push-button verification of an OS kernel. In *Proceedings of the 26th ACM Symposium on Operating Systems Principles (SOSP)*, pages 252–269, Shanghai, China, October 2017.

## Awards

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**Best Paper Award and Distinguished Artifact Award**, ACM Symposium on Operating Systems Principles 2019  
**Corin Anderson Endowed Fellowship**, University of Washington 2017–2018

## Presentations and Posters

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<b>A proof-carrying approach to building correct and flexible BPF verifiers</b> , <i>Presentation</i>	
Linux Plumbers Conference 2021	Sep. 2021
<b>Eliminating bugs in BPF JITs using automated formal verification</b> , <i>Presentation</i>	
Linux Plumbers Conference 2020	Aug. 2020
<b>Scaling symbolic evaluation for automated verification of systems code with Serval</b> , <i>Presentation</i>	
2019 New England Systems Verification Day	Oct. 2019
<b>Verifying enclave systems with Serval</b> , <i>Presentation</i>	
2019 Open-Source Enclaves Workshop	Jul. 2018
<b>Nickel: A framework for design and verification of information flow control systems</b> , <i>Presentation</i>	
2018 New England Systems Verification Day	Oct. 2018
<b>Hyperkernel: Push-Button Verification of an OS Kernel</b> , <i>Poster</i>	
SOSP (with Helgi Sigurbjarnarson)	Oct. 2017
<b>Designing Systems for Push-Button Verification</b> , <i>Presentation</i>	
Allen School 2017 Annual Research Day	Nov. 2017
2017 New England Systems Verification Day (with Xi Wang and Helgi Sigurbjarnarson)	Oct. 2017
<b>Ouroboros: Bootstrapping a Formally Verified In-Kernel Interpreter</b> , <i>Poster</i>	
OSDI (Jared Roesch, Luke Nelson, Zachary Tatlock, Xi Wang)	Oct. 2016

## Teaching

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CSE P 551: Professional Master's Operating Systems — <i>Teaching Assistant</i>	Autumn 2019
CSE 551: Graduate Operating Systems — <i>Teaching Assistant</i>	Winter 2019
CSE 481A: OS Capstone – <i>Teaching Assistant</i>	Winter 2018
CSE 351: The Hardware/Software Interface – <i>Teaching Assistant</i>	Spring 2015