

Prof. Dr. Max-K. von Renesse

Curriculum Vitae

Scientific Profile

- **Research Areas:** Stochastic & Geometric Analysis, Optimal Transport & Applications in Physics and Data Science.
- **Research Contributions:** Measure-valued dynamics • Stochastic partial differential equations • Interacting particle systems • Stochastic flows • Geometry of neural networks

Professional Career & Personal Information

- Since 2011** **Professorships:** Professor (W3) at Univ. Leipzig (since 2012; declined W3 offer from Univ. Jena) • Professor (W2) at LMU Munich (2011–2012; declined W2 offer from Univ. Paderborn)
- 2003–2011** **PostDoc & Habilitation:** University Assistant (C1) and Habilitation (2010) at TU Berlin • PostDoc at Courant Institute, New York (2005) and TU Berlin (2003–2004)
- 1992–2002** **Education & PhD:** In-house Consultant, IKB Deutsche Kreditbank AG (2002) • PhD (2002) and Scientific Assistant at Univ. Bonn (Advisor: Prof. K.-T. Sturm) • Studies of Mathematics, Physics & Computer Science in Marburg, Bonn, and St. Petersburg (Diploma 1997)
- Personal** Born February 28, 1972 • Nationality: German • Married, five children

Five Selected Publications

1. **M.-K. von Renesse and K.-T. Sturm.** *Transport inequalities, gradient estimates, entropy, and Ricci curvature.* Communications on Pure and Applied Mathematics (CPAM), 2005.
Contribution: Characterizes lower Ricci curvature bounds via entropy convexity on Wasserstein space, providing a foundation for the subsequent Lott–Sturm–Villani theory.
2. **M.-K. von Renesse and K.-T. Sturm.** *Entropic measure and Wasserstein diffusion.* Annals of Probability, 2009.
Contribution: Introduces a new class of stochastic diffusion processes on Wasserstein space of probability measures.
3. **M.-K. von Renesse.** *An optimal transport view of Schrödinger’s equation.* Canadian Mathematical Bulletin, 2012.
Contribution: Derives Schrödinger’s equation as Newtonian dynamics on Wasserstein space.
4. **V. Konarovskyi, T. Lehmann, and M.-K. von Renesse.** *Dean–Kawasaki dynamics: ill-posedness vs. triviality.* Electronic Communications in Probability, 2019.
Contribution: Establishes a fundamental well-posedness dichotomy for Dean–Kawasaki SPDEs for fluctuating hydrodynamics.
5. **M. Hehl, M.-K. von Renesse, and M. Weber.** *Neural Feature Geometry Evolves as Discrete Ricci Flow.* ICML 2026 (Spotlight).
Contribution: Shows that feature evolution in well trained neural networks can be modeled as discrete Ricci flow of data graphs.