

# Theophilus Benson

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Employment	<b>Assistant Professor</b> Brown University	<b>Sept 2017-Present</b>
	<b>Assistant Professor</b> Duke University	<b>Jul 2013-Aug 2017</b>
	<b>Post-Doctoral Scholar</b> Princeton University	<b>Jul 2012-Jul 2013</b>

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Education	<b>University of Wisconsin</b> , Madison, Wisconsin USA Ph.D., Computer Science, May 2012 M.S., Computer Science, May 2008 <ul style="list-style-type: none"><li>• Dissertation: “New Approaches for Managing Enterprise Networks”</li><li>• Advisor: Aditya Akella</li></ul> <b>Tufts University</b> , Medford, Massachusetts USA B.S., Computer Science, May 2004
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Honors and Awards	<ul style="list-style-type: none"><li>• Facebook Faculty Award, awarded 2015, 2016.</li><li>• Yahoo FREP (Faculty Research and Engagement Program), awarded 2014, 2015.</li><li>• Yahoo ACE (Academic Career Enhancement), awarded 2014.</li><li>• Best paper, IMC 2010.</li><li>• Top ranked paper (fast tracked to CCR), SIGCOMM WREN 2009.</li><li>• IBM Research fellowship, awarded 2009-2010.</li><li>• IBM Research PhD Assistantship, awarded 2009.</li><li>• IBM Bravo Award, awarded 2009.</li><li>• AOF Fellowship, Univ. of Wisconsin, awarded 2006 and 2011.</li></ul>
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Publications	<ol style="list-style-type: none"><li>1. <b>Sounding the Bell for Improving Internet (of Things) Security.</b> Balakrishnan Chandrasekaran and Theophilus Benson In Proc. of IoT S&amp;P 2017.</li><li>2. <b>Hermes: Providing Tight Control over High-Performance SDN Switches.</b> Huan Chen and Theophilus Benson In Proc. of CoNext 2017.</li><li>3. <b>A Call to Arms for Tackling the Unexpected Implications of SDN Controller Enhancements.</b> Theophilus Benson In Proc. of ApNet 2017.</li><li>4. <b>ConfigTron: Tackling network diversity with heterogenous configurations.</b> Usama Naseer and Theophilus Benson In Proc. of HotCloud 2017.</li><li>5. <b>Dapper: Data Plane Performance Diagnosis of TCP.</b> Mojgan Ghasemi, Theophilus Benson and Jennifer Rexford In Proc. of SoSR 2017.</li></ol>
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6. **The Case for Making Tight Control Plane Latency Guarantees in SDN Switches.**  
Huan Chen and Theophilus Benson  
In Proc. of SoSR 2017.
7. **A First Look at Bugs in OpenStack.**  
Washington Garcia and Theophilus Benson  
In Proc. of CAN 2016.
8. **A View from the Other Side: Understanding Mobile Phone Characteristics in the Developing World.**  
Sohaib Ahmad, Abdul Lateef Haamid, Zafar Ayyub Qazi, Zhenyu Zhou,  
Theophilus Benson and Ihsan Ayyub Qazi  
In Proc. of IMC 2016.
9. **Performance Characterization of a Commercial Video Streaming Service.**  
Mojgan Ghasemi, Partha Kanuparth, Ahmed Mansy, Theophilus Benson and Jennifer Rexford  
In Proc. of IMC 2016.
10. **FOCUS: Function Offloading from a Controller to Utilize Switch Power.**  
Ji Yang, Zhenyu Zhou, Theophilus Benson and Xiaowei Yang, Xin Wu and Chengchen Hu  
In Proc. of NFV-SDN 2016.
11. **SFC-Checker: Checking the Correct Forwarding Behavior of Service Function Chaining.**  
Brendan Tschaen, Ying Zhang, Theophilus Benson, Sujata Banerjee, Jeongkeun Lee and Joon-Myung Kang  
In Proc. of NFV-SDN 2016.
12. **Picocenter: Supporting long-lived, mostly-idle applications in cloud environments.**  
Liang Zhang, James Litton, Frank Cangialosi, Theophilus Benson, Dave Levin and Alan Mislove  
In Proc. of EuroSys 2016.
13. **Isolating and Tolerating SDN Application Failures with LegoSDN.**  
Balakrishnan Chandrasekaran, Brendan Tschaen and Theophilus Benson  
In Proc. of SOSR 2016.
14. **Dynamic Prioritization of Traffic in Home Networks.**  
Ilker Nadi Bozkurt, Yilun Zhou and Theophilus Benson  
In Proc. of SOSR 2016.
15. **Programming Slick Network Functions.**  
Bilal Anwer, Theophilus Benson, Dave Levin, and Nick Feamster  
In Proc. of SOSR 2015.
16. **A Universal Approach to Data Center Network Design.**  
Aditya Akella, Theophilus Benson, Balakrishnan Chandrasekaran,  
Cheng Huang, Bruce Maggs, and David Maltz  
In Proc. of International Conference on Distributed Computing and Networks (ICDCN) 2015.
17. **Dynamic Prioritization of Traffic in Home Networks.**  
Ilker Nadi Bozkurt, Yilun Zhou and Theophilus Benson  
In Proc. CoNEXT Student Workshop 2015.
18. **Destroying Networks for Fun (and Profit).**  
Nick Shelly, Brendan Tschaen, Tyco-Kaus, Michael Chang, Theophilus Benson and Laurent Vanbever  
In Proc. ACM Workshop on Hot Topics in Networks (HotNets) 2015.
19. **Towards a Safe Playground for HTTPS and Middleboxes with QoS2.**  
Zhenyu Zhou and Theophilus Benson  
In Proc. of ACM SIGCOMM Workshop on Hot Topics in Middleboxes 2015 (HotMiddleboxes) 2015.

20. **Tolerating SDN Application Failures with LegoSDN.**  
Balakrishnan Chandrasekaran, Theophilus Benson  
In Proc. ACM Workshop on Hot Topics in Networks (HotNets) 2014  
Appeared earlier In Proc. of ACM HotSDN 2014 as a Poster
21. **ProActive Routing in Scalable Data Centers with PARIS**  
Durshyant Arora, Theophilus Benson, Jennifer Rexford  
In Proc. Workshop on Distributed Cloud Computing (DCC) 2014
22. **Real-time diagnosis of TCP performance in clouds**  
Mojgan Ghasemi, Theophilus Benson, Jennifer Rexford  
In Proc. CoNEXT Student Workshop 2013
23. **A Slick Control Plane for Network Middleboxes**  
Bilal Anwer, Theophilus Benson, Nick Feamster, Dave Levin, Jennifer Rexford  
In Proc. of ACM HotSDN 2013 (Poster), and In Proc. of ONS 2013
24. **HotSwap: Correct and Efficient Controller Upgrades for Software-Defined Networks**  
Laurent Vanbever, Joshua Reich, Theophilus Benson, Nate Foster and Jennifer Rexford  
In Proc. of ACM HotSDN 2013
25. **Challenges in Unifying Control of Middlebox Traversals and Functionality**  
Aaron Gember, Theophilus Benson, and Aditya Akella.  
In Proc. of LADIS 2012
26. **A First Look at Problems in the Cloud**  
Theophilus Benson, Sambit Sahu, Aditya Akella and Anees Shaikh.  
In Proc. of USENIX HotCloud 2010.
27. **The Case for Fine-Grained Traffic Engineering in Data Centers**  
Theophilus Benson, Ashok Anand, Aditya Akella and Ming Zhang.  
In Proc. of USENIX INM/WREN 2009.
28. **The Evolution of Network Configuration: A Tale of Two Campuses**  
Hyojoon Kim, Theophilus Benson, Aditya Akella and Nick Feamster.  
In Proc. of ACM IMC 2011.
29. **Demystifying Configuration Challenges and Trade-Offs in Network-based ISP Services**  
Theophilus Benson, Aditya Akella and Aman Shaikh.  
In Proc. of ACM SIGCOMM 2011.
30. **Network Traffic Characteristics of Data Centers in the Wild**  
Theophilus Benson, Aditya Akella and David Maltz.  
In Proc. of ACM IMC 2010.
31. **Understanding Data Center Traffic Characteristics**  
Theophilus Benson, Ashok Anand, Aditya Akella and Ming Zhang.  
In Proc. of IMC 2010.
32. **Mining Policies from Enterprise Network Configuration**  
Theophilus Benson, Aditya Akella and David Maltz.  
In Proc. of ACM IMC 2009.
33. **Unraveling the Complexity of Network Management**  
Theophilus Benson, Aditya Akella and David Maltz.  
In Proc. of USENIX NSDI 2009.

## Posters

1. **Delorean: Using Time Travel to Avoid Bugs and Failures in SDN Applications.**  
Zhenyu Zhou, Theophilus Benson, Marco Canini and Balakrishnan Chandrasekaran.  
In Proc. of SoSR 2017.
2. **FOCUS: Function Offloading from a Controller to Utilize Switch Power.**  
Ji Yang, Zhenyu Zhou, Theophilus Benson and Xiaowei Yang, Xin Wu and Chengchen Hu  
In Proc. of NSDI 2016.
3. **Picocenter: Supporting long-lived, mostly-idle applications in cloud environments.**  
Liang Zhang, Frank Cangialosi, Theophilus Benson, Dave Levin and Alan Mislove.  
In Proc. of SoCC 2015.
4. **Towards a Safe Playground for HTTPS and Middleboxes with QoS2.**  
Zhenyu Zhou and Theophilus Benson.  
In Proc. of NSDI 2015.
5. **CloudSSI: revisiting SSI in cloud era**  
Mansoor Alicherry, Ashok Anand, Shoban Preeth Chandrabose and Theophilus Benson.  
In Proc. of SoCC 2014.
6. **Harmony: coordinating network, compute, and storage in software-defined clouds.**  
Robert Grandl, Yizheng Chen, Junaid Khalid, Suli Yang, Ashok Anand, Theophilus Benson and Aditya Akella.  
In Proc. of SoCC 2013.
7. **Phoenix: A system for automatically reconfiguring networks.**  
Theophilus Benson, Aditya Akella and David Maltz.  
In Proc. of USENIX NSDI 2009.

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## Grants and Gifts

### External Funded Grants:

- **2016-2017** Facebook Faculty Award, \$30K.
- **2015-2016** Facebook Faculty Award, \$30K.
- **2015-2016** Yahoo Faculty Research Proposal, PI, \$29K.
- **2014-2015** Google Cloud Resource Usage Grant, \$10K.
- **2014-2018** NSF Medium, Co-PI, Towards Finer-grained Cloud Computing, \$399,650K.
- **2014-2015** Yahoo Faculty Research Proposal, PI, \$30K.
- **2014** Equipment Gift from Yahoo, estimated \$50K
- **2014** Gift from Facebook, \$25K
- **2014-2015** Yahoo Academic Career Enhancement, \$10K.

### Internal Funding and Gifts:

- **2014-2017** Duke Bass Connections, PI, “Distance-based, Executive- style Degree Completion Program for Ghanaian Nurse Anesthetists”, interdisciplinary team developing an online distance-based degree completion program for Ghanaian nurse anesthetists without internet connections.

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## Service Activities

### Organizing committee member for:

- **2017:** Technical Program Chair for CCS Workshop on IoT S&P , SoCC Poster and Demo Co-Chair, SoSR Publicity Chair.
- **2016:** Co-Editor for IJNM (Special Issue on SDN and NFV for Flexible Management), Co-Editor for IEEE Internet Computing (NFV Special Issue).
- **2015:** HotMiddleboxes Technical Program Chair, SIGCOMM Publicity Co-Chair, LISA Research Committee, CoNext Student Workshop Co-Chair.
- **2014:** CoNEXT Travel Grant Co-Chair, LISA Research Committee.
- **2013:** ITC Publicity Co-Chair.

Program committee member for:

- **2018:** SIGCOMM, SoSR, ICDCS, USENIX ATC.
- **2017:** SIGCOMM, IMC, HotCloud, SIGCOMM Workshop on HotContainers, ITC (Future Internet Architectures), IEEE Networking, SoCC, SoSR Poster and Demo.
- **2016:** Usenix ATC, CoNext, INFOCOM, SIGCOMM, ANCS, HotMiddleboxes, ICDCS, SoSR, IMC, Richard Tapia Scholarship Committee, CAN.
- **2015:** ANCS, SoSR, Workshop on Cross-Cloud, LISA, ICNP, ONUG Research Track, DCC.
- **2014:** NSF Cloud, IMC, CoNEXT, SOCC, HotCloud, LISA, SIGCOMM Posters/Demos, ANCS, ICWA, INFOCOM Workshop on Cross-Cloud.
- **2013:** IMC, SOCC, HotCloud, NSDI Posters/Demos, RSDA.

Tutorials:

- Configuration, Management and Enablement in a Software Defined Platform.
  - **2014:** IEEE NOMS Tutorial Session.

Duke Campus Involvement:

- **2014-Present:** Student Organization Advisor for *Duke Stop Motion*.

Mentorship Activities:

- **Summer 2015:** StreetCoders @ Facebook.
- **2014-Present:** Semester Faculty Round Tables with Delta Sigma Theta.

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Invited Talks	<i>Failure as a First Class Entity of SDNs.</i>	
	• IBM Research, Bangalore, India.	Jun 2016
	• MSR India, Bangalore, India.	Jun 2016
	• Huawei Networking Summit, Princeton, NJ.	Dec 2015
	• ATT Research.	Dec 2015
	• Tufts University.	Dec 2015
	• University of North Carolina, Chapel Hill.	Nov 2015
	<i>Commoditizing Software Defined Networks.</i>	
	• VMWare Labs.	Aug 2015
	• HP Labs.	Jul 2015
	• ONUG - Research Track	May 2015
	<i>Large Scale Systems Research from a Fish Bowl.</i>	
	• Keynote ICNP Phd Forum.	Oct 2014
	<i>Managing Software Defined Networks.</i>	
	• IBM Research.	Jun 2014
	• NEC Labs.	Jun 2014
	<i>Slick: A control plane for network middleboxes.</i>	
	• Raytheon BBN.	Jul 2013
	<i>Demystifying and Controlling the Performance of Data Center Networks.</i>	
	• CAARMS 20 (Princeton, NJ).	Jun 2014
	• Yahoo! Performance Summit.	Feb 2014
	• DIMACS Workshop on Algorithms for Green Data Storage.	Dec 2013
	• Facebook (Hosted by Guohui Wang).	Aug 2013
	• CloudTech3.	Oct 2012

- University of California, Berkeley (AMPLab Seminar). Apr 2011

*Peeking into the Cloud.*

- Clouds10 Workshop. Nov 2010

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Classes Taught	• CPS 512/ECE 514: Computer Networks and Distributed Systems: Advanced Networking.	Fall 2015
	• CPS 356: Computer Network Architecture.	Spr 2015
	• CPS 590-04: Software Defined-Networking.	Fall 2014
	• CPS 512/ECE 514: Computer Networks and Distributed Systems: Advanced Networking.	Spr 2014
	• CPS 590-04: Rethinking Networking Paradigms for Cloud Computing and Big Data Analytics: Infrastructure for Big Data.	Fall 2013

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Professional Experience	<b>Facebook</b> , Menlo Park, California USA	
	<i>Web Performance Consultant; Summer</i>	<b>2015</b>
	<b>Yahoo Research</b> , Sunnyvale, California USA	
	<i>Data Center Performance Consultant</i>	<b>2014-2017</b>
	<b>AT&amp;T Research; Visiting Researcher</b> , Florham Park, New Jersey USA	
	<i>Researcher; Spring Intern</i>	<b>2011</b>
	<b>Microsoft Research</b> , Redmond, Washington USA	
	<i>Researcher; Summer Intern</i>	<b>2008</b>
	<b>IBM Research</b> , Hawthorne, New York USA	
	<i>Researcher; Summer Intern</i>	<b>2007–2009</b>