Partial Differential Equations and Meshing

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In this talk I will present some ideas on how partial differential equations (PDEs) can be used to generate meshes, i.e., geometrical discretizations of space—the reverse of the usual workflow, where meshes are used to solve PDEs. The motivation for this approach stems from new engineering and biomedical applications, and from advances in fast PDE solvers. Two main application areas will be touched upon: the reparametrization of complex surfaces and the generation of quadrilateral finite element meshes. The talk will be accessible to anyone: no preliminary background about PDEs or finite elements is necessary.