**CURRICULUM VITAE**
March 4, 2016

**Boon Thau Loo**
605 Levine, 3330 Walnut Street, Philadelphia, PA 19104, USA.

## Education

| | |
|---|---|
| 2006 | **University of California at Berkeley**<br>Ph.D. in Computer Science<br>Thesis: *The Design and Implementation of Declarative Networks*<br>Advisors: Joseph M. Hellerstein and Ion Stoica.<br>*Winner of the 2007 ACM-SIGMOD Dissertation Award*<br>*Winner of the 2006 David J. Sakrison Memorial Prize (UC Berkeley)* |
| 2000 | **Stanford University**<br>M.S. in Computer Science |
| 1999 | **University of California at Berkeley**<br>B.S. (Highest Honors) Electrical Engineering and Computer Science |

## Employment

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|---|---|
| 2013 – | Associate Professor (primary), CIS Department**,** University of Pennsylvania |
| 2015 - | Associate Professor (secondary), ESE Department, University of Pennsylvania |
| 2016 - | Co-founder and Chief Scientist of Termaxia, a big data storage company. |
| 2013 – | Co-founder of Gencore, spinoff from University of Pennsylvania |
| 2007 - 2013 | Assistant Professor**,** CIS Department**,** University of Pennsylvania |
| 2006 | Post-doctoral Researcher**,** Microsoft Research Silicon Valley |
| 2001-2005 | Graduate Research Assistant, EECS CS Dept, UC Berkeley, |
| 2005 | Research Intern, Intel Research Laboratory at Berkeley |
| 2002 | Visiting Student, EECS Dept, MIT |
| 2002 | Research Intern, Intel Research Laboratory at Seattle |
| 2000-2001 | Senior software engineer, Kent Ridge Digital Labs (KRDL) in Singapore |
| 2000 | Intern, VMWare |
| 1999 | Research Intern, IBM Almaden Research Center |
| 1998 | Research Intern, IBM Almaden Research Center |

## Research Overview

I lead the NetDB (http://netdb.cis.upenn.edu) research group at Penn. My research group applies data-centric techniques and formal methods to the design, analysis, and implementation of distributed systems. My primary interest lies in the development of new programming tools and analysis techniques that improve the process of designing, implementing, verifying, and securing large-scale distributed systems. I take an inter-disciplinary approach, combining ideas from databases, programming languages, and formal methods, with applications to networking, security, and systems in general. Given the inter-disciplinary nature of our work, my students and I have **published across a wide range of conferences**, including databases (SIGMOD, VLDB, CIDR, ICDE, SOCC), networking (SIGCOMM, PODC, INFOCOM, IEEE/ACM Transactions on Networking, HotNets, CoNEXT, ICNP, COMSNET), security (NDSS, PETS), systems (SOSP, USENIX ATC, HPDC), and formal methods (TACAS, PPDP, FMOODS, TPHOLs). We have

received **best paper awards in diverse venues**, such as IEEE ICDE (databases), ACM HPDC (high performance computing), and ACM ICAC (autonomic computing).

**Funding**

Funding from NSF (CNS/CSR, CNS/NeTS, SaTC, IIS, CCF, and IIP), DoD (DARPA, AFOSR, ONR), Amazon, AT&T, and Google. Total funding raised: $24M in 9 years. 64% NSF overall success funding rate. 84.6% funding success rate as lead PI.

Current (as PI):

- **Dynamic Cost-Performance Optimizations in Multipath Video Delivery.** Google Research Award, $73,500, 2016.
- **DeDOS: Declarative Dispersion-Oriented Software, DARPA Extreme DDoS Defense (XD3)**, (PI: Boon Thau Loo, co-PI: Andreas Haeberlen, Linh T.X. Phan, Micah Sherr, Clay Shields, Wenchao Zhou), $3.5 million with $450K options, 04/16 – 10/18. (recommended for funding)
- **I-Corps: NetEgg: Toolkit for Programming Network Policies by Examples**, NSF IIP-1564730 (PI: Boon Thau Loo), $50K, 11/01/2015 – 04/30/2016.
- **NeTS: Medium: Collaborative Research: DEFIND: Declarative Formal Interative Network Design**, NSF NeTS Medium, (Penn PI: Boon Thau Loo, collaborative project with CMU and Georgetown University). $1.2 million, 09/15 – 08/19.
- AT&T Labs-Research University Gift, $25K, 2014 – present.
- **NeTS: Small: Routing Design and Analysis with Incomplete Information**, NSF CNS-1218066, Boon Thau Loo (PI). $400K, 9/12-8/2016.
- **TC:Small: Collaborative Research: Towards a Formal Framework for Analyzing and Implementing Secure Routing Protocols**, with Limin Jia (CMU) and Wenchao Zhou, $499K, 3 years. 09/01/2011 – 08/31/2016.
- **CAREER: Towards a Unified Declarative Platform for Composable Verifiable Networks**, NSF CNS-0845552, (**PI: Boon Thau Loo**), $450,000, 06/01/2009 – 05/31/2016.

Current (as co-PI):

- **CSR Nets: Medium: Network Functions Virtualization with Timing Guarantees**, NSF CSR Medium (PI: Linh Thi Xuan Phan, co-PI: Andreas Haeberlen, Boon Thau Loo), $1.2 million, 09/16 – 08/20. Recommended for funding.
- **DEDUCE: Distributed Enclave Defense Using Configurable Edges.** Joint project with ACS, Apogee Research, MIT, and Texas A&M university, DARPA EdgeCT, $1.17M, 07/2015-06/2018.
- **Probalogical Hybrid Defense (PHD).** Office of Naval Research (ONR) grant, Jonathan M. Smith (PI), $1.09M, Rajeev Alur, Andre Dehon, Sampath Kannan, Boon Thau Loo, A. Rahklin, Andre Scedrov, Oleg Soloksly (co-Pis), 10/2014 – 09/2017.
- **Collaborative Research: Expeditions in Computer Augmented Program Engineering (ExCAPE): Harnessing Synthesis for Software Design**, NSF Expedition, with Rajeev Alur, Milo Martin, George Pappas, Steve Zdancewic (Penn) and several others, $3.75 million (Penn), 04/01/2012-03/31/2017.
- **CSR: Small: Resource Management for Real-time Cloud Computing**, with Linh P.X. Phan and Insup Lee, $450K, 09/01/2011 – 08/31/2016.
- **TC: Medium: Collaborative Research: Tracking Adversarial Behavior in Distributed Systems with Secure Networked Provenance,** NSF TC-1065130, (PI: Andreas Haeberlen, Co-PI: Zachary Ives, Boon Thau Loo, Micah Sherr), $1.2 million, 09/01/2011 – 08/31/2016.

Pending:

- **RIDIR:Collaborative Research:Longitudinal Collection and Analysis of Massive Network Graphs for Social Science Research**, NSF SBE Office of Multidisciplinary Activities, ), (PI: Boon Thau Loo, co-PI: Sandra Gonzalez-Bailon (Annenberg School of Communications), Susan Davidson (CIS), Laura Huang (Wharton), Zachary Ives (CIS), Poh-Ling Loh (Wharton), Pinar Yildirum (Wharton)), in collaboration with Rowan University's Public Relations and Advertising department, $1.6 million, 09/16 – 08/18.
- **BIGDATA:Collaborative Research:IA: Data-driven and User-driven Social Analytics for Optimizing Technology Startups**, NSF Division of Information and Intelligent Systens (IIS), (PI: Boon Thau Loo, co-PI: Laura Huang (Wharton), Karthik Hosanagar (Wharton), Poh-Ling Loh (Wharton)), in collaboration with Rowan University's Public Relations and Advertising department, $1.2 million, 09/16 – 08/19.

Completed:

- **A Unified Algebraic and Logic-based Framework towards Safe Routing Implementations.** Air Force Office of Scientific Research (AFOSR) Young Investigator Program (YIP) award, $360K, 6/2012 – 6/2015.
- **SBIR Phase 1: Declarative Platform for Software-defined Networking Applications.** NSF IIP- 1345294, $150K (1/2014-12/2014). Technology transfer from NetDB@Penn research.
- **FIA: Collaborative Research: NEBULA: A Future Internet That Supports Trustworthy Cloud Computing,** NSF Future Internet Architecture, (PI: Jonathan M. Smith, Co-Pis from various universities), $1.47 million (Penn's award), 09/01/2010 – 31/08/2014.
- **Collaborative Research: Scalable Knowledge-based Middleware for Networked and Mobile Systems**, NSF CCF-0820208/0819845 (**PI: Boon Thau Loo**, Co-PI: William Regli from Drexel University), $499,866, 09/01/2008-08/31/2012.
- **AFOSR MURI: Collaborative Policies and Assured Information Sharing,** AFOSR grant number FA9550-08-1-0352, (Penn PI: Andre Scedrov, Co-PI: Boon Thau Loo), $850K (Penn's award), (2008-2013).
- **Selectable Anonymity for Enabling SAFER Telecommunications,** part of the DARPA SAFER program, (PI: Jonathan M. Smith, Co-PI: Matthew Blaze, Boon Thau Loo, Micah Sherr, Clay Shields), $3.3 million, 10/2011 – 09/2014.
- **CSR-EHCS(CPS) TM: Robust Composition and Interoperability of CPS Components**, NSF CSR-0834524. (PI: Insup Lee, Co-PI: Oleg Sokolsky, Boon Thau Loo, and Rahul Mangharam), $950,000, 09/01/2008-08/31/2011.
- **NGNI-Small: Declarative Secure Networked Information Systems,** NSF IIS-0812270 (**PI: Boon Thau Loo**), $450,000, 09/01/2008 – 08/31/2014.
- **Amazon Web Services (AWS)** in Education grant, 2011-2012.
- **Network Opposing Botnets (NoBot**), ONR N00014-09-1-0770, (PI: Jonathan M. Smith, Co-Pis from Princeton University and Harvard University, $2.2 million for three years, 2009 – 2012.
- **CT-S: Application-Aware Anonymity (A3) for the Masses**, NSF CNS-0831376. (**PI: Boon Thau Loo**, Co-PI: Matthew Blaze), $400,000, 09/01/2008-08/31/2011.
- **Policy-based Information centric Reliable Ad hoc Network (PIRANA)**, part of the Wireless Network After Next Program, sponsored by DARPA-STO AFRL #FA8750-07-C-0169, $245,391 (Penn's subcontract total), (10/2007 – 12/2008)
- **FIND: Wireless Knowledge Infrastructure (WiKI)**, NSF CNS-0721845, (**PI: Boon Thau Loo**, Co-Pis: Zachary Ives and Jonathan M. Smith), $235,300, (08/01/2007 – 07/31/2009).

**Students and post-docs** *(female or minority students in italics)*

Graduated Ph.D. Students

- Dong Lin
  Software engineer at LinkedIn.
  Thesis: Scalable Anonymous Group Communication, May 2015.

- *Zhuoyao Zhang* (co-advised with Insup Lee)
  Software engineer at Google.
  Thesis: Performance Modeling and Resource Management for MapReduce Applications, May 2014.
  **SPEC Distinguished Dissertation Award (Runner-up), 2014 for "**outstanding doctoral dissertation in the field of computer benchmarking, performance evaluation, and experimental system analysis in general."

- *Anduo Wang* (co-advised with Andre Scedrov)
  Post-doctoral researcher at the University of Illinois, Urbana-Champaign (2013-2016)
  Tenure-track Assistant Professor at Temple University (2016)
  Thesis: Automated Formal Analysis of Internet Routing System*s*, Aug 2013.

- Wenchao Zhou
  Tenure-track Assistant Professor at Georgetown University
  Thesis: Secure Time-aware Provenance towards Forensics in Distributed Systems*, Aug 2012*.
  **Jim Gray SIGMOD Doctoral Dissertation Award (Runner-up), 2013 for "**excellent research by doctoral candidates in the database field.**"**

- Changbin Liu
  Founding CEO/CTO of Termaxia, a big data storage company.
  Senior member of technical staff at AT&T Labs Research.
  Thesis: *Transactional Automated Cloud Resource Orchestration.*, Aug 2012

- Micah Sherr (co-advised with Matt Blaze)
  Tenured Associate Professor at Georgetown University.
  Thesis: Coordinate-Based Routing for High Performance Anonymity*,* Aug 2009.
  **Morris and Dorothy Rubinoff Award for "**best dissertation in the CIS department at UPenn".

- Yun Mao (co-advised with Jonathan M. Smith)
  AT&T Labs Research (2008-2012), Facebook (2012)
  Thesis: A Unified Data-centric Approach towards an Extensible Internet Architecture, Aug 2008.

Current PhD Students:

- *Behnaz Arzani* (5th year, co-advise with Roch Guerin). Completed WPE-I and WPE-II.
- Chen Chen (5th year). Completed WPE-I and WPE-II.
- *Miao Cheng* (1st year)
- Yang Li (5th year, co-advise with Sanjeev Khanna). Completed WPE-I and WPE-II

- *Mengmeng Liu* (co-advise with Zachary Ives). Completed WPE-I, WPE-II, and dissertation proposal. Expected graduation: 05/16.
- Yifei Yuan (6th year, co-advise with Rajeev Alur). Completed WPE-I, WPE-II, and dissertation proposal. Expected graduation: 08/16.

Post-doctoral researchers

- Dr. Alexander Gurney from Cambridge University, 04/2011 – 03/2014. First employment: Comcast.
- Dr. Micah Sherr from the University of Pennsylvania, 08/2009 – 08/2010. First employment: Georgetown University.
- Dr. Vivek Nigam LIX – Ecole Polytechnique. 03/2009 - 12/2010 (with Andre Scedrov). First employment: Ludwig-Maximilians-Universität München (Alexander von Humboldt Fellow)

Selected Masters Research Students:

- Jitesh Gupta (MSc. 2016)
- Nicholas Iodice (MSc. 2016)
- Ankit Mishra (MSc. 2016)
- Sudarshan Muralidhar (MSc. 2016)
- Prithvi Kapara (MSc. 2016)
- Anand Sriramalu (MSc. 2016)
- Stuart Wagner (MSc. 2016)
- *Shanni Xi* (MSc. 2016)
- Jatin Sharma (MSc. 2015, Taser Inc.)
- Nikhilesh Behera (MSc. 2015, Taser Inc.)
- Sibi Vijayakumar (MSc. 2015, GitStar)
- Rahul Nafde (MSc. 2015, ColdLight)
- *Sonal Ektaa* (MSc. 2015, Goldman Sachs)
- Bo Li (MSc. 2014, Google)
- Sitian Cheng (MSc. 2014, Box Inc.)
- Eric Xiang (MSc. 2014, Yahoo Inc.)
- Shuotian Cheng (MSc. 2013, Amazon).
- Sanchit Aggrawal (MSc. 2013, Microsoft)
- Xianglong Han (MSc. 2013, Oracle)
- Lohit Sarna (MSc. 2013, Intel)
- Hao Xu (MSc. 2013, EBay).
- Yuankai Zhang (MSc. 2013, Ph.D. program at Georgetown University)
- Yiqing Ren (MSc. 2012, Georgetown University).
- Suyog Mapara (MSc. 2012, Microsoft).
- Saravana Soundararajan (MSc. 2012, Oracle).
- *Sangeetha A Jyothi* (MSc. 2012, UIUC Ph.D. in Computer Science).
- Ren Lu (MSc. 2011, Bank of America).
- Taher Saeed (MSc. 2011, DramaFever).
- *Qiong Fei* (MSc. 2011, Amazon)
- Qi Zheng (MSc. 2011, Microsoft)
- Saumya Jain (MSc. 2010, Microsoft)

- Xiaozhou Li (MSc. 2010, Princeton Ph.D. in Computer Science)
- Shivkumar Muthukumar (MSc. 2010, Amazon)
- *Tao Tao* (MSc. 2010, Microsoft)
- *Ricardo Correa* (MSc. 2008, Barkly)

Selected Undergraduate Research Students:

- Jinyan Cao (B.Sc. 2014).
    - Participated in ACM SIGCOMM'12 demonstration.
- Kenton Lee (B.Sc. 2014).
    - Participated in ACM SIGCOMM'12 demonstration.
- Robert Mead (B.Sc. 2014)
    - Participated in ACM SIGCOMM'12 demonstration.
- *Trisha Kothari* (B.Sc. 2014)
    - Co-author of DAMP (POPL) 2012 workshop paper.
    - Winner of the Microsoft Undergraduate Scholarship, 2012-2013.
- *Sandy Shengzhi Sun* (B.Sc. 2013 expected).
    - Co-author of SIGMOD 2011 demonstration.
    - Winner of the Microsoft Undergraduate Scholarship, 2011-2012.
- Andrew Quishi Mao (B.Sc. 2009)
    - Ph.D. program in Computer Science at Harvard University (2009-)
- William Marczak (B.Sc. 2009)
    - Honorable mention for the CRA Outstanding Undergraduate 2009.
    - University of Pennsylvania SEAS Computer Science Academic Award, 2009.
    - Ph.D. program in Computer Science at the University of California-Berkeley (2009-)
- Undergraduate senior projects supervised:
    - Chenyang Lei, Sudarshan Muralidhar, Doron Shapiro, Michelle Socher (2015)
    - Constanza Figuerola, Samy Lanka, Utkarsh Shah, Max Tromanhauser (2015)
    - Charles Cobb, Meyer Kizner, Xiuro Zhang (2015)
    - Thomas Delacour, Sedam Fialor, John Weir (2015)
    - Eric Kim (2013).
    - Patrick Wingo, Aubrey Chase, Bill He, Daniel Ge, and Ryan Sasson (2013). Christian Cocking, James/Chang Im, *Connie Ho*, Jinyan Cao, Kenton Lee (2013)
    - Jin You, Hongda Ma, *Di Mu* (2013)
    - Perk Lun Lim, Albert Young Kwon, Alex Kaiyu Zhang, Yuchen "Martin" Pan (2013) – 1st prize for senior design project competition.
    - Stefan Zhelyazkov, David McDowell, Eric O'Brien (2013)
    - Jonathan Leung, Sean Welleck, Archit Budhraja, *Sung Won Hwang*, Bob Han (2013) - Honorable mention for senior design project competition.
    - *Sandy Sun* (2013)
    - Cheng Luo, Thanat Olwart (2012).
    - Samuel Appelbaum, Geoffroy Bablon, Mathew Vogel, Evan Mossop (2012) – Honorable mention for senior design project competition.
    - Greyson Gregory, Alex Marple, Vin Mannino (2012) – 3rd prize for senior design project competition.
    - Yash Saini, *Aditi Jain* (2011) – Honorable mention for senior design project competition.
    - *Sam Riggs,* Raymond Ko (2010)

- William Marczak (2009) – Senior project resulted in a SIGMOD 2010 publication.
- Andrew Quishi Mao, Dan Kefei Zhou (2009) – Senior project resulted in a NDSS 2010 publication.
- Mihai Oprea (2009) – 3rd prize for senior design project competition. Project directly contributed toward a SIGCOMM 2009 demonstration.

**Dissertations /Thesis Committees**

Chair of thesis committee:

- Bongho Kim (adviser: Insup Lee), 2015.
- Mingchen Zhao (adviser: Andreas Haeberlen), 2015
- Shaohui Wang (adviser: Insup Lee and Oleg Sokolsky), 2015.
- Arjun Ravi Narayan (advisor: Andreas Haeberlen), 2015.
- Jian Chang (advisor: Insup Lee and Sampath Kannan), 2013.
- Svilen Mihaylov (advisor: Zachary Ives), 2012.
- Adam Aviv (advisor: Jonathan M. Smith and Matt Blaze), 2012.
- Nicholas Taylor (advisor: Zachary Ives), 2010.
- Grigoris Karvounarakis (advisors: Zachary Ives and Val Tannen), 2009.

Member of PhD. thesis committee:

- Marie Jacob, 2012.
- Gaurav Shah (advisor: Matthew Blaze), 2009.
- Arvind Easwaran (advisors: Insup Lee and Oleg Sokolsky), 2008.

Member/chair of WPE-II committee:

- John Sonchack, 2014 (Chair)
- Yang Wu, 2014 (Chair)
- Nimit Singhania, 2014
- Mingchen Zhao, 2014 (Chair)
- Shaohui Wang, 2012.
- Zhuoyao Zhang, 2012.
- Jian Chang, 2011.
- Changbin Liu, 2009.
- Svilen Mihaylov, 2009 (Chair).
- Eric Cronin.2009.
- Rafi Rubin, 2009.
- Karl Mazurak, 2008.
- Nichoas Taylor, 2008. (Chair).
- Gaurav Shah, 2008.
- Aaron Bohannon, 2008.
- Micah Sherr, 2007.

Masters thesis supervision:

- Sanchit Aggrawal, 2013 (advisor)
- Dhruv Arya, 2013 (committee member)
- Yuankai Zhang, 2013 (advisor)
- Dong Lin, 2012 (advisor).

- Saravana Soundararajan, 2012 (advisor).
- Prakashkumar Thiagarajan (committee member).
- Sumanth Mysore Sathyanarayana, 2012 (committee member).
- Geetika Vasuedeo, 2011 (committee member).
- Ruchir Jha, 2010 (committee member).

**Teaching Experience**

- **CIS 800 – Software Defined Data Centers** (Fall 2015)
  - Graduate-level seminar class on Software-defined Networking, Network Functions Virtualization, and virtualization techniques for storage and compute.
  - Reviewed and discussed papers from networking and systems conferences.
  - Invited guest speakers from Brocade, Comcast, and Juniper Networks.

- **PREC 712.001 Introduction to Computer Science and Enterpreneurship** (Fall 2015, Fall 2014)
  - Preceptorial seminar to Penn engineering and Wharton business school students on computer science startups.
  - Educate undergraduates interested in doing startups on fund raising, go-to-market strategy, customer discovery, and lean startup development methodologies.

- **CIS 380 Operating Systems** (Fall 2013, Fall 2012, Fall 2011)
  - Core advanced undergraduate in operating systems
  - Highest course and instructor ratings in past three years (since CIS 381 was removed from curriculum)

- **CIS 505 Software Systems** (Spring 2016, Spring 2015, Spring 2011, Spring 2009, Spring 2008)
  - Core advanced undergraduate / masters level distributed systems course
  - Course and instruction ratings and enrollment are the highest since 2003.
  - Latest enrollment: 149 students (Spring 2016).
  - Highest enrollment and course evaluation among any CIS 505 instructor since 2004

- **CIS 553 / TCOM 512 Networked Systems** (Spring 2013, Spring 2012, Fall 2010, Fall 2009, Fall 2008, Fall 2007)
  - Advanced undergraduate / masters level networking course
  - Developed this course in Fall 2007
  - Highest rated and highest enrollment class in TCOM program

- **CIS 700/005 Networking meets Databases** (Spring 2007)
  - Research seminar on topics at the intersection of databases and networking.

- **CIS 800/003 Rigorous Internet Protocol Engineering** (Fall 2011)
  - Research seminar on topics at the intersection of formal methods and networking.

**Coursework Development**

- **CIS 800: Software-defined Data Centers.** Developed a new graduate level seminar on the building blocks behind Software-defined Data Centers, in particular, recent innovations in Software-defined Networking (SDN), Network Functions Virtualization (NFV), and virtualization technologies for storage and compute. This course includes paper readings, discussions, programming assignment, and a project. The final project will use open-source SDN/NFV platforms to develop software-based automation solutions for data centers. The reading list consists of research papers from networking and systems conferences. Invited speakers from industry (Brocade, Comcast, and Juniper Networks) will brainstorm practical use cases in the industry.

- **CIS 380. Operating Systems.** Required core class for our CIS undergraduates. Created a new project sequence based on *PennOS*, in which students develop a full-fledged operating systems in user-space. Paper describing PennOS has been published at the ACM SIGOPS Operating Systems Review (OSR) journal. The course/instructor ratings and enrollment are the highest in the past three years (since the CIS 381 lab component was removed).
  URL: http://www.cis.upenn.edu/~cis380/

- **CIS 505: Distributed software systems:** In Spring 2008, overhauled a required core course for advanced undergraduates and first-year graduate students. In addition to fundamentals in distributed computing, introduced contemporary topics that apply these fundamentals to large-scale data management in cloud computing platforms and data centers. For the final project, students work in teams to build a mail client/server based on the POP3 and SMTP RFC specifications, and then extend their implementations to enable fault tolerance and distribution. The project provides students with the experience of implementing systems from RFCs, and extending their implementations based on concepts they learnt in class. In Spring 2015, the projects have been evolved into a distributed chat server implementation. The head TA for the course received the outstanding teaching assistant award for 2008-2009.
  URL: http://www.cis.upenn.edu/~cis505/

- **CIS 553 / TCOM 512: Networked systems.** Started a new advanced undergraduate / graduate level networking course in Fall 2007, cross-listed between CIS and TCOM (part of our Electrical and Systems Engineering department). In this course, students work in teams to develop routing protocols and the Chord Distributed Hash Table which they have to demonstrate working on a cluster of machines, developed using the open-source network simulator 3 (ns-3). To provide students with the valuable experience of building a system after synthesizing the concepts from a publication, students develop the Chord protocol based on the Chord SIGCOMM paper. Moreover, the Chord DHT has to work as a layer above their own routing protocol implementation, and a p2p keyword search engine has to function as a layer above their Chord implementation. A paper describing PennSearch was presented at the SIGCOMM Education workshop. To the best of our knowledge, we are one of the first (in 2010) to attempt using the ns-3 platform for course projects that span network and application-layer protocols in a large class setting. The course enrollment has grown steadily, from 34 students in Spring 2008 since the course was started, to 107 in Spring 2012.

- **CIS 700: Networking-meets-Databases**. Created new course in Spring 2007 which introduces students to current research at the intersection of databases and networking. The class was attended by several doctoral students in diverse areas of networking, databases, and security. As indication of its success, in its first offering, papers that emerged from final

projects led by students have been published in security, peer-to-peer, networked data management, and mobile networking workshops, with a number of follow-up conference paper submissions.
URL: http://www.cis.upenn.edu/~boonloo/cis700-sp07/

- **CIS 800: Rigorous Internet Protocol Engineering.** Created a new course in Fall 2011 that introduces students to current research on the rigorous design, implementation, and analysis of network protocols. The topics covered in this course include formal mathematical models of Internet protocols, domain specific languages (declarative, functional, or logic-based) for specifying protocols with high-assurance, and verification techniques to prove correctness and security properties of protocols. Case studies are drawn traditional IP protocols, BGP policy configurations, secure BGP, transport protocols, application-layer overlay networks, and protocols developed using emerging platforms such as OpenFlow. Through these case studies, students acquire knowledge into formal modeling of protocols, and apply well-known verification techniques such as model checking and automated theorem proving into the analysis of network protocols.
  URL: http://netdb.cis.upenn.edu/cis800-fa11/

- **CIS 19X: Undergraduate mini-course series:** Administrator for the CIS department's popular mini-courses, a series of half-credit programming courses (C++, C#, Python, and Unix/Linux) offered to undergraduates. These courses each typically have an enrollment of 30 undergraduates, and have enjoyed good course/instructor reviews. The Unix/Linux course peaks at 90 students. The courses are taught once a week, and each lecture is conducted by graduate students. These mini-courses offer a win-win situation, where graduate students get to hone and cultivate their teaching skills, while undergraduates benefit immensely from practical skills obtained from these courses. Milestones from 2010-2012 include: (1) significant increase in enrollments, (2) new courses in Haskell, iPhone programming, and Ruby on Rails, (3) engaging part-time lecturers from entrepreneurs and technical professionals in Philadelphia, (4) offerings in Fall and Spring semester, as opposed to only in the Spring semester), (5) departmental awards for several mini-course instructors and undergraduate TAs.

**University Activities and Services**

- CIS Masters Chair (07/2015 - present)
  - Overseeing all masters programs within the CIS department, and Director of the Master of Science in Engineering in CIS program
  - Major achievements/initiatives to date:
    - Standardize masters thesis requirements across all CIS masters programs (CGGT, CIS, Embedded Systems, MCIT, Robotics)
    - Created social networks on Facebook and LinkedIn for existing CIS/MSE students.
    - Initiated the development of alumni database for CIS/MSE students for past 15 years as part of alumni outreach. Graduation gifts for CIS/MSE students as part of alumni outreach.
    - Started data-driven analytics initiative to optimize CIS/MSE admissions process on overseas university evaluation based on past admissions and GPA results of Masters students.
    - Started industrial talk series for CIS/MSE students

        - Created inaugural CIS Alumni panel, where 7 alums from 2007-2012 were invited to Penn to meet current students.
        - Chaired three-person CIS/MSE admissions committee to oversee masters students admissions (>1000 applicants).
- Faculty adviser to the Jerome Fisher M&T Innovation Fund that provide seed funding to Penn student-led startups (2015 -)
- Jerome Fisher M&T Director Search Committee (2015)
- Blue Sky committee (2015) – assembled by Dean Vijay Kumar to brainstorm on new initiatives in the School of Engineering and Applied Sciences.
- Lecturer search committee (2015)
- Systems faculty hiring committee (2015)
- Teaching and research faculty policy reevaluation committee (2015)
- University of Pennsylvania disciplinary hearing panel member (2014 - )
- Computer Engineering (CMPE) committee (2014 - )
- Mentor for the National University of Singapore (NUS) College in Bio Valley, an undergraduate work-study exchange program between Penn Engineering and NUS. The program promotes startups and entrepreneurship by getting undergraduates to experience first-hand on working in a startup while taking classes at Penn (2008 - 2013)
- Adviser for CIS masters and BSE undergraduates (2008 - )
- Number of academic advisees (from Advisor in Touch):
    - Spring 2016: 41 students
    - Fall 2015: 33 students
    - Spring 2015: 22 students
    - Fall 2014: 19 students
    - Spring 2014: 22 students
    - Fall 2013: 30 students
    - Spring 2013: 40 students
    - Fall 2012: 35 students.
    - Spring 2012: 37 students
    - Fall 2012: 43 students
    - Spring 2011: 45 students
    - Fall 2010: 39 students
    - Spring 2010: 33 students
    - Fall 2009: 37 students
    - Spring 2009: 22 students
    - Fall 2008: 24 students
    - Spring 2008: 9 students
    - Fall 2007: 8 students
- Organizer of the popular CIS mini-courses in C#, C++, Haskell, Python, Unix, iPhone, Ruby-on-Rails, etc. (Fall 2009 – Fall 2013)

**Press Coverage and Interviews**

- NJ Tech Weekly: "Juniper's OpenLab in Bridgewater Having Worldwide Impact " (07/22/15)
  http://www.njtechweekly.com/art/2734-junipers-openlab-in-bridgewater-having-worldwide-impact/

- Network Computing: "Lab Carries SDN-Based Software From Concept To Reality" (06/01/15) http://www.networkcomputing.com/networking/lab-carries-sdn-based-software-from-concept-to-reality/d/d-id/1320639

- The Daily Pennsylvanian article (04/07/2015): "Faculty startup raises $100K". http://www.thedp.com/article/2015/04/gencore-raised-100000-cloud

- City of Philadelphia press release (03/27/2015): "Mayor Nutter announces Startup PHL Angel Fund Investment in Gencore Systems". https://cityofphiladelphia.wordpress.com/2015/03/27/mayor-nutter-announces-startup-phl-angel-fund-investment-in-gencore-systems/

- Philadelphia Business Journal (03/26/2015): "Penn startup raises $100K from Startup PHL Angel Fund". http://www.bizjournals.com/philadelphia/news/2015/03/26/penn-faculty-startup-raises-100k-from-startup-phl.html

- Technical.ly (Philly) article: "Penn startup raises $100K from city's Startup PHL fund". http://technical.ly/philly/2015/03/27/startup-phl-gencore-systems/

- The Daily Pennsylvanian (07/28/2014): "Penn researchers develop technology to improve computer networks. http://www.thedp.com/article/2014/07/gencore-computer-science-efficiency

- Technical.ly (Philly) article (Nov 6, 2013): "Meet one of the first faculty startups from Penn's Comp. Sci. department" https://technical.ly/philly/2013/11/06/comp-sci-penn-startup-gencore-systems

- Juniper networks press release (Sept 16, 2013): Juniper Networks launches production-ready Software-defined Networking Solution to Bring Networking into Cloud Era". http://www.marketwatch.com/story/juniper-networks-launches-production-ready-software-definednetworking-solution-to-bring-networking-into-the-cloud-era-2013-09-16

- Press releases on NSF Expeditions on Program Synthesis (Apr 3, 2013): "Penn to Lead $10 Million Project on Computer-assisted Programming" http://www.upenn.edu/pennnews/news/penn-lead-10-million-project-computer-assisted-programming

- Press release on Air Force Office of Scientific Research (AFOSR) Young Investigator Program (11 Jan 2012): "AFOSR awards grants to 48 scientists and engineers through its Young Investigator Research Program" http://www.eurekalert.org/pub_releases/2012-01/afoo-aag011112.php

**Professional Activities**

Highlighted Activities:

- **Program co-chair**, 1st International Workshop on Rigorous Protocol Engineering (WRiPE), co-located with ICNP 2011.

- **Local arrangements chair**, 6th International Conference on emerging Networking EXperiments and Technologies (CoNEXT), 2010
- **Program co-chair**, 5th International Workshop on Networking meets Databases (NetDB), co-located with SOSP, 2009.
- **Program co-chair**, 4th International Conference on emerging Networking EXperiments and Technologies (CoNEXT) Student Workshop, 2008
- **Steering committee**, International Workshop on Networking-meets-Databases (NetDB).
- 17th Privacy Enhancing Technologies Symposium (PETS), 2017.
- USENIX Symposium on Networked Systems Design and Implementation (NSDI), 2017.
- Milken-Penn GSE Education Business Plan Competition, 2016.
- Workshop on Hot Topics in Middleboxes and Network Function Virtualization (HotMiddlebox), co-located with SIGCOMM, 2016.
- Program Committee, Symposium on SDN Research (SOSR), 2016.
- Program Committee, Symposium on Operating Systems Design and Implementation (OSDI), 2016.
- Program Committee, Database Systems for Advanced Applications (DASFAA), 2014.
- Program Committee, Usenix Annual Technical Conference (ATC), 2013.
- Program Committee, 27th International Conference on Logic Programming (ICLP), 2012.
- Program Committee, WWW (Data and Content management track), 2012.
- Program Committee, ACM SIGMOD, 2011, 2012 (demo).
- External Program Committee, ACM Symposium on Principle of Database Systems (PODS), 2012.
- Program Committee, ACM SIGMOD Dissertation Award, 2010.
- Program Committee, 34th Conference on Very Large Databases (VLDB), 2007, 2008, 2009, 2010, 2012, 2013.
- Program Committee, 25th International Conference on Data Engineering (ICDE), 2009, 2010, 2012.
- Program Committee, 2nd ACM Symposium on Cloud Computing (SOCC), 2011.
- Program Committee, 4th Biennial Conference on Innovative Data Systems Research (CIDR), 2009, 2011.
- Program Committee, Conference on Computer Communications (IEEE INFOCOM), 2009.
- Program Committee, ACM International Conference on emerging Networking EXperiments and Technologies (ACM CoNEXT), 2009.
- Program Committee, International Conference on Distributed Computing Systems (ICDCS) Operating Systems and Middleware track, 2007.

Other Activities:

- Program Committee, SIGMOD/PODS PhD Workshop, 2012.
- Program Committee, Datalog 2.0 workshop, 2012.
- Program Committee, Usenix Workshop on Hot Topics in Management of Internet, Cloud, and Enterprise Networks and Services (Hot-ICE), 2012.
- Program Committee, Off the Beaten Track (OBT): Underrepresented Problems for Programming Language Researchers (co-located with POPL), 2012.
- Member, DARPA Information Science and Technology Study Group (ISAT) on Programming Functional Networks, 2012.
- Member, DARPA Information Science and Technology Study Group (ISAT) on Programming Program Synthesis, 2011.

- Program Committee, Workshop on Programmable Routers for Extensible Services of Tomorrow (PRESTO), 2010.
- Program Committee, IEEE International Symposium on Policies for Distributed Systems and Networks (POLICY), 2010.
- Program Committee, 6th International Workshop on P2P Systems (IPTPS), 2007, 2009, 2010.
- Program Committee, 3rd International Workshop on Networking meets Databases (NetDB), 2007, 2008.
- Program Committee, 2nd SIGMOD PhD Workshop on Innovative Database Research (IDAR) 2008.
- Program Committee, VLDB PhD Workshop, 2008
- Program Committee, 9th International Workshop on Web Information and Data Management (WIDM), 2007.
- NSF grant panelist, 2007 (1 panel), 2010 (1 panel), 2014 (4 panels), 2015 (6 panels).
- Member, DARPA Information Science and Technology Study Group (ISAT) on Engineering Ensemble Effects, 2007.
- GENI project office proposal reviewer, 2008.
- Journal Reviewer, VLDB Journal, ACM Transactions of Programming Languages and Systems (TPLS), ACM Transactions of Parallel and Distributed Databases (TPDS), IEEE/ACM Transactions on Networking (ToN), International Journal for Information Technology (IJIT), IEEE Transactions on Knowledge and Data Engineering (TKDE), ACM Transaction of Computer Systems (TOCS), Distributed and Parallel Databases (Springer), ACM Transactions on Databases Systems (TODS)

**Invited Keynotes**

- **A Declarative Perspective on Programmable Networking.** Invited keynote speaker at the Workshop on Software Defined Networking (SDN), co-located with the IEEE International Conference on Communications (ICC), 2012.
- **Recent Advances in Declarative Networking.** Invited keynote speaker at the 14th International Symposium on Practical Aspects of Declarative Languages (PADL), co-located with ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages, Jan 2012.
- **Declarative Policy-based Networking.** Invited keynote speaker at the IEEE International Symposium on Policies for Distributed Systems and Networks (POLICY), Jul 2010.

**Invited Seminars**

- **Cloud: What's Next?**
  Wharton Technology Conference (panel moderator), Nov 2015.
- **Scenario-based Programming for SDN Policies.**
  Open Networking User Group (ONUG), Nov 2015.
- **Declarative Cloud Performance Analytics.**
  2015 Informs Annual Meeting -- Big Data in the Cloud Track, Nov 2015.
- **Declarative Network Programming: Implementation, Verification and Synthesis.**
  University of Pennsylvania ESE Colloquia, Sept 2015.
- **Automated Analysis and Actuation for Software Defined Infrastructure.**
  Software Defined Networking Symposium for Defense and National Security, Dec 2014.

- **Data Center, Co-location, Hosted Solutions - What is Best for my Business?**
  NJTC Data Summit and Expo (panel moderator), Dec 2014.
- **Faculty Start-Up Companies.**
  Penn Center for Innovation (PCI) Seminar, Nov 2014.
- **Declarative Networking.**
  Nanyang Technological University (NTU), Aug 2014.
- **Building a Start-Up in a Marketplace Ripe For Disruption.**
  National University of Singapore, Aug 2014.
- **Perspectives on University Technology Transfer.**
  National University of Singapore iLEAD guest lecture (held at the University of Pennsylvania), Jul 2014.
- **Declarative Networking.**
  Air Force Research Laboratory, Jul 2014.
  AFOSR Young Investigator Meeting, Jun 2014.
- **Innovation Process and Core Methodology.**
  Comcast Innovation Summit, Sept 2013.
- **Automated Formal Analysis of Internet Routing Configurations.**
  National University of Singapore, 2013.
- **Declarative Networking.** Harvard University, Fall 2012 (Invited).
- **Declarative Constraint Optimizations in Distributed Systems**. New England Database Society, Sept 2012.
- **Declarative Networking.** Temple University, Sept 2012.
- **Declarative Networking.** Nanyang Technological University (NTU), Aug 2012.
- **Declarative Networking.** Singapore University of Technology and Design (SUTD), Aug 2012.
- **Declarative Constraint Optimizations in Distributed Systems**. National University of Singapore, Aug 2012.
- **Declarative Constraint Optimizations in Distributed Systems.** University of California Davis, May 2012
- **Declarative Distributed Constraint Optimization Platform.** Cornell University, Apr 2012.
- **Evolving the Internet with Declarative Networking.** Carnegie Mellon University, Feb 2012.
- **Evolving the Internet with Declarative Networking.** University of Washington-Seattle, Oct 2011.
- **Evolving the Internet with Declarative Networking.** University of California Berkeley, Sept 2011.
- **Evolving the Internet with Declarative Networking.** Rutgers University, Sept 2011.
- **Declarative Secure Distributed Systems.** Singapore Management University, Jul 2011.
- **Declarative Networking: Present and Future.** National University of Singapore, Jul 2011.
- **Secure Time-aware Provenance for Distributed Systems.** Advanced Digital Sciences Center, Singapore, Jun 2011.
- **Declarative Networking: Present and Future.** Advanced Digital Sciences Center, Singapore, Jun 2011.
- **Declarative Secure Distributed Systems.** University of California San Diego Database Seminar, Dec 2010.
- **Declarative Policy-based Networking.** NEC Labs Princeton, Aug 2010.
- **Declarative Policy-based Networking.** Keynote speaker at IEEE POLICY, Jul 2010,
- **Declarative Networking**. Lockheed Martin Advanced Technologies Laboratory (ATL), Apr 2010.

- **Declarative Secure Distributed Systems.** Stanford University, Security seminar, March 2010.
- **Declarative Techniques for Secure Network Routing.** DIMACS Workshop on Secure Routing, Rutgers University, March 2010.
- **Declarative Networking**. Telcordia Technologies, Mar 2010.
- **Datalog and Its Application to Network Routing Design.** Princeton University Research Seminar on *Formal Methods in Networking*, Feb 2010.
- **DS2: Declarative Secure Distributed Systems.** University of California-Berkeley Database Seminar, Dec 2009.
- **Applying PL and Database Techniques to Networking.** DIMACS Workshop on Designing Networks for Manageability, Rutgers University, Nov 2009.
- **DS2: Declarative Secure Distributed Systems.** University of Waterloo Database seminar, June 2009.
- **Declarative DSL: A Declarative Networking Perspective.** Panelist, ICDE 2008 panel on Declarative domain-specific languages.
- **Boon Thau Loo Speaks Out.** ACM SIGMOD Record (Sept 2007 edition)
- **The Design and Implementation of Declarative Networks.** AT&T Labs Research, New Jersey, Jul 2007.
- **The Design and Implementation of Declarative Networks.** National University of Singapore, June 2007.
- **The Design and Implementation of Declarative Networks.** ACM SIGMOD dissertation award presentation, Beijing, China, Jun 2007.
- **The Design and Implementation of Declarative Networks.** AT&T Labs Research, New Jersey, Jul 2007. BBN Technologies, Boston, Apr 2007.
- **Declarative Networking: Extensible Networks with Declarative Queries**. UC Santa Cruz Database Seminar, June 2006.
- **Declarative Networking: Extensible Networks with Declarative Queries**. Academic Job Talk, [Yale University, California Institute of Technology, University of Pennsylvania, University of Toronto, IBM Almaden, Cornell University, Microsoft Research Silicon Valley, Duke University, University of Texas-Austin, ETH Zurich, University of Michigan-Ann Arbor, University of California at Los Angeles], Feb-Apr 2006

**Selected Awards and Honors**

- One of 5 papers nominated for the best paper award at ACM CoNEXT 2015.
- Selected best papers of the 22nd ACM High Performance and Distributed Computing (HPDC), 2013.
- Best student paper award, 9th ACM International Conference on Autonomic Computing (ICAC), 2012.
- Air Force Office of Scientific Research (AFOSR) Young Investigator Program (YIP) award, 2012.
- Honorable mention for best demonstration competition in SIGMOD 2009.
- Selected best papers of the 25th International Conference on Data Engineering (ICDE), 2009
- NSF's Faculty Early Career Development (CAREER) Award, 2009
- ACM SIGMOD Dissertation Award, 2007.
- UC Berkeley David J. Sakrison Award made annually to a graduate student who has completed what is deemed by a faculty committee to be a truly outstanding piece of research. (2006)

- Computing Research Association (CRA) Outstanding Undergraduate Awards (Honorable mention), 1999.

**Books**

- **Datalog and Recursive Query Processing.**
  Todd J. Green, Shan Shan Huang, Boon Thau Loo, and Wenchao Zhou.
  Foundations and Trends in Databases, Nov, 2013.

- **Declarative Networking.**
  Boon Thau Loo, and Wenchao Zhou.
  Morgan & Claypool's Synthesis Lectures on Data Management, 2012.

**Journal Publications**

- **Scalable and Anonymous Group Communication with MTor**
  Dong Lin, Micah Sherr, and Boon Thau Loo.
  Proceedings on Privacy Enhancing Technologies (PoPETS), 2016

- **A Program Logic for Verifying Secure Routing Protocols.**
  Chen Chen, Limin Jia, Hao Xu, Cheng Luo, Wenchao Zhou, and Boon Thau Loo.
  Logical Methods in Computer Science Journal, 2015.

- **Exploiting Cloud Heterogeneity to Optimize Performance and Cost of MapReduce Processing.**
  Zhuoyao Zhang, Lucy Cherkasova, and Boon Thau Loo.
  ACM SIGMETRICS Performance Evaluation Review, (PER), Special Issue on Performance and Resource Management in Big Data Applications, March, 2015, Pages 38-50.

- **Private and Verifiable Interdomain Routing Decisions.**
  Mingchen Zhao, Wenchao Zhou, Alexander J. T. Gurney, Andreas Haeberlen, Micah Sherr, and Boon Thau Loo
  IEEE/ACM Transactions on Networking (ToN), 2014, Pages 383-394.

- **A Brief Overview of the NEBULA Future Internet Architecture**.
  The Nebula FIA team.
  ACM SIGCOMM Computer Communication Review, 2014, Pages 81-86.

- **Declarative Platform for High-Performance Network Traffic Analytics.**
  Harjot Gill, Dong Lin, Cam Nguyen, Tanveer Gill, and Boon Thau Loo.
  Cluster Computing journal, 2014, Pages 1121-1137.
  *Special Issue on selected best papers of HPDC 2013.*

- **Parameterizable Benchmarking Framework for Designing a MapReduce Performance Model.**
  Zhuoyao Zhang, Ludmila Cherkasova, and Boon Thau Loo.
  Concurrency and Computation: Practice and Experience journal, 2014, Pages 2005-2026. ICPE 2013 special issue.

- **PUMA: Policy-based Unified Multi-radio Architecture for Agile Mesh Networking.**
  Changbin Liu, Ricardo Correa, Harjot Gill, Tanveer Gill, Xiaozhou Li, Shivkumar Muthukumar, Taher Saeed, Boon Thau Loo, and Prithwish Basu.
  IEEE/ACM Transactions on Networking (ToN), 2013, Pages 1897-1910,

- **The Design and Implementation of the A3 Application-Aware Anonymity Platform.**
  Micah Sherr, Harjot Gill, Taher Aquil Saeed, Andrew Mao, William R. Marczak, Saravana Soundararajan, Wenchao Zhou, Boon Thau Loo, and Matt Blaze.
  Computer Networks (COMNET), Elsevier Publishing, 2013, Pages 206-227.

- **Performance Modeling and Optimization of Deadline-Driven Pig Programs.**
  Zhuoyao Zhang, Ludmila Cherkasova, and Boon Thau Loo.
  ACM Transactions on Autonomous and Adaptive Systems (TAAS), 2013.
  *Journal version of ACM ICAC'12 best student paper award.*

- **The NEBULA Future Internet Architecture.**
  The NSF NEBULA FIA Team.
  The Future Internet, Springer Berlin Heidelberg publisher, 2013.

- **Declarative Secure Distributed Information Systems.**
  Wenchao Zhou, Tao Tao, Boon Thau Loo, and Yun Mao
  Computer Languages, Systems & Structures (COMLAN), Elsevier Publishing, 2012, Pages 1-24.

- **Experiences in Teaching an Educational User-Level Operating Systems Implementation Project**.
  Adam J. Aviv, Vin Mannino, Thanat Owlarn, Seth Shannin, Kevin Xu, and Boon Thau Loo
  Operating Systems Review (OSR) journal, 2012, Pages 80-86.

- **AS-CRED: Reputation and Alert Service for Inter-domain Routing.**
  Jian Chang, Krishna Venkatasubramanian, Andrew West, Sampath Kannan, Insup Lee, Boon Thau Loo, and Oleg Sokolsky.
  IEEE Systems Journal (Special Issue on Security and Privacy of Complex Systems), 2012.

- **Maintaining Distributed Logic Programs Incrementally.**
  Vivek Nigam, Limin Jia, Boon Thau Loo and Andre Scedrov.
  Computer Languages, Systems & Structures (COMLAN), Elsevier Publishing, 2012, Pages 158-180.

- **MOSAIC: Declarative Platform for Dynamic Overlay Composition.**
  Yun Mao, Boon Thau Loo, Zachary Ives and Jonathan M. Smith
  Computer Networks (COMNET), Elseiver Publishing, Pages 64-84, 2012.

- **FSR: Formal Analysis a Implementation Toolkit for Safe Inter-domain Routing**
  Anduo Wang, Limin Jia, Wenchao Zhou, Yiqing Ren, Boon Thau Loo, Jennifer Rexford, Vivek Nigam, Andre Scedrov, Carolyn L. Talcott.
  IEEE/ACM Transactions on Networking (ToN), 2012.

- **Declarative Policy-based Adaptive Mobile Ad Hoc Networking.**
  Changbin Liu, Ricardo Correa, Xiaozhou Li, Prithwish Basu, Boon Thau Loo, Yun Mao.
  IEEE/ACM Transactions on Networking (ToN), 2012, Pages 770-783.

- **SmartCIS: Integrating Digital and Physical.**
  Mengmeng Liu, Svilen R. Mihaylov, Zhuowei Bao, Marie Jacob, Zachary G. Ives, Boon Thau Loo, and Sudipto Guha.
  ACM SIGMOD Record, Mar 2010. Pages 48-53.

- **5th International Workshop on Networking Meets Databases (NetDB 2009)**
  Boon Thau Loo, and Stefan Saroiu
  ACM SIGMOD Record and the ACM Operating Systems Review (OSR), Dec 2009.

- **Declarative Networking**
  Boon Thau Loo, Tyson Condie, Minos Garofalakis, David E. Gay, Joseph M. Hellerstein, Petros Maniatis, Raghu Ramakrishnan, Timothy Roscoe, Ion Stoica
  Communications of the ACM, 2009. Pages 87-95.

- **Maintaining Recursive Views of Regions and Connectivity in Networks**
  Mengmeng Liu, Nicholas E. Taylor, Wenchao Zhou, Zachary Ives, and Boon Thau Loo.
  IEEE Transactions of Knowledge and Data Engineering (TKDE) Journal, 2009. Pages 1126-1141.
  *Special Issue on Best papers of the 25th International Conference on Data Engineering (ICDE), 2009*

**Invited articles/papers**

- **Enhancing University Technology Transfer through Juniper's Openlab.**
  Boon Thau Loo. Juniper Networks Partner Watch article, 2015.

- **University Spinoff's Take on SDN.**
  Boon Thau Loo, Open Networking Foundation (ONF) invited article, 2012.

- **Toward Automated Analysis and Actuation for Software Defined Infrastructure.**
  Boon Thau Loo. SDN Central Invited article, 2014.

- **Implementing Network Protocols as Distributed Logic Programs.**
  Boon Thau Loo.
  Association of Logic Programming (ALP) Newsletter, Mar 2012.

- **Recent Advances in Declarative Networking**.
  Boon Thau Loo, Harjot Gill, Changbin Liu, Yun Mao, William R. Marczak, Micah Sherr, Anduo
  Wang, and Wenchao Zhou.
  Fourteenth International Symposium on Practical Aspects of Declarative Languages (PADL), co-located with POPL, Pages 1-16, Jan 2012. *(invited paper and keynote speech)*

**Conference and Highly Selective Workshop Publications**
***Google Scholar citations count 5046 (total), 2670 (since 2010)***

- **Network Functions Virtualization with Soft Real-Time Guarantees**
  Yang Li, Linh T.X. Phan, and Boon Thau Loo.
  IEEE International Conference on Computer Communications (INFOCOM), 2016

*[18.25% acceptance]*

- **Scenario-based Programming for SDN Policies.**
  Yifei Yuan, Dong Lin, Rajeev Alur, and Boon Thau Loo.
  11th Conference on emerging Networking EXperiments and Technologies (ACM CoNEXT), Heidelberg, Germany, Dec 2015. ***[20.9% acceptance]***

- **Differential Provenance: Better Network Diagnostics with Reference Events.**
  Ang Chen, Yang Wu, Andreas Haeberlen, Wenchao Zhou, and Boon Thau Loo.
  14th ACM Workshop on Hot Topics in Networks (HotNets), 2015. ***[18.6% acceptance]***

- **Automated Network Repair with Meta Provenance.**
  Yang Wu, Ang Chen, Andreas Haeberlen, Wenchao Zhou, and Boon Thau Loo.
  14th ACM Workshop on Hot Topics in Networks (HotNets), 2015. ***[18.6% acceptance]***

- **Automated Verification of Safety Properties in Declarative Networking Programs.**
  Chen Chen, Lay Kuan Loh, Limin Jia, Wenchao Zhou, and Boon Thau Loo.
  17th International ACM SIGPLAN Symposium on Principles and Practice of Declarative Programming (PPDP), July, 2015.

- **A Scalable Multi-Datacenter Layer-2 Network Architecture.**
  Chen Chen, Changbin Liu, Pingkai Liu, Boon Thau Loo, and Ling Ding.
  Symposium on SDN Research (SOSR), 2015. ***[19.7% acceptance]***

- **NetEgg: Programming Network Policies by Examples.**
  Yifei Yuan, Rajeev Alur, and Boon Thau Loo.
  13th ACM Workshop on Hot Topics in Networks (HotNets-XIV), 2014. ***[22.0% acceptance]***

- **Deconstructing MPTCP Performance.**
  Behnaz Arzani, Alexander Gurney, Sitian Cheng, Roch Guerin, and Boon Thau Loo.
  22nd IEEE International Conference on Network Protocols (ICNP), 2014. (short paper) .
  ***[19.0% acceptance]***

- **Diagnosing Missing Events in Distributed Systems with Negative Provenance.**
  Yang Wu, Mingchen Zhao, Andreas Haeberlen, Wenchao Zhou, and Boon Thau Loo.
  ACM SIGCOMM Conference on Data Communication, 2014. ***[19.0% acceptance]***

- **A Program Logic for Verifying Secure Routing Protocols.**
  Chen Chen, Limin Jia, Hao Xu, Cheng Luo, Wenchao Zhou and Boon Thau Loo.
  34th IFIP International Conference on Formal Techniques for Distributed Objects, Components and Systems (FORTE), 2014. ***[36.0% acceptance]***

- **Optimizing Cost and Performance Trade-Offs for MapReduce Job Processing in the Cloud.**
  Zhuoyao Zhang, Ludmila Cherkasova, and Boon Thau Loo.
  IFIP/IEEE Network Operations and Management Symposium (NOMS 2014).
  ***[29.0% acceptance]***

- **A Reduction-based Approach Towards Scaling Up Formal Analysis of Internet Configurations.**

Anduo Wang, Alexander Gurney, Xianglong Han, Jinyan Cao, Boon Thau Loo, Carolyn Talcott, and Andre Scedrov.
33rd Annual IEEE International Conference on Computer Communications (INFOCOM), 2014. ***[19.4% acceptance]***

- **Answering Why-Not Queries in Software-Defined Networks with Negative Provenance.**
  Yang Wu, Andreas Haeberlen, Wenchao Zhou, and Boon Thau Loo.
  Twelfth ACM Workshop on Hot Topics in Networks (HotNets-XII), 2013.
  ***[23.6% acceptance]***

- **On the Feasibility of Automation for Bandwidth Allocation Problems in Data Centers.**
  Yifei Yuan, Anduo Wang, Rajeev Alur, and Boon Thau Loo.
  Formal Methods in Computer-Aided Design (FMCAD), 2013.

- **Distributed Time-aware Provenance.**
  Wenchao Zhou, Suyog Mapara, Yiqing Ren, Yang Li, Andreas Haeberlen, Zachary Ives, Boon Thau Loo, and Micah Sherr.
  39th International Conference on Very Large Databases (VLDB), Aug 2013.
  ***[13.2% acceptance]***

- **AutoTune: Optimizing Execution Concurrency and Resource Usage in MapReduce Workflows.**
  Zhuoyao Zhang, Ludmila Cherkasova, and Boon Thau Loo.
  9th ACM International Conference on Autonomic Computing (ICAC) Management of Big Data Systems (MBDS) track, June 2013. ***[21.9% acceptance]***

- **Performance Modeling of MapReduce Jobs in Heterogeneous Environments.**
  Zhuoyao Zhang, Ludmila Cherkasova, and Boon Thau Loo.
  IEEE 6th International Conference on Cloud Computing (CLOUD), June, 2013.
  ***[25.0% acceptance]***

- **Scalanytics: A Declarative Multi-core Platform for Scalable Composable Traffic Analytics.**
  Harjot Gill, Dong Lin, Xianglong Han, Cam Nguyen, Tanveer Gill, and Boon Thau Loo.
  22nd International ACM Symposium on High Performance and Distributed Computing (HPDC), June, 2013. ***[15.3% acceptance]***

- **Benchmarking Approach for Designing a MapReduce Performance Model.**
  Zhuoyao Zhang, Ludmila Cherkasova, and Boon Thau Loo.
  4th ACM/SPEC International Conference on Performance Engineering (ICPE), Apr 2013.

- **Automated Profiling and Resource Management of Pig Programs for Meeting Service Level Objectives.**
  Zhuoyao Zhang, Ludmila Cherkasova, Abhishek Verma, and Boon Thau Loo.
  IEEE/ACM International Conference on Autonomic Computing (ICAC), 2012.
  ***[24.2% acceptance]***

- **Private and Verifiable Interdomain Routing Decisions.**
  Mingchen Zhao, Wenchao Zhou, Alexander J.T. Gurney, Andreas Haeberlen, Micah Sherr, and Boon Thau Loo

ACM SIGCOMM Conference on Data Communication (SIGCOMM). Pages 383-394, Aug 2012. ***[13.6% acceptance]***

- **Cologne: A Declarative Distributed Constraint Optimization Platform.**
  Changbin Liu, Lu Ren, Boon Thau Loo, Yun Mao, and Prithwish Basu.
  38th International Conference on Very Large Databases (VLDB), Pages 752-763, Aug 2012.

- **A Calculus of Policy-Based Routing Systems.**
  Anduo Wang, Carolyn Talcott, Alexander J.T Gurney, Boon Thau Loo and Andre Scedrov
  31st Annual ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (PODC), Pages 343-344, July 2012. (Brief announcement)

- **TROPIC: Transactional Resource Orchestration Platform In the Cloud.**
  Changbin Liu, Yun Mao, Xu Chen, Mary F. Fernández, Boon Thau Loo, and Jacobus E. Van der Merwe.
  USENIX Annual Technical Conference (USENIX ATC), June, 2012. ***[18.4% acceptance]***

- **Reduction-based Formal Analysis of BGP Instances**.
  Anduo Wang, Carolyn Talcott, Alexander J.T. Gurney, Boon Thau Loo and Andre Scedrov.
  18th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), Mar 2012. ***[24.5% acceptance]***

- **PUMA: Policy-based Unified Multi-radio Architecture for Agile Mesh Networking**.
  Changbin Liu, Ricardo Correa, Harjot Gill, Tanveer Gill, Xiaozhou Li, Shivkumar Muthukumar, Taher Saeed, Boon Thau Loo, and Prithwish Basu.
  4th International Conference on Communication Systems and Networks (COMSNETS), Pages 1-10, Jan 2012. ***[27% acceptance]***

- **Having your Cake and Eating it too: Routing Security with Privacy Protections.**
  Alexander J. T. Gurney, Andreas Haeberlen, Wenchao Zhou, Micah Sherr, and Boon Thau Loo
  10th ACM Workshop on Hot Topics in Networks (HotNets-X), Cambridge, MA, November 2011. ***[20.2% acceptance]***

- **Secure Network Provenance.**
  Wenchao Zhou, Qiong Fei, Arjun Narayan, Andreas Haeberlen, Boon Thau Loo, and Micah Sherr.
  23rd ACM Symposium on Operating Systems Principles (SOSP), Cascais, Portugal, Pages 295-310, October 2011. ***[18.4% acceptance]***

- **PUMA: Policy-based Unified Multi-radio Architecture for Agile Mesh Networking**
  Changbin Liu, Ricardo Correa, Harjot Gill, Tanveer Gill, Xiaozhou Li, Shivkumar Muthukumar, Taher Saeed, Boon Thau Loo, and Prithwish Basu.
  4th International Conference on Communication Systems and Networks (COMSNETS), Jan 2012. ***[27% acceptance]***

- **Declarative Automated Cloud Resource Orchestration**
  Changbin Liu, Boon Thau Loo, Yun Mao.
  2nd ACM Symposium on Cloud Computing (SoCC), 2011. ***[16.9% acceptance]***

- **Efficient Querying and Maintenance of Network Provenance at Internet-Scale**

Wenchao Zhou, Micah Sherr, Tao Tao, Xiaozhou Li, Boon Thau Loo, and Yun Mao
ACM SIGMOD International Conference on Management of Data, June 2010. Pages 615-626. ***[20.8% acceptance]***

- **SecureBlox: Customizable Secure Distributed Data Processing**
  William R. Marczak, Shan Shan Huang, Martin Bravenboer, Micah Sherr, Boon Thau Loo, and Molham Aref.
  ACM SIGMOD International Conference on Management of Data, June 2010. Pages 723-734. ***[20.8% acceptance]***

- **A3: An Extensible Platform for Application-Aware Anonymity.**
  Micah Sherr, Andrew Mao, William R. Marczak, Wenchao Zhou and Boon Thau Loo.
  17th Annual Network & Distributed System Security Symposium (NDSS), Feb 2010. ***[15.4% acceptance]***

- **Formally Verifiable Networking.**
  Anduo Wang, Limin Jia, Changbin Liu, Boon Thau Loo, Oleg Sokolsky, and Prithwish Basu.
  8th Workshop on Hot Topics in Networks (ACM SIGCOMM HotNets-VIII), New York, Oct 2009. ***[16.0% acceptance]***

- **Declarative Policy-based Adaptive MANET Routing.**
  Changbin Liu, Richardo Correa, Xiaozhou Li, Prithwish Basu, Boon Thau Loo, and Yun Mao.
  17th IEEE International Conference on Network Protocols (ICNP 2009), Princeton, New Jersey, Oct, 2009. Pages 354-363. ***[18.3% acceptance]***

- **Scalable Link-Based Relay Selection for Anonymous Routing.**
  Micah Sherr, Matt Blaze, and Boon Thau Loo.
  9th Privacy Enhancing Technologies Symposium (PETS), Seattle, WA, Aug 2009. Pages 73-93. ***[31.8% acceptance]***

- **Veracity: Practical Secure Network Coordinates via Vote-based Agreements.**
  Micah Sherr, Matt Blaze, and Boon Thau Loo.
  USENIX Annual Technical Conference (USENIX ATC), San Diego, CA, June 2009. ***[16.8% acceptance]***

- **Recursive Computation of Regions and Connectivity in Networks.**
  Mengmeng Liu, Nicholas E. Taylor, Wenchao Zhou, Zachary Ives, and Boon Thau Loo.
  25th International Conference on Data Engineering (ICDE), Shanghai, China, Apr 2009. Pages 1108-1119. ***[16.8% acceptance]***

- **Unified Declarative Platform for Secure Networked Information Systems.**
  Wenchao Zhou, Yun Mao, Boon Thau Loo, and Martín Abadi.
  25th International Conference on Data Engineering (ICDE), Shanghai, China, Apr 2009. Pages 150-161. ***[16.8% acceptance]***

- **Declarative Reconfigurable Trust Management.**
  William R. Marczak, David Zook, Wenchao Zhou, Molham Aref, and Boon Thau Loo.
  4th Biennial Conference on Innovative Data Systems Research (CIDR) Proceedings Track, Pacific Grove, CA, Jan 2009. ***[27.1% acceptance]***

- **MOSAIC: Unified Declarative Platform for Dynamic Overlay Composition.**
  Yun Mao, Boon Thau Loo, Zachary Ives and Jonathan M. Smith
  4th Conference on emerging Networking EXperiments and Technologies (ACM CoNEXT), Madrid, Spain, Dec 2008. ***[17.5% acceptance]***

- **Towards Application-Aware Anonymous Routing**.
  Micah Sherr, Boon Thau Loo, and Matt Blaze
  2nd USENIX Workshop on Hot Topics in Security (HotSec), in conjunction with USENIX Security Symposium, Boston, MA, Aug 2007. ***[33.3% acceptance]***

- **The Case for a Unified Extensible Data-centric Mobility Infrastructure**.
  Yun Mao, Boon Thau Loo, Zachary Ives, and Jonathan M. Smith.
  2nd ACM International Workshop on Mobility in the Evolving Internet Architecture (MobiArch), in conjunction with SIGCOMM, Kyoto, Japan, Aug 2007. ***[23.4% acceptance]***

- **Declarative Networking: Language, Execution and Optimization**
  Boon Thau Loo, Tyson Condie, Minos Garofalakis, David E. Gay, Joseph M. Hellerstein, Petros Maniatis, Raghu Ramakrishnan, Timothy Roscoe, Ion Stoica
  ACM SIGMOD International Conference on Management of Data, Chicago, June 2006, Pages 97-108. ***[13% acceptance]***

- **Implementing Declarative Overlays.**
  Boon Thau Loo, Tyson Condie, Joseph M. Hellerstein, Petros Maniatis, Timothy Roscoe, Ion Stoica.
  20th ACM Symposium on Operating Systems Principles (SOSP), October 2005. Pages 75-90
  ***[13% acceptance]***

- **Declarative Routing: Extensible Routing with Declarative Queries.**
  Boon Thau Loo, Joseph M. Hellerstein, Ion Stoica, Raghu Ramakrishnan.
  ACM SIGCOMM Conference on Data Communication, Aug 2005. Pages 289-300
  ***[9% acceptance]***

- **The Architecture of PIER: an Internet-Scale Query Processor.**
  Ryan Huebsch, Brent Chun, Joseph M. Hellerstein, Boon Thau Loo, Petros Maniatis, Timothy Roscoe, Scott Shenker, Ion Stoica, Aydan R. Yumerefendi.
  2nd Biennial Conference on Innovative Data Systems Research (CIDR), Jan 2005. Pages 28-43.

- **Enhancing P2P File-Sharing with an Internet-Scale Query Processor.**
  Boon Thau Loo, Joseph M. Hellerstein, Ryan Huebsch, Scott Shenker, Ion Stoica.
  30th International Conference on Very Large Databases (VLDB), Sep 2004. Pages 432-443
  ***[16% acceptance]***

- **The Case for a Hybrid P2P Search Infrastructure.**
  Boon Thau Loo, Ryan Huebsch, Ion Stoica, Joseph M. Hellerstein.
  3rd International Workshop on Peer-to-Peer Systems (IPTPS), Feb 2004. Pages 141-150.
  ***[18.6% acceptance]***

- **Querying the Internet with PIER.**

Ryan Huebsch, Joseph M. Hellerstein, Nick Lanham, Boon Thau Loo, Scott Shenker, Ion Stoica.
29th International Conference on Very Large Databases (VLDB), Sep 2003. Pages 321-332.
***[15% acceptance]***

- **On the Feasibility of Peer-to-Peer Web Indexing and Search.**
  Jinyang Li, Boon Thau Loo, Joseph M. Hellerstein, Frans Kaashoek, David Karger, Robert Morris.
  2nd International Workshop on Peer-to-Peer Systems (IPTPS), Feb 2003. Pages 207-215.
  ***[16.3% acceptance]***

- **Adaptive Precision Setting for Cached Approximate Values.**
  Chris Olston, Boon Thau Loo, Jennifer Widom.
  20th ACM SIGMOD Conference on Management of Data, May 2001. Pages 355-366.
  ***[15% acceptance]***

- **Complex Queries in DHT-based Peer-to-Peer Networks.**
  Matthew Harren, Joseph M. Hellerstein, Ryan Huebsch, Boon Thau Loo, Scott Shenker, Ion Stoica.
  1st International Workshop on Peer-to-Peer Systems (IPTPS), Mar 2002. Pages 242-259.
  ***[31.3% acceptance]***

**Tutorials**

- **Datalog and Emerging Applications: An Interactive Tutorial.**
  Shan Shan Huang, Todd J. Green, and Boon Thau Loo.
  ACM SIGMOD International Conference on Management of Data (tutorial), Athens, Greece, Jun 2011.

**Demonstrations**

- **A Formal Framework for Secure Routing Protocols.**
  Chen Chen, Limin Jia, Hao Xu, Cheng Luo, Wenchao Zhou, and Boon Thau Loo.
  USENIX Symposium on Networked Systems Design and Implementation (NSDI), 2013.

- **SP4: Scalable Programmable Packet Processing Platform.**
  Harjot Gill, Dong Lin, Lohi Sarna, Robert Mead, Kenton C.T. Lee, and Boon Thau Loo.
  ACM SIGCOMM Conference on Data Communication, Helsinki, Finland, Aug, 2012.

- **Reduction-based Analysis of BGP Systems with BGPVerif.**
  Anduo Wang, Alexander J.T. Gurney, Xianglong Han, Jinyan Cao, Carolyn Talcott, Boon Thau Loo, and Andre Scedrov.
  ACM SIGCOMM Conference on Data Communication, Helsinki, Finland, Aug, 2012.

- **Route Shepherd: Stability Hints for the Control Plane.**
  Alexander J.T. Gurney, Xianglong Han, Yang Li, and Boon Thau Loo.
  ACM SIGCOMM Conference on Data Communication, Helsinki, Finland, Aug, 2012.

- **FSR: Formal Analysis and Implementation Toolkit for Safe Inter-domain Routing**

Yiqing Ren, Wenchao Zhou, Anduo Wang, Limin Jia, , Alexander J.T. Gurney, Boon Thau Loo, Jennifer Rexford.
ACM SIGCOMM Conference on Data Communication, Aug 2011. *Runner-up for ACM Student Research Competition.*

- **NetTrails: A Declarative Platform for Provenance Maintenance and Querying in Distributed Systems.**
  Wenchao Zhou, Qiong Fei, Shengzhi Sun, Tao Tao, Andreas Haeberlen, Zachary Ives, Boon Thau Loo, and Micah Sherr.
  ACM SIGMOD International Conference on Management of Data, Athens, Greece, Jun 2011.

- **Towards Transactional Cloud Resource Orchestration**
  Changbin Liu, Yun Mao, Xu Chen, Mary F. Fernandez, Boon Thau Loo, Kobus Van der Merwe.
  USENIX Symposium on Networked Systems Design and Implementation (NSDI), 2011.

- **Secure Forensics Without Trusted Components**
  Wenchao Zhou, Qiong Fei, Arjun Narayan, Andreas Haeberlen, and Boon Thau Loo, Micah Sherr.
  USENIX Symposium on Networked Systems Design and Implementation (NSDI), 2011.

- **A Demonstration of the Rapidmesh Development Toolkit.**
  Xiaozhou Li, Shivkumar C. Muthukumar, Changbin Liu, Joseph B. Kopena, Mihai Oprea, Richardo Correa, Boon Thau Loo, and Prithwish Basu.
  4th ACM International Workshop on Wireless Network Testbeds, Experimental Evaluation and Characterization (WiNTECH 2009) demonstration, in conjunction with ACM MobiCom, Beijing, China, Sept, 2009.

- **Declarative Toolkit for Rapid Network Protocol Simulation and Experimentation.**
  Shivkumar C. Muthukumar, Xiaozhou Li, Changbin Liu, Joseph B. Kopena, Mihai Oprea, and Boon Thau Loo.
  ACM SIGCOMM Conference on Data Communication, Barcelona, Spain, Aug 2009.

- **SmartCIS: Integrating Digital and Physical Environments.**
  Mengmeng Liu, Svilen Mihaylov, Zhuowei Bao, Marie Jacob, Zachary G. Ives, Boon Thau Loo, and Sudipto Guha.
  ACM SIGMOD International Conference on Management of Data, Providence, RI, June 2009. Pages 1111-1114. *Honorable mention for best demonstration competition.*

- **Querying at Internet-Scale.**
  Brent Chun, Joseph M. Hellerstein, Ryan Huebsch, Shawn R. Jeffery, Boon Thau Loo, Sam Mardanbeigi, Timothy Roscoe, Sean C. Rhea, Scott Shenker, Ion Stoica.
  ACM SIGMOD 2004, Paris, France, Jun 2004. Pages 935-936.

**Education related Publications**

- **Experiences in Teaching an Educational User-Level Operating Systems Implementation Project**.

Adam J. Aviv, Vin Mannino, Thanat Owlarn, Seth Shannin, Kevin Xu, and Boon Thau Loo
Operating Systems Review (OSR) journal, Pages 80-86, 2012.

- **An Open-source and Declarative Approach Towards Teaching Large-scale Networked Systems. Programming**.
  Harjot Gill, Taher Saeed, Qiong Fei, Zhuoyao Zhang, and Boon Thau Loo.
  ACM SIGCOMM 2011 Education Workshop, Aug 2011.

**Other Publications**

- **Automating Platform Selection for MapReduce Processing in the Cloud.**
  Zhuoyao Zhang, Lucy Cherkasova, and Boon Thau Loo.
  2015 IEEE International Conference on Cloud and Autonomic Computing (ICCAC), 2015.

- **Impact of Path Selection and Scheduling Policies on MPTCP Performance.**
  Behnaz Arzani, Alexander Gurney, Shuotian Cheng, Roch Guerin and Boon Thau Loo.
  4th International Workshop on Protocols and Applications with Multi-Homing Support (PAMS 2014).

- **Logic-based Verification of Software Defined Networks.**
  Chen Chen, Limin Jia, Wenchao Zhou, and Boon Thau Loo.
  Open Networking Summit (ONS), 2014.

- **Automated Synthesis of Reactive Controllers for Software-Defined Networks.**
  Anduo Wang, Salar Moarref, Ufuk Topcu, Boon Thau Loo and Andre Scedrov.
  3rd International Workshop on Rigorous Protocol Engineering (WRiPE), 2013.

- **A Formal Framework for Secure Routing Protocols.**
  Chen Chen, Limin Jia, Hao Xu, Cheng Luo, Wenchao Zhou and Boon Thau Loo.
  Workshop on Foundations of Computer Security (FCS), co-located with CSF, New Orleans, Louisiana,
  June 2013.

- **Exploiting Cloud Heterogeneity for Optimized Cost/Performance MapReduce Processing.**
  Zhuoyao Zhang, Ludmila Cherkasova, and Boon Thau Loo.
  Fourth International Workshop on Cloud Data and Platforms (CloudDP 2014).

- **Towards Dynamic Pricing-Based Collaborative Optimizations for Green Data Centers.**
  Yang Li, David Chiu, Changbin Liu, Linh T.X. Phan, Tanveer Gill, Sanchit Aggarwal, Zhuoyao Zhang, Boon Thau Loo, David Maier, and Bart McManus.
  Second International Workshop on Data Management in the Cloud (DMC), co-located with ICDE, Apr 2013.

- **Getting More for Less in Optimized MapReduce Workflows.**
  Zhuoyao Zhang, Ludmila Cherkasova, and Boon Thau Loo.
  IFIP/IEEE International Symposium on Integrated Network Management (IM), 2013.

- **Reduction-based Security Analysis of Internet Routing Protocols.**

Chen Chen, Limin Jia, Boon Thau Loo, and Wenchao Zhou.
2nd International Workshop on Rigorous Internet Protocol Engineering (WRiPE), co-located with ICNP, 2012.

- **Collaborative Red Teaming for Anonymity System Evaluation.**
  Sandy Clark, Chris Wacek, Matt Blaze, Boon Thau Loo, Clay Shields, and Jonathan Smith.
  5th Workshop on Cyber Security Experimentation and Test (CSET), co-located with USENIX Security, 2012.

- **Privacy-Preserving Collaborative Verification Protocols.**
  Andreas Haeberlen, Mingchen Zhao, Wenchao Zhou, Alexander Gurney, Micah Sherr and Boon Thau Loo. 2012.
  Workshop on Large-Scale Distributed Systems and Middleware (LADIS 2012), Madeira, July, 2012.

- **Optimizing Completion Time and Resource Provisioning of Pig Programs.**
  Zhuoyao Zhang, Ludmila Cherkasova, Abhishek Verma, and Boon Thau Loo.
  Workshop on Cloud Computing Optimization (CCOPT), May 2012.

- **Meeting Service Level Objectives of Pig Programs.**
  Zhuoyao Zhang, Ludmila Cherkasova, Abhishek Verma, and Boon Thau Loo
  2nd International Workshop on Cloud Computing Platforms (CloudCP), Apr 2012.

- **Towards a Secure and Verifiable Future Internet.**
  Limin Jia, Chen Chen, Sangeetha A. Jyothi, Wenchao Zhou, Suyog Mapara, and Boon Thau Loo.
  Off the Beaten Track: Underrepresented Problems for Programming Language Researchers, co-located with POPL, 2012.

- **Declarative Constraint Optimization in Distributed Systems.**
  Changbin Liu, and Boon Thau Loo.
  Workshop on Languages for Distributed Algorithms (LADA), co-located with POPL, Jan 2012.

- **Declarative Multicore Programming of Software-based Stateful Packet Processing.**
  Harjot Gill, Dong Lin, Trisha Kothari and Boon Thau Loo.
  Declarative Aspects and Applications of Multicore Programming (DAMP), co-located with POPL, Jan 2012.

- **An Empirical Analysis of Scheduling Techniques for Real-time Cloud-based Data Processing.**
  Linh P.X. Phan, Zhuoyao Zhang, Qi Zheng, Boon Thau Loo, and Insup Lee.
  4th IEEE International Workshop on Real-time Service-Oriented Architecture and Application (RTSOAA), Irvine, Dec 2011.

- **Partial Specifications of Routing Configurations**
  Alexander J. T. Gurney, Limin Jia, Anduo Wang, and Boon Thau Loo.
  1st International Workshop on Rigorous Protocol Engineering (WRiPE), co-located with ICNP 2011.

- **TAP: Time-aware Provenance for Distributed Systems**

Wenchao Zhou, Ling Ding, Andreas Haeberlen, Zachary Ives, Boon Thau Loo.
3rd USENIX Workshop on the Theory and Practice of Provenance (TaPP), 2011.

- **Maintaining Distributed Logic Programs Incrementally.**
  Vivek Nigam, Limin Jia, Boon Thau Loo and Andre Scedrov.
  13th International ACM SIGPLAN Symposium on Principles and Practice of Declarative Programming (PPDP), Odense, Denmark, Pages 125-136, July 2011.

- **Analyzing BGP Instances in Maude.**
  Anduo Wang, Carolyn L. Talcott, Limin Jia, Boon Thau Loo, and Andre Scedrov.
  International Conference on Formal Techniques for Networked and Distributed Systems (FMOODS), Reykjavik, Iceland, Pages 334-348, June 2011. (32.3% acceptance)

- **AS-TRUST: A Trust Quantification Scheme for Autonomous Systems in BGP.**
  Jian Chang, Krishna K. Venkatasubramanian, Andrew G. West, Sampath Kannan, Boon Thau Loo, Oleg Sokolsky, and Insup Lee.
  4th International Conference on Trust and Trustworthy Computing (TRUST 2011), Pittsburgh, PA, Pages 262-276, June 2011.

- **A Policy-based Constraint-solving Platform Towards Extensible Wireless Channel Selection and Routing**.
  Changbin Liu, Xiaozhou Li, Shivkumar C. Muthukumar, Harjot Gill, Taher Saeed, Boon Thau Loo, and Prithwish Basu.
  ACM Workshop on Programmable Routers for Extensible Services of TOmorrow (PRESTO), in conjunction with ACM CoNEXT, Philadelphia, PA, Dec 2010.

- **On the Feasibility of Dynamic Rescheduling on the Intel Distributed Computing Platform**.
  Zhuoyao Zhang, Linh T.X. Phan, Godfrey Tan, Saumya Jain, Harrison Duong, Boon Thau Loo, and Insup Lee.
  ACM/IFIP/USENIX 11th International Middleware Conference (Industry Track), Bangalore, India, Dec 2010.

- **Towards a Data-centric View of Cloud Security**.
  Wenchao Zhou, Micah Sherr, William R. Marczak, Zhuoyao Zhang, Tao Tao, Boon Thau Loo, Insup Lee.
  Second International Workshop on Cloud Data Management (CloudDB), in conjunction with CIKM, Toronto, Canada, Oct 2010. Pages 25-32.

- **An Operational Semantics for Network Datalog.**
  Vivek Nigam, Limin Jia, Anduo Wang, Boon Thau Loo, and Andre Scedrov.
  Third International Workshop on Logics, Agents, and Mobility (LAM), July 2010.

- **Ontologies for Distributed Command and Control Messaging.**
  Duc N. Nguyen, Joseph B. Kopena, Boon Thau Loo, and William C. Regli.
  6th International Conference on Formal Ontology in Information Systems (FOIS), May 2010. Pages 373-384. *[39% acceptance]*

- **RapidMesh: Declarative Toolkit for Rapid Experimentation of Wireless Mesh Networks.**

Shivkumar C. Muthukumar, Xiaozhou Li, Changbin Liu, Joseph B. Kopena, Mihai Oprea, Richardo Correa, Boon Thau Loo, and Prithwish Basu.
4th ACM International Workshop on Wireless Network Testbeds, Experimental Evaluation and Characterization (WiNTECH 2009), in conjunction with ACM MobiCom, Beijing, China, Sept, 2009.

- **A Theorem Proving Approach towards Declarative Networking.**
  Anduo Wang, Boon Thau Loo, Changbin Liu, Oleg Sokolsky, and Prithwish Basu.
  22nd International Conference on Theorem Proving in Higher Order Logics (TPHOLs) emerging trends proceedings, Munich, Germany, Aug 2009.

- **Message Models and Aggregation in Knowledge Based Middleware for Rich Sensor Systems.**
  Joseph B. Kopena, William C. Regli, and Boon Thau Loo.
  6th International Workshop on Data Management for Sensor Networks (DMSN), in conjunction with VLDB, Lyon, France, Aug 2009.

- **Formalizing Metarouting in PVS.**
  Anduo Wang, and Boon Thau Loo.
  Automated Formal Methods (AFM), in conjunction with CAV, Grenoble, France, Jun 2009.

- **DMaC: Distributed Monitoring and Checking.**
  Wenchao Zhou, Oleg Sokolsky, Boon Thau Loo, and Insup Lee.
  9th International Workshop on Runtime Verification (RV), Grenoble, France, Jun 2009. Pages 184-201.

- **Declarative Network Verification.**
  Anduo Wang, Prithwish Basu, Boon Thau Loo, and Oleg Sokolsky.
  11th International Symposium on Practical Aspects of Declarative Languages (PADL), in conjunction with POPL, Jan 2009. Pages 61-75.

- **A Declarative Perspective on Adaptive MANET Routing.**
  Changbin Liu, Yun Mao, Mihai Oprea, Prithwish Basu, and Boon Thau Loo.
  ACM SIGCOMM Workshop on Programmable Routers for Extensible Services of Tomorrow (PRESTO), Seattle, WA, Aug 2008. Pages 63-68.

- **Trace-driven Analysis of an Internet-scale Cloud Computing Platform (Poster).**
  Harrison Duong, Boon Thau Loo, and Godfrey Tan
  33rd ACM Usenix Annual Technical Conference (USENIX), Boston, MA, June 2008.

- **OntoNet: Scalable Knowledge-Based Networking.**
  Joseph B. Kopena and Boon Thau Loo.
  4th International Workshop on Networking meets Databases (NetDB), in conjunction with ICDE, Cancun, Mexico, Apr 2008. Pages 170-175.

- **Provenance-aware Secure Networks.**
  Wenchao Zhou, Eric Cronin and Boon Thau Loo.
  4th International Workshop on Networking meets Databases (NetDB), in conjunction with ICDE, Cancun, Mexico, Apr 2008. Pages 188-193.

- **Veracity: A Fully Decentralized Service for Securing Network Coordinate Systems.**
  Micah Sherr, Boon Thau Loo, and Matt Blaze.
  7th International Workshop on Peer-to-Peer Systems (IPTPS), Tampa Bay, Florida, Feb 2008. *[30.9% acceptance]*

- **Towards a Declarative Language and System for Secure Networking**.
  Martín Abadi and Boon Thau Loo.
  3rd International Workshop on Networking meets Databases (NetDB), Cambridge, MA, Apr 2007.

- **Public Health for the Internet (PHI): Towards a New Grand Challenge for Information Management**
  Joseph M. Hellerstein, Tyson Condie, Minos Garofalakis, Boon Thau Loo, Petros Maniatis, Timothy Roscoe, Nina Taft.
  3rd Biennial Conference on Innovative Data Systems Research (CIDR), Asilomar, CA, Jan 2007. Pages 332-340. ***[44% acceptance]***

- **Customizable Routing with Declarative Queries.**
  Boon Thau Loo, Joseph M. Hellerstein, Ion Stoica.
  3rd Workshop on Hot Topics in Networks (ACM SIGCOMM HotNets-III), Nov 2004.

**Technology Transfer**

- NetEgg (2015 - 2016)
  - Participating in the National Science Foundation Innovation Corps (I-Corps) program, 2015.
  - Filed provisional patent on NetEgg (HotNets 2014, CoNEXT 2015) through Penn Center of Innovation.
- Termaxia (2016 - )
  - Founding Chief Scientist of big data storage platform company
- Gencore Inc. (2013 - )
  - Founding CEO and later, transitioned to Lead Scientist role.
  - Commercialized early research (2007-2013) on the RapidNet Declarative Networking Engine (http://netdb.cis.upenn.edu/rapidnet/).
  - Received National Science Foundation Small Business Innovation Research (SBIR) funding.
  - Raised seed round from City of Philadelphia, angels and institutional investors.
  - Company relocated to SF Bay area with funding from Silicon Valley investors.
  - Cloud-based application performance analytics platform running in production at several companies.
  - Featured in several press releases, and form partnerships with Juniper Networks and NEC.

**Patents**

- Yifei Yuan, Rajeev Alur, Boon Thau Loo. U.S. Provisional patent filed on September 2015, "Methods, Systems, and Computer Readable Media for Generating Software Defined Networking (SDN) Policies".

- Yun Mao, Changbin Liu, Boon Thau Loo, Jacobus Van der Merwe, U.S. Patent Application filed on October 2011, AT&T Docket Number 2011-0012 - "Systems, Methods, and Articles of Manufacture to Provide Cloud Resource Orchestration".