David T Naylor

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Education

Carnegie Mellon University, Pittsburgh, PA

Ph.D., Computer Science, *2011 – present*

- Advisor: Peter Steenkiste

The University of Iowa, Iowa City, IA

B.S., Computer Science, *2007 – 2011*
B.S., Mathematics, *2007 – 2011*

- Graduated with Highest Distinction
- Graduated from the Honors Program

Research Interests

computer networks, network architecture, network security, privacy

Research Projects

Living in an Encrypted World, Telefónica Research
Spring 2014–present

My current work explores privacy/security vs. performance/functionality tradeoff presented by encryption, particularly in the context of the Web. The standardization of HTTP 2.0 is just around the corner, and all signs point to the use of TLS becoming mandatory. This work (1) attempts to quantify the *cost* of HTTPS-by-default and (2) explores mechanisms for re-introducing beneficial in-network functionality to secure connections.

Balancing Accountability and Privacy, Carnegie Mellon University
Fall 2013–present

This work considers how changes to the network architecture can help strike a balance in the tussle between accountability (i.e., knowing who sends each packet) and privacy (i.e., hiding who sends each packet). We do this by splitting today's overloaded source address into two fields: an *accountability address* and a *return address*.

eXpressive Internet Architecture (XIA), Carnegie Mellon University
Fall 2011–present

XIA, one of five future Internet architecture projects funded by the NSF, is a clean-slate redesign of the Internet aiming to (1) make the Internet *evolvable*—good ideas in the future shouldn't require a "flag day" upgrade, (2) support an extensible set of communication paradigms (like content- or service-centric communication) that align with what applications actually want to do, and (3) provide "intrinsic" security at the network layer.

Computational Epidemiology Group, University of Iowa
Spring 2009–Summer 2011

I studied the spread of disease and outbreak prevention; in particular, I did this in a hospital setting by using wireless sensor networks to examine social networks among healthcare workers and to monitor hand hygiene compliance. I used this data to drive outbreak simulations.

Relevant Work Experience

Virtual Reality Applications Center, Iowa State University
Summer 2008, Summer 2009, Winter 2009

I worked on a team at ISU's world-famous virtual reality center developing Meta!Blast, an interactive 3D computer game designed to enhance cell biology education in high schools. One of my projects was developing the game's character animation library.

Awards

American Society for Engineering Education

- National Defense Science and Engineering Graduate Fellowship, *2012 – 2015*

The University of Iowa

- Sanxay Prize for Graduate Study, 2011
- Interdisciplinary Health Group Student Poster Session Award, 2011
- John Deere Scholarship in Computer Science, *2010*
- Arthur Collins Scholarship in Computer Science, *2008, 2009*
- Dewey B. Stuit Honors Scholarship, *2009*
- Rhodes Dunlap Honors Scholarship, *2008, 2009, 2010*
- William and Effa McMeans Scholarship, *2007 – 2011*
- Old Gold Scholarship, *2007 – 2011*
- National Merit Scholar, *2007 – 2011*

Publications

[1] **Naylor, D.**, K. Schomp, M. Varvello, I. Leontiadis, J. Blackburn, D. Lopez, K. Papagiannaki, P. Rodriguez, P. Steenkiste. multi-context TLS (mcTLS): Enabling Secure In-Network Functionality in TLS. *SIGCOMM 2015*, August 2015.

[2] Mukerjee, M.K., **D. Naylor**, J. Jiang, D. Han, S. Seshan, H. Zhang. Practical, Real-time Centralized Control for CDN-based Live Video Delivery. *SIGCOMM 2015*, August 2015.

[3] **Naylor, D.**, A. Finamore, I. Leontiadis, Y. Grunenberger, M. Mellia, M. Munafò, K. Papagiannaki, P. Steenkiste. The Cost of the "S" in HTTPS. *CoNEXT 2014*, December 2014. *(Short Paper)*

[4] **Naylor, D.**, M.K. Mukerjee, P. Steenkiste. Balancing Accountability and Privacy in the Network. *SIGCOMM 2014*, August 2014. **(Best Paper Award)**

[5] **Naylor, D.**, M.K. Mukerjee, P. Agyapong, R. Grandl, R. Kang, M. Machado, S. Brown, C. Doucette, H.C. Hsiao, D. Han, T. Kim, H. Lim, C. Ovon, D. Zhou, S.B. Lee, Y.H. Lin, C. Stuart, D. Barrett, A. Akella, D. Andersen, J. Byers, L. Dabbish, M. Kaminsky, S. Kiesler, J. Peha, A. Perrig, S. Seshan, M. Sirbu, P. Steenkiste. XIA: Architecting a More Trustworthy and Evolvable Internet. *SIGCOMM CCR*, July 2014.

[6] Hornbeck, T., **D. Naylor**, A.M. Segre, G. Thomas, T. Herman, and P.M. Polgreen. Using Sensor Networks to Study the Effect of Peripatetic Healthcare Workers on the Spread of Hospital-Associated Infections. *Journal of Infectious Diseases*, 2012.

[7] Hornbeck, T., **D. Naylor**, A.M. Segre, G. Thomas, T. Herman, and P.M. Polgreen. On Hand Hygiene Compliance and Diminishing Marginal Returns: An Empirically-Driven Agent-Based Simulation Study. *The Computational Social Science Society of the Americas Annual Conference*, 2011.

[8] Thomas, G., P. Polgreen, T. Herman, D. Sharma, B. Johns, H. Chen, G. Scranton, **D. Naylor**, M. Ireland, T. McCarty, T. Decker, A. Segre. Improving Patient Safety With Hand Hygiene Compliance Monitoring. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, 55(1):823–827, 2011.

Posters, Talks, and Demos

[9] Mukerjee, M.K., J. Hong, J. Jiang, **D. Naylor**, D. Han, S. Seshan, H. Zhang. Enabling Near Real-time Central Control for Live Video Delivery in CDNs. *SIGCOMM 2014*, August 2014. *(Poster)*

[10] Grandl, R., D. Han, S.B. Lee, H. Lim, M. Machado, M.K. Mukerjee, **D. Naylor**. Supporting Network Evolution and Incremental Deployability with XIA. *SIGCOMM 2012*, August 2012. *(Demo)*

[11] **Naylor, D.**, M.K. Mukerjee, P. Steenkiste. eXpressive Internet Architecture: GEC15 Demo. *GENI Engineering Conference 15*, October 2012. *(Talk/Demo)*

[12] **Naylor, D.**, D. Han, M.K. Mukerjee, S.B. Lee, P. Steenkiste. XIA: An Evolvable, Expressive, and Secure Internet Architecture. *GENI Engineering Conference 12*, November 2011. *(Poster/Demo)*

[13] **Naylor, D.**, T. Hornbeck, A.M. Segre, and P.M. Polgreen. Analyzing the Impact of Superspreading Using Hospital Contact Networks. *International Meeting on Emerging Diseases and Surveillance*, February 2011. *(Poster)*

Teaching

Fall 2013	**Undergraduate Computer Networks** (15-441)	*Peter Steenkiste*
Fall 2012	**Graduate Computer Networks** (15-744)	*Peter Steenkiste*

Graduate Coursework

Carnegie Mellon University

Spring 2014	**Software Security**	*Lujo Bauer*
Spring 2013	**Machine Learning**	*Barnabás Póczos and Alex Smola*
Fall 2012	**Computer Architecture**	*Todd Mowry*
Fall 2012	**Network Security**	*Adrian Perrig*
Spring 2012	**Advanced Storage Systems**	*Greg Ganger and Garth Gibson*
Spring 2012	**Graduate Algorithms**	*Manuel Blum*
Fall 2011	**Computer Networks**	*Peter Steenkiste*
Fall 2011	**Types and Programming Languages**	*Bob Harper*

The University of Iowa

Spring 2011	**Distributed Systems and Algorithms**	*Sukumar Ghosh*
Spring 2010	**Artificial Intelligence**	*Alberto Segre*
Fall 2009	**Knowledge Discovery** (Machine Learning)	*Nick Street*

Service

Doctoral Review Committee, Carnegie Mellon University
Member **Spring 2013 – present**

CS Admitted Student Open House, Carnegie Mellon University
Student Co-Coordinator **Spring 2013, Spring 2014**

Dec/5, Carnegie Mellon University
President **Fall 2012 – Spring 2013**

Co-direct the School of Computer Science's graduate student social organization. My primary responsibility is organizing the Dec/5 "TGs" — SCS-wide happy hours sponsored by industry recruiters and held roughly twice a month.

Lecture Committee, University of Iowa
Member **Fall 2010 – Spring 2011**

Planned and produced the only student-run lecture series in the US. Duties included

contacting agents, preparing publicity materials, hosting speakers on campus, and coordinating lectures' technical needs. Our Lecture Series included Aasif Mandvi from The Daily Show and Wikipedia founder Jimmy Wales.

OTHER INTERESTS

photography, theatrical lighting design, running