TEXAS ADVANCED COMPUTING CENTER
WWW.TACC.UTEXAS.EDU

TEXAS
The University of Texas at Austin

Texas Advanced Computing Center: Cyberinfrastructure Resources for UT System

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Office of Campus Engagement
Life Sciences Computing Group
Texas Advanced Computing Center
The University of Texas at Austin

Texas Advanced Computing Center

Who are we:

- Research center at UT Austin
- 180+ staff (~70 PhD scientists, ~20 students and interns)
- Funded by significant investment from UT System, NSF, NIH, DoD
- 15,000 sq ft of data center, total capacity of 12 MW
- Design, build, manage, and operate ~10-15 big machines
- Developed and host dozens of science gateways

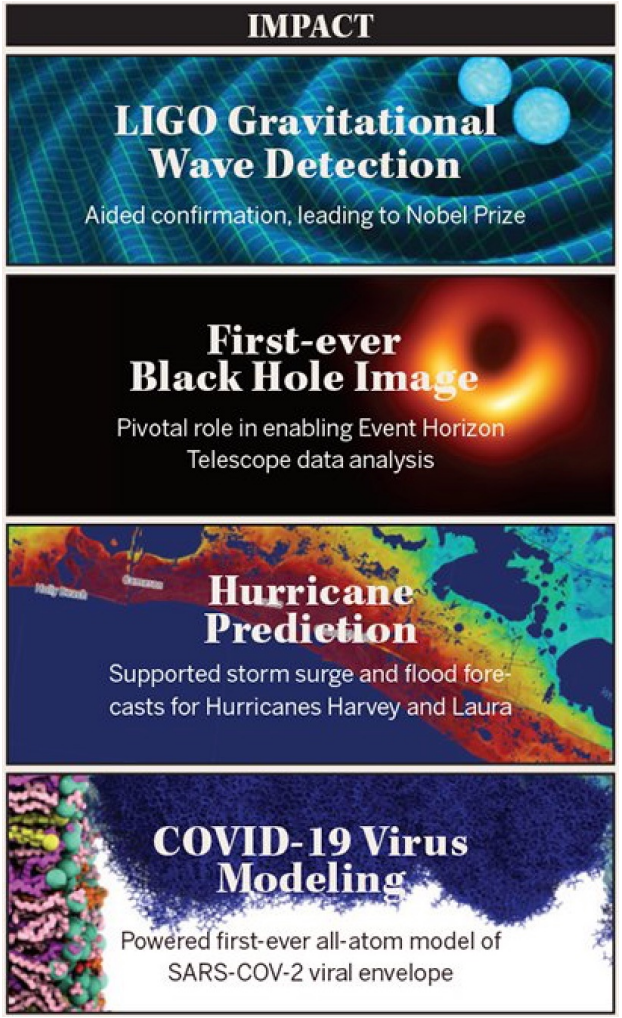
Mission: *"To enable discoveries that advance science and society through the application of advanced computing technologies."*

Texas Advanced Computing Center

Who uses TACC:

- ~4,000 active projects representing 152 fields of science
- ~15,000 annual command line users
- ~80,000 annual users via, e.g., web portals, APIs
- Partnerships with UT System, NSF ACCESS, industry, international
- K-12 programs, college classes, institutes and other training opportunities (1,000+ users trained annually)

- 7 billion compute hours annually
- 5 billion files processed annually
- 100PB stored archival data

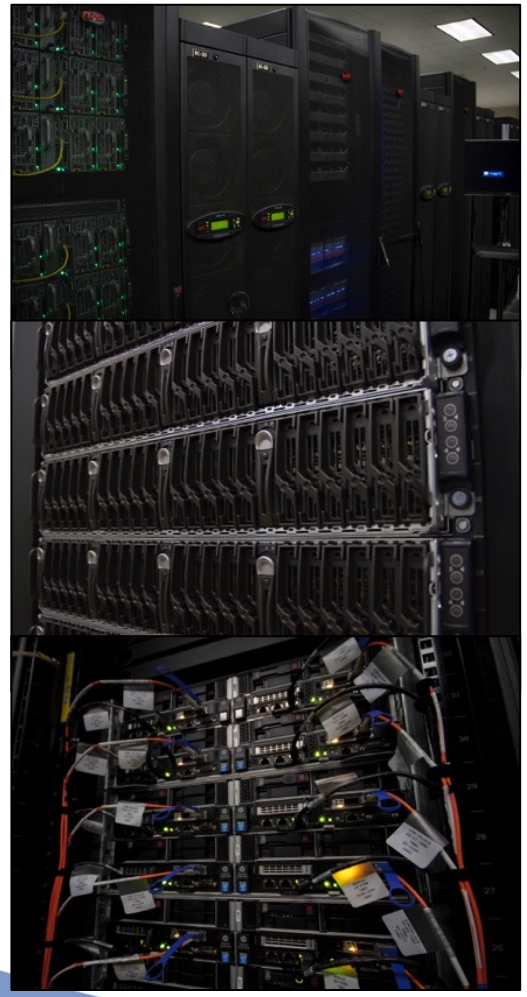


Texas Advanced Computing Center

Why use TACC:

- Scale up existing computational research
- Gain access to the latest hardware
- Use gateways / portals for common, domain-specific workflows
- Store, manage, and share large datasets
- Add computational data analysis to experimental research
- Add computational component to modern courses or workshops
- Collaborate with our domain experts

TACC Hardware Ecosystem



Resource	Specialization
Frontera	National Leadership Class System – Intel Cascade Lakes / RTX GPUs
Stampede3	National NSF Resource – Intel Ice Lakes + Sapphire Rapids + Skylakes, Ponte Vecchio GPUs, 12 PB flash storage
Lonestar6	UT System Resource – 3PF AMD EPYC plus A100 GPUs
Vista	AI Focused Supercomputer – NVIDIA H100 Grace Hopper Superchips
Jetstream & Chameleon	OpenStack Cloud – Usable, programmable infrastructure
Rodeo & Cyclone	VMware/OpenStack – Production hosting
Stockyard	7PB Global, compute-optimized, parallel filesystem
Corral	40PB High-integrity, performant HDD + Data services
Ranch	160PB Long-term archival storage (disc and tape)
Horizon	*Coming Soon*


VISTA
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STAMPEDE 3
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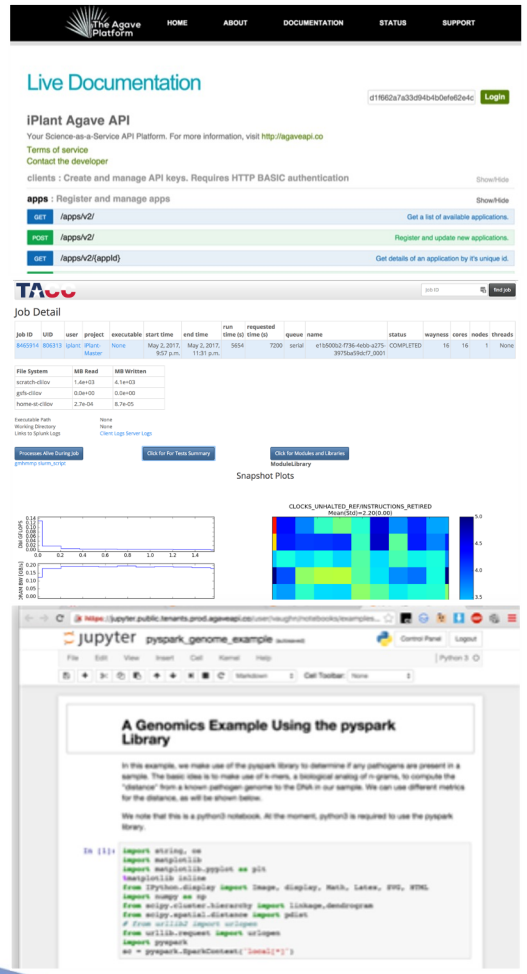
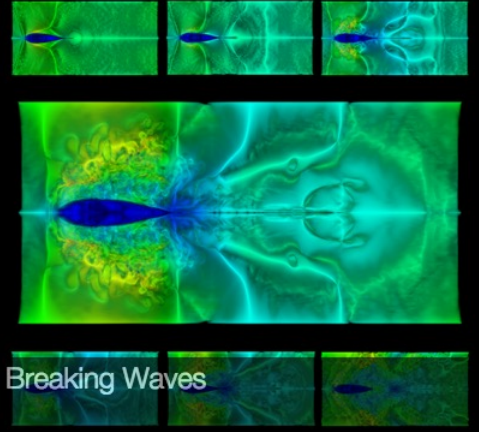
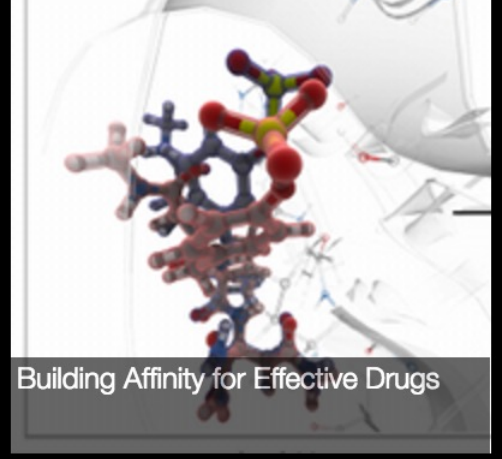
TACC Software Ecosystem

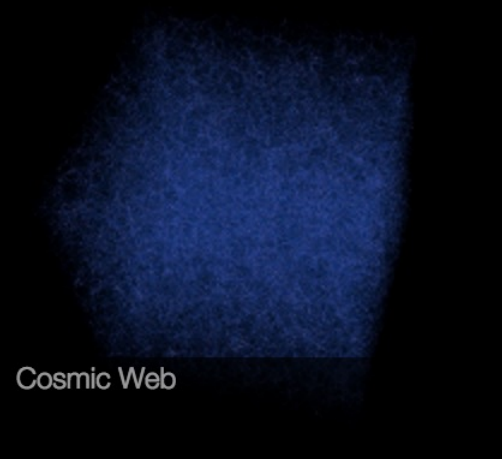


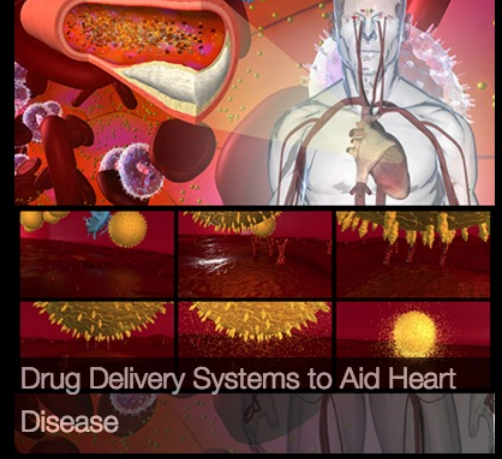
Software	Specialization
Tapis API	PaaS for identity and access management, data marshalling & management, code publishing, orchestration, data center bridging
Reactors API	PaaS bringing functional programming to a hybrid HPC/cloud environments
Core Experience Portal	Powerful, intuitive, and project-oriented web interface for high performance computing and data management
TACC Stats	Detailed performance analysis for all TACC HPC jobs
JupyterHub	HPC-aware, API-integrated notebook computing
OpenStack	User-configurable, programmable infrastructure
TAS	Foundational TACC service for IAM, allocations, and reporting
Jenkins	Automation and continuous integration service
Nagios + Splunk	Monitoring and advanced log aggregation

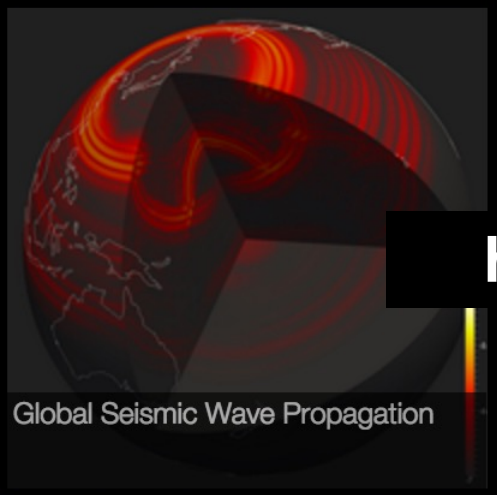

BP Deepwater Horizon Oil Spill


Breaking Waves

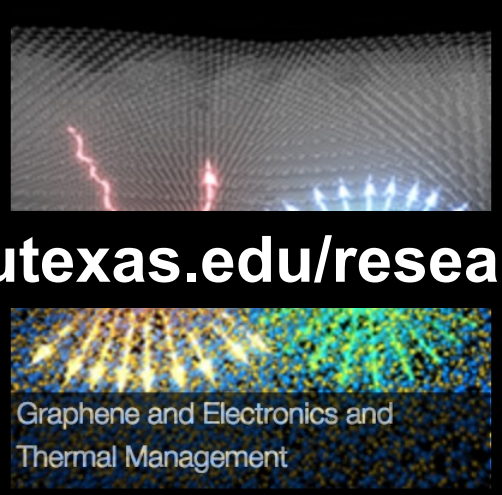

Building Affinity for Effective Drugs


Cosmic Web

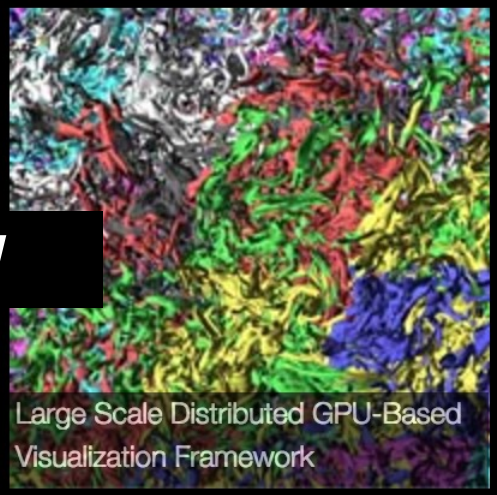

Drug Delivery Systems to Aid Heart Disease


Global Seismic Wave Propagation

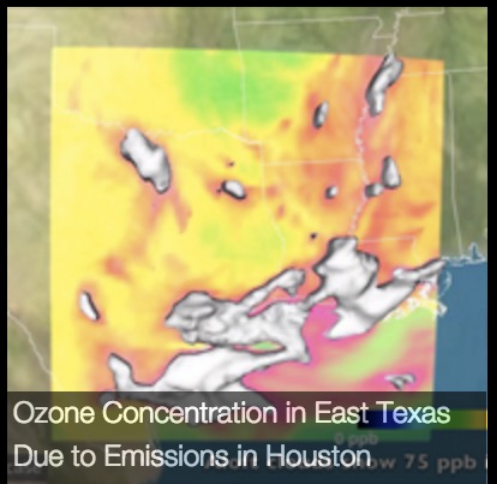

Going Nano: Big Innovations at Small Scales

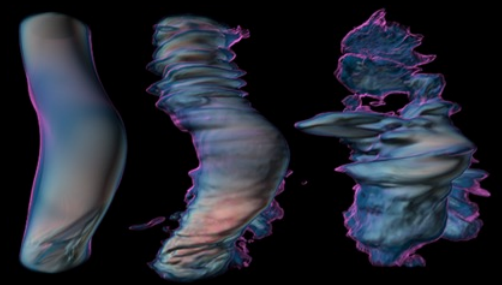

Graphene and Electronics and Thermal Management

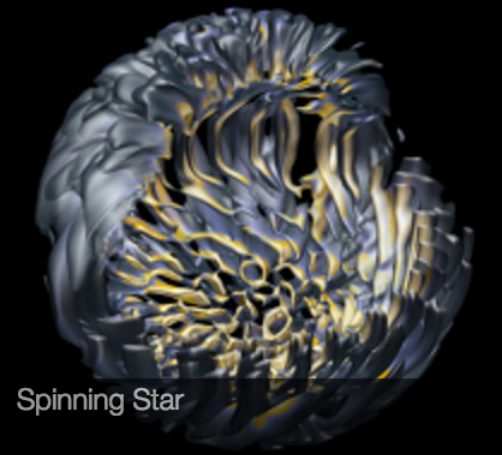

H1N1 Epidemic

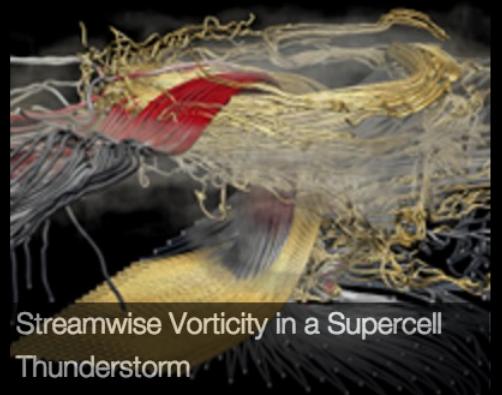

Large Scale Distributed GPU-Based Visualization Framework

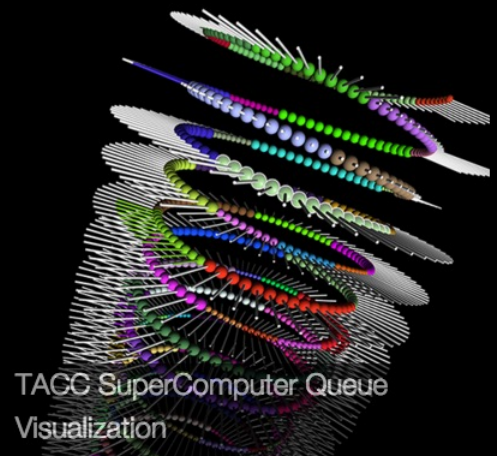
https://www.tacc.utexas.edu/research/scivis-gallery/


Ozone Concentration in East Texas Due to Emissions in Houston


Plasma Turbulence

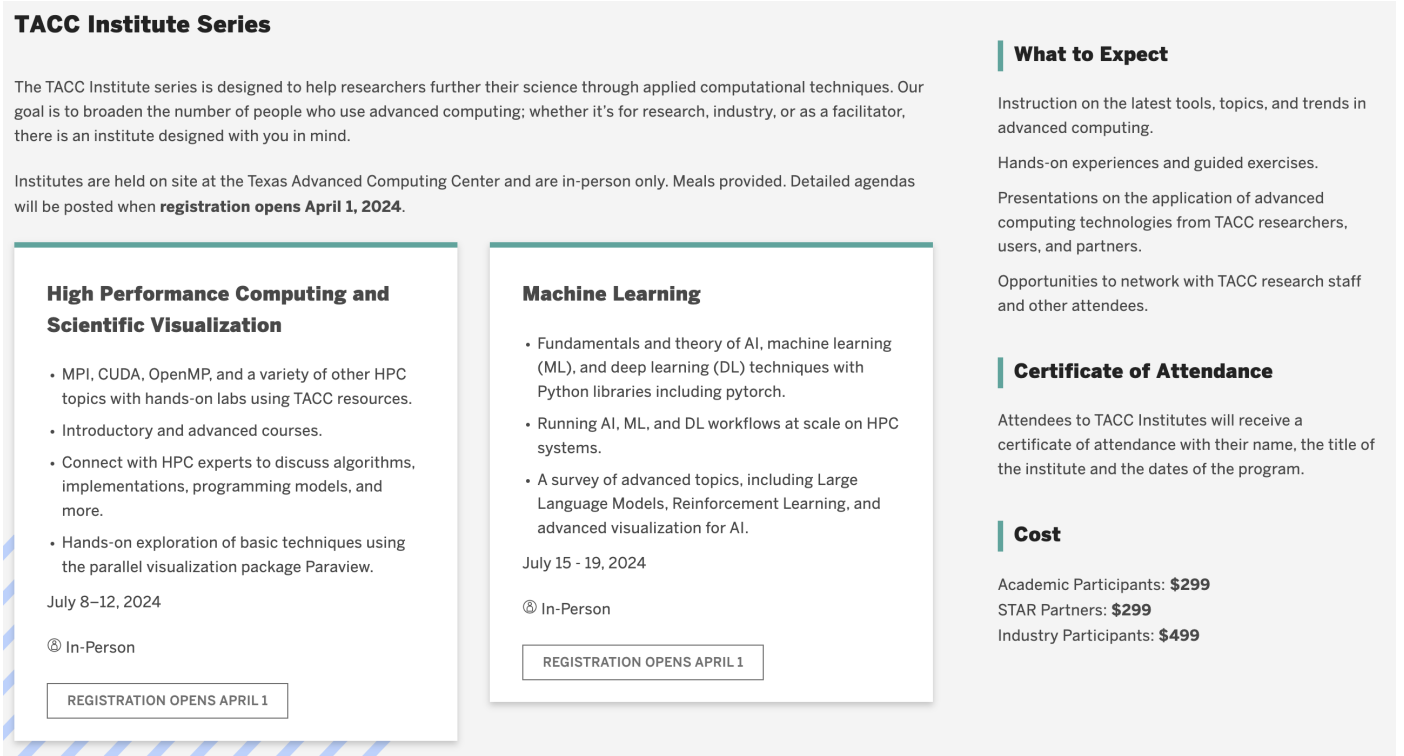

Spinning Star


Streamwise Vorticity in a Supercell Thunderstorm


TACC SuperComputer Queue Visualization

How to Get Started?

1) Create a TACC Account
   - https://accounts.tacc.utexas.edu/register
2) Create a project and request an allocation
   - https://tacc.utexas.edu/portal/projects
3) Add staff and students to the project
   - https://tacc.utexas.edu/portal/projects
4) Log in to a cluster, upload data, submit jobs
   - https://docs.tacc.utexas.edu/
5) Attend training on a variety of topics
   - https://tacc.utexas.edu/use-tacc/training/
6) Ask for our help!
   - https://tacc.utexas.edu/about/help/



TACC Institute Series

The TACC Institute series is designed to help researchers further their science through applied computational techniques. Our goal is to broaden the number of people who use advanced computing; whether it's for research, industry, or as a facilitator, there is an institute designed with you in mind.

Institutes are held on site at the Texas Advanced Computing Center and are in-person only. Meals provided. Detailed agendas will be posted when **registration opens April 1, 2024**.

High Performance Computing and Scientific Visualization

- MPI, CUDA, OpenMP, and a variety of other HPC topics with hands-on labs using TACC resources.
- Introductory and advanced courses.
- Connect with HPC experts to discuss algorithms, implementations, programming models, and more.
- Hands-on exploration of basic techniques using the parallel visualization package Paraview.

July 8–12, 2024

In-Person

REGISTRATION OPENS APRIL 1

Machine Learning

- Fundamentals and theory of AI, machine learning (ML), and deep learning (DL) techniques with Python libraries including pytorch.
- Running AI, ML, and DL workflows at scale on HPC systems.
- A survey of advanced topics, including Large Language Models, Reinforcement Learning, and advanced visualization for AI.

July 15 - 19, 2024

In-Person

REGISTRATION OPENS APRIL 1

What to Expect

Instruction on the latest tools, topics, and trends in advanced computing.

Hands-on experiences and guided exercises.

Presentations on the application of advanced computing technologies from TACC researchers, users, and partners.

Opportunities to network with TACC research staff and other attendees.

Certificate of Attendance

Attendees to TACC Institutes will receive a certificate of attendance with their name, the title of the institute and the dates of the program.

Cost

Academic Participants: **$299**
STAR Partners: **$299**
Industry Participants: **$499**

Note: If the data is PHI, review this first: https://tacc.utexas.edu/about/security-and-compliance/protected-data-service/

For questions, please contact:

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For more information:

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