

Geospatial Technology and Online Education

May 2nd, 2014

1730 Cambridge St., Cambridge, MA 02138



Co-sponsor:
Center for Geographic Analysis
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In recent years, geospatial technologies have rapidly developed into online platforms, attested to by the rise of web-based GIS, the geoweb, and cyberinfrastructure. Although guided by different kinds of motivation and under other kinds of pressure, public and private institutions of higher education and for profit education companies have increasingly turned to online platforms to enhance as well as diversify their outreach. From remotely delivered credit courses to massive open online courses (MOOC), education of any subject, including geospatial topics, is increasingly offered online.

What can be learned from these trends? How are they currently connected to each other, and how might new connections be made, to leverage one to enhance the other --

- (1) using online education as a means to advance geospatial education, and
- (2) using geospatial technology to enhance the online education of many disciplines?

This conference is aimed at reviewing the current status, achievements, lessons learned, unmet needs, challenges, potentials and perspectives of both geospatial online education and geospatial-enabled online education across the disciplines. Invited speakers will present their expert views, and engage the audience in a discussion on the following topics:

- understanding the spatial-temporal background of the online education surge
- teaching geospatial courses via an online platform
- using geospatial tools in teaching an online course about non-geospatial subjects
- evaluating online geospatial systems for use in online courses
- applying geospatial tools and methods in studying the online education phenomenon and effects

For more information about CGA conferences, please go to <http://gis.harvard.edu/events/conferences>

9:00 AM - 9:30 AM*Registration and breakfast***9:30 AM - 9:50 AM****Opening Remarks***Peter Bol***9:50 AM - 10:30 AM****Keynote Address***Peter Shea***10:30 AM - 10:45 AM***Coffee Break***10:45 AM - 12:05 PM****Panel I: Higher Education Online***Meg Benke, Isaac Chuang, Andrew Ho, Huntington Lambert, Robert Lue**Moderator: David DiBiase***12:05 PM - 1:35 PM***Lunch; Poster Competition and Judging - CGIS South Concourse***1:35 PM - 2:55 PM****Panel II: Geospatial Education Online***Adrienne Goldsberry, Karen Kemp, Doug Richardson, Anthony Robinson, Diana Sinton, John Wilson**Moderator: Matt Wilson***2:55 PM - 3:10 PM***Coffee Break***3:10 PM - 4:30 PM****Panel III: Geoenabled Online Education***Tom Baker, Scott Bell, Werner Kuhn, Adena Schutzberg, Michael Solem**Moderator: Stephen Ervin***4:30 PM - 4:55 PM****Closing Remarks***David DiBiase***4:55 PM - 5:00 PM****Poster Awards***Peter Bol***5:00 PM - 6:00 PM***Reception - CGIS South Concourse*

Opening Remarks

Peter Bol

Peter Bol is the Vice Provost for Advances in Learning and the Charles H. Carswell Professor in East Asian Languages and Civilizations. He led Harvard's university-wide effort to establish support for geospatial analysis in teaching and research. In 2005 he was named the first director of the Center for Geographic Analysis. He also directs the China Historical Geographic Information Systems project, a collaboration between Harvard and Fudan University in Shanghai to create a GIS for 2000 years of Chinese history, and is involved in other projects aimed at enhancing digital information linkages between East Asian and Western scholars.



Keynote Address

Peter Shea

Online Learning: A 130 Year Mission to Democratize and Improve Higher Education

Abstract: *Online learning has been proposed as the solution to many of the challenges confronting higher education. Results to date have been mixed. Online education has its antecedents in distance learning and much of the discourse surrounding current online efforts can be viewed through a historical perspective. This presentation will examine the roots of online education, briefly chart its history, and identify recurring themes and aspirations. Taking a long view we find that forms of distance education consistently raise questions on three significant issues – democratization, liberal education, and educational quality. Lessons learned suggest that implementing distance education also requires us to consider what it means to learn, and foregrounds various conceptions of the roles of learners, teachers, knowledge, and learning. Along the way I will discuss tensions between these competing conceptualizations and examine opposing perspectives around the nature and promise of networked learning. In summary, online education may now be positioned to advance a more than century-long goal to democratize and improve higher ed-*

ucation. To accomplish this however will require that we make difficult choices and also remember and apply what we have long known.

Peter Shea is an associate professor at the University at Albany, State University of New York with joint appointments in the Departments of Educational Theory and Practice and Informatics. His research focuses on the development of communities of learners in



higher education online environments. Dr. Shea has more than 100 publications on the topic of online learning and is co-author of the book, *The Successful Distance Learning Student*. He directs a program of research on online learning that has attracted significant external funding from organizations such as the Alfred P. Sloan Foundation and the US Department of Education. He is the recipient or co-recipient of four national awards including the EDUCAUSE Award for Systemic Improvement in Teaching and Learning and awards from the Sloan Consortium for online and faculty development programs. He is a Sloan-C Fellow in research on online learning and a member of their board of directors. Prior to joining the University at Albany, he was Director of the SUNY Learning Network, one of the largest online higher education systems in the United States with annual student enrollments of more than 100,000. He was recently appointed Associate Provost for Online Learning at the University at Albany and last year was awarded the University's Excellence in Education Award.

Panel I: Higher Education Online

Meg Benke, Isaac Chuang, Andrew Ho, Huntington Lambert, Robert Lue

Moderator: David DiBiase

Abstract: *Online learning is now well-established in higher education, involving a third of U.S. students in 2013. Attitudes about online learning vary. Many consumers accept it as a desirable complement to on-campus learning, and two-thirds of academic leaders in the U.S. consider it a strategic priority. Many faculty members remain skeptical, however, despite mounting research evidence of its educational effec-*

tiveness. The aim of this session is to achieve a shared understanding of the current status of online learning in the U.S. and worldwide, and to identify challenges and opportunities for higher education.

Meg Benke is a professor and mentor in the Empire State College's graduate programs in adult learning and emerging technologies. She was the dean of the Center for Distance Learning, vice provost, provost and acting president at Empire State College. She also serves as a commissioner for the Middle States Association for Higher Education, and participated as a commissioner for the National Commission on Inter-state Regulation of Distance Education. She also serves as a member of New York State's Regents Advisory Council.



Isaac Chuang is a Professor of Physics and a Professor of Electrical Engineering and Computer Science at MIT. His research focuses on quantum information and quantum computation, and his research group is part of the MIT-Harvard Center for Ultracold Atoms. Professor Chuang also leads the NSF IGERT on Interdisciplinary Quantum Information Science and Engineering at MIT. He is deeply involved in developing new methods for teaching and learning, as the Associate Director of MIT's Office of Digital Learning, and as a core author of the edX platform.



Andrew Ho is an Associate Professor at the Harvard Graduate School of Education. He is a psychometrician interested in educational accountability metrics: an intersection between educational statistics and educational policies. He has studied the consequences of "proficiency"-based accountability metrics, the validation of high stakes test score



trends with low stakes comparisons, and the potential for alternative accountability structures—like "growth models" and "index systems"—to improve school- and classroom-level incentives. Dr. Ho also chairs the HarvardX Research Committee and conducts research on the measurement of learning in online environments.

Huntington D. Lambert

is Dean of the Division of Continuing Education at Harvard University. The Division serves 20,000 students annually and includes Harvard Extension School, with more than 650 online and on-campus courses, as well as numerous undergraduate and graduate degree programs; Harvard Summer School, which offers more than 300 courses to nearly 6,000 students each summer and includes study abroad programs in more than 30 worldwide locations; Harvard Institute for Learning in Retirement; Harvard Professional Development Programs; and the Crimson Summer Academy.



Robert Lue is a professor

of molecular and cellular biology at Harvard University and the Richard L. Menschel Faculty Director of the Derek Bok Center for Teaching and Learning, where he is responsible for fostering innovative teaching in Harvard's Faculty of Arts and Sciences. Lue earned his Ph.D. in biology from Harvard, and since 1988 has taught undergraduate courses acclaimed for their innovative and interdisciplinary approach. In 2012, Lue's extensive work on using technology to enhance learning took a new direction when he became faculty director of HarvardX, Harvard's university-wide online education initiative that includes the edX partnership with MIT. Lue now helps to shape Harvard's engagement in online learning to reinforce its commitment to teaching excellence and expand its reach and impact globally. He also serves as the faculty director of Life Sciences Education at Harvard, the director of Life Sciences Outreach, and faculty director of



the Harvard Allston Education Portal.

Panel II: Geospatial Education Online

Adrienne Goldsberry, Karen Kemp, Douglas Richardson, Anthony Robinson, Diana Sinton, John Wilson

Moderator: Matt Wilson

Abstract: Many higher education institutions now offer online courses, and in some cases complete online certificate and degree programs, focused on geospatial technologies and methods. Online geospatial programs tend to differ from their on-campus counterparts in various ways, including target audiences, educational objectives, business models, faculty composition, and others. Recently, the first geospatial MOOCs have shown potential to expand greatly public awareness of their relevance in society. The goal of this session is to take stock of the current status of geospatial education online and to consider its relationships with traditional programs on campus.

Adrienne Goldsberry is an instructor and developer of online courses for Michigan State University's Geography Department. She started working for MSU in 2008, teaching geography and urban planning courses. She transitioned to on-GEO, MSU Geography's division for online course offerings, in 2010. Since that time, she has taught numerous courses, mostly focused in the areas of GIS and cartography, and developed additional courses on a variety of geographic topics (meteorology, human geography, in addition to GIS, cartography, and remote sensing). Prior to working for MSU, she was an urban planner in California and Texas. She has an undergraduate degree in geography from The University of Texas at Austin, as well as a graduate degree in geography from the University of California - Santa Barbara (specializing in geography education).



Karen Kemp is Professor of the Practice of Spatial Science at the University of Southern California, and has been a major figure in the evolution of GIS education in the US and abroad. Some of her major contributions include co-editing the in-

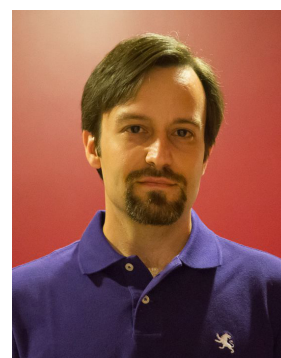
fluent 1990 NCGIA Core Curriculum in GIS, leadership in the establishment of the University Consortium for Geographic Information Science (UCGIS) in 1994, founding membership with the GIS Certification Institute, participation in the editorial team for the 2006 UCGIS Geographic Information Science and Technology Body of Knowledge, and editing the Sage Encyclopedia of Geographic Information Science (2008). Professor Kemp was honored by the UCGIS with the 2004 Educator of the Year award and 2011 induction as a UCGIS fellow. Her scientific research has focused on formalizing and integrating, through GIS and its ability to link diverse information to places, the very different conceptual models of space used by scientists, humanities scholars and indigenous peoples.



Douglas Richardson is the Executive Director of the Association of American Geographers (AAG). Prior to joining the AAG, Dr. Richardson founded and was the president of GeoResearch, Inc., a private research firm specializing in the environmental and geographical sciences. His current research interests range from GIScience and Health to Geography and the Humanities. He has served on numerous private, public, and NGO boards and committees, including currently the National Geospatial Advisory Committee, chairing its Geolocational Privacy subcommittee.



Anthony Robinson is Lead Faculty for Online Geospatial Education programs and Assistant Director for the Department of Geography's GeoVISTA research center at Penn State. In the former role, Robinson directs Penn State's Online Geospatial Education efforts, including its Master of GIS and Post-Bac-



calaureate GIS Certificate programs, which have served over 5000 students since 1999. Robinson recently taught Maps and the Geospatial Revolution on Coursera, a MOOC that enrolled over 48,000 students. For the GeoVISTA Center, Robinson's research focuses on the science of interface and interaction design for geographic visualization software tools. He has developed interface design and usability assessment methods for integrating geographic visualization tools with work in epidemiology, crisis management, and homeland security. Robinson's recent research projects have focused on the design of map symbol standards, developing tools for collecting and adding meaning to geographic information, designing new systems to leverage geospatial information in social media, and eye-tracking to design new geovisualization techniques.

Diana S. Sinton is the Executive Director of the University Consortium for Geographic Information Science (UCGIS), a non-profit organization that supports a higher education community of practice around GIScience research and teaching. As an adjunct associate professor at Cornell University, she teaches courses in spatial analysis and GIS. Her interests include the roles of geospatial technologies and spatial literacy in teaching and learning, the use of social and cultural data within GIS applications, and humanitarian mapping projects. Diana worked previously for the University of Redlands where she led a campus-wide initiative to integrate mapping and spatial perspectives into diverse academic disciplines. She also served as the GIS Program Director for the National Institute for Technology and Liberal Education (NITLE).



John P. Wilson is Professor of Spatial Sciences and Sociology in the Dana and David Dornsife College of Letters, Arts and Sciences at the University of Southern California where he directs the Spatial Sciences Institute as well as the Geo-



graphic Information Science & Technology Graduate Programs and the Geospatial Services Unit in the Southern California Environmental Health Sciences Center. In addition, he holds adjunct appointments as Professor in the School of Architecture and in the Viterbi School of Engineering's Departments of Computer Science and Civil & Environmental Engineering. He founded the journal Transactions in GIS (Wiley-Blackwell) in 1996 and has served as Editor-in-Chief since its inception, is a Past-President of the University Consortium for Geographic Information Science (UCGIS) (2006-07), a UCGIS Fellow, and an active participant in the UNIGIS International Association. His research focuses on the modeling of environmental systems and makes extensive use of GIS software tools, fieldwork, spatial analysis techniques, and computer models.

Panel III: Geoenabled Online Education

Tom Baker, Scott Bell, Werner Kuhn, Adena Schutzberg, Michael Solem

Moderator: Stephen Ervin

Abstract: Location awareness and analytics have the potential to enrich online teaching and learning across disciplines. For example, students in physical science and social science classes can contribute field observations to a common web map. Humanities students can earlier construct rich, map-based narratives. Location analytics are now available to education administrators as apps that accommodate their accustomed workflows. And the convergence of "the object formerly known as the textbook" and online courseware sets the stage for profound new educational use cases for embedded multiscale webmaps coupled with interactive assessment. This session will consider these and other potentials.

Thomas R. Baker is an instructional technologist (Ph.D. in curriculum and instruction, 2002) serving as an education manager at Environmental Systems Research Institute (Esri) where he leads STEM education activities, digital materials development, and educational research efforts. He also works in K-12 science education and teacher education. In the former project, he



designed and created the technical framework and co-designed the instructional materials for this online geospatial course for educators (2003). His research interests have focused on improving student learning and affective outcomes with geospatial technologies, teacher professional development, and online student collaborations.

Scott Bell is a Professor of Geography and Planning at the University of Saskatchewan and teaches GIS, Cartography, and human geography. He has expertise in advanced applications of GIS and GIS training for academic research. Scott holds an MA and PhD in Geography from the University of California, Santa Barbara and has collaborated on interdisciplinary health, environmental, social science, and cognitive science research during his career. As a Harvard Visiting Scholar, Scott leads the CGA GIS Institute. The Institute provides graduate students, faculty, and other Harvard researchers with hands on training in GIS and leads them through the integration of GIS and research. While his collaborative research interests are broad his personal research program is focused on spatial cognition and applied GIS for health and social geography. His research has been funded by the Canadian Institutes for Health Research (CIHR), the Social Sciences and Humanities Research Council of Canada (SSHRC), The Fedoruk Centre for Nuclear Innovation, and GEOIDE, a Network Centre of Excellence focused on GIS for decision making.



Werner Kuhn holds the Jack and Laura Dangermond Endowed Chair in Geography at the University of California, Santa Barbara (UCSB), where he is professor of Geographic Information Science. He is also the director of the Center for Spatial Studies at UCSB. His main research and teaching goal is to make spatial information and computing accessible across domains and disciplines. Before joining UCSB in late 2013, Kuhn was a professor



of Geoinformatics at the University of Munster, Germany, where he led MUSIL, an interdisciplinary semantic interoperability research lab (<http://musil.uni-muenster.de>). He holds a doctorate from ETH Zurich in Surveying Engineering and was a post-doctoral researcher with the National Center for Geographic Information and Analysis (1989–1991) as well as with the Vienna University of Technology (1991–1996). He is a co-founder of the COSIT Conference Series (since 1993) and of the Vespucci Initiative (<http://vespucci.org>, since 2003) and has been a visiting scientist at UCSD's Meaning and Computation Lab (2002/03), the UK eScience Center at Edinburgh (2007), and the Brazilian Institute for Space Research, INPE (2011). Werner Kuhn's publications range from GIScience and usability engineering through cognitive science to formal ontology.

Adena Schutzberg is Executive Editor of Directions Magazine and contributes to its widely-read electronic newsletters, website, podcast and blog. She is also the Principal of ABS Consulting Group, Inc., a GIS consulting firm with a current focus on geography and GIS education. She's taught undergraduate face-to-face geography courses and online graduate GIS courses. Before opening her own company, Schutzberg headed U.S. operations for UK-based Cadcorp and held several positions at Esri over eight years. She holds a BA in Chemistry from the University of Chicago and an MS in Geography from Pennsylvania State University.



Michael Solem is Director of Educational Research and Programs for the Association of American Geographers. Michael is principal investigator on several large-scale, federally funded projects spanning geography at all levels of education, focusing on professional development, internationalization, global education, and teacher preparation. Michael currently serves as Co-Director of the National Center for Research in Geogra-



phy Education and is Treasurer for the International Geographical Union's Commission on Geographical Education. He is a member of the editorial board for the Journal of Geography in Higher Education, Review of International Geographical Education Online, and the Journal of Research and Didactics in Geography. Michael has twice received the Journal of Geography in Higher Education's award for promoting excellence in teaching and learning for his research on faculty development and graduate education in geography.

Closing Remarks

David DiBiase

David DiBiase leads the Education Team within Esri's Industry Solutions group. The Team promotes GIS use and spatial thinking in higher education, schools, and youth groups worldwide. Before joining Esri in 2011, David led the Dutton e-Education Institute at the Pennsylvania State University, where he helped create six new graduate and undergraduate online programs, including the Penn State Online Masters degree in GIS, which earned the Sloan Consortium's award for Most Outstanding Online Program in 2009. He's currently leading an Esri team that's developing an open online class on spatial analysis.



Panel Moderators

David DiBiase, Stephen Ervin, Matthew Wilson

Stephen M. Ervin is the Assistant Dean for Information Technology at the Harvard University Graduate School of Design, and a Lecturer in the Department of Landscape Architecture, where he has taught since 1989. Ervin teaches and conducts research in the areas of design, computing, media and technology, with a special interest in landscape modeling and visu-



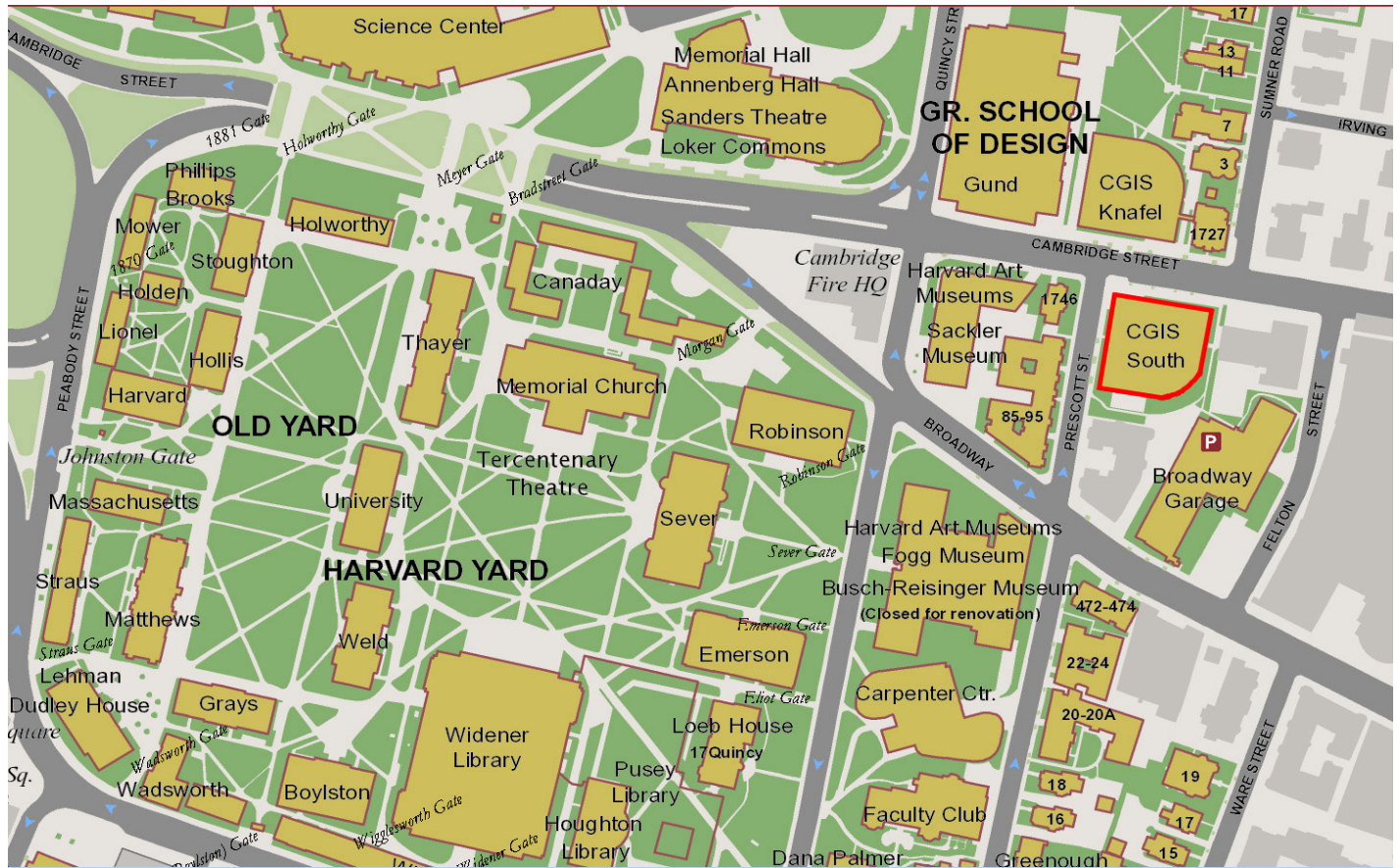
alization, and the integration of CAD, GIS and emerging technologies including GeoDesign. The founding chairman of the American Society of Landscape Architects' (ASLA) Open Committee on Computers in Landscape Architecture and a Fellow of the ASLA, he holds a Master's degree in Landscape Architecture from the University of Massachusetts at Amherst and a PhD in Urban Studies from the Massachusetts Institute of Technology. A regular contributor to the International Digital Landscape Architecture (DLA) conference, he has been a prominent player in the development of the theoretical basis for the integration of computing tools and design methods.

Matthew W. Wilson is currently Visiting Assistant Professor of Landscape Architecture and Urban Planning and Design at the Graduate School of Design; Visiting Scholar at the Center for Geographic Analysis at Harvard University; and Assistant Professor of Ge-

ography at the University of Kentucky, where he co-directs the New Mappings Collaboratory. Matt's scholarly activities are at the intersection of critical human geography and geographic information science, as part of an evolving research agenda in 'critical GIS'. His research draws upon STS and urban political geography to understand the development and proliferation of location-based technologies, with particular attention to the consumer electronic sector. His manuscripts have been published in leading journals and collections including: Society & Space, Landscape & Urban Planning, Qualitative GIS (Sage), Geoforum, The Professional Geographer, Cartographica, Social & Cultural Geography, Area, and Gender, Place & Culture. He has recently co-edited special issues of Environment & Planning A and Geojournal on the topic of neo-geography. Matt holds a PhD in Geography from the University of Washington.



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