

Virginia Tech

- Immersive VR research since 1997

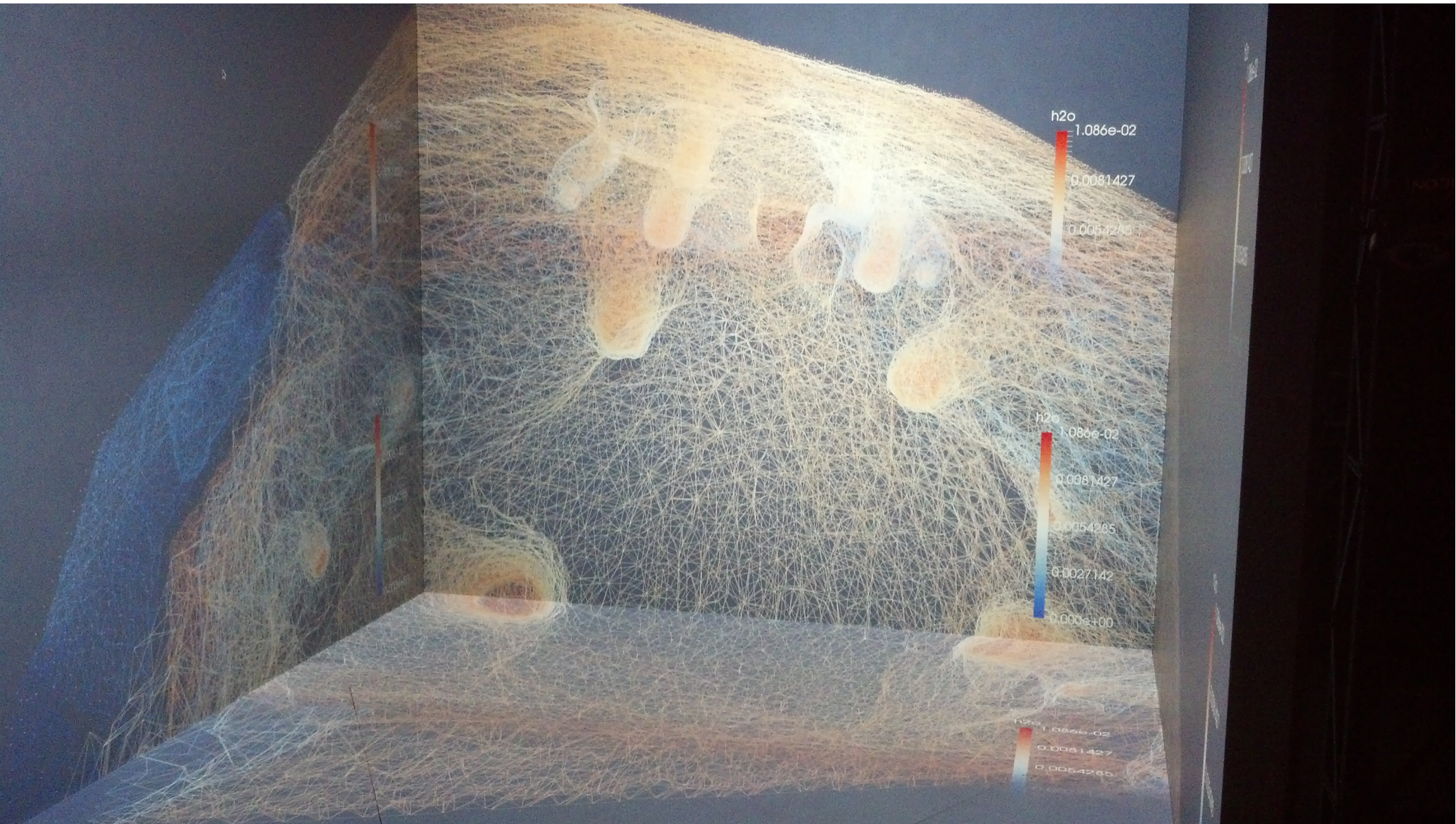


Visionarium Lab Upgrade

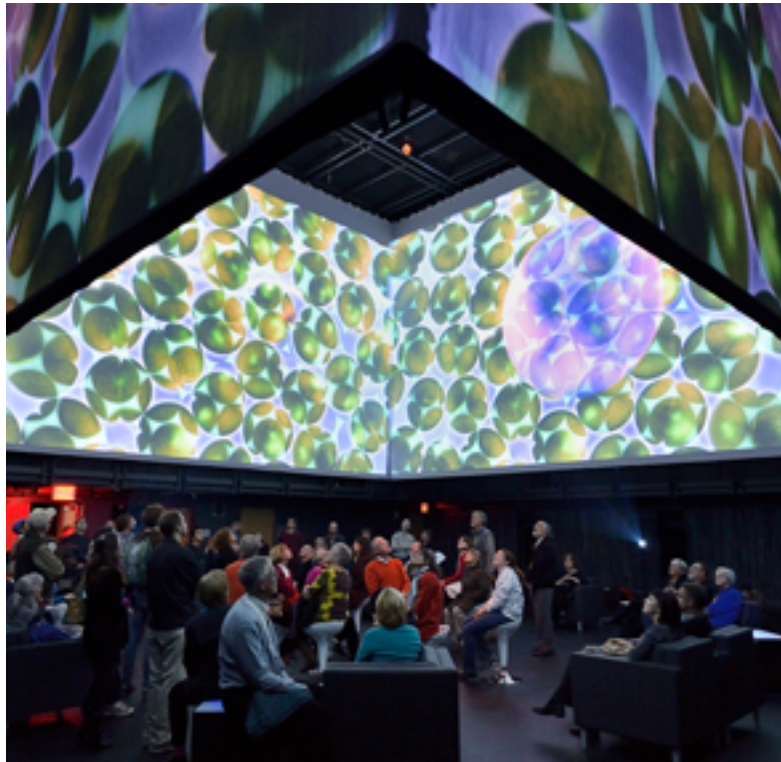
- 26.7 million active stereo pixels



Paraview CAVE remote rendering



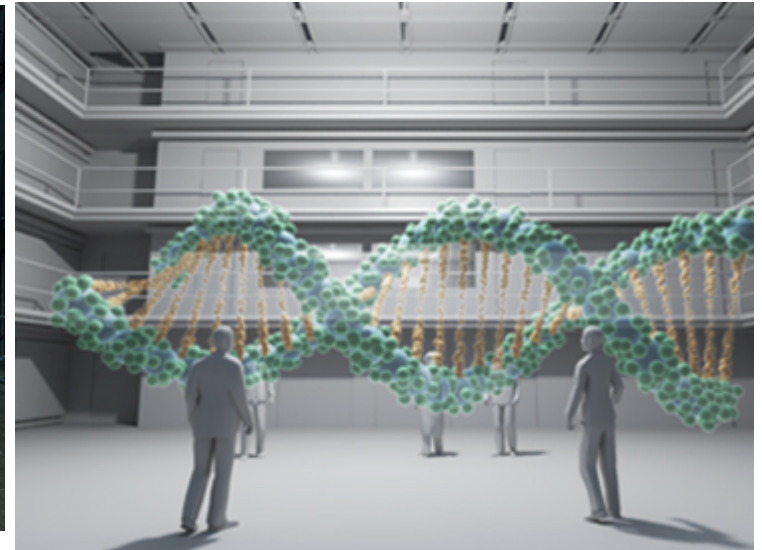
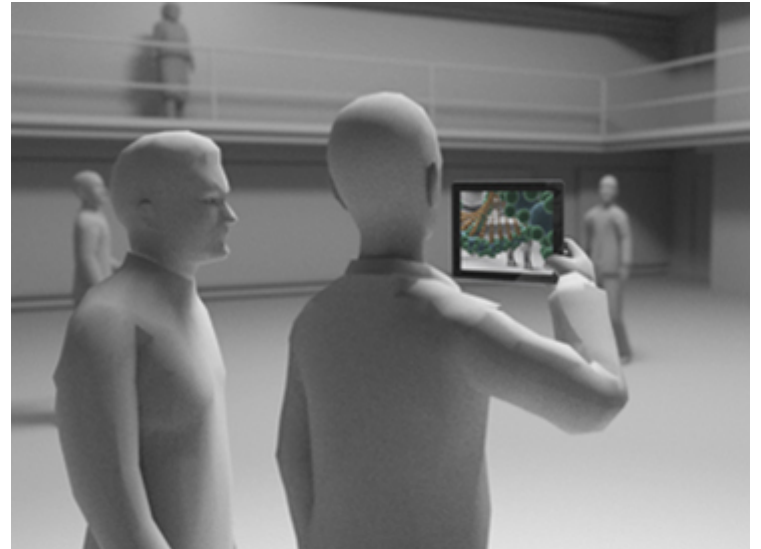
ICAT CUBE & Cyclorama





01:27

HD :: vimeo



Many Platforms, Diverse Content

Interactive 3D models, 2D plots for:

- Design
- Science & Engineering
- Simulation
- Published to :
 - Desktop, Web, mobile
 - Immersive HMDs and projection systems
- Immersive has a technical meaning

Many Platforms

- X3D is central for its:
 - Portability, Interoperability, Durability
- Visualization and Interaction Design
- Comparing immersive platforms :
- N. Polys et al., "Immersive analytics: Crossing the gulfs with high-performance visualization," 2016 Workshop on Immersive Analytics (IA), Greenville, SC, 2016, pp. 13-18. doi: 10.1109/IMMERSIVE.2016.7932376
- Jagathshree Iyer, Nicholas F. Polys, and Lance Arsenault. 2017. Text density and display bandwidth: evaluating scalability by model and experiment. In Proceedings of the 22nd International Conference on 3D Web Technology (Web3D '17). ACM, New York, NY, USA, Article 12, 7 pages. DOI: <https://doi.org/10.1145/3055624.3075958>



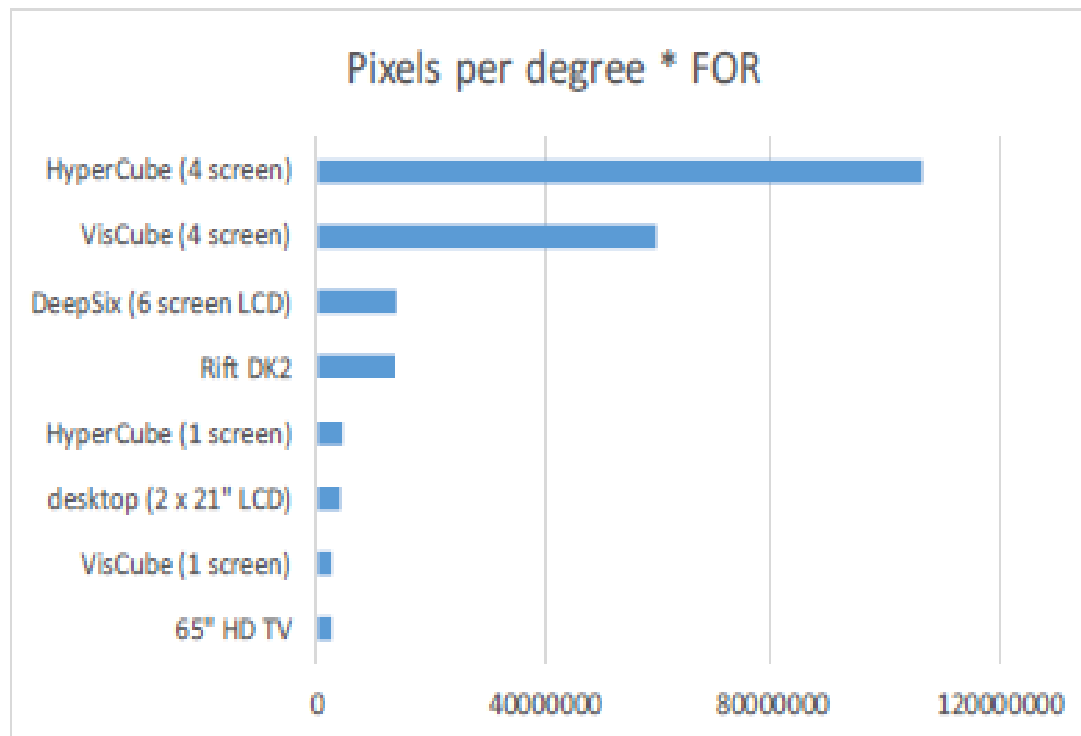
Metrics for bandwidth evaluation

- Two approaches to using immersive technologies
 - To increase the **bandwidth** of the sensory modalities or
 - To increase the **throughput** of the existing channels
- Metrics
 - Number of visible pixels
 - Number of visible pixels in the workspace (resolution $x * y$)
 - Visual angle of visible workspace (vFOV * hFOV) in degrees
 - Number of available pixels in the workspace (resolution $x * y$)
 - Visual angle in degrees of available workspace (hFOR * vFOR)

FOV = Field of View, FOR = Field of Regard, vFOR = Vertical FOR, hFOR = Horizontal FOR



Display Bandwidth (by pixel)



Metric for total display bandwidth

Bandwidth of Text

- Pixel model predicts 7x more bandwidth on the Visionarium CAVE than a 6 screen tiled display
- By experiment, readable text is more like 4x
-
-
- Nicholas Polys, Virginia Tech
- npolys@vt.edu

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- An Educational Tool to Explore the Dynamics of Subatomic Physics Interactions
 - <http://icat.vt.edu/project/educational-tool-explore-dynamics-subatomic-physics-interactions>