Presentations

1 AI²: Artificial Intelligence, Adaptation, and Innovation Group (Mike Kirby)
- Use-Inspired AI Applications
- Connecting Foundational AI with Engineering
- AI for Optimal Hypersonic Vehicle Design
- Accelerating Predictions with Neural Operators
- What is Physics-Informed Machine Learning (PIML)?
- Advances in Physics-Informed Neural Networks

2 Alter Lab (Orly Alter)
- Prospective Validation from a Retrospective Trial That Validated an AI/MLDerived Whole-Genome Biomarker as the Most Accurate and Precise Predictor of Survival and Response to Treatment in Glioblastoma
- AI/ML-Derived Mechanistically-Interpretable Whole-Genome Biomarkers of Patient Survival in Pre-Treatment Primary Neuroblastoma Tumors and Whole Blood

3 Computational Electrocardiology Group (Rob MacLeod)
- Cardiac Electrophysiology Background
- Image-Based Modeling: From Image to Cardiac Digital Twins
- Machine Learning in Cardiology
- Modeling of Cardiac Electrophysiology
- Software and Support in the CEG
- Uncertainty Quantification Applied to Cardiac Electrophysiology

4 CEDMAV (Valerio Pascucci)
- A Geometric Visual Comparative Analysis of Neural Network Model
- Attribute-Aware Radial Basis Functions:
- Interactive Visualization of Time Series Particle Volumes using RT Core Range Queries
- Immersive Neuron Tracing in Large-scale Microscopy Data
- National Science Data Fabric: data democratization at a national level
- Scalable AI training and inference of cancer images for in-situ surgery support
- U.S.-Canada Center on Climate-Resilient Western Interconnected Grid
- Web-based Visualization and Analytics of Petascale NASA Climate Data: Equity as a Tide that Lifts All Boats
- WIFIRE: A Scalable Cyberinfrastructure for Wildfires
- VisStore: Achieving equity in data access for agriculture, materials science, and more

5 Computational Biomechanics Group (Amir Arzani)
- Patient-Specific Cardiovascular Computational Fluid Dynamics Modeling
- Dimensionality reduction and denoising of unsteady flows
- Physics Informed Neural Networks (PINNs) in Cardiovascular Flows

6 Elhabian Lab (Shireen Elhabian)
- CranioRate: A Deep-Phenotyping Analysis Toolset, Repository, and Interface for Craniosynostosis
- ShapeWorks: An Integrated Suite for Shape Representation and Analysis & more

7 Weiss Biomechanics Lab (Jeff Weiss)
- Computational Modeling of Adaptive Bone Healing During Physical Rehabilitation
- Vessel Growth and Remodeling in FEBio
- Impact of Intermolecular Crosslinking on Tendon Mechanics
- Quantifying Material Uncertainty in Computational Biomechanics

8 KAPPAK (Kate Isaacs, Alex Lex, Paul Rosen)
- Deixis-Centered Documentation for Data Meetings
- Interactive Visualization of Binary Code for Compiler Optimizations
- GASP: Gradient Aware Shortest Path Algorithm for Boundary-Confined Visualization of 3D ReebGraphs
- How do people lie with charts?
- Enabling Analysis of Complex Data with User-Centric Approaches to Data Visualization
- Elevate Your Charts: Make Visualizations Speak with Effective and Engaging Annotations
- Deciphering Visual Cognition: The Influence of Line Chart Variations on Trust, Trend Perception, and Reproducibility
- Crowdsourced think-aloud studies

9 Parashar Lab (Manish Parashar)
- Accelerating Data-Intensive Seismic Research Through
- Parallel Workflow Optimization and Federated CI
- Optimizing Data Movement for GPU-Based In-Situ Workflow
- GeoSciFramework : Pioneering Early Warning Systems Through Big Data And Machine Learning

10 MULTI (Chris Johnson, Valerio Pascucci, Bei Wang)
- Developing Efficient Uncertainty Visualization Algorithms in VTK-m
- A Virtual Frame Buffer Abstraction for Parallel Rendering of Large Tiled Display Walls
- Interactive Visualization of Time-Varying Flow Fields Using Particle Tracing Neural Networks
- Ray Tracing Generalized Tube Primitives: Method and Application
- Visualizing Uncertainties in Ensemble Wildfire Simulations
- GPGPU Adaptive Ray Tracing for Radiation Transport in the Nyx Cosmological Simulation Code
- Local Regularization for Inverse Problems (EEG)
- Approximation and Visualization of Surface Uncertainty

11 Chuck Hansen
- **11a** OpenSpace: Scientific Astronomy Visualization
- **11b** FluoRender: An Interactive System for 3D and 4D Image Data Analysis in Biomedical Research

12 TDAVis (Bei Wang)
- Fast Comparative Analysis of Merge Tree Using Locality Sensitive Hashing
- In-context Example Ordering Guided by Label Distributions
- Activation Space Visualization of Morse Complex Generation
- Flexible & Probabilistic Topology Tracking Using Partial Optimal Transport
- Topological Characterization and Uncertainty Visualization of Atmospheric Rivers
- Topology Preserving Compressor

13 Tolga Tasdizen
- Tolga'sGroup
- Eye-gaze Guided Alignment between Image and Text
- Pathology-specific Data Augmentation
- Machine Learning forNuclear Forensics
- Hierarchical Transformer: Bring Scale To Your Attention

14 Bao Wang
- Rethinking the Benefits of Steerable Features in 3D Equivariant Graph Neural Networks

Live Demos

Time	Demo
2:00	Web-based Visualization and Analytics of Petascale Climate Data from NASA: Equity as a Tide that Lifts All Boats
2:10	National Science Data Fabric: Data Democratization at a National Level
2:20	Live Demonstration of Heart Electrical Activity Simulation
2:30	ShapeWorks: An Integrated Suite for Shape Representation and Analysis
2:40	Introduction to the FEBio Software for Simulations in Biomechanics and Biophysics
2:50	Cancer Cell Microscopy Visualization
3:00	ChannelExplorer: Visualizing CNN Activation Channels for Exploring Class Separability
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Demos floor map / venue layout.

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