

New Generation GIS (NGIS) Workshop

Oct 11, 2018, Cambridge, MA



NGIS WORKSHOP

The New Generation GIS workshop was organized by the NSF Spatiotemporal Innovation Center (STC) and hosted by Harvard University Center for Geographical Analyses on Oct 11, 2018. Sixteen talks were given by invited speakers from academia, NGOs, and industry, sharing their thoughts and visions of future GIS in three main aspects:

- I. Theory and Methodology
- II. Application and Technology
- III. Computation and Cyberinfrastructure

The presentations and discussion are followed by an NGIS survey report from the STC Director.

The workshop asked: What are the specific GIS challenges we are facing today (in commercial and open source domains) in light of ABCDE (see sidebar)?

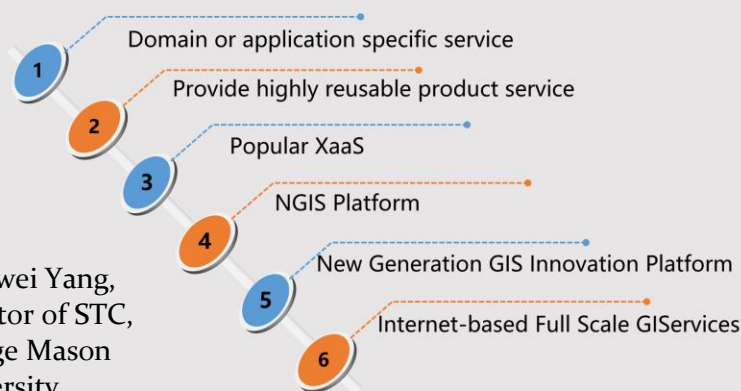
- What architecture is needed to support addressing such challenges?
- What are the new GIS functionalities needed?
- What are the new research directions needed?
- How should we adjust the curriculum for educating the next generation of GIScientists?
- How will the GIS industry be impacted/revolutionized?

MOTIVATION

The past decade has witnessed several revolutionary IT technologies, i.e., ABCDE

- a) Artificial Intelligence (AI) changing all walks of human life
- b) Blockchain innovating the way data/information is shared
- c) Cloud computing (C₂) changing the way how computing is used
- d) Big Data as characterized by 4Vs calling for value extraction
- e) Edge (Fog) computing that powers intelligently the Internet of Things (IoT) integrating the physical and virtual worlds

4. Maturing New Generation GIS



Chaowei Yang,
Director of STC,
George Mason
University

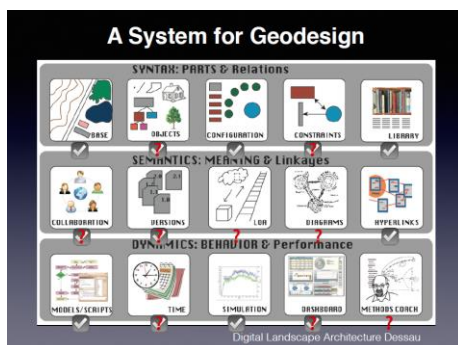
THEORY & METHODOLOGY

Stephen Ervin, Harvard Graduate School of Design – GeoDesign

Keith Clarke, University of California Santa Barbara – Advancing GIScience

May Yuan, University of Texas Dallas – Attention to Epistemology and Place

Joshua Lieberman, Harvard Center for Geographic Analysis - Six cardinal directions: observational, representational, graphical, semantic, cognitive, and computational



Stephen Ervin's Geodesign Envision

COMPUTATION CYBERINFRA-STRUCTURE

Siva Ravada, Senior Director of Development for the Oracle Spatial - Data Management as a Service

Shaowen Wang, University of Illinois at Urbana-Champaign – CyberGIS and Geospatial Data Science

Shashi Shekar, University of Minnesota - Harness the spatial data revolution

Axing Zhu, University of Wisconsin Madison - Easy Geographic Computing

5. How should we adjust the curriculum?

- Emphasize "Convergence"
 - Solve societal grand challenges
 - Using recent revolutions in GIS & sister fields
- Harness the Spatial Data Revolution
 - Cloud hosted satellite imagery, GPS trajectories, ...
 - Power AI e.g., CNN, to map buildings, roads, trees, ...
 - Challenges: fairness, accountability & transparency

The slide also features a 'Convergence' book cover on the left and a grid of 17 Sustainable Development Goals icons on the right.

Shashi Shekar's New GIS Education Vision

APPLICATION & TECHNOLOGY

Yun Zhang, Professor of Remote Sensing at the University of New Brunswick - 3D interaction and visualization

Jason Ur, Director of Harvard Center for Geographic Analysis – Applying spatial archaeology

Peter Bol, Former Vice Provost for Advances in Learning at Harvard University - Importance of building and maintaining (sustainability) of the geospatial platforms

Daniel Sui, University of Arkansas - Technological emergence and innovations of Quantum Computing, GeoAI

Sudhir Raj Shrestha, ESRI – Spatial Data Science at ESRI

Wenwen Li, Arizona State University – Geospatial Data Discovery and GeoAI

Zhenlong Li, University of South Carolina - Hurricane Evacuation Behavior using Big Social Data

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NGIS workshop
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