

iGENI: International Global Environment for Network Innovations

Joe Mambretti, Director, (j-mambretti@northwestern.edu)
International Center for Advanced Internet Research (www.icair.org)
Northwestern University
Director, Metropolitan Research and Education Network (www.mren.org)
Partner, StarLight/STAR TAP, PI-OMNINet (www.icair.org/omninet)

Maxine Brown, Associate Director (maxine@uic.edu)
Electronic Visualization Laboratory (www.evl.uic.edu)
University of Illinois at Chicago

Tom DeFanti, Research Scientist (tdefanti@ucsd.edu)
California Institute for Telecommunications and Information Technology
(www.calit2.net),
University of California, San Diego

9th Annual Global Lambda Grid Workshop
Daejeon, Korea
October 29, 2009



Global Environment for Network Innovations (GENI)

- **GENI Is Funded By The National Science Foundation's Directorate for Computer and Information Science and Engineering (CISE)**
- **GENI Is a Virtual Laboratory For Exploring Future Internets At Scale.**
- **GENI Is Similar To Instruments Used By Other Science Disciplines, e.g., Astronomers – Telescopes, HEP - Synchrotrons**
- **GENI Creates Major Opportunities To Understand, Innovate and Transform Global Networks and Their Interactions with Society.**
- **GENI Is Dynamic and Adaptive.**
- **GENI Opens Up New Areas of Research at the Frontiers of Network Science and Engineering, and Increases the Opportunity for Significant Socio-Economic Impact.**



Global Environment for Network Innovations (GENI)

- **GENI**
 - **Supports At-Scale Experimentation on Shared, Heterogeneous, Highly Instrumented Infrastructure**
 - **Enables Deep Programmability Throughout the Network,**
 - **Promotes innovations in Network Science, Security, Technologies, Services and Applications**
 - **Provides Collaborative and Exploratory Environments for Academia, Industry and the Public to Catalyze Groundbreaking Discoveries and Innovation.**
- **The NSF Funds GENI Through the GENI Program Office (GPO) at BBN Technologies**
- **The Recently Announced Latest Round of GENI Funding Will Accelerate the Prototyping of a Suite of Infrastructure for the GENI Project With Federation and Early Experiments to Guide Future GENI System Design.**



iGENI: The International GENI

- **The iGENI Initiative Will Design, Develop, Implement, and Operate a Major New National and International Distributed Infrastructure.**
- **iGENI Will Place the “G” in GENI Making GENI Truly Global.**
- **iGENI Will Be a Unique Distributed Infrastructure Supporting Research and Development for Next-Generation Network Communication Services and Technologies.**
- **This Infrastructure Will Be Integrated With Current and Planned GENI Resources, and Operated for Use by GENI Researchers Conducting Experiments that Involve Multiple Aggregates At Multiple Sites.**
- **iGENI Infrastructure Will Connect Its Resources With Current GENI National Backbone Transport Resources, With Current and Planned GENI Regional Transport Resources, and With International Research Networks and Projects,**



iGENI Consortium

- **Consortium Partners Include Several Major Network Research Organizations:**
 - International Center for Advanced Internet Research (iCAIR) at Northwestern University,
 - Electronic Visualization Laboratory (EVL) at the University of Illinois at Chicago
 - The California Institute for Telecommunications and Information Technology (Calit2) at the University of California, San Diego
 - Cisco Systems, Inc. Research
 - BBN Technologies GENI Program Office (GPO).
 - The StarLight Consortium
 - RENCI
 - Duke University
 - International Partners
 - Et Al



iGENI Control Framework

- **The iGENI Consortium Will Integrate Its Global Infrastructure With the Open Resource Control Architecture (ORCA) Control Framework**
- **ORCA Was Developed by GENI-funded Colleagues at RENCI (Renaissance Computing Institute) and Duke University,**
- **ORCA Will Enable iGENI Researchers to Dynamically Control International Network Services, Associated Transport Resources and GENI Aggregates.**
- **iGENI Will Partner With Other National and International Experimental Environments Are In Development**
 - For Example, the European Union's FIRE (Future Internet Research and Experimentation).
 - JGN2plus
 - Korea Future Internet Initiative
 - And Many Others...



iGENI and StarLight

- **iGENI Will Integrate Multiple Network Resources, Including:**
 - **Resources at the StarLight International Communications Exchange in Chicago - StarLight Current Supports Over 20 Major Network Research Testbeds, Including National and International Fabrics**
 - **Segments of National Research and Education Network Infrastructures**
 - **A National Wide-Area Private Network Operated by Cisco called C-Wave**
 - **Components of the International Optical-Networking GLIF Fabric.**



StarLight – “By Researchers For Researchers”

StarLight is an advanced national and international communication exchange facility optimized for high-performance data intensive applications

World’s “Largest”
10G Exchange
Over 100 10 Gbps
Channels
Interoperability
Services
At All Layers



View from StarLight



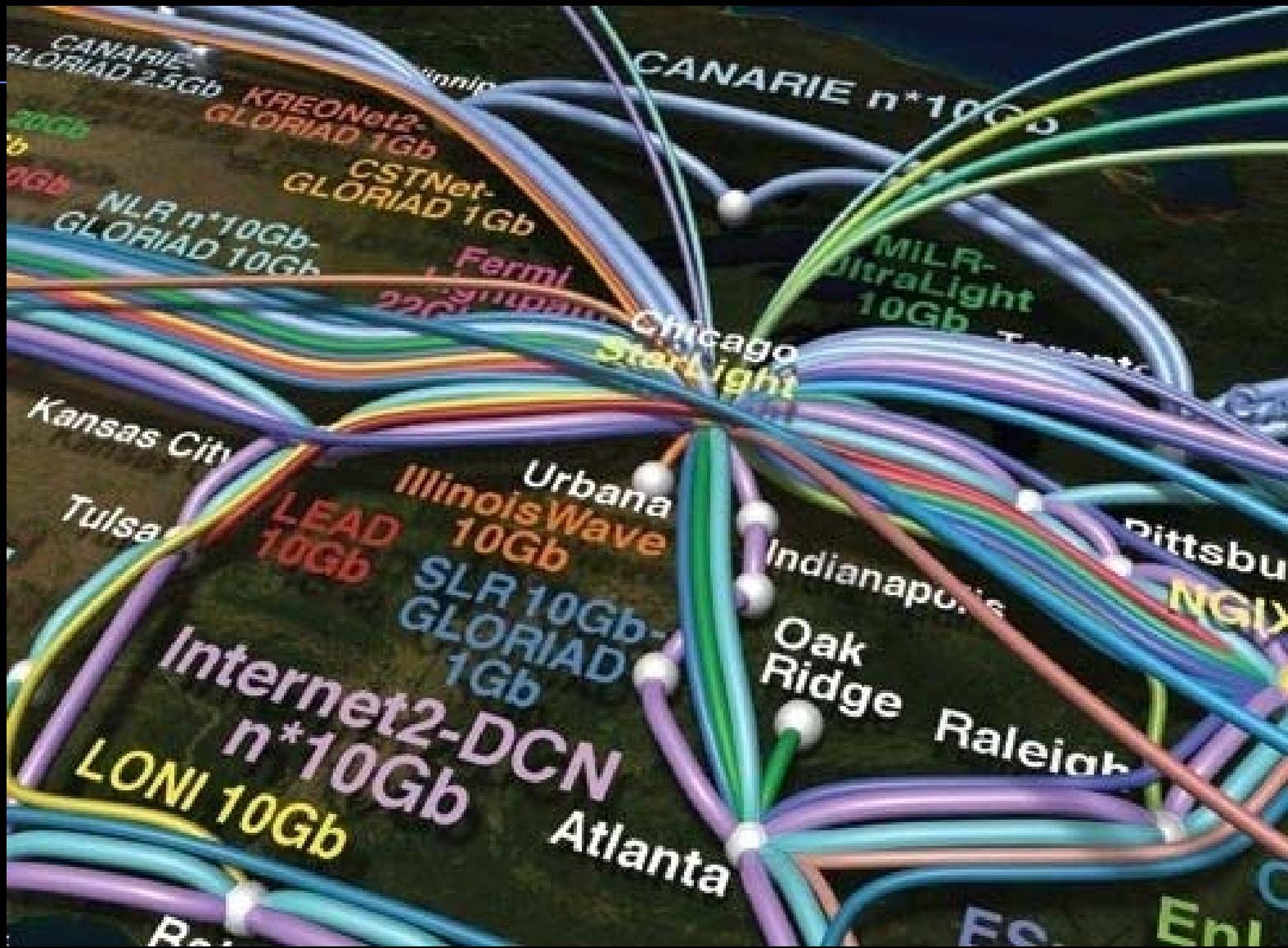
Abbott Hall, Northwestern University's
Chicago downtown campus



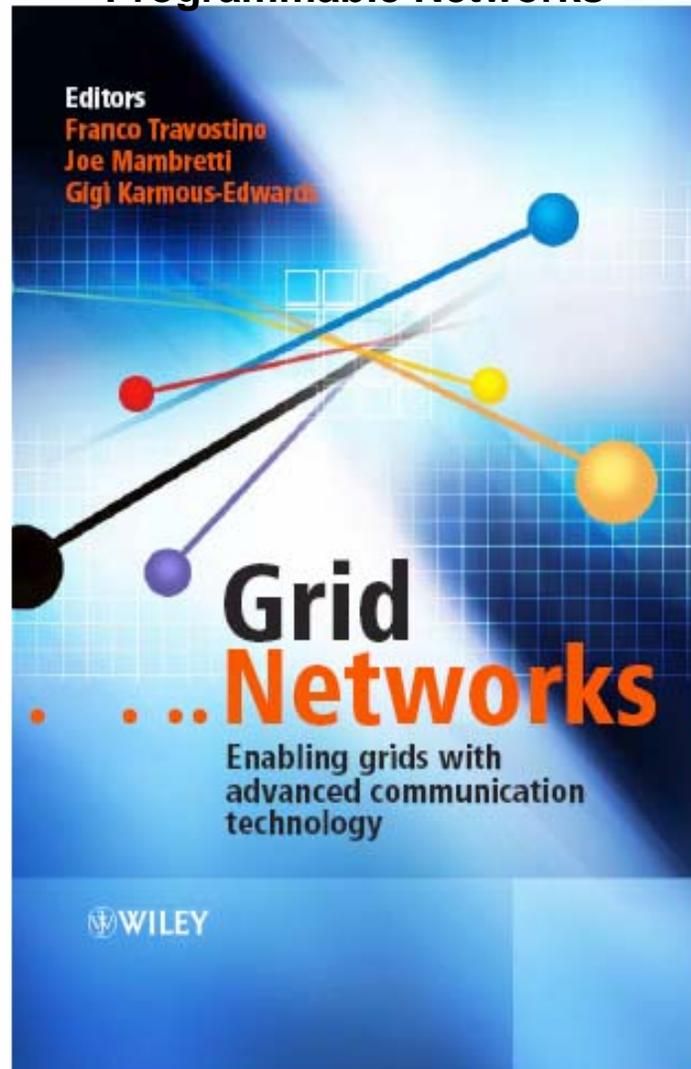
iGENI and GLIF

- **iGENI Consortium Members Have Partnered with Many Other Participants of the Global Lambda Integrated Facility (GLIF) To Undertake Multiple Experimental Network Research Projects**
- **The iGENI Initiative Will Build On That Experience To Create and Exploring New Prototypes of Innovative Communication Services and Technologies.**





The iGENI Consortium Has Significant Experience With Programmable Networks --



www.startup.net/starlight

**Thanks to the NSF, DOE, DARPA
Universities, National Labs,
International Partners,
and Other Supporters**



STARLIGHTSM