

John Todd Award

Laudatio for Dr. Jonas Latz

Klaus-Robert Müller

Dr. Latz's academic trajectory has been defined by excellence across Europe's leading institutions. After graduating *summa cum laude* with a PhD from the Technical University of Munich in 2019, he held prestigious postdoctoral and research associate positions at the University of Cambridge and Queens' College. His rapid ascent to permanent positions at Heriot-Watt University and subsequently the University of Manchester—achieved just two years after his PhD—reflects his standing in the global mathematical community. Jonas is awarded with the John Todd Award since with his interdisciplinary research he has, already as an early career researcher, fundamentally reshaped key aspects of numerical analysis, applied probability, and machine learning. Jonas's research is characterized by its "depth and breadth," bridging the gap between theoretical rigor and practical application.

Let us consider specific contributions.

- **Bayesian Inverse Problems:** His landmark work, "*On the Well-posedness of Bayesian Inverse Problems*," demonstrated that these problems are well-posed in infinite dimensional spaces. By employing tools from measure theory and functional analysis, he established that posterior measures are Lipschitz continuous with respect to data perturbations under remarkably broad conditions. This contribution was so significant it earned him the **SIAM Student Paper Prize** and the **2023 SIGEST Award**, leading to its reprint as a definitive resource in *SIAM Review*.
- **Stochastic Gradient Descent (SGD):** At Cambridge, he revolutionized the understanding of SGD by fitting it into a continuous-time stochastic dynamical systems framework. In fact, by interpreting SGD as a discretization of a stochastic differential equation (SDE), he has enabled a more precise quantification of uncertainty in high-dimensional optimization, bridging the gap between classical dynamical systems and modern machine learning. His innovative analysis provides a much-improved representation of uncertainty in stochastic optimization, earning him the **2024 Early Career Prize** from the SIAM Activity Group on Uncertainty Quantification.
- **Machine Learning Criticality:** Dr. Latz is also known for his fearless academic inquiry, notably co-authoring the highly cited paper, "*Can Physics-Informed Neural Networks beat the Finite Element Method?*" which transparently addressed the shortcomings of certain machine learning methods.

Beyond his 25+ top-tier publications, Dr. Latz is a dedicated mentor and a pillar of the scientific community. He currently supervises six PhD students and serves as an Associate Editor for premier journals such as the *SIAM/ASA Journal on Uncertainty Quantification* and *Statistics and Computing*.

His commitment extends to social responsibility and public engagement. Whether he is empowering underrepresented groups through grants for collaborative work with international academics or organizing "Science Slams" to make mathematics accessible to the public, Dr. Latz embodies the role of a modern, socially conscious scholar. His ability to simplify complex theories—often prefacing a breakthrough with the humble remark, "*you know, this is actually not so difficult*"—makes him an infectious and inspiring figure for students and peers alike.

Dr. Jonas Latz is more than just a brilliant mathematician; he is a creative problem-solver and a gifted communicator. His work ensures that the mathematical foundations of our data-

driven world are not only more robust but also more understandable. We celebrate his past achievements and look forward with great anticipation to his future contributions to the field.