17th APCA International Conference on Automatic Control and Soft Computing (CONTROLO 2026)

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https://controlo2026.apca.pt/

Special Session on
"Geometric and Riemannian Methods for Data Analysis and Optimization"

Organised by

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Luís Machado, University of Trás-os-Montes e Alto Douro, Vila Real, Portugal & Institute of Systems and Robotics - Coimbra, Portugal, lmiguel@utad.pt

Call for Papers

Description:

The last decade has witnessed a considerable amount of research devoted to the processing and analysis of large-scale, and in particular nonlinear, data.
However, a fact often neglected is that a considerable portion of today's data arising in engineering and applied sciences is highly structured from a mathematical viewpoint. This includes in many cases for instance structures based on (differential) geometric constraints.
The goal of this special session is to join researchers and experts with different know-how in the field to present their results and share recent ideas, new methodologies and theoretical approaches, that is, to deal with nonlinear data exploiting a priori knowledge about its mathematical structure.

Topics of interest include (but are not limited to):

- Riemannian and differential-geometric methods in data analysis
- Exploiting differential-geometric structure in large-scale datasets
- Structure-preserving numerical algorithms for nonlinear data
- Analytic and geometric methods for inverse problems and learning
- Optimization on manifolds

Short CV of Each Organizer

Knut Hüper is professor at the Institute of Mathematics at Julius-Maximilians-Universität Würzburg, Germany. Formerly he has held positions at National ICT and ANU, Canberra, Australia and at Max-Planck-Institute, Tübingen, Germany. He holds a Ph.D. (Dr.rer.nat.) in Electrical Engineering from Technische Universität München and a Habilitation in Mathematics from JMU Würzburg. His current scientific interests focus around applied differential geometry with applications in computer vision, control, dynamical systems and geometric optimization.	

Luís Machado is Assistant Professor in the Department of Mathematics at the University of Trás-os-Montes e Alto Douro and a researcher at the Institute of Systems and Robotics, University of Coimbra. He holds a Ph.D. in Mathematics from the University of Coimbra, specializing in Riemannian geometry and optimization on manifolds. His research focuses on differential and Riemannian geometry, optimization on manifolds, and spline and interpolation techniques on curved spaces, with applications to robotics and dynamical systems. He has authored several publications in international journals and has been invited to present his work at leading international conferences in the field.