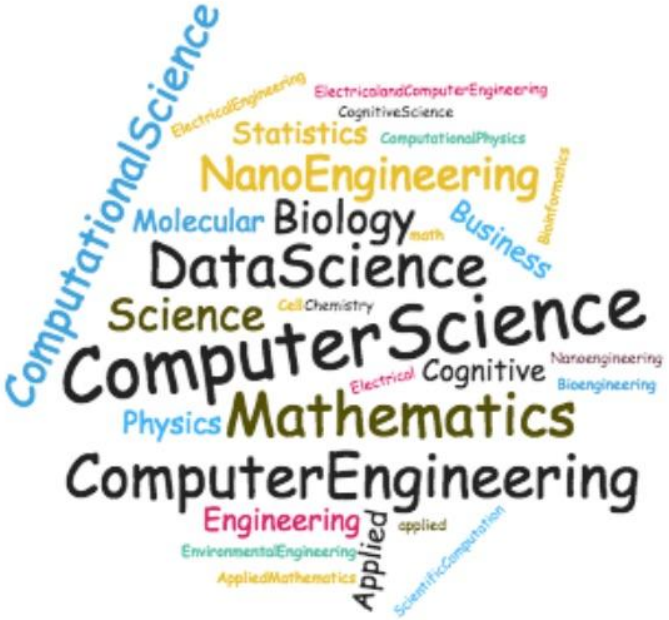
SDSC HPC-Students

A Student Led Club

Mary Thomas & Nigel Brown

SDSC HPC-Students

A student-led group, with a common interest in high performance computing in the sciences, supported by SDSC.



What do YOU want to do?

What is High Performance Computing?

High Performance Computing most generally refers to the practice of aggregating computing power in a way that delivers much higher performance than one could get out of a typical desktop computer or workstation in order to solve large problems in science, engineering, or business. (HPC Wire)

HPC-Students will get to play on Comet (and other machines)!

- 2.762.6 PetaFlops (10^15)
- 27 standard racks, ~6.7 TF /rack with
  - 1944 nodes, 46,656 cores
  - 249 TB DRAM, 622 TB SSD

Goals of the SDSC HPC Student Group

http://hpc-students.sdsc.edu

- To facilitate and increase interactions between the San Diego Supercomputer Center and UCSD students:
- To educate and train students in all things HPC: parallel programming, running applications, learning hardware.
- To connect students to the wider world of HPC through events, meetings, interactions with industry, attending meetings.
- To participate in HPC related events at SDSC/UCSD, in San Diego, and at relevant meetings.
- To mentor students to help train the next generation of scientists

Organization

SDSC Role:

- Provide space for group meetings
- Find budget and sponsors to support club activities
- Provide technical expertise for projects, tutorials, etc.
- Provide students with access to HPC resources and accounts
- Mentor projects, activities, events

Student Role:

- Organize UCSD club:
  - mailing list, etc.
  - Meeting times
  - Set agendas
- Recruit members
- Find sponsors
- Organize and promote activities and events

A Few Suggested Activities

- Hands-on tutorials with SDSC staff & other experts:
  - visualization, singularity containers, data mining, GPU computing, building a cluster.
- Participate in hackathons and other competitions.
  - MPI, GPU, Cloud computing
  - Cluster build outs: cpu + gpu; Raspberry-Pi cluster
  - ARM cluster hackathon
- Supercomputing meetings in
  - US: http://sc19.supercomputing.org)
  - Europe (possibly)
- Mentor students who want to do in Research

Supercomputing Student Activities

- Compete to be on the student cluster competition (SCC) team - 6 students + alternates (budget permitting)
  - all travel expenses paid - travel to Denver, Co in November
  - Significant time commitment
  - Co-curriculum credit
- Mentor student volunteers at SC'19
  - https://sc19.supercomputing.org/program/studentssc/student-volunteers/
- ACM SigHPC Computing4Change competition: this is more individual but something worth supporting
  - https://www.sighpc.org/for-our-community/computing4change

More About HPC-Students
Nigel Brown

Who Am I and Why Should You Care?

- New transfer student
- Computer Engineering Major
- Researcher at SDSC and IBM
- Passion for building and supporting communities

What I’m Hoping We Get From This:

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The Student Cluster Competition

A few more details

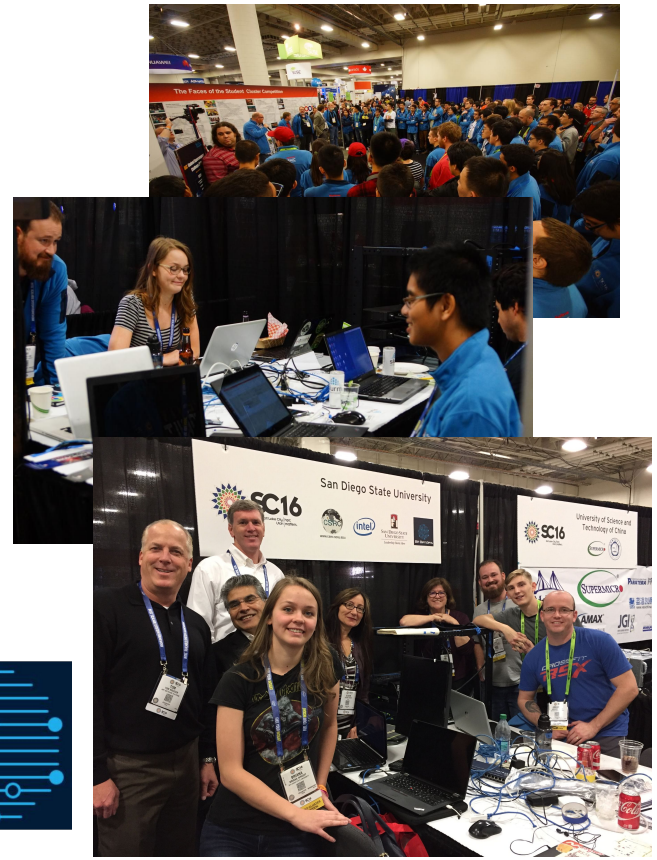
SC19

Denver, CO | hpc is now.

SCC History/Background

http://www.studentclustercompetition.us/
https://sc19.supercomputing.org/

- Began in 2007 to provide HPC experience to undergraduate and high school students.
- Students design and build small clusters, learn scientific computing, run applications
- Compete in a non-stop, 48-hour challenge to complete a real-world scientific workload
- Reproducibility Challenge: students attempt to reproduce results & reports → highly rated published in special issue of the journal *Parallel Computing*.



SCC: How to Compete

Site is now up: http://www.studentclustercompetition.us/2019/overview.html

ONLY 6 undergraduate students can be on the official team, and participate in the competition at SC

- Entering is competitive: we must write a formal application and submit this for review: 4/19/18
  - We must have the 6 members of the team for the application (can change later).
  - All travel and expenses will be paid for by SCC and SDSC
- To participate on the team requires a *significant* level of commitment:
  - Work during the Summer & Fall to learn HPC, applications, cluster hardware
  - Be able to travel to the meeting -- this year in Denver, Nov 17-22, 2019
  - SDSC will support a few alternates and/or graduate student mentors (budget)

SCC: Experience

- We have in-depth technical experience at SDSC
- We have brilliant undergraduates (YOU)
- We have team members who have participated at SCC in the past:
  - Student: Nigel Brown, 2018
  - Student: Gary Williams, 2016
  - Mentor: Mary Thomas, 2016 and 2017

Potential Technologies (and sponsors?)

SDSC

XSEDE
Extreme Science and Engineering Discovery Environment

NVIDIA

arm

HALICIOĞLU DATA SCIENCE INSTITUTE

Mellanox TECHNOLOGIES

GitHub

GEIST
Future Thinking • Solutions Today

NSF