Adaptive mesh refinement is a widely used strategy for solving partial differential equations (PDEs) using finite-volume, finite-element or finite-difference methods. By dynamically allocating grid resources only in regions of a computational domain where the solution features are of the most interest, we can realize significant savings in computational effort and cost. In this talk, we will introduce block-structured adaptive mesh refinement (AMR) as first described by Berger and Oliger (Journal of Computational Physics, 1984), then survey existing software frameworks for implementing this approach to AMR, discuss the challenges in coupling AMR with sophisticated spatial schemes and time-stepping strategies, and finally describe our own efforts to develop adaptive mesh codes that can easily be coupled with existing single-grid PDE solvers. In this talk, I will focus on finite-volume methods for equations that model wave-like behavior, including advection, gas dynamics, and shallow water wave equations.

In addition, the speaker will also describe the pros and cons of working in industry vs academia, pulling on her many experiences from working in industry, national labs and academia.