Numerical Reproducibility at Exascale: NRE2019

Thursday, June 20, 2019

In cooperation with ISC-HPC 2019, Frankfurt, DE

1400-1800: Marriot Hotel, kB room

Walid Keyrouz & Michael Mascagni, co-organizers

NRE2019 Program

Start	Speaker	Title
2:00 pm	Thorsten Hoefler (ETH, CH)	Performance Reproducibility in HPC and Deep Learning
2:40 pm	N. Bombace & M. Weiland (EPCC, UK)	A Study on the Performance of Reproducible Computations
3:05 pm	Thomas Ludwig (DKRZ, D)	Bitwise Reproducibility with Exascale Machines
3:30 pm	Coffee break	Provided by conference
4:00 pm	David R. C. Hill (ISIMA, F)	Reproducibility of Parallel Stochastic Simulations: Enabling Parallel and Sequential Results Comparison Before Scaling on Top Supercomputers
4:40 pm	B. Lathuilière & F. Févotte (EDF R&D, F)	Verrou: A Tool to Reproduce Floating-Point-Induced Non-Reproducibilities (and help fix them)
5:05 pm	Michael Mascagni (FSU & NIST, USA)	Three Reproducibility Issues That Can Be Explained As Round-Off Error
5:30 pm	Panel	Panel Discussion on Numerical Reproducibility

Panel Discussion Question Suggestions

1. Can we describe most aspects of "Numerical Reproducibility" using statistical or probabilistic settings?

2. Besides being an interesting and challenging intellectual question, how important is "Reproducibility" in Computational Science

3. If you answered the previous question in the affirmative, how do we raise awareness of this issue, train people, introduce it to the curriculum, etc.?

4. What should be our requirements from the hardware and software vendors? How do we get the vendors to engage this problem?

5. What trends in HPC are making this situation worse? Hint---mixed precision approaches and half-precision floating point numbers.