

# Laurent VANBEVER

Assistant professor, PhD & MSc in computer science, MSc in management

35 Gloriastrasse

8092 Zürich

Switzerland

+41 44 632 70 04

<http://vanbever.eu>

<https://nsg.ee.ethz.ch>

[ivanbever@ethz.ch](mailto:ivanbever@ethz.ch)

born in Dec. 1985 (32 year), Belgian

## Education

- 2008–2012 PhD in computer science, **University of Louvain** (Louvain-la-Neuve, Belgium)  
Advised by Prof. Olivier Bonaventure.  
Dissertation: *Methods and Techniques for Disruption-Free Network Reconfiguration*.
- 2008–2010 Master in management, **Solvay Brussels School** (Brussels, Belgium)  
Graduated *magna cum laude*, ranked 1 out of 100 students.  
Specialization: Finance. Master's thesis (advised by Prof. S. Peffer):  
*Liquidity analysis of the belgian non-regulated stock market. How to improve it?*
- 2003–2008 Master in computer science (ingénieur civil), **University of Louvain** (Louvain-la-Neuve, Belgium)  
Graduated *magna cum laude*, ranked 1 out of 30 students.  
Specialization: Networks and security. Master's thesis (advised by Prof. O. Bonaventure):  
*Automatic generation and validation of network configurations*.

## Experience

- 2015– Assistant professor, **ETH Zürich**, Switzerland  
I lead the *Networked Systems Group* within the Information Technology and Electrical Engineering department (D-ITET). I am also affiliated with the Computer Sciences department (D-INFK).
- 2017– Scientific advisory board, **Exeon Analytics (ETH spin-off)**, Switzerland  
The start-up builds upon our research results on network traffic analysis and anomaly detection.
- 2012–2014 Postdoctoral research associate, **Princeton University**, New Jersey, USA  
I collaborated with Prof. Jennifer Rexford on developing new abstractions on top of Software Defined Networks (SDN) to enable better network management.  
My projects included:
  - Applying SDN design principles to cellular networks and Internet routing (BGP),
  - Developing techniques and tools to upgrade SDN controllers in a disruption-free manner,
  - Developing transition mechanisms to deploy SDN within traditional IP networks,
  - Scaling Internet routing through filtering without requiring global coordination.
- 2012–2014 Research advisor, **Princeton University**, New Jersey, USA  
I advised three graduate students working on cellular core networks and Internet Exchange Points, as well as one undergraduate student working on SDN.
- Oct–Nov 2011 Visiting researcher, **Roma Tre University**, Rome, Italy  
I implemented a reconfiguration framework and performed large-scale network analysis.

- Feb–Mar 2011 Visiting researcher, **Internet Initiative Japan Innovation Institute**, Tokyo, Japan  
I developed and validated seamless reconfiguration mechanisms for both IGP and BGP.
- 2010–2012 Private tutor, **Université Libre de Bruxelles**, Belgium  
I provided support in statistics, computer science and game theory to master students in business management.
- Summer 2007 Intern, **Belgian national research network** (BELNET), Brussels, Belgium  
I collaborated on the design and on the implementation of Quality of Service in the network.  
At the end of my internship, the project was successfully deployed.
- 2007–2015 Project leader, **Alain & Evelyne Morel de Westgaver Art Auctions**, Brussels, Belgium  
I designed and implemented a complete live auction management software. Since 2007, I have provided customer support and extended the software which is still used daily. I have also actively collaborated in the organization and the operation of 3 to 4 art auctions per year.

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## Honors and awards

- 2017 Roland Meier CyCon Junior Scholar Award (as advisor)
- 2016 Golden Owl Teaching Award, ETH Zürich  
Usenix NSDI Community Award  
IETF/IRTF Applied Networking Research Prize (for our work on network programmability)  
Roland Meier ETH Silver Medal for outstanding master thesis (as advisor)
- 2015 ACM SIGCOMM Best Paper Award  
IETF/IRTF Applied Networking Research Prize (for our work on routing scalability)
- 2013 IEEE ICNP Best Paper Award  
IETF/IRTF Applied Networking Research Prize (for our work on network reconfiguration)
- 2012 ACM SIGCOMM Doctoral Dissertation Award (runner up)  
University of Louvain/ICTEAM Best PhD Thesis Award
- 2008–2012 PhD scholarship from the Belgian scientific research foundation (FNRS/FRIA grant)
- 2010 CeFiP Academic Award Belgium for my master's thesis on SMEs financing
- 2008 Alcatel-Lucent Innovation Award for my master's thesis on network configuration
- 2007 Winner of the Belgium BEST Engineering Competition (beBEC)

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## Languages

- |         |                 |                      |
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| French  | Mother tongue   |                      |
| English | Fluent          |                      |
| Dutch   | Fair knowledge  | CEFR level B2 (2008) |
| German  | Basic knowledge |                      |

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## Teaching

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|------|--|--|
| 2017 | Discrete Event Systems<br>Communication Networks | with Prof. Roger Wattenhofer & Prof. Lothar Thiele                                 |
| 2016 | Discrete Event Systems<br>Communication Networks | with Prof. Roger Wattenhofer & Prof. Lothar Thiele                                 |
| 2015 | Discrete Event Systems<br>Communication Networks | with Prof. Roger Wattenhofer & Prof. Lothar Thiele<br>with Prof. Bernhard Plattner |

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## Research awards

|           |  |
|-----------|--|
| 2017-2020 | Swiss National Science Foundation (SNF)<br>“Data-Driven Internet Routing”  |
| 2017-2020 | Armasuisse & Zurich Information Security and Privacy Center (ZISC)<br>“Improving network security through programmability”                 |
| 2016-2018 | European Project Horizon 2020, Principal Investigator<br>“MAMI: Measurement and Architecture for a Middleboxed Internet”                   |
| 2016-2017 | Armasuisse & Zurich Information Security and Privacy Center (ZISC)<br>“Context-aware Digital Incident Data Compression and Representation” |

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## Research group

|            |                    |                   |   |
|------------|--------------------|-------------------|---|
| PhD        | Edgar Costa Molero | Mar 2017-         |   |
|            | Roland Meier       | Jan 2017-         |   |
|            | Tobias Bühler      | Nov 2016-         |   |
|            | Rüdiger Birkner    | July 2016-        | co-supervised with Prof. Martin Vechev (D-INFK) |
|            | Thomas Holterbach  | Jan 2016-         |   |
|            | Maria Apostolaki   | Sep 2015-         |   |
|            | Ahmed El-Hassany   | June 2015-        |   |
| Post-doc   | Mirja Kühlewind    | Oct 2015-         |   |
|            | David Gugelmann    | Nov 2015-Nov 2016 |   |
|            | Bernhard Ager      | Aug-Dec 2015      |   |
| Researcher | Brian Trammel      | Jan 2016-         |   |

*My group and I have supervised 25 master theses [M] and 18 semester theses [S] since 2015. The theses which lead to a peer-reviewed publication are indicated with a ●*

|     |      |   |
|-----|------|---|
| MSc | 2018 | <p>[M] Fabian Schleiss (supervised jointly with T. Holterbach and E. C. Molero)<br/>“Data-plane driven network convergence”</p> <p>[M] Samuel Steffen (supervised jointly with P. Tsankov, D. Drachler-Cohen, T. Gehr, M. Vechev)<br/>“Probabilistic Network Analysis and Synthesis”</p> <p>[M] Giorgio Tresoldi (externally supervised by V. Lenders and D. Moser)<br/>“Verifying ADS-B Position Claims with Passive Radar”</p> <p>[M] Piet De Vaere (supervised jointly with M. Kuehlewind and B. Trammel)<br/>“Adding measurability to QUIC”</p> <p>[S] Coralie Busse-Grawitz (supervised jointly with R. Meier)<br/>“Data-driven classification and isolation of network devices”</p> <p>[M] Ruggiero Dargenio (externally supervised by U. O’Reilly, MIT)<br/>“Learning Defenses in Computer Networks: Neural Networks Approach”</p>   |
|     | 2017 | <p>[S] Gian Marti (supervised jointly with M. Apostolaki)<br/>“Safeguarding Bitcoin Against Active Routing Attacks”</p> <p>[M] Nicola Rustignoli (supervised jointly with D. Dimitrova and J. Liagouris)<br/>“Constraint-based routing as a stream computation”</p> <p>[M] Michael Walter (externally supervised by with B. Trammell and M. Kühlewind)<br/>“Tracing Internet Path Transparency”</p> <p>[S] Pierre Dumont-dit-Voitel (externally supervised by V. Lenders, R. Meier, and D. Guggelmann)<br/>“Detection of Malicious Remote Shell Sessions”</p> <p>[M] Cornelia Scherrer (externally supervised by D. Gugelmann, V. Lenders, and R. Meier)<br/>“Analysis of Cyber Threat Intelligence Feeds”</p> <p>[M] Andreas Germann (externally supervised by M. Kühlewind and B. Trammell)<br/>“Evaluation of AQM schemes to support Low Latency in the Internet”</p> <p>[M] Andreas Pantelopoulos (supervised jointly with M. Apostolaki and E. C. Molero)<br/>“Towards accurate simulations of programmable dataplanes”</p> <p>[M] Antonios Karkatsoulis (supervised jointly with Prof. A. Singla)<br/>“Exploring the impact of TCP/IP parameter tuning on performance”</p> <p>[S] Fabian Schleiss (supervised jointly with R. Meier)<br/>“In-network Anomaly Detection with Programmable Switches”</p> <p>[S] Giorgio Tresoldi (externally supervised by V. Lenders)<br/>“A FLARM Receiver for Crowdsourced Air Traffic Monitoring”</p> <p>[S] Christelle Gloor (supervised jointly with A. El-Hassany)<br/>“Chronos: Finding the configurations recipe for fast convergence”</p> |

- [S] Simon Miescher (supervised jointly with T. Holterbach)  
“A Fast and Loop-Free Convergence upon Remote BGP Disruptions in Large IP Networks”
- [S] Philipp Mao (supervised jointly with T. Holterbach and R. Birkner)
  - “Boosting the convergence performance of SDX platforms”
- [S] Piet De Vaere (externally supervised by M. Kühlewind and B. Trammell)
  - “Continuous Measurements of Internet Path Transparency”
- [S] Floyd Basler (supervised jointly with M. Apostolaki)  
“Detecting and mitigating network attacks on Bitcoin”
  
- 2016 [M] Roman May (supervised jointly with A. El-Hassany)
  - “Practical Concurrency Analysis for SDN”
- [M] Ferran Llamas Arroniz (supervised jointly with Prof. Dr. S. Vissicchio, UCL London)  
“Improving Load-Balancing in IP-based Data Centers with Fibbing”
- [S] Stefan Rietmann  
“Applying meaningful destruction in Software-Defined Networks”
- [S] Dominic Brüttsch (externally supervised by M. Kühlewind and B. Trammell)  
“Cooperating with Middleboxes in the Internet”
- [M] Pavlos Lamprakis (externally supervised by with D. Gugelmann and M. Happe)
  - “Human or malware? Detection of malicious Web requests”
- [M] Edgar Costa Molero  
“Improving Load-Balancing Decisions in Data Center Networks Using SDN”
- [S] Severin Amrein (externally supervised by M. Kühlewind and D. Gugelmann)  
“Does your phone spy on you?”
- [S] Ruggiero Dargenio (externally supervised by D. Gugelmann)
  - “Accurate classification of Web requests”
- [M] Elio Gubser (externally supervised by B. Trammell and M. Kühlewind)
  - “Building a Path Transparency Observatory”
- [M] Rüdiger Birkner (supervised jointly with Prof. Dr. N. Feamster, Princeton University)
  - “On the Correctness of Inter-Domain Deflections”
- [M] Stephan Dollberg (supervised jointly with Prof. Dr. J. L. Sobrinho, Instituto Superior Técnico)  
“Implementation and validation of distributed route aggregation in the wild”
- [S] Pascal Sprenger (externally supervised by M. Kühlewind and B. Trammell)  
“Design and Implementation of an ECN Proxy for Performance Improvements in the Internet”
- [S] Martin Müller (externally supervised by M. Kühlewind and B. Trammell)  
“Integration of measurement probes into a distributed measurement plane”

- 2015 [M] Tobias Bühler
- “Improving Network-Wide Troubleshooting with Few SDN Devices”
- [M] James Guthrie
- “NetBursting: Network Infrastructure in the Cloud”
- [M] Roland Meier
- “SDN-based Network Obfuscation” **ETH medal for best M.Sc. thesis**
- [M] Maciej Bednarek (externally supervised by M. Kühlewind and B. Trammell)
- “Multipath bonding at Layer 3”
- [M] Tabita Arn
- Flexible SDN testing in production with Shadow Policies
- [S] Roman May
- “Supercharging IP router memory with SDN”
- [M] Damian Scherrer (supervised jointly with M. Brunner, P. Georgopoulos, B. Ager, V. Kotronis)
- “Self-Learning Enterprise Networks Via Software Defined Networking”
- [S] Rüdiger Birkner
- “Improving the scalability of Software-Defined Internet Exchange Points”
- [M] Jeremie Miserez (supervised jointly with P. Bielik and M. Vechev)
- “Detecting Concurrency Violations in Software-Defined Networks”

|            |                    |                   |   |
|------------|--------------------|-------------------|---|
| BSc        | Michael Alan Chang | Jan–Jun 2015      |   |
| Researcher | Nick Shelly        | Sep 2015–May 2016 |   |
| Intern     | Tobias Bühler      | Jan–Sept 2016     |   |
|            | Roland Meier       | Oct 2015–Feb 2016 |   |
|            | Rüdiger Birkner    | July–Aug 2015     |   |
|            | Thomas Holterbach  | Jan–Dec 2015      |   |
| Visitor    | Olivier Tilmans    | September 2017    | from the University of Louvain            |
|            | Shouxi Luo         | Oct 2015–Sep 2016 | from UESTC                                |
|            | Olivier Tilmans    | May–June 2016     | from the University of Louvain            |
|            | Liang Zhang        | Jul–Aug 2015      | from the Hong Kong Polytechnic University |

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## PhD Thesis committee

Der-Yeuan Yu, ETH Zürich. Advisor: Prof. Srdjan Capkun.

Maciej Kuzniar, EPFL. Advisor: Prof. Dejan Kostic.

Peter Peresini, EPFL. Advisor: Prof. Dejan Kostic.

Xuan-Nam Nguyen, INRIA Sophia Antipolis. Advisor: Dr. Thierry Turetli.

Olivier Tilmans, University of Louvain. Advisor: Prof. Olivier Bonaventure.

Ignacio de Castro Arribas, Universitat Oberta de Catalunya. Advisor: Dr. Sergey Gorinsky.

## Professional services to the academic community

|       |               |  |
|-------|---------------|--|
| 2018  | Program chair | ■ ACM SOSR'18  |
|       | TPC member    | ■ ACM SIGCOMM'18<br>■ ACM SIGCOMM Workshop on In-Network Computing   |
| 2017  | TPC member    | ■ ACM SIGCOMM'17<br>■ ACM CoNEXT'17<br>■ ACM SOSR'17   |
|       | Reviewer      | ■ IEEE/ACM Transactions on Networking<br>■ Elsevier Computer Networks  |
| 2016  | Jury member   | ■ Swisscom's Call for Innovation: SDN and NFV startups   |
|       | Chair         | ■ ACM SIGCOMM Doctoral Dissertation Award Committee<br>■ ACM CoNEXT'16 student workshop<br>■ USENIX NSDI'16 poster session   |
|       | TPC member    | ■ ACM SIGPLAN PLDI'16 (External Review Committee)<br>■ ACM CoNEXT'16   |
|       | Reviewer      | ■ IEEE/ACM Transactions on Networking<br>■ ACM SIGCOMM Computer Communication Review (CCR)   |
| 2015  | Organizer     | ■ Summer School on Software-Defined Networks (SDNschool'15)  |
|       | Reviewer      | ■ Wiley's International Journal of Network Management (SDN issue)<br>■ IWT (Flemish/Belgian government funding agency) project proposals<br>■ ACM Computing Surveys  |
|       | TPC member    | ■ ACM SOSR'16 (Symposium on SDN Research)<br>■ USENIX NSDI'16 (heavy)<br>■ ACM CoNEXT Student Workshop<br>■ ACM SIGCOMM AINTEC<br>■ ACM Distributed Cloud Computing (DCC) Workshop<br>■ IEEE International Conference on Network Protocols (ICNP'15) |
| 2014  | Reviewer      | ■ ACM Computing Surveys  |
|       | TPC member    | ■ ACM CoNEXT Student Workshop<br>■ IEEE ICNP CoolSDN Workshop<br>■ IEEE ICCCN<br>■ IEEE INFOCOM SDP Workshop<br>■ ONS Research Track<br>■ IEEE NetSys SDNflex Workshop   |
| 2008- | Member:       | ACM SIGCOMM, USENIX, IEEE Computer Society   |

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## Professional services to ETH Zürich

|       |           |  |
|-------|-----------|--|
| 2017  | Committee | <ul style="list-style-type: none"><li>■ ETH medals committee (D-ITET)</li><li>■ Search committee for professor in Embedded Information Systems</li></ul> |
| 2016  | Organizer | <ul style="list-style-type: none"><li>■ ETH Zürich programming challenge (100 participants)</li><li>■ ETH Zürich meets California's Hackathon</li></ul>  |
|       | Panelist  | <ul style="list-style-type: none"><li>■ "The Future of the Internet", ETH Zürich meets London</li></ul>  |
| 2016- | Sport     | <ul style="list-style-type: none"><li>■ ETH Zürich Professoren Ruderteam</li></ul>   |

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## Recent selected publications

Full-length and peer-reviewed (sorted by date)

Olivier Tilmans, Tobias Bühler, Ingmar Poesse, Stefano Vissicchio, Laurent Vanbever  
Stroboscope: Declarative Traffic Mirroring on a Budget  
*USENIX NSDI'18*. Washington, WA, USA (April 2018)

Ahmed El-Hassany, Petar Tsankov, Laurent Vanbever, Martin Vechev  
NetComplete: Practical Network-Wide Configuration Synthesis with Autocompletion  
*USENIX NSDI'18*. Washington, WA, USA (April 2018)

Rüdiger Birkner, Dana Drachler Cohen, Laurent Vanbever, Martin Vechev  
Net2Text: Interactive Summarization of Network Forwarding Behaviors  
*USENIX NSDI'18*. Washington, WA, USA (April 2018)

Thomas Holterbach, Stefano Vissicchio, Alberto Dainotti, Laurent Vanbever  
SWIFT: Predictive Fast Reroute  
*ACM SIGCOMM'17*. Los Angeles, CA, USA (August 2017)

Ahmed El-Hassany, Petar Tsankov, Laurent Vanbever, Martin Vechev  
Network-wide Configuration Synthesis  
*CAV'17*. Heidelberg, Germany (July 2017)

Maria Apostolaki, Aviv Zohar, Laurent Vanbever  
Hijacking Bitcoin: Routing Attacks on Cryptocurrencies  
*IEEE Symposium on Security and Privacy (S&P'17)*. San Jose, CA, USA (May 2017)

Ahmed El-Hassany, Jeremie Miserez, Pavol Bielik, Laurent Vanbever, Martin Vechev  
SDNRacer: Concurrency Analysis for Software-Defined Networks  
*ACM PLDI'16*. Santa Barbara, CA, USA (June 2016)

Arpit Gupta, Robert MacDavid, Rudiger Birkner, Marco Canini, Nick Feamster  
Jennifer Rexford, Laurent Vanbever  
An Industrial-Scale Software Defined Internet Exchange Point  
*USENIX NSDI'16*. Santa Clara, CA, USA (March 2016)

Stefano Vissicchio, Olivier Tilmans, Laurent Vanbever, Jennifer Rexford  
Central Control Over Distributed Routing  
*ACM SIGCOMM'15*. London, UK (August 2015)



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## Conference publications

Olivier Tilmans, Tobias Bühler, Ingmar Poesse, Stefano Vissicchio, Laurent Vanbever  
Stroboscope: Declarative Traffic Mirroring on a Budget  
*USENIX NSDI'18*. Washington, WA, USA (April 2018)

Ahmed El-Hassany, Petar Tsankov, Laurent Vanbever, Martin Vechev  
NetComplete: Practical Network-Wide Configuration Synthesis with Autocompletion  
*USENIX NSDI'18*. Washington, WA, USA (April 2018)

Rüdiger Birkner, Dana Drachler Cohen, Laurent Vanbever, Martin Vechev  
Net2Text: Interactive Summarization of Network Forwarding Behaviors  
*USENIX NSDI'18*. Washington, WA, USA (April 2018)

Thomas Holterbach, Stefano Vissicchio, Alberto Dainotti, Laurent Vanbever  
SWIFT: Predictive Fast Reroute  
*ACM SIGCOMM'17*. Los Angeles, CA, USA (August 2017)  
see <https://swift.ethz.ch>

Ahmed El-Hassany, Petar Tsankov, Laurent Vanbever, Martin Vechev  
Network-wide Configuration Synthesis  
*CAV'17*. Heidelberg, Germany (July 2017)  
see <http://synet.ethz.ch>

Pavlos Lamprakis, Ruggiero Dargenio, David Gugelmann, Vincent Lenders, Markus Happe, Laurent Vanbever  
Unsupervised Detection of APT C&C Channels using Web Request Graphs  
*DIMVA'17*. Bonn, Germany (July 2017)

Maria Apostolaki, Aviv Zohar, Laurent Vanbever  
Hijacking Bitcoin: Routing Attacks on Cryptocurrencies  
*IEEE Symposium on Security and Privacy (S&P'17)*. San Jose, CA, USA (May 2017)  
see <https://btc-hijack.ethz.ch>

Roman May, Ahmed El-Hassany, Laurent Vanbever, Martin Vechev  
BigBug: Practical Concurrency Analysis for SDN  
*ACM SOSR'17*. Santa Clara, CA, USA (April 2017)  
see <http://sdnracer.ethz.ch>

[CyCON award]

Roland Meier, David Gugelmann, Laurent Vanbever  
iTAP: In-network Traffic Analysis Prevention using Software-Defined Networks  
*ACM SOSR'17*. Santa Clara, CA, USA (April 2017)  
see <https://itap.ethz.ch>

Rüdiger Birkner, Arpit Gupta, Nick Feamster, Laurent Vanbever  
SDX-Based Flexibility or Internet Correctness? Pick Two!  
*ACM SOSR'17*. Santa Clara, CA, USA (April 2017)

Shouxi Luo, Hongfang Yu, Laurent Vanbever  
Swing State: Consistent Updates for Stateful and Programmable Data Planes  
*ACM SOSR'17*. Santa Clara, CA, USA (April 2017)

Ahmed El-Hassany, Jeremie Miserez, Pavol Bielik, Laurent Vanbever, Martin Vechev  
SDNRacer: Concurrency Analysis for Software-Defined Networks  
*ACM PLDI'16*. Santa Barbara, CA, USA (June 2016)  
see <http://sdnracer.ethz.ch>

[NSDI community award]

Arpit Gupta, Robert MacDavid, Rudiger Birkner, Marco Canini, Nick Feamster  
Jennifer Rexford, Laurent Vanbever  
An Industrial-Scale Software Defined Internet Exchange Point  
*USENIX NSDI'16*. Santa Clara, CA, USA (March 2016)  
see <http://sdx.cs.princeton.edu>

Arpit Gupta, Nick Feamster, Laurent Vanbever  
FLANC: A Formal Logic for Authorizing Network Control  
*ACM SOSR'16*. Santa Clara, CA, USA (March 2016)

Karla Saur, Joseph Collard, Nate Foster, Arjun Guha, Laurent Vanbever, Michael Hicks  
Safe and Flexible Controller Upgrades for SDN  
*ACM SOSR'16*. Santa Clara, CA (March 2016)

Thomas Holterbach, Cristel Pelsser, Randy Bush, Laurent Vanbever  
Quantifying interference between measurements on the RIPE Atlas platform  
*ACM IMC'15*. Tokyo, Japan (October 2015)

Yixin Sun, Anne Edmundson, Laurent Vanbever, Oscar Li, Jennifer Rexford, Mung Chiang, Prateek Mittal  
RAPTOR: Routing Attacks on Privacy in Tor  
*USENIX Security'15*. Washington, D.C., USA (August 2015)

[best paper]  
[ANRP prize]

Stefano Vissicchio, Olivier Tilmans, Laurent Vanbever, Jennifer Rexford  
Central Control Over Distributed Routing  
*ACM SIGCOMM'15*. London, UK (August 2015)  
see <http://fibbing.net>

Peng Sun, Laurent Vanbever, Jennifer Rexford  
Scalable Programmable Inbound Traffic Engineering  
*ACM SOSR'15*. Santa Clara, US (June 2015)

Jeremie Miserez, Pavol Bielik, Ahmed El-Hassany, Laurent Vanbever, Martin Vechev  
SDNRacer: Detecting Concurrency Violations in Software-Defined Networks  
*ACM SOSR'15*. Santa Clara, US (June 2015)

Stefano Vissicchio, Luca Cittadini, Olivier Bonaventure, Geoffrey Xie, Laurent Vanbever  
On the Co-Existence of Distributed and Centralized Routing Control-Planes  
*IEEE INFOCOM'15*. Hong Kong (April 2015)

[ANRP prize]

João Luis Sobrinho, Laurent Vanbever, Franck Le, Jennifer Rexford  
DRAGON: Distributed Route Aggregation on the Global Network  
*ACM CoNEXT'14*. Sydney, Australia (December 2014)  
see <http://route-aggregation.net>

Shuyuan Zhang, Sharad Malik, Sanjai Narain, Laurent Vanbever  
In-Band Update for Network Routing Policy Migration  
*IEEE ICNP'14* (Concise paper). Raleigh, NC, USA (October 2014).

Arpit Gupta, Laurent Vanbever, Muhammad Shahbaz, Sean Donovan, Brandon Schlinker,  
Nick Feamster, Jennifer Rexford, Scott Shenker, Russ Clark, Ethan Katz-Bassett  
SDX: A Software Defined Internet Exchange  
*ACM SIGCOMM'14*. Chicago, IL, USA (August 2014)

Stefano Vissicchio, Laurent Vanbever, Luca Cittadini, Geoffrey Xie, Olivier Bonaventure  
Safe Routing Reconfigurations with Route Redistribution  
*IEEE INFOCOM'14*. Toronto, ON, Canada (April 2014)

Xin Jin, Li Erran Li, Laurent Vanbever, Jennifer Rexford  
SoftCell: Scalable and Flexible Cellular Core Network Architecture  
*ACM CoNEXT'13*. Santa Barbara, CA, USA (December 2013)

[best paper]

Marco Chiesa, Luca Cittadini, Laurent Vanbever, Stefano Vissicchio, Giuseppe Di Battista  
Using Routers to Build Logic Circuits: How Powerful is BGP?  
*IEEE ICNP'13*. Göttingen, Germany (October 2013)

Laurent Vanbever, Stefano Vissicchio, Luca Cittadini, Olivier Bonaventure  
When the Cure is Worse than the Disease: the Impact of Graceful IGP Operations on BGP  
*IEEE INFOCOM'13*. Turin, Italy (April 2013)

Stefano Vissicchio, Luca Cittadini, Laurent Vanbever, Olivier Bonaventure  
iBGP Deceptions: More Sessions, Fewer Routes  
*IEEE INFOCOM'12*. Orlando, FL, USA (March 2012)

Laurent Vanbever, Stefano Vissicchio, Cristel Pelsser, Pierre Francois, Olivier Bonaventure  
Seamless Network-Wide IGP Migrations  
*ACM SIGCOMM'11*. Toronto, ON, Canada (August 2011)

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## Journal publications

Stefano Vissicchio, Laurent Vanbever, Luca Cittadini, Geoffrey G. Xie, Olivier Bonaventure  
Safe Update of Hybrid SDN Networks  
*IEEE/ACM Transactions on Networking*, Volume 25, Issue 3, pp. 1649-1662 (June 2017)

João Luis Sobrinho, Laurent Vanbever, André Sousa, Franck Le, Jennifer Rexford  
Scaling the Internet Routing System through Distributed Route Aggregation  
*IEEE/ACM Transactions on Networking*, Volume 24, Issue 6, pp. 3462-3476 (December 2016)  
see <http://route-aggregation.net>

Stefano Vissicchio, Laurent Vanbever, Olivier Bonaventure  
Opportunities and Research Challenges of Hybrid Software Defined Networks  
*ACM SIGCOMM Computer Communications Review*, Editorial Zone (April 2014)

[ANRP prize]

Stefano Vissicchio, Laurent Vanbever, Cristel Pelsser, Luca Cittadini, Pierre Francois, Olivier Bonaventure  
Improving Network Agility with Seamless BGP Reconfigurations  
*IEEE/ACM Transactions on Networking*, Volume 21, Issue 3, pp. 990-1002 (June 2013)

Laurent Vanbever, Stefano Vissicchio, Cristel Pelsser, Pierre Francois, Olivier Bonaventure  
Lossless Migrations of Link-State IGPs  
*IEEE/ACM Transactions on Networking*, Volume 20, Issue 6, pp. 1842-1855 (December 2012)

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## Workshop publications

Aaron Gember-Jacobson, Costin Raiciu, Laurent Vanbever  
Integrating Verification and Repair into the Control Plane  
*ACM HotNets'17*. Palo Alto, California, USA (November 2017)

Thomas Holterbach, Emile Aben, Cristel Pelsser, Randy Bush, Laurent Vanbever  
Measurement Vantage Point Selection Using A Similarity Metric  
*ACM, IRTF & ISOC Applied Networking Research Workshop*. Prague, Czech Republic (July 2017)

Olivier Tilmans, Tobias Bühler, Stefano Vissicchio, Laurent Vanbever  
Mille-Feuille: Putting ISP traffic under the scalpel  
*ACM HotNets'16*. Atlanta, Georgia, USA (November 2016)

Nick Shelly, Brendan Tschaen, Klaus-Tycho Forster, Michael Chang, Theophilus Benson, Laurent Vanbever  
Destroying networks for fun (and profit)  
*ACM HotNets'15*. Philadelphia, PA, USA (November 2015)

Laurent Vanbever, Oscar Li, Jennifer Rexford, Prateek Mittal  
Anonymity on QuickSand: Using BGP to Compromise Tor  
*ACM HotNets'14*. Los Angeles, CA, USA (October 2014)

Stefano Vissicchio, Laurent Vanbever, Jennifer Rexford  
Sweet Little Lies: Fake Topologies for Flexible Routing  
*ACM HotNets'14*. Los Angeles, CA, USA (October 2014)

Laurent Vanbever, Stefano Vissicchio  
Enabling SDN in old school networks with Software-Controlled Routing Protocols  
*Open Network Summit (Research Track)*. Santa Clara, CA, USA (March 2014)

Laurent Vanbever, Joshua Reich, Theophilus Benson, Nate Foster, Jennifer Rexford  
HotSwap: Correct and Efficient Controller Upgrades for Software-Defined Networks  
*ACM SIGCOMM HotSDN'13*. Hong Kong, China (August 2013)

Xin Jin, Li Erran Li, Laurent Vanbever, Jennifer Rexford  
CellSDN: Software-Defined Cellular Core Networks  
*Open Network Summit (Research Track)*. Santa Clara, CA, USA (April 2013)

Laurent Vanbever, Bruno Quoitin, Olivier Bonaventure  
A Hierarchical Model for BGP Routing Policies  
*ACM SIGCOMM PRESTO*. Barcelona, Spain (August 2009)

Laurent Vanbever, Grégory Pardoën, Olivier Bonaventure  
Towards Validated Network Configurations with NCGuard  
*Internet Network Management*. Orlando, FL, USA (October 2008)

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## Theses

[SIGCOMM & UCL prize]

Methods and Techniques for Disruption-Free Network Reconfiguration  
*PhD thesis*. University of Louvain, Louvain-la-Neuve, Belgium (October 2012)

[CeFiP prize]

Liquidity analysis of the Belgian non-regulated stock market. How to improve it?  
*Master thesis*. Solvay Brussels School of Economics & Management, Brussels, Belgium (June 2010)

[Alcatel prize]

Design and implementation of a software enabling the validation and the generation of network configurations  
*Master thesis*. University of Louvain, Louvain-la-Neuve, Belgium (June 2008)

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## Demos

Philipp Mao, Rüdiger Birkner, Thomas Holterbach, Laurent Vanbever  
Boosting the BGP convergence in SDXes with SWIFT  
*ACM SIGCOMM'17*. Los Angeles, CA, USA (August 2017)

Olivier Tilmans, Stefano Vissicchio, Laurent Vanbever, Jennifer Rexford  
Fibbing in action: On-demand load-balancing for better video delivery  
*ACM SIGCOMM'16*. Florianopolis, Brazil (August 2016)

Michael Alan Chang, Brendan Tschaen, Theophilus Benson, Laurent Vanbever  
Chaos Monkey: Increasing SDN Reliability through Systematic Network Destruction  
*ACM SIGCOMM'15*. London, UK (August 2015)

Arpit Gupta, Laurent Vanbever, Muhammad Shahbaz, Sean Donovan, Brandon Schlinker, Nick Feamster, Jennifer Rexford, Scott Shenker, Russ Clark, Ethan Katz-Bassett  
SDX: A Software Defined Internet Exchange  
*ACM SIGCOMM'14*. Chicago, IL, USA (August 2014)

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## Technical reports

Ahmed El-Hassany, Petar Tsankov, Laurent Vanbever, Martin Vechev  
Network-wide Configuration Synthesis  
eprint arXiv:1611.02537 (Nov 2016)

Maria Apostolaki, Aviv Zohar, Laurent Vanbever  
Hijacking Bitcoin: Large-scale Network Attacks on Cryptocurrencies  
eprint arXiv:1605.07524 (May 2016)

Michael Alan Chang, Thomas Holterbach, Markus Happe, Laurent Vanbever  
Supercharge me: Boost Router Convergence with SDN  
eprint arXiv:1505.06630 (May 2015)

Karla Saur, Joseph Collard, Nate Foster, Arjun Guha, Laurent Vanbever, Michael Hicks  
Morpheus: Safe and Flexible Dynamic Updates for SDNs  
University of Maryland (March 2015)

Yixin Sun, Anne Edmundson, Laurent Vanbever, Oscar Li, Jennifer Rexford, Mung Chiang, Prateek Mittal  
RAPTOR: Routing Attacks on Privacy in Tor  
eprint arXiv:1503.03940 (March 2015)

Arpit Gupta, Muhammad Shahbaz, Laurent Vanbever, Hyojoon Kim, Russ Clark,  
Nick Feamster, Jennifer Rexford, Scott Shenker  
SDX: A Software Defined Internet Exchange  
Georgia Institute of Technology, GT-CS-13-06 (November 2013)

Stefano Vissicchio, Laurent Vanbever, Luca Cittadini, Geoffrey Xie, Olivier Bonaventure  
Safe Updates of Hybrid SDN Networks  
University of Louvain, TR-134360 (October 2013)

Xin Jin, Li Erran Li, Laurent Vanbever, Jennifer Rexford  
SoftCell: Taking Control of Cellular Core Networks  
Princeton University, TR-950-13 (May 2013)

Marco Chiesa, Luca Cittadini, Giuseppe Di Battista, Laurent Vanbever, Stefano Vissicchio  
Computing with BGP: from Routing Configurations to Turing Machines  
University of Louvain, TR-113003 (August 2012)

Olivier Bonaventure, Simon van der Linden, Laurent Vanbever  
Towards a Modular Architecture for Future Internet Control Plane Protocols  
University of Louvain, 2010

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## Patents

Michael Alan Chang, Thomas Holterbach, Laurent Vanbever  
Speeding up the convergence of network devices using low-cost SDN switches  
U.S. patent, Provisional Application 62/165,362 (May 2015)

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## Presentations and invited talks

Improving network security through programmability

Industry            Armasuisse, Thun, Switzerland (August 2017)

Hijacking Bitcoin: Routing Attacks on Cryptocurrencies

Academia           Summer Research Institute 2017, EPFL, Lausanne, Switzerland (June 2017)

Industry            IBM Research, Zürich, Switzerland (May 2017)

Network programmability. A primer on routing synthesis

Academia            Dagstuhl Seminar, Germany (January 2017)

SWIFT: Predictive Fast Reroute upon Remote BGP Disruptions

Academia            Munich Internet Research Retreat, Germany (November 2016)

Improving the Internet. From Fragility to Resilience

Academia            World Web Forum, Zürich, Switzerland (January 2017)

ETH Zürich, Switzerland (December 2015)

The Future of the Internet

General            ETH Zürich, "Zürich meets London", London, UK (May 2016)

Boosting existing networks with Software-Defined Networking

Industry            ABB corporate research center, Baden-Dättwil, Switzerland (July 2016)

Open Cloud Day 2016, Winterthur, Switzerland (June 2016)

SWITCH, Zürich, Switzerland (November 2015)

Swisscom AG, Ittigen, Switzerland (May 2015)

Academia            École polytechnique fédérale de Lausanne (EPFL), Switzerland (June 2016)

Hebrew University, Jerusalem (June 2015)

ETH Zürich, Switzerland (April 2015)

SIGCOMM preview session: SDN track

Academia            ACM SIGCOMM 2015, London, UK (August 2015)

SDN Research Directions: Promising problems to invest time on

Academia            Summer School on Software-Defined Networks (SDNschool 2015), Greece (July 2015)

Anonymity on QuickSand: Using BGP to Compromise Tor

Conference        ACM HotNets 2014 Workshop. Los Angeles, CA, USA (October 2014)

Academia            Columbia University, New York City, NY, USA (May 2015)

Making the Internet more scalable and manageable

Academia            ETH Zürich, Switzerland (June 2014)

#### Enabling SDN in old school networks with Software-Controlled Routing Protocols

Industry Open Network Summit, Santa Clara, CA, USA (March 2014)

#### On integrating Software-Defined Networking within existing routing systems

Industry Applied Communication Sciences (ACS), NJ, USA (August 2014)  
Facebook Inc., Menlo Park, CA, USA (November 2013)  
Google Inc., Mountain View, CA, USA (November 2013)  
Academia Stanford University, Stanford, CA, USA (November 2013)  
UC Berkeley, Berkeley, CA, USA (November 2013)

#### Novel Applications for an SDN-Enabled Internet Exchange Point

Industry AT&T/ON.Lab/Intel SDN retreat, Stanford University, Stanford, CA (October 2014)  
Workshop on Prototyping and Deploying Experimental SDX, Washington DC, (June 2014)  
RIPE 67, Plenary Session, Athens, Greece (October 2013)  
Software Defined Networking Research Group, IETF 87, Berlin, Germany (July 2013)  
Academia Fed4FIRE/GENI Research Experiment Summit, FGRE 2014, Ghent, Belgium (July 2014)

#### HotSwap: Correct and Efficient Controller Upgrades for Software-Defined Networks

Conference ACM SIGCOMM HotSDN 2013 Workshop (August 2013)

#### CellSDN: Taking control of cellular core networks

Industry IBM Thomas J Watson Research Center, NY, USA (April 2013)

#### Improving Network Agility with Seamless BGP Reconfigurations

Industry IRTF Open Meeting, IETF, Berlin, Germany (July 2013)  
AT&T Labs Research, Florham Park, NJ, USA (March 2012)  
Academia Princeton University, Princeton, NJ, USA (March 2012)

#### iBGP Deceptions: More Sessions, Fewer Routes

Conference IEEE INFOCOM 2012, Orlando, FL, USA (March 2012)

#### Seamless Network-Wide (IGP) Migrations

Conference ACM SIGCOMM 2011, Toronto, ON, Canada (August 2011)  
Industry Network Automation, Upperside conferences, Paris, France (November 2011)  
Internet Initiative Japan, Tokyo, Japan (February 2011)  
Academia Roma Tre University, Rome, Italy (May 2011)

#### Customized BGP Route Selection Using BGP/MPLS VPNs

Industry Internet Initiative Japan, Tokyo, Japan (February 2010)  
Routing Symposium, Cisco Systems, San Jose, CA, USA (October 2009)

#### A Hierarchical Model for BGP Routing Policies

Conference ACM SIGCOMM PRESTO Workshop, Barcelona, Spain (August 2009)



**Unleashing Network Testing and Troubleshooting**

Academia            Trilogy Summer School, Louvain-la-Neuve, Belgium (August 2009)

**Towards Validated Network Configurations with NCGuard**

Conference            Internet Network Management Workshop, Orlando, FL, USA (October 2008)

Workshop on Data Networks as Formal Objects, Adelaide, Australia (February 2010)