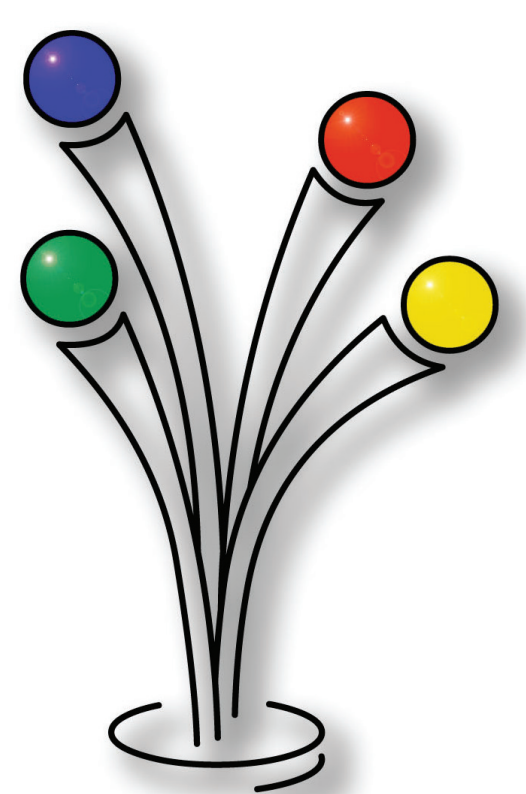


DV25 over IP: High Quality Video Over I-Light

Doug Pearson
James McGookey
Indiana University

Leroy Marburger
Indiana University –
Purdue University Indianapolis

- DV25 is a common form of digital video reduction and compression employed in consumer digital camcorders
- DV25 applies a 5:1 compression and a 4:1:1 color space; achieves a fixed data rate of 25 Mbps
- Audio is typically two-channel PCM encoded at 16 bits, 48 kHz sampling frequency, uncompressed, similar to digital audio tape (DAT)
- DV25 achieves relatively high audio and picture quality with very low encoding latency.
- Experimental DV25 over IP is accomplished by:
 - Output from a standard digital camcorder utilizing Firewire (IEEE1394)
 - Signal is fed into standard personal computer, with Firewire interface, running the DVTS software; DVTS can run on Unix, Windows or OS/X operating systems
 - DVTS accepts the DV25 digital video and audio, and wraps the digital packets in UDP/IP and places onto the Internet, destined for a target receive partner.
 - DVTS can be employed in unicast or multicast transmission.
- End-to-end quality is full DV25 video and 16/48 audio; no additional compression is performed by DVTS.
- DVTS requires approximately 33 Mbps of Internet bandwidth.



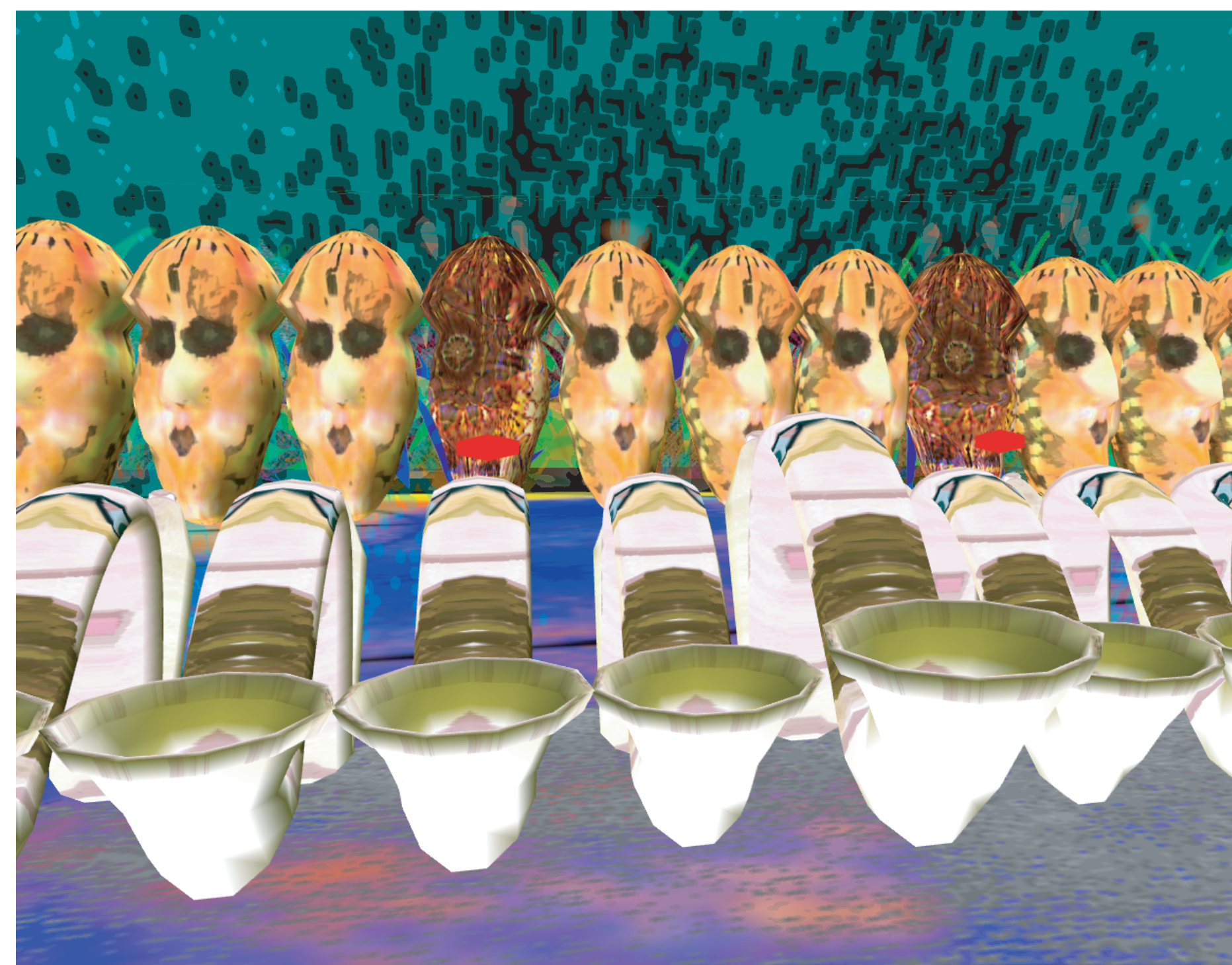
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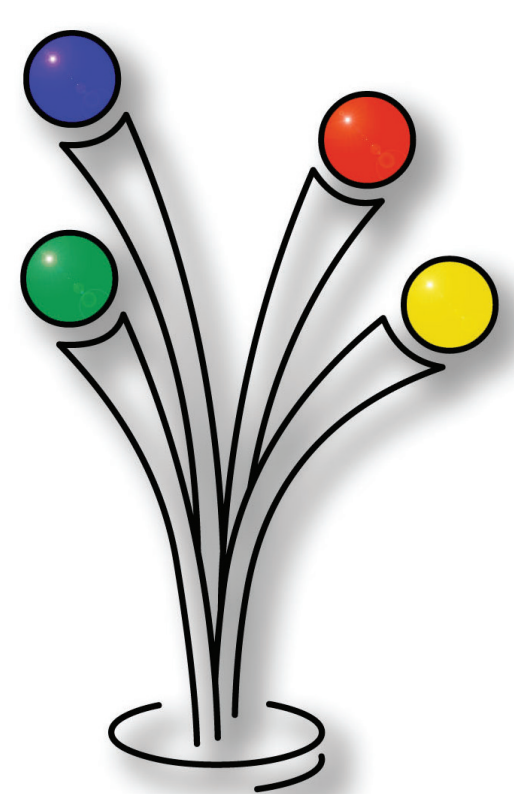
Beat Box

Margaret Dolinsky
Edward J. Dambik
Nicholas J. Bradley

Indiana University



- Beat Box is an educational environment and musical arena for people to meet via the Internet and create music together
- Beat Box presents networked CAVE participants with a playful environment of interactive virtual sound machines
- Each machine acts as sequencer with a unique periodic duration
- Beat Box is virtual sonic chronometry
- Participants cycle through sound selections
- Participants give voice to an interval by introducing it to a thoroughly odd indigenous head
- Each head represents a distinct moment in a sequence that contributes to the resultant delivery of the collective instruments



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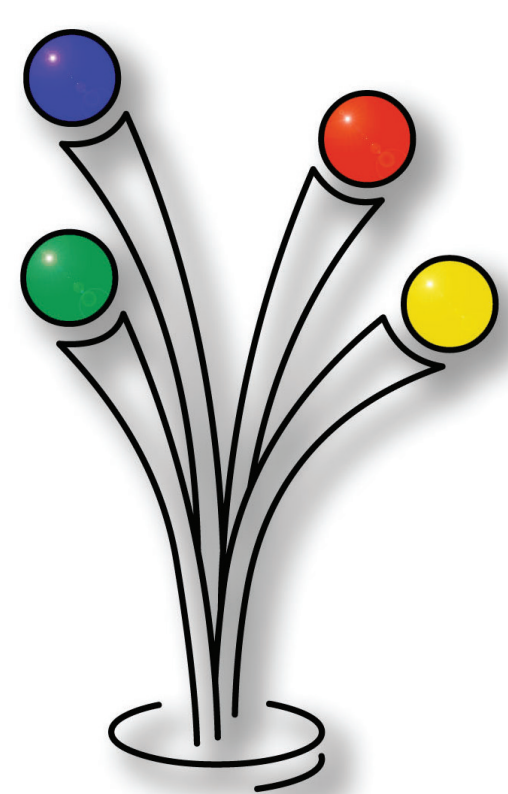
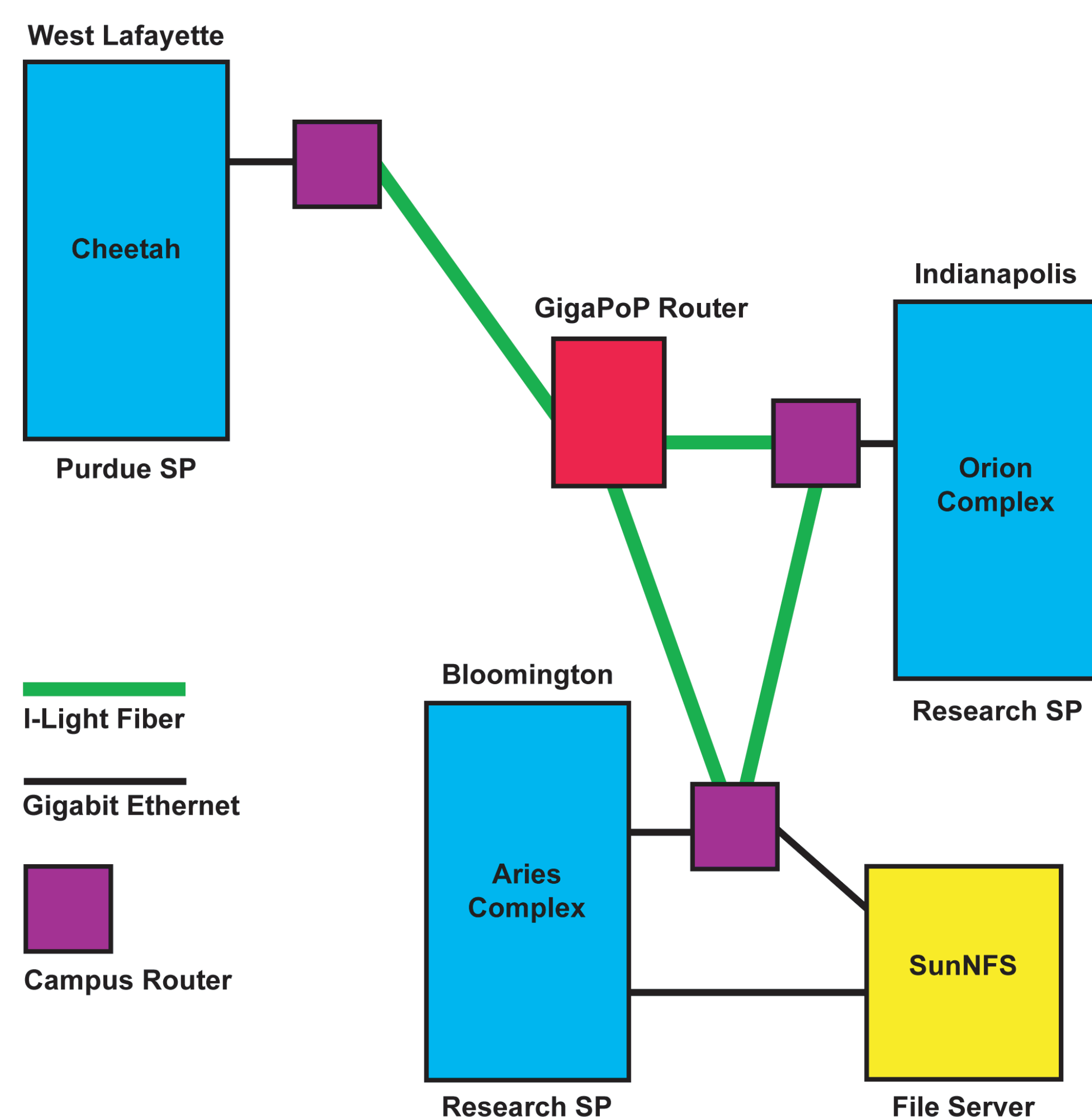
I-Light Connectivity

Mary Papahkian

Indiana University

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I-Light Connectivity Map



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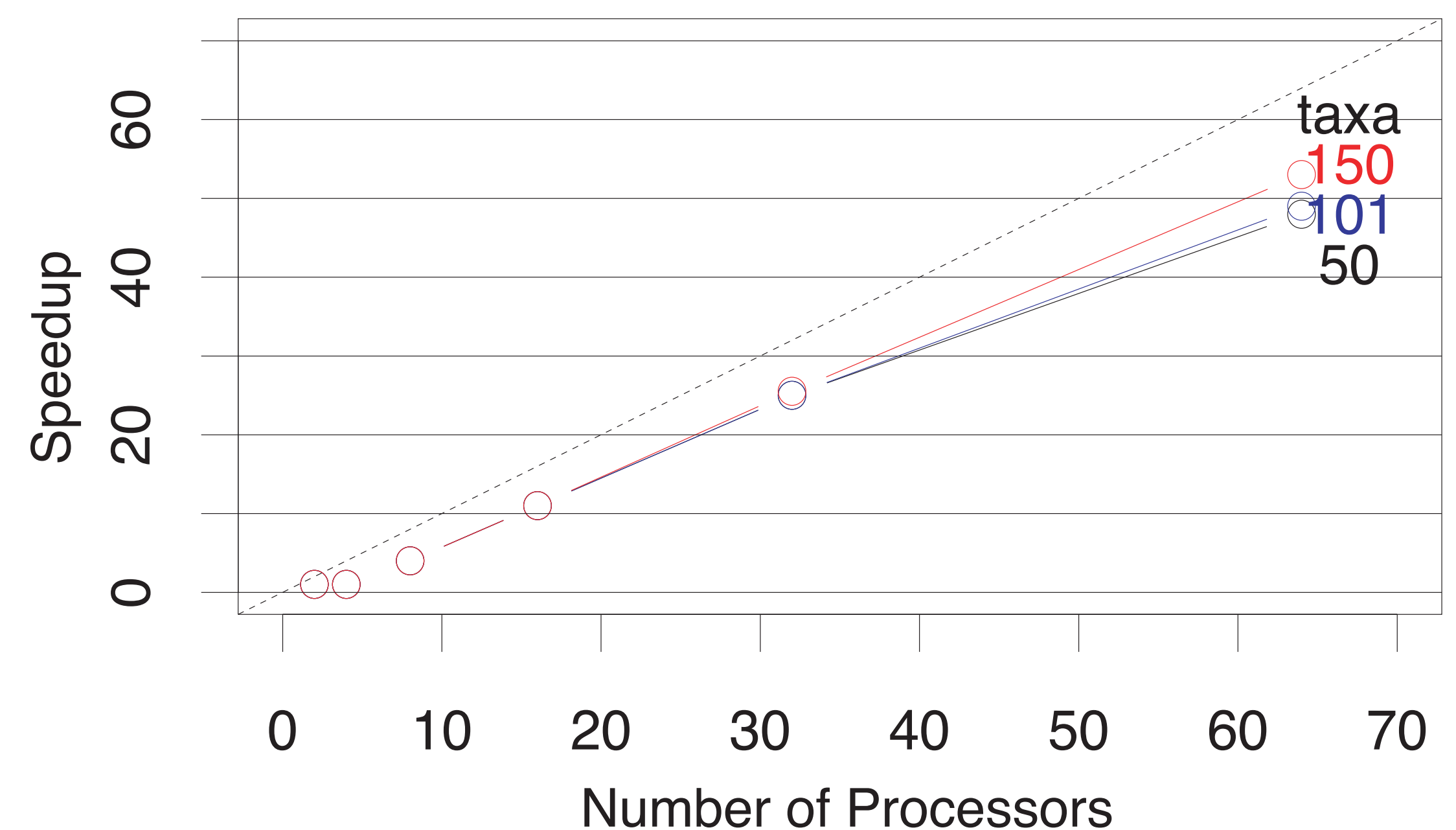
Biomedical Applications over I-Light

Richard Repasky
Eric Wernert

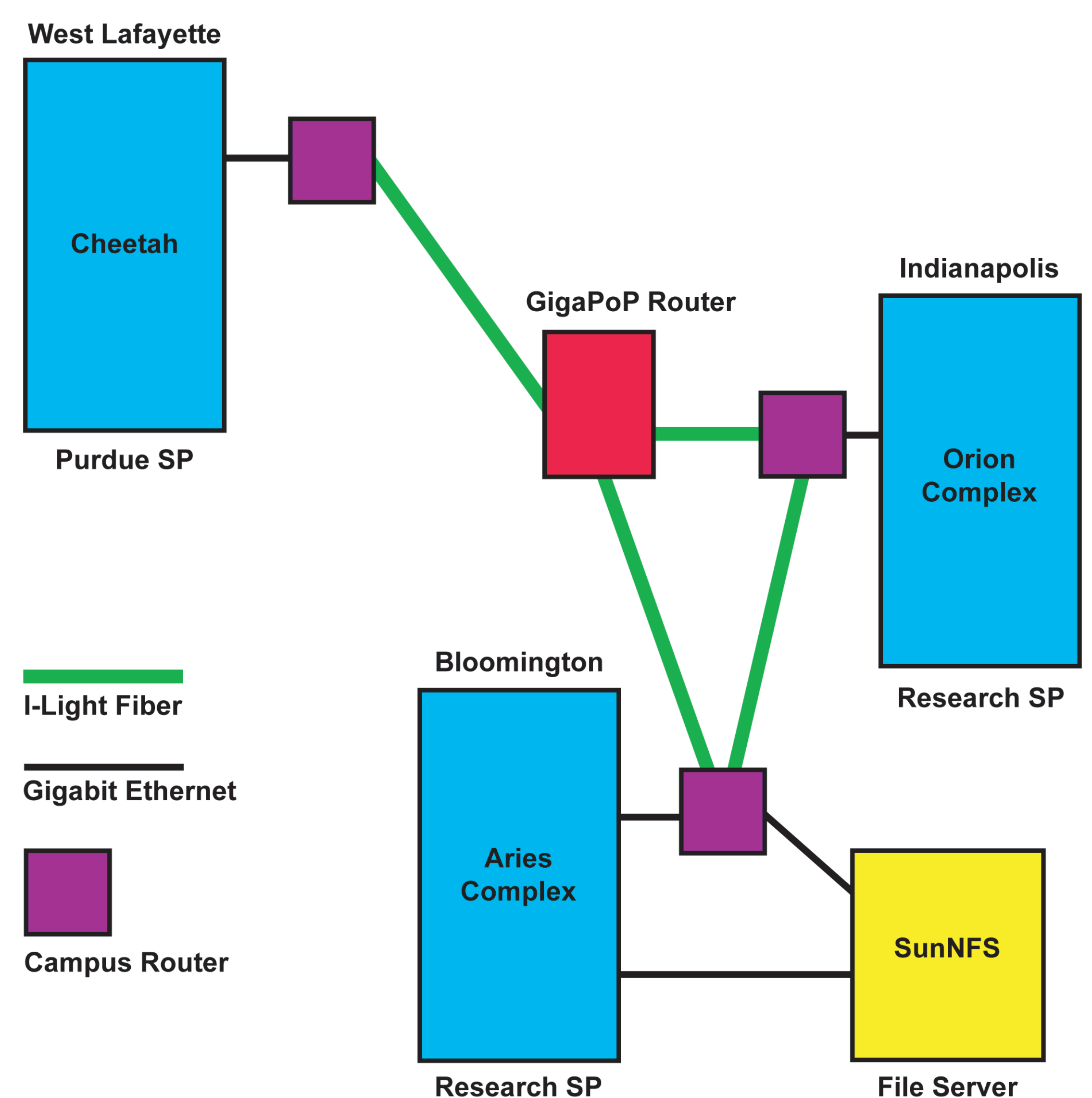
Andrew Arenson
Mary Papakhian

Indiana University

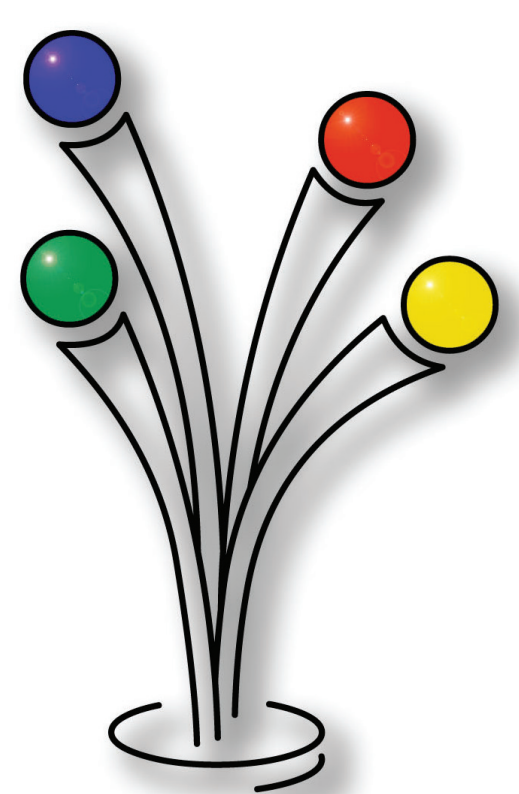
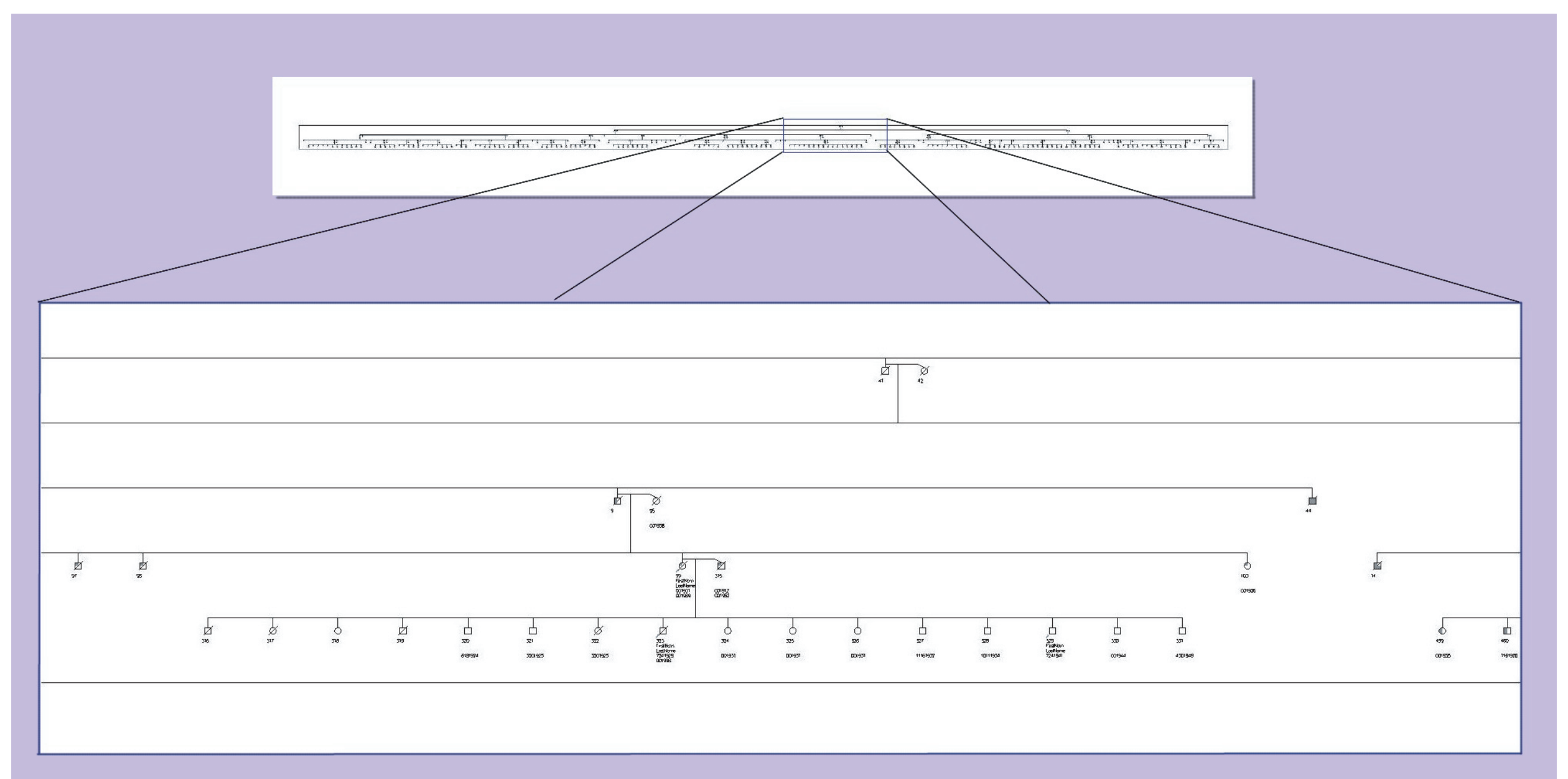
- fastDNAmI
 - Estimates evolutionary pedigrees from DNA sequences using likelihood methods
 - Scales well up to at least 500 processors
 - Parallel version maintained by UITS High Performance Computing
 - Uses PVM, MPICH or LAM (by Lumsdaine lab, IU) parallel interfaces
 - Available on SP
 - On display here, today, using LAM across SP's.
- MEME
 - Discovers patterns in DNA and protein sequences
 - Scales well up to at least 128 processors
 - Available on SP
- BLAST
 - Searches database for DNA/protein sequences that are similar to a target
 - Expected to scale well
 - Coming soon to an SP near you



I-Light Connectivity Map



- Centralized Life Sciences Data (CLSD)
 - Provides single point of access to widely-used, public databases: BIND, LocusLink, UniGene, ENZYME, LIGAND, and multiple NCBI sequence and protein datasets
 - Uses IBM's DiscoveryLink software to incorporate BLAST queries into SQL queries
 - Uses I-Light to enable processing for a single query on both the Orion SP complex in Indianapolis and Solar in Bloomington
- PViN — Pedigree Visualization and Navigation
 - Visualizes pedigree trees from databases collected by Hereditary Diseases and Family Studies Division of IU School of Medicine
 - Scales efficiently, handling data sets well beyond limits of commercial pedigree packages
 - Provides flexible data access model supporting direct local file access or queries to remote database server through ODBC interface
 - Enhances user capabilities with new visual query, browsing, and printing options
 - Developed by UITS Advanced Visualization Lab with support from Indiana Genomics Initiative



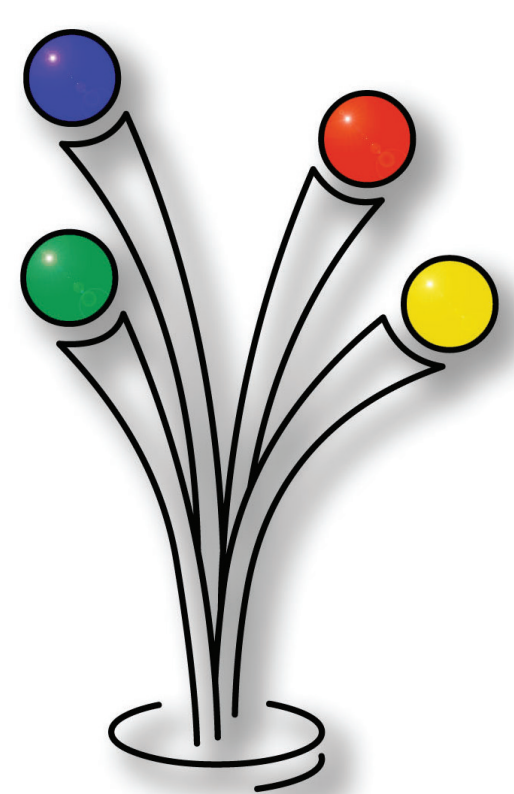
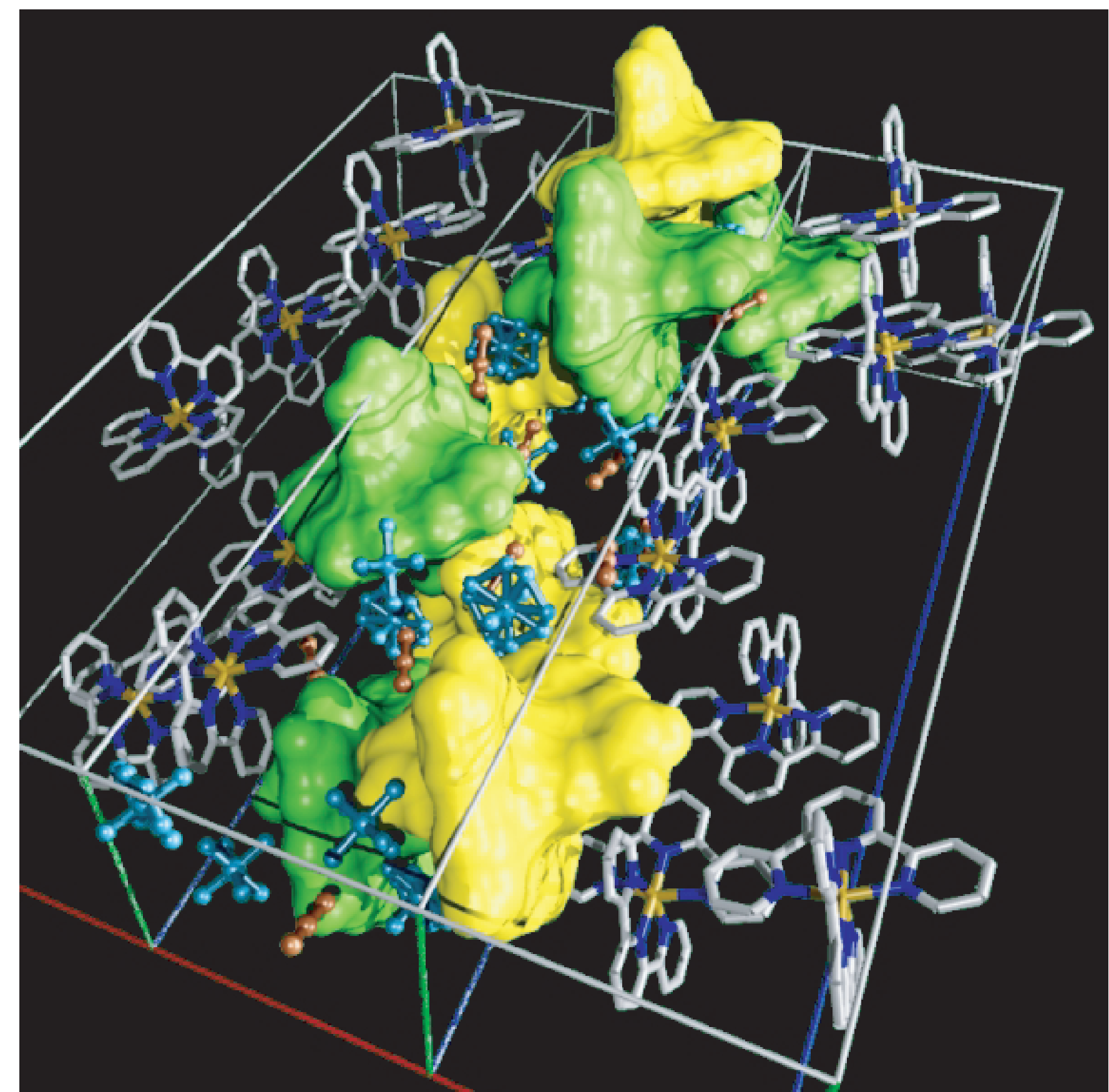
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Affordable VR & Advanced Networking

UITS Advanced Visualization Lab Indiana University

- Affordable Virtual Reality
 - The John-e-box: new family of technologies with benefits of CAVE and ImmersaDesk at dramatically lower cost
 - Broader deployment of display systems and more routine utilization for research, education, and creative activities at IU
- Tele-Immersion
 - Participants at multiple remote sites participate in shared 3D environment; remote participants represented as avatars
 - 3D environment may be supplemented by real-time audio and video
 - Specific applications include visualization of architectural spaces, cultural heritage sites, scientific data, GIS information
 - Current version utilizes CAVERNSOFT G2 middleware from EVL at UIC
- Remote Data Access
 - Integrates power of high-end visualization displays and techniques with benefits of data repositories and remote instrument access
 - Data may be transferred in whole or in part to local visualization system for rendering
 - Enhances visual browsing and querying paradigms
- Visual Streaming
 - Enables sharing of single 3D application between multiple monoscopic or stereoscopic displays by streaming images across the network
 - Provides simple alternative to developing complex, custom tele-immersion applications
 - Currently utilizing TightVNC (Virtual Network Computing) enabling sharing of applications across multiple platforms



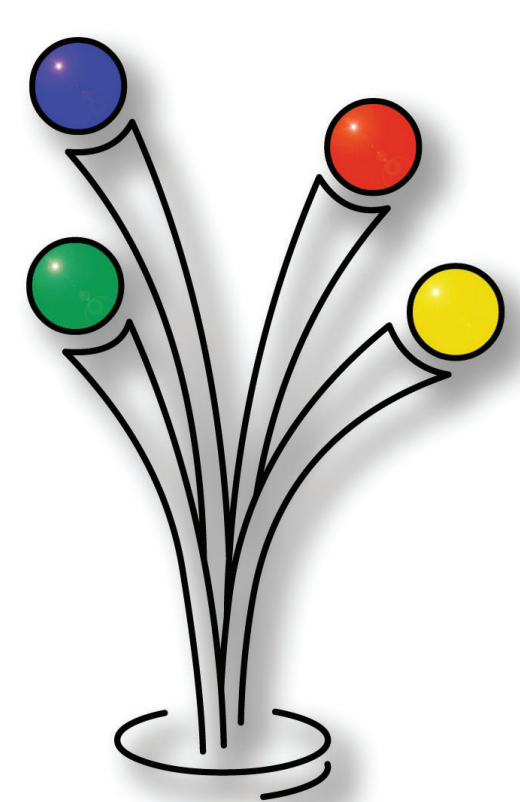
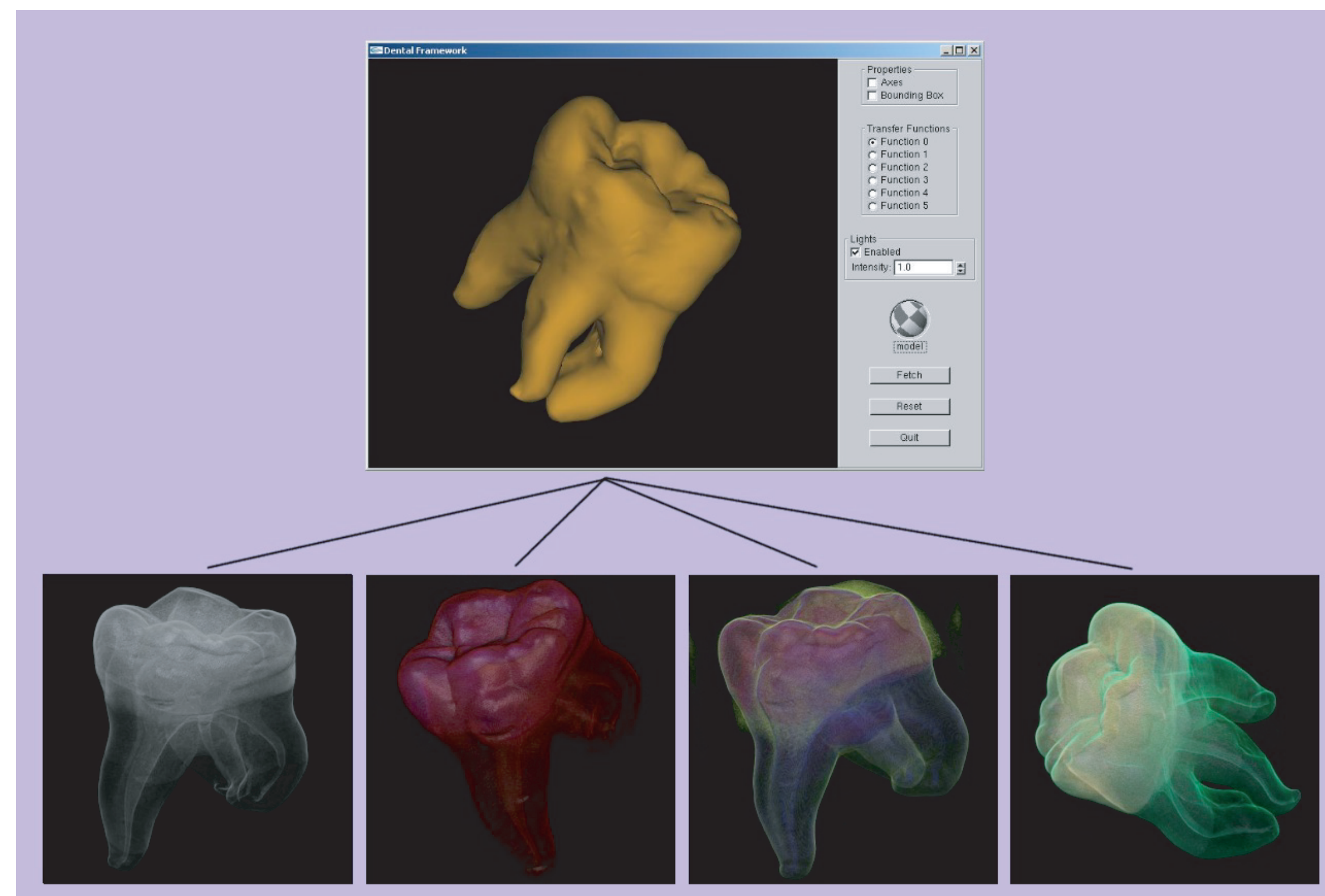
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Server-based Rendering & Advanced Networking

UITS Advanced Visualization Lab Indiana University

- Access to high-quality visualization from thin client systems
- Beneficial when resources of central server provide enhanced capabilities
- Simple interactive interface presented to the user
- Requests for high-quality images triggered by the user, carried out by remote server
- ToothPics – Interactive Oral & Maxillofacial Radiographic Imaging
 - Enables access to high-quality volume-rendering methods from thin clients using custom interface and standard Web delivery
 - Flexible server configurations include VolumePro 1000 hardware on Windows or OpenDX on Linux
 - Developed by the UITS Advanced Visualization Lab and IU School of Dentistry
- UMSC Molecular Rendering Beowulf Cluster
 - Provides custom, high-quality ray-traced images of molecules from on-line repository of chemical structures
 - Rendering performed in parallel on a Beowulf cluster
 - Developed by IU Molecular Structure Center with assistance from UITS Advanced Visualization Lab
 - Try it at <http://www.iumsc.indiana.edu/Beowulf/>



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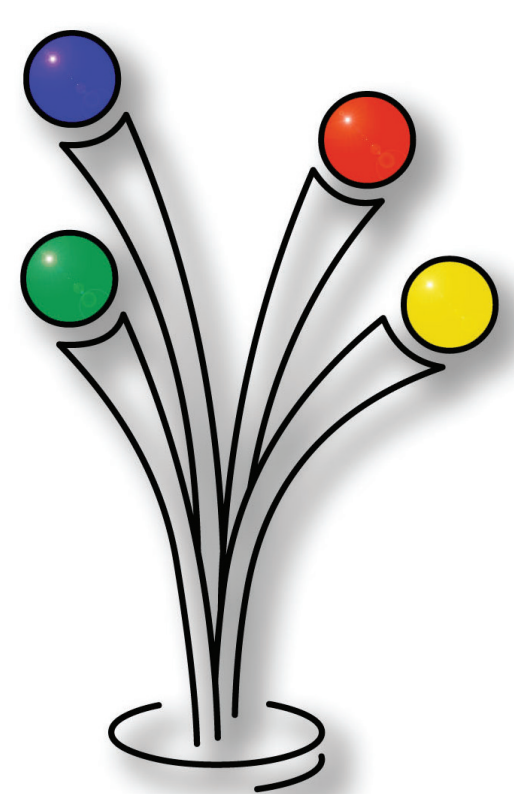
iUniverse: A Collaborative Information Universe for IU

Katy Börner
Elijah Wright
Indiana University

Michael Boyles
Indiana University –
Purdue University Indianapolis



- iUni is an exciting collaboration between the School of Library and Information Science (SLIS) and University Information Technology Services (UITs), primarily involving the Advanced Visualization Laboratory (AVL).
- The project's goal is to provide a 3D Web-based collaboration mechanism for all IU faculty, staff, and students on any IU campus.
- Begun in Summer 2001, the universe currently hosts 16 virtual worlds.
- Research focuses on:
 - The design of tools and building blocks that ease 3D world design, utilization, and evaluation
 - The application of data analysis and information visualization techniques to help ease social navigation in 3D, to enable support designers to evaluate and optimize world layout and interaction design, and to enable researchers to analyze and study online communities
 - The exploitation of 3D desktop interfaces as a means of increasing access to geographically distributed information and expertise.



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