

Nathaniel Wesley Filardo

Curriculum Vitæ

✉ nwfcv@cmx.ietfng.org
🌐 <https://www.acmetensortoy.com/nwf>
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Education

- 2007–2017 **Ph.D. Computer Science.** *Johns Hopkins University.*
- 2007–2011 **M.S. Computer Science.** *JHU.*
- 2006–2007 **B.S. Computer Science.** *Carnegie Mellon University.*
- 2002–2006 **B.S.H. Physics.** *CMU.*

Publications (Available at <https://www.acmetensortoy.com/nwf/pubs>)

Computer Architecture

1. **N. W. Filardo**, B. F. Gutstein, J. Woodruff, J. Clarke, P. Rugg, B. Davis, M. Johnston, R. Norton, D. Chisnall, S. W. Moore, P. G. Neumann, and R. N. M. Watson. “Cornucopia Reloaded: Load Barriers for CHERI Heap Temporal Safety.” In: *Proceedings of the 29th ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS’24)*. Aug. 2024.
2. S. Amar, D. Chisnall, T. Chen, **N. W. Filardo**, B. Laurie, K. Liu, R. Norton, S. W. Moore, Y. Tao, R. N. M. Watson, and H. Xia. “CHERIoT: Complete Memory Safety for Embedded Devices.” In: *Proceedings of MICRO 2023*. Nov. 2023.
3. R. N. M. Watson, P. G. Neumann, J. Woodruff, M. Roe, H. Almatary, J. Anderson, J. Baldwin, G. Barnes, D. Chisnall, J. Clarke, B. Davis, L. Eisen, **N. W. Filardo**, F. A. Fuchs, R. Grisenthwaite, A. Joannou, B. Laurie, A. T. Markettos, S. W. Moore, S. J. Murdoch, K. Nienhuis, R. Norton, A. Richardson, P. Rugg, P. Sewell, S. Son, and H. Xia. “Capability Hardware Enhanced RISC Instructions: CHERI Instruction-Set Architecture (Version 9).” Tech. rep. University of Cambridge, Computer Laboratory, Sept. 2023.
4. **N. W. Filardo**, B. F. Gutstein, J. Woodruff, S. Ainsworth, L. Paul-Trifu, B. Davis, H. Xia, E. T. Napierala, A. Richardson, J. Baldwin, D. Chisnall, J. Clarke, K. Gudka, A. Joannou, A. T. Markettos, A. Mazzinghi, R. M. Norton, M. Roe, P. Sewell, S. Son, T. M. Jones, S. W. Moore, P. G. Neumann, and R. N. M. Watson. “Cornucopia: Temporal Safety for CHERI Heaps.” In: *2020 IEEE Symposium on Security and Privacy (SP)*. IEEE Computer Society, May 2020, pp. 1507–1524.
5. H. Xia, J. Woodruff, S. Ainsworth, **N. W. Filardo**, M. Roe, A. Richardson, P. Rugg, P. G. Neumann, S. W. Moore, R. N. M. Watson, and T. M. Jones. “CHERIVoke: Characterising Pointer Revocation Using CHERI Capabilities for Temporal Memory Safety.” In: *Proceedings of the 52nd IEEE/ACM International Symposium on Microarchitecture (IEEE MICRO 2019)*. MICRO-52. Oct. 2019.
6. B. Davis, P. G. Neumann, R. N. M. Watson, S. W. Moore, A. Richardson, J. Baldwin, D. Chisnall, J. Clarke, **N. W. Filardo**, K. Gudka, A. Joannou, B. Laurie, A. T. Markettos, J. E. Maste, A. Mazzinghi, E. T. Napierala, R. M. Norton, M. Roe, P. Sewell, S. Son, and J. Woodruff. “CheriABI: Enforcing Valid Pointer Provenance and Minimizing Pointer Privilege in the POSIX C Runtime Environment.” In: *Proc. of The 24th ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)*. (Best Paper Award). Apr. 2019.

7. J. Woodruff, A. Joannou, H. Xia, A. Fox, R. Norton, T. Bauereiss, D. Chisnall, B. Davis, K. Gudka, **N. W. Filardo**, A. T. Markettos, M. Roe, P. G. Neumann, R. N. M. Watson, and S. W. Moore. “CHERI Concentrate: Practical Compressed Capabilities.” In: *IEEE Transactions on Computers* (Apr. 2019).

Computer Security

8. S. Amar, T. Chen, D. Chisnall, F. Domke, **N. Filardo**, K. Liu, R. Norton-Wright, Y. Tao, R. N. M. Watson, and H. Xia. “CHERIoT: Rethinking security for low-cost embedded systems.” Tech. rep. Microsoft, Feb. 2023.
9. **N. W. Filardo**. “Research Report: Mitigating LangSec Problems With Capabilities.” In: *Security and Privacy Workshops (SPW), 2016 IEEE*. 2016.
10. **N. W. Filardo** and G. Ateniese. “High-Entropy Visual Identification for Touch Screen Devices.” In: *Proceedings of the 8th International Conference on Information Security Practice and Experience*. ISPEC’12. Springer-Verlag, 2012, pp. 182–198.

Logic Programming

11. **N. W. Filardo**. “Dyna 2: Towards a General Weighted Logic Language.” PhD thesis. Johns Hopkins University, Oct. 2017.
12. T. Vieira, M. Francis-Landau, **N. W. Filardo**, F. Khorasani, and J. Eisner. “Dyna: Toward a Self-Optimizing Declarative Language for Machine Learning Applications.” In: *Proceedings of the First ACM SIGPLAN Workshop on Machine Learning and Programming Languages (MAPL)*. June 2017.
13. **N. W. Filardo** and J. Eisner. “A Flexible Solver for Finite Arithmetic Circuits.” In: *Technical Communications of the 28th International Conference on Logic Programming, ICLP 2012*. Ed. by A. Dovier and V. S. Costa. Vol. 17. Leibniz International Proceedings in Informatics (LIPIcs). Sept. 2012, pp. 425–438.
14. J. Eisner and **N. W. Filardo**. “Dyna: Extending Datalog For Modern AI.” In: *Datalog Reloaded*. Ed. by O. de Moor, G. Gottlob, T. Furche, and A. Sellers. Vol. 6702. Lecture Notes in Computer Science. (Longer version available as tech report). Springer, 2011, pp. 181–220.

Formal Languages

15. **N. W. Filardo** and J. Eisner. “Rigid Tree Automata With Isolation.” In: *Proceedings of the Fourth International Workshop on Trends in Tree Automata and Tree Transducers (TTATT)*. Aug. 2016.

Distributed Systems

16. V. Srinivas and **N. W. Filardo**. “Styx Caching via Journal Callbacks.” In: *4th International Workshop on Plan9*. 2009.

Natural Language Processing

17. K. Baker, B. Dorr, M. Bloodgood, C. Callison-Burch, **N. Filardo**, C. Piatko, L. Levin, and S. Miller. “Use of Modality and Negation in Semantically-Informed Syntactic MT.” In: *Comput. Linguist.* 38 (June 2012), pp. 411–438.
18. K. Baker, M. Bloodgood, C. Callison-Burch, B. Dorr, **N. Filardo**, L. Levin, S. Miller, and C. Piatko. “Semantically-Informed Machine Translation: A Tree-Grafting Approach.” In: *Proceedings of the Ninth Conference of the Association for Machine Translation in the Americas*. 2010.
19. K. Baker, M. Bloodgood, B. Dorr, **N. Filardo**, L. Levin, and C. Piatko. “A Modality Lexicon and its use in Automatic Tagging.” In: *Proceedings of the Seventh Language Resources and Evaluation Conference (LREC)*. 2010.

20. K. Baker, S. Bethard, M. Bloodgood, R. Brown, C. Callison-Burch, G. Coppersmith, B. Dorr, **N. Filardo**, K. Giles, A. Irvine, M. Kayser, K. Levin, J. Martineau, J. Mayfield, S. Miller, A. Phillips, A. Philpot, C. Piatko, L. Schwartz, and D. Zajic. “Semantically Informed Machine Translation.” Tech. rep. Human Language Technology Center of Excellence, Johns Hopkins University, 2009.

Teaching

At the University of Cambridge

- 2020 **Demonstrator for Advanced Operating Systems (L41)**. (Lent term; Robert Watson)
2019 **Supervised five students for Semantics of Programming Languages**. (Michelmas term; Peter Sewell)
2018 **Supervised seven students for Semantics of Programming Languages**. (Michelmas term; Peter Sewell)

As Instructor

- 2013–2016 **Special Topics in Category Theory**. *JHU*.
Summer 2015 **15-213: Computer Systems**. *CMU*.
January 2012 **Fun With Haskell**. *JHU*. (One-month course)
2008 **EN.600.438: Advanced Topics in Operating Systems**. *JHU*.

As Teaching Assistant

- 2016 **EN.600.328: Compilers and Interpreters**. *JHU*. (Peter Fröhlich, Senior Lecturer)
2015 **EN.600.318: Operating Systems**. *JHU*. (Peter Fröhlich, Senior Lecturer)
2015 **EN.600.328: Compilers and Interpreters**. *JHU*. (Peter Fröhlich, Senior Lecturer)
Summer 2013 **LI 569: Introduction to Computational Linguistics**. *LSA Linguistic Institute at the University of Michigan*. (Jason Eisner, JHU; this course used our Dyna prototype implementation, and I was on hand to assist debugging)
2006–2007 **15-410: Operating Systems Design and Implementation**. *CMU*. (S’06, F’06, S’07, and some continued involvement subsequently. David Eckhardt, Teaching Professor)

Awards

- 2016 Finalist for JHU Whiting School of Engineering Excellence in Teaching Awards.
2009 JHU Computer Science Department Special Service Award.
2007 CMU Senior Leadership Recognition Award.
2006 CMU Senior Leadership Recognition Award.
2002 Florence Fessenden Award for Technical Theater, The Seven Hills School, Cincinnati, OH.

Employment

Academic

- 2018–2020 **Research Associate**. *University of Cambridge*.
Summer 2015 **Adjunct Professor**. *Carnegie Mellon University School of Computer Science*.
2007–2014 **Graduate Fellow**. *JHU Human Language Technology Center of Excellence*.

Other

- 2022–pres. **Senior Researcher**. *Microsoft Canada, Inc*.
2020–2022 **Senior Researcher**. *Microsoft Research, Cambridge, UK*.

- 2016–2018 **Contractor.** *AuriStor, Inc.*
- 2006 **Solaris Kernel Developer, Summer Intern.** *Sun Microsystems, Inc.*
- 2005–2006 **Systems Administrator.** *RedZone Robotics.*
- 2003–2005 **Systems Administrator and Programmer.** *CMU Robotics Institute, Laboratory of Dr. Scott Thayer.*
- 2002 **Programmer, Summer Intern.** *Procter & Gamble Pharmaceuticals, Discovery.*

Extracurriculars

- 2019–2021 NodeMCU firmware volunteer maintainer.
- 2018–2020 Adult artistic gymnastics.
- 2009–2018 Founding member, Baltimore NODE Makerspace.
- 2008–2017 JHU ACM chapter volunteer system administrator and museum curator.
- 2015–2017 Supervisor for students' independent studies with JHU ACM.
- 2013–2015 Secretary for Baltimore NODE Makerspace.
- 2012–2014 JHU ACM Vice Chair.
- Summer 2011 Google Summer of Code Mentor with Dragonfly BSD.
- 2007–pres. Amateur Radio operator; Extra Class since 2014. (KD8GIN)
- Summer 2007 Google Summer of Code Student with Plan 9.
- 2003–2004 CMU KGB Recording Secretary.
- 1991–2002 Classical piano training; continue to play for my own pleasure.
- 2000–2002 Student Technical Director, Upper School Theater Program, The Seven Hills School.

References Available by request