Concurrent GARTH (Genetic AlgoRiTHms) using C++11

1. Cover
2. Outline
3. Intro & Motivations
4. Application Area
   1. Thomson Problem – Open Problem
      1. Simple Case: Electrostatic potential minimization
         1. Like charges on a uniform sphere
      2. Harder Case: Quantum Dots, quantum condensed matter, etc.
         1. Manifolds & weird topologies, non-uniform charges
   2. NP-Hard, solved with Heuristics
   3. Great candidate for GAs
5. Genetic Algorithms
   1. Go over general GA structure
   2. Say why adding parallelism is helpful in different steps!!!
   3. Sequential but components are parallizable.
6. Genetic Algorithm Framework
   1. Zoo, ZooKeeper, Habitat, Trainer
   2. Explain concurrency with Trainers (locks, atomic, etc)
7. Results – Cross-Compiler/Platform
8. Results – Performance
   1. Not great results
   2. Overhead of threads equals performance gain from threads?
   3. Use harder problems with more complex fitness function
   4. OOP design hits performance?
9. Future Work
   1. Better scalability testing with up to 57+ threads
   2. Test MPI