TEMPLE UNIVERSITY
Department of Mathematics

Colloquium

Wednesday, 25 April 2018, 4:00 p.m.
Room 617 Wachman Hall

(refreshments and social at 3:45 p.m)

Exploiting Multiprecision Arithmetic

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Abstract. There is a growing availability of multiprecision arithmetic: floating point arithmetic in multiple, possibly arbitrary, precisions. Demand in applications includes for both low precision (deep learning and climate modelling) and high precision (long-term simulations and solving very ill conditioned problems). We discuss

- Half-precision arithmetic: its characteristics, availability, attractions, pitfalls, and rounding error analysis implications.

- Quadruple precision arithmetic: the need for it in applications, its cost, and how to exploit it.

As an example of the use of multiple precisions we discuss iterative refinement for solving linear systems. We explain the benefits of combining three different precisions of arithmetic (say, half, single, and double) and show how a new form of preconditioned iterative refinement can be used to solve very ill conditioned sparse linear systems to high accuracy.