

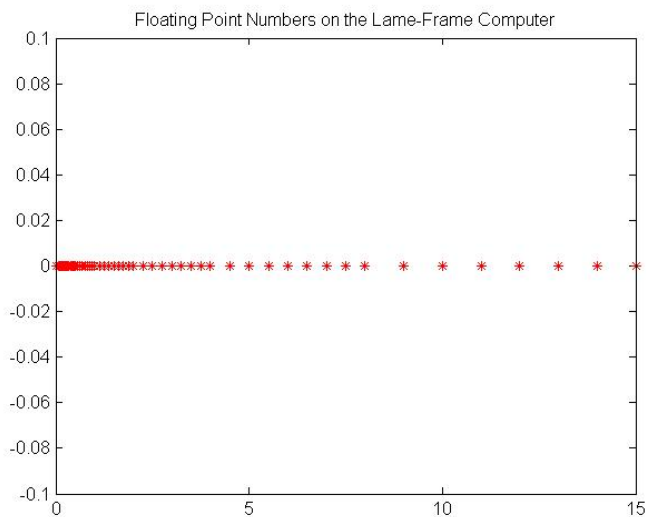
# PREP: A Discovery-Learning Approach to Computational Mathematics



**WHERE:** James Madison University in Virginia's beautiful Shenandoah Valley

**WHEN:** June 8 – 12, 2009

**WHO:** Will you be teaching a numerical methods course for the first time? Are you seeking to enhance a current numerics course? Are you introducing a new computational course in a liberal arts setting? Do you want to make an existing computational course more relevant to a STEM setting? Are you interested in more discovery-learning approaches in teaching computational mathematics? Do you want to be more fully aware of both the power and the pitfalls of digital computing? *If you answered "yes" to any of these questions, then this PREP workshop is for you.*



**Figure 1 (above):** All possible floating-point numbers on hypothetical "lame-frame" computer with 4-bit mantissa and 3-bit exponent.

**Figure 2 (right):** High-order polynomial interpolation error for uniform and non-uniform (Chebyshev) node spacings.

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**WHAT:** Provisional topics include the following:

- Real-life numerical disasters and how they can be avoided
- Error, error everywhere: the battle between truncation and round-off errors
- Bad, good, and better algorithms
- Numerical exploration for mathematical intuition and conjecture
- Engaging and novel numerical projects for undergraduates

