



Spring 2021 Colloquium

Department of Computer and Information Sciences

Self-Adjusting Networks: From Metrics to Algorithms

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Professor

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Zoom Link: <https://temple.zoom.us/j/7348129717>

Abstract: In this talk I will present the vision of self-adjusting networks: communication networks whose physical topology adapts to the traffic pattern it serves, in a demand-aware manner. This vision is reminiscent of biased and self-adjusting data structures, such as Mehlhorn trees and splay trees. Self-adjusting networks are enabled by emerging reconfigurable optical technologies. I will show that the benefit of self-adjusting networks depends on the amount of "structure" there is in the demand, and present an information-theoretical approach to measure the complexity of traffic traces and derive entropy-based metrics accordingly. I will also present optimal offline and online algorithms to design self-adjusting networks whose performance matches the derived metrics asymptotically.



Bio: Stefan Schmid is a Professor at the Faculty of Computer Science, at University of Vienna, Austria. He obtained his diploma (MSc) in Computer Science at ETH Zurich in Switzerland (minor: micro/macro economics, internship: CERN) and did his PhD in the Distributed Computing Group led by Prof. Roger Wattenhofer, also at ETH Zurich. As a postdoc, he worked with Prof. Christian Scheideler at the Chair for Efficient Algorithms at the Technical University of Munich and at the Chair for Theory of Distributed Systems at the University of Paderborn, in Germany. From 2009 to 2015, Stefan Schmid was a senior research scientist at the Telekom Innovation Laboratories (T-Labs) and at TU Berlin in Germany (Internet Network Architectures group headed by Prof. Anja Feldmann). In 2013/14, he was an INP Visiting Professor at CNRS (LAAS), Toulouse, France, and in 2014, a Visiting Professor at Université catholique de Louvain (UCL), Louvain-la-Neuve, Belgium. From 2015 to 2017, Stefan Schmid was a (tenured) Associate Professor in the Distributed, Embedded and Intelligent Systems group at Aalborg University, Denmark, and continued working part-time at TU Berlin, Germany. Since 2015, he serves as the Editor of the Distributed Computing Column of the Bulletin of the European Association of Theoretical Computer Science (BEATCS), since 2016 as Associate Editor of IEEE Transactions on Network and Service Management (TNSM), and since 2019 as Editor of IEEE/ACM Transactions on Networking (ToN). Stefan Schmid received the IEEE Communications Society ITC Early Career Award 2016 and acquired several major grants including an ERC Consolidator Grant, various other EU grants (e.g., STREP and IP projects), a German-Israeli GIF grant, a Villum Fonden grant, a WWTF grant, and various German grants (e.g., from BSI and BMBF). Stefan Schmid's research interests revolve around the fundamental and algorithmic problems of networked and distributed systems.