

## Invitation to the Oral Examination – Department MATH

For the occasion of his examination for a Doctoral Degree,

**Benedikt Fluhr**

will present his dissertation entitled/on

***Cohomological and Derived Persistence Theory of Functions***

on **Wednesday, December 18<sup>th</sup> 2024** at **16:00 h CET**

Attendance to the presentation is open to the public. The presentation will be in English.

The candidate, all members of the Examination Committee, and authorized examiners of the TUM School of CIT are invited to the presentation and subsequent oral examination.

The presentation and subsequent examination will take place  
in **room 00.10.011 (CIT Sitzungsraum 1)**, TUM – Boltzmannstr. 3, 85748 Garching

and online via Zoom:

<https://tum-conf.zoom-x.de/j/68123512159?pwd=TTWn4z5pawGbZPu5bZSty5nrpilbr3.1>

Meeting-ID: 681 2351 2159

Passcode: 377674

### **Examination committee:**

Chair: Prof. Dr. Gregor Kemper (TUM)

First Examiner: Prof. Dr. Ulrich Bauer (TUM)

Second Examiner: Prof. Dr. Thomas Brüstle (Université de Sherbrooke and Bishop's University)

Third Examiner: Prof. Dr. Justin Curry (University at Albany)

Munich/Garching, the **28<sup>th</sup> of November 2024**

### **Mailing list:**

Members of the examination committee

Doctoral candidate

### **Abstract:**

Relative interlevel set cohomology (RISC) is an invariant of real-valued continuous functions stemming from (zigzag) persistent homology by Edelsbrunner, Letscher, Zomorodian, Carlsson, de Silva, and Morozov. We provide a proof to a structure theorem for RISC inspired by Crawley-Boevey, Höppner, and Lenzing, a theory of interleavings in the sense of Bubenik, de Silva, Scott, and Scoccola, as well as a functorial equivalence to derived level set persistence by Curry. Finally we harness RISC to provide an abelian categorification of extended persistence diagrams as well as a Mayer–Vietoris principle. We note that Parts III and IV can be read independently from Part II.