

# Overview of TACC

Charlie Dey, Virginia Trueheart

Spring 2020

Your instructors

*Charlie Dey, Virginia Trueheart*

work at the

Texas Advanced Computing Center

# So where is TACC?



# How do you get to TACC?



# Pickle Campus

Formerly Balcones Research Center,  
location of some of the best wildflowers in Austin.



# James Jarrell ‘Jake’ Pickle

- 1913–2005, congressman  
1963–1995
- US Navy during WW II
- important role in Civil Rights Act and Social Security reform



# TACC

- Started in 2001 with 10-ish people, now 140
- UT has had computing centers before; in 2001 TACC became independent unit: falls under VP for research.
- First major supercomputer in 2008: Ranger.
- Currently: Frontera, #5 in the world, and largest academic computer in the world; and Stampede2, #19 in the world.

# TACC now

- 140-ish people, divided into Systems, High Performance Computing, Computational Biology, Big Data, Machine learning, Visualization, Outreach (and more) groups.
- 15 platforms
- 1000 projects, 200 public data collections
- 30 web portals with 35k users
- new 10MWatt data center
- second new building in 10 years

# Our new building



# **Supercomputers come and go**

TACC has operated some of the leading supercomputers in the country / the world since 2008,

Want to guess how much a computer costs? How long it stays operational?

# Frontera

- Our currently most powerful machine, operational as of Right Now.
- Rough cost: \$60M for hardware, and similar for personnel.
- 91 racks with 8008 nodes; each node two 28-core Intel Cascade Lake processors.
- 60Pbyte of storage, of which 3Pbyte flash.
- Two GPU subclusters

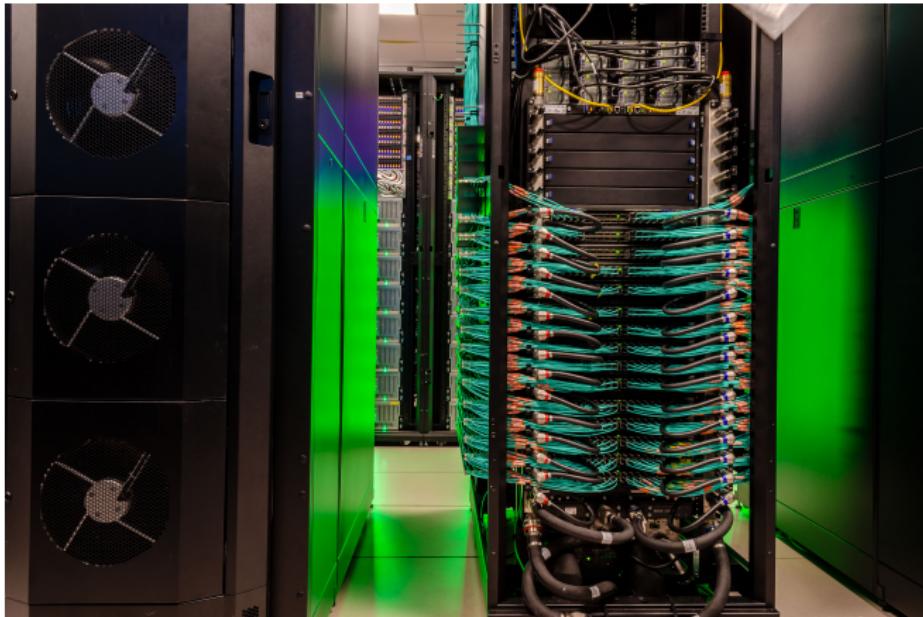
# Frontera compute racks; front view



# Frontera compute racks; rear view



# Frontera network switch



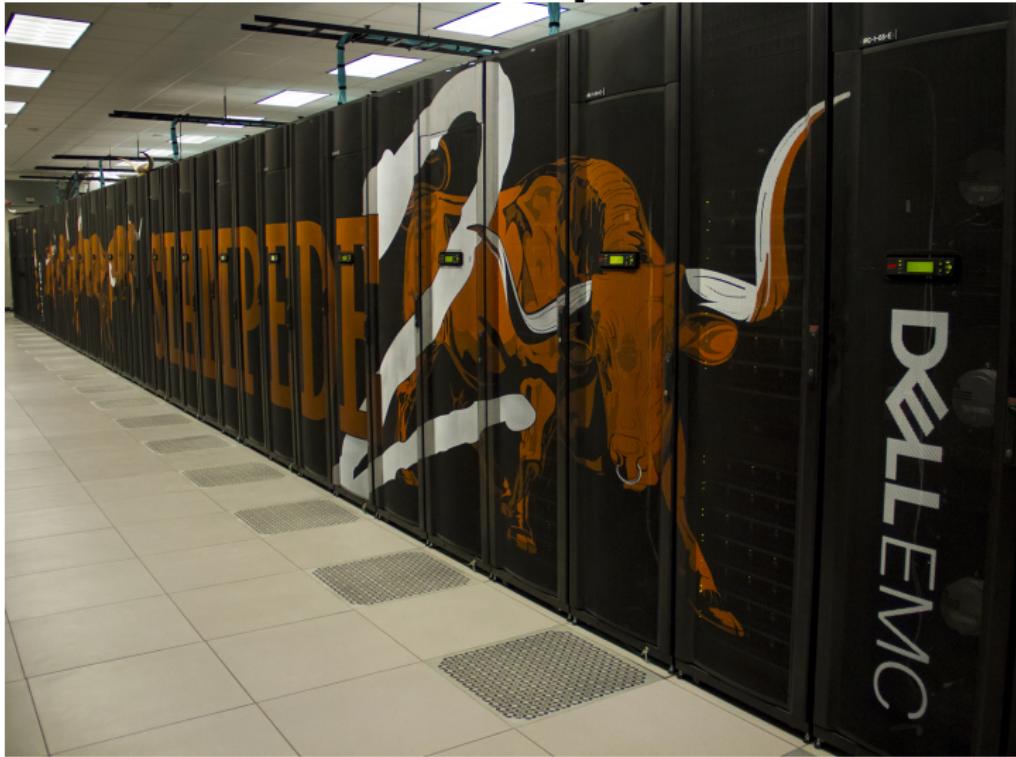
# Overhead cabling



# Stampede2

- Second biggest machine: cost \$30M
- 4000 nodes with Intel 'Knights Landing' Xeon phi;  
1700 nodes with two Skylake server processors.
- 75 miles of cabling, up to 4.5Mwatt power
- TACC's machines are popular and reliable:  
Stampede1 was used by 5000 users, up 98% of the time,  
8 million jobs over its lifetime.

# Stampede2



# Cabling coming down

Cables go from each, over the racks,  
coming down to the switches



# Lonestar5

Our Cray



# Maverick2

GPU machine



Btw, this picture is not sideways:  
the machine hangs in a bath of HEB-\$1/bottle-mineral oil  
(ok, slightly better than that)

# Hikari



# Hikari water cooling



# Big data

- Wrangler: big data machine with lots of SSDs
- Rustler: hadoop cluster
- Stockyard: 20Pbyte spinning disc (shared between all clusters)
- Ranch: 50Pbyte of tape

# Wrangler



# Clouds

- Rodeo: mostly internal use
- Chameleon: cloud research
- Jetstream: for educational use

# Catapult

Microsoft FPGA machine learning platform



# Stockyard

Mass storage

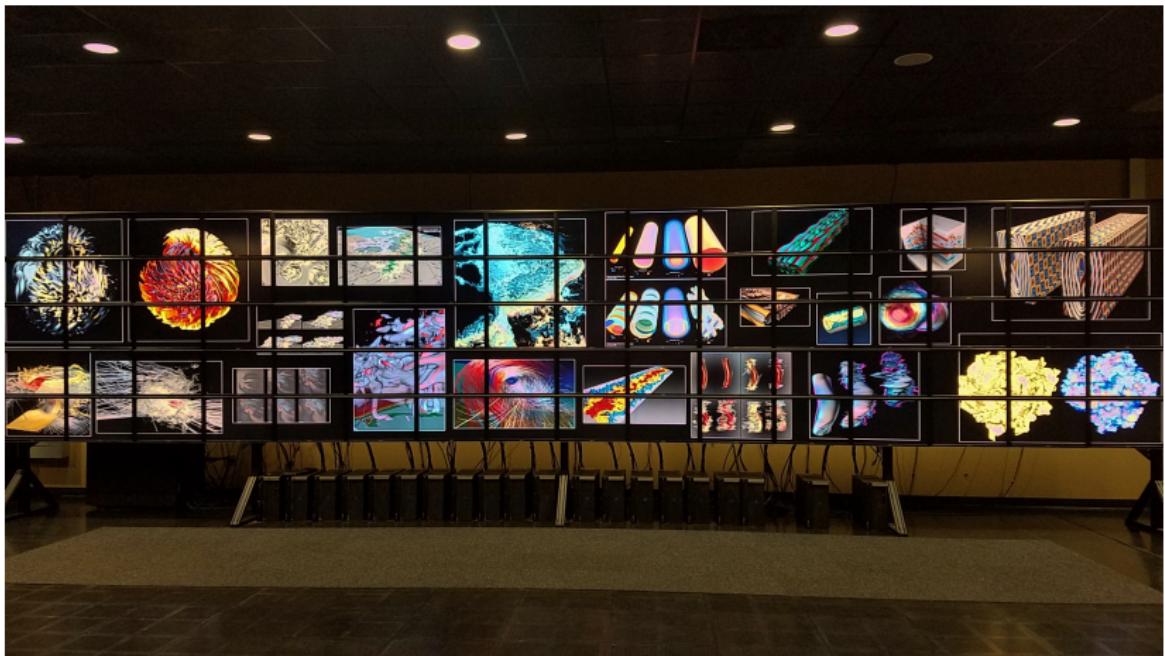


# Visualization lab (POB)

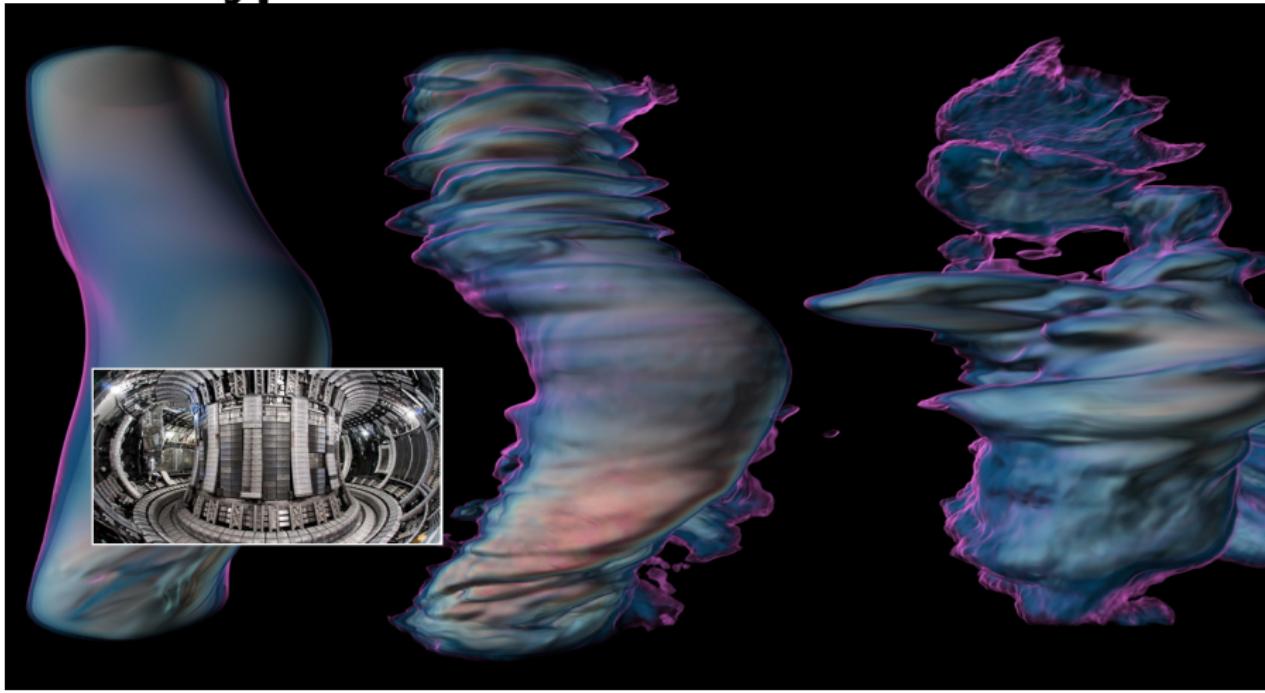


# A picture is worth a thousand...

Our graphics people can help you understand your results (and sell your research) through high quality visualization.



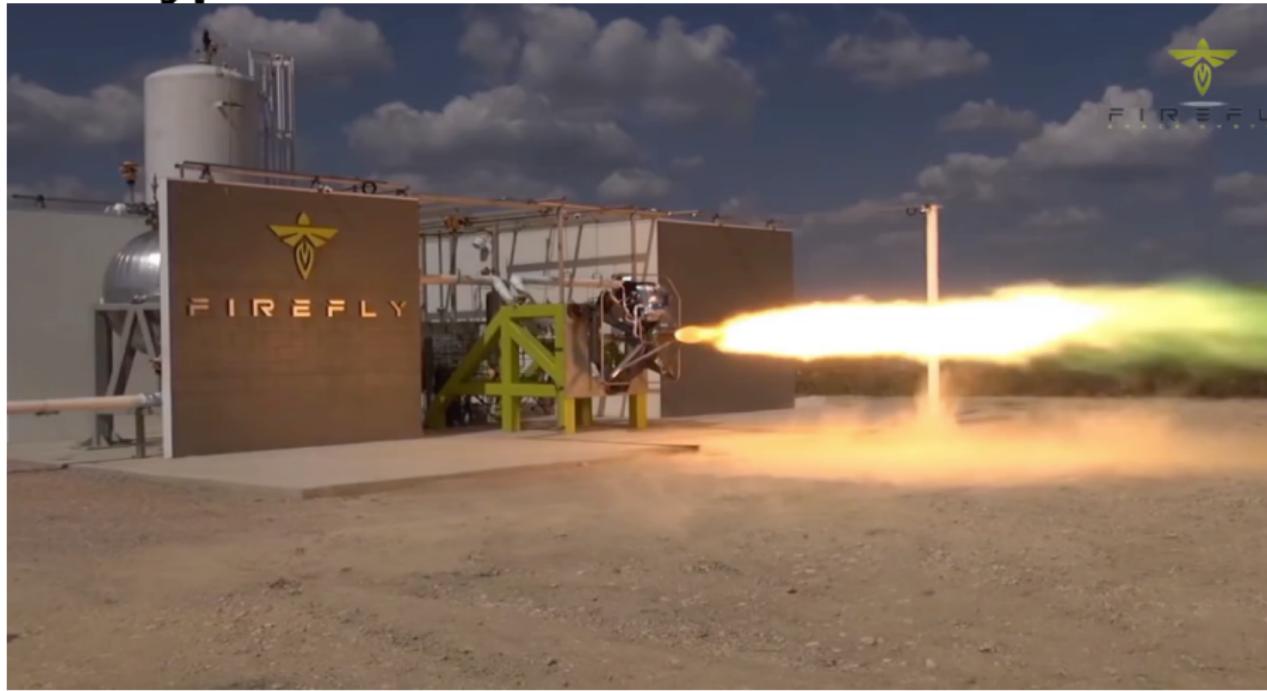
# Typical academic customer



# Non-typical academic customer



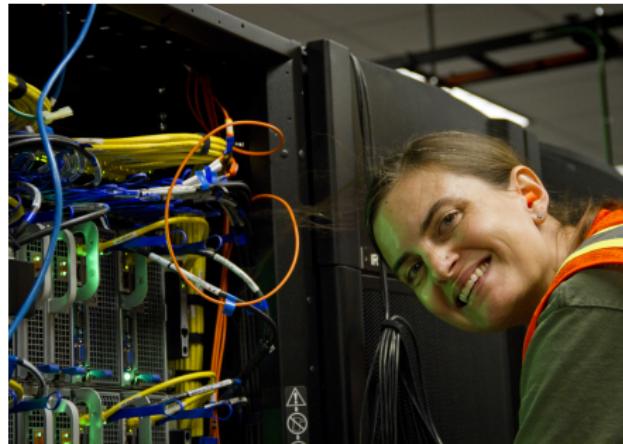
# Typical non-academic customer



# We're very hands-on



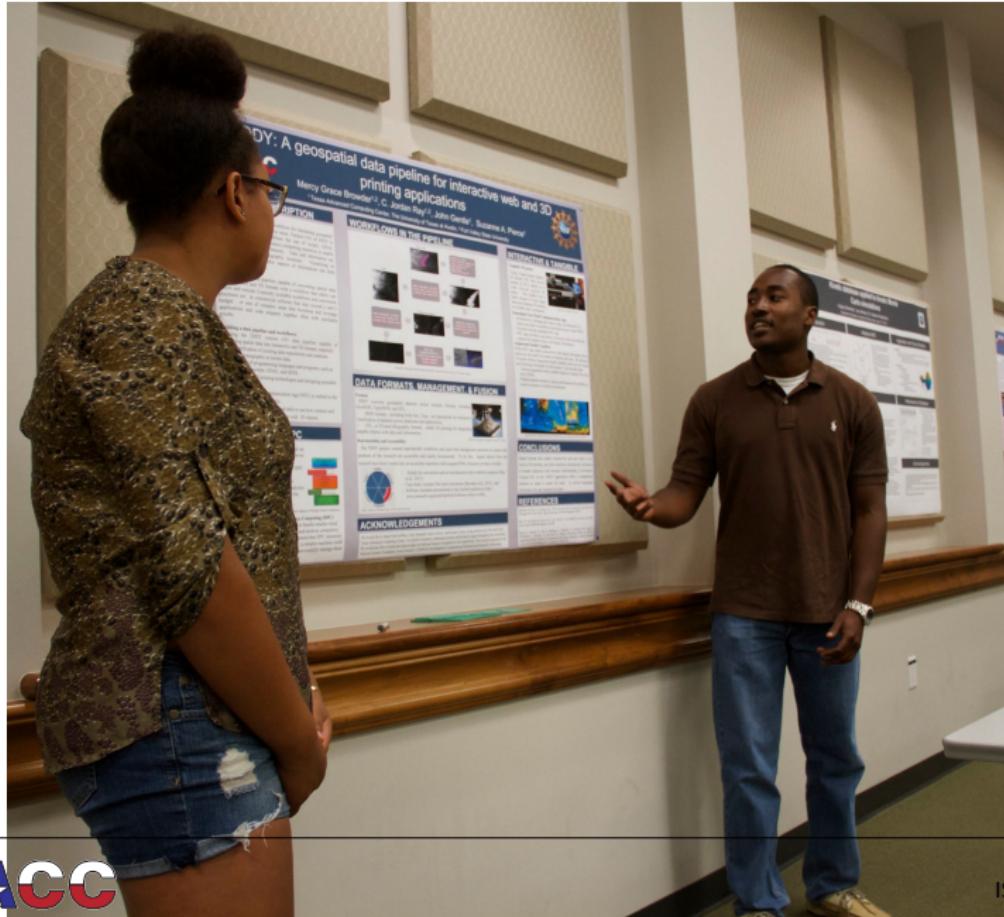
# We're very hands-on



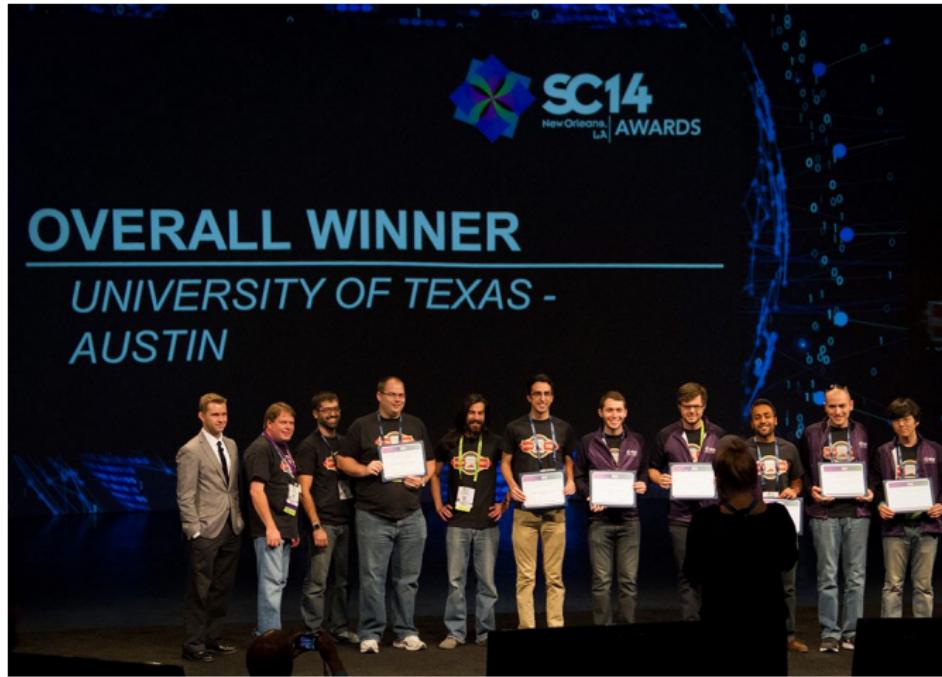
# We're very hands-on



# Student activities: REU



# Student cluster competition



# Outreach: Code at TACC



# We keep growing

