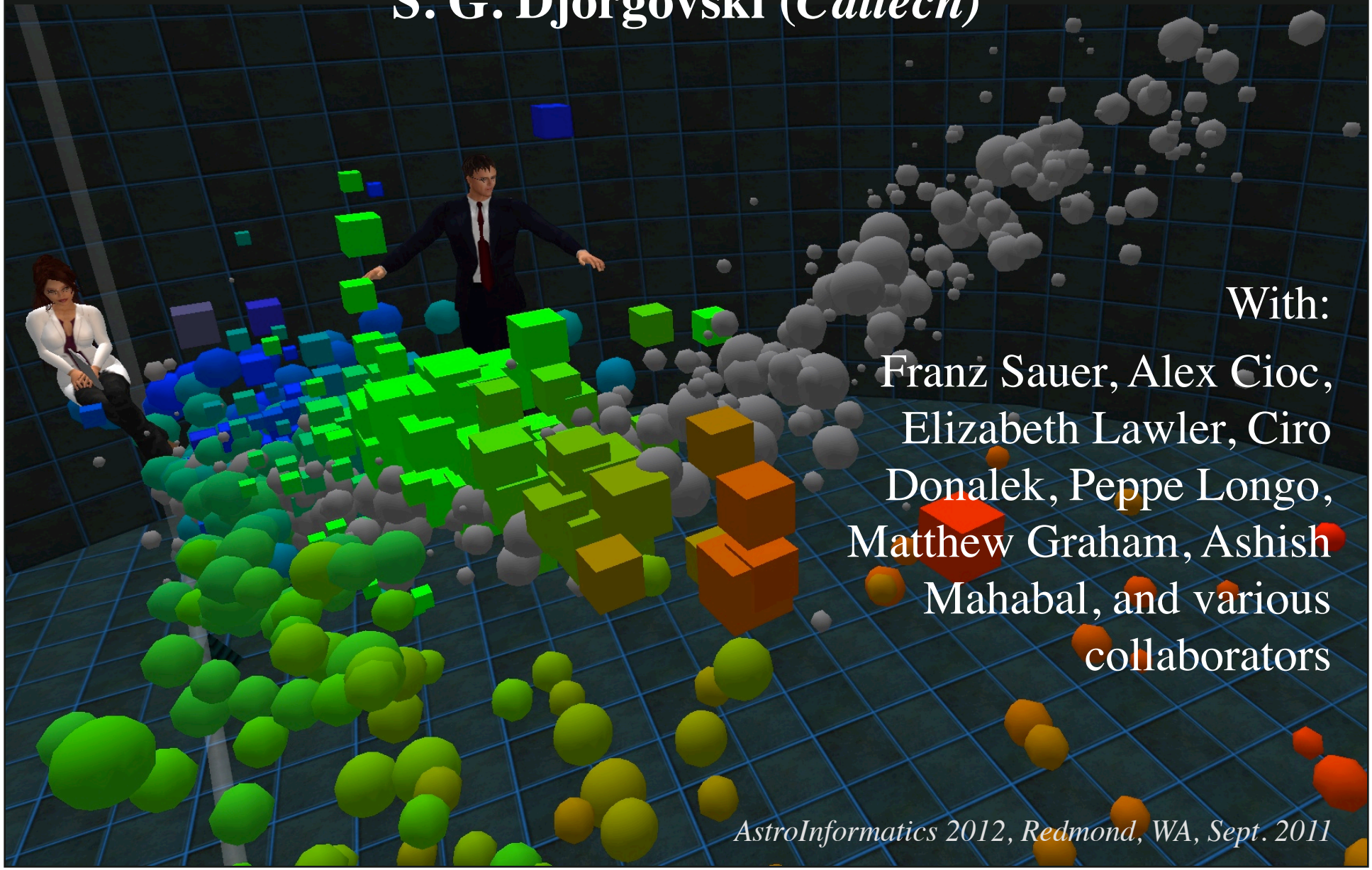
Immersive Data Visualization

S. G. Djorgovski (*Caltech*)



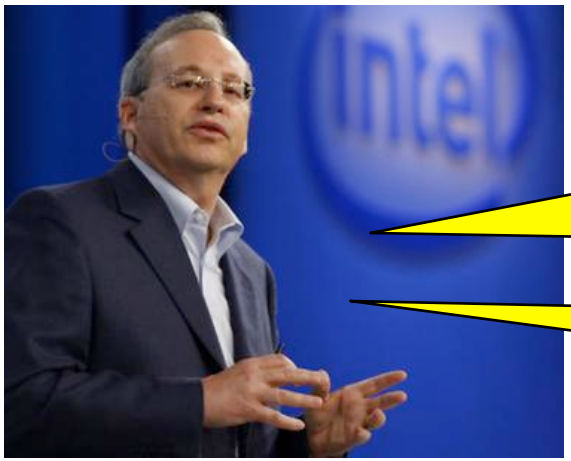
With:

Franz Sauer, Alex Cioc, Elizabeth Lawler, Ciro Donalek, Peppe Longo, Matthew Graham, Ashish Mahabal, and various collaborators

AstroInformatics 2012, Redmond, WA, Sept. 2011

Immersive VR and the Emerging 3D Web

… and the future of the Web:



Justin Rattner, Intel CTO, in a keynote talk at the SC'09:

"… There is nothing more important to the long-term health of the HPC industry than the 3D Web…"

"… the 3D Web will be the technology driver that revitalizes the HPC business model …"

We are exploring these emerging technologies for scientific purposes, data visualization in particular

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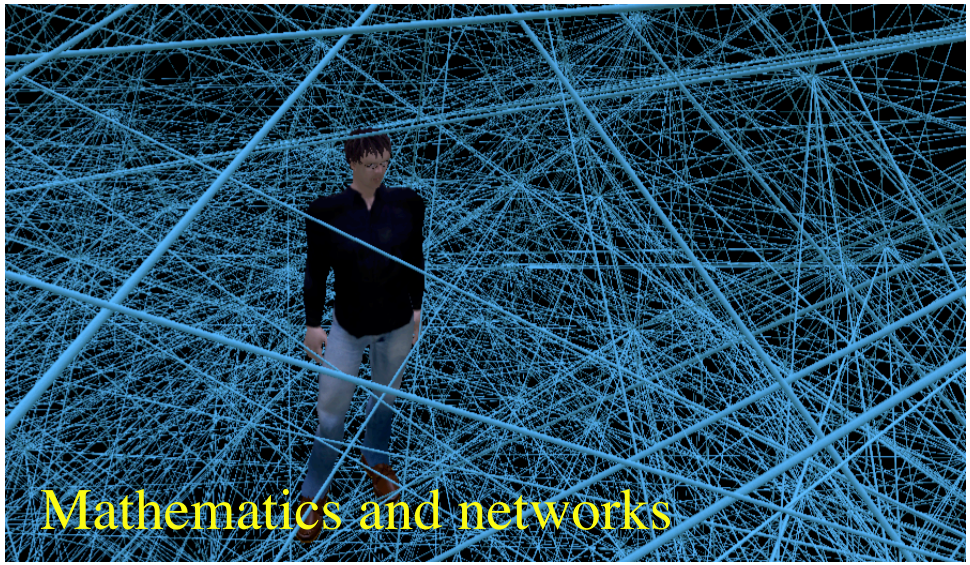
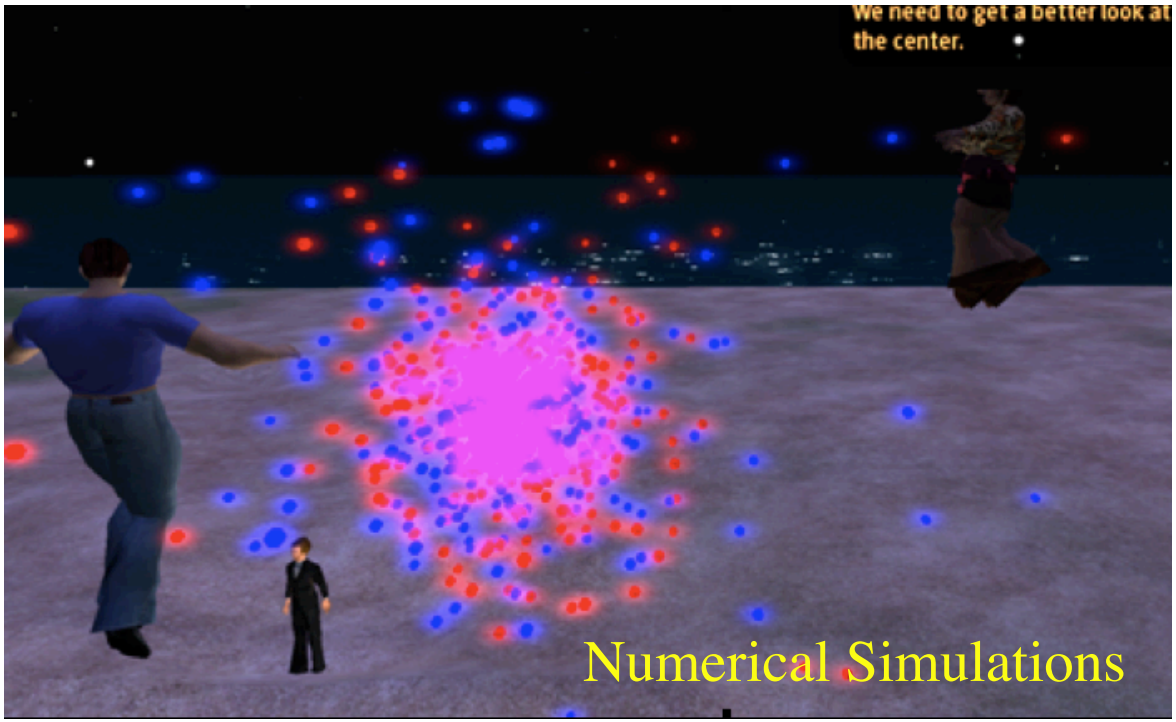
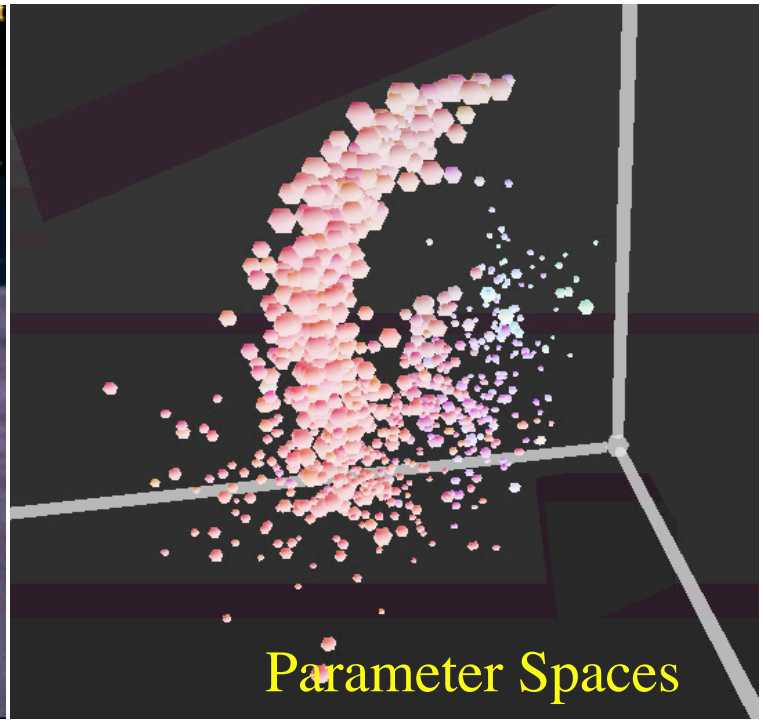


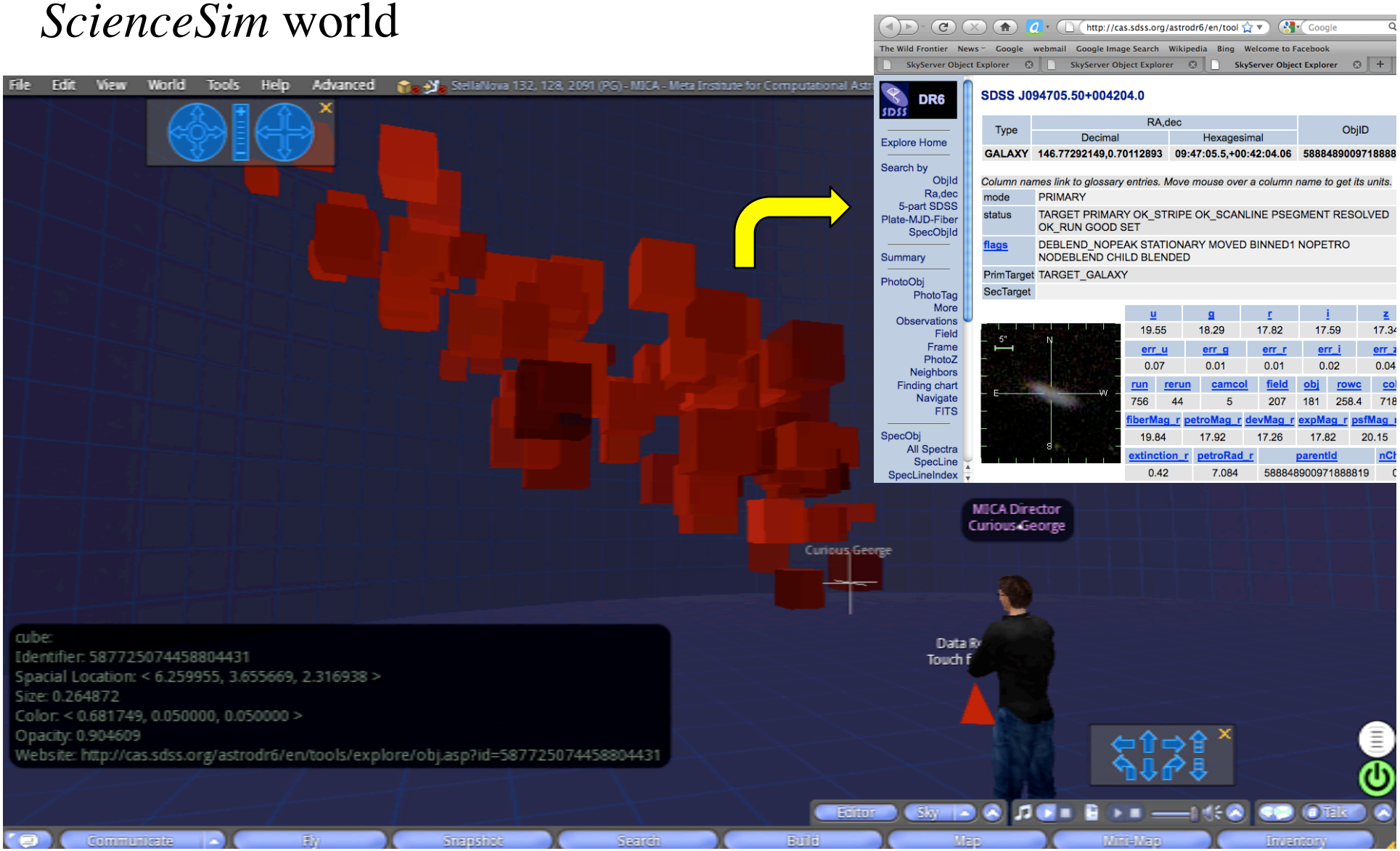




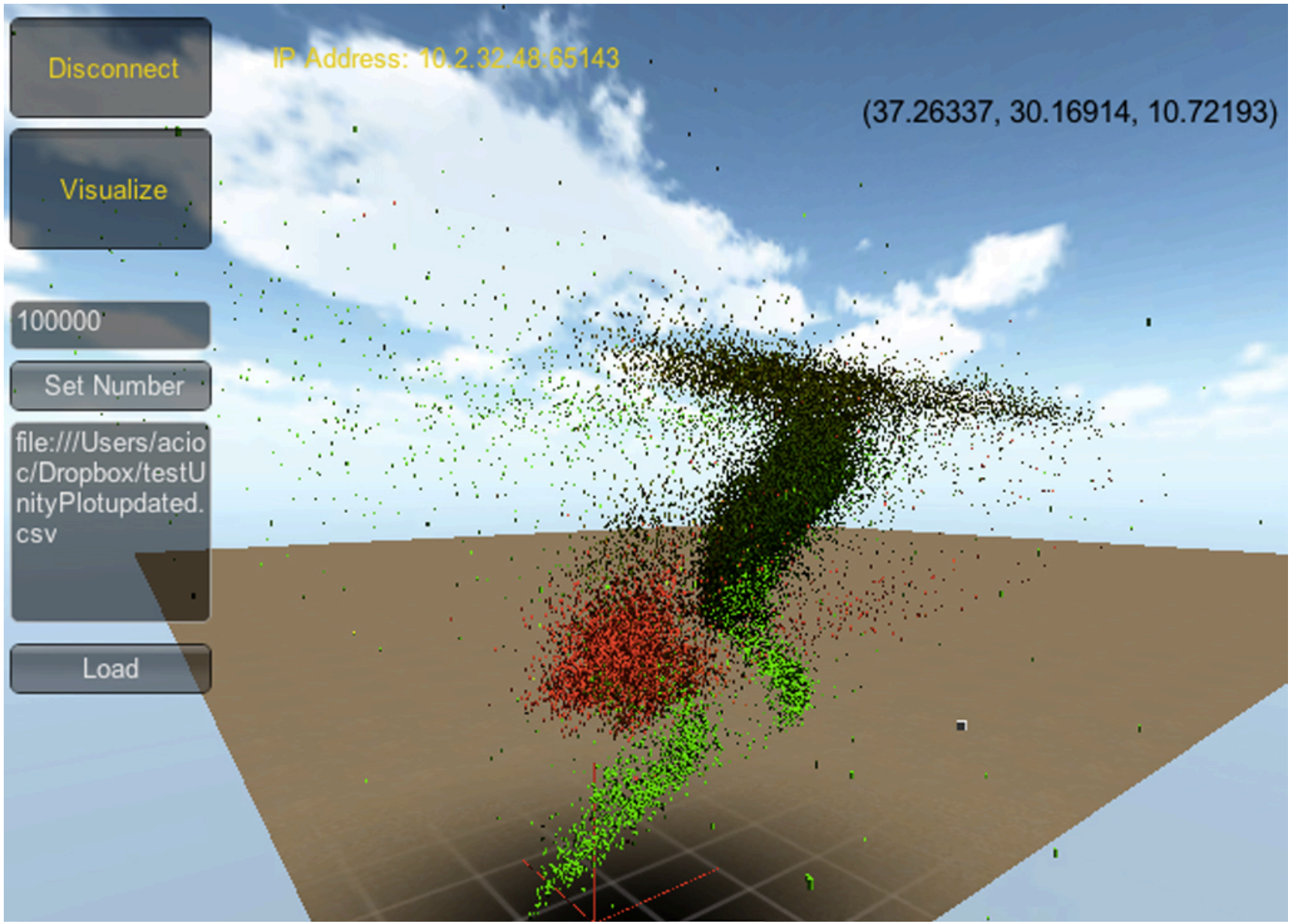
Interactive Data Visualization

Experiments in Intel's *ScienceSim* world

Data points linked to web resources



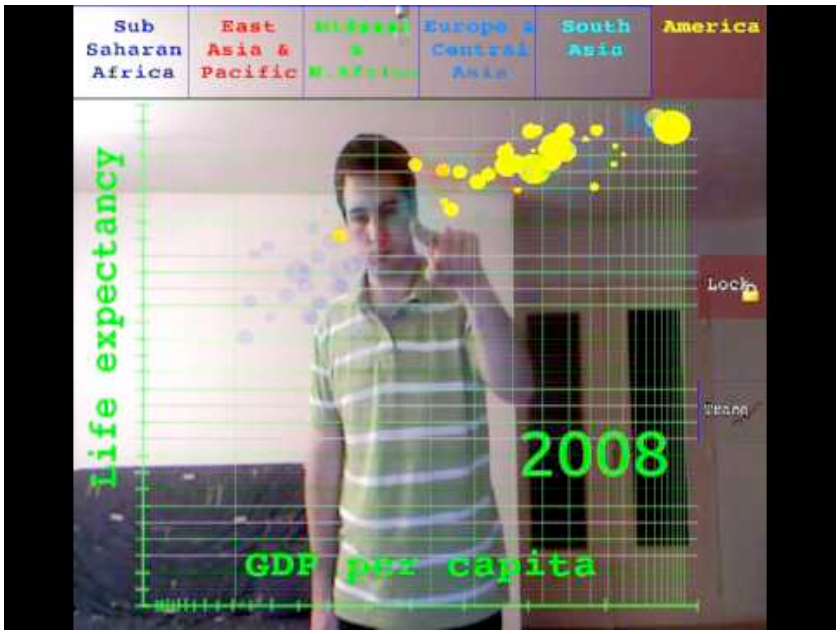
Data Browser Using Unity 3D



3D Interfaces

- 3D displays (multiple technologies)
- Haptic interfaces (Kinect, Sixth Sense, ...) to capture expressions, body language
- Increasingly photorealistic avatars
- Now driven by the games/movie industry, but likely to become a standard interface to the immersive/augmentative VR web

From Science Fiction to (Virtual) Reality



Summary

- Visualization is a key need for discovery and understanding
- The 3D Web is coming, and probably sooner than you think

Enabling technologies: 3D video, games, virtual worlds, haptic interfaces

- 3D, interactive, collaborative visualization is far more intuitive than the traditional 2D approaches – greater insights?
- Up to a dozen dimensions can be encoded effectively (more if we add sonification to visualization)
  - That is still not enough for the hyperdimensional data spaces that we are dealing with – a key limitation
- Working tools already on the *OpenSim*/*SL* platform; Unity 3D based, web-browser data visualization tool coming soon
- Cost is very low (hardware); zero cost for virtual worlds