

Nathaniel Wesley Filardo

Curriculum Vitæ

✉ nwfcv@cmx.ietfng.org
🌐 <https://www.acmetensortoys.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.acmetensortoys.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)*. Apr. 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.

Natural Language Processing

16. 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.
17. 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.
18. 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.
19. 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.

Miscellaneous

20. **N. W. Filardo** and M. J. Parkinson. “BatchIt: Optimizing Message-Passing Allocators for Producer-Consumer Workloads: An Intellectual Abstract.” In: *Proceedings of the 2024 ACM SIGPLAN International Symposium on Memory Management (ISMM '24)*, June 25, 2024, Copenhagen, Denmark. June 2024.
21. V. Srinivas and **N. W. Filardo**. “Styx Caching via Journal Callbacks.” In: *4th International Workshop on Plan9*. 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**. (Michelman term; Peter Sewell)
- 2018 **Supervised seven students for Semantics of Programming Languages**. (Michelman 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