**ARCHITECURE FOR EXTREME-SCALE COMPUTING**

Extreme scale computing refers to computer architectures employing performance measures up to peta-op (10^15 operations) performance. Some examples of computer installations employing this level of performance are:

* Roadrunner (<http://en.wikipedia.org/wiki/IBM_Roadrunner>)
* IBM’s Blue Gene/P (<http://en.wikipedia.org/wiki/Blue_Gene>)
* Blue Waters (<http://www.ncsa.illinois.edu/BlueWaters/>)

The architectures considered to be “extreme scale” have very high performance , and when considering this category of computer, the range from tera-op to exa-op to peta-op should be considered normal.

There are various challenges involved in the design of extreme scale architectures. Some of these are

* Increasing energy and power efficiency
  + One option is to replace the standard npn transistor with phase change memory
* Enabling concurrency and locality
  + Examples include design of a many-core chip (presentation gave example of Thrifty architecture which consists of 1,024 many-core chips
* Bolstering resiliency
* Designing for programmability

This presentation focused on the topic of Extreme Scale Computing Architectures. An extreme scale architecture is one that incorporates massive computing resources and boasts very high performance ratings. By giving examples of currently operating extreme scale computers and detailing some of the challenges inherent in working with extreme scale architectures, this presentation helped further the class’s understanding of the field.