



# Roles of Professional Research Software Engineers in the Science Gateway Landscape

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## Research Software Engineers in eScience (RSE-eScience-2022)

Stories of Application of RSE Expertise to Scientific Research

To be held as part of **eScience 2022**, Salt Lake City, Utah.

# Research Computing

Lab Instruments



Web-based agile frameworks



Distributed data and computing infrastructures



Data and Compute-intensive Problems



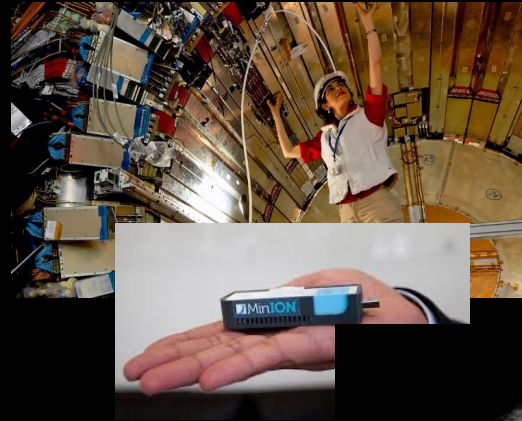
Research Software



High-speed networks

# Research Computing

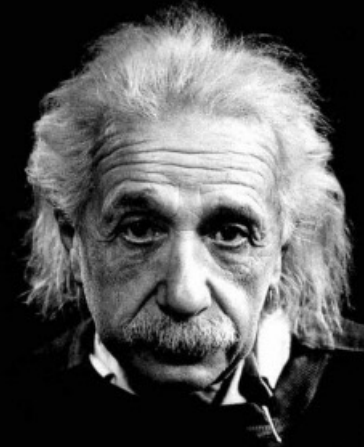
Lab Instruments



Web-based agile frameworks



Data and Compute-intensive Problems



Distributed data and computing infrastructures



Research Software



High-speed networks



# Research Computing

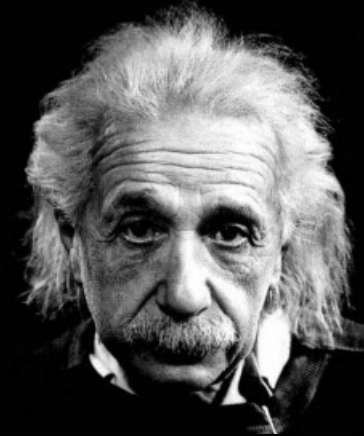
Lab Instruments



Web-based agile frameworks



Data and Compute-intensive Problems



Distributed data and computing infrastructures



## Need for science gateways



Research Software



High-speed networks

# Research Computing

Lab Instruments

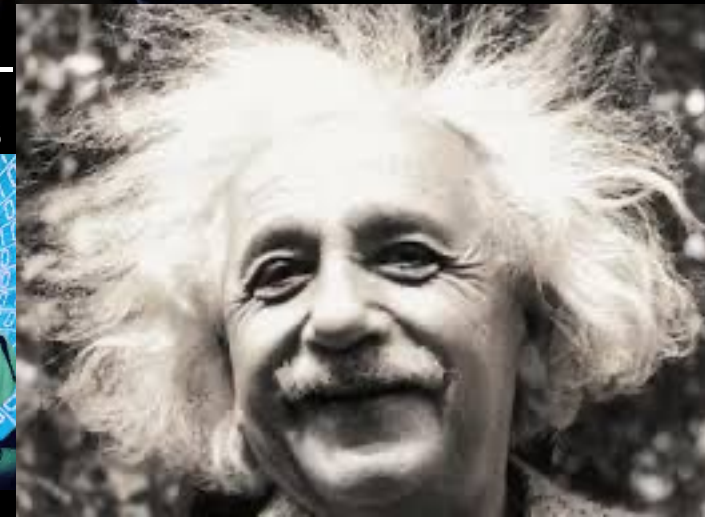


Web-based agile frameworks



Distributed data and  
infrastructures

Data and Compute-  
Problems



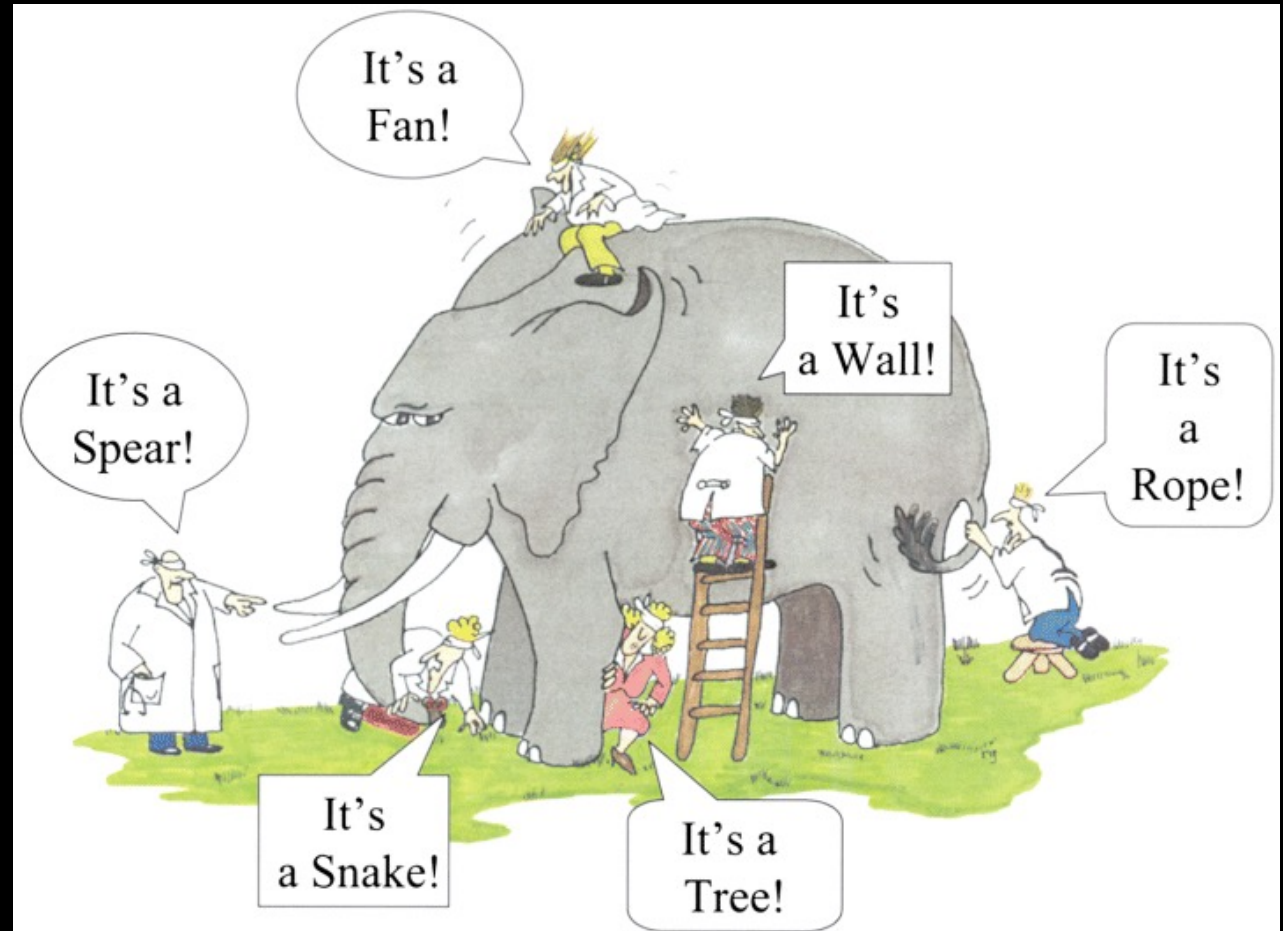
Research Software



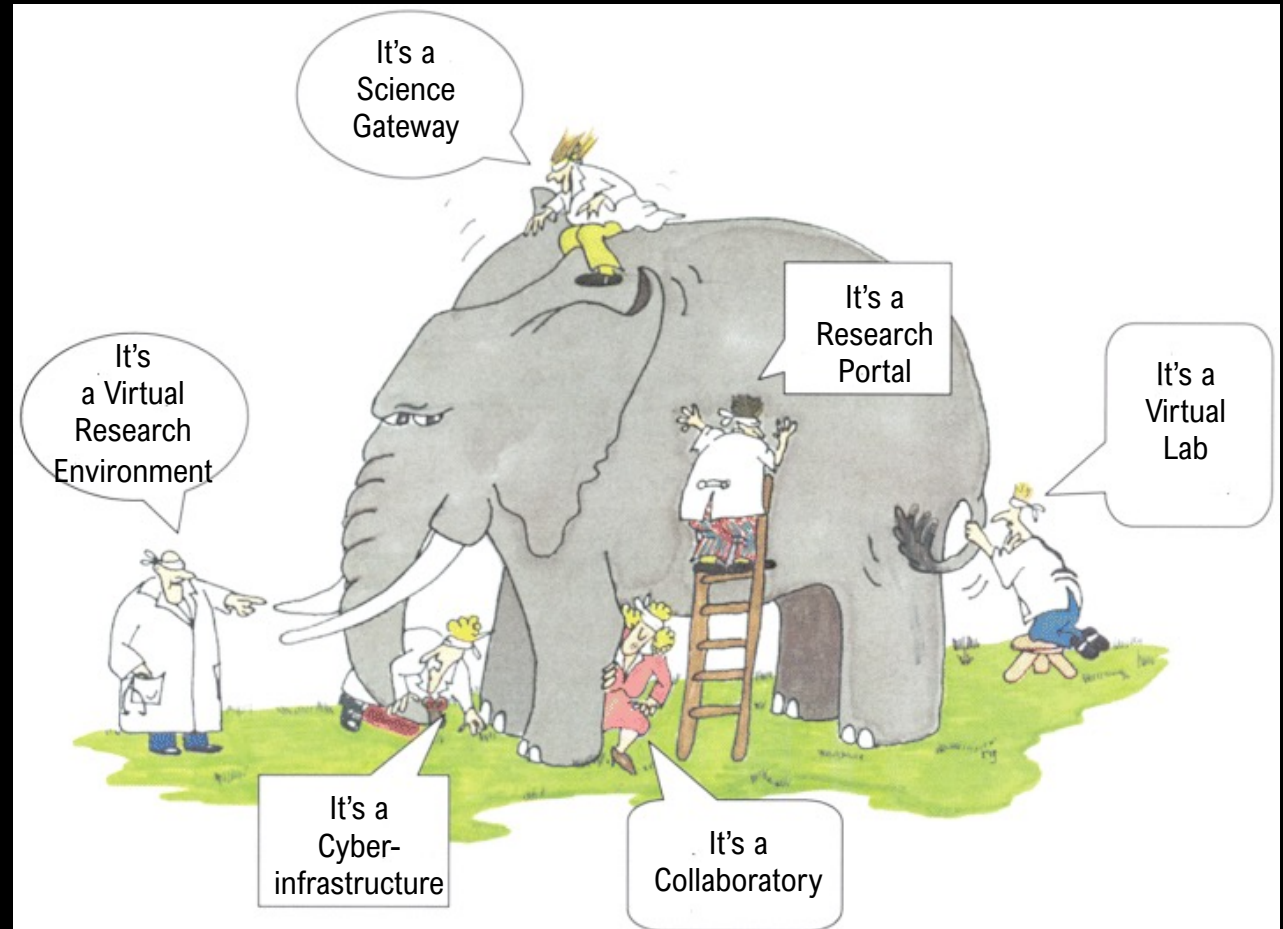
High-speed networks



# Science Gateways

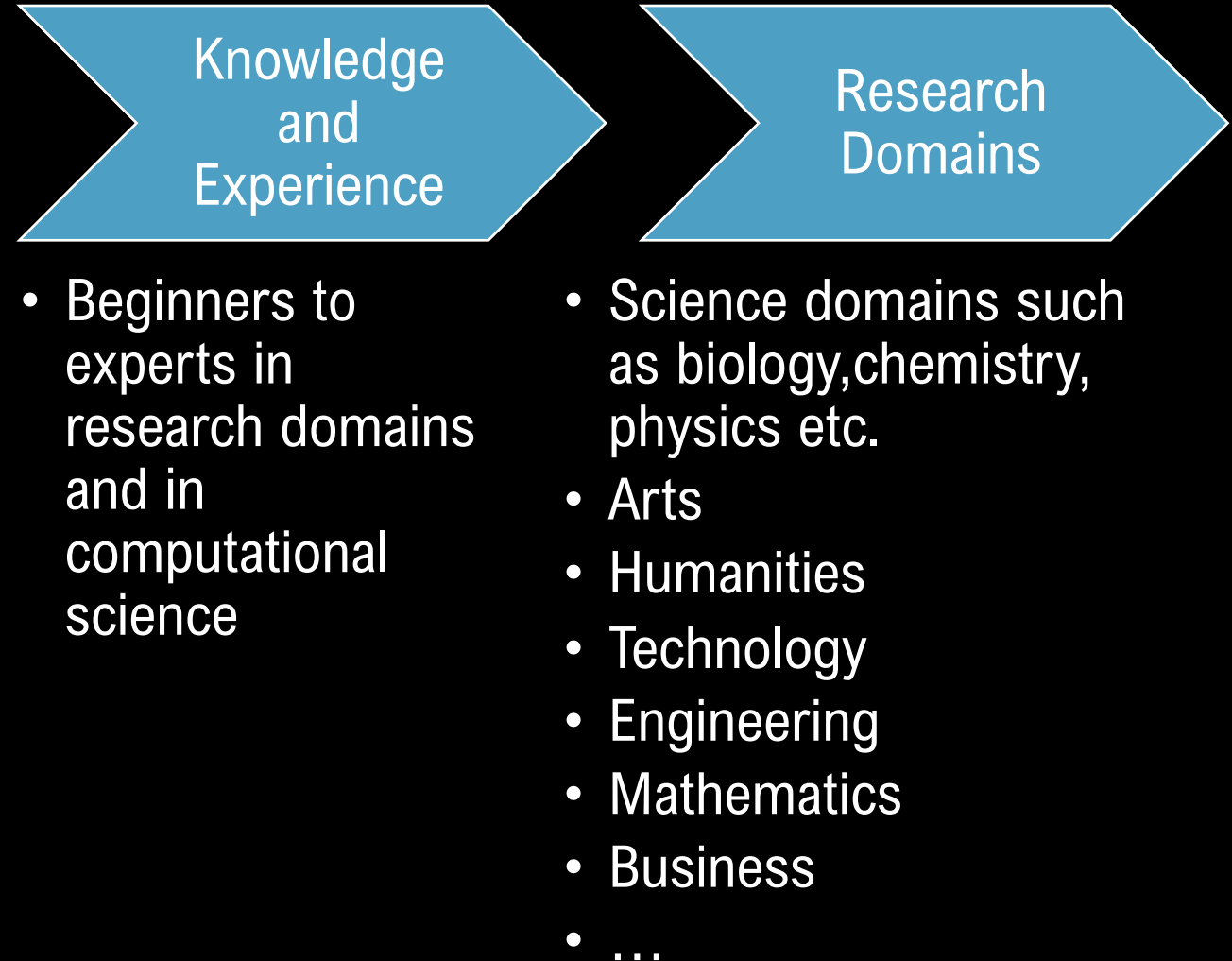


# Science Gateways



# **Science Gateways Community – Heterogeneous and Multidisciplinary**

## **Researchers and Educators**





# Science Gateway Creators and Providers

**Science Gateways Community – Heterogeneous and Multidisciplinary**



**With subcommunities such as**

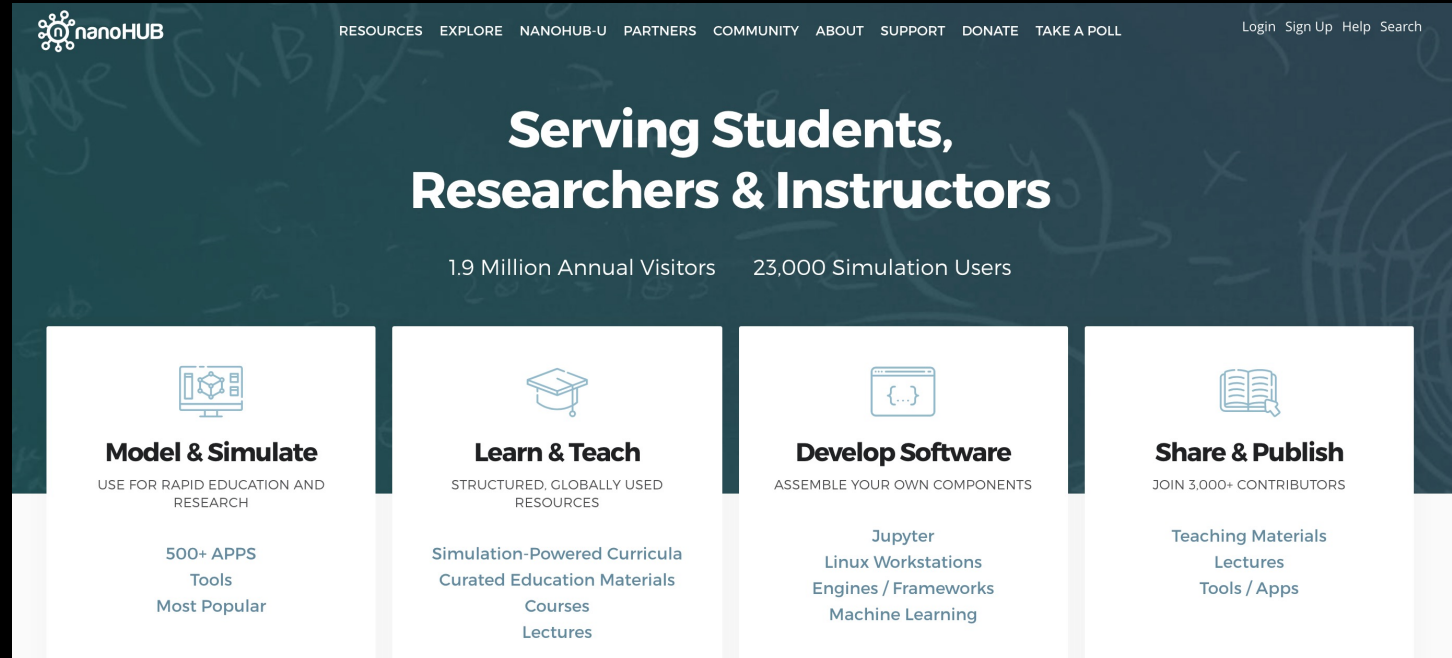
**hubzero**

**Galaxy**  
PROJECT



# HUBzero

- Open source platform
- Development
- Hosting services
- 60+ Hubs
- 2 million visitors worldwide



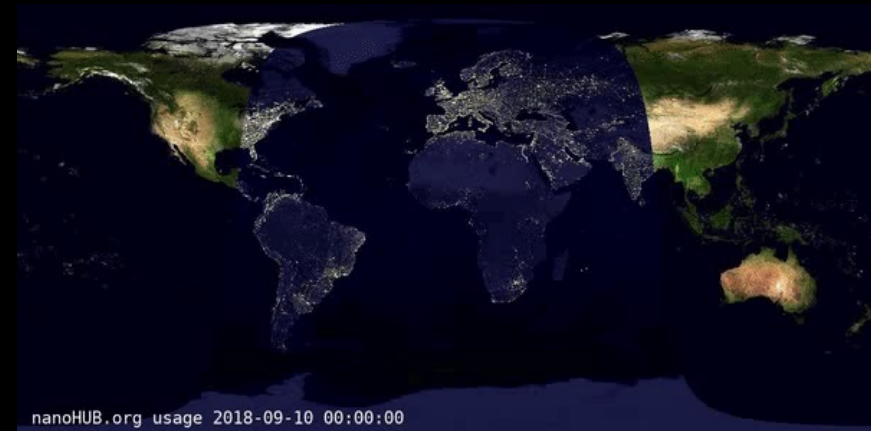
The screenshot shows the nanoHUB website homepage. At the top, the nanoHUB logo is on the left, and a navigation menu with links like RESOURCES, EXPLORE, NANOHUB-U, PARTNERS, COMMUNITY, ABOUT, SUPPORT, DONATE, and TAKE A POLL is on the right. Below the navigation, a large banner reads "Serving Students, Researchers & Instructors" with statistics "1.9 Million Annual Visitors" and "23,000 Simulation Users". The main content area is divided into four columns, each with an icon and a title: "Model & Simulate" (icon of a computer monitor), "Learn & Teach" (icon of a graduation cap), "Develop Software" (icon of a code editor), and "Share & Publish" (icon of a book). Each column lists specific services or resources available on the platform.

**Model & Simulate**  
USE FOR RAPID EDUCATION AND RESEARCH  
500+ APPS  
Tools  
Most Popular

**Learn & Teach**  
STRUCTURED, GLOBALLY USED RESOURCES  
Simulation-Powered Curricula  
Curated Education Materials  
Courses  
Lectures

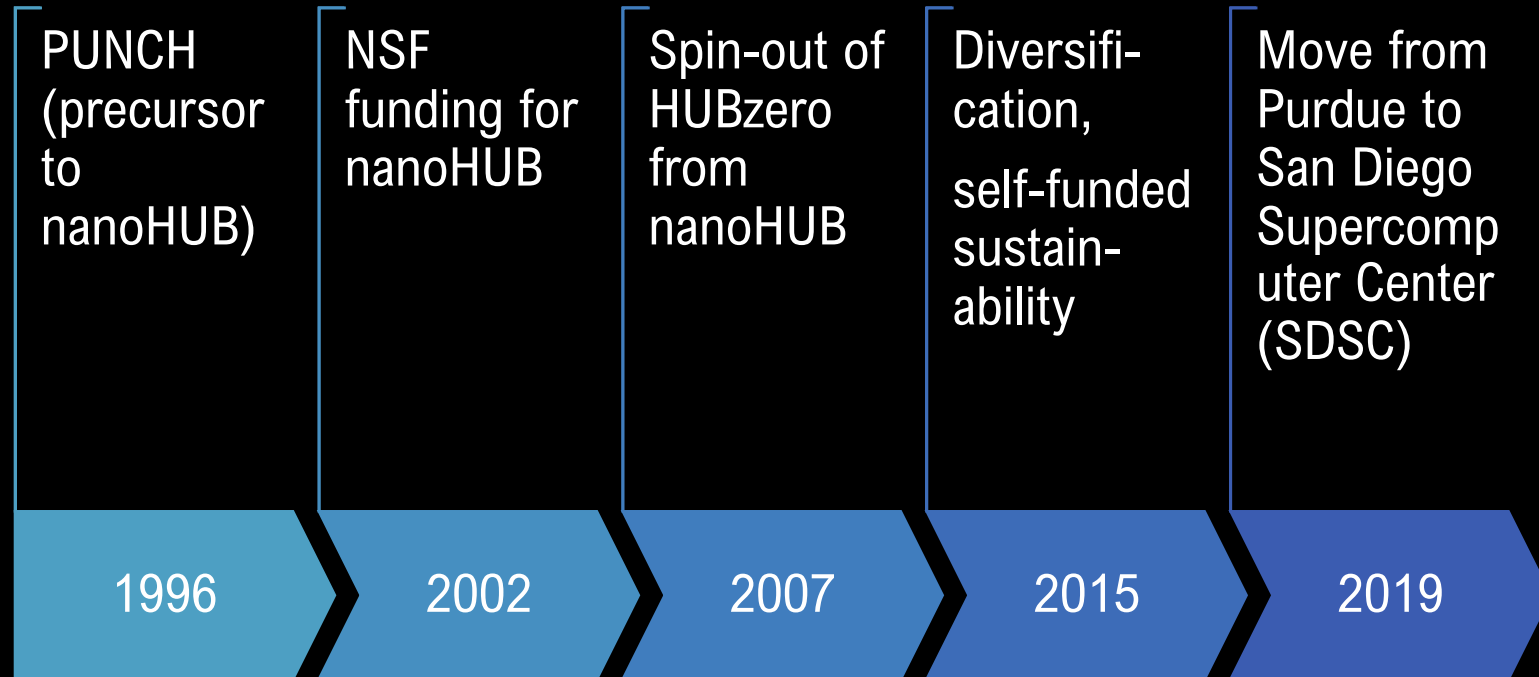
**Develop Software**  
ASSEMBLE YOUR OWN COMPONENTS  
Jupyter  
Linux Workstations  
Engines / Frameworks  
Machine Learning

**Share & Publish**  
JOIN 3,000+ CONTRIBUTORS  
Teaching Materials  
Lectures  
Tools / Apps



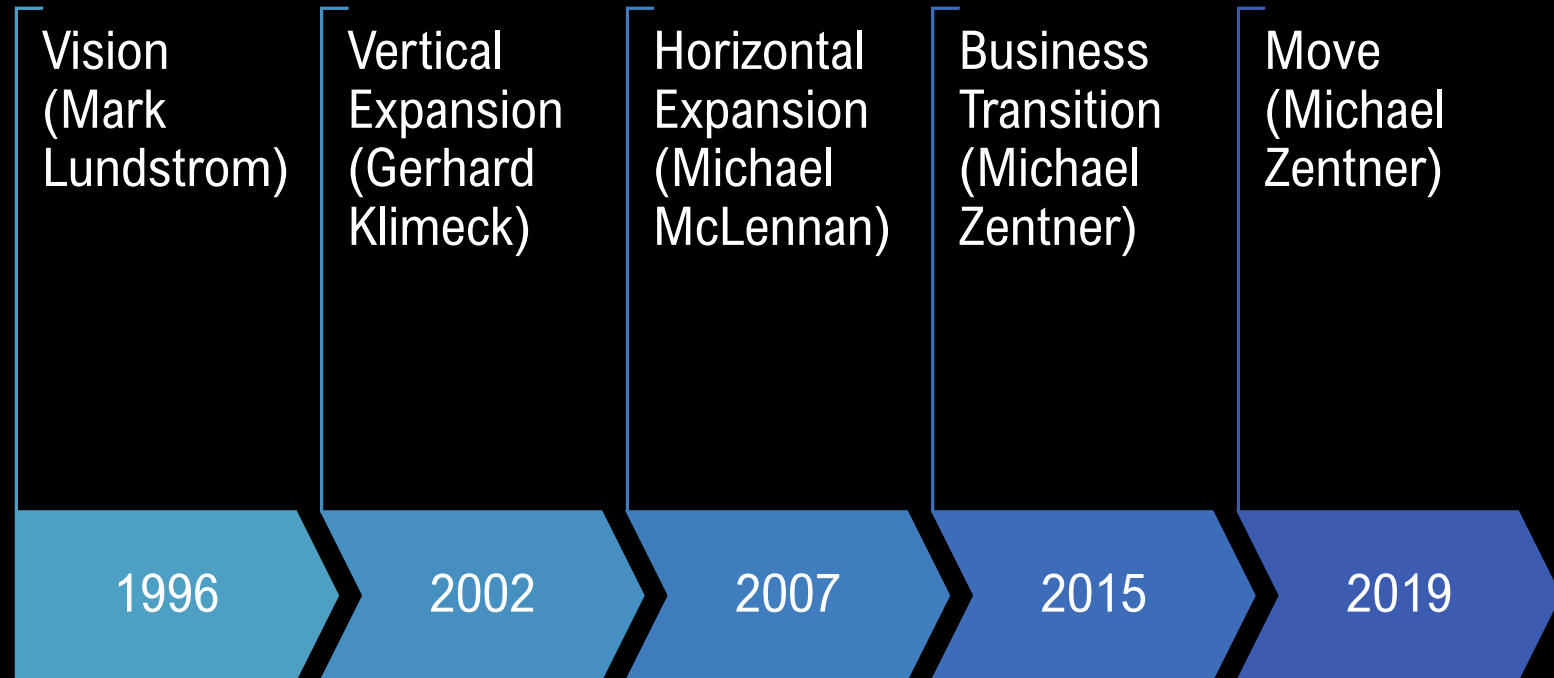
Worldwide nanoHUB activity over a 24-hour period

# HUBzero History: Operating Model Path





# HUBzero History: Key Team Enablers



# HUBzero in 2022

*Even with success we must continue to innovate new business models, partnerships, delivery capabilities, and service architectures and continue to address additional research domains.*

- Over 20 full time software professionals specializing in:
  - Cybersecurity
  - Web programming
  - User experience design
  - Scientific application development
  - Analytics
  - Middleware
  - High performance computing
  - System administration
  - Customer service
- Entirely self funded

# RSE Roles

- Cybersecurity
- Web programming
- User experience design
- Scientific application development
- Analytics
- Middleware
- High performance computing
- System administration
- Customer service
- ...





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*Thanks!*