

## Information on the keynote at GMP-X 2026

**Helmut Pottmann, TU Vienna**

### **Short biography**

Helmut Pottmann is a professor emeritus of applied geometry at TU Vienna. He has had faculty positions in the US, in Germany and at King Abdullah University of Science and Technology in Saudi Arabia, where he has been founding director of the Visual Computing Center. His research interests are in applied geometry, classical geometry and discrete differential geometry with a focus on applications in architecture, computational design and fabrication. His work in architectural geometry has also found its way into real projects such as the Eiffel Tower Pavilions and the Museum of Islamic Art in the Louvre in Paris, or the Yas Island Marina Hotel in Abu Dhabi. He is a Fellow of SIAM and received the Eurographics Outstanding Technical Contributions Award and the Bezier Award of the Solid Modeling Association.

<https://www.geometrie.tuwien.ac.at/geom/ig/pottmann/>

### **Title: Quad meshes in sphere geometries**

*Abstract:* Quad meshes play a key role in discrete differential geometry and various applications, including geometry processing, computational design and architecture. Some quad meshes can be seen as objects of classical sphere geometries. For example, the main discrete principal curvature parameterizations, namely circular meshes and conical meshes, are objects of the sphere geometries of Möbius and Laguerre, respectively. One can turn them into a Lie geometric structure, resulting in a smooth surface composed of Dupin cyclide patches. Moreover, the study of principal-symmetric meshes and their applications is naturally performed within sphere geometries. Finally, we consider sphere meshes all whose elements are defined within sphere geometry. Möbius geometric sphere meshes have spherical faces and circular edges. The Laguerre geometric counterparts are composed of planar, spherical and conical patches and the resulting surfaces are smooth for positive curvature. We address various approximation problems with such meshes and thereby encounter a new theoretical tool, namely generalized conjugate nets. The presentation illustrates the interplay of theory and applications and the alternation between smooth nets and their discrete counterparts.