Challenges and Rewards of Building Research Networks: PRAGMA, GLEON, CREON"

Peter Arzberger

SEAIP 5

Chair, PRAGMA Steering Committee

Director, NBCR

Congratulations to NCHC and Participants!

Hello to all PRAGMA friends and colleagues!

Welcome and Thank You!

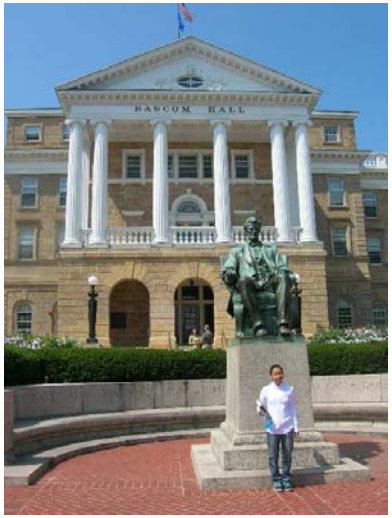
Two Thanks to the National Science Foundation

- Community
  - PRAGMA
  - PRIME
  - GLEON Research Coordination Network
  - Supplements to Expand GLEON, CREON, PRIME
- Personal
  - Acting Assistant Director, Computer and Information Science and Engineering
  - Division Director, Biological Infrastructure
  - Program Officer

And thanks to GBMF, NIH and friends and colleagues In PRAGMA, GLEON, CREON, PRIME, NSF

Wisconsin Idea: Benefit Society

- The boundaries of the university should be the boundaries of the state, and that research conducted … should be <u>applied to solve problems and improve health, quality of life, the environment and agriculture for all citizens of the state</u>.
  - UW President Charles Van Hise in **<u>1904</u>**.



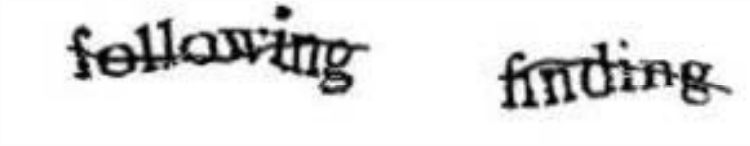
NSF's Mission
Still Valid after 60 years

- Government should … "promote the flow of new scientific knowledge and the development of scientific talent in our youth. … (since these) affect our health, our jobs, and our national security"
  - Science, The Endless Frontier (V Bush) July 1945
- "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense…"
  - NSF Mission, NSF established by Congress 1950
  - BIO, GEO, EHR, SBE, CISE, MPS, ENG, OCI, OISE, …

Computer Science Impact on Society

- Page-rank algorithm

- Machine learning algorithms and face detection in cameras



- Catpcha

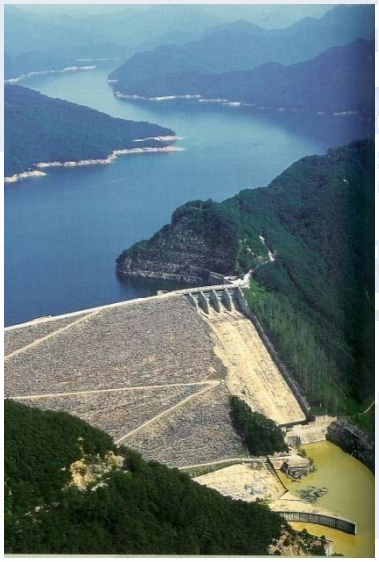
- Public key cryptography (RSA)

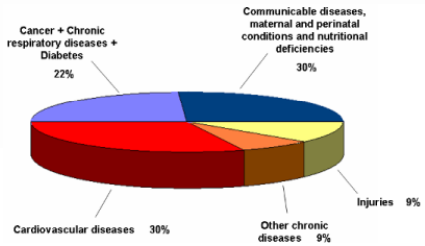
Future Research and Collaboration Areas with Societal Impact

- Health IT and Wellness
- Co-Robots
- Cyberphysical Systems (internet of things)
- Future Internet Architecture and GENI testbed
- Energy Efficiency
- Massive Data in Environmental Studies
  - Dimensions of Biodiversity
- Cyberinfrastructure

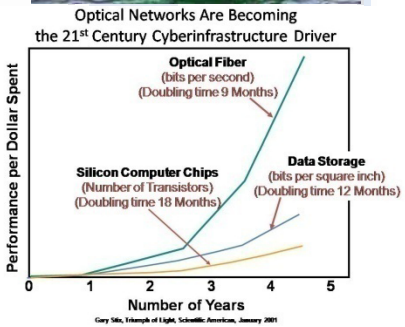
Societal Needs, Technology Challenges, Community Needs

Societal Needs



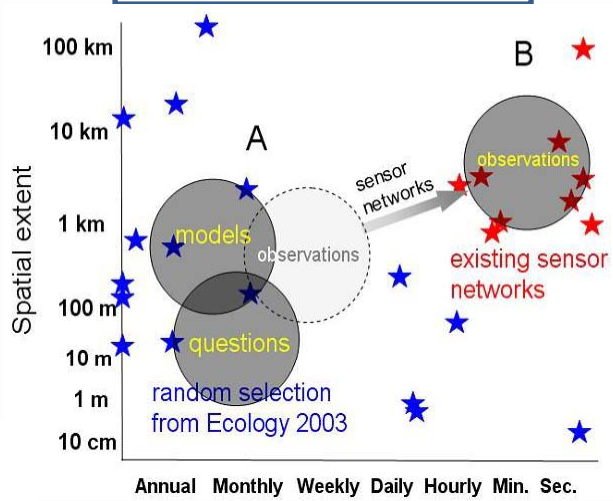


Technologies



Challenges/ Opportunities

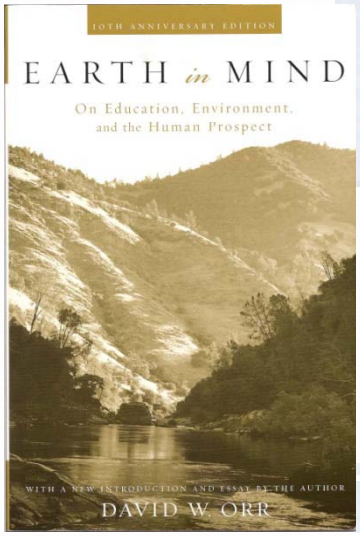
- Data: Synthesis
- Collaboration:



PRAGMA

GLEON global lake ecological observatory network

Education: Societal Imperative

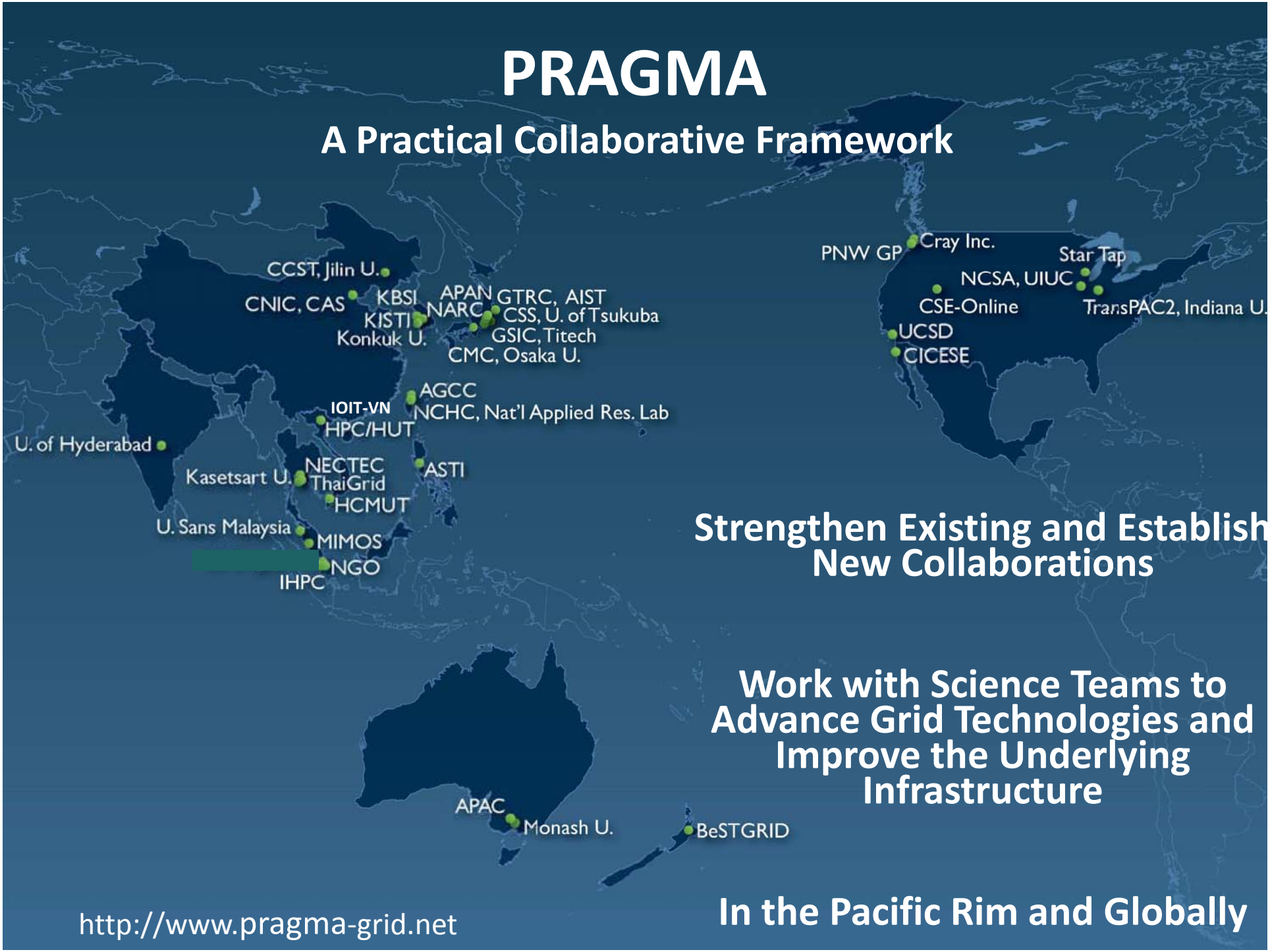


Place work in larger societal context

David Orr: Earth in Mind

PRAGMA

A Practical Collaborative Framework



Strengthen Existing and Establish New Collaborations

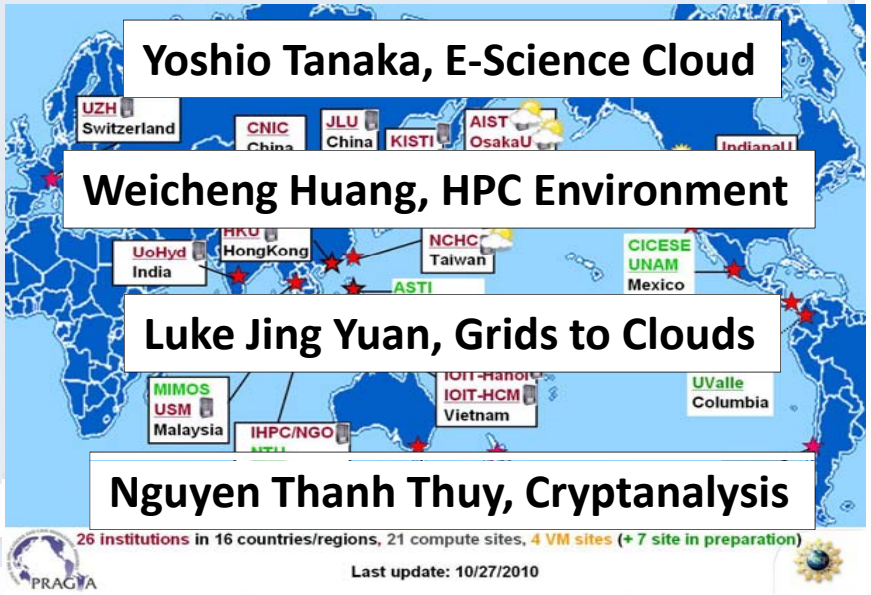
Work with Science Teams to Advance Grid Technologies and Improve the Underlying Infrastructure

In the Pacific Rim and Globally

http://www.pragma-grid.net

Working Groups: Organize Activities

Resources



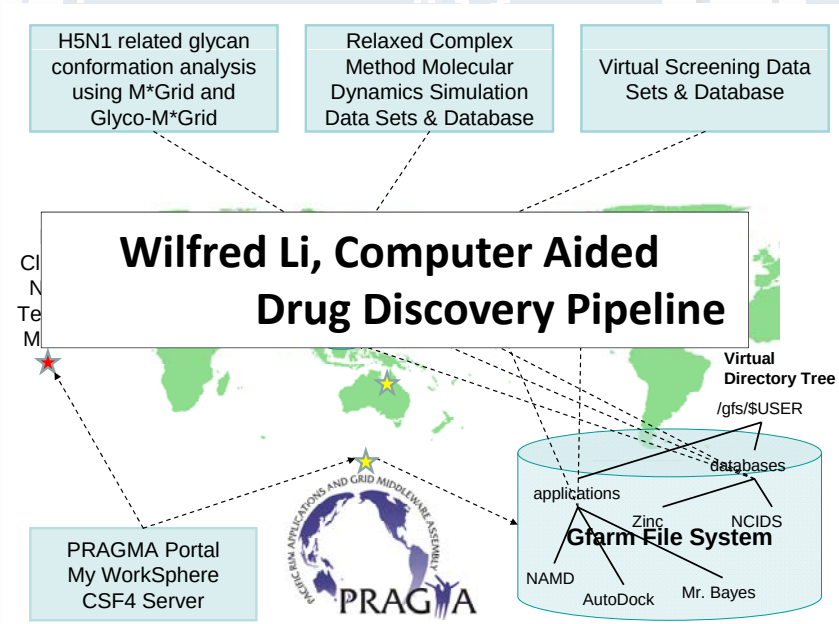
Yoshio Tanaka, E-Science Cloud

Weicheng Huang, HPC Environment

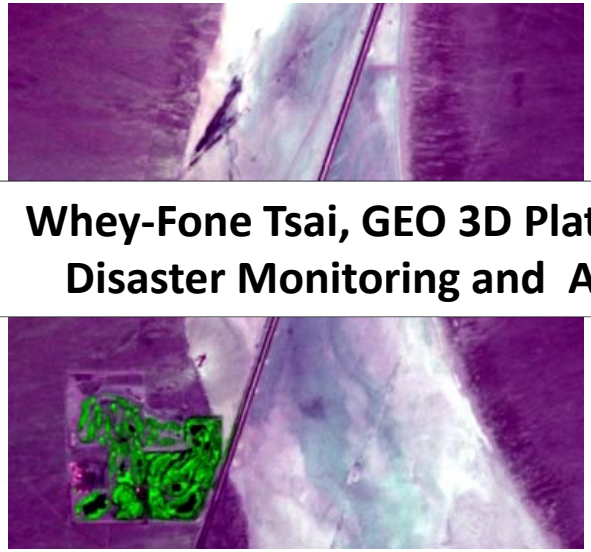
Luke Jing Yuan, Grids to Clouds

Nguyen Thanh Thuy, Cryptanalysis

Biosciences



Wilfred Li, Computer Aided Drug Discovery Pipeline



Whey-Fone Tsai, GEO 3D Platform for Disaster Monitoring and Assessment

Shinji Shimojo, E-Culture

Fang-Pang Lin, Organizer
Hsiu-Mei Chou
GLEON, CREON

Telescience

GEO

PRAGMA 2010 - 2011

- Highlights
- Select Software
- Institutional Benefit
- Partners
  - GLEON, CREON
  - PRIME, MURPA
- Working Groups and Workshops
- Participants and Sponsors

People, Science, People, Technology, People, Students, People, Culture, People

One Story, Three Perspectives

- Societal
  - Irazu volcano location and ash distribution 1963-5
- Technical
  - NG-TEPHRA, Nimrod, EC2
- Collaborative
  - PRAGMA 18 Development Institute

Resources Working Group

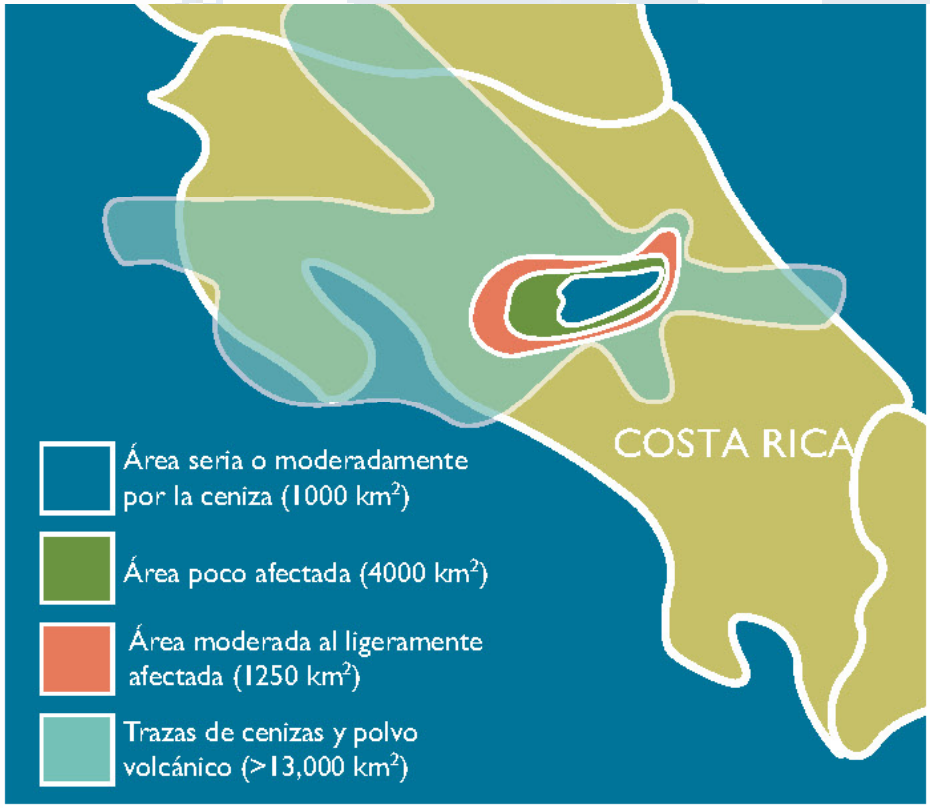


Fig. 1. Irazú volcano location and ash distribution during 1963-1965

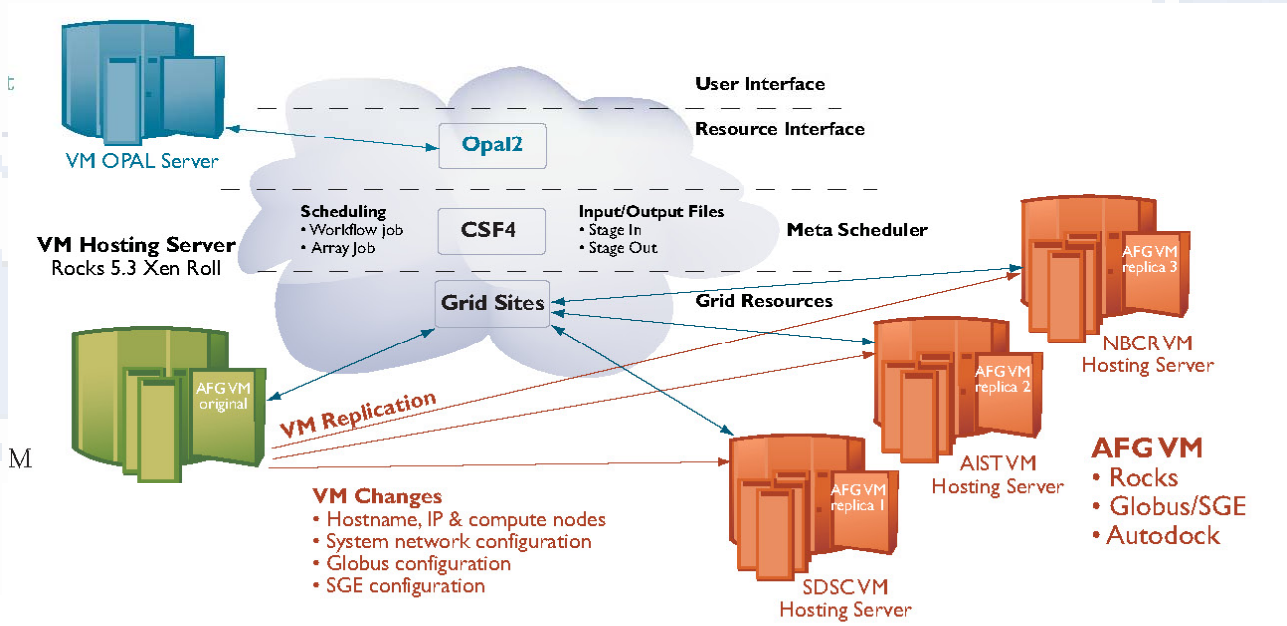
Costa Rica Institute of Technology, Monash University, UCSD

National University of Costa Rica, Citizen's Network of Meteorological Stations

From Grid to Cloud: VM Image Replication

- Previous Model on PRAGMA Grid
  - Set up each machine separately
- Future Model on PRAGMA Grid
  - Migrate "Images" of working pipeline

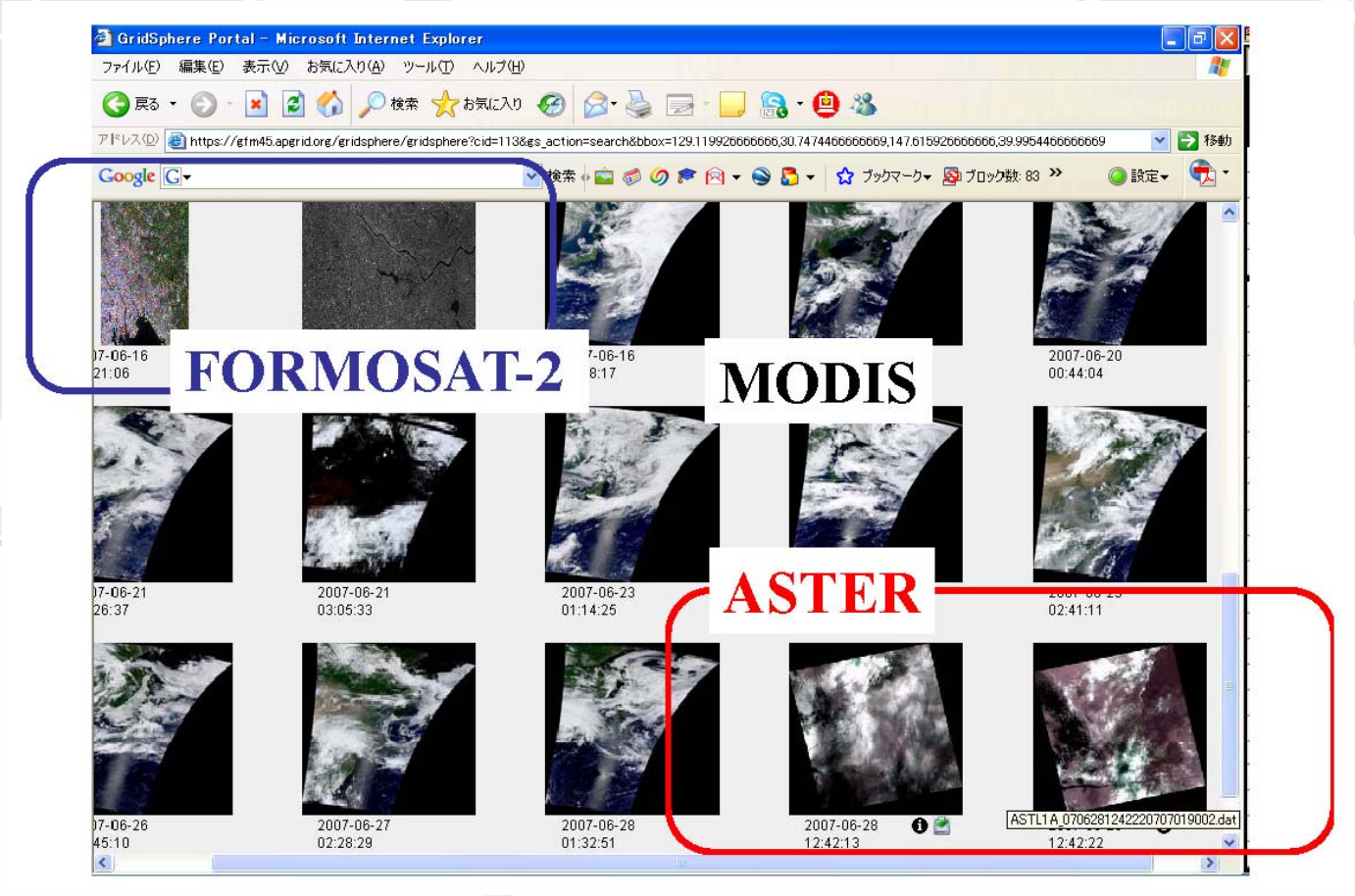
- Societal Impact
  - Avian Flu Grid
- Collaboration
  - AIST, UCSD, NBCR
  - Jilin U: CSF4



Biosciences and Resources WGs

GEO Grid: Providing Secure Grid Resources for the GLEON Community

Ryosuke Nakamura, Yoshio Tanaka



Collaboration: AIST and NARL (NSPO, NCHC), U Waikato

Societal: Understanding Lake Dynamics to Forecast Distribution of Run Off

GEO and Telescience WG

MURPA Seminar: Feb 2010

From Tokyo

From Tokyo

From Monash

From San Diego

Telescience

In San Diego

Contributions and Benefits in PRAGMA

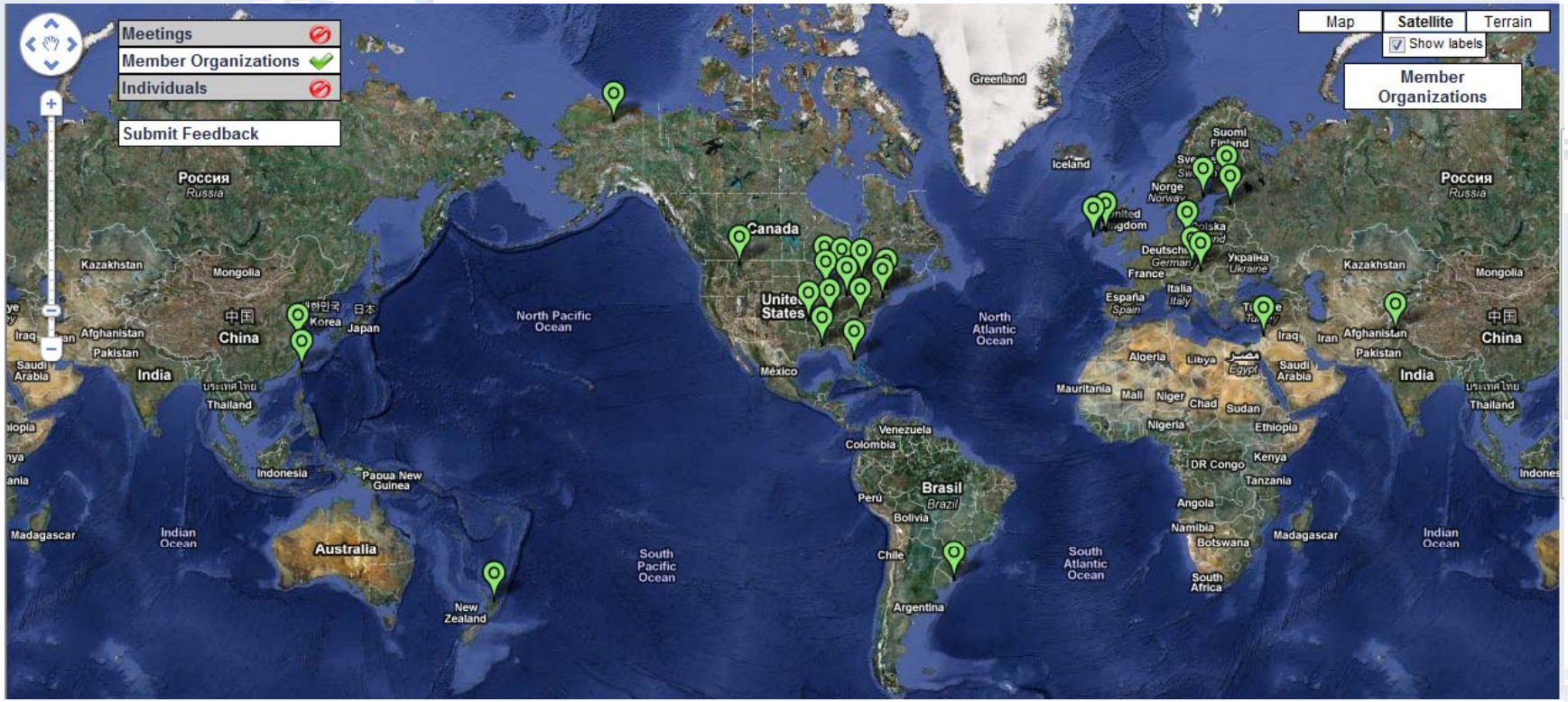
Contributions

- Software Sharing
  - Duckling (CNIC)
  - E-AIRS (KISTI)
  - G-Farm (U Tsukuba, AIST)
  - CSF4
- Personnel and Students
- Applications
- Resources
- Participation

Benefits

- Testing and Users
  - PRAGMA Workshops
  - Promotion and Use
  - Feedback and Use
  - Use and Incorporation in Avian Flu Grid Virtual Image
- Collaborations and Publications
- Resources, Expertise
- Experience, Knowledge
- Friendships

GLEON: revolutionizing understanding of aquatic ecosystems through an international grassroots network of people, data, and lake observatories

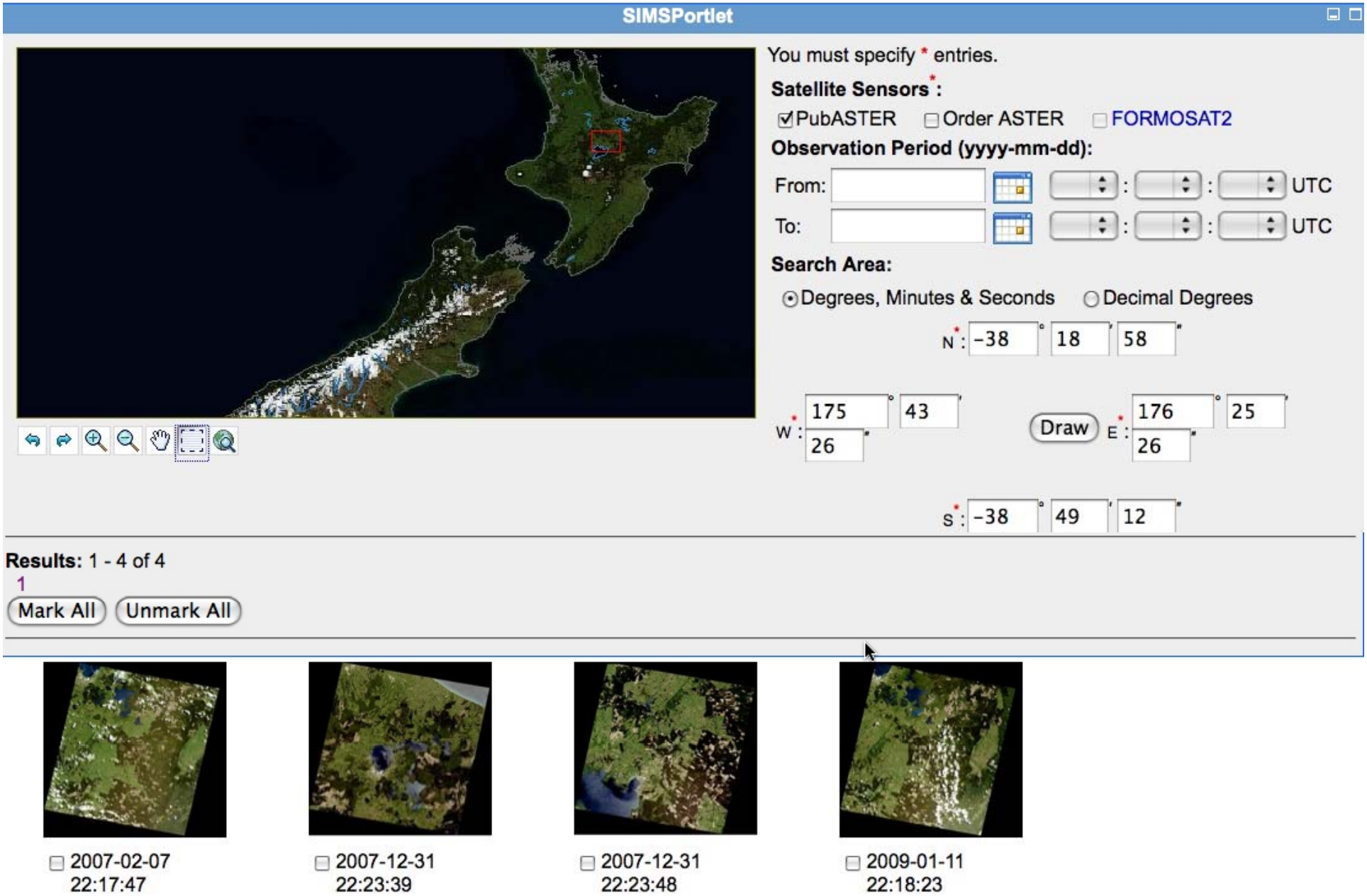


30 Site Members (sites shown)
236 Individual Members (4Dec10)

GLEON and Students

Source: Tim Kratz

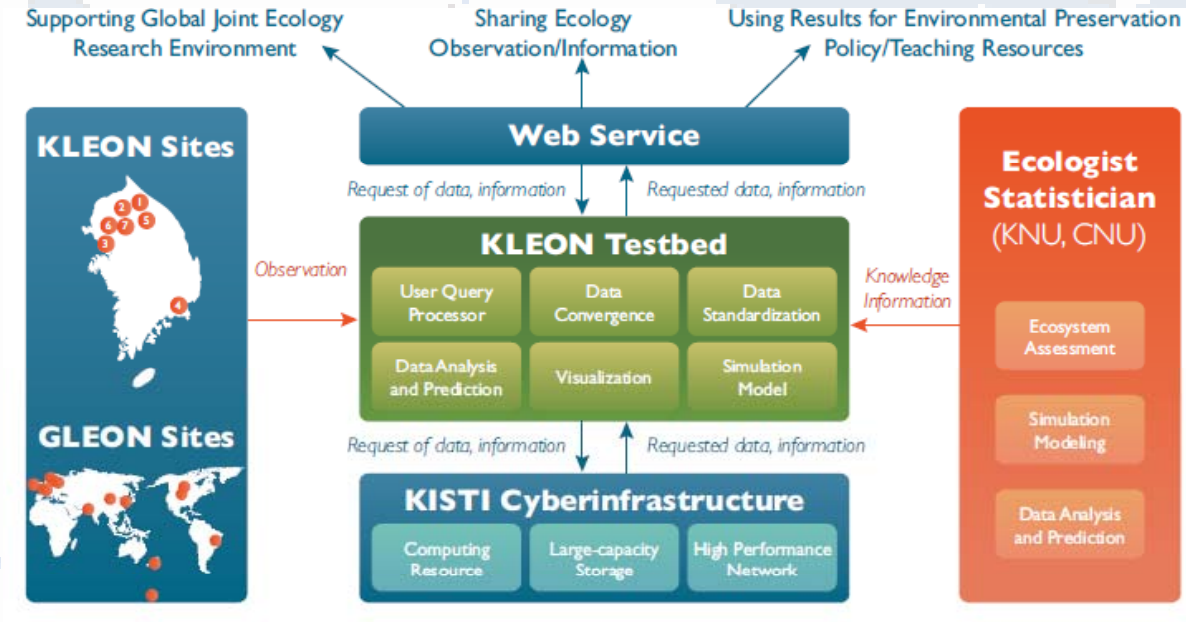
ASTER data around Rotorua lake in New Zealand provided in GEO group of PRAGMA VO



PRAGMA + GLEON + KISTI + KEON

Korean Lake Ecological Observatory Network

- Seven Sites
- Architectural Framework
- Linked with Konkuk U



- Technical meeting (September 2010)
  - Follow-up to meeting after PRAGMA 18 in San Diego
  - NECTEC made connection to Racha Island
- Additional funding from US NSF
  - Help establish node at Racha Island
  - Help build community of scientists
- Additional support from AIMS
  - Loan of equipment

NARL

行政院國家科學委員會
National Science Council

NCHC

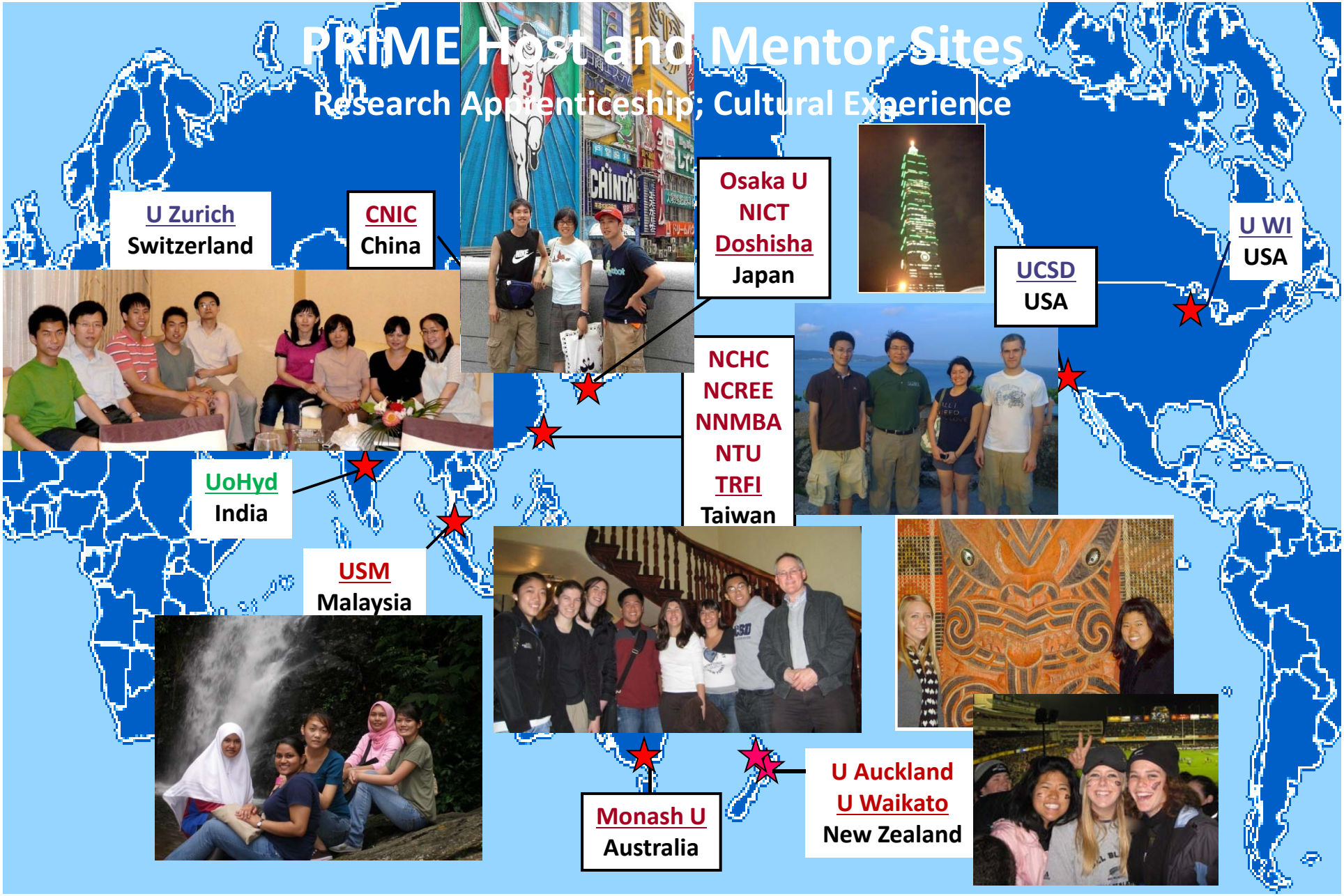
Great Barrier Reef

Moorea

Racha Island

Orchid Island (Lanyu)

Coral Reef Environmental Observatory Network



Source Cindy Zheng

Original host sites: Osaka U, NCHC and NCREE, Monash, CNIC;

New in 2008: USM, U Auckland, U Waikato New in 2009: U Hyderabad India; Doshisha U and NICT Japan; NNMBA and NTU, Taiwan. New in 2010: Taiwan Forest Research Institute

Challenges for These Organizations

- Staying fresh
- Sharing common focus
- Encouraging openness and diversity
- Remaining committed
- Remaining relevant to members
- Broadening the leadership
- Impacting a broader community and society!

Challenge to You

- What do you want to achieve in the next year?
- What can be done together?
- What is stopping you?

A Challenge to All of Us

- Bring students together from our organizations
- Create joint projects
- Sustain them through technology

Congratulations!
Get Involved!

- Future Workshops PRAGMA
  - PRAGMA 20, Hong Kong University, Hong Kong, 2 – 4 March 2010
  - PRAGMA 21, AIST, Sapporo Japan (last week of September or first week of October)
- Future Workshops GLEON
  - GLEON 12, Lake Kinneret, 4 - 7 April 2011, Israel
  - GLEON 13, Lake Sunapee, September/ October 2011 New Hampshire, US

Enjoy the Cultural Tour and Events

I gave my love a cherry without a stone
The Riddle Song