

# EDUCATION & WORKFORCE DEVELOPMENT

Melyssa Fratkin

Industrial Programs Director

HPC User Forum

April 3, 2019

# VARIETY OF EDUCATION AND WORKFORCE PROGRAMS

- ▶ Undergraduate/Graduate Classes
- ▶ Industry-funded Internships
- ▶ Research Experiences for Undergraduates (REU)
  - ▶ NSF Funded
- ▶ Training – one day, multi-day, week-long Institutes



# UNIVERSITY COURSES IN ADVANCED COMPUTATION

- ▶ UT Austin dept. of Statistics and Data Sciences
- ▶ Dual-listed undergraduate/graduate
- ▶ Courses covering many aspects of advanced computation
  - ▶ Introduction to Scientific Programming – programming concepts using C/C++ and Fortran
  - ▶ Scientific/Technical Computing – basic numerical methods, fundamentals of floating-point arithmetic, common tools for scientific software development (git, make), profiling and optimization, debugging
  - ▶ Parallel Computing for Scientists and Engineers – developing parallel applications using OpenMP and MPI
  - ▶ In Computational Engineering Dept: Scientific Computation and Software Engineering & Design

<https://www.tacc.utexas.edu/education/academic-courses>



# STAR SCHOLARS

- ▶ Graduate or undergraduate interns, depending on project
- ▶ Students work under a TACC mentor, on projects of interest to Partners
- ▶ Students submit papers or posters at conferences
- ▶ Partner funded (\$50K per student for 2 semesters)
- ▶ Past funding from BP, Shell, NASA



# UNDERGRADUATE PROGRAMS

- ▶ NSF Research Experiences for Undergraduates (REU) grants
  - ▶ 10 undergraduates majoring in science and engineering disciplines
  - ▶ Participants explore grand challenges such as climate modeling, weather forecasting, drug delivery, brain mapping, energy exploration and understanding the human genome, among others.



# TOPIC-FOCUSED TRAINING IN ADVANCED COMPUTING

- ▶ Offered in both spring and fall academic semesters
- ▶ 1 and 2-day courses in HPC, Data, and Visualization
  - ▶ Mix of lecture and hands-on exercises
- ▶ Open to TACC users, academic and industry partners
- ▶ In many cases courses are live-streamed and recorded on YouTube
  - ▶ <http://bit.ly/TACCtraining>
- ▶ Upcoming and past training at: <https://learn.tacc.utexas.edu>

Courses have included:

- ✓ MPI/OpenMP
  - ✓ Profiling and Optimization
  - ✓ Debugging
  - ✓ Programming the Intel Xeon Phi (KNC/KNL)
  - ✓ Python
  - ✓ R
  - ✓ Using Hadoop/Spark
  - ✓ Data Management Practices and Techniques
  - ✓ Introduction to Scientific Visualization
- ...and more

# TACC IMMERSIVE TRAINING INSTITUTES



## Series of 1-week\* training events – in person

- ▶ Applied Parallel Programming, April 30 – May 3
- ▶ Advanced Computing Foundations Workshop,\* May 7-8
- ▶ Essentials of Advanced Computing\*, June 5-7
- ▶ Scientific Visualization, June 10-13
- ▶ Designing and Administering Large-Scale Systems, June 25-28
- ▶ Workflows and Reproducibility in Scientific Computing, July 9-12
- ▶ Computational Science in the Cloud, July 23-26
- ▶ Machine Learning Foundations, August 12-15
- ▶ HPC Leadership Institute\*, September 17-19

[www.tacc.utexas.edu/education/institutes](http://www.tacc.utexas.edu/education/institutes)

# CURRENT INDUSTRY PARTNERS







# INDUSTRY COLLABORATION FOCUS: BP

- ▶ BP has been a STAR member since 2008.
- ▶ Funded a wide range of student programs at TACC, at all levels:
  - ▶ High school student coding competitions
  - ▶ SC Student Cluster team
  - ▶ Graduate and undergraduate student interns at TACC
- ▶ Keith sees the importance of 'filling the pipeline' so he can find HPC-savvy hires in the future



# INDUSTRY COLLABORATION FOCUS: BP



- ▶ Internships are key: BP identified students that are either already interns (or future hires), or will be summer interns, and send them to TACC for internships during the school year.
- ▶ We work together to choose projects that are mutually beneficial, so the student(s) can take what they learn and go to BP and get to work immediately.

# INDUSTRY COLLABORATION FOCUS: BP

- ▶ BP also uses TACC as a resource for general HPC knowledge. We tend to be on the 'bleeding edge' of technologies, installing new processors, file systems, and networks before industry, and usually at a much larger scale.
- ▶ TACC engineers provide support in overcoming issues/roadblocks, and feedback on possible future directions.
- ▶ Regularly attend our training courses and institutes.



# SHAMELESS PLUG



<https://www.txwomeninhpc.org/>



<https://womeninhpc.org>

# YES, FRONTERA HAS STARTED ARRIVING!



# THANKS!

- ▶ Melyssa Fratkin, Industrial Programs Director  
[mfratkin@tacc.utexas.edu](mailto:mfratkin@tacc.utexas.edu)
- ▶ Charlie Dey, Director of Training & Professional Development  
[charlie@tacc.utexas.edu](mailto:charlie@tacc.utexas.edu)
- ▶ <http://learn.tacc.utexas.edu>

