

## TUM-Lecture: Digital Signal Processing for Optical Communication Systems (DSP-OCS)

High-throughput fiber-optical communication systems are essential for the backbone of today's internet, as well as technologies like the 5th generation of wireless networks (5G). Ideally, every device should be directly connected to an optical fiber link, as it provides higher bandwidth and performance compared to copper-based or wireless communication systems. This would obviously be very impractical as it limits the mobility of the connected devices. To bridge the short distance between a mobile device and the fiber backbone, wireless networks, like 5G, will complement optical data transmission systems. By all means, the optical backbone will be in charge to transport most of the traffic from and to the wireless base stations. Therefore it is important to model, understand and optimize optical communication links.

Our lecture introduces you to the key building blocks of a practical optical communication system and therefore complements the lecture Optical Communication Systems (OCS). We will briefly review what the transmitter, receiver and the optical fiber channel consist of and discuss typical impairments affecting each of the components. As central part of the course, you will learn to formulate models for the impairments and successively apply digital signal processing (DSP) to mitigate these perturbations. The lecture will contain the necessary theory to understand the effects occurring in an optical communication system. The exercises will be student-centered and include hands-on programming in a Python framework. You will simulate, visualize and compensate a variety of impairments and acquire profound knowledge of practical optical data transmission systems.

Start date: Summer term 2020

Link: <https://www.ei.tum.de/en/lnt/teaching/lectures>

