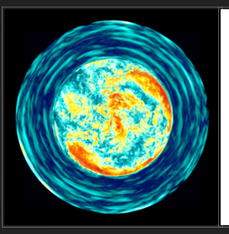
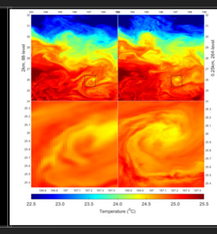




2019 PETASCALE COMPUTING INSTITUTE

RESOURCES AT SCINET

Marcelo Ponce (SciNet/UofT)

SciNet
ADVANCED RESEARCH COMPUTING at the UNIVERSITY OF TORONTO

UNIVERSITY OF TORONTO

SciNet: **Advanced Research Computing @ the University of Toronto**

- SciNet is a Consortium for High Performance Computing consisting of researchers at the University of Toronto and the associated Hospitals.
- Provides compute resources and support for researchers across Canada.
- We host the largest supercomputers in Canada for academics.
- We have a strong and solid training program aimed to teach scientists how to take full advantage of HPC systems, as well as how to do proper Scientific Computing.
- Funded by the federal and provincial government and the University of Toronto.
- Team of 15 members comprising system administrators and analysts.

SYSTEMS TIMELINE

GPC (2009-2018)

BGQ (2012-2019)

KNL (2016-2018)

NIAGARA (2018-...)

P8 (2016-...)

TEACH (2018-...)

sandy (2011-2018)

HPSS (2011-...)

P7 (2013-2019)

SGC (2017-...)

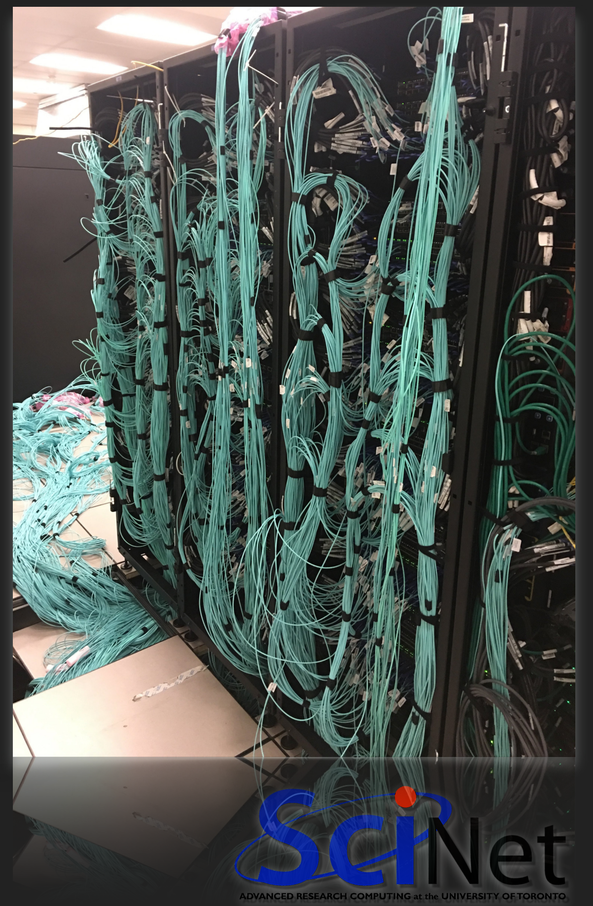
2008 2010 2012 2014 2016 2018

NIAGARA: CANADA'S FASTER SUPERCOMPUTER

SYSTEM SPECIFICATIONS

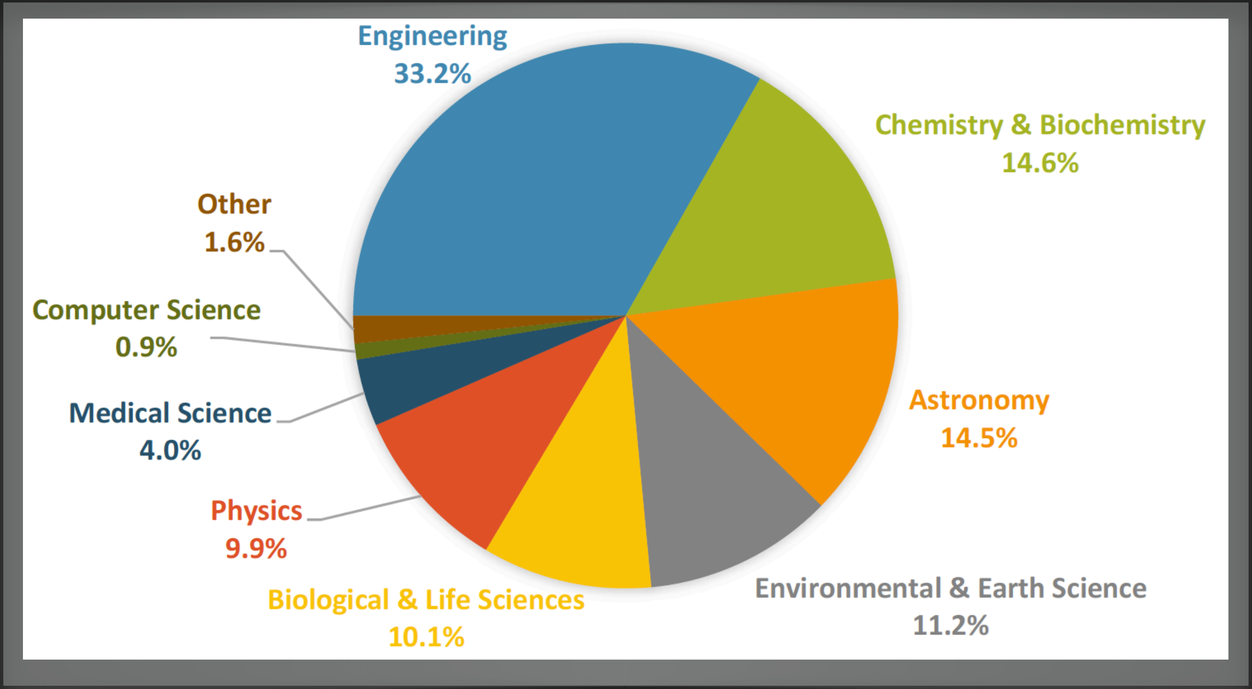
- 1548 Lenovo SD530 compute nodes (2x20 core Intel Gold 6148 with 192GB Ram)
- 21 compute racks w/RDHx, 9 management racks
- 61,920 cores

- Mellanox ConnectX-5 EDR InfiniBand (Dragonfly+ Topology)
- 10PB spinning disk (GPFS)
- 256TB Burst Buffer (Excelero NVMe)
- Rpeak/Rmax:
  4.75/3.07 PFlops
  53rd on June 2018 Top500
  69th on June 2019 Top500
- 685 kW

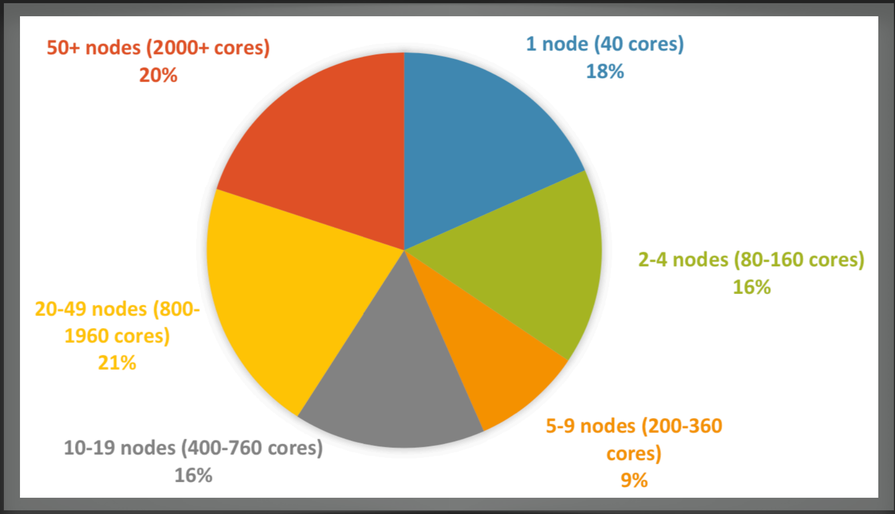


"**Deploying a Top-100 Supercomputer for Large Parallel Workloads: the Niagara Supercomputer.**"
Ponce et al. Proceedings of thePEARC '19 (2019)
https://doi.org/10.1145/3332186.3332195

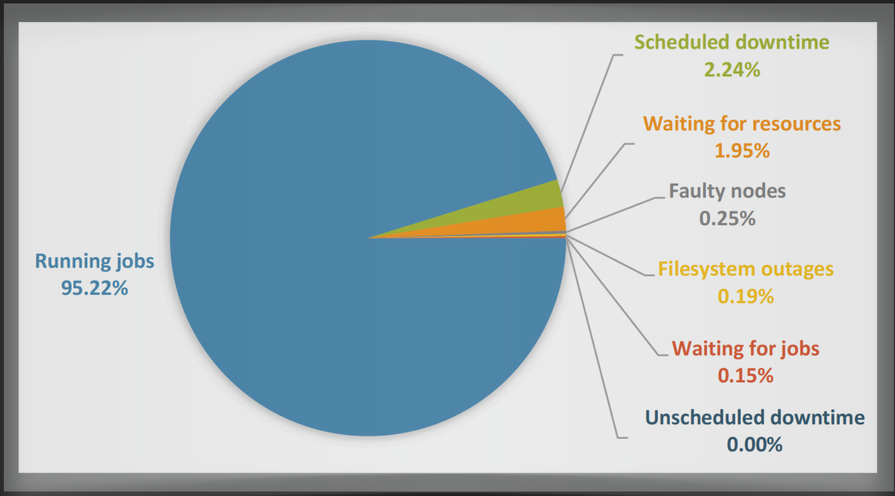
NIAGARA UTILIZATION – SECOND QUARTER 2019



Usage breakdown by discipline



Job size distribution



Node utilization

GETTING A SCINET ACCOUNT

Any qualified researcher at a Canadian University is eligible to use SciNet's systems.

To get access, one must first obtain a Compute Canada account. The PI (Principle Investigator, a faculty member) of a group first applies for their Compute Canada account, after which group members can request accounts sponsored by that PI.

1. Register with the Compute Canada Database (CCDB)
   https://ccdb.computecanada.ca/account_application

2. If you're not a PI and your PI does not have a CC account, they have to get one first, so they can sponsor your account.

3. To get access to the Niagara supercomputer, you need to click the "join" button on the CCDB opt-in page; you should receive an email within a day or two confirming your access to Niagara.

4. *Outside Canada*: can still get access to the systems but have to be added as external collaborators by a Canadian PI.

WHAT CAN YOU DO WITH A SCINET ACCOUNT

1. You will be able to access SciNet's systems, as well as, any other national resource (i.e. Graham, Cedar and Beluga general purpose clusters) –see next section about resource allocations–.

2. You will be able to enrol in SciNet's training events and get recognition through credits in our HPC/Scientific Computing & Data Science certificate programs (https://www.scinethpc.ca/scinet-certificate-program/).

RESOURCE ALLOCATION COMPETITION

1. Each year, in the fall there is a call for proposals for allocating computational resources for researchers (RAC)
2. If you don't apply for RAC, you can still access the national resources but your priority and ability to run jobs is going to be set to a default value which is lower than the one assigned by the RAC process.
3. In a way, this process is similar to grant proposals but instead of getting budgetary funds, researchers are given computational resources.

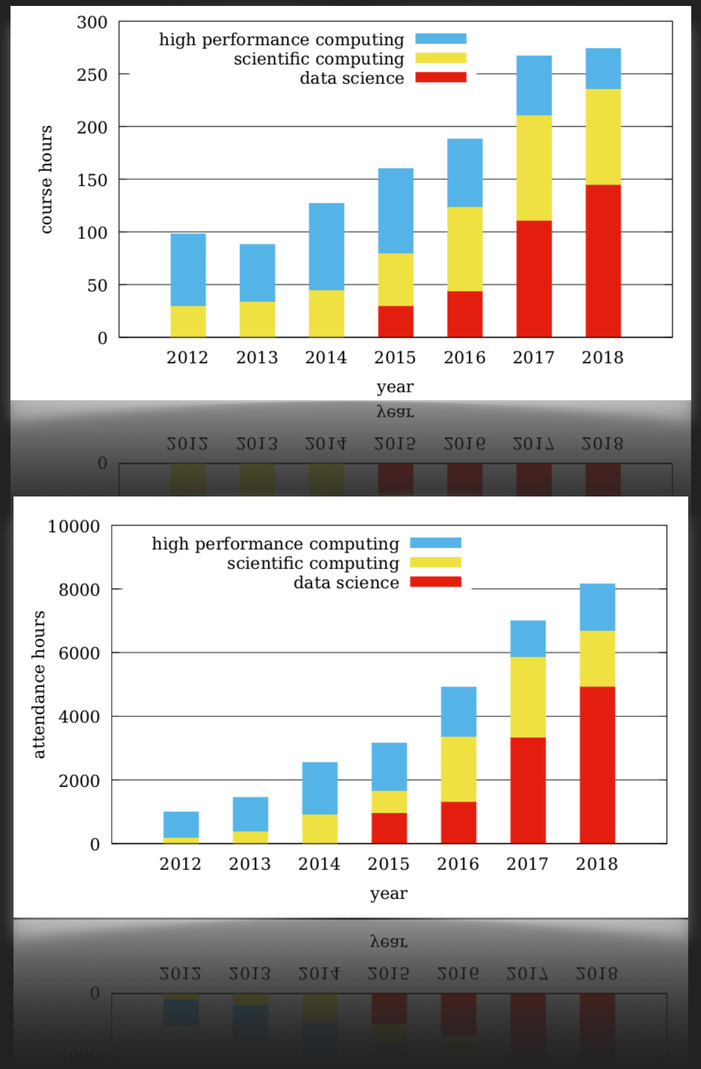
ACCESS TO SCIENTIFIC COMPUTING EXPERTISE

- Consultation with our analysts team
- Opportunities to establish collaborations
- Expertise in several areas of computational science, data analysis, machine learning, neural networks, scientific visualization, bioinformatics, etc.
- Technical support

- More information @ https://www.scinethpc.ca/research-scinet/

TRAINING & EDUCATION

- Short, long and full-term courses and workshops on Scientific Computing, High-Performance Computing and Data Science
- ***Certificate Programs*** on on Scientific Computing, High-Performance Computing and Data Science
- Several full-term graduate courses: “Scientific Computing for Physicists” , “Introduction to Computational Biostatistics”, “Quantitative Applications for Data Analysis”
- Summer Schools: OHPCSS, IHPCSS, …
- Monthly SNUG meetings
- Course resources freely available online (recording, slides, etc) @ https://scinet.courses

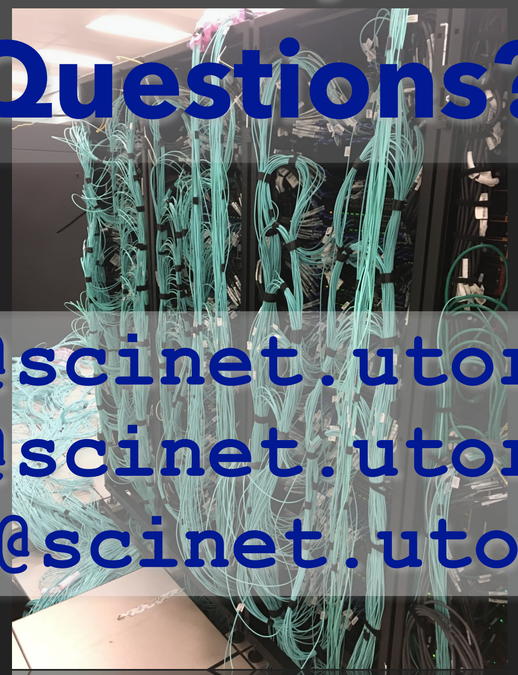


ONLINE RESOURCES

- MAIN WEBSITE
  HTTPS://WWW.SCINET.UTORONTO.CA
- EDUCATION AND TRAINING
  HTTPS://COURSES.SCINET.UTORONTO.CA
- TECHNICAL DOCUMENTATION & SYSTEM STATUS
  HTTPS://DOCS.SCINET.UTORONTO.CA
- SYSTEM LIVE-STATISTICS
  HTTPS://MY.SCINET.UTORONTO.CA
- SCINET RESEARCH
  HTTPS://WWW.SCINETHPC.CA/RESEARCH-SCINET
- ABOUT NIAGARA
  HTTPS://WWW.SCINET.UTORONTO.CA/LAUNCH-OF-NIAGARA/
- SCINET HPC TOOLS REPOSITORY
  HTTPS://GITLAB.COM/SCINET-HPC

Thank you!

Questions?



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