

# Chapel:

**An Emerging Parallel Programming Language**



# A Call To Arms

**Q:** Why doesn't HPC have languages as enjoyable and productive as Python / Java / Matlab /            (your favorite language here)            ?

**A:** We believe it's due not to any particular technical challenge, but rather to a lack of sufficient...

...long-term efforts

...resources

...community will

...co-design between developers and users

...patience

**Let's change this!**

# What is Chapel?

- **An emerging parallel programming language**
  - Design and development led by Cray Inc.
    - in collaboration with academia, labs, and industry (both domestically and internationally)
- **A work-in-progress**
- **Chapel's overall goal: Improve programmer productivity**
  - Improve the **programmability** of parallel computers
  - Match or beat the **performance** of current programming models
  - Support better **portability** than current programming models
  - Improve the **robustness** of parallel codes

# Chapel's Implementation

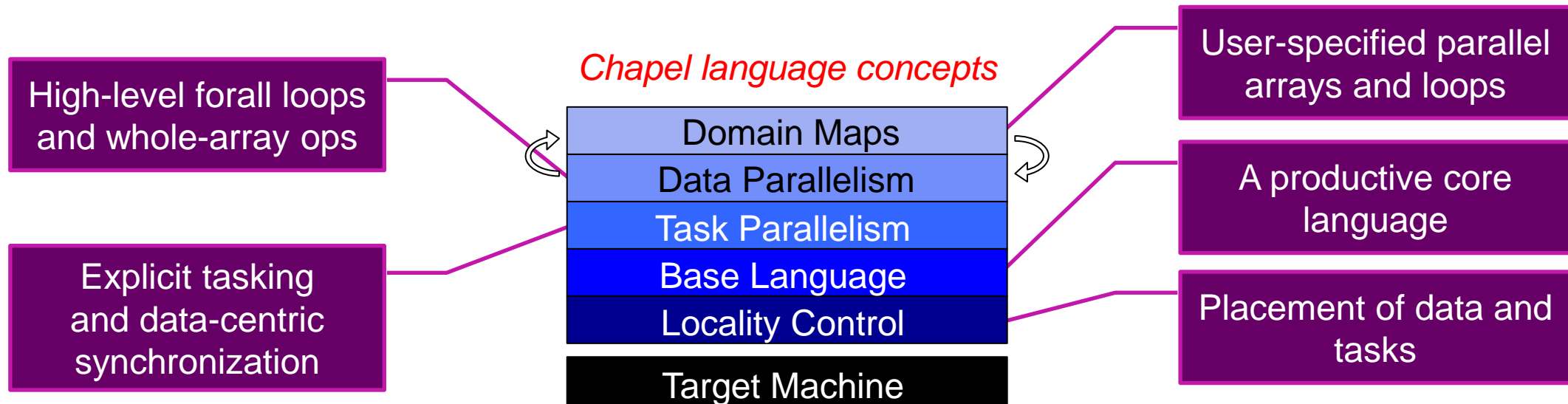
- **Developed as open source at SourceForge**
- **Licensed as BSD software**
- **A Community Effort**
  - 19 developers from 8 organizations and 5 countries contributed to version 1.8
- **Target Architectures:**
  - multicore desktops and laptops
  - commodity clusters and the cloud
  - HPC systems from Cray and other vendors
  - *in-progress*: CPU+accelerator hybrids, manycore, ...

# Chapel's Multiresolution Design



## ***Multiresolution Design:*** Support multiple tiers of features

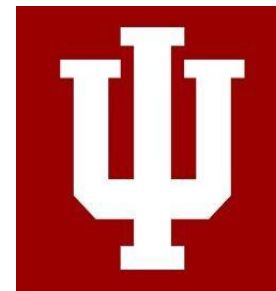
- higher levels for programmability, productivity
- lower levels for greater degrees of control



# A Team Effort — Join Us!



Lawrence Berkeley  
National Laboratory



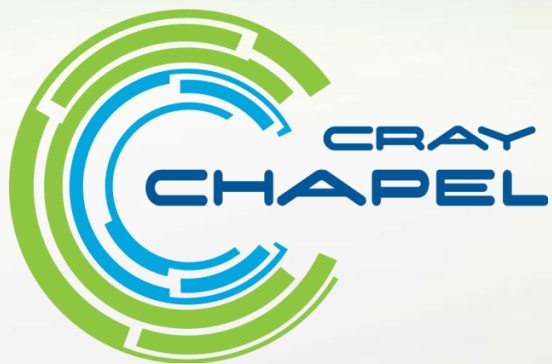
and others as well...

# Chapel at SC13



- **Meet a Developer:** Chapel team members will be staffing this booth all week
- **Poster (Tues @ 5:15):** *Towards Co-Evolution of Auto-Tuning and Parallel Languages*
  - Ray Chen (University of Maryland), Posters Session
- **Talk (Tues @ 3:20):** *Hierarchical Locales: Exposing the Node Architecture in Chapel*
  - Sung-Eun Choi (Cray Inc.), KISTI booth #3713
- **Chapel Lightning Talks BoF (Wed @ 12:15)**
  - 5-minute talks on Chapel and... education! MPI-3! Big Data! Autotuning! Futures! MiniMD!
- **Talk (Wed @ 4:30):** *Chapel, an Emerging Parallel Language*
  - Brad Chamberlain (Cray Inc.), HPC Impact Theatre (right next door)
- **Happy Hour (Wed @ 5pm):** 4<sup>th</sup> annual Chapel Users Group (CHUG) Happy Hour
  - Pi Bar (just across the street)
- **HPC Educators (Thus @ 1:30pm):** *High-Level Parallel Programming Using Chapel*
  - David Bunde (Knox College) and Kyle Burke (Colby College)





**CRAY**  
THE SUPERCOMPUTER COMPANY