WHITEHEAD PRIZE: citation for Andrea Mondino

Short citation:
Professor Andrea Mondino of the University of Oxford is awarded a Whitehead Prize in recognition of his contributions to geometric analysis in differential and metric settings. In particular, he has played a central part in the development of the theory of metric measure spaces with Ricci curvature lower bounds.

Long citation:
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Mondino has contributed prolifically to numerous domains across analysis and geometry, but he is best known for playing a central part in the development of the theory of metric measure spaces with Ricci curvature lower bounds. Since Sturm and Lott-Villani gave the first synthetic definitions of the notion of Ricci curvature lower bounds for metric measure spaces, a far-reaching theory has been developed by many authors that extends the classical theory for smooth Riemannian manifolds with Ricci curvature lower bounds, and is analogous to the theory of Alexandrov spaces. Mondino is responsible for many of these developments, including numerous advances in the foundational theory of the so-called RCD spaces of Ambrosio-Gigli-Savaré, which are refinements of the early definitions of Lott-Sturm-Villani that are now widely studied. Some of this work involves developing the technical machinery that allows one to mimic differential geometry in this new setting where the objects of study are so rough as to prohibit derivatives. In joint work with Naber, for instance, he proved that such RCD spaces are much more regular than previously expected. Indeed, they are rectifiable and have Euclidean tangent spaces in almost every point.

Mondino has also pioneered the applications of this new theory to older topics such as Alexandrov spaces and Ricci limit spaces. As an example, in work with Cavalletti, Mondino has proved the Levy-Gromov inequality in the context of metric measure spaces with N-Ricci curvature lower bounds. The work, which builds on original ideas of Klartag, breaks free from the constraints of previous techniques that relied on smoothness of the spaces in question. A key role in such a development is played L^1 optimal transportation theory. The techniques revealed to be robust enough to establish several other geometric and functional inequalities in the nonsmooth setting in a sharp form.