

# A U S H A N G

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## FREIE UNIVERSITÄT BERLIN

Fachbereich Mathematik und Informatik

Promotionsbüro, Arnimallee 14, 14195 Berlin

## DISPUTATION

**Donnerstag, 13.07.2023, 11:30 Uhr**

**Ort: Seminarraum 2006**

**(Zuse Institut Berlin, Takustr.7, 14195 Berlin)**

**Disputation über die Doktorarbeit von**

**Herrn Martin Hanik**

**Thema der Dissertation:**

**Geometric Data Analysis: Advancements of the Statistical  
Methodology and Applications**

**Thema der Disputation:**

**Convolutions over non-Euclidean Domains**

Die Arbeit wurde unter der Betreuung von **Prof. Dr. C. Schütte** durchgeführt.

Abstract: Euclidean convolutions have been studied for a long time, and they have found numerous applications, e.g., in physics and engineering. More recently, they have been used in machine learning tasks and are now an integral part of many deep-learning architectures. Motivated by complex learning problems, several ways to generalize convolutions for non-Euclidean domains like (discrete) manifolds [1, 3] and graphs [1, 2] have been investigated. When used as part of the architecture, they can help to increase the performance. In this talk, we discuss some of these generalizations—how they are motivated and which properties of the Euclidean convolution they share—and show selected applications.

[1] <https://arxiv.org/pdf/2104.13478.pdf> (mainly Chapter 4)

[2] <https://arxiv.org/pdf/1606.09375.pdf>

[3] <https://par.nsf.gov/servlets/purl/10336824>.

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. C. Schütte