Accurate Simulation on Geometry in the Wild

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Abstract: The numerical solution of partial differential equations (PDEs) is ubiquitous in applications, from engineering to computer graphics. The finite element method (FEM) is the most commonly used discretization of PDEs, due to its generality: it works for arbitrary geometries and a broad range of PDEs in theory. In this talk, I will discuss our work towards an integrated, automated pipeline, considering geometric problems (meshing) and numerical computing problems (element design and FEM simulation) as parts of a single system with minimal assumptions on the input and controllable output error. The key aspects include our work on robust meshing and geometry-driven FEM basis construction.

Biography: Denis Zorin is professor and department chair of computer science and mathematics at the Courant Institute of Mathematical Sciences at New York University. He is an associate editor of ACM Transactions on Graphics, the leading journal in the field. He was a program committee co-chair of the Symposium on Geometry Processing. Professor Zorin holds Ph.D. degree in computer science from California Institute of Technology. His main contributions are in the theory and practical algorithms for subdivision surfaces, surface deformation and mapping and efficient computational methods for integral equations.

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