

A U S H A N G

FREIE UNIVERSITÄT BERLIN

Fachbereich Mathematik und Informatik

Promotionsbüro, Arnimallee 14, 14195 Berlin

D I S P U T A T I O N

Montag, 24. November 2025, 16:00 Uhr

Ort: Seminarraum 006 & [WebEx](#)
(Fachbereich Mathematik und Informatik, Takustr. 9, 14195 Berlin)

Disputation über die Doktorarbeit von

Michael Schäfer

Thema der Dissertation:

Non-linear Data-driven Transforms for Visual Data Compression

Thema der Disputation:

Recent Advances in Transform Coding Techniques for Image and Video Compression

Die Arbeit wurde unter der Betreuung von **Prof. Dr.-Ing. H. Schwarz** durchgeführt.

Abstract: Transform coding methods are a key component in lossy image and video coding standards JPEG, AVC, HEVC and VVC, because there are efficient entropy coding methods for transmitting the transform coefficients.

Thus, the first talk will present state-of-the-art approaches for designing codingefficient transforms. These include methods like the Karhunen-Loève theorem, trigonometric transforms, and learned linear transforms like LFNST and NSPT, some of which are supported by VVC. Furthermore, learned codecs for image compression like JPEG AI are presented. These methods rely on non-linear transform coding. In the second talk, I will present novel methods for non-linear transform coding. Rate-distortion optimization methods and quantizers designed for linear block transforms are applied to learned image codecs for increasing the coding efficiency. Then, data-trained, non-linear transform coding tools are developed for block-based video compression. Integrating these tools into VVC yields improved bitrate savings.

Die Disputation besteht aus dem o. g. Vortrag, danach der Vorstellung der Dissertation einschließlich jeweils anschließenden Aussprachen.

Interessierte werden hiermit herzlich eingeladen

Der Vorsitzende der Promotionskommission
Prof. Dr.-Ing. H. Schwarz