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Keynote: Preparing for Extreme Heterogeneity in High Performance Computing

Tuesday, 21 September 2021 14:50 (1 hour)

While computing technologies have remained relatively stable for nearly two decades, new architectural features, such as heterogeneous cores, deep memory hierarchies, non-volatile memory (NVM), and near-memory processing, have emerged as possible solutions to address the concerns of energy-efficiency, manufacturability, and cost. However, we expect this 'golden age' of architectural change to lead to extreme heterogeneity and it will have a major impact on software systems and applications. Software will need to be redesigned to exploit these new capabilities and provide some level of performance portability across these diverse architectures. In this talk, I will survey these emerging technologies, discuss their architectural and software implications, and describe several new approaches (e.g., domain specific languages, intelligent runtime systems) to address these challenges.

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