Geographic Data Science and Public Policy

June 30, 2021

In the wake of much public data science and public data visualization (as related to COVID-19, election data, data about police violence, evictions, etc.), how is geographic knowledge translated to various publics? What are the important GIScience principles that get muddied in the rush toward storytelling with data, including long-standing concerns around choropleth thematic maps, polygonal transformations, data normalization, scales, projections and more?

In this forum, we invite geographers and data-based journalists in a variety of organizations to offer thoughts on the roles and means of translation. The speakers will address the primary question that motivates this event: how is geographic knowledge translated to various publics? They will share their thoughts about the role of data transformations, projections and standards, about storytelling and visualizations, about ethics and privacy, and about how these efforts move us towards policy recommendations.

The event is structured as a series of four 15-minute presentations by Jeremy White (NYTimes), Carolyn Fish (U of Oregon), Ensheng Dong (Johns Hopkins), and Yonette Thomas (UrbanHealth360), followed by four 5-minute lightning talks by Jared Shoultz (Esri), Devika Kakkar (Harvard), Jeff Blossom (Harvard) and Alan Leidner (NYC GISMO). These will culminate in a panel discussion, where participants will also be invited to ask questions. Bookending this event will be opening remarks by Subu Subramanian (Harvard) and closing remarks by Xiao-li Meng (Harvard).

This event is hosted by the [Center for Geographic Analysis](#), a member of the [Institute for Quantitative Social Science](#) at Harvard University, and co-sponsored by the NSF IUCRC [Spatiotemporal Innovation Center](#) (Award numbers 1841403 and 1841520).

For more information about CGA conferences, please visit https://gis.harvard.edu/conferences

Program

Wednesday, June 30, 2021, 10:30AM - 12:30PM (EDT)

Begin	End	Dura-tion	Topic	Speaker	Organization
10:30 AM	10:35 AM	0:05	*Welcome & Introduction*	S V Subramanian	Harvard
10:35 AM	10:50 AM	0:15	How the New York Times Maps Spatial Data	Jeremy White	New York Times
10:50 AM	11:05 AM	0:15	Map Stories for Climate Change Communication	Carolyn Fish	U of Oregon
11:05 AM	11:20 AM	0:15	Behind the Curtain: The Story of the COVID-19 Map	Ensheng Dong	JHU
11:20 AM	11:35 AM	0:15	Virtual Treatment and Learning Program: Using Data Visualization to Strengthen Health Knowledge and Policy Action in Urban Poor Communities	Yonette Thomas	Urban-Health360
11:35 AM	11:40 AM	0:05	*Break*		
11:40 AM	11:45 AM	0:05	ArcGIS Dashboards Used in Public Health	Jared Shoultz	Esri
11:45 AM	11:50 AM	0:05	Measurement of Partisan Segregation for 180 Million U.S. Voters Using Advanced Geospatial Data Science	Devika Kakkar	Harvard
11:50 AM	11:55 AM	0:05	Geographic Apportioning Health Indicators for Policy Relevant Decision Making	Jeff Blossom	Harvard
11:55 AM	12:00 PM	0:05	The Spatial Information Revolution: Why We Can't See the Forest for the Trees	Alan Leidner	NYC GISMO
12:00 PM	12:20 PM	0:20	*Panel Discussion*	Matt Wilson (Moderator)	UKY / Harvard
12:20 PM	12:30 PM	0:10	Closing remarks	Xiao-li Meng	Harvard

Register in advance for this webinar:
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162.255.36.11 (US East)
115.114.131.7 (India Mumbai)
115.114.115.7 (India Hyderabad)
213.19.144.110 (Amsterdam Netherlands)
213.244.140.110 (Germany)
103.122.166.55 (Australia Sydney)
103.122.167.55 (Australia Melbourne)
149.137.40.110 (Singapore)

64.211.144.160 (Brazil)
69.174.57.160 (Canada Toronto)
65.39.152.160 (Canada Vancouver)
207.226.132.110 (Japan Tokyo)
149.137.24.110 (Japan Osaka)
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Abstracts and Biography

**Opening Remarks (Welcome and Introduction)**
Subu Subramanian (Harvard)

S (Subu) V Subramanian is Professor of Population Health and Geography at Harvard University. He was the Founding Director of Graduate Studies for the interdisciplinary PhD program in Population Health Sciences at Harvard. He has published over 700 articles, book chapters, and books in the field of social and contextual determinants of population health, determinants of health inequalities in India, and applied multilevel statistical models. He has consistently been included in the Highly Cited Researchers (top 1% of cited publications in Web of Science) list since 2015. Subramanian is the Co-Editor-in-Chief for the international journal Social Science & Medicine (SSM), a Co-Senior Editor for the social epidemiology office of SSM, and the founding Co-Editor-in-Chief of a new journal SSM – Population Health, winner of the 2020 PROSE Award for Best New Journal in Social Sciences.

How the New York Times Maps Spatial Data
Jeremy White (New York Times)

Abstract: From the Covid-19 pandemic to climate change, global issues are impacting the world in ways that are better understood through mapping. Using traditional cartographic and GIS methods, along with the latest tools and techniques, the graphics department at the New York Times produces a range of different map types to help better understand complex stories.
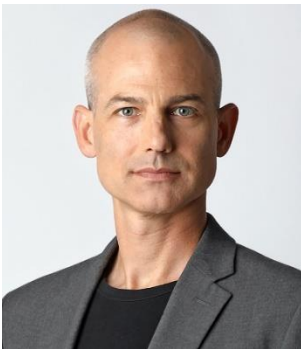
Jeremy White Jeremy White is a graphics editor for The New York Times and an adjunct professor at Columbia University. He has contributed to projects that have earned several Emmy nominations, a Peabody award, and top honors from the Society of News Design, World Press Photo and Pictures of the Year International. Prior to joining the Times, he created motion, interactive and print graphics for blueshirt, the company he founded in 1998, serving clients such as Toyota, Fiat, Sony, and Microsoft. Jeremy has a BA from the School of Journalism at the University of Montana, and an MS in cartography and geographic information systems from the University of Wisconsin.

Map Stories for Climate Change Communication
Carolyn Fish (University of Oregon)

Abstract: Maps are a particularly powerful means by which to communicate the impacts of climate change. However, despite their use in the media most maps present climate change as abstract and scientific not as a problem that has human impacts. Within both climate change communication and cartography there have been calls to better understand the role of story to captivate and persuade readers. We present a user study where we

manipulated the structure of a storytelling map on climate change to investigate how this influences narrative transportation, emotional arousal, and climate change attitudes.

Carolyn Fish is an Assistant Professor at the University of Oregon. Her research interests lie at the intersection of cartography and climate change communication. Recently her research has been published in the Journal of Cartography and Geographic Information Science and Cartographica: The International Journal for Geographic Information and Geovisualization. The research she is presenting here at the Harvard CGA Virtual Forum is based on research funded by the National Center for Atmospheric Research (NCAR) Innovators Program. This program is designed to foster research which expands the impact of climate science through collaborative integration across the social and physical sciences.

Behind the Curtain: The Story of the COVID-19 Map
Ensheng Dong (Johns Hopkins University)

Abstract: A local outbreak of "pneumonia of unknown cause" detected in Wuhan, China in late December 2019, has since spread to more than 190 countries, with more than 155 million confirmed cases as of May 6, 2021. In response to this ongoing public health emergency, we developed an online interactive dashboard on January 22, 2020, hosted by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU), to visualize and track the reported COVID-19 epidemic. This dashboard was the first out, and it has been the most popular visualization tool for people to track global and local COVID-19 situation. It has been featured in the New York Times, CNN, Washington Post, WSJ, Fox News, and other mainstream media in the US and the world. Members of the public health community around the world are relying on this dashboard for informing, planning, and decision making on public safety.

Ensheng Dong is a PhD candidate and Louis M. Brown Engineering Fellow of the Department of Civil and Systems Engineering (CaSE) and the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University. He is also a member of the Infectious Disease Dynamics (IDD) group at the JHU Bloomberg School of Public Health. He is interested in interdisciplinary research on network science, mobility modeling, spatial analysis, geo-visualization, and infectious diseases. His recent work includes forecasting the risk of measles in the US and the Pacific Island Countries and Territories (PICTs), building and maintaining the JHU CSSE coronavirus dashboard, and modeling the global coronavirus pandemic.

Virtual Treatment and Learning Program: Using Data Visualization to Strengthen Health Knowledge and Policy Action in Urban Poor Communities
Yonette Thomas (UrbanHealth360)

Abstract: Urban Health 360's intent is to bridge the divide between the science of urban health and the knowledge, awareness, and practice of health in urban poor communities. Our signature project is the Virtual Treatment and Learning Program. As a partnership with several other organizations, the program makes World Telehealth Initiative's Teledoc network and virtual care program available for clinicians and patients via devices at the Opoji Health Care Center in Edo State, Nigeria. UH360 utilizes country-level and state-level data from the Demographic and Health Survey (DHS) and the UN-Habitat to measure changes in health outcomes and ethnographic data to assess community engagement and health learning. Treatment data generated through the Teladoc network will be combined with these data to assess change in treatment outcomes. Geospatial data provide insights into the distances travelled by residents to receive treatment and care. These combined data will be used to engage community leaders and other stakeholders in solution building and the implementation of practical strategies for better health outcomes.*

Dr. Yonette Felicity Thomas is the founder and president of UrbanHealth360, an institute of multidisciplinary thinkers centered on a people-oriented, community-focused approach to urban health. Dr. Thomas is a globally acknowledged thought leader, urban health champion, and an advocate for valuing the health of women and girls as an economic imperative. A social epidemiologist/medical sociologist by training, she has served as the chief of Epidemiology at the National Institute on Drug Abuse in the National Institutes of Health, held academic positions at University of Miami Miller School of Medicine and Howard University, and as a vice president for research. She founded Borjoner International and Strategic Transitions to influence the progress, health, and wellbeing of individuals and communities across the world. Her primary research and publications have focused on the social determinants of health, health disparities, the health of women and girls as an economic value, the social epidemiology of drug abuse and HIV/AIDS and the link with geography, including edited volumes: Geography and Drug Addiction, Crime, HIV, and Health: intersections of Criminal Justice and Public Health Concerns.

ArcGIS Dashboards Used in Public Health
Jared Shoultz (Esri)

Abstract: This lightening talk will highlight the different ArcGIS Dashboards use cases during the COVID-19 pandemic.*

Jared Shoultz, M.A. is the Esri Health and Human Services Technical Lead drawing on over 20 years' experience. Prior to Esri, he was a Senior GIS Research Associate at the University of South Carolina Institute for Families in Society. He also spent 12 years at the SC Department of Health and Environmental Control as a Deputy Director, Informatics Director and GIS Manager. His professional focus has been on the development, operation and GIS integration of enterprise public health and environmental information systems. He is part of the core Esri COVID-

19 Response Team and has been working with public and private sector organizations at every level around the world to both respond and recover from the current pandemic.

Measurement of Partisan Segregation for 180-Million U.S. Voters Using Advanced Geospatial Data Science
Devika Kakkar (Harvard)

Abstract: *Partisan segregation among people has important political and social implications. Historically, measurement of partisan segregation has been limited to large geographic areas since researchers usually relied on analyzing data at aggregated levels. In this work, CGA along with the Department of Government has leveraged advances in geospatial data science to measure partisan segregation down to the level of an individual for 180 million U.S. voters. This presentation will highlight the creation of most detailed metrics to analyze partisanship within small geographic units such as neighborhoods or cities.*

Devika Kakkar is a Geospatial data scientist with 10+ years of experience in GIS, big data and software development. She is an expert in data science and cloud computing. Before joining CGA in 2015, she worked as a researcher with Fraunhofer IIS, Germany and London School of Economics, UK. She holds a master's degree in geodesy and geoinformation science from Technical University Berlin, Germany; and a bachelor's in civil engineering from HBTI in India.

Geographic Apportioning Health Indicators for Policy Relevant Decision Making
Jeff Blossom (Harvard)

Abstract: *For elected officials to best represent constituencies they serve, information must be presented and analyzed for the entire geographic extent of their constituency. Health indicators such as malnutrition, substance abuse, and disease counts are often collected and reported at census geographies, or other units that do not conform to constituency boundaries. The CGA and Geographic Insights team has applied population apportioning methods in India and the USA to create "crosswalks" between geographies at which health data is reported and policy relevant constituency boundaries. This presentation will highlight this apportioning work, focusing on how this important, timely geographic information is translated and communicated to elected officials and the general public.*

Jeff Blossom joined the Center for Geographic Analysis at Harvard in 2007 as a Senior GIS Specialist, and became the GIS Service Manager in 2016. He has experience working in the GIS industry as a technician, analyst, developer, manager, and educator. Jeff earned an M.A. in Geography from the University of Denver in 2002, and a B.S. from Willamette University (OR) in 1995. Specializations and skill sets include cartography, data science, curriculum development, and working with researchers from numerous disciplines to extract, analyze, enhance, and visualize geospatial data.

The Spatial Information Revolution: Why We Can't See the Forest for the Trees
Alan Leidner (New York City GISMO)

Abstract: Geographical location and spatial information so permeate our consciousness, and are used in so many ways on a daily basis, that we tend to take them for granted and fail to put the pieces together in a way that would fully recognize their power and their importance. Consequently, current and future applications of spatial systems tend to be ignored and compartmentalized within the confines of Information Technology, and they fail to get the funding and the influence that they deserve based on their impacts. For example: 9-1-1 Emergency Response systems depend precise spatial location and efficient routing to save hundreds of lives daily. Spatial applications used to assess and tax private property provides billions of dollars in annual revenues to local governments. Ever since Dr. Snow identified a water pump as the source of a London cholera outbreak, location has been a major component of epidemiology – and yet even over the past year, when spatial systems could have done so much more to combat COVID infections and deaths, they were used superficially. The potential of spatial systems continues to be ignored because it is not understood by the public, by managers and leaders, and even by information professionals who have never explored the concept of geo-convergence and digital twins. We must find better ways to explain ourselves.

Alan Leidner, with a master's degree in Urban Planning from Brooklyn's Pratt Institute, worked for thirty-five years as a planner and manager with New York City government. Starting in the late 1980's he served as IT Director of the Department of Environmental Protection (DEP) where he initiated the City's Enterprise GIS Program and oversaw the development of the City's digital basemap. Mr. Leidner subsequently served as Assistant Commissioner in the Department of Information Technology and Telecommunications (DOITT), in charge of the City's GIS Utility. In the Fall of 2001, he organized and managed the Emergency Mapping and Data Center (EMDC) which provided information and mapping services to 9/11 responders. Alan has also worked for Booz Allen Hamilton on critical infrastructure protection and for the Fund for the City of New York heading their Center for Geospatial Innovation. He currently serves as President of the NYC Geospatial Information Systems and Mapping Organization (www.gismonyc.org) and consults with the Open Geospatial Consortium on the development of an underground infrastructure data model and on a data model for the management of health emergencies and pandemics. Mr. Leidner was a recipient of the 2001 NYC Sloan Public Service

Award and the 2002 ESRI Presidential Award. Among other writings, Alan's "Geo-Info CONOPS" article was published by GeoWorld Magazine in October, 2007.

Closing Remarks
Xiao-li Meng (Harvard)

<u>Xiao-Li Meng</u>, the Whipple V. N. Jones Professor of Statistics, and the Founding Editor-in-Chief of Harvard Data Science Review, is well known for his depth and breadth in research, his innovation and passion in pedagogy, his vision and effectiveness in administration, as well as for his engaging and entertaining style as a speaker and writer. Meng was named the best statistician under the age of 40 by COPSS (Committee of Presidents of Statistical Societies) in 2001, and he is the recipient of numerous awards and honors for his more than 150 publications in at least a dozen theoretical and methodological areas, as well as in areas of pedagogy and professional development. He has delivered more than 400 research presentations and public speeches on these topics, and he is the author of "The XL-Files," a thought-provoking and entertaining column in the IMS (Institute of Mathematical Statistics) Bulletin. His interests range from the theoretical foundations of statistical inferences (e.g., the interplay among Bayesian, Fiducial, and frequentist perspectives; frameworks for multi-source, multi-phase and multi-resolution inferences) to statistical methods and computation (e.g., posterior predictive p-value; EM algorithm; Markov chain Monte Carlo; bridge and path sampling) to applications in natural, social, and medical sciences and engineering (e.g., complex statistical modeling in astronomy and astrophysics, assessing disparity in mental health services, and quantifying statistical information in genetic studies). Meng received his BS in mathematics from Fudan University in 1982 and his PhD in statistics from Harvard in 1990. He was on the faculty of the University of Chicago from 1991 to 2001 before returning to Harvard, where he served as the Chair of the Department of Statistics (2004-2012) and the Dean of Graduate School of Arts and Sciences (2012-2017).

Panel Moderator
Matt Wilson (University of Kentucky & Harvard)

 <u>Matthew W. Wilson</u>, PhD, is Associate Professor of Geography at the University of Kentucky and Visiting Scholar at the Center for Geographic Analysis at Harvard University. He co-founded and co-directs the New Mappings Collaboratory which studies and facilitates new engagements with geographic representation. He is co-editor of Understanding Spatial Media, published by SAGE, and his most recent book is New Lines, published with the University of Minnesota Press. He has previously taught at the Harvard Graduate School of Design, and his current research examines mid-20th century, digital mapping practices.