11th Annual Birds of a Feather Meeting - 2019

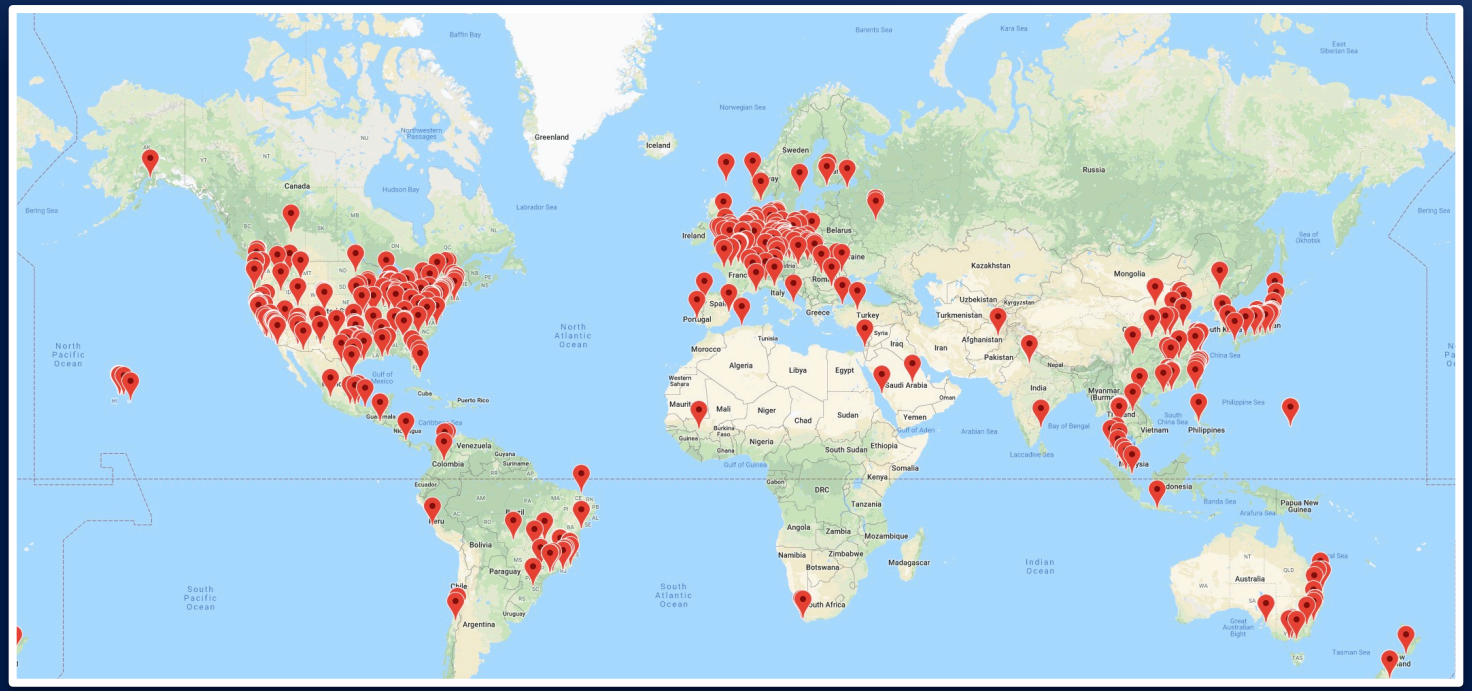
Laboratory for Advanced Visualization & Applications
University of Hawai'i at Mānoa & Hilo
Jason Leigh, Dylan Kobayashi, Francis Cristobal, Jared McLean

Electronic Visualization Laboratory
University of Illinois at Chicago
Maxine Brown, Luc Renambot, Lance Long,
Krishna Bharadwaj, Andrew Burks

SAGE2
TM

SAGE2 User Community 2019

~4,000 users at ~800 sites (with multiple walls at large institutions) in many countries worldwide , and counting...



SAGE2 User Community 2019

2017 SAGE2 community survey:

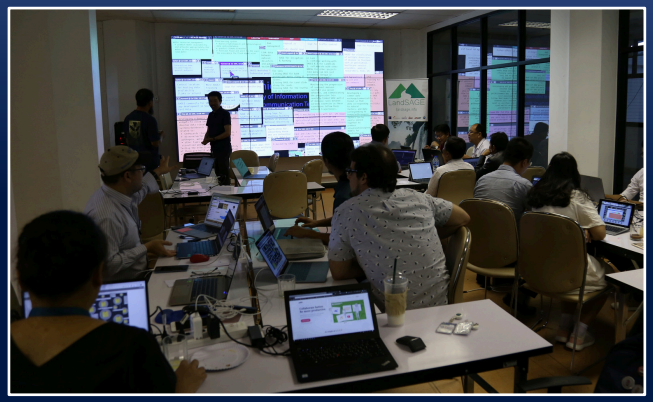
- 61% of institutions manage 1 tiled display wall, and 39% manage more than one
- 77% use their walls several times a week, and 20% use several times a day
- Meeting sizes range between 2-200 users, with 20 being the average
- SAGE2 institutions: 67% academia, 11% government labs, 9% industry, 13% other
- **Disciplines using SAGE2**: Archaeology, Architecture, Art, Atmospheric Science, Biology, Chemistry, Civil Engineering, Communications, Computer Science, Education, Geoscience, Health, Library Science, Mathematics, Medical, Meteorology, Network Engineering, Neuroscience, Physics, Psychology, and Statistics

SAGE2 User Sites 2019 Examples

International

CHINA, Chinese Academy of Forestry, CAVE2

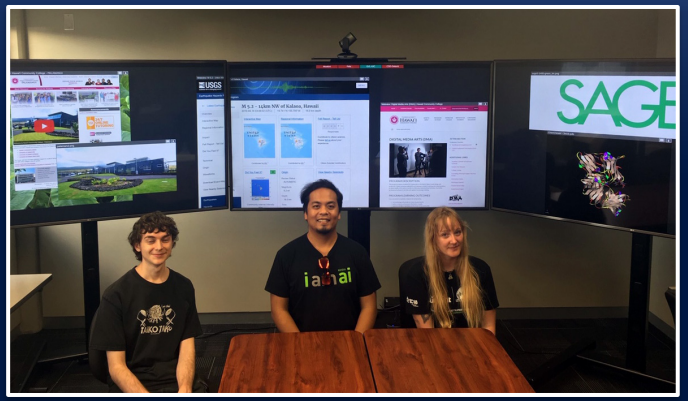
FRANCE, Maison de la Simulation (MDLS/CNRS)



THAILAND, Mahidohl University, Computer Science

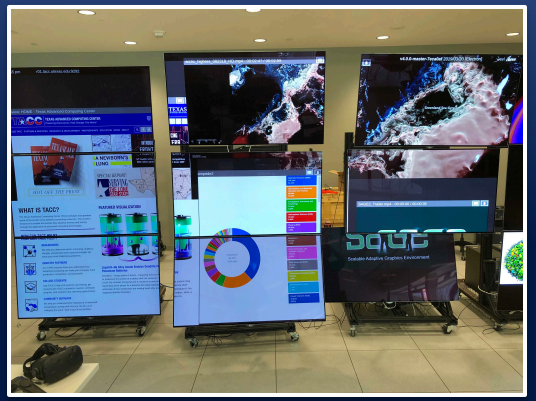
SAGE2 User Sites 2019 Examples

National



USA, Hawaii Community College – Palamanui

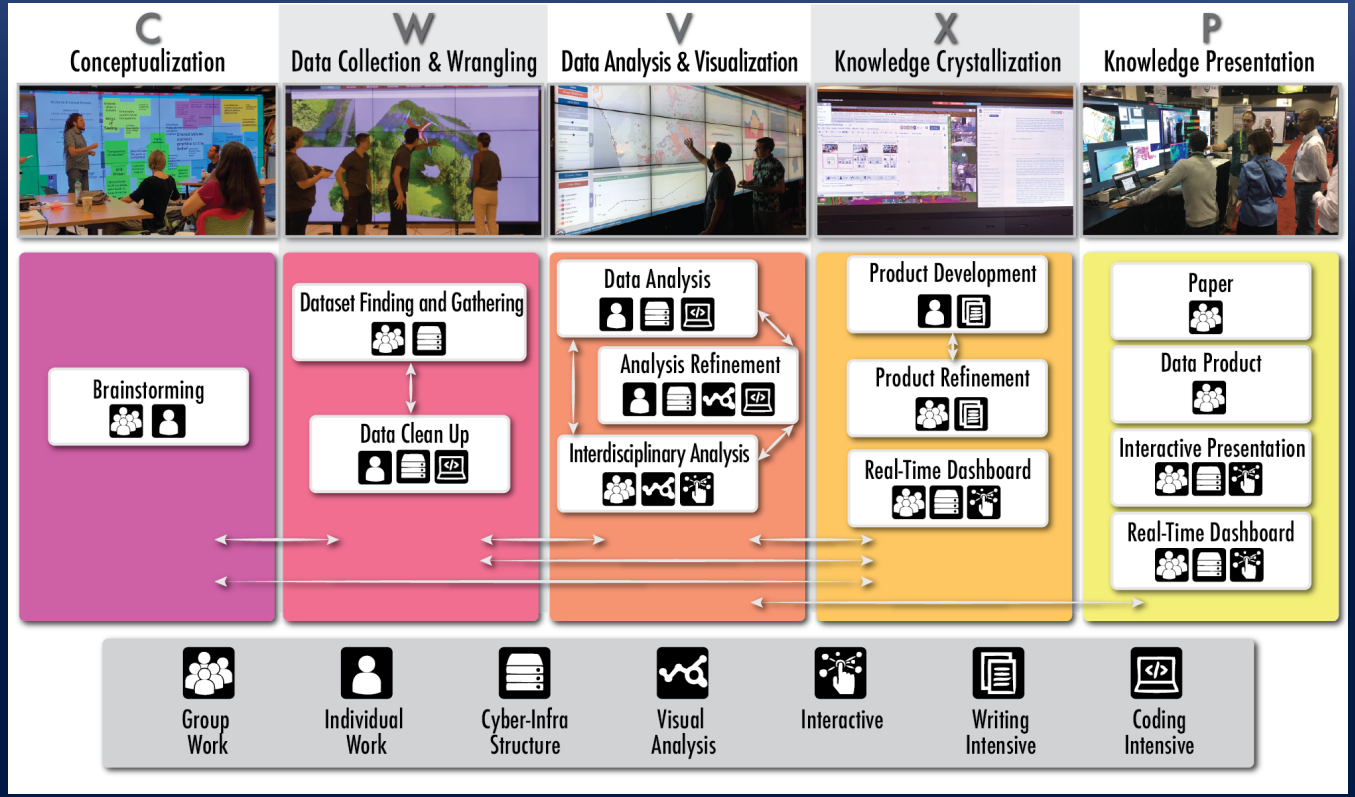
USA, NOAA, National Weather Service, Operations Proving Ground



USA, University of Texas, Austin, Texas Advanced Computing Center (TACC)

Academy for Creative Media SYSTEM

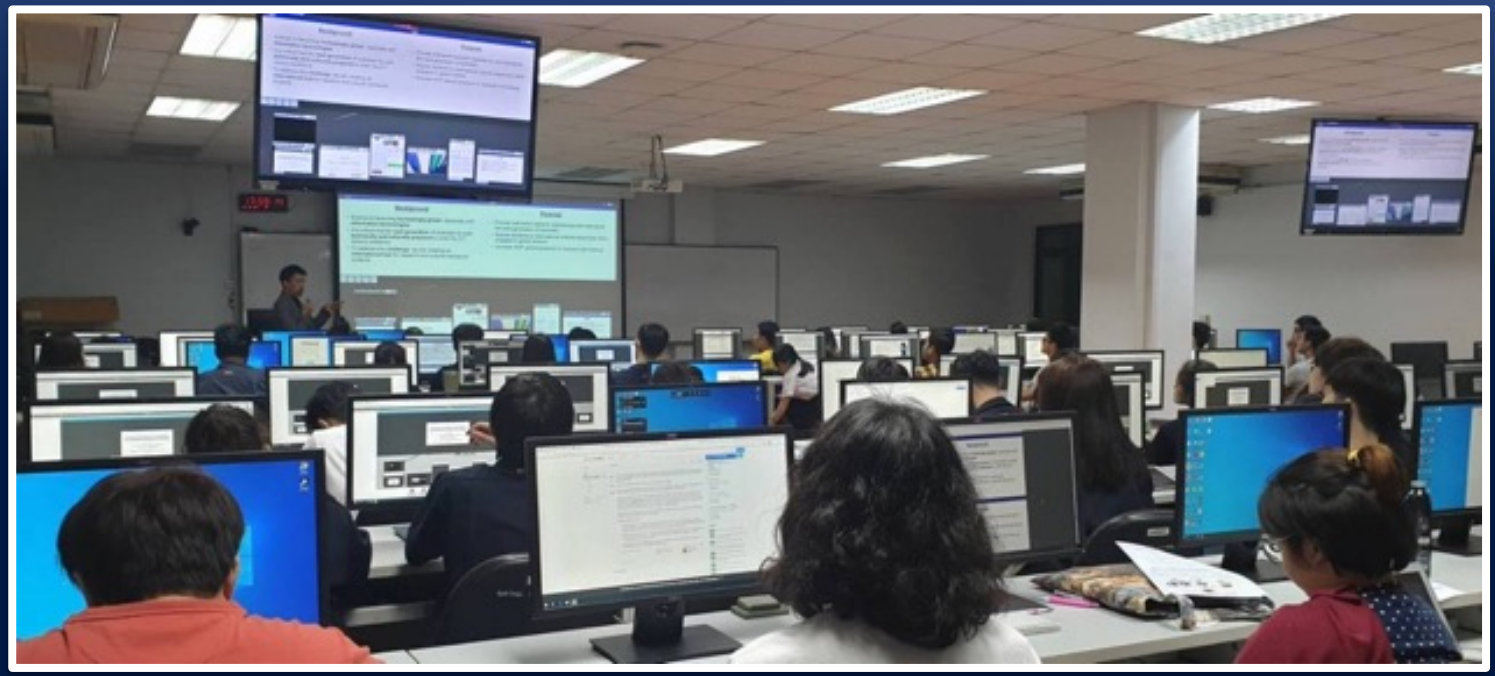
SAGE2 Usage Patterns - Overview



"**Usage Patterns of Wideband Display Environments In e-Science Research, Development and Training**," *15th IEEE International Conference on e-Science, (eScience 2019), San Diego, California, September 24-27, 2019.*

Association for Overseas Technical Scholarship

SAGE2 Use Cases



In October 2019, SAGE2 collaborator Jason Haga (AIST, Japan) taught his second SAGE2 training course at Thammasat University, Thailand. It was part of a series of short courses hosted by Japan's Association for Overseas Technical Scholarship program entitled "AI for Business and Industry Training Program." ~60 students.

Courtesy Jason Haga, AIST

PRAGMA and CENTRA International Collaborations

SAGE2 Use Cases

PRAGMA (Pacific Rim Applications and Grid Middleware Assembly) (NSF-funded)

CENTRA (Collaborations to Enable Transnational Cyberinfrastructure Applications) (NSF-funded)

PRAGMA and CENTRA are ***interdisciplinary, multi-country, multi-institution*** organizations focused on collaborative problem solving. They have promoted SAGE2 tutorials and use of SAGE2 in projects (see student posters). Many partnering sites are SAGE2 users.

Posters: Lifemapper on SAGE2, Security Data Visualization on SAGE2, Digital Poster Management on SAGE2, SAGE2 Component for AUAV Management with Smart Agriculture, Visualizer for Data-centric Modeling of Gainesville Businesses.

http://www.pragma-grid.net/pragma37-program/
http://www.pragma-grid.net/pragma36-program/
http://www.globalcentra.org/meetings/

São Paulo Telehealth

SAGE2 Use Cases

São Paulo Telehealth
Federal University of São Paulo (UNIFESP)

- **Remote collaboration for health apps:** The platform is shared with municipal health managers in 29 cities in São Paulo State who are responsible for basic public health units, which is where people go to get medical treatment.
- **Second opinion (video) for telehealth:** Health professionals (doctors/nurses), particularly in rural and poor areas, can get second opinions in real time by submitting questions and sharing exam images via the web or videoconferencing to Telehealth's electronic health system. *Poor network connectivity in rural areas necessitates using Mconf/Adobe Connect systems, but they want to use SAGE2 as the network improves.*
- **Data visualization:** UNIFESP uses SAGE2 to visualize and monitor real-time network and Telehealth transactions.
- **Virtual monitoring:** On the left, they view the number of users connected to the platform and the location (geolocated by IP addresses). On the right, they view connectivity and data traffic of health professionals using the system and the number of questions/tickets sent to the electronic health system.

TELESSAÚDE SÃO PAULO

Courtesy Cicero da Silva, Telessaúde São Paulo, Universidade Federal de São Paulo

University of Chicago's Wall of Knowledge

SAGE2 Use Cases

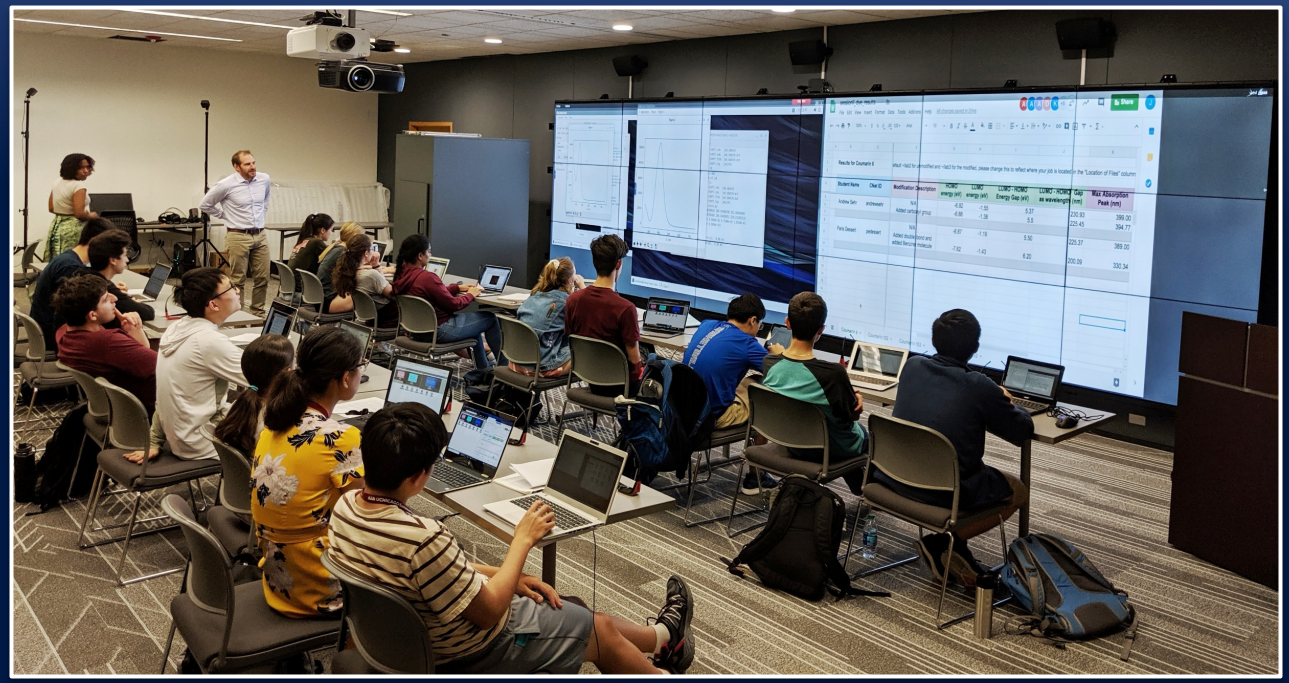
Demonstration of the capabilities of the RCC's Visualization Wall.

Working session between UChicago and Center in Hong Kong.

Courtesy of Hakizumwami Birali Runesha and Teodora Szasz, Research Computing Center (RRC), University of Chicago

University of Chicago's Wall of Knowledge

SAGE2 Use Cases



Students use SAGE2 to present results during the Pathways in Molecular Engineering outreach program

Courtesy of Hakizumwami Birali Runesha and Teodora Szasz,
Research Computing Center (RRC), University of Chicago

TEIN LandSage Decision Support Project

SAGE2 Use Cases

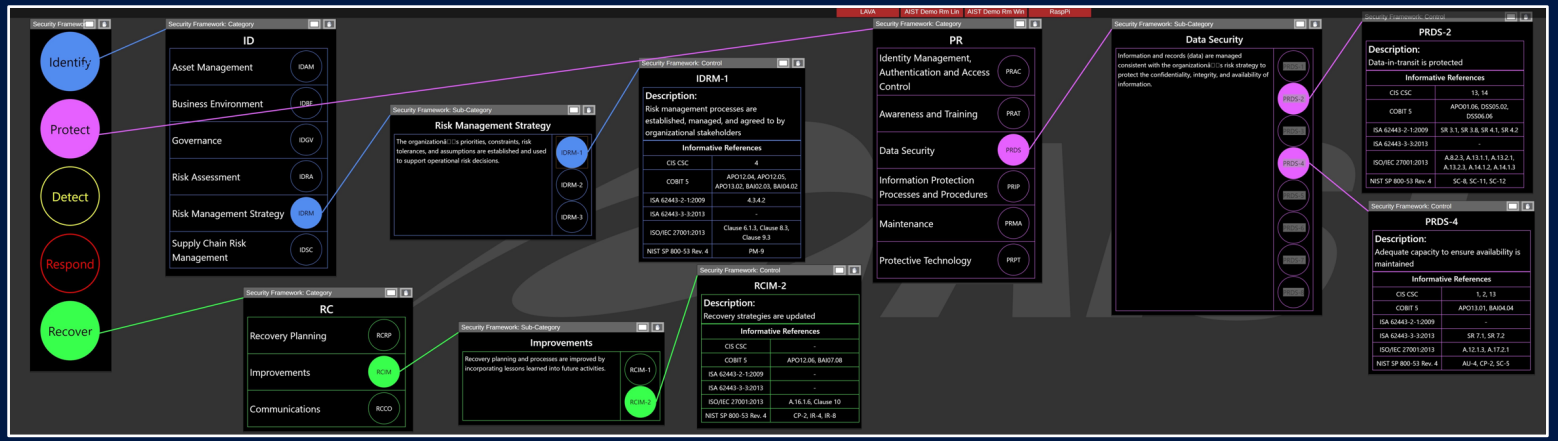
AIST (Japan) and LAVA (UH Manoa receive funding EU's Trans-Eurasia Information Network (TEIN) funding for the "LandSage: Decision Support" project – to monitor and mitigate natural disasters in Southeast Asia using SAGE2. AIST kickoff workshop was held in 2018 with partners in Thailand, Vietnam, Laos, and Cambodia.

SecuritySAGE

SAGE2 Use Cases

Jason HAGA
jh.haga@aist.go.jp

- Cybersecurity standards are used by many corporations and are in large documents containing hundreds of pages of text
- The large volumes of information are difficult to understand and compare
- Created a visualization application to better enable stakeholders in their decision-making process
  - Based on NIST Cybersecurity Framework
  - Provides a more interactive mode of user interaction with content



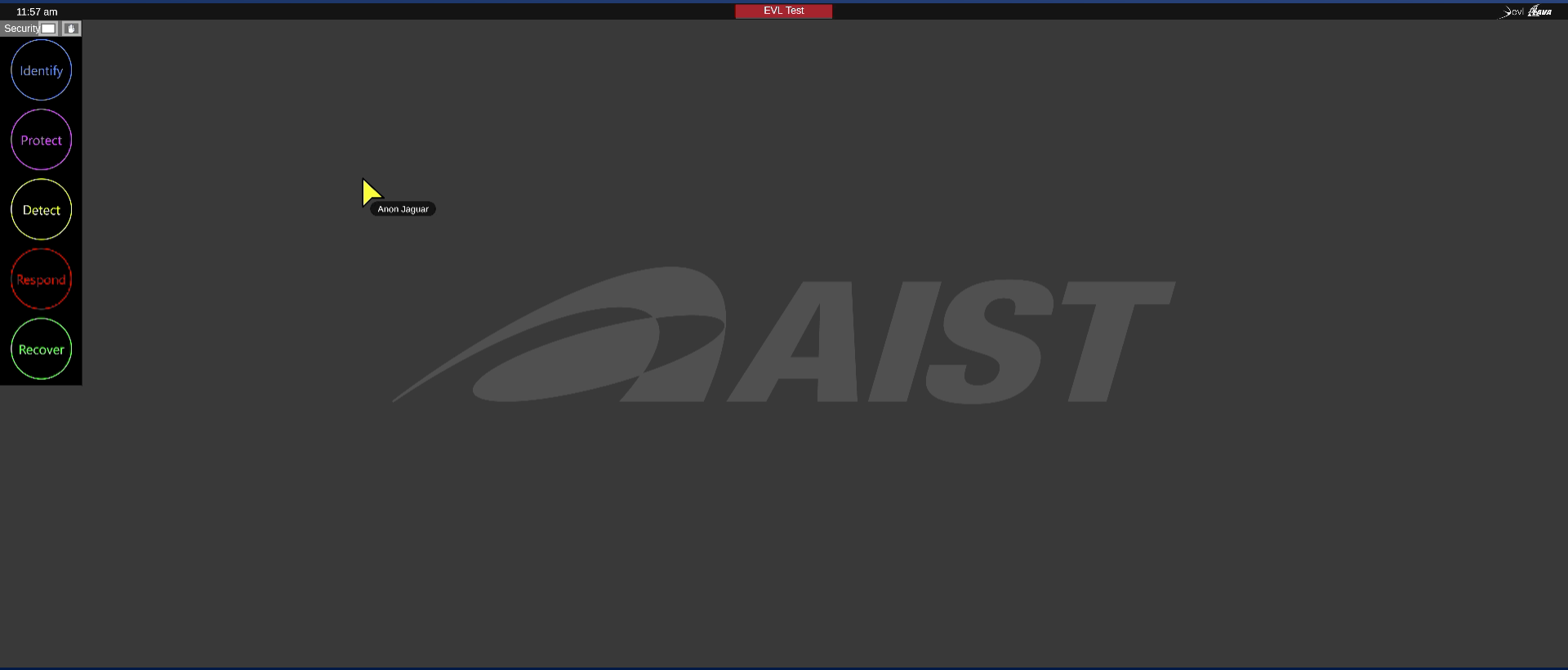
Mahidol University

AIST

SecuritySAGE

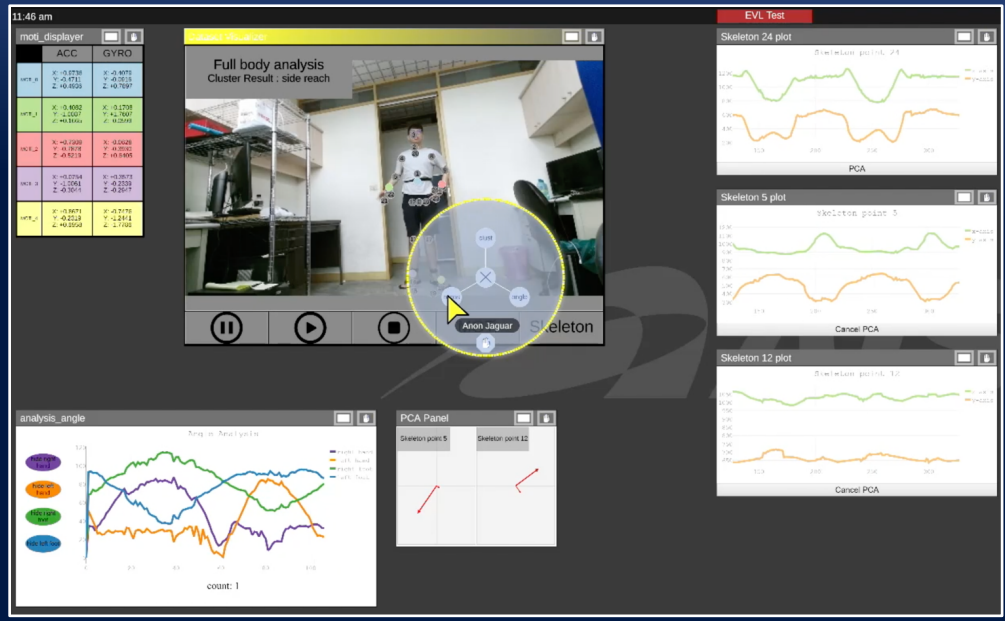
SAGE2 Use Cases

Jason HAGA
jh.haga@aist.go.jp



ExerciseSAGE

- Sports/exercise medicine is a very data intensive domain
  - Motion sensors track body movement
  - Microsoft Kinect
- Analyzing movement patterns during exercise from different data sources is a challenge
- Created a data and analysis rich environment that can:
  - Assess level of reproducibility of movement to encourage proper exercise
  - Compare the ability of several subjects for sports teams



National Chiao Tung University

AIST

SAGE2 on TACC Rattler (and Stallion)

SAGE2 Use Cases

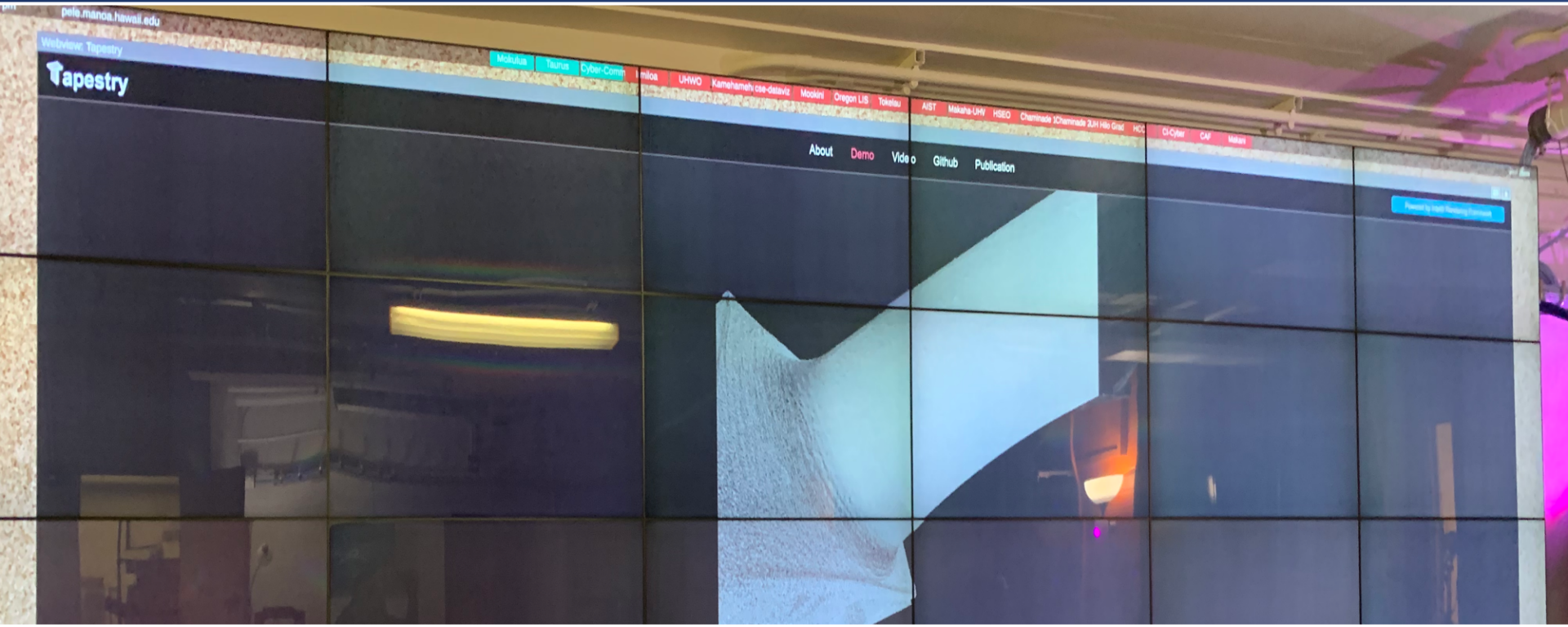
- “Off label” use of SAGE2 on distributed cluster – works!
- Video connectivity between vislabs on main UT campus and TACC main offices
- Web-based analysis via TACC Vis Portal, Jupyter notebook, etc.
- Exploring use of distributed systems for content feeds, similar to DisplayCluster / TIDE

NSF Large Facilities Workshop, April 2019

Paul Navrátil
pnav@tacc.utexas.edu

Web-based Ray Tracing via Tapestry

SAGE2 Use Cases



Paul Navrátil
pnav@tacc.utexas.edu

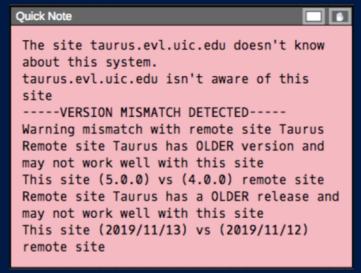
SAGE2 Version 5

Automated Sharing To Remote Sites

- Users want an easier way to share throughout a meeting
- Now, we can enable **automatic sharing** of content
- Features
  - Activate by right clicking on a remote site icon
  - Icon shows current state
  - Multiple sites can be enabled at once

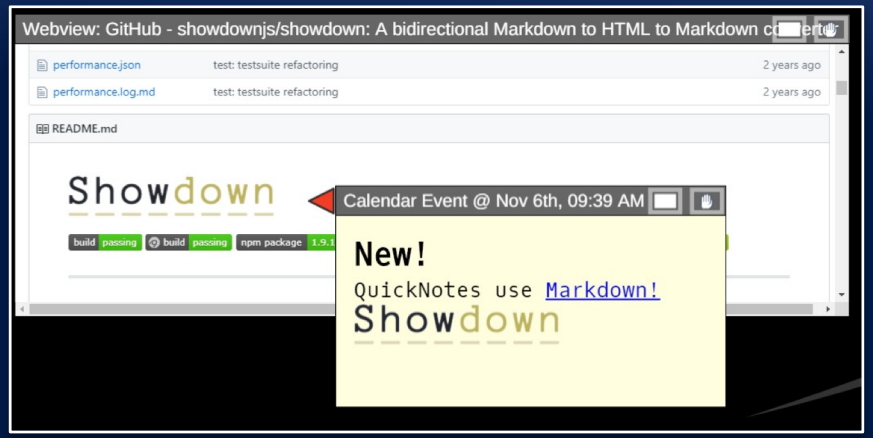
Version Checking for Sharing

- Version conflicts when sharing
  - Different versions of SAGE2 are in usage
  - Partially caused by the desire to use experimental features
  - May cause sharing issues
- Features
  - Warning icon added when version mismatch
  - Clicking on it will produce a note with greater details



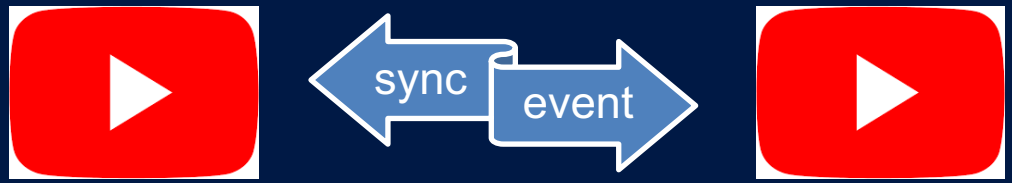
Better QuickNotes

- QuickNote is among the most used apps in SAGE2 meetings
- Features
  - Can now style a note
    - *Markdown* syntax
  - Links can be opened by clicking on them with a SAGE2 pointer
  - Freely change text size on a note
  - Arrow can be toggled for pointing



Webview YouTube Synchronization

- Users want a way to synchronize shared YouTube video
- Webview now updated to support this
- Features
  - YouTube videos shared between remote sites synchronized:
    - play, pause, and seek events
  - Note: Video buffering (caused by network speed) can cause delay of actual playback



Easier Application Development

- Application Template
  - Developers expressed limitations of application creation
  - Many would rather write SAGE2 applications as a web page
- Features
  - Write a standalone webpage and make into a SAGE2 app with a code wrapper
  - Can still utilize SAGE2 app API by including a provided script with the webpage
  - Utilizes a modified Webview
  - Doc on SAGE2 Wiki

SAGE2 + JupyterLab: v1.2.1

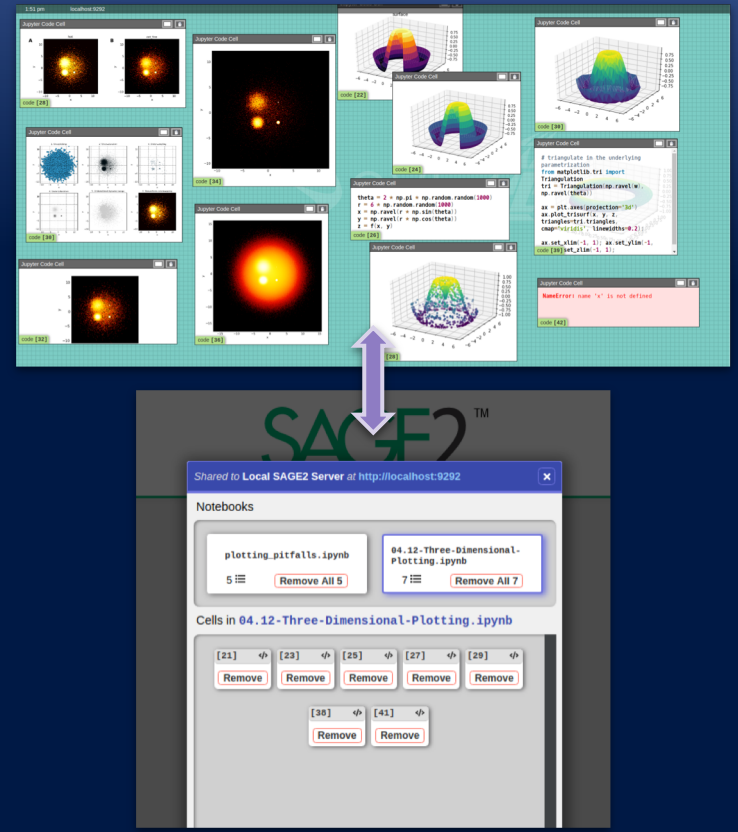
- **JupyterLab** is out
- SAGE2 plugin couples allows you to break free from the notebook format
- Interactive presentation on the wall
- Work in your notebook and watch shared cells update **dynamically**

Jupyter Plugin Features

Share **all** Markdown or *Code* cells

- Render **Image**, **Text**, or **HTML**
- Display **Errors** thrown during code execution
- Toggle **Code Overlays** for any cell
- Use the SAGE2 UI to **Copy** any cell's code to your clipboard

Manage and remove shared content from within JupyterLab



Using **JupyterLab** with **SAGE2**

*Requires **SAGE2** v5.0+ for **all** new features*

`andrewtburks/jupyterlab_sage2`

`jupyterlab_sage2`

`sage2/jupyterlab-datascience-notebook`

Visit the repository on GitHub for detailed installation and usage instructions

VisSnippets

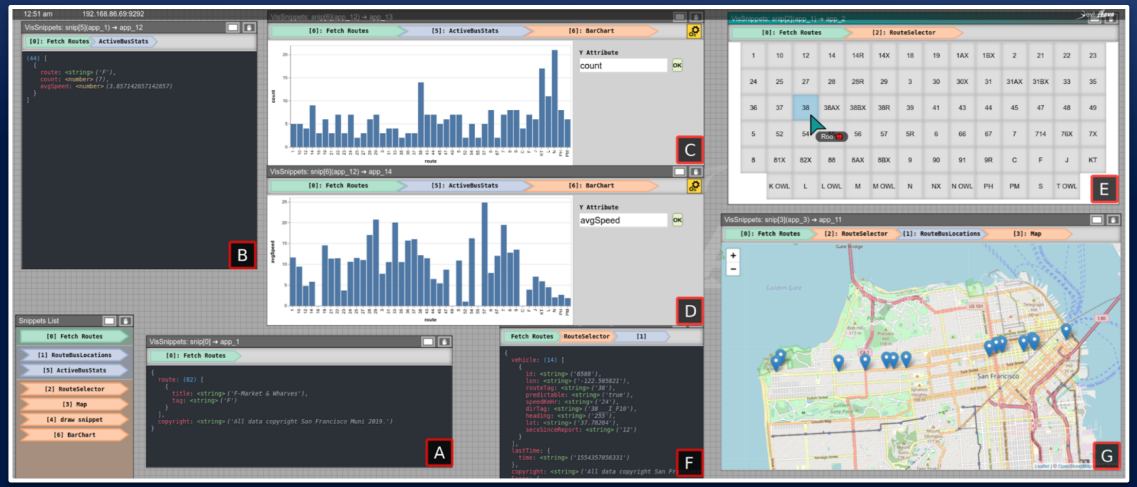
- Exploratory data analysis on the wall
- The common notebook format is not conducive for synchronous collaboration

- **VisSnippets** supports exploratory analysis through **collaborative programming *within* SAGE2**

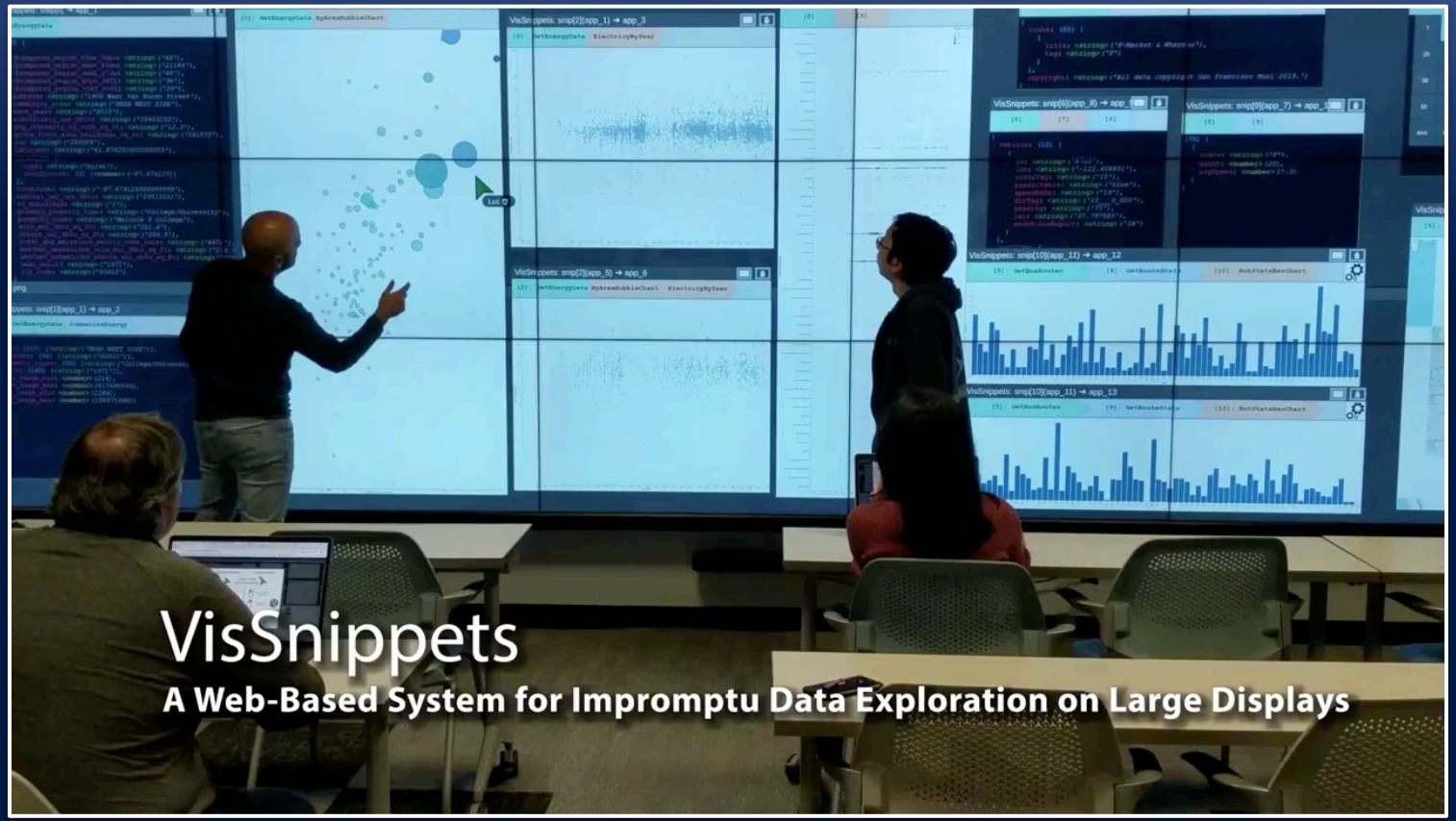
- Enable it a configuration flag

Supporting Complex Analysis

- Declarative APIs for rendering, form elements, and periodic execution support **complex, dynamic exploration**
- Analysis sessions can be exported and viewed outside of SAGE2

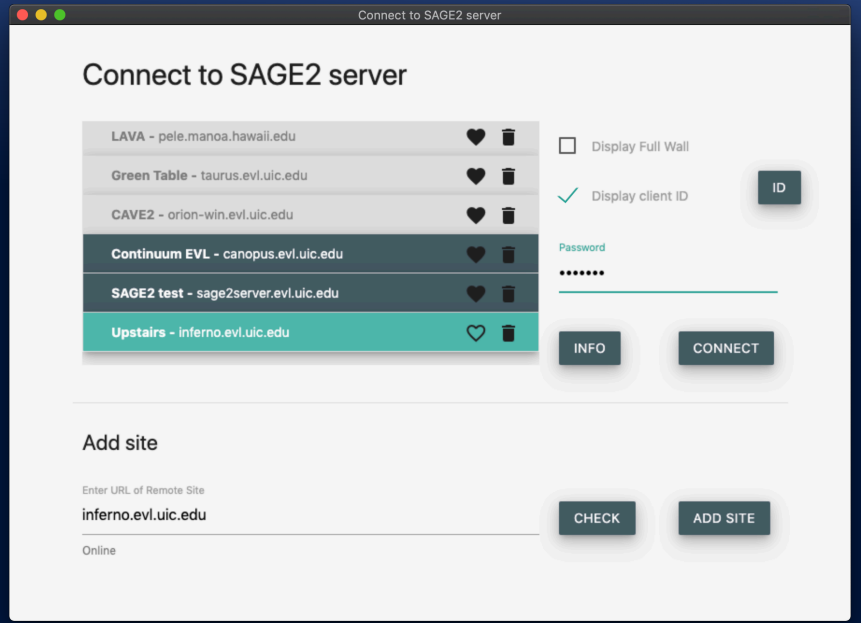


VisSnippets



SAGE2 Remote View

- Easily access different sites remotely
- Save sites and passwords, check status
- New connection panel in menu
- Saves favorite sites and passwords
- **Binary download for Mac/Windows**



SAGE2 Multi-Touch

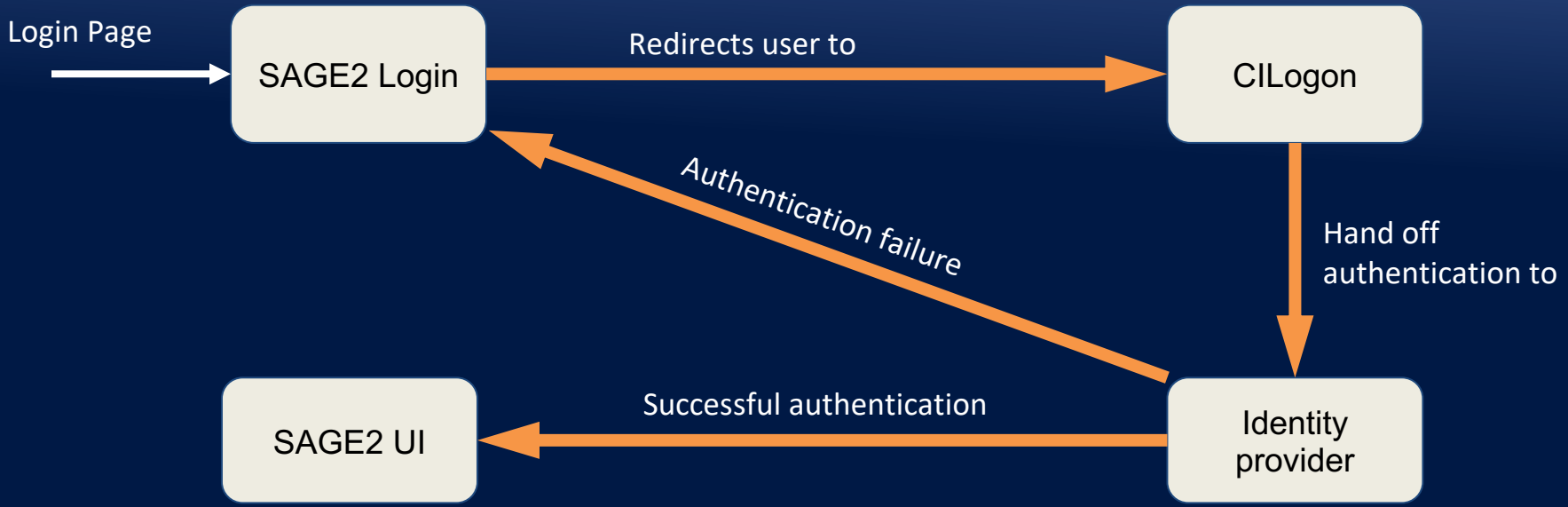
- Integration of Windows native touch and vendor API (*PQLabs*)
  - Some allow scrolling of multiple windows others don't
  - Most only allow dragging one window at a time
  - Most simultaneous touches resolves to a zoom gesture
- Per-application handling
  - Switch modes automatically
- Future
  - Windows native touch for window manipulation

SAGE2 Multi-Touch

Identity Management: **Single Sign-On**

- Why?
  - To provide SAGE2 users with simple ID interface
- How?
  - Integration with **CILogon**
  - Identity and Access Control (in progress)
- Features:
  - Single sign on using institutional accounts or third parties such as Google, GitHub…
  - Secure and controlled access to data.

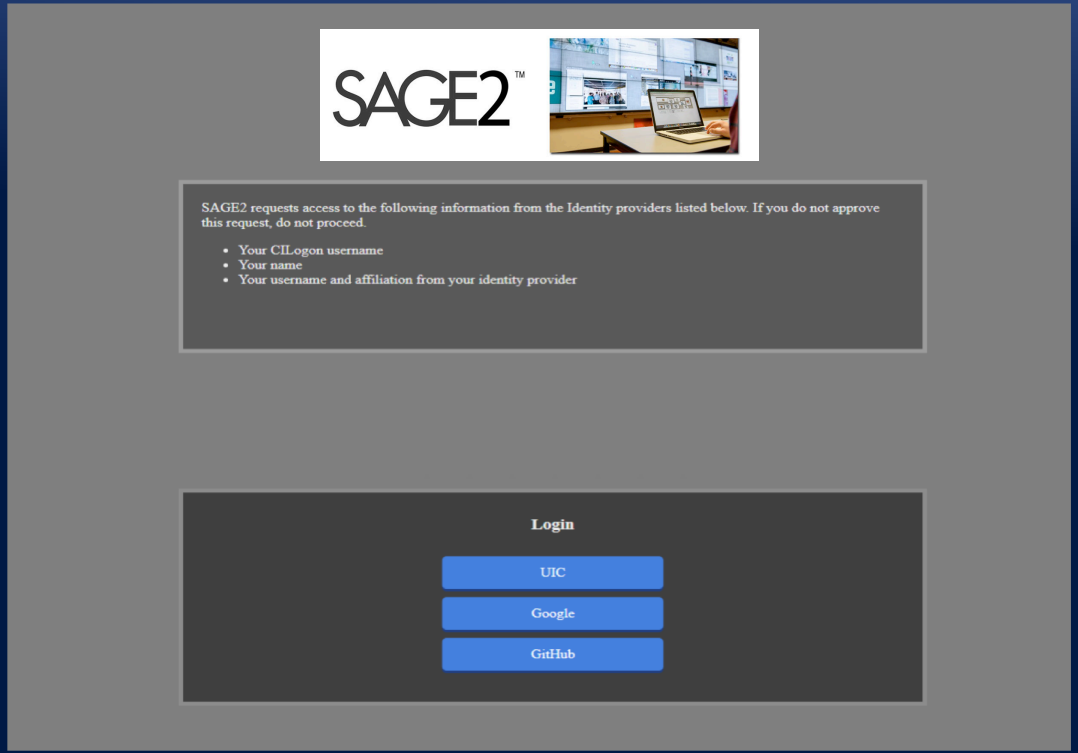
CILogon Delegation



~ 3000 identity providers registered

New SAGE2 Login Page

- Each administrator needs to register with CILogon team
- Simple email process
- Next step
  - Connect to a role-based access control model

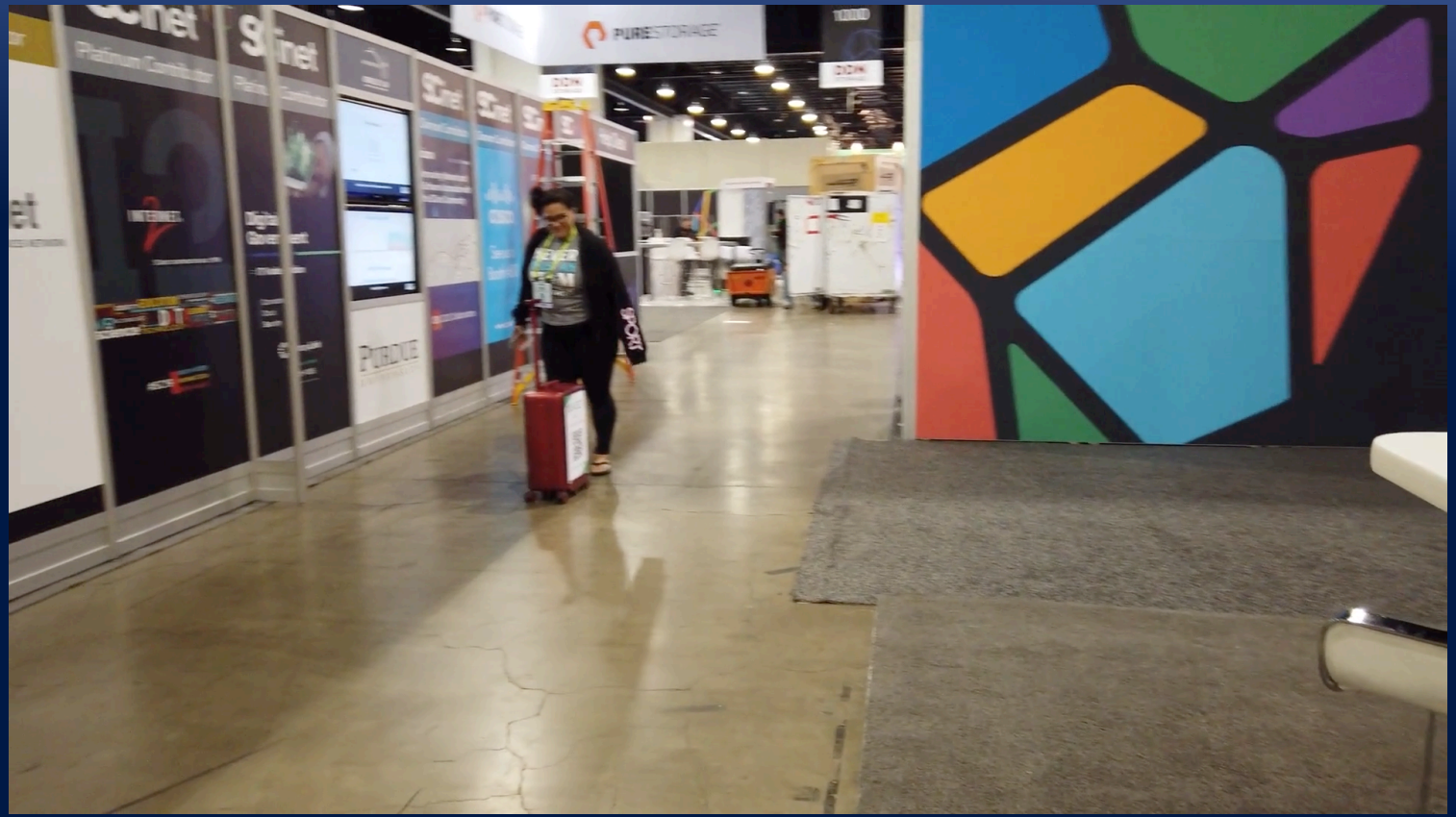


SC'19 Show Floor

- StarLight Booth # 993
  - Talk with the SAGE2 Team
  - Major demonstrations
- AIST Booth # 1117 (Collaborations with SAGE2 Team)
  - Tuesday, 2-4pm, SAGE2 tutorial + Jupyter plugin demo
  - Wednesday, 2-3pm, SAGE2 BoF repeat
  - Thursday, 11am-12pm, SAGE2 demos
- SCInet walls
  - SCInet Analytics and SC Theater

References

- Web
  - sagecommons.org
- Google group
  - https://groups.google.com/forum/#!forum/sage2
- Slack group
  - sage2.slack.com

NSF #OAC-1441963 SAGE2
NSF #OAC-1450871 StarLight SDX
NSF #OAC-1550126 CENTRA
NSF #CNS-1530873 MRI CyberCANOE

StarLight Booth # 993