Research initiatives on Geospatial Information Science and Technologies in UC
GINs Cluster & GIESN Research Center

Ishi Buffam
Hongxing Liu
Amy Townsend-Small
Peng Zhang

Agenda

- GINs Research Initiative & Cluster Hiring
  L. Liu, G. Cameron
- Introduction to GINs Hires
  Ishi Buffam
  Peng Zhang
  Hongxing Liu
  Amy Townsend-Small
- GIESN Research Center
  H. Liu
- Discussions on GIESN activities

GINs Research Initiative in McMicken College of Arts and Sciences at UC

- GINs (Geographical Information Networks)
  A cluster of cross-disciplinary hires (2009-2010)
- Participating departments
  Geography, Geology, Biological Science, Chemistry
- Purpose
  Integrating Geographical Information Networks (GINs), and related sensing technologies to support real-time environmental monitoring, analysis and response of physical and biological hazards
  Become one of the first end-to-end GINs research centers in the US.
- GINs hires
  Hongxing Liu, Geography, Professor, 2009
  Amy Townsend-Small, Geology/Geography, Assistant Professor, 2010
  Ishi Buffam, Biology/Geography, Assistant Professor, 2010
  Peng Zhang, Chemistry, Associate Professor, 2010

GIESN Research Center

- GIESN
  The Center for Geospatial Information & Environmental Sensor Networks (GIESN)
  A platform to launch and organize GINs activities
  Establish the identity and presence of the GINs on campus
  Virtual Research Center without dedicated space & funding

Mission and Objectives

- Overall goal
  Facilitate and promote the cutting-edge research and applications of the geospatial information technologies on campus.
- Specific objectives
  To leverage interdisciplinary interactions and collaborations on the applications of geospatial technologies across departments;
  To develop new research projects and procure external funding;
  To create high-quality research publications and increase academic visibility and reputation;
  To make technological innovations through developing new algorithms, software tools, and new sensors;
  To provide training, workshops, and support resources on campus and to local community.

GIESN Research Center

- Director
  Hongxing Liu
- ExCom (Executive Committee): monthly meeting
  Members: Richard Beck, Ishi Buffam, Hongxing Liu (chair)
  Responsibility: develops strategies and work plans and organize the center activities.
- AdCom (Advisory Committee): quarterly meeting
  Members: Guy Cameron, Robert Frank (chair), William Heineman, Lin Liu, Lewis Owen
  Responsibility: provides supervision, guidance, criticism and advice on the strategic focal areas of the research, and review the center work plans and activities.
GIESN Web Site & Email List

- GIESN Web Site
  - http://giesn.uc.edu
- GIESN Email List
  - artscl-giesn@listserv.uc.edu

GIESN Research Center

- Personnel
  - faculty members & graduate students whose research interests are related to geospatial information science and technologies (GIS, remote sensing, GPS, mapping, surveying, cartography, sensing technologies, etc.)
- Affiliated faculty members: 37
  - Geography: 8
  - Geology: 7
  - Biological sciences: 7
  - Chemistry: 2
  - Other departments (computer science, aerospace engineering, mechanical engineering, environmental engineering, Fire Science and Emergency Management, planning).

GIESN Research Center

- Personnel

GIESN Research Center

- Capabilities & expertise
  - geographical information sciences (GIS)
  - remote sensing
  - environmental sensor networks
  - geospatial computation
  - scientific visualization
  - internet mapping and web GIS
  - location-based services (LBS)
  - global positioning system (GPS)
  - space-time data assimilation
  - environmental and urban modeling
  - Natural hazard monitoring & management
  - ...

Strategic Research Focal Areas

- Applications of geospatial information technologies in
  - Monitoring and predicting environmental changes and conditions and changes (land use and land cover changes, water and air pollutions, climate changes, ...);
  - Managing natural hazards (floods, hurricanes, storm surges, landslides, wild fire, coastal erosion, glacial hazards, etc.);
  - Acquiring geospatial information and intelligence for homeland security, environment developments, and public security;
  - Addressing geoscientific research questions and issues of regional and national importance.

Strategic Research Focal Areas

- Developments of geospatial information theories and technologies
  - GIS, remote sensing, GPS, internet-based mapping;
  - Environmental sensor network/sensor web;
  - New bio-sensors, chemical sensors
  - ...
- Developments of geospatial information analysis & modeling techniques
  - Multi-scale spatio-temporal analysis algorithms & techniques;
  - Multi-sensor data synthesis, fusion and assimilation;
  - Integrated dynamic environmental models;
  - Innovative geospatial decision-support tools;
  - ...
Brownbag Seminar Series

- **Purposes**
  - Get to know each other’s research interests and strengths;
  - Exchange information and simulate research ideas
  - Identify common research interests and possible collaborative proposal topics
- **Format**
  - Informal, weekly or bi-weekly
  - Lunch hour
  - Address casually
  - Strong discussion session
- **Speakers**
  - Internal, local/external
  - Welcome for suggestions

**Joint Proposal Activities**

- **Working groups for collaborative proposals**
  - Identify core faculty and graduate students for each proposal
  - Find out possible collaborative faculty for each proposal
- **Examples**
  - **Ken Hinkel**: Arctic observation network proposal to NSF, with participation of R. Beck, W. Eisner, C. Kim, and H. Liu, USGS, UNL, UAF
  - **Dharma Agrawal**: Sensor network education proposal to NSF IGERT program, with participation of K. Cohen, M. Kumar, and H. Liu

Possible Proposal Topics

1. **Multi-scale Comprehensive Arctic Lake Observing System**
   - Ken Hinkel (PI) submitted to NSF
2. **Watershed modeling and lake water quality monitoring**
   - EPA GLRI $485 Million/Phase 2 RFP due Jan 29.
   - NASA ROSES;
   - NSF
3. **Urban ecosystem/heat island/observing/modeling**
   - Urban gradient proposal and eco-watch proposals of biological sciences
   - Urban heat island, solar radiation, sensor network
4. **Glaciers/Landslides/Flooding/wild fire observations & modeling**
   - Build and expand on the existing research
5. **Coastal geomorphology & coastal hazards**
6. **Others**
   - Climate change education
   - Geoscience education proposal
   - Earth Science Instruments

Open Solicitations

**Possible Funding Sources**

- Climate Change Education
- NSF Cooperative Agreement
- NSF DRIP
- NSF EPSCoR (Earliest Access to Hazardous Waste Research, Education, and Technology Information Network)
- USGS GAP (Geocellular Analysis Program)
- USGS N-CASS (National Cooperative Air Sampling System)
- USGS CRCP (Coastal Research Center Program)
- NSF IGERT (Integrated Graduate Education and Research Training)
- EPA RAP (Research and Applications Program)
- NASA ROSES (Research Opportunities in Space Science)
- Navy OCEAN - Oceans and Coastal Education and Access Network
- NSF STTR (Small Business Innovation Research)
- DOE EPP (Environmental Protection Program)
- NSF EPSCoR (Early Access to Hazardous Waste Research, Education, and Technology Information Network)
- DOE OIT (Office of Science and Technology Information)
- NSF CREST (Center for Research in Education Science and Technology)
- USGS GAP (Geocellular Analysis Program)
- NSF EPSCoR (Early Access to Hazardous Waste Research, Education, and Technology Information Network)
Proposal Preparation Strategies

- Develop draft proposals: lead, core by key faculty members
- Encourage and arrange graduate students to conduct thesis/dissertation research related to the proposals
- Seeking small graduate student research grants
  - NSF dissertation grants
  - NASA fellowship program
  - EPS STAR programs
- Conduct proof-of-the-concept projects
  - Initial experiments/review papers
  - Publications
- Host visiting scholars/students
  - China CSC scholarship programs

Research Infrastructure

- Sharing instruments, facilities, data & software tools
- Develop an inventory of available instruments
- GIESN Server/lab
  - Host the website for the virtual research center
  - Support the GINs related project
  - Share research data, software tools;
- Acquire Instruments, Sensors & software
  - Start-up grants, NSF Instrument grants
  - Instrument/data gifts from companies

GIESN Research Awards

- Incentive & encouraging mechanisms
  - internal award
- Two seeding grants
  - $1,500 /each
- Excellent faculty research award
  - cash award: $700
  - award certificate
- Excellent graduate research award
  - cash award: $300
  - award certificate

Education & Outreach

- Training workshops
  - LiDAR workshop for Ohio URISA & UC students
  - ...
- Joint internship program
  - Wright-Patterson Air Force Research Lab/Tech-Edge IIC
    - Two geography undergraduate students in 2009 summer
    - ...
- Joint Teaching
  - Possible courses to be team-taught
  - ...

Comments, suggestions, and questions?