

ThinkSpatial

The UCSB brown-bag forum on spatial thinking

Presents

Danielle Forsyth

Thetus Corporation, Portland, Oregon

Using Savanna to Model and Analyze Complex Human Ecosystems

Ellison 5824

12:00 p.m. Monday

4 October 2010

Abstract. Modeling and communicating complex interconnected cultural and behavioral systems is difficult as the participants and observers bring their own bias, influence and motivations. While difficult in familiar regions, understanding unfamiliar regions of the world where power, trade, communication, finance, cultural and social practices have changing players, pressures and nuances seems insurmountable. Nonetheless, government, non-government, commercial organizations and academics continue to try to collect, connect, contextualize and communicate this information for security, stability, and sustainability purposes worldwide. This session addresses the approaches and tools used by US Government Commands, NGOs and ways that they may apply in an academic and research setting.

Danielle Forsyth is the Co-Founder and CEO of Thetus Corporation, a complex system modeling and analysis software company in Portland, Oregon. Danielle has spent most of her professional career in 3D graphics, multi-dimensional systems and conceptual modeling. She spent her formative years in engineering, marketing and management positions at Hewlett-Packard followed by Wavefront (3D Animation), Adaptive Solutions (Neural Networks and Machine Learning), Microsoft (Graphics Libraries and Procedural Modeling), Digimarc (Identity Solutions and Digital Watermarks) and SketchUp (Conceptual Modeling). Danielle has degrees in Mathematics, Computer Science and Business.

The objectives of the **ThinkSpatial** brown-bag presentations are to exchange ideas about spatial perspectives in research and teaching, to broaden communication and cooperation across disciplines among faculty and graduate students, and to encourage the sharing of tools and concepts.

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Presents

Arnold Bregt

Geo-information Science, Wageningen University

Discovering Spatial Thinking

Ellison 5824

12 p.m. Tuesday

5 October 2010

Abstract: A new framework for spatial thinking is presented. The framework consists of four interconnected domains: problem, information, cognition, and the solution domains. The application of the framework is illustrated by three examples: (1) the mapping of cognitive knowledge of farmers for field variation in the Netherlands, (2) the scale perspectives test for problem mapping of citizens in Oxfordshire, UK, and (3) simulation of knowledge sharing in a spatial planning setting by agents. The relevance of this framework for the current spatial concepts as the driving forces for spatial thinking is then discussed.

Arnold Bregt is Professor of Geo-information Science at Wageningen University. He received his M.Sc. and Ph.D. from the same university. He is chairman of the spatial data infrastructure subcommittee of the Royal Netherlands Academy of Arts and Sciences. He was scientific director of the “space for geo-information program” from 2004–2009 and chair of the European CEN-committee for geo-information. standardization. He has (co)-authored more than 250 publications on spatial statistics in soil science, spatial data uncertainty, spatial-temporal modeling, spatial data infrastructures and the application of geo-information science in environmental sciences. His current research interests are spatial data infrastructures, agent-based modeling, and human-space interactions.

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Michael Worboys

Spatial Information Science and Engineering, University of Maine

The foundations of spatial change

Ellison 5824

10:00 a.m. Friday

15 October 2010

Abstract. The world is dynamic but many of the traditional models at the core of GIS are static. There is also a paradigm shift to the decentralized collection of geospatial information by autonomous artificial sensors and groups of human volunteers. Expressive geometric models are needed to effectively computationally represent and reason about complex dynamic physical and socio-behavioral processes. These models should embrace the decentralized approach to geospatial reasoning. This talk discusses some of the background to the development of such models, and proposes a formal approach to topological change. Also considered are decentralized approaches to topological change detection.

Mike Worboys has a PhD in mathematics, and is Professor and Chair of the Department of Spatial Information Science and Engineering, University of Maine. He is a Distinguished Scientist of the Association for Computing Machinery, and a life member of the London Mathematical Society. He is an editor-in chief of the Journal of Spatial Information Science and co-author of the textbook "GIS: A Computing Perspective". Mike works at the boundary between computer science, mathematics, and geographic information science. His current research interests include ontologies and models for dynamic geographic phenomena, sensor informatics, and connections and transitions between indoor and outdoor spaces.

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Petrutza Caragea

Statistics, Iowa State University

Analysis of Areal Data: Should a Model with (Spatial) Dependence be Considered?

Ellison 5824

12:00 p.m. Tuesday, 26 October 2010

Abstract. The application of Markov random fields to problems involving spatial data on lattice systems (as often desirable in the environmental and ecological sciences, agriculture, and other areas of biology) requires decisions regarding a number of important aspects of model structure. Existing exploratory techniques appropriate for spatial data do not provide direct guidance to an investigator about these decisions. We introduce a diagnostic quantity useful in situations for which one is contemplating the application of a Markov random field model based on conditional one-parameter exponential family distributions. This exploratory diagnostic is shown to be a meaningful statistic that can inform decisions involved in modeling spatial structure with statistical dependence terms. We illustrate its use in guiding modeling decisions with simulated examples and demonstrate that these properties have use in applications.

Petrutza Caragea is Associate Professor of Statistics in the Department of Statistics at Iowa State University. She received her BS in Applied Mathematics from University of Bucharest, Romania and earned her MS and PhD from the University of North Carolina at Chapel Hill. Her areas of research are the methodology and applications of spatial statistics and time series to environmental, ecological, meteorological and agricultural applications. Recently, she has proposed an approximation method for estimating parameters of spatial models for large spatial data sets; proposed and alternative parametrization of one-parameter conditionally specified spatial models, which allow for interpretable covariate manipulations; worked on developing wind forecasting models that use meteorological model outputs; and participated in interdisciplinary research groups analyzing dispersal of genetically modified pollen flow. Currently she is working on developing methodologies for analyzing soil moisture output from satellite data (specifically, SMOS).

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Waldo Tobler

Geography, UCSB

Visualization of Some Spatial Concepts

Ellison 5824

12:00 p.m. Tuesday

2 November 2010

Abstract. A few examples from my research in geography. Included are spatial and temporal lag effects, comparison of movement patterns, consequences of changing the spatial resolution, migration potential and fields, impact of biproportional adjustment on movement tables, coalescent cities, explanation of multidimensional scaling iterations, the transform-solve-invert paradigm, a map comparison method, mass preserving reallocation of spatial data, and potentials from asymmetry.

Waldo Tobler is a Professor Emeritus at UCSB, having held positions as Professor of Geography and Professor of Statistics. His degrees in Geography are from the University of Washington. He was on the faculty for several years at the University of Michigan and holds a Doctorate *honoris causa* from the University of Zurich. Tobler taught courses at Michigan and UCSB on the history of cartography, geographic transformations, and migration and was one of the principal investigators and a Senior Scientist in the NSF-sponsored National Center for Geographic Information and Analysis. He was an early pioneer in the use of computers in geography, emphasizing mathematical modeling and graphic interpretations. He formulated the "first law of geography" in 1970 while producing a computer movie and is the inventor of novel and unusual map projections, among which was the first derivation of the partial differential equations for area cartograms. Research achievements include the development of a global latitude-longitude-oriented demographic information base; smooth finite element and categorical pycnophylactic geographic information reallocation models; and methodologies in computational geography, including the analyses of geographical vector fields and related research on migration and global trade models. He is the recipient of a Lifetime Achievement Award in GIS by ESRI and is a member of the National Academy of Sciences of the United States.

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George Legrady

Media Arts & Technology / Art (UCSB)

Representing Space—Representation in Space

Ellison 5824

12:00 p.m. Tuesday

9 November 2010

Abstract. This lecture will address two data visualization projects that have a perspective on space - How to represent information about space will feature "We Are Stardust", a commission for the NASA Spitzer Centre on the Spitzer sun-orbiting satellite telescope's mission from 2003 until 2009. The subject of "representation in space" will address the design process of representing abstract data in time-based visual space, with a focus on the "Making Visible the Invisible", a ten-year data collection/visualization work at the Seattle Public Library.

George Legrady is professor of digital media, director of the Experimental Visualization Lab in the Media Arts & Technology doctoral program. He has a joint appointment in MAT and the Department of Art. He has previously held faculty positions in Canada and Germany. Legrady received his MFA from the San Francisco Art Institute, and is one of the first generation of artists in the 1980s to integrate computer processes into artistic work. His early work focused on the syntax of photographic visualization, and his contribution to the digital media field since the early stages of its formation into a discipline in the early 1990s has been in intersecting cultural content with data processing as a means of creating new forms of aesthetic representations and socio-cultural narrative experiences. His commission for the Seattle Public Library is one of the few digital artworks to collect and parse data continuously until 2014. He has exhibited internationally.

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Think Spatial

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Lisa Parks

Film and Media Studies, UCSB

Zeroing In: Infrastructure Ruins and Datalands in Afghanistan and Iraq

Ellison 5824

12:00 p.m. Monday, 30 November 2010

Abstract. Zeroing in is an apt metaphor for the way citizen-viewers are positioned in relation to world events since they increasingly view them from the perspectives of aerial and orbital machines. Building on the work of Rey Chow, Paul Virilio and others, this essay delineates a series of knowledge practices that take shape in relation to satellite imagery. The discussion moves from an analysis of declassified US satellite images of bombed communication infrastructure in Afghanistan and Iraq to an analysis of a US policy known as the “shutter control rule,” designed to limit access to satellite imagery to protect US national security interests, and onto a discussion of Google Earth’s emergence and some of the controversies surrounding its use. I consider how satellite images represent the world, or parts of it, simultaneously as sites of scrutiny, destruction and extraction. As the satellite image figures the earth’s surface as a target of observation, conquest, and (re)development, it is commandeered in flexible economies of visual, military and corporate control, and in efforts to regulate acts of interpretation and access to information.

Lisa Parks, Ph.D. is Professor and Chair of the Department of Film and Media Studies at the University of California-Santa Barbara and is a research affiliate of the Center for Information Technology and Society and the Carsey Wolf Center. Her areas of interest include media and geography, globalization, and science and technology studies. She is the author of *Cultures in Orbit: Satellites and the Televisual* (Duke UP, 2005), and co-editor of *Planet TV* (NYU, 2003) and is currently writing two new books: *Coverage: Media, Space and Security after 911* (Routledge) and *Mixed Signals: Media Infrastructures and Cultural Geographies*. She is also co-editing the book *Down to Earth: Satellite Technologies, Industries and Cultures* (Rutgers UP) with James Schwoch. Parks was a research fellow at the Institute for Advanced Study (Wissenschaftskolleg) in Berlin in 2006/2007 and has given keynote lectures at Media Studies, Communication, and Geography Conferences and invited lectures in 15 countries.

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is pleased to preview the

The New UCSB Undergraduate Minor in Spatial Studies

The discussion will be chaired by

Michael Goodchild (Geography, UCSB) and **Donald Janelle** (spatial@ucsb)

Ellison Hall 5824

12:00pm, 18 January 2011

An academic **Minor in Spatial Studies** is now available for students at UCSB. The goals of this minor are to:

- provide opportunities for undergraduates to complement disciplinary majors with a supportive set of courses that strengthen spatial reasoning skills for problem solving; and
- facilitate acquisition of knowledge and perspective on creativity that transcends disciplinary boundaries, unites quantitative and qualitative thinking, and allies with multi-media graphic display and communication of information.

For the Minor, students select a focus area that aligns most clearly with their disciplinary and/or career interests. These include (1) **Spatial Thinking**, (2) **Space and Place**, and (3) **Spatial Sciences**. The minor draws on the academic strengths of UCSB in the arts, humanities, sciences, social sciences, and engineering fields that invoke spatial reasoning and innovation. Students have the opportunity to select courses and to integrate knowledge around spatial themes from elective and required courses from a broad range of UCSB departments and programs.

The focus of discussion at this session will be the resources available to students and advisors at

- <http://geog.ucsb.edu/undergraduates/minor-spatial-studies>
- <http://www.spatial.ucsb.edu/programs/academic-minor.php>

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Jon Jablonski

Davidson Library, Map & Imagery Lab, UCSB

A Geographic Approach to Information Seeking Behavior

Ellison 5824

12 p.m. Tuesday

1 February 2011

Abstract: A dominant research theme in Library and Information Science (LIS) is the study of information seeking behavior. A variety of models have been proposed that use strong spatial metaphors and terms that are close enough to ideas from geography as to make comparisons inevitable.

Can geographic research methodologies be used to examine this behavior? Are wayfinding and navigation processes similar to information seeking behavior? How similar are the questions 'How do I get from point A to point B?' to 'Can you give me more information on topic Y?'?

This presentation will propose a research agenda to explore these questions and discuss upcoming fieldwork on campus and in China.

Jon Jablonski, director of the Davidson Library's Map & Imagery Lab will be a Fulbright Scholar to Wuhan University during the winter of 2011. A new arrival to UCSB, he was most recently Map, GIS & Aerial Photography Librarian at the University of Oregon in Eugene. He holds degrees in fine arts, library and information science, and geography. His previous work in China was a case study of cultural heritage cyberinfrastructure in provincial libraries.

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Marko Peljhan

Department of Art, UCSB; Media Arts & Technology Program, UCSB;
UC Institute for Research in the Arts

Unmanned Poles – Human Landscapes

Ellison 5824

12 p.m. Tuesday, 15 February 2011

Abstract. The lecture will present current research and engagement in the Arctic and Antarctic in the framework of the Arctic Perspective Initiative (API), with specific focus on the use of unmanned aerial systems and other on-the-land mapping technologies by artists, hunters, scientists, tactical media workers, and cartographers.

The Arctic Perspective Initiative (API) is a non-profit, international group of individuals and organizations, founded by Marko Peljhan and Matthew Biderman, whose goal is to promote the creation of open authoring, communications and dissemination infrastructures for the circumpolar region. Its aim is to empower the North and Arctic peoples through open source technologies and applied education and training. By creating access to these technologies while promoting an open, shared network of communications and data, without a costly overhead, further sustainable and continued development of culture, traditional knowledge, science, technology and education opportunities for peoples in the North and Arctic regions is enabled. Conceptual decisions behind the current API projects and their future paths will be traced.

Marko Peljhan is a native of Slovenia and a theatre and radio director by profession. Peljhan founded the arts and technology organization Projekt Atol in the early 1990s and cofounded one of the first media labs in Eastern Europe, LJUDMILA in 1995. In the same year, he founded the technology branch of Projekt Atol called PACT SYSTEMS where he developed one of the first Global Positioning Systems-based participatory networked mapping projects, the Urban Colonisation and Orientation Gear 144. He has been working on the Makrolab, a unique project that focuses on telecommunications, migrations and weather systems research in an intersection of art and science from 1997-2007, the Interpolar Transnational Art Science Constellation during the International Polar Year (project 417) and is currently coordinating the Arctic Perspective Initiative art/science/tactical media project focused on the global significance of the Arctic geopolitical, natural, and cultural spheres. Peljhan has also been the flight director of ten art/science parabolic experimental flights in collaboration with the Microgravity Interdisciplinary Research initiative and the Yuri Gagarin Cosmonaut Training Centre, creating conditions for artists to work in alternating gravity conditions. He is the recipient of many prizes for his work, including the 2001 Golden Nica Prize at Ars Electronica together with Carsten Nicolai for their work, and the UNESCO Digital Media Prize for Makrolab in 2004. During 2008, Peljhan was appointed as one of the European Union Ambassadors of Intercultural dialogue. His work was exhibited internationally at multiple biennales and festivals (Venice, Gwangju, Brussels, Manifesta, Johannesburg), at the documenta X in Kassel, several ISEA exhibitions, several Ars Electronica presentations and major museums, such as the P.S.1 MOMA, New Museum of Contemporary Art, ICC NTT Tokyo, YCAM Yamaguchi and others. From 2009 on he is one of the series editors of the Arctic Perspective Cahiers series (Hatje Cantz). He holds joint appointments with the Department of Art and the Media Arts & Technology graduate program at the University of California Santa Barbara and was appointed as Co-Director of the UC Institute for Research in the Arts in 2009, where he is coordinating the art/science Integrative methodologies initiative.

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Ruth Mostern

University of California, Merced
School of Social Sciences, Humanities and Arts

Spatial Literacy in the History Classroom Teaching the Silk Road with Google Earth

12 p.m. Thursday
24 February 2011

Abstract: Students in my Spring 2010 upper division history class *The Silk Road* developed extensive KMLs based on travel narratives. I will explain how I taught Google Earth and other tools to history students and used Google Earth to improve spatial literacy. I will also introduce survey data about student response to the course, showcase student work, and reflect upon the challenges of using Google Earth in a history classroom. Finally, I will discuss the experience of evaluating digital and spatial student work: the class included detailed and transparent evaluation standards with potentially broad applicability in both pedagogical and research domains.

Ruth Mostern (faculty.ucmerced.edu/rmostern/index.html) is Associate Professor and Founding Faculty in the School of Social Sciences, Humanities and Arts at the University of California, Merced. An expert in Chinese and world history, she has a long-standing interest in socially-authored, spatial, and digital tools for reasoning and communicating about history. She has recently published the *Digital Gazetteer of the Song Dynasty* (songgis.ucmercedlibrary.info), co-authored with Elijah Meeks. Her book *Dividing the Realm in Order to Govern: The Spatial Organization of the Song State* is forthcoming from Harvard University Press.

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Mark Kram

Groundswell Technologies, Inc., Santa Barbara

Sensor and GIS Integration for Automated Web-Based Environmental Monitoring

Ellison 5824

12:00 p.m. Tuesday, 8 March 2011

Abstract. The presentation outlines current technological capabilities and industry applications relative to automated web-based monitoring that includes a live demonstration of the Waiora 2.0 geospatial software platform. Waiora can automatically generate contour maps, 3D and 4D visualizations, and playback loops. Using sensor data collected from a bioremediation project managed by the USEPA and USDA in Iowa this past summer, Dr. Kram will demonstrate how Waiora rapidly generates nitrate mass flux distributions, and will provide examples of the 3-D and transect analysis features for evaluating contaminant remediation performance. He will also demonstrate the Groundwater Basin Storage Tracking (GBST) module, which allows resource managers to instantly determine aquifer volumetric changes and spatial distributions of these changes between any two user-selected time steps. It is hoped that the presentation will suggest possible collaborations between Groundswell Technologies and UCSB researchers.

Mark Kram is the Founder and CTO of Groundswell Technologies, Inc. (www.GroundswellTech.com), a group specializing in automated monitoring and modeling of environmental and homeland security sensor networks. He earned his Ph.D. in Environmental Science and Management from the University of California at Santa Barbara (UCSB), an M.S. degree in Geology from San Diego State University, and his B.S. degree in Chemistry from UCSB. He has over 27 years of experience developing innovative environmental assessment techniques, has taught related graduate-level courses at UCSB, served as a Senior Hydrogeologist and Principal Investigator for numerous groundbreaking U.S. Department of Defense projects, and has authored articles, book chapters and national standards on the subject. Dr. Kram has been instrumental in the areas of sensor development and implementation, innovative GIS applications, dense non-aqueous phase liquid (DNAPL) site characterization, chemical field screening, expedited site characterization and monitoring well design, and holds several patents for hydrogeologic and chemical characterization tools and methods.

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Steve Conner and Dennis Whelan

Campus Planning and Design, UCSB

Campus Long Range Development Planning with a 3D GIS Model

Ellison 5824

12 p.m. Tuesday

19 April 2011

Abstract. The UCSB Office of Campus Planning & Design is working on a Long Range Development Plan that will guide campus growth until the year 2025 horizon. The plan document has been analyzed under the California Environmental Quality Act and approved by the UC Board of Regents. The document is currently being reviewed by California Coastal Commission staff. A three dimensional model will aid in the quantification and visualization of proposed development/redevelopment—particularly in areas adjacent to Environmentally Sensitive Habitat Areas (ESHA). The model includes existing/proposed buildings and terrain built from existing LIDAR and CAD survey data.

Steve Conner joined the Campus Planning & Design group after a few years as an Associate Planner with a multi-disciplinary design firm in San Luis Obispo. An undergraduate degree in forestry led to graduate work in geographic information systems. Steve took his Bachelor of Science from The College of Forestry and Wildlife Resources at Virginia Polytechnic Institute & State University and then a Master of Arts degree in Geography (Rural and Town Planning Option) at California State University, Chico. Steve's primary responsibilities include working on environmental and regulatory reviews for campus development projects including CEQA and some California Coastal Act duties.

Dennis Whelan has been part of UCSB's professional planning staff for over 20 years. He arrived at UCSB as an undergraduate in Art Studio, graduating in 1979 and earned a Masters in Architecture from UCLA Graduate School of Architecture and Urban Planning in 1985. He is a licensed California Architect and member of the American Institute of Architects and the American Institute of Certified Planning. Whelan's planning duties involve the development of the physical facilities, from buildings and landscape to roads, bike paths and graphics by working with design professionals to ensure a cohesive and organized campus.

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Volker M. Welter

History of Art & Architecture, UCSB

Umwelt: Seeing the World from the Inside Out

Ellison 5824
12 p.m. Tuesday
3 May 2011

Abstract: Historically, the term *Umwelt* was associated from the late nineteenth century onwards with worldviews that aimed to integrate man within a given natural space. Nowadays, *Umwelt* seems to rely on a viewpoint extraterritorial to the environment; most dramatically illustrated, perhaps, by earth images taken from outer space. Accordingly, *Umwelt* oscillates between referring to a world that surrounds us or opposes us. This dichotomy has not only determined investigations into the meaning of *Umwelt* by biologists, geographers, and philosophers, but also by twentieth-century architects addressing environmental concerns.

Volker M. Welter is Associate Professor in the Department of the History of Art & Architecture at UCSB. He has been awarded fellowships by the Getty Grant Program, the Paul Mellon Centre for Studies in British Art, and the Canadian Centre for Architecture. Among his publications are *Biopolis-Patrick Geddes and the City of Life* (MIT Press, 2002) and 'The Limits of Community—The Possibilities of Society: On Modern Architecture in Weimar Germany' (*Oxford Art Journal*, 33/2010). His book on the architect son of Sigmund Freud, *Ernst L. Freud and the Case of the Modern Bourgeois Home*, is in press; an essay on earth images seen from outer space will be published this spring by *Cabinet Quarterly Magazine of Art and Culture*.

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