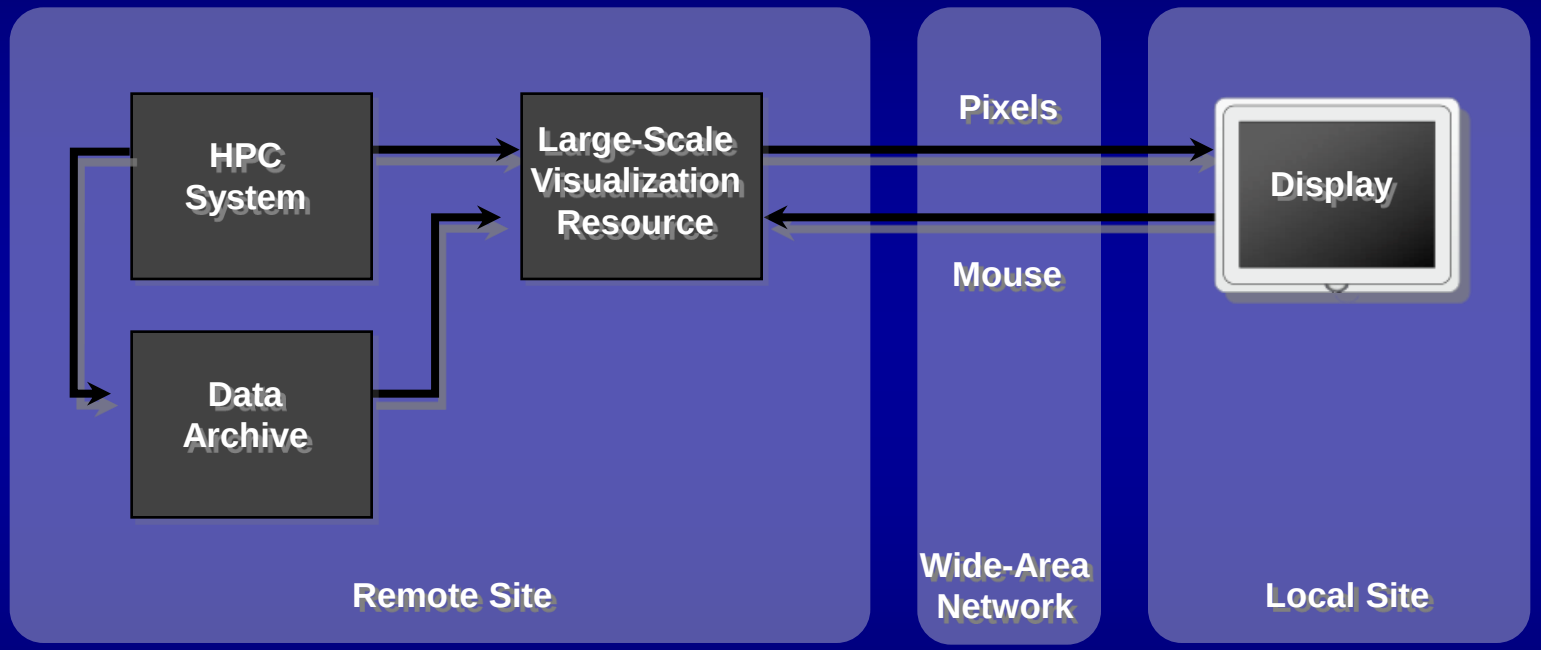
Remote & Collaborative Visualization

Greg Johnson

TACC Remote Visualization Systems

- **Longhorn** – Dell XD Visualization Cluster
  - 256 nodes, each with 48 GB (or 144 GB) memory, 8 cores, 2 NVIDIA Quadro FX 5800 GPUs with 4 GB graphics memory each
- **Spur** – Sun Visualization Cluster
  - 8 nodes, each with 128 GB (or 256 GB) memory, 16 cores, 4 NVIDIA Quadro FX 5600 GPUs with 1.5 GB graphics memory each
- Available for use by TACC and TeraGrid users
- Both mount Ranger's filesystems

Remote Visualization Model

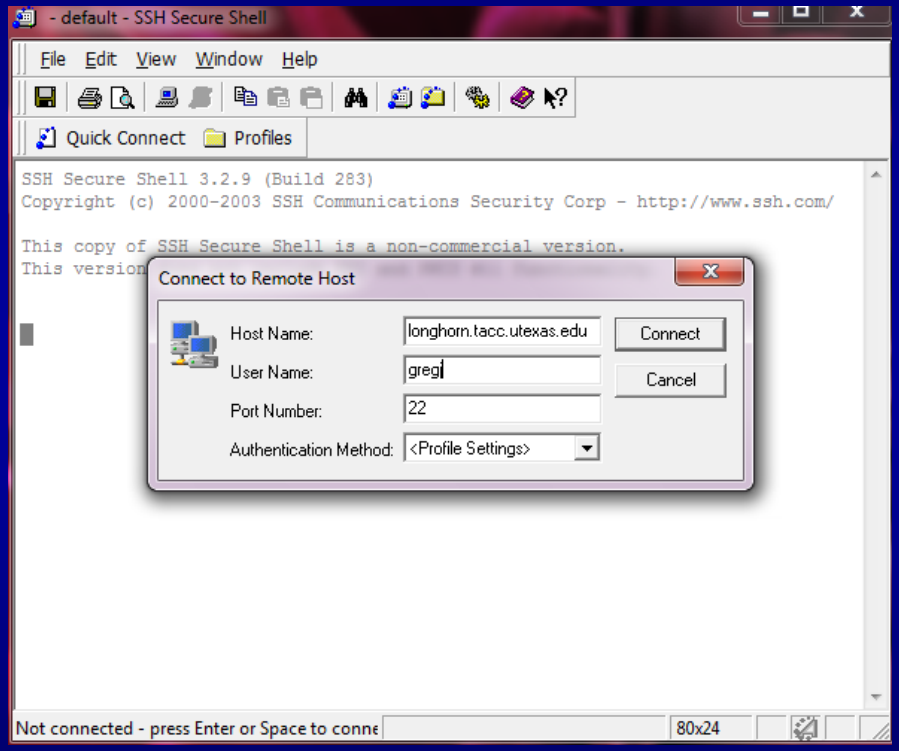


Methods of Remote Access

- SSH
  - Basic command-line interface, useful for managing files, submitting jobs, etc.
- Longhorn Visualization Portal
  - Simplified web-based interface for:
    - Viewing your allocations
    - Submitting jobs
    - Interacting with remote vis sessions (VNC or EnVision)
- Direct VNC connection

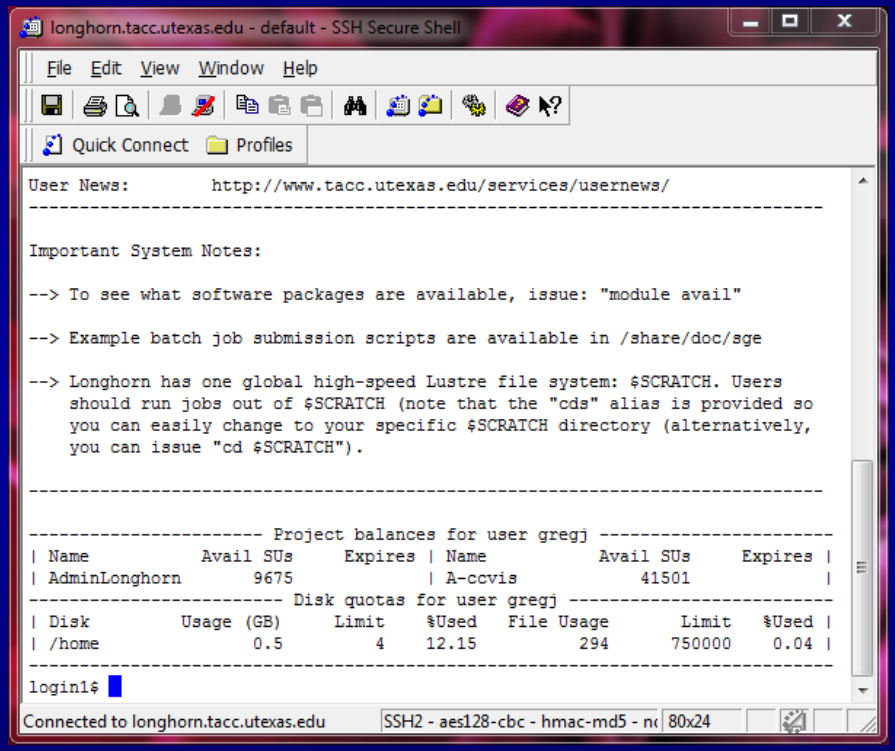
SSH Access

- Start the “Secure Shell Client” application
- Click “Quick Connect”
  - Host Name: longhorn.tacc.utexas.edu
  - User Name: <your training account>
  - Click “Connect”



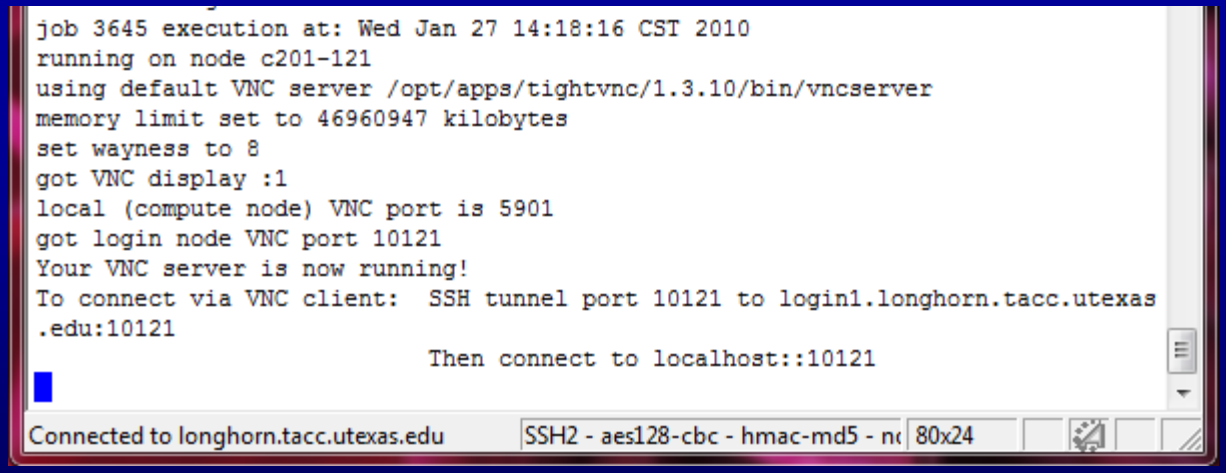
SSH Access

- You're now on a Longhorn login node
- Can run usual shell utilities
- Manage data, etc.



SSH Access

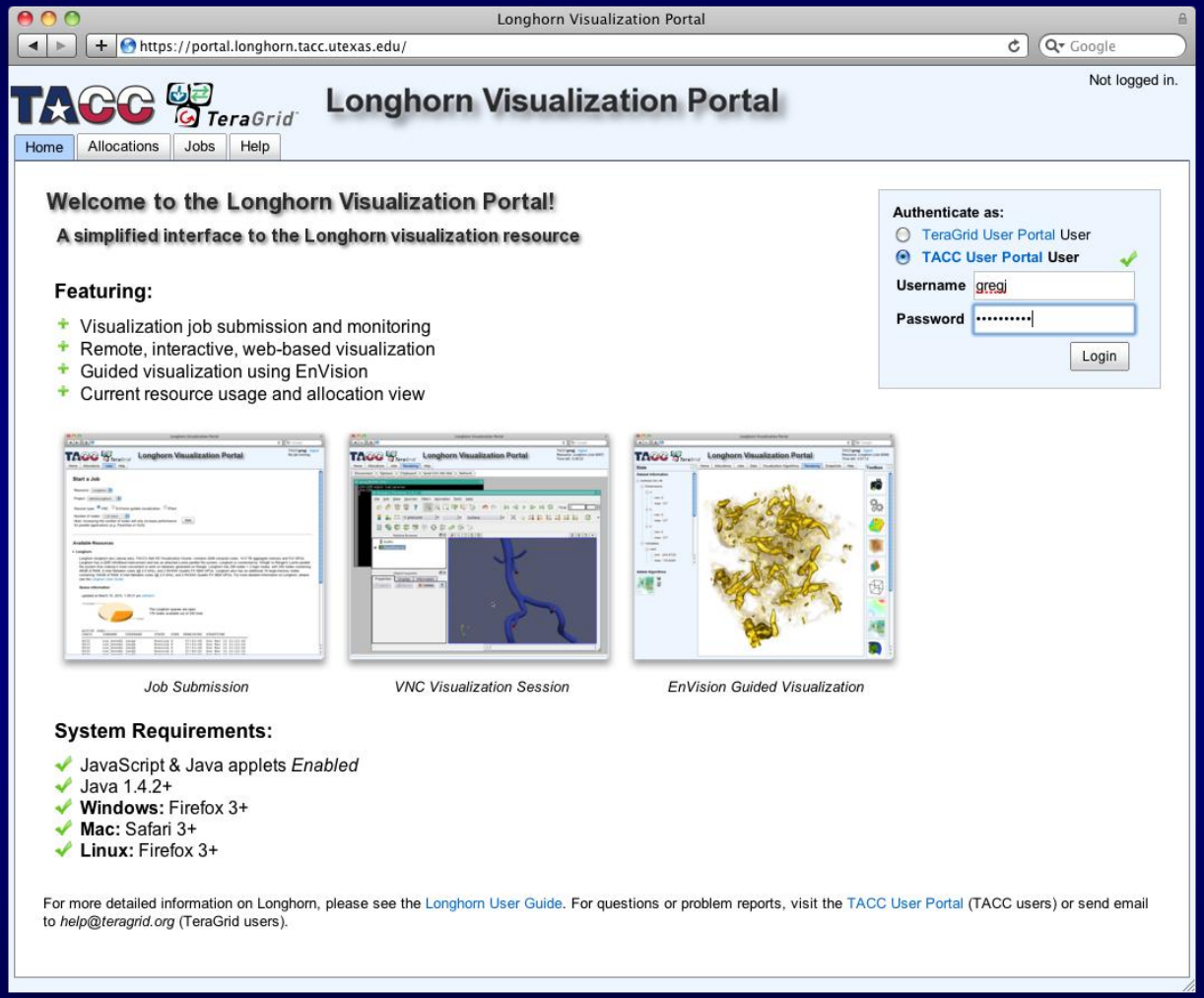
- For later reference (more details in Longhorn User Guide):
  - Can submit a remote VNC job from here
    - qsub /share/doc/sge/job.vnc
    - tail -f vncserver.out
    - Connect to address in output file with a VNC viewer



Longhorn Visualization Portal

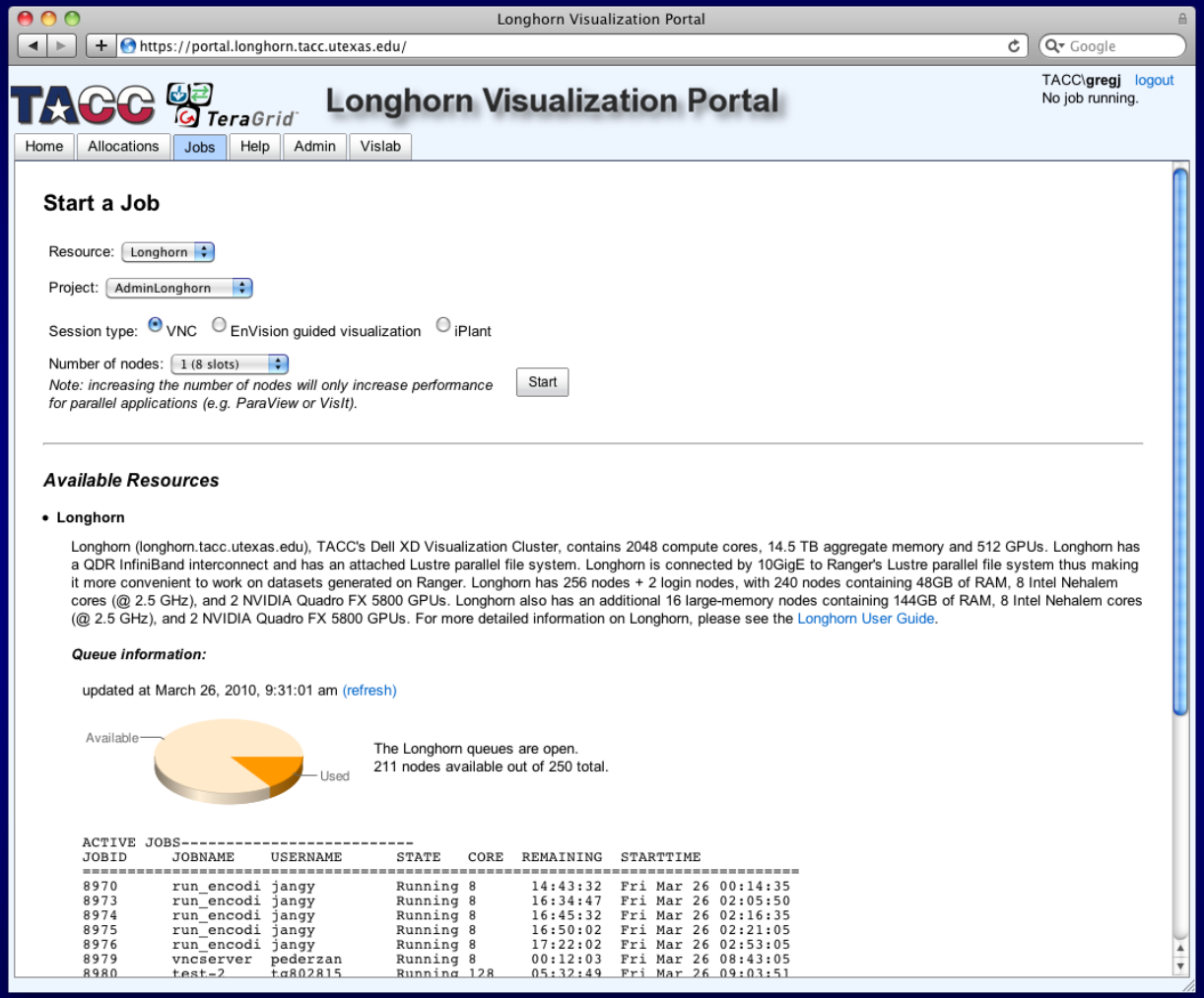
- ***http://portal.longhorn.tacc.utexas.edu***
- A web-based interface that lets you:
  - View your allocations
  - Submit jobs
  - Interact with remote VNC or EnVision sessions
- Avoids the hassle and complexity of manually managing your jobs
- For many users this can be the primary method of interacting with Longhorn
- Advanced users may still use SSH

Login as a TACC user with your training account (Firefox)



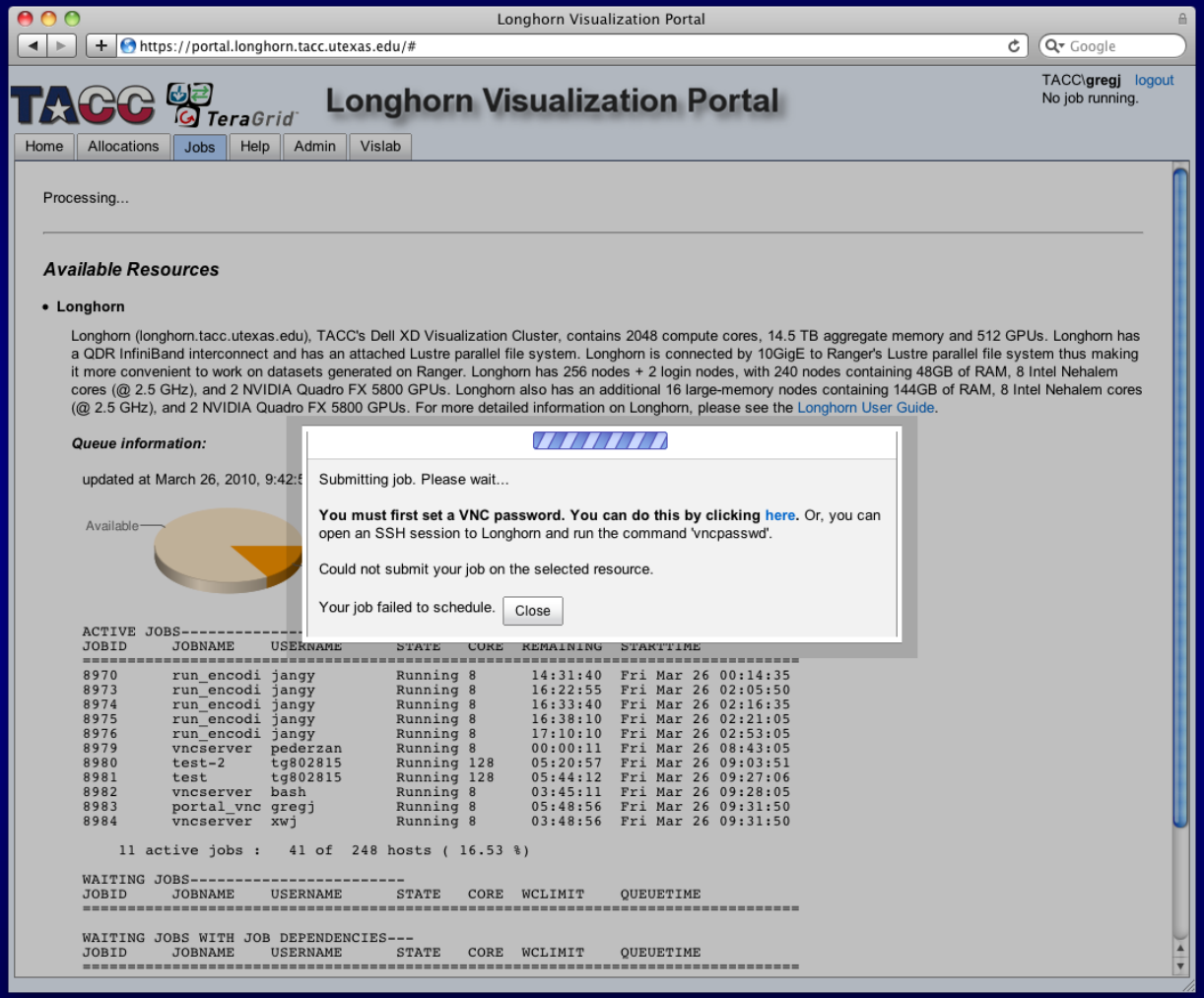
TACC

Start a VNC job

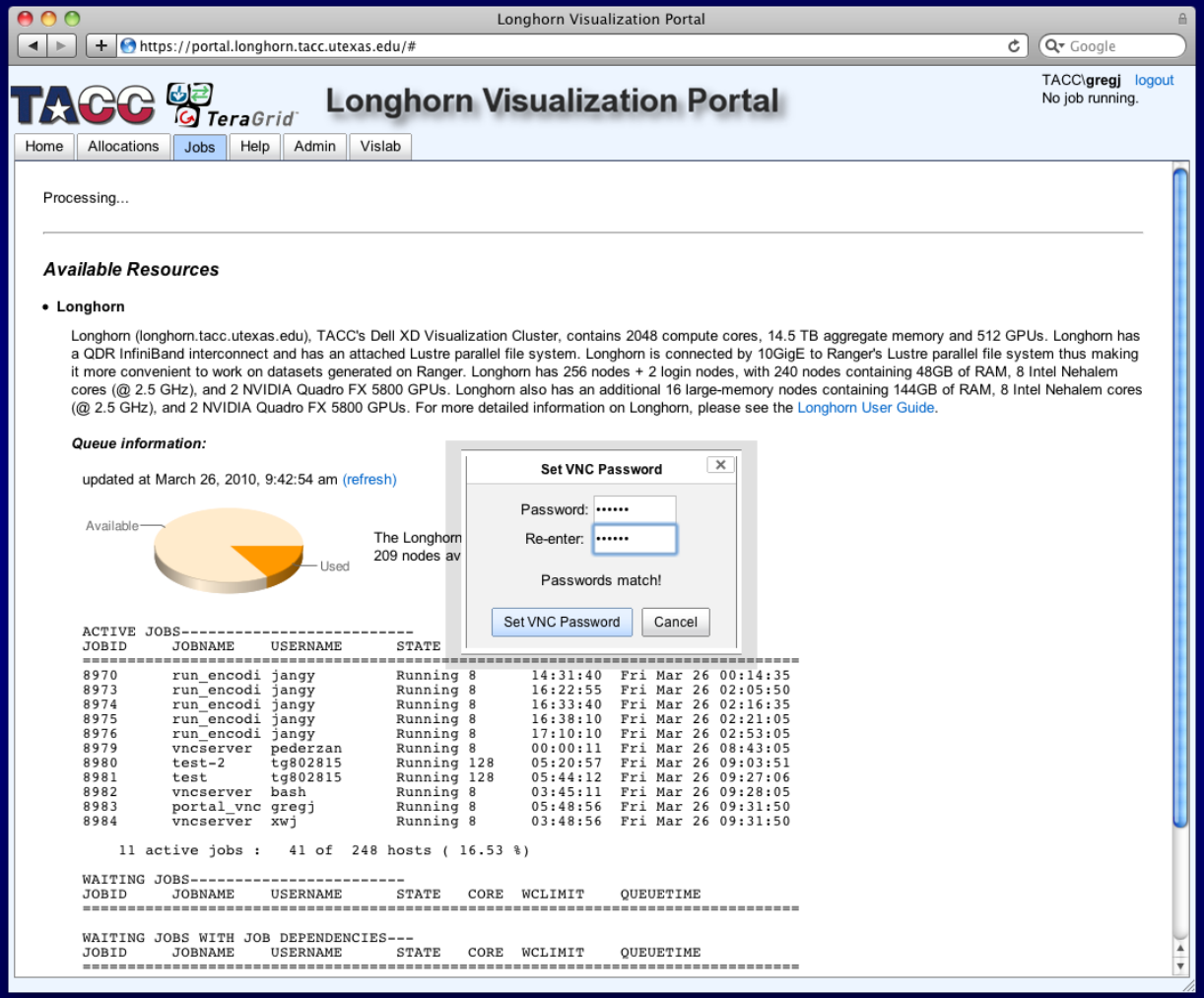


TACC

First time only: Set a VNC password

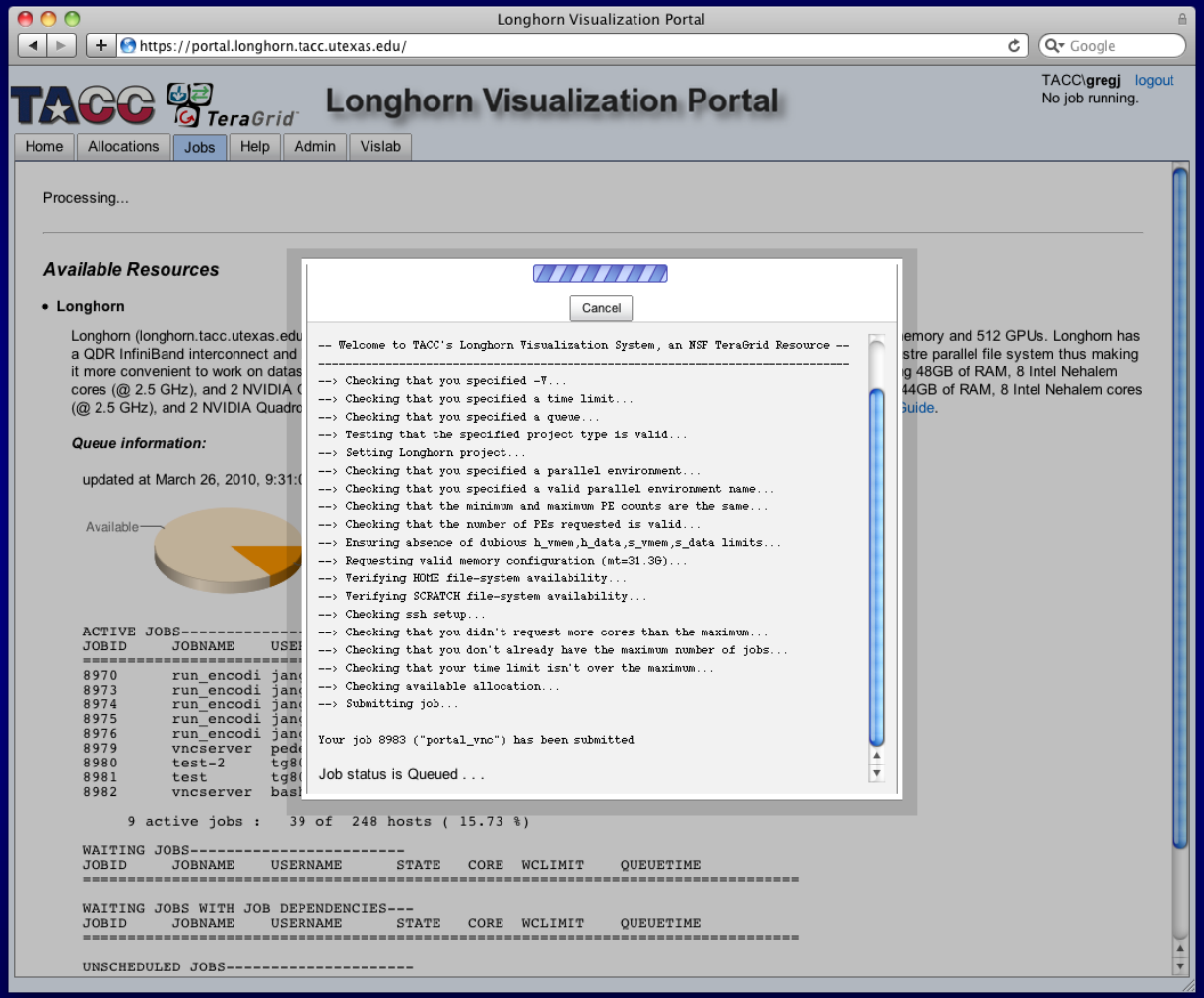


First time only: Set a VNC password

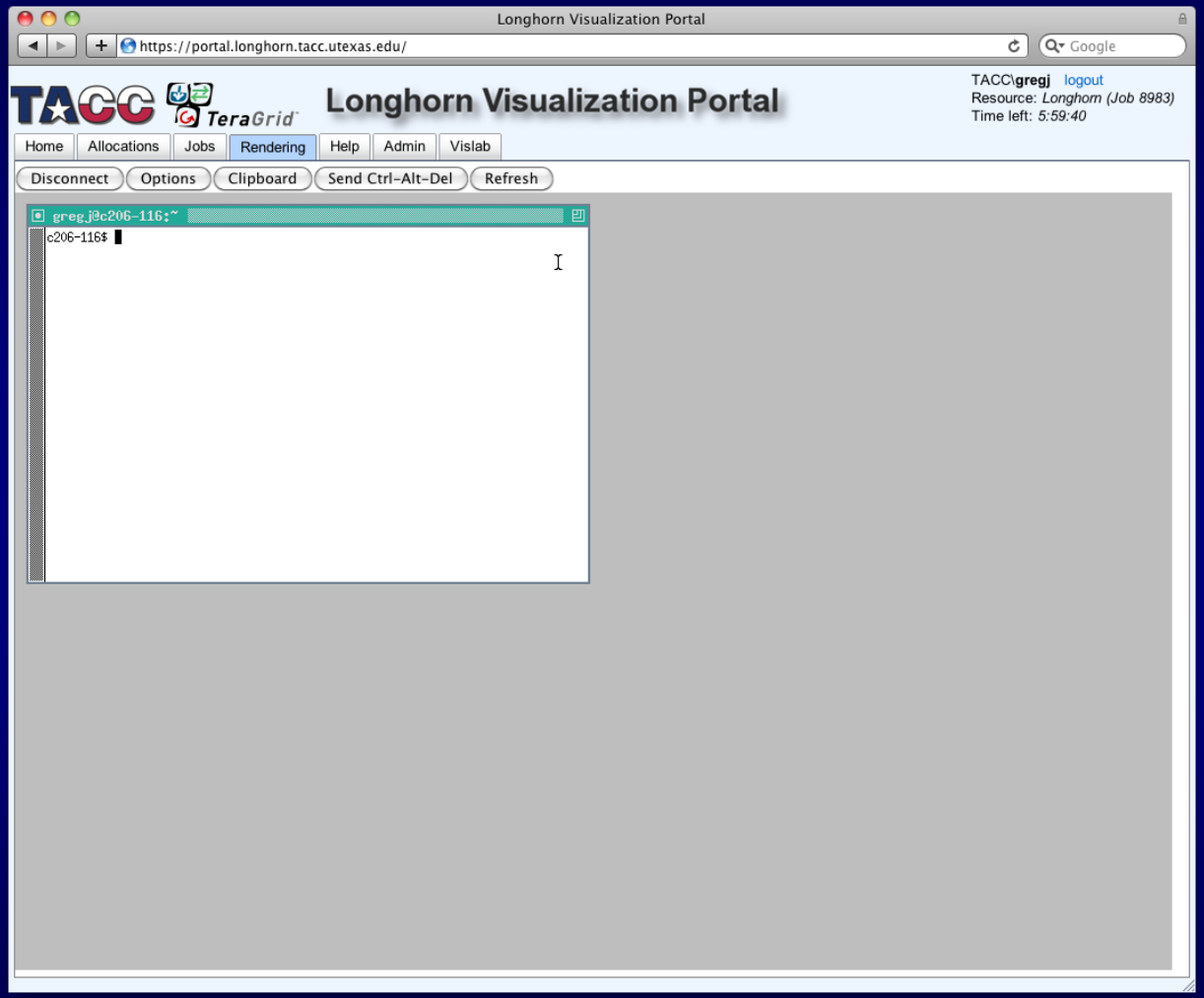


TACC

Start a VNC job (submit again)

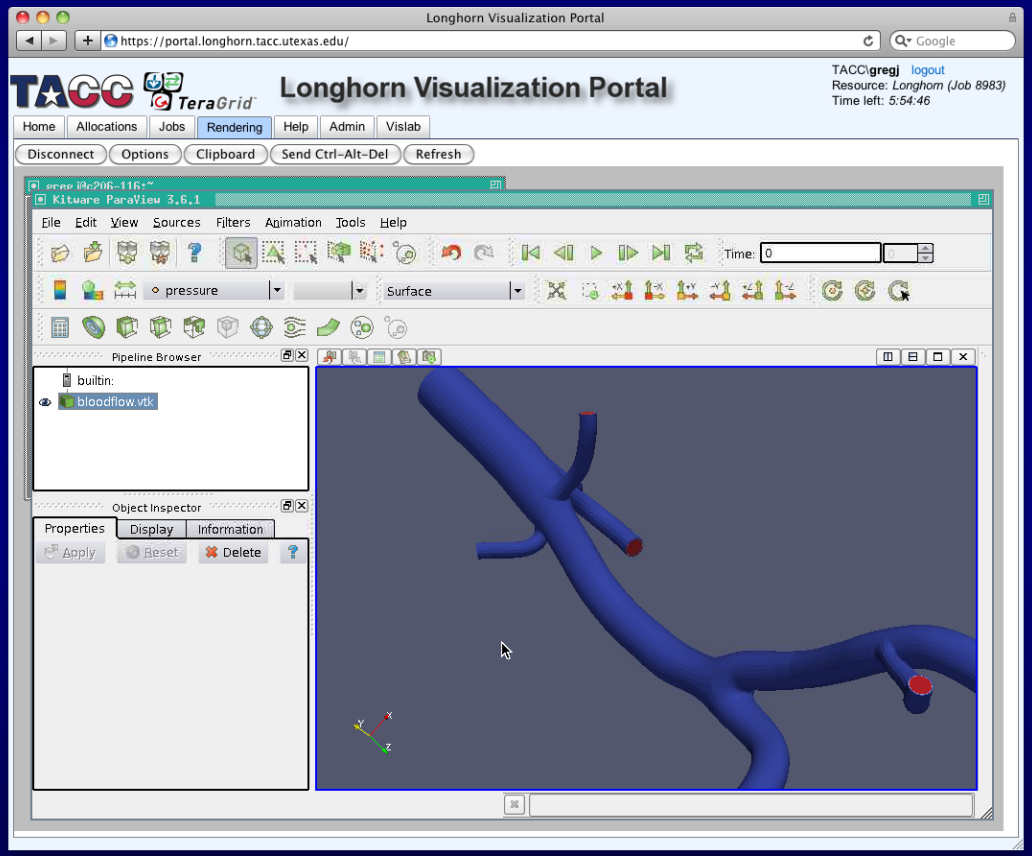


VNC Session


Longhorn Visualization Portal
https://portal.longhorn.tacc.utexas.edu/
Google
TACC
TeraGrid
Longhorn Visualization Portal
TACC\gregj logout
Resource: Longhorn (Job 8983)
Time left: 5:59:40
Home
Allocations
Jobs
Rendering
Help
Admin
Vislab
Disconnect
Options
Clipboard
Send Ctrl-Alt-Del
Refresh
gregj@c206-116:~
c206-116$

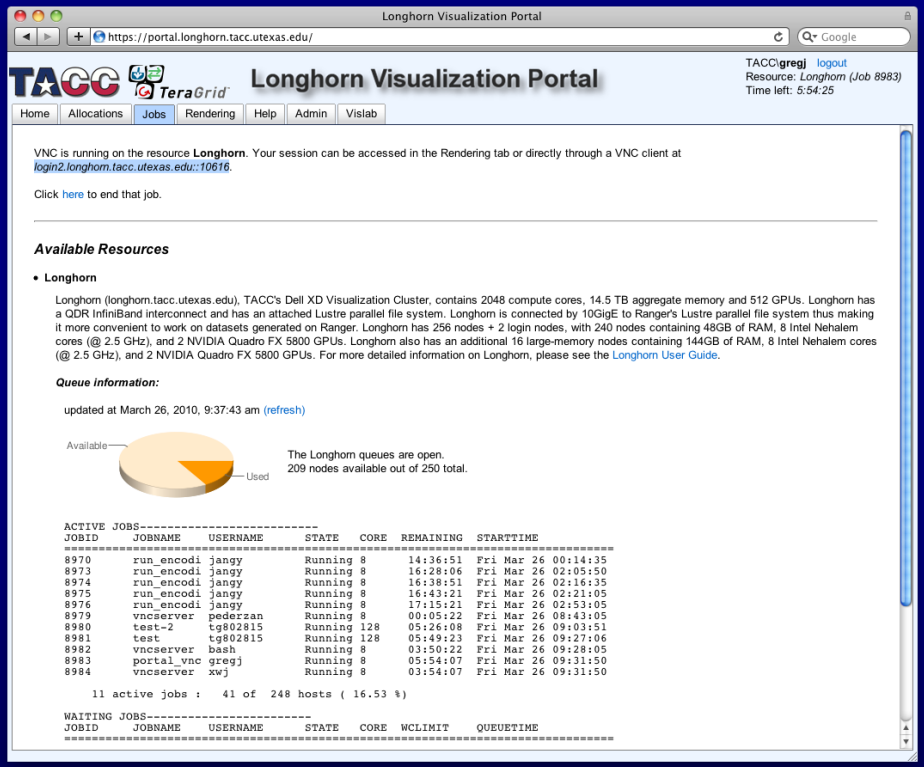
Running Vis Applications through VNC

- To see available applications:
  - *module avail*
- Examples:
  - Run ParaView:
    - *module load paraview*
    - *vglrun paraview*
  - Run VisIt
    - *module load visit*
    - *vglrun visit*



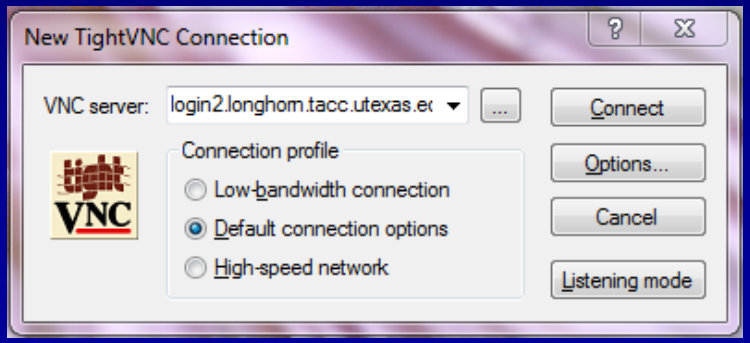
Accessing your VNC session with a stand-alone viewer

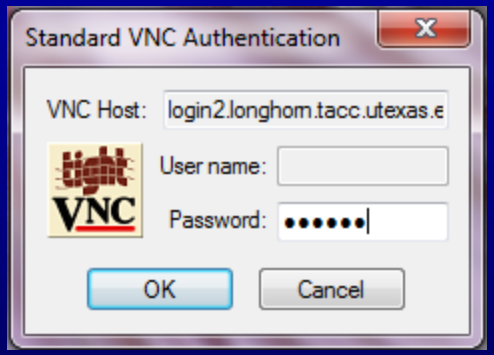
- Navigate to the Jobs tab
- *Copy the server address*



Accessing your VNC session with a stand-alone viewer

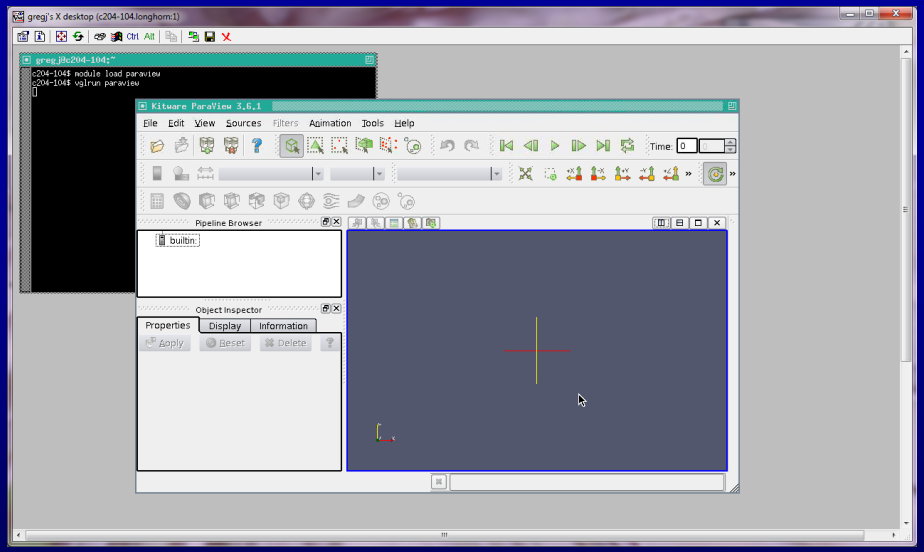
- Navigate to the Jobs tab
- Copy the server address
- *Run the "TightVNC Viewer" application*
  - *Enter the server address from the Jobs tab*
  - *Click Connect*
  - *Enter your VNC password set previously*
  - *Click Okay*





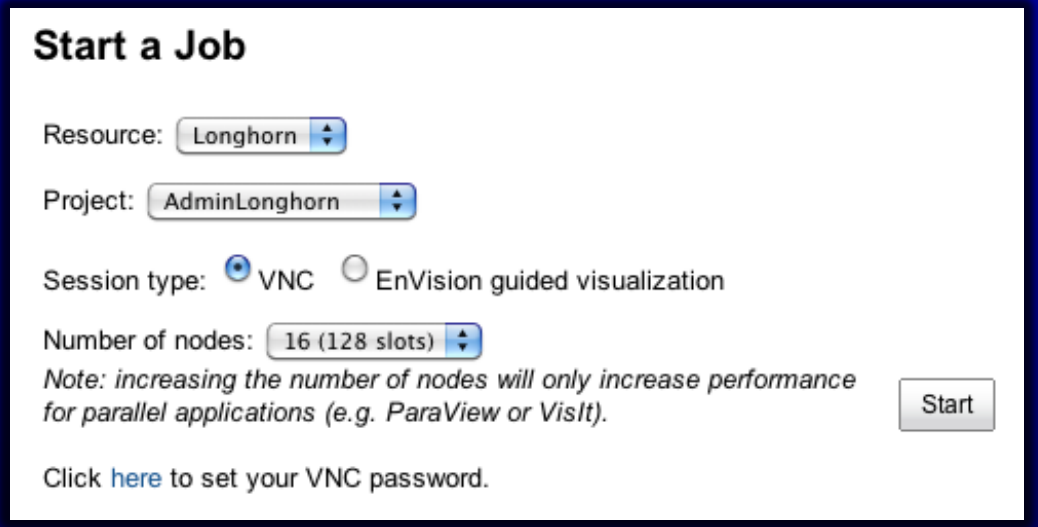
Accessing your VNC session with a stand-alone viewer

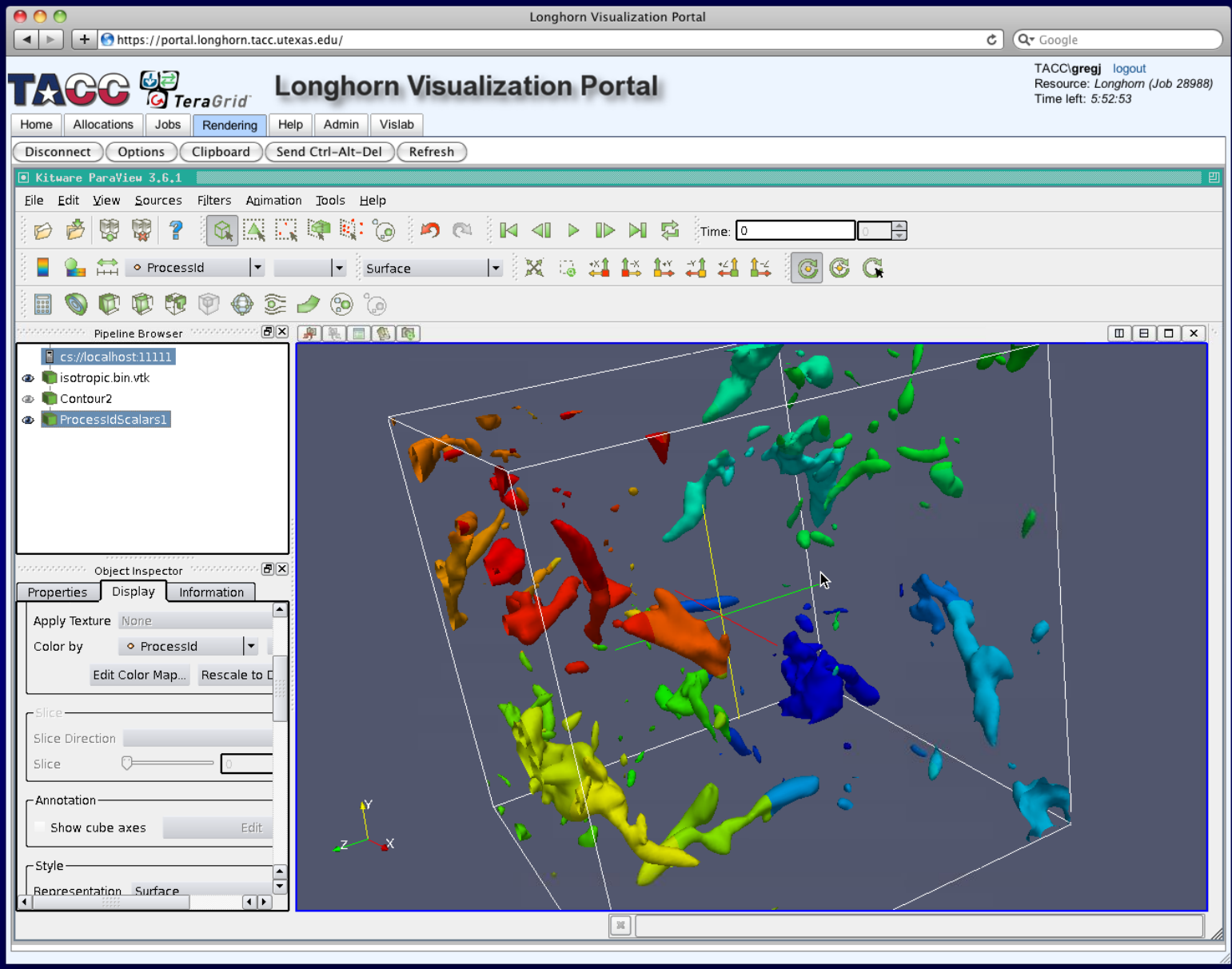
- Navigate to the Jobs tab
- Copy the server address
- Run the “TightVNC Viewer” application
  - Enter the server address from the Jobs tab
  - Click Connect
  - Enter your VNC password set previously
  - Click Okay
- *You can now interact with your VNC session (and share this session with your collaborators)*



Parallel Visualization

- You can specify how many nodes (or slots) to use during job submission
- Run vis applications in the parallel environment




Longhorn Visualization Portal
https://portal.longhorn.tacc.utexas.edu/
Google
TACC
TeraGrid
Longhorn Visualization Portal
TACC\gregj logout
Resource: Longhorn (Job 28988)
Time left: 5:52:53
Home
Allocations
Jobs
Rendering
Help
Admin
Vislab
Disconnect
Options
Clipboard
Send Ctrl-Alt-Del
Refresh
Kitware ParaView 3.6.1
File Edit View Sources Filters Animation Tools Help
Time: 0
ProcessId
Surface
Pipeline Browser
cs://localhost:11111
isotropic.bin.vtk
Contour2
ProcessIdScalars1
Object Inspector
Properties
Display
Information
Apply Texture None
Color by ProcessId
Edit Color Map...
Rescale to D
Slice
Slice Direction
Slice
Annotation
Show cube axes
Edit
Style
Representation Surface
Y
Z
X

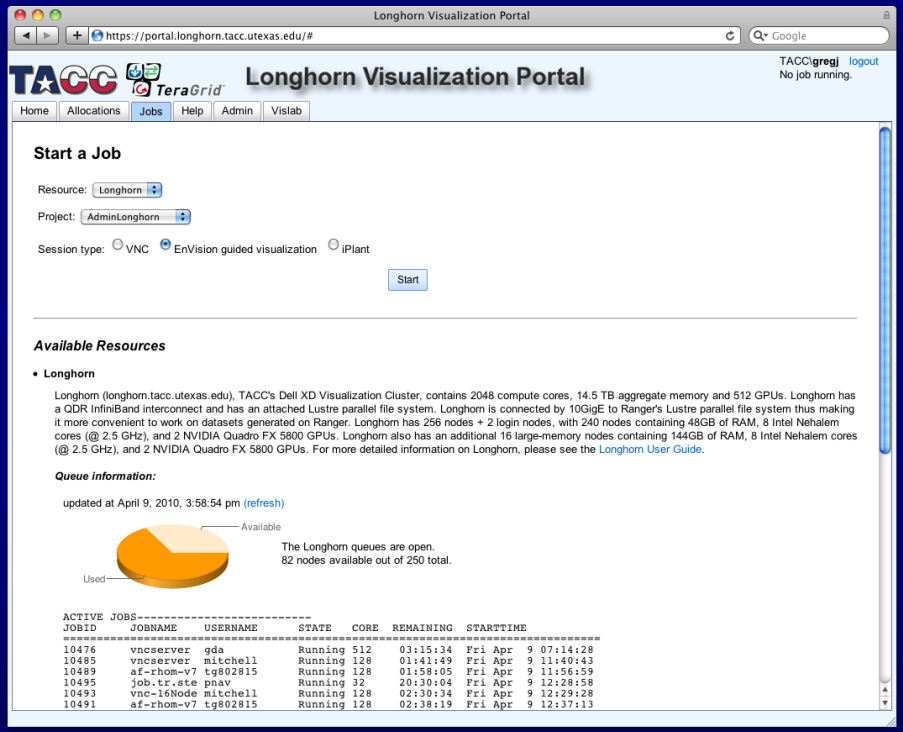
TACC

EnVision Guided Visualization

- An easy-to-use web-based tool for remote scientific visualization
- Available through the Longhorn Vis Portal
- Developed at TACC
  - Funded in part by TeraGrid and the DoD PET program
  - Development team: Greg Johnson, Steve Mock, Brandt Westing, Matthew Hanlon

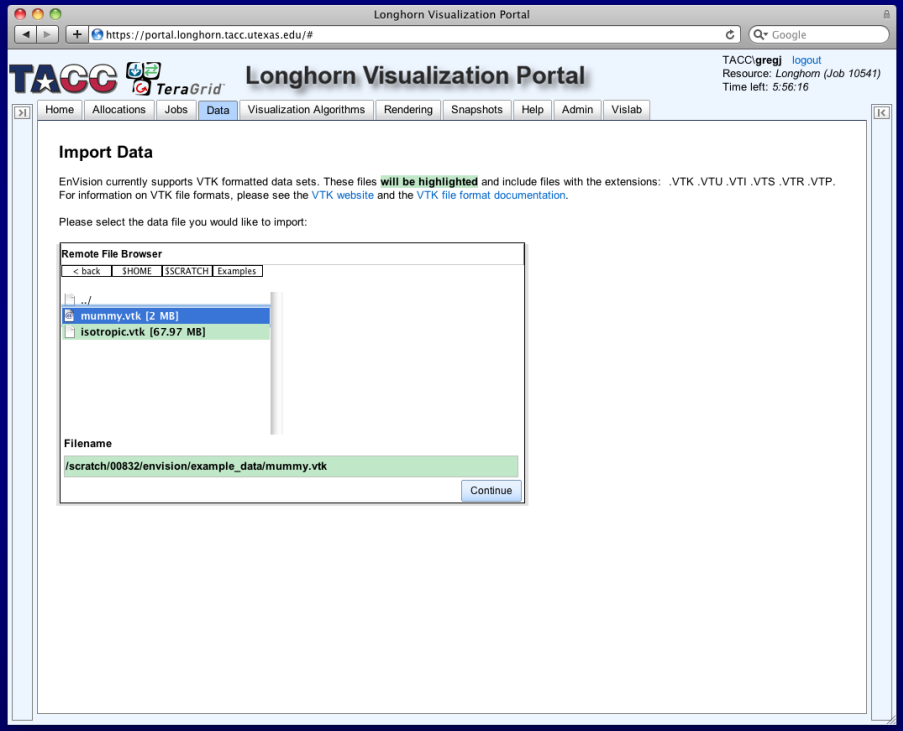
Run an EnVision session

- Navigate back to the “Jobs” tab
- End your current job
- Select the session type “EnVision guided visualization”



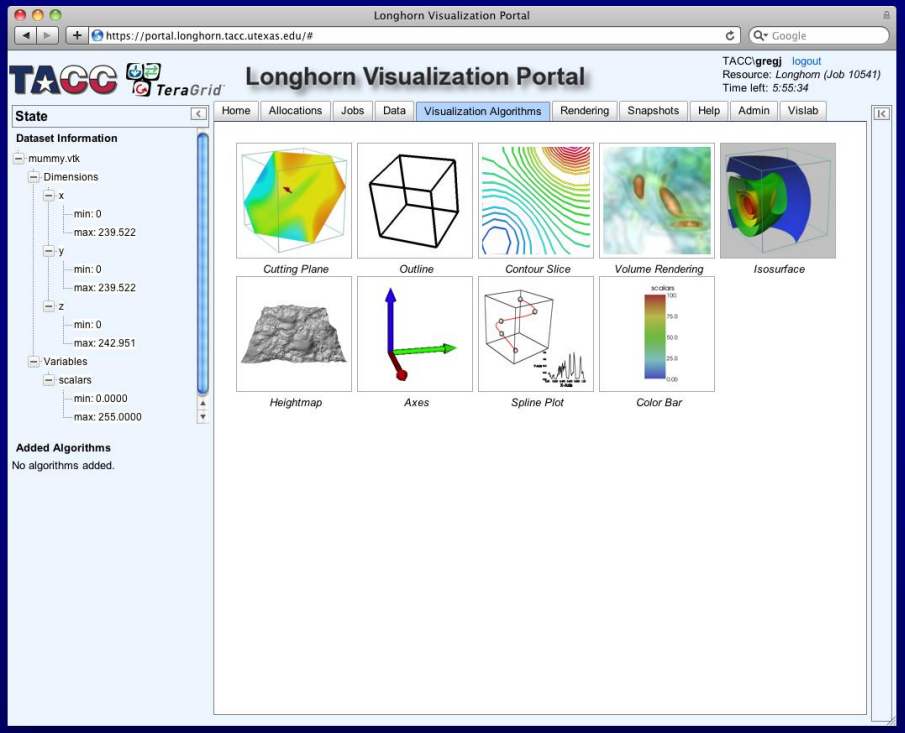
Run an EnVision session

- *Load the mummy data in the remote file browser (click the Examples shortcut)*



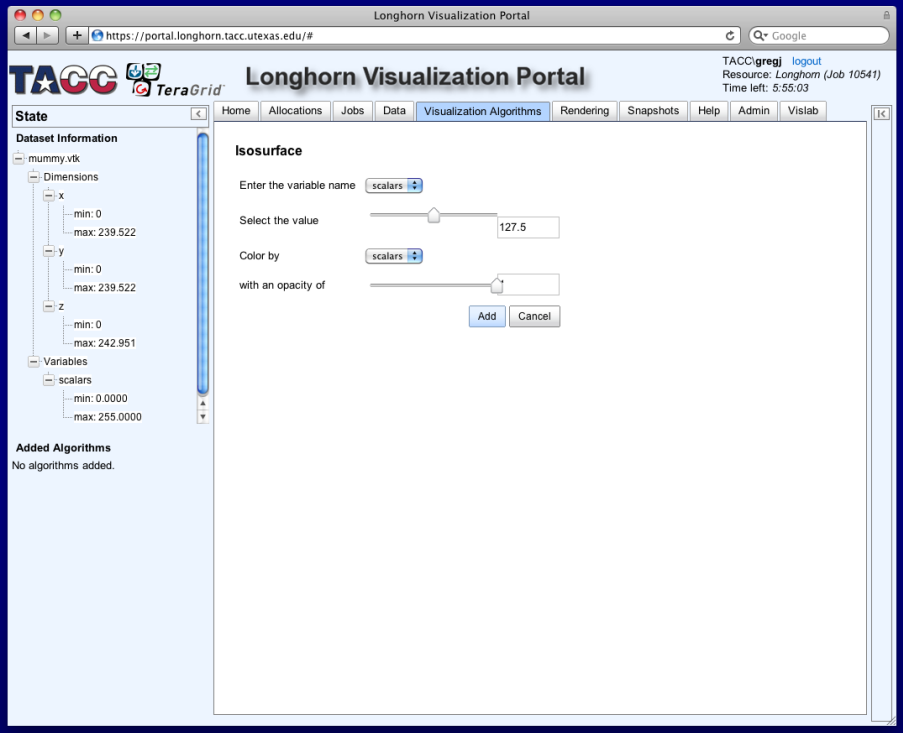
Run an EnVision session

- Load the mummy data in the remote file browser (click the Examples shortcut)
- *Click the Isosurface icon*



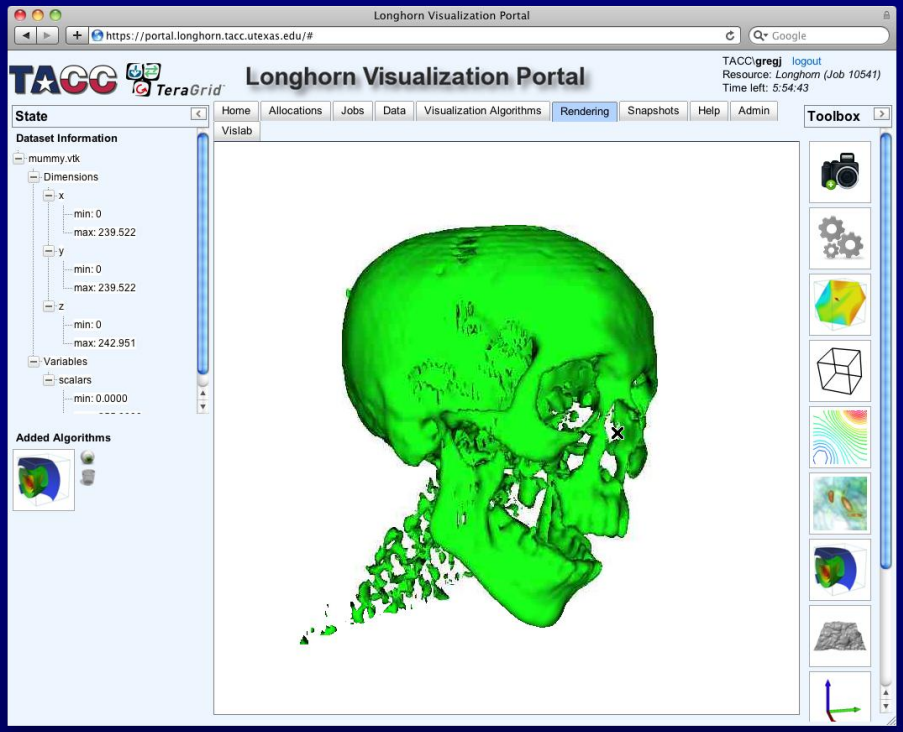
Run an EnVision session

- Load the mummy data in the remote file browser (click the Examples shortcut)
- Click the Isosurface icon
- *Add an isosurface with default parameters*



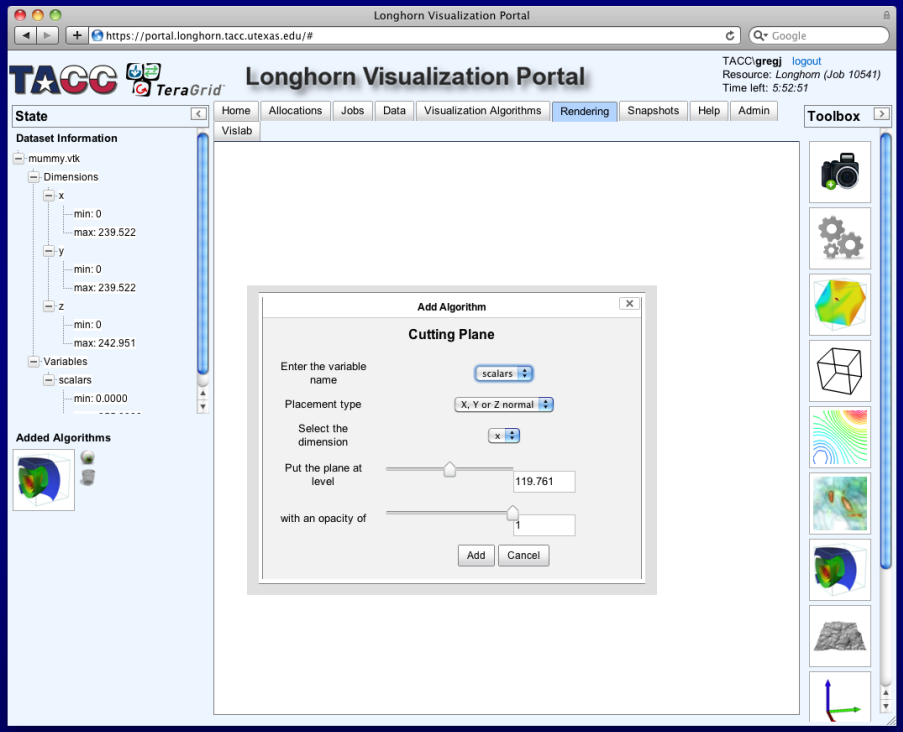
Run an EnVision session

- Load the mummy data in the remote file browser (click the Examples shortcut)
- Click the Isosurface icon
- Add an isosurface with default parameters
- *See the visualization in the Rendering tab*



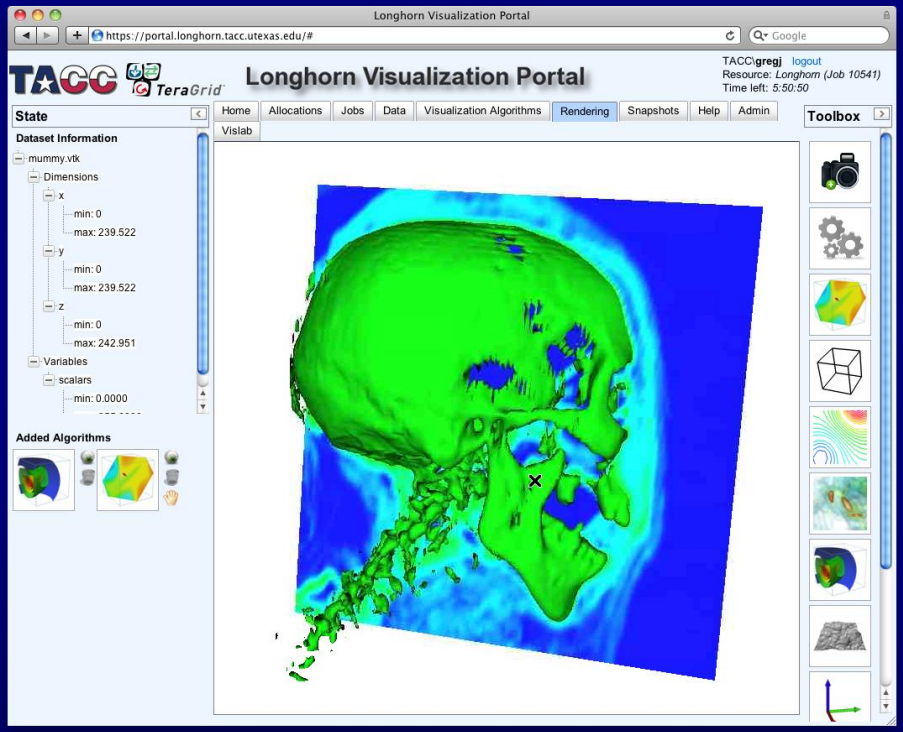
Run an EnVision session

- *Click the cutting plane icon in the toolbox*



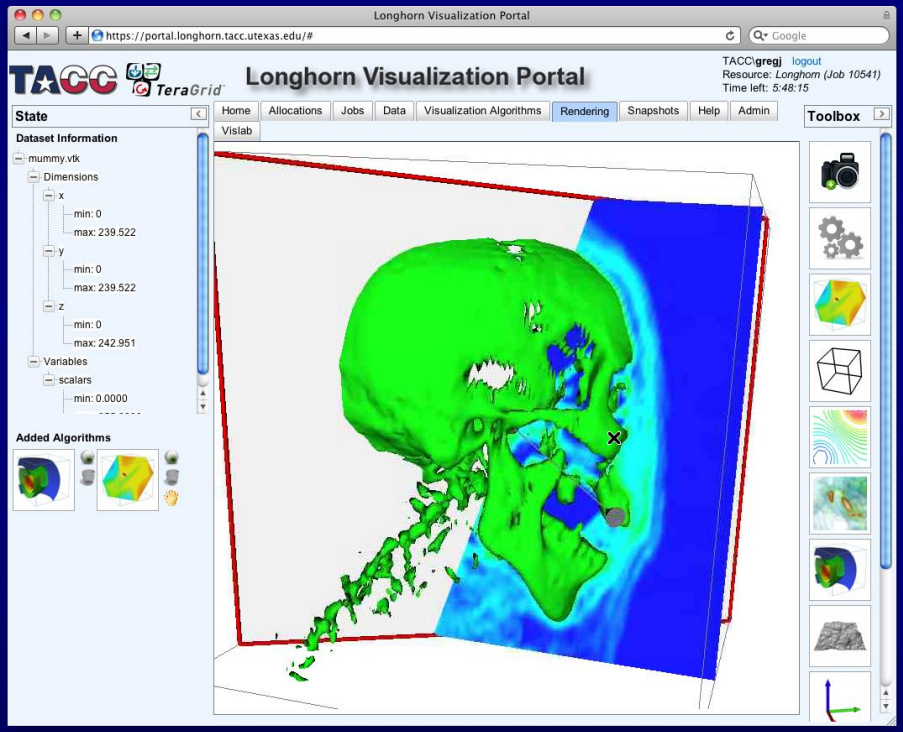
Run an EnVision session

- Click the cutting plane icon in the toolbox
- *Keep the default values; click Add*



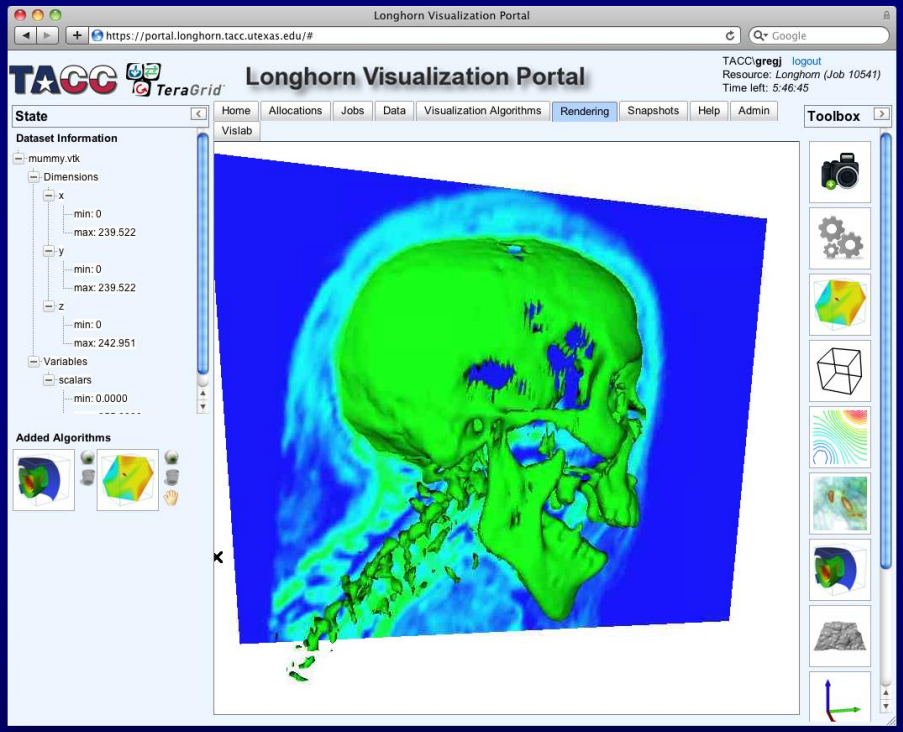
Run an EnVision session

- Click the cutting plane icon in the toolbox
- Keep the default values; click Add
- *Click the hand next to the cutting plane under Added Algorithms; use the widget to interact*



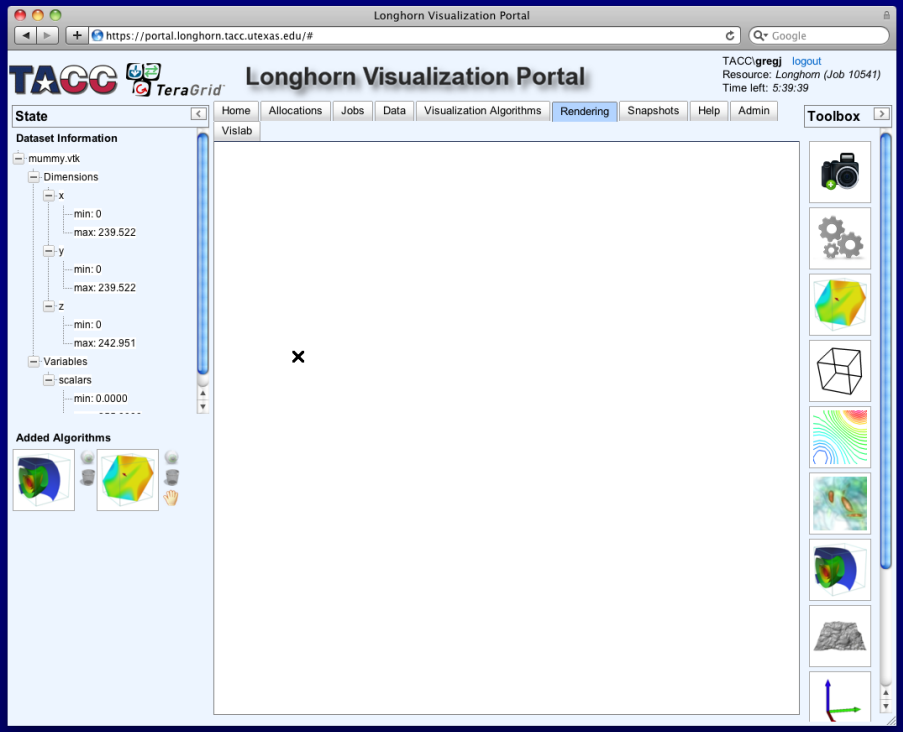
Run an EnVision session

- Click the cutting plane icon in the toolbox
- Keep the default values; click Add
- Click the hand next to the cutting plane under Added Algorithms; use the widget to interact
- *Click the hand again*



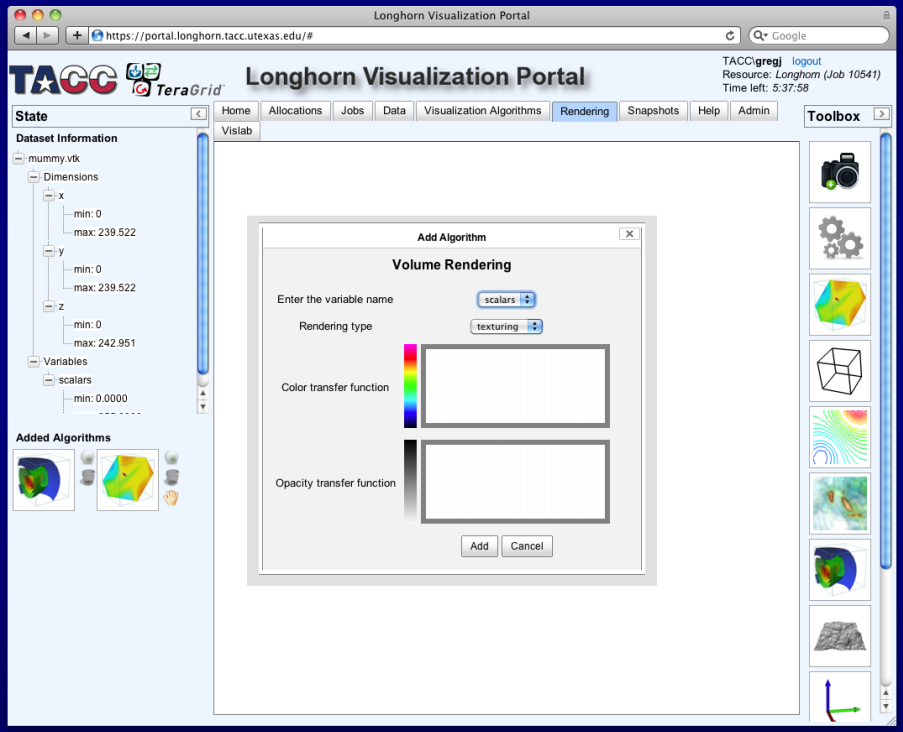
Run an EnVision session

- *Click the Eye next to each added vis algorithm to hide*



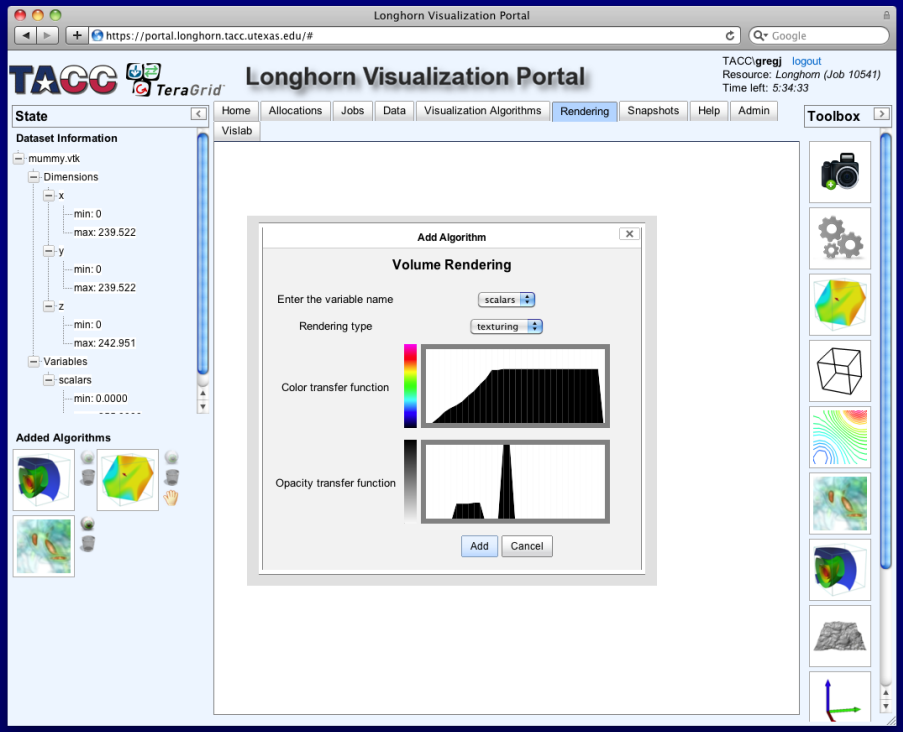
Run an EnVision session

- Click the Eye next to each added vis algorithm to hide
- *Click volume rendering icon in the toolbox*



Run an EnVision session

- Click the Eye next to each added vis algorithm to hide
- *Click volume rendering icon in the toolbox*
- *Set values as shown and click Add*



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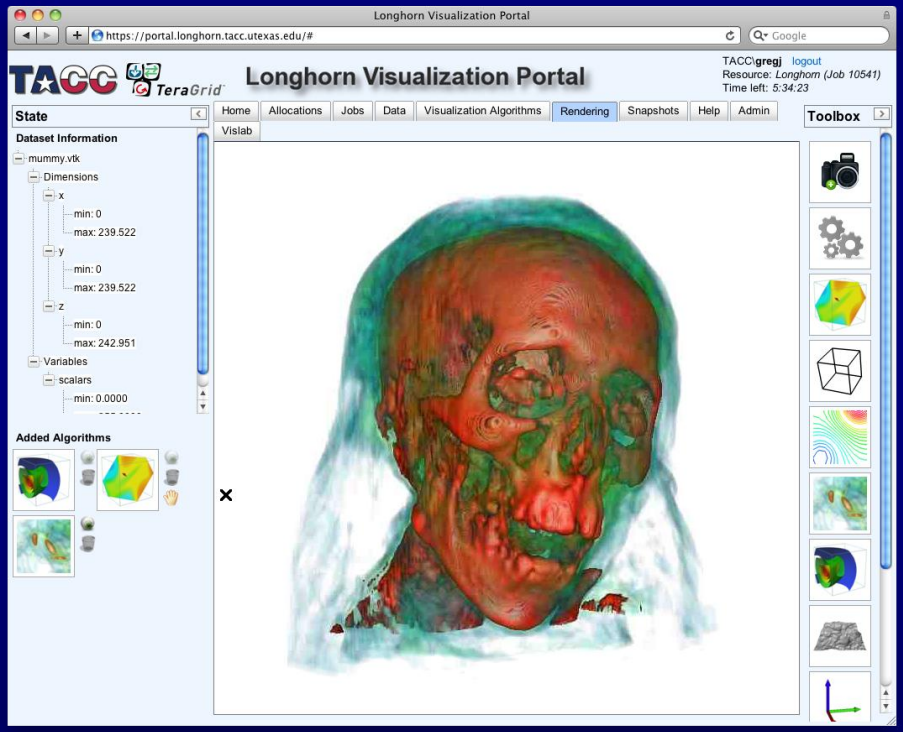
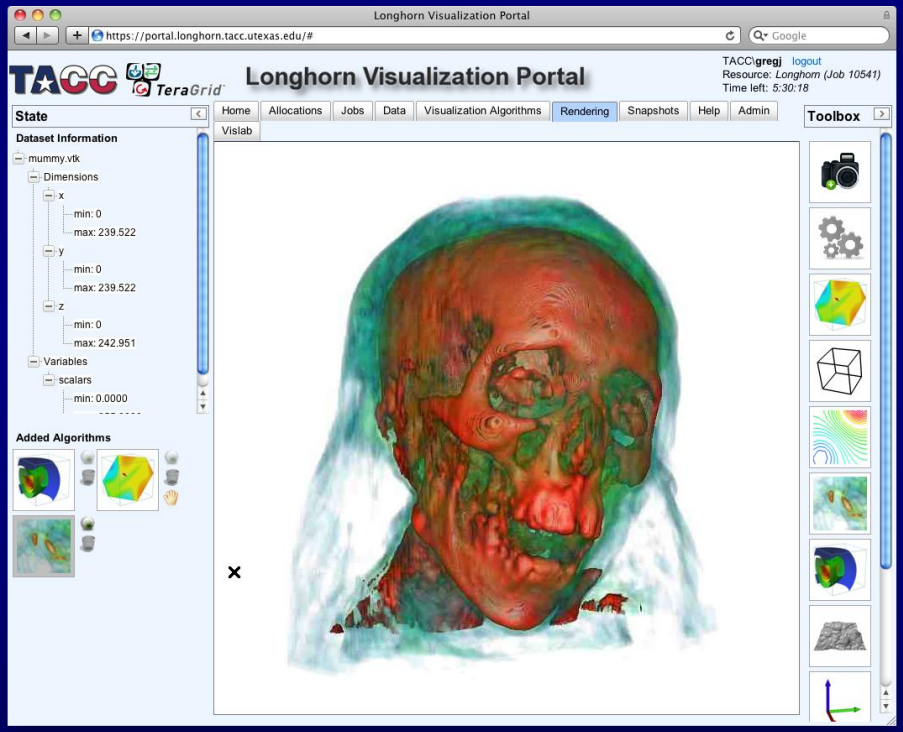


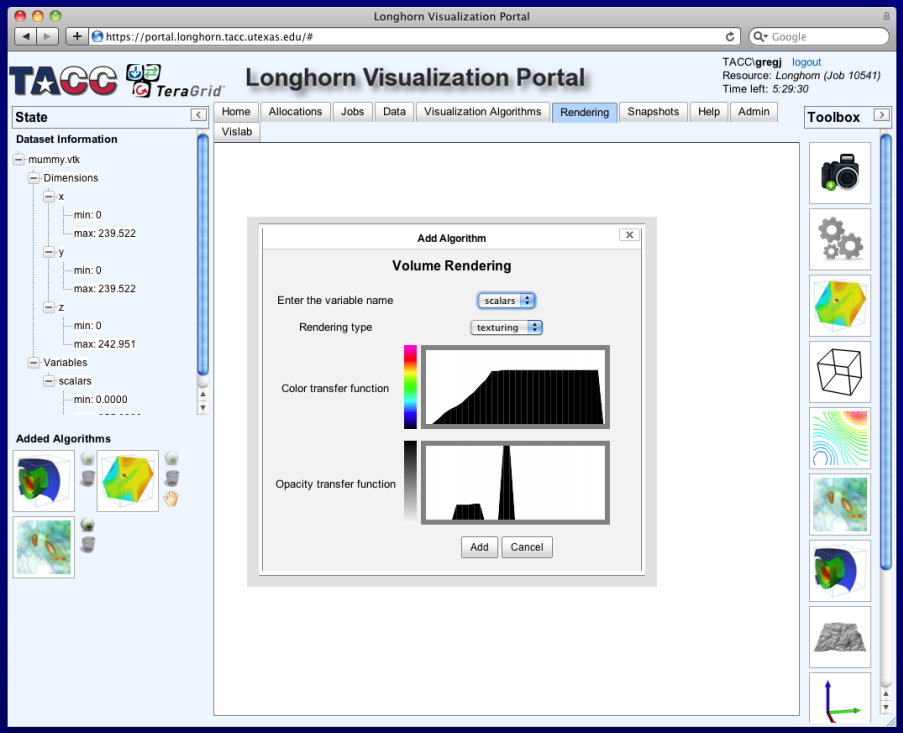
Run an EnVision session

- Click the Eye next to each added vis algorithm to hide
- Click volume rendering icon in the toolbox
- Set values as shown and click Add
- *Click volume rendering icon in lower left; change settings as you wish*



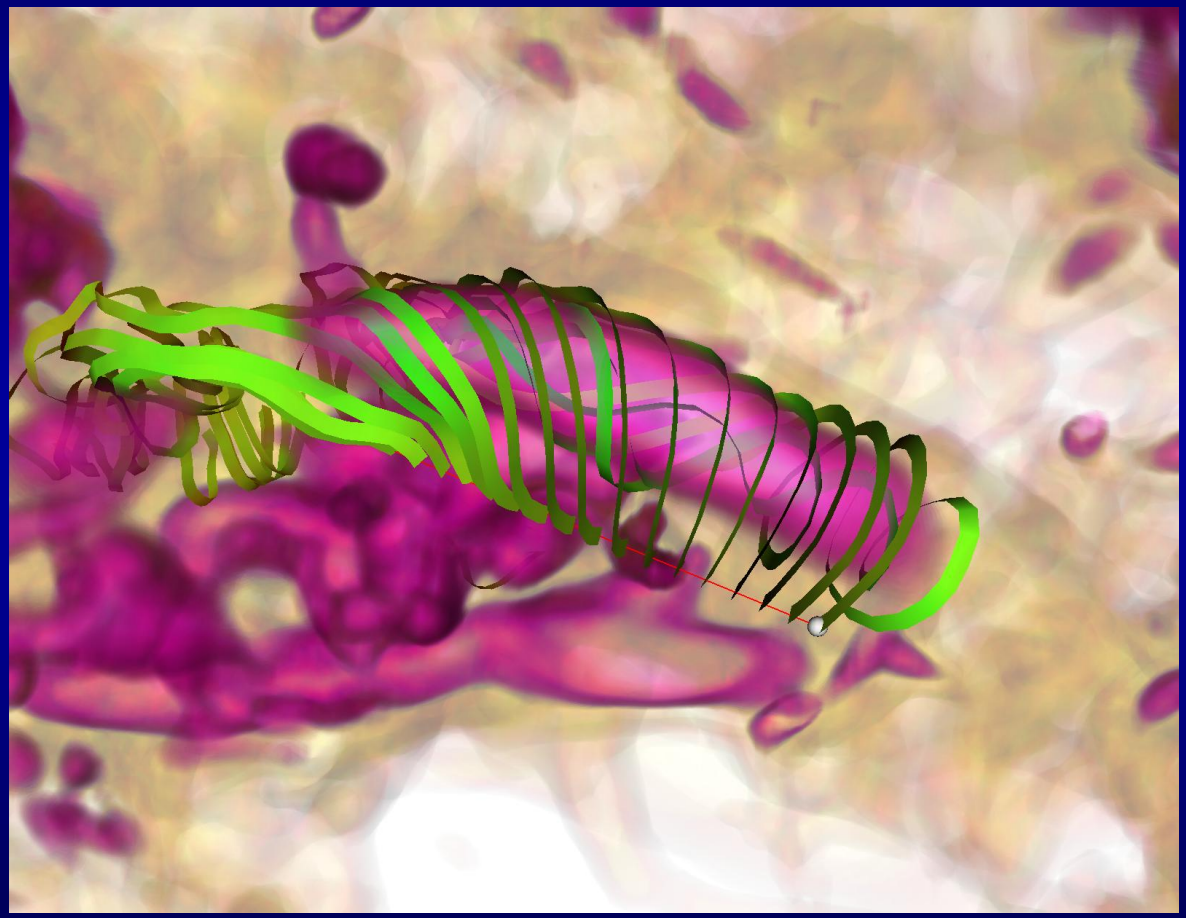
Run an EnVision session

- Click the Eye next to each added vis algorithm to hide
- Click volume rendering icon in the toolbox
- Set values as shown and click Add
- *Click volume rendering icon in lower left; change settings as you wish*



Run an EnVision session

- Explore the isotropic turbulence example data on your own



Questions?

gregj@tacc.utexas.edu