

# Maria Apostolaki

## Curriculum Vitae

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### Research Interests

Network Security, Cryptocurrencies, Blockchain, Internet Routing, Networking, Systems.

### Education

- Sep 2015–Present **PhD Student in Department of Information Technology and Electrical Engineering, ETH Zürich,**  
*Thesis:* Routing Security on Cryptocurrencies.  
*Advisor:* Prof. Laurent Vanbever
- Sep 2010–Jul 2015 **MEng Electrical and Computer Engineering,**  
*National Technical University of Athens, GPA 9.22/10.00*  
Major: Computer Software & Systems; Minor: Biomedical engineering,  
*Thesis:* Cooperative mitigation of DDoS in SDN environment.  
*Advisor:* Prof. Vasilis Maglaris

### Research Experience

- Sep 2015–Present **Research Assistant, ETH Zürich, Networked Systems Group, Switzerland.**  
*Advisor:* Prof. Laurent Vanbever
- Oct 2018–Apr 2019 **Part-time Researcher, Microsoft Research, Mobility & Networking Research Group, Redmond, WA.**  
*Host:* Dr. Victor Bahl
- Oct 2018–Jan 2019 **Visiting Student, Massachusetts Institute of Technology (MIT), Cambridge, MA.**  
*Advisor:* Prof. Manya Ghobadi
- Jun 2018–Aug 2018 **Research Intern, Microsoft Research, Mobility & Networking Research Group, Redmond, WA.**  
*Host:* Prof. Manya Ghobadi
- Jun 2017–Sep 2017 **Software Engineering Intern, Google, Networking Infrastructure Group, Mountain View, CA.**  
*Host:* Dr. Tobias Flach
- Sep 2014–Jul 2015 **Undergraduate Research Assistant, NTUA, Network Management Lab, Athens, Greece.**  
*Advisor:* Prof. Vasilis Maglaris

### Awards

- **Rising Stars in EECS Workshop, 2020**  
Selected to attend the academic workshop at UC Berkeley.
- **Facebook Fellowship Awards Finalist, 2020**  
Selected as finalist for the Networking & Connectivity field (top 4%).
- **IRTF/IETF Applied Networking Research Prize, 2018**  
Awarded for my work on routing attacks on cryptocurrencies.
- **GHC Student Scholarship by Anita Borg Institute, 2017**  
Selected to attend the Grace Hopper Celebration of Women in Computing (acceptance rate 4%).
- **Winner of the Zühlke & Schindler IoT big data sensing challenge, Hackathon Zürich 2016**  
Extraction of user motion patterns from smartphone sensor data in an interdisciplinary group of four members from ETH Zurich and university of Cambridge.

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## Professional Service

- Student Representative in Faculty Hiring Committee, D-ITET ETH, 2020
- External Review Committee Member, ACM CCS 2020
- Reviewer for ACM Transactions on Privacy and Security, 2020
- Program Committee Member, SPIN (ACM Workshop SIGCOMM) 2020

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## Publications

### Network Security

- [1] **M. Apostolaki**, A. Zohar, and L. Vanbever, "Hijacking Bitcoin: Routing Attacks on Cryptocurrencies," in *Proceedings of the 38th IEEE Symposium on Security and Privacy (S&P'17)*, 2017. Acceptance rate: 12.9% (60/463), IETF/IRTF ANRP Award .
- [2] **M. Apostolaki**, G. Marti, J. Müller, and L. Vanbever, "SABRE: Protecting Bitcoin against Routing Attacks," in *Proceedings of the 26th Network and Distributed System Security Symposium (NDSS'19)*, 2019. Acceptance rate: 17.0% (89/521).
- [3] Y. Sun, **M. Apostolaki**, H. Birge-Lee, L. Vanbever, J. Rexford, M. Chiang, and P. Mittal, "Securing Internet Applications from Routing Attacks," *Communications of the ACM (CACM)*, 2020.
- [4] K. Giotis, **M. Apostolaki**, and V. Maglaris, "A reputation-based collaborative schema for the mitigation of distributed attacks in SDN domains," in *Proceedings of the 2016 IEEE/IFIP Network Operations and Management Symposium (NOMS'16)*, 2016. Acceptance rate: 25.3% (54/213).
- [5] **M. Apostolaki**, C. Maire, and L. Vanbever, "PERIMETER: A Network-layer Attack on the Anonymity of Cryptocurrencies," *Under submission*.
- [6] E. C. Kirci, **M. Apostolaki**, R. Meier, A. Singla, and L. Vanbever, "Mass Surveillance of VoIP Calls Does Not Require a Nation-state Budget," *Work in progress*.

### Network Management

- [1] T. Holterbach, E. C. Molero, **M. Apostolaki**, A. Dainotti, S. Vissicchio, and L. Vanbever, "Blink: Fast Connectivity Recovery Entirely in the Data Plane," in *Proceedings of the 16th USENIX Symposium on Networked Systems Design and Implementation (NSDI'19)*, 2019. Acceptance rate: 14.7% (49/332).
- [2] P. Wintermeyer, **M. Apostolaki**, A. Dietmüller, and L. Vanbever, "P2GO: P4 Profile-Guided Optimizations," in *Proceedings of the 19th ACM Workshop on Hot Topics in Networks (HotNets'20)*, 2020. Acceptance rate: 25.0% (30/120).
- [3] **M. Apostolaki**, L. Vanbever, and M. Ghobadi, "FAB: Toward Flow-aware Buffer Sharing on Programmable Switches," in *Proceedings of the 2019 ACM Workshop on Buffer Sizing*, 2019.
- [4] **M. Apostolaki**, A. Singla, and L. Vanbever, "Performance-Driven Internet Path Selection," *arXiv preprint*, 2020.
- [5] **M. Apostolaki**, V. Addanki, M. Ghobadi, and L. Vanbever, "Plasticine: A Flexible Buffer Management Scheme for Data Center Switches," *Under submission*.

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## Research in the News

- **Hacker News**, “Hijacking Bitcoin: Routing Attacks on Cryptocurrencies”, 2017
- **Bitcoin.com**, “Research shows how Bitcoin can be attacked via internet routing infrastructure”, 2017
- **The Morning Paper**, “Hijacking Bitcoin: routing attacks on cryptocurrencies”, 2017
- **Coindesk**, “How SABRE Tech Can Stop Hackers From Splitting Bitcoin Into Two”, 2019
- **The Register**, “Evil ISPs could disrupt Bitcoin’s blockchain”, 2017
- **Cryptoheroes**, “Introducing SABRE - Bitcoin’s New Relay Network”, 2019
- **Hacking, Distributed**, “Hijacking Bitcoin: Routing Attacks on Cryptocurrencies”, 2017
- **Coin Telegraph**, “Bitcoin Network Faces "Hijack" Threat From ISPs: ETH Zurich ”, 2017
- **Naked Security**, “Internet routing weakness could cost Bitcoin users”, 2017
- **Bitcoin Insider**, “New SABRE Relay Network Intends on Defending Bitcoin Attackers”, 2019
- **Noction**, “BGP and Cryptocurrencies”, 2017
- **Radix**, “What are network splits?”, 2018
- **Disruptor**, “BGP Hijacking Vulnerability Allows for Bitcoin Double Spending”, 2017

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## Invited & Conference Talks

- **Large Scale Routing Attacks on Bitcoin**
  - 38th IEEE Symposium on Security and Privacy, (S&P’17)
  - Princeton University, NJ, USA (hosted by Prof. Jennifer Rexford)
  - IBM, Zurich, Switzerland (hosted by Prof. Christian Cachin)
  - Ernst & Young, Zurich, Switzerland (hosted by Dr. Tom Hofmann)
  - RIPE RCC 88, Amsterdam Netherlands (hosted by Luca Cicchelli)
- **Protecting Blockchain Applications from BGP Hijacking**
  - 26th Network and Distributed System Security Symposium (NDSS’19)
  - ACM AFT, Zurich, Switzerland (invited by the chairs)
  - Hopperx1, London, UK (selected by AnataB.org London Committee)
  - IETF 102, Montreal, Canada (selected by IRTF committee)
  - ChainSecurity, Zurich, Switzerland (hosted by Dr. Petar Tsankov)
- **P2GO: P4 Profile-Guided Optimizations**
  - 19th ACM Workshop on Hot Topics in Networks (HotNets’20)
- **Routing Security on Blockchain Systems**
  - PL Research Seminars, Protocol Labs (hosted by Prof. Yiannis Psaras)
- **FAB: Toward Flow-aware Buffer Sharing on Programmable Switches**
  - ACM Workshop on Buffer Sizing at Stanford University
- **Plasticine: A Flexible Buffer Management Scheme for Data Center Switches**
  - MIT, CSAIL (scheduled) (hosted by Prof. Manya Ghobadi)

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## Teaching

Fall 2016-2020 **Teaching Assistant**, *ETH Zürich*, Switzerland.

- Discrete Event Systems.
- Advanced Topics in Communication Networks.

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## Mentoring

- Oct 2015–Present **Thesis Supervisor, ETH Zürich, Switzerland.**
- o Control meets Programmable Data Planes (Master Student).
  - o Programmable Buffer Management (Master Student).
  - o Meta Congestion Control (Master Student).
  - o Ensuring Transport Fairness with Smart Networks (Master Student).
  - o Traffic Aware Compilation (Master Student).
  - o De-anonymizing Users of Cryptocurrencies (Master Student).
  - o Toward Flow-aware Buffer Sharing (Master Student).
  - o Protecting Blockchain Applications with Programmable Networks (Master Student).
  - o Improving Internet Path Selection with SDN (Master Student).
  - o Improving Distributed Denial of Service Mitigation using SDN (Master Student).
  - o Detecting and Mitigating Network Attacks on Bitcoin (Master Student).
  - o Data-Driven Performance Correlation (Master Student).
  - o Load Balancing in a Datacenter using the Data Plane (Master Student).
  - o Data-Driven Performance Correlation (Master Student).
  - o Multi-path Routing (Master Student).

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## Extracurricular Activities

- 2018–Present **Member of Diversity & Inclusion Organization, D-ITET ETH.**
- o Organization of workshops and mentoring program for supporting underrepresented students.
- 2014 **Member of Fund Raising Team in Job Fair Athens.**
- o Organization of the first-ever company workshop in the Fair with 50 participants.

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## Languages

English, Greek (Native), German

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## References

**Prof. Laurent Vanbever**

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**Prof. Aviv Zohar**

School of Engineering and Computer Science  
The Hebrew University of Jerusalem  
✉ avivz@cs.huji.ac.il

**Prof. Prateek Mittal**

Department of Electrical Engineering  
Princeton University  
✉ pmittal@princeton.edu

**Prof. Manya Ghobadi**

CSAIL  
Massachusetts Institute of Technology  
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**Dr. Victor Bahl**

Technical Fellow & Chief Technology Officer  
Azure for Operators  
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