

# Project Topics and References

How to pick a project

Tool vs Application

*1. Approach ONE:*

- *Find a topic and identify an algorithm needed to parallelize*

*2. Approach TWO:*

- Find an interesting parallel algorithm and apply it to topic!

# Projects Topics

1. Heat Flow or Image processing (Chapter I I)
2. Multigrid solvers et al (Chapter I0)
3. FFT and Convolutions (Chapter 9)
4. Molecular Dynamics — Neighbor Graphs (Chapter XII)
5. Monte Carlo and Random Graphs (Chapter XIII)
6. Triangulated Lattices and Integration. (Chapter XIV)
7. Quantum Computing on IBM simulator (Chapter XV)

# Projects Guidelines

1. Identify general **topic** discuss in lectures with team
2. Identify critical **algorithm** and class:
  - ◆ Laplacian on a 2d Regular Graph - How to run
  - ◆ Molecules Dynamics (balls) moving in 2d boxes
  - ◆ Monte Carlo\_Random cluster on Graph
  - ◆ Triangulation\_2d\_Integration
3. **Parallelize** with MPI or OpenACC et al.
4. **Timers or counters** to analyzed performance (with errors?)
  - ◆ for different algorithms, sizes (N) and parallelization methods
5. **GitHUB** with
  - ◆ README, Code, Makefile Tables and Graphs and Slides and Report.