1137-65-228 **Yekaterina Epshteyn**, **Gunilla Kreiss**, **Gustav Ludvigsson**, **Kyle R. Steffen*** (steffen@math.utah.edu), **Simon Sticko**, **Siyang Wang** and **Qing Xia**. *The Difference Potentials Method for interface problems and models with moving geometry.*

The numerical approximation of partial differential equations (PDE) posed in domains with complicated geometry (e.g., moving domains, or domains with interfaces between two or more subdomains) is crucial in the analysis and study of mathematical models from fluid dynamics, phase transitions (melting and freezing), and materials science (models for an annealing metal), among many other areas.

In this talk, first we will give an introduction to the Difference Potentials Method (DPM), which is a framework for designing high-order accurate and efficient methods for the numerical approximation of PDE posed in arbitrary domains. (The DPM can be viewed as a discrete analog to the method of Calderón potentials and Calderón boundary equations with projections from the theory of PDE.) Then, we will discuss our recent work in designing the DPM to consider parabolic PDE posed in domains with implicitly-defined interfaces, and elliptic PDE in moving geometries. Moreover, we will consider benchmark problems for parabolic interface problems, and present numerical results and comparisons with other methods.

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