

# spatial@ucsb.local2019

## SPATIAL DATA FOR SMARTER CITIES



## Featured Speakers



**Mahnoosh Alizadeh, Ph.D.**  
Dept. of Electrical and Computer Engineering  
University of California, Santa Barbara

### ***Opportunities and Challenges of Transportation Electrification in Smart Cities***

#### **Abstract:**

It is well-known environmental benefits of transportation electrification will only be realized if electric vehicles (EVs) are charged using renewable energy resources, and at times when the power grid is not under stress.

In this talk, I will present some of our recent research results on methods that can enable sustainable EV charging practices in smart cities, ranging from personal vehicle charging in parking lots or fast charging station to mobility-on-demand platforms that operate a fleet of EVs.

#### **Bio:**

**Mahnoosh Alizadeh** is an Assistant Professor of Electrical and Computer Engineering at the University of California, Santa Barbara. Her research is focused on designing scalable control and data analytic frameworks and market mechanisms for enabling sustainability and resiliency in societal infrastructure systems (with a specific focus on power systems and electric transportation systems) and smart cities. She is the director of the Smart Infrastructure Systems laboratory.

Prior to joining UCSB in Nov. 2016, Alizadeh spent two years at Stanford University as a postdoctoral scholar. She received her Ph.D. degree in Electrical and Computer Engineering from the University of California Davis in 2014 and her B.Sc. degree in Electrical Engineering from Sharif University of Technology in 2009.



**Konstadinos (Kostas) Goulias**  
Department of Geography  
University of California, Santa Barbara

### ***Activity-Travel GeoSimulation for Smart City Planning, Design, and Operations***

#### **Abstract:**

In this presentation I review a few facets of smart city simulation needs and describe the framework and application of a large scale spatio-temporal simulator of activities and travel that has been developed for Southern California and is developed for New York and Qatar. The simulator includes population synthesis that recreates the entire resident population in the region studied, provides locations for residences, workplaces, and schools for each household, estimates car ownership and type, and provides other key personal and household characteristics. Then, for each synthetically generated person a schedule of activities and travel that is based on intra-household activity coordination for a day is created. These synthetic activity-travel daily schedules are then converted into vehicular travel and assigned to the network. The assignment output is then used to produce estimates of fuel consumed and pollutants emitted (including Greenhouse gases such as CO<sub>2</sub>) by different classes of vehicles. At different stages of this simulation model system we use a variety of ideas from Geographic Information Science that will be presented here. I will also review briefly future directions about place perception and the use of data from online platforms to verify/validate and improve Geosimulation.

#### **Bio:**

**Konstadinos (Kostas) G. Goulias** is Professor of Transportation in the Geography Department and Director of the GeoTrans Laboratory at the University of California, Santa Barbara. He is also Editor-in-Chief of *Transportation Letters*, Vice-Chair of the *International Association for Travel Behavior Research*, editor of *Transportation Systems Planning: Methods and Applications* and the author or co-author of more than 300 papers and reports in travel behavior dynamics, geographic information science, and microsimulation.

#### **Kurt Shellhause**

Kasraie Consulting  
Water Resource Engineer  
CIRGIS Member

### ***Thinking Inside the Box, Outside the Box, and about What could Destroy our Box***

#### **Abstract:**

A key component of developing resilient and sustainable cities will be visually communicating proposed

city improvements and potential hazards. Recent technological advancements are transitioning city planning and design work into virtual three- and four-dimensional geospatial platforms. As part of the discussion on “Smarter Cities,” this presentation will include real world local examples of how 3D and 4D geo-spatial based models are currently being utilized to aid city planning, civil engineering design, and hazard communication as cities and communities progress toward developing digital copies of themselves.

The presentation will include an overview of workflows developing 3D and 4D geo-spatial based models and common end products. The current challenges of developing these models including integrating varied and incomplete data sources, working across multiple platforms, level of quality and audience communication will also be discussed. A review of new digital resources developed as byproducts of work in other fields which may be harvested for developing 3D content in your community will also be provided. Get them for free, tell no one.

Lastly, this presentation close with a near future look at virtual cites and their applications.

### **Bio:**

**Kurt Shellhause** is a Water Resources Engineer with Kasraie Consulting. He has more than 10 years of experience in of professional civil engineering, flood control design, floodplain management, and geographic information systems experience. He is a licensed engineer, certified floodplain manager, and the newest “Member at Large” with CIRGIS. Kurt was introduced to the geospatial community through floodplain mapping and continues to use GIS tools for engineering design and flood hazard communication. His latest work has included development of 3D and 4D models of communities in multiple GIS based platforms.

Kasraie Consulting is a local Ventura County-based civil engineering/hydrology consulting firm. It has been in business for more than 15 years, providing conceptual drainage design, hydrology, hydraulics, floodplain management, engineering plan checking, analysis, GIS mapping, and LiDAR topography services to local municipalities, public agencies, private development and the engineering community.



**Moderator:**

**Werner Kuhn**

Center for Spatial Studies, Department of Geography  
University of California, Santa Barbara

### **Bio:**

**Werner Kuhn** holds the Jack and Laura Dangermond Endowed Chair in Geography at the University of California, Santa Barbara, 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. Kuhn is described as a leading expert in the area

of geospatial semantics and especially known for his work on Semantic Reference Systems as well as his work on interaction metaphors for Geographic Information Systems. Recent research projects include the Linked Open Data University of Muenster (together with the university library), and a series of EU projects on geospatial services in the semantic web.

Kuhn holds a doctorate from ETH Zurich (1989) 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 for Advancing Science through Geographic Information. He 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). His publications range from GIScience and usability engineering through cognitive science to formal ontology.