

John Vilik

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Research Interests

My research spans software systems, programming languages, and software engineering, with a focus on overcoming challenges posed by web application development.

Education

University of Massachusetts Amherst (Advised by Emery D. Berger)

Ph.D. in Computer Science *Anticipated* May, 2018
M.S. in Computer Science 2014

Worcester Polytechnic Institute

B.S. in Computer Science; Minor: Math May, 2011

Honors & Awards

Facebook Ph.D. Fellowship in Programming Languages & Compilers 2015-2017

SIGPLAN Research Highlight for DOPPIO: Breaking the Browser Language Barrier 2014

Distinguished Artifact Award for DOPPIO: Breaking the Browser Language Barrier PLDI 2014

Inducted into WPI chapter, Upsilon Pi Epsilon computer science honor society 2011

Salisbury Prize Worcester Polytechnic Institute 2011

Awarded for completing all of my requirements at WPI "faithfully, industriously, and with distinguished attainment".

Dr. Neil G. Sullivan Memorial Award Worcester Polytechnic Institute 2010

Awarded annually to three juniors in recognition of their demonstrated ability and promise.

Charles O' Thompson Scholar Worcester Polytechnic Institute 2008

Recognizes outstanding performance by first-year students.

Travel Grants PLDI 2016 IEEE S&P 2015 OSDI 2014 PLDI 2014 POPL 2012

Publications

- REJS: Time-Travel Debugging for Browser-Based Applications** *In Progress*
 John Vilk, James Mickens, and Mark Marron MSR-TR-2016-7
- BLEAK: Automatically Debugging Memory Leaks in Web Applications** *In Submission*
 John Vilk and Emery D. Berger (Preprint available on my website)
- BROWSIX: Bridging the Gap Between Unix and the Browser** ASPLOS 2017
 Bobby Powers, John Vilk, Emery D. Berger
- SURROUNDWEB: Mitigating Privacy Concerns in a 3D Web Browser** IEEE S&P 2015
 John Vilk, David Molnar, Eyal Ofek, Chris Rossbach, Benjamin Livshits, Alexander Moshchuk, Helen J. Wang, and Ran Gal
- DOPPIO: Breaking the Browser Language Barrier** PLDI 2014
 John Vilk and Emery D. Berger *SIGPLAN Research Highlight*

Posters

- BROWSIX: Bridging the Gap Between Unix and the Browser** NSDI 2017
 Bobby Powers, John Vilk, and Emery D. Berger
- BCoZ: Effective Performance Debugging for Web Applications** NENS 2016
 John Vilk and Emery D. Berger, NENS 2016.
- TARDIS: Affordable Time-Travel Debugging in Managed Runtimes** OOPSLA 2014
 Earl T. Barr, Mark Marron, and John Vilk

Talks

- BLEAK: Automatically Debugging Memory Leaks in Web Applications**
 New England Networking and Systems Day, Boston, MA. December, 2017
 Facebook Fellows Workshop, Menlo Park, CA. September, 2017
- BROWSIX: Bridging the Gap Between Unix and the Browser**
 IBM Programming Languages Day, Yorktown Heights, NY. December, 2017
- BCoZ: Effective Performance Debugging for Web Applications**
 PLDI 2016 - JSTools, Barcelona, Spain. June, 2017
- Making the Browser Reasonable for Sane Developers**
 Northeastern University, Boston, MA. January, 2017
 University of Pennsylvania, Philadelphia, PA. December, 2016

A Gray Box Approach For High-Fidelity High-Speed Time-Travel Debugging

Facebook Fellows Workshop, Menlo Park, CA. June, 2016
 End of Internship Talk at Microsoft Research, Redmond, WA. August, 2014

SURROUNDWEB: Mitigating Privacy Concerns in a 3D Web Browser

IEEE Symposium on Security & Privacy, San Jose, CA. May, 2015
 End of Internship Talk at Microsoft Research, Redmond, WA. August, 2013

DOPPIO: Breaking the Browser Language Barrier

Microsoft Research, Redmond, WA. January, 2015
 PLDI 2014, Edinburgh, UK. June 2014
 Harvard University, Cambridge, MA. May, 2014

Employment

University of Massachusetts Amherst Research Assistant 2011 – present
with Programming Languages and Systems at Massachusetts (PLASMA) group

University of Massachusetts Amherst Teaching Assistant Spring 2016
for CMPSCI 326: Web Programming, with Professor Timothy Richards

Microsoft Research Research Intern Summer 2015, Summer 2014
with James Mickens and Mark Marron in the Distributed Systems and Research in Software Engineering (RiSE) groups

Microsoft Research Research Intern Summer 2013
with David Molnar in the Security and Privacy Group

Google, Inc. Software Engineering Intern Summer 2012
with the Java Platform Team

MIT Lincoln Laboratory Research Intern Summer 2011
in Division 6: Communication Systems

SoftArtisans Inc. Software Engineering Intern Summer 2010

Professional Service**External Review Committee Member**

ACM Conference on Programming Language Design and Implementation (PLDI17) 2017
 ACM Conference on Programming Language Design and Implementation (PLDI16) 2016

Artifact Evaluation Committee Member

ACM Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA15) 2015

ACM Conference on Programming Language Design and Implementation (PLDI15) 2015
 ACM Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA14) 2014

External Reviewer

USENIX Security Symposium 2014
 ACM Object-Oriented Programming, Systems, Languages, and Applications (PLDI14) 2014
 ACM Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA12) 2012
 ACM SIGPLAN Workshop on Memory Systems Performance and Correctness (MSPC12) 2012
 USENIX Workshop on Hot Topics in Parallelism (HotPar12) 2012

Student Volunteer

ACM Conference on Programming Language Design and Implementation (PLDI16) 2016
 ACM Conference on Programming Language Design and Implementation PC Meeting 2016
 ACM Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA14) 2014

Graduate Representative UMass Amherst College of Information and Computer Sciences 2014-2015

One of four Ph.D. students elected to serve for one year. Attended and voted during faculty meetings, met with faculty candidates, and organized department seminars

Patents

Protecting privacy in web-based immersive augmented reality Patent US 20150143459 A1

David Molnar, John Vilk, Eyal Ofek, Alexander Moshchuk, Jiahe Wang, *Granted 2015*
 Ran Gal, Lior Shapira, Douglas Christopher Burger, Blair MacIntyre,
 and Benjamin Livshits

Software

BLEAK Automatic memory leak debugger for web applications.

<https://github.com/plasma-umass/bleak>

BROWSIX Bridges the gap between Unix and the browser.

<https://browsix.org>

DOPPIO+DOPPIOJVM Breaks the browser language barrier and includes a plugin-free JVM.

<https://github.com/plasma-umass/doppio>

BrowserFS POSIX-like file system with numerous backends. Forms part of DOPPIO.

<https://github.com/jvilk/browserfs>

Teaching & Mentoring Experience

Guest Lecturer University of Massachusetts Amherst

COMPSCI 326: Web Programming (undergraduate)

Spring 2016

Teaching Assistant University of Massachusetts Amherst

COMPSCI 326: Web Programming

Spring 2016

As a TA, I co-taught the class with the instructor. I redesigned the curriculum, designed and wrote all of the assignments, graded assignments, held well-attended office hours, and answered hundreds of questions on Piazza.

Research Mentor

Muhammad Bhatti Undergraduate in Computer Science, NUST, Pakistan

Summer 2015

Remotely supervised contributions to a research project via Google Summer of Code. Extended an experimental Python implementation with multithreading support.

Giles Lavelle Undergraduate in Computer Science, University of Bristol

Summer 2013

Remotely supervised contributions to DOPPIO via Google Summer of Code. Extended DOPPIO's file system with cloud storage support.

Braden McDorman Undergraduate in Computer Science, Univ. of Oklahoma

Summer 2013

Remotely supervised contributions to DOPPIO via Google Summer of Code. Extended DOPPIO with support for outgoing TCP sockets.

Mentor Computing Beyond the Double Bind Mentoring Network

2015-2016

Provided remote guidance and support to undergraduate women of color in computer science.

References

Emery D. Berger (advisor)

Professor
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James Mickens

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Harvard University
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Yuriy Brun

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Arjun Guha

Assistant Professor
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Timothy Richards (Teaching Reference)

Senior Teaching Faculty & Undergraduate Program Director
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