

# Scattered Data Approximation and Meshfree Galerkin Methods

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## **Abstract**

In the talk, I will present the basic principles that have guided the development of meshfree approximation schemes. Over the past decade, with an aim towards alleviating the need to remesh in moving boundary and large deformation problems, there has been significant interest in the application of meshfree methods for the solution of partial differential equations. Meshfree approximations have also generated interest in the computer graphics and geometric modeling communities for surface parametrization and volume visualization of large data sets. As opposed to finite elements, in meshfree methods, the approximation is built without the explicit connectivity information between the nodes. I will place emphasis on moving-least squares, radial basis functions, natural neighbor and polygonal interpolants, and maximum entropy approximation schemes. The pros and cons of using these approximation schemes in a Galerkin procedure for the solution of partial differential equations will be discussed.