NARSC NEWS

Words from the Executive Director

As I write this, we are still in the middle of the Covid-19 pandemic. While Covid-19 has created new research opportunities for regional scientists, it has unfortunately resulted in the cancellation of a number of traditional face-to-face regional science conferences around the world. At this moment in time, NARSC is planning to proceed with hosting the 2020 North American Meetings of RSAI as a traditional face-to-face meeting. These meetings will take place in beautiful San Diego, California, November 11-14. The deadline for abstract submissions is July 5. Information about the abstract submission process can be found here. In addition to the general sessions, we have over a dozen special organized sessions on a wide variety of topics of interest to regional scientists. More information about these sessions can be found here. If you are interested in participating in one of these, please contact the session organizers. As usual, we will have two Student Paper Competitions - Graduate-Student-Author Paper Competition and the Graduate-Student-Led Paper Competition. If you are a graduate student, please consider submitting a paper to one of these two competitions.

In addition to inviting you to attend the meetings in San Diego, I would also like to share some other developments with you. Recognizing the importance of diversity to the health or our organization, NARSC recently established a Diversity Committee. Co-chaired by Daoqin Tong of Arizona State University and Sandy Dall'erba of the University of Illinois, Champaign this committee will be working to foster an environment that embraces diversity, equity and inclusion in pursuing excellence in the field of regional science. The Committee is already hard at work, and you will be hearing more from them in the coming weeks. We are also in the process of creating a Young Scholars Committee. Elizabeth Mack of Michigan State University and Amanda Weinstein of the University of Akron have agreed to co-Chair this Committee. While still in the process of being created the

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charge of this committee will be to identify ways to enhance the experience of young scholars at the annual NARSC conference. Finally, the Council is currently exploring the possibility of establishing a NARSC Online Lecture Series. Haifenq Qian of the University of Iowa is leading this initiative, and we hope to be able to provide more details soon.

Once again, thank you to Ran Wei and Isabelle Nilsson for creating another interesting and informative newsletter. I hope that you enjoy reading it.

Neil Reid
NARSC Executive Director

Words from the Editors


We are delighted to bring you the latest issue of the North American Regional Science (NARSC) newsletter. This June 2020 edition of the newsletter features a series of short essays by some prominent regional scientist who reflect on the role of networks in Regional Science – a timely contribution given the role of networks in the pandemic we are currently facing. To bring some good news during these difficult times, we also highlight recent successes by our members such as recent grant awards and published books as well as this year's recipient of the Benjamin H. Stevens Graduate Fellowship in Regional Science.

If you have ideas or suggestions regarding content or would like to contribute to the newsletter, please do not hesitate to contact us.

We hope to see all of you at the NARSC meeting in San Diego in November.

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The Network Paradigm in Regional Science

by Michael Batty

If you examine the origins of Regional Science which began in the early to mid-1950s, then the idea of distance and its impact in terms of cost and time with respect to interacting between different locations was one of the first cornerstones in this emergent science. In fact distance, as Walter Isard so admirably summarized in his **Location and Space Economy** in 1956, is key to the way space enters the picture and throughout its history over the last 70 years, regional scientists have dealt with the spatial differentiation and variance of largely economic activities using explanations focused on distance and interactions. Along this path at various points, regional scientists have introduced the notion of networks, mainly with respect to trade flows, traffic volumes, and migration patterns but in many respects the field has not sought to explain the evolution and growth of regional economies with respect to their networks. Insofar as networks have been explicit, it has usually been in terms of their existence in the morphology of communications within

which transportation takes place. Thus although networks have been accepted as basic elements in the structure of cities and regions, they have been articulated through models as being independent variables that drive spatial organization. There have been few attempts to understand how networks are formed, how they evolve, and how their future form can be predicted for the focus has been much more on explaining how interactions might be predicted, often independently of the networks on which such interactions take place. A good example is in traffic modelling where it is all important to predict flows on networks but the networks themselves are essentially assumed as a given.

To an extent this began to change more or less halfway through this long history. In the mid-1980s, there was a slow resurgence of network thinking, at first on the back of complexity theory. As we moved from thinking about cities and regions as being formed from the top down to evolving from the bottom up, the notion that much more disaggregate ways of understanding the space economy became important. This was first reflected in the development of more individualistic models such as those built around agents, cellular representations, and individual actors and objects which formed the core of tools such as agent-based modelling and microsimulation (Batty, 2005). Still networks remained implicit in most models rather than being explicitly modelled but in the late 1990s, there was a sea change coming from physics where the idea of building statistical models of networks suddenly emerged.

From the immediate post war years, there had been a small but significant use of network theory in anthropology, political science and sociology but mainly for dealing with social power structures. This came to be badged as 'social networks' but this was a focus very different from Regional Science. Nevertheless social network theory did introduce some interesting ideas about how to measure the structure of networks introducing concepts that are now well-known such as Linton Freeman's (1977) 'betweenness', Milgram's (1967) 'small-world problem', Granovetter's (1973) 'strength of weak ties' and so on. A few of these ideas did penetrate our world with respect to labor markets, but it was in statistical physics that the notion of studying networks for their own sake really took off; first there was the small world problem and then research into the statistical properties of graphs, in particular from the distribution of network properties and morphologies to power laws, hence to ideas about scaling (Barabasi, 2017). In fact the world came full circle in this sense, because once it was discovered that network properties might scale with respect to the hubs in such networks, then other scaling laws which had remained dormant in Regional Science such as Zipf's Law – the rank size rule – and Christaller's central place theory – were resurrected as important constructs relating to the organization of the space economy.

Of course, the idea of a network is generic to many ways in which we classify the world and seek to understand relationships between its parts. In Regional Science, the most obvious ideas of networks are as structures which appear as communications channels that enable traffic and freight to move, ideas to flow, people to migrate, with every other form of physical and ethereal transfer that dominate our cities and regions being embodied in physical or virtual networks. Much of this is now encapsulated in more formal approaches to urban morphology such as that embodied in the applications of fractal geometry where self-similar structures across different scales are clearly observed in the way we differentiate and organize space. The notion of hierarchy either from the top down or bottom up resonates strongly in the way urban forms and function evolve. But other conceptions of networks on the edge of Regional Science such as ideas coming from social power which have been employed to think about how our models, can be used predictively to think about how we might best make decisions. In fact, I deal with networks in cities and then networks in planning and

design as two rather separate but still essential constructs in my recent book **The New Science of Cities** (Batty, 2013). There I make the point time and again that we need to unpack locations and people to examine the interactions that determine how their interactions work, how they function and how our behavior is affected with respect to space and its manipulation.

There is however a third way involving networks and this is perhaps a little closer to the idea of using these techniques to think about how we relate to one another in producing plans and designs. In the early days of Regional Science, a series of models geared to optimizing locational activity enabling models to predict the best locations for specific activities, were proposed and developed. Although these models were eventually found lacking in that the problems they addressed were simply too complex to formulate in formal ways, methods used to explore solution spaces where activities were closely related through networks, were proposed. Britton Harris's paper 'Planning as a Branch and Bound Process' published in the **Papers of the RSA** in 1971 is a typical example of this genre. 50 years on, these kinds of problems are now formulated as problems potentially soluble using machine learning which in turn is based on deep layers of neural nets which enable everything to relate to everything else based on initiating learning processes that eventually yield 'solutions' that cannot be found in any other way. There is now a whole class of problems enabling such techniques to be used to explore patterns in data, not only based on optimization problems but finding all sorts of structures in 'big data' sets that now pervade Regional Science as in every other domain.

Thus networks are becoming generic to Regional Science and my own contribution is to stress that no longer can we assume that the world is explicable simply in terms of locational patterns. Of course it never was but it needs to be much more explicit about networks as many powerful tools have been devised in this domain in the last 20 years. We need to adopt the perspective that says that locational patterns need to be unpacked into the forces that determine them and this means exploring the relationships between the parts that ultimately lead to locating activities in particular ways. In short, locations depend on interactions and this means we need to define networks and the flows that come to define the activities which are flowing on or being communicated by these structures. These occur at all the spatial scales that Regional Science embraces which although originally focusing on the regional and then the urban-local, are extending to the global as well as originating at the most local, at the level of streets and buildings. Networks are therefore key in suggesting how interacting processes are critical to explanations and predictions in this field.

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COVID-19, Networks and Regional Science[1]

by Stephan J. Goetz

Like no other disaster in recent memory, the COVID-19 crisis has brought home the importance of networks and connections. How different entities – countries, cities, firms and individuals – are connected has profoundly affected the spread of the virus and continues to determine both its human and economic costs. The very forces that give rise to and disseminate network benefits are now distributing and amplifying the costs of the virus through hub and spoke systems. Not coincidentally, the first known U.S. infected patient was recorded in Snohomish County, Washington,[1] just north of Seattle where the SEA-TAC airport serves as an important Delta Airlines connector (hub) to Asia. Subsequent cases were identified in Los Angeles and Chicago, where LAX and ORD, respectively, are international and major domestic hubs for United Airlines. A New York Times animation shows how the virus is believed to have spread through the world's airline network (Wu et al., March 22, 2020).[2]

The largest initial concentrations of infections in the U.S. appeared in densely settled or connected places, such as New York City. Population agglomerations have benefited enormously from network externalities and spillovers associated with high population density [3], but these same proximity-based forces are now likely causing rapid growth in the number of infections. To illustrate, animated maps shows how the virus has spread in Pennsylvania, first in the eastern part from New York City and New Jersey and then via Philadelphia and Pittsburgh towards the center of the state. The Vail ski resort in Colorado, with international visitors had a heavy caseload early on: https://imgur.com/a/Ci3ZSEI

Early news media reports highlighted the vulnerability of tightly coupled global supply chains which had origins or component manufacturing located in Wuhan, Hubei Province. Such chains build on and capture network effects and, when they disintegrate, lead to cascading failures; they also illustrate the concept of node centrality (importance) of different actors within them. Apple Inc. lost $34bn in stock valuation as of mid-February 2020 largely due to pressure on its suppliers located in Hubei[4]. This current experience will likely lead companies to rewire their supply networks, i.e., to rethink how they source components in terms of geographic diversification around the globe.

Decision makers in food industry supply chains are struggling to redirect unused perishable food in the restaurant sector into retailing, by rewiring or reorganizing their transportation and storage networks. Input-output tables that show multiplier effects of new economic activity are now being used to show the opposite effects in terms of economic collapse. When a restaurant shuts down, the local linen supplier loses businesses, farmers are left with unsold perishable product that had been contracted for delivery, and local newspapers no longer receive advertising dollars. And the ripples continue on through reduced purchasing power of the restaurant's laid off workers, and reduced tax payments.

[1] This essay brief is also published as NERCRD COVID-19 Issues Brief No. 2020-2

Another example of a critical supply chain is found in the medical sector. Here detailed knowledge of where different firms are located spatially could improve coordination and prioritize production of critically needed medical equipment and drugs. As in food-tracing, RFID-enabled tracking and analysis of big data allow researchers to develop real time models to accelerate transshipment and finetune delivery schedules using tools and innovation from logistics firms such as Walmart and Amazon.[5]

The coronavirus has separated "essential" jobs from those which are not, and jobs that can be carried out at home from those that cannot. It has also raised awareness of what is considered "critical infrastructure," specifically in a network context. Millions of jobs were lost in an unimaginably short period of time, but labor now is being reallocated into essential jobs, including in the food system.[6] These kinds of shifts can be modelled and better understood for future disaster preparation using network ideas and analytical tools such as network rewiring[7]. Likewise, international trade networks are changing as countries restrict exports of food[8] and other essential goods and understanding these changes may help decision-makers to better anticipate and deal with future supply shortages.

The term "contact tracing" has entered the vernacular, as public authorities seek to mitigate the spread of the disease using knowledge of afflicted individuals' networks.[9] Cell phone companies are providing location data to allow law enforcement agencies to identify not only where the disease may be spilling over but also where illegal social gatherings may be occurring. While highly controversial given the privacy issues involved, all of these examples are relevant to regional scientists, to the extent that they include human behavior tied to geographic space.

Looking ahead, the many natural experiments that are being created by the devastating current crisis could lead to new frontiers of applied regional science research, both in terms of analytical tools and development of theory that bridges concepts from aspatial network science with those of regional science. In addition to the above examples, the virus has upended migration and commuting patterns or networks. Examining these changes may help us not only to better predict future pandemics, but also to mitigate their horrific toll on humans around the world.

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Regions from Social Networks: What's Next?

by Clio Andris

Spatial social network (SSN) data are geolocated network data that show interpersonal connections between sets of origins and destinations. Today, these networks are used to create regional partitions. One prominent example are regions defined from an origin-destination matrix of Facebook friendships between counties [1]. The New York Times brought this dataset to life with interactive graphics and descriptions [2] (Figure 1).

Other examples include regions created from networks of phone call patterns ([3] and examples abound) and geolocated Twitter friendships [4]. While not everyone has access to a wide range of SSN data for regional delineation, these types of delineations may become more commonplace in the future. Currently, they have produced some exciting visualizations and have invited provocative ways to think about metropolitan areas—like online-dating regions (Figure 2).

The idea of partitioning regions from networks is over fifty years old. For instance, it is mentioned in Haggett and Chorley's classic Network Analysis in Geography [6]. These efforts have most often used commuter data and input/output (I/O) analysis methods stemming from linear algebra and matrix transformation techniques [7]. The resulting regions are naturally anchored by firm location, as commuter networks mirror the trajectories taken to best earn a paycheck. Because of the economic principles driving I/O methods, these regions are also capacitated by resource allocation principles.

Current social network regions are different because they use SN data evidencing personal relationships, and newer methods. First, SSNs are an exciting slice of human behavior data that allow researchers to deviate from the prevailing focus of mobility analytics (although regions created from mobility networks are fully a part of this conversation). Second, classical I/O methods have given way to newer agglomerative, divisive, hierarchical, and unsupervised classification methods formalized through network science channels. These methods have matured through an interdisciplinary chorus of mathematics, physics, engineering, computer science and social network analysis experts, producing a trailing parade of terms such as subgraphs, partitioning, bottom-up, community detection, regionalization, modularity, etc.

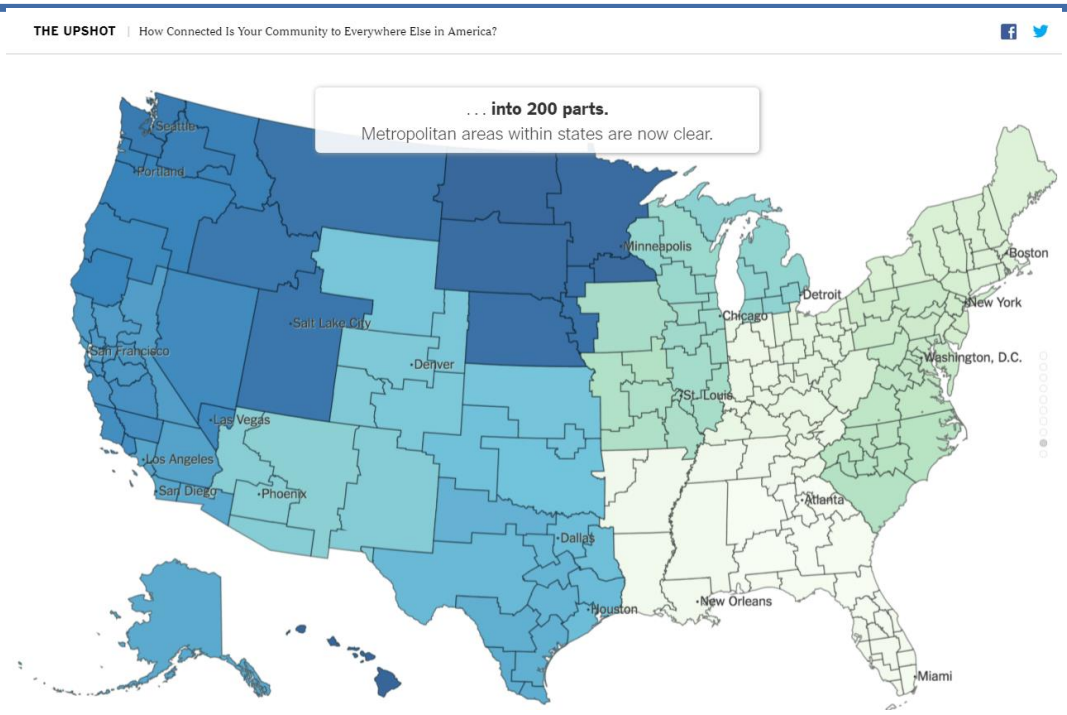

Figure 1. A screen capture from [2] shows the results of hierarchical partitions of a large network of county-to-county Facebook friendships. Although this map shows 200 partitions, the team performed this task for just two partitions (resulting in Hawaii vs. the rest of the U.S.) up to 435 partitions (in which certain counties became their own regions).

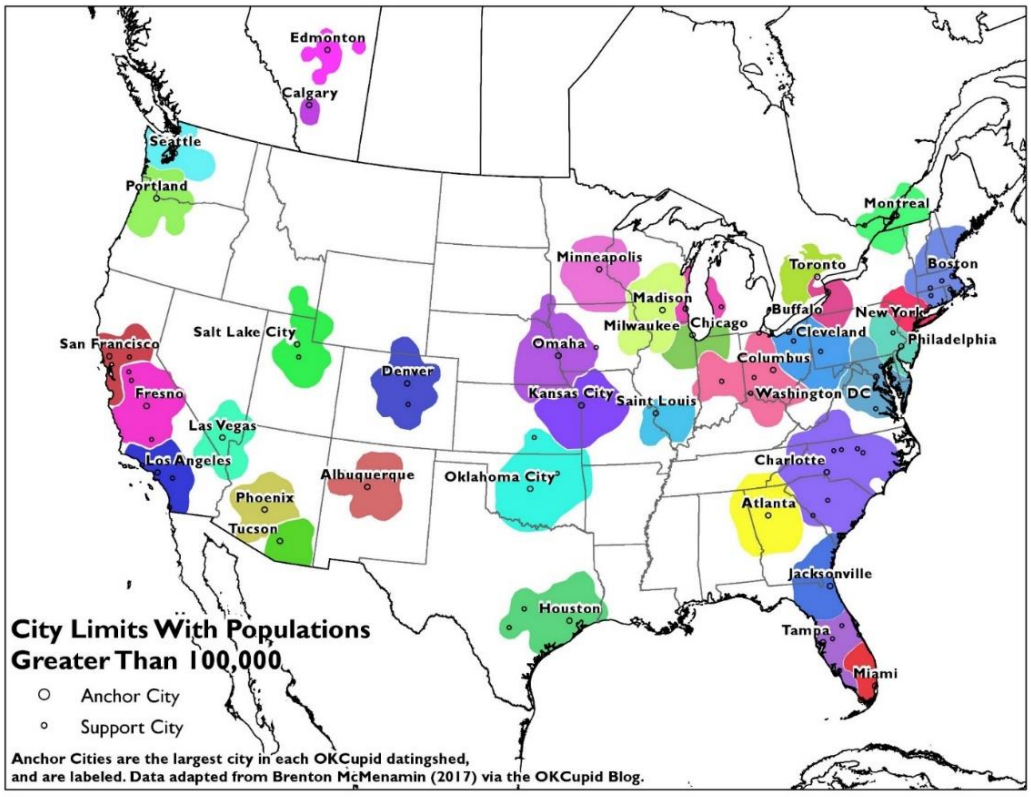

Figure 2. These "online dating" regions were created by using a modularity algorithm to partition a network of messages sent on the popular dating website OKCupid (data re-digitized from [5] with permission). Each color represents a region wherein users send messages to one another intra-regionally more often than inter-regionally.

Combined with computing advances, these new datasets and methods have created a perfect storm for an almost sport-like quest to create regions from social interaction networks at many scales from multi-national regions [8] to neighborhoods [9], [10]. The resulting regions, mathematically, reflect a cohesive group of people who, ostensibly, know one another through chartable degrees of separation (as Dr. Batty has alluded to above with the mention of Stanley Milgram's 'small-world problem'). Each region can be given a score of how well it is partitioned (i.e. does each network neatly nest into its region or does it spill into other regions?), and the overall network can be given a similar universal score. These regions are not prescribed to follow administrative, infrastructural, socio-economic or geophysical boundaries, but often do.

But what do these regions mean? Do people in the regions care about or influence one another? Are those within the region more likely to share information internally? Are these regions tinder boxes where one could ignite a special subarea and information will wildly spread? Do they form culture hearths? (Do we teach the term 'vernacular region' in a network science class now?) Perhaps these regions mark a group with a cohesive mindset who may agree on policies, or who don't demand a cumbersome variety of things (*two* football teams!). Are they easier to serve, or at least more predictable in their groupthink and loyalties (the opposite of a swing state)? These questions could benefit from insight into the *effects* of homophily, the sociological process in which similar entities frequently connect. But even after discovering these effects, even the most straightforward homophilic network could be packed orderly into regions like ice in a tray, or it may sprawl on top of other networks like a basket of yarn. If they do resemble the ice tray, these areas may reflect echo chambers, keeping traditions (for better or worse) and maintaining an identity that fertilizes the underlying space with character and genuineness. (The value judgement we place upon a *genuine* region is a larger conversation.)

Yet, after a decade of SSN regionalization, this research lacks impact. Once researchers partition networks into regions, they revert into a discussion of pure description, e.g. this region joined North and South Carolina as one, or these regions divided Belgium into Francophone and Flemish. And the discussion purports that their method can be very useful for policy makers, epidemiologists, political scientists, urban planners, geographers.

It doesn't seem to be.

Real-world problems do not appear to be solved with this method in the public realm (it may be in use in the private sector) and the cure-all network-based region is not being implemented. There are many reasons why this could be: researchers are not setting out to respond to a problem or do applied work; policy makers are not connected with academic research; there is no central repository of boundaries; the results are impractical to implement; there is no proof that social network regions are an improvement for society. There are also normative values to consider: Should social regions be used to delineate school districts or will that exacerbate segregation? Should they be used to define political districts or will that feed polarization? Should they be used to define neighborhood boundaries or does that reinforce socio-economic differences?

For research to have maximum impact, we should both create the regions and address their utility. To do so, we must be willing to engage in thoughtful testing of what these regions mean. We should also partner with organizations to implement them in the real-world, and document how they can improve upon the current state-of-the-art.

Addendum

The COVID-19 pandemic has shaken networks and galvanized traditional metropolitan regions into the *hyperlocal* (closest shopping facility, helping others on Nextdoor.com, distance to hospital, park etiquette, local policies) and the *wherever*: video chats with colleagues, family and friends in the ether. Our physiological needs depend on the hyperlocal, and our social needs on the wherever. As such, the utility of the social network region comes into question but should not be ignored. The word-of-mouth social pressure from our trusted contacts (family, Instagram influencers) to stay home (or not) and wear a mask (or not) comes from a SSN that absorbs the policies in place and the current situation (responsive Seattle vs. capricious rural Georgia) and circulates these local dictums within in. When these SSNs are geographically compact, the information may stay local, and when they are dispersed, it may disperse. We are seeing that, as always, policy is *applied* to the geographic and regional level. But policy may be *followed* at the social network level. (Similarly, large sources of funding are allocated at the administrative levels, but crowd-sourced sources (e.g. GoFundMe) are gathered at the social network levels.) If our geographic space was partitioned to represent our social space, these activities may convolve. Regional partitioning could be used right now to show:

-Regions where misinformation can (and is being) spread quickly and effectively.

-Regions whose residents have sparse network connections and no central (influential) nodes.

-Regions whose residents have distant or no social support, compounded by lack of Internet connectivity.

-Regions that naturally 'contain' spreading (using mobility networks).

and evoke more specialized policies to help human livelihood during this global crisis.

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Some Thoughts Concerning Network Analysis Approaches in Regional Science
by Hyun Kim

When I was asked to contribute an essay to the newsletter, I thought I had been chosen by mistake. Because the theme of networks is quite popular in many domains of regional science, I thought the topic should be addressed by senior researchers who could offer mature insights into directions for future research, or perhaps by emerging junior scholars who could seek to infuse state-of-the-art knowledge on network analysis into regional science. My own thoughts, by contrast, will focus on the current issues of network analysis in transportation and location science. Even so, I hope that the ideas I present will motivate my readers' future research.

Over the past decade, a number of keywords related to network analysis have garnered a great deal of attention and have thus been widely adapted in regional science: these include vulnerability, reliability, survivability, and accessibility as network measures. At the same time, another layer of terminology, including robustness and resilience, has been recognized as characterizing network performance. Though all these are recognized as essential concepts or methods in network assessment, little effort has been made to clarify the differences between them, so that each discipline understands them differently in relation to its own research. From my perspective, the nuances of the concepts of vulnerability and survivability have more to do with operational aspects, or how a network maintains operations in the face of disruption, whereas reliability and accessibility describe how well it offers services under normal circumstances [1, 2]. Those concepts can perhaps in aggregate represent a dimension of robustness and resilience to networks in a variety of potential scenarios. The underlying issue, however, is that the terms themselves are often used without clear distinction, a practice that might well mislead researchers who seek to understand the characteristics of networks. Empirically, a more reliable network is not necessarily more survivable or more resilient—and vice versa. Often, lower-accessibility stations in a subway system may more significantly affect network functionality. Accordingly, a comparative approach to tracing the relationships among these various concepts could be a fitting task for the next phase of network analysis research.

A second issue relates to the representation of a network. With the aid of computing power and advanced algorithms, capabilities for network analysis have expanded dramatically, so that network representations used for network analysis have become more realistic. Much research, however, still follows the traditional approach in using representations based on graph theory, which tends to translate a complex system into an abstract form: for example, linkages with single connectivity, all-or-nothing operation of nodes, or static flow distribution as a closed system. Network landscapes,

however, are much more complicated, featuring multiple lines of connectivity, multiple transfer gates at a node, partial/complete nodal operation or failure, and dynamic flow among multiple modes. Recent work has demonstrated that network resilience may be presented differently when more complex representations are reflected in the analysis [3].

Third, the issue of standardization and integration of measures should be addressed. A significant advantage of network analysis is the flexibility of modeling that it makes possible, whether based on a mathematical or a statistical approach, and perhaps, there is no single correct methodology. This advantage often allows creation of different outcomes and interpretation with which to understand the characteristics of networks, for the sensitivity of the measures is responsive to the setting of parameters. For example, various accessibility measures are affected by changes to network size (e.g., number of stations and lines), attributes (travel times, friction of distance, amount of flow), and formulation (e.g., addition, multiplication, log-transformation), so that comparing the characteristics of different networks, and even of a single network for longitudinal analysis, is virtually impossible. A standardized measure or research framework is needed to benchmark across networks and prompt follow-up studies [4].

Finally, the spatial disparity associated with use of network analysis can be emphasized for those doing regional science. Networks reflect complicated interactions among people, freight, and information and are represented by spatial disparities in many ways through space. For instance, with evolutions to public transit networks, or in combination with other modes of transport, the beneficiary is differentiated at the local and global scales. How do we display this disparity, test models' validity, and identify significant areas of networks? Sound methods are needed for many network applications through which to gain the information needed for strategic planning that enhances network benefits [4, 5].

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Hyun Kim is an Associate Professor in the Department of Geography at the University of Tennessee, Knoxville. His research interests include network analysis, transportation and location modeling using spatial optimization and GIScience.

David Plane is Awarded the 2020 Hirotada Kohno Award

David Plane has been awarded the 2020 edition of the Hirotada Kohno award. The decision was made by the Jury comprising Mark Partridge (President); Serena Erendira (Council member); Andrés Rodrigues-Pose and Yoshiro Higano (RSAI Past Presidents), which I would like to thank for their service despite these troubled times.

The Hirotada Kohno award is bestowed to eminent regional scientists for their outstanding professional service to our discipline, and this description perfectly fits Prof. Plane's.

In fact, David A. Plane, a Professor Emeritus of the University of Arizona, has been a lifetime contributor to regional science. His research focuses on population geography and regional science, U.S. migration and settlement patterns, the role of the life course in affecting mobility, and methods for modeling activity patterns and temporal change in spatial interaction systems.

Prof. Plane was elected as a Fellow of the Regional Science Association International (RSAI) in 2010. He has served as President and Chair of the North American Regional Science Council (NARSC); President of the Pacific Regional Science Conference Organization (PRSCO); Editor-in-Chief of Papers in Regional Science (PiRS) and Co-Managing Editor of the Journal of Regional Science (JRS); as well as numerous panels and committees for the National Science Foundation, the National Academies, and the U.S. Most importantly, David Plane had been leading the Western Regional Science Association of NARSC as the executive director for 21 years between 1991 and 2011, served as the 57th president for WRSA and elected as a fellow in 2011. For over two decades, David Plane had been the main driving force for the continuing growth of WRSA. He had focused on maintaining the quality of scholarly interaction among regional scientists through the annual meetings of the WRSA. Since 1998, he has been serving as a councillor for PRSCO, which was founded by WRSA and JSRSA (Japan Section of the Regional Science Association) in 1968.

Margaret Bock of West Virginia University to Receive the 20th Annual Benjamin H. Stevens Graduate Fellowship in Regional Science

Margaret Bock, a Ph.D. candidate in Economics at West Virginia University has been selected as the winner of the Twentieth Annual Benjamin H. Stevens Graduate Fellowship in Regional Science. The Fellowship will provide a 2020–2021 Academic Year stipend of $30,000 to support Ms. Bock's dissertation research entitled, "The Road Less Traveled: Economic Analysis of Roads and Highways."

The research investigates the connection between roads and highways on several aspects of urban and rural locales including commuting, mortality, and mayoral elections. The results of this dissertation will be of wide-ranging interest to regional scientists and policymakers given current interest in the state of infrastructure in the United States, poising Ms. Bock to make several scholarly and practical contributions. Ms. Bock's doctoral research is supervised by Joshua Hall, Professor and Chair of Economics at West Virginia University.

In addition to selecting the Fellowship recipient, the Selection Committee identified two applicants as meriting special recognition in the 20th Annual Competition: Melissa Haller, Ph.D. student in the Department of Geography at the University of California Los Angeles (UCLA), supervised by David Rigby; and Sydney Schreiner, Ph.D. student in Agricultural, Environmental, and Developmental Economics at The Ohio State University, supervised by Mark Partridge.

The 20th competition winner and finalists will be recognized at the awards banquet luncheon of the upcoming November 11–14, 67th North American Meetings of the RSAI in San Diego, California.

The Fellowship is awarded in memory of Dr. Benjamin H. Stevens, an intellectual leader whose selfless devotion to graduate students as teacher, advisor, mentor, and friend continues to have a profound impact on the field of regional science. Fundraising efforts to increase the Fellowship's endowment are ongoing. Donations should be sent to: The Stevens Fellowship Fund, First Financial Bank, Attn. Trust Department, 1205 S. Neil Street, Champaign, IL 61820 USA. Checks should be drawn to The Stevens Fellowship Fund. Donations may also be made by credit card through the NARSC website at www.narsc.org/newsite/donations2.php.

The 2020 Stevens Fellowship Selection Committee is composed of: Elizabeth Mack, Geography, Michigan State University (Chair); Daoqin Tong, Geographical Sciences and Urban Planning, Arizona State University; Nicholas Nagle, Geography, University of Tennessee; and Steven Deller, Agricultural and Applied Economics, University of Wisconsin-Madison. The Stevens Fellowship Committee administrates the Stevens Fellowship Fund on behalf of the North American Regional Science Council; its members are: Tony Smith, Chair; David Plane, Secretary; Michael Lahr, Treasurer; Janet Kohlhase; and Neil Reid, Executive Director of NARSC.

The Committee thanks the 24 students who entered the competition in 2020, as well as their dissertation supervisors. Faculty at all North American Ph.D. programs related to the interdisciplinary field of Regional Science are encouraged to have their best students apply for the Twenty-First Annual Stevens Graduate Regional Science Fellowship. The winning student's dissertation research will be supported during the 2021–2022 year with a one-year stipend of $30,000. The application deadline is February 15, 2021. Full submission guidelines will be posted at http://www.narsc.org/newsite/awards-prizes/applications/

NARSC Members' Recent Grant Awards

Funding Agency: National Science Foundation
Amount: $3,000,000
Project Participants: Guangqing Chi, Davin Holen, Ann Tickamyer, Lance Howe, and Chris Maio
Project summary: *NNA Track 1: Pursuing Opportunities for Long-term Arctic Resilience for Infrastructure and Society (POLARIS).* Alaskan coastal Indigenous communities face severe, urgent, and complex social and infrastructural challenges resulting from environmental changes. The challenges demand a robust, integrated, and convergent research platform to identify the complexities of the issues and the ways communities can respond. The POLARIS (Pursuing Opportunities for Long-term Arctic Resilience for Infrastructure and Society) project supplies just that kind of research platform for analyzing current and future needs in order to create resilient communities in the face of a changing

environment. The POLARIS project has identified three convergent research pillars to help communities adapt: environmental hotspots of disruption to communities and infrastructure, food in complex adaptive systems, and migration and community relocation. These pillars are interwoven with five component processes: education, outreach, local community engagement, international comparison and collaboration, and evaluation. Research integrates the pillars where system responses and uncertainties are predicted under several socio-environmental scenarios. This integrated research project will enable communities to become more resilient with both stronger societies, civic culture, and improved infrastructure needed as the new Arctic continues to emerge.

Funding Agency: National Science Foundation Sustainability Research Networks
Amount and Project Participants: Approx. $500K for Kara Kockelman and her students (out of a multi-million-$, multi-campus project, led by Princeton Prof Anu Ramaswami)
Project summary: *Healthy, Sustainable Cities*. My students & I examine the environmental (& other) implications of shared automated electric vehicle fleets (including automated & electric buses). Other impacts include system operational attributes (like service or response times by zone & time of day, average vehicle occupancies, empty vehicle-miles traveled, for different scenarios – like different cities & regions & geofences, with and without CBD parking restrictions on SAEVs, different fares for SAEV use, different technology costs, different battery charging speeds & EV charging station placements, etc.). More info here: https://www.sustainablehealthycities.org/

Other Recent Grants Received by Team Kockelman:

MSPaul (Twin Cities) MPO (MetCouncil) project for $90k (UT portion only) on decarbonization methods (via transportation & land use [UT's focus] + other smart strategies [building, agriculture, etc.]).

TxDOT Pedestrian Crash project, for approx. $350k to identify reasons for ped crashes & treatments & policies to cost-effectively reduce those.

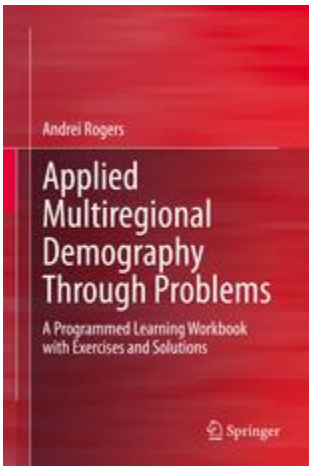
NSF Fellowship (3-years of student costs) for my student (Matt Dean) to investigate power & energy (& GHG & emissions) implications of shared, automated, electric vehicle fleets for US cities & regions.

UT-funded Planet Texas 2050 project on evacuation of Texas coast in event of hurricane (or other fast-emerging disasters, in any location) using smarter routing and guidance strategies, including self-driving vehicles (just $30k/yr for hopefully 2+ years).

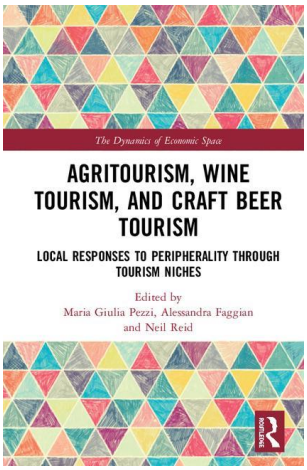
Cruise Automation $50k contribution per year (for 2 yrs) to our NSF Industry-University Cooperative Research Center (IUCRC) on Efficient Vehicles for Sustainable Transportation Systems (EV-STS) with NSF also providing $115k/yr to UT site (& each of other 3 sites). More Center details here: http://www.evsts.org/

NREL & ANL (National DOE labs) funding of students at about $100k/yr (per lab) for operational & energy impacts of our shared autonomous vehicle simulations (in Chicago, Bloomington & Austin).

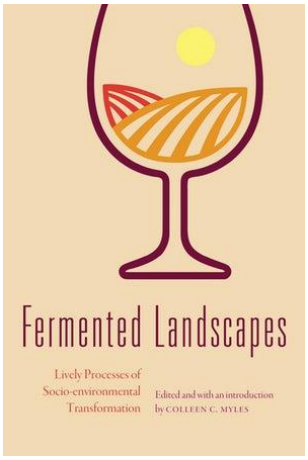
NARSC Members' Recent Books



Title: *Applied Multiregional Demography Through Problems*
Editors: Andrei Rogers
Publisher: Springer
Description: Written by the 2018 Mindel C. Sheps Award winner, this textbook offers a unique method for teaching how to model spatial (multiregional) population dynamics through models of increasing complexity. Each chapter in this programmed workbook starts with a descriptive text, followed by a sequence of exercises focused on particular multiregional models, of increasing complexity, and then ends with the solutions. It extends the current developments in the spatial analysis of social data towards improving our understanding of dynamics and interacting change across multiple populations in space. Frameworks for analyzing such dynamics were first proposed in multiregional demography, over 40 years ago. This book revisits these methods and then illustrates how they may be used to analyze spatial data and study spatial population dynamics. Topics covered include spatial population dynamics, population projections and estimations, spatial and age structure of migration flows and much more. As such this innovative textbook is a great teaching and learning tool for teachers, students as well as individuals who want to study demographic processes across space.



Title: *Agritourism, Wine Tourism, and Craft Beer Tourism: Local Responses to Peripherality Through Tourism Niches*
Editors: Maria Giulia Pezzi, Alessandra Faggian, and Neil Reid
Publisher: Routledge
Description: This book delves into the development opportunities for peripheral areas explored through the emerging practices of agritourism, wine tourism and craft beer tourism. It celebrates the entrepreneurial spirit of people living in peri-urban regions. Peripheral areas tend to be far from urban hubs, providing essential services but also typically suffering from marginalisation and remoteness, despite the access to environmental, cultural and social resources. In this sense, this book investigates the linkages between local agency and tourism in peripheral areas, the role of existing policies, and the evolving bottom-up practices in fostering local development. The basic aim is to disestablish the dichotomies that often emerge when dealing with issues of rural-urban and/or centre-periphery relationships; innovation vs tradition; authenticity vs mise en scene; agency vs inertia; and social, cultural, economic mobility vs immobility etc. With focused attention on the possible compliance or conflicting strategies of local actors with the existing policies, the book considers how local actors and communities respond to the implications of peripherality in areas often impacted by marginalizing processes. Drawing upon case studies from North America and Europe, this book presents this connection as a global phenomenon which will be of interest to community and economic development planners and entrepreneurs.

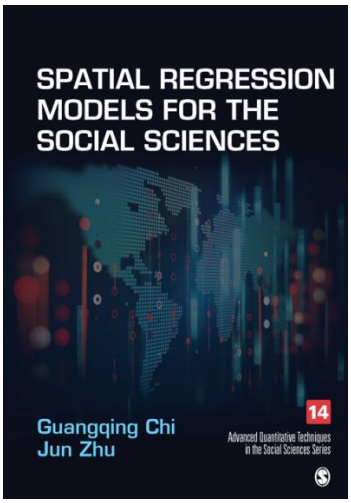


Title: *Fermented Landscapes: Lively Processes of Socio-environmental Transformation*

Editors: Colleen C. Myles

Publisher: University of Nebraska Press

Description: Fermented Landscapes applies the concept of fermentation as a mechanism through which to understand and analyze processes of landscape change. This comprehensive conceptualization of "fermented landscapes" examines the excitement, unrest, and agitation evident across shifting physical-environmental and sociocultural landscapes as related to the production, distribution, and consumption of fermented products. This collection includes a variety of perspectives on wine, beer, and cider geographies, as well as the geography of other fermented products, considering the use of "local" materials in craft beverages as a function of neolocalism and sustainability and the nonhuman elements of fermentation. Investigating the environmental, economic, and sociocultural implications of fermentation in expected and unexpected places and ways allows for a complex study of rural-urban exchanges or metabolisms over time and space—an increasingly relevant endeavor in socially and environmentally challenged contexts, global and local.

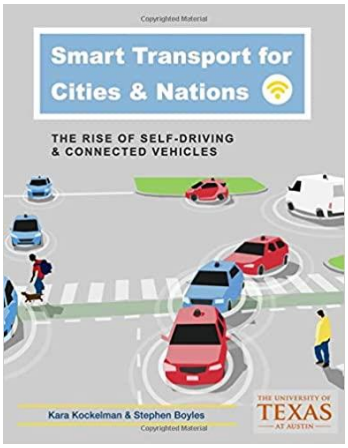


Title: *Spatial Regression Models for the Social Sciences*

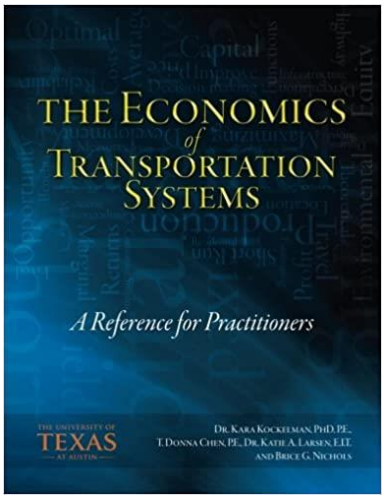
Editors: Guangging Chi and Jun Zhu

Publisher: SAGE

Description: This is a primer type of textbook for social scientists who would like a quick start to learning spatial regression methods. The past few decades have seen rapid development in spatial regression methods, which have been introduced in a great number of books and journal articles. However, when teaching spatial regression models and methods, the authors had difficulty recommending a suitable textbook for students in the social sciences to read. Many of the existing textbooks are either too technical for social scientists or are limited in scope, partly due to the rapid development in the methods. A textbook that provides relatively comprehensive coverage of spatial regression methods for social scientists and introduces the methods in an easy-to-follow approach is much needed. This book fills the gap and focuses on the methods that are commonly used by social scientists and tend to be useful to them. These methods include exploratory spatial data analysis, methods dealing with spatial dependence and/or spatial heterogeneity, and spatio-temporal regression models. The distinguishing features of the book include: comprehensive coverage of spatial regression models—from simple concepts and methods to advanced models—makes this book useful for a diverse audience including instructors, researchers, and students in a wide range of disciplines; the book's pedagogy includes study objectives, sidebars highlighting important points, figures/illustrations, and study questions for easy mastery of the material; supplemental materials including figures in color, data, and codes are available on github.com/srmss, which also hosts online discussions and new materials. This book could be particularly useful for social scientists who are familiar with standard regression methods and desire to learn spatial regression models and methods.



Title: *Smart Transport for Cities & Nations: The Rise of Self-Driving & Connected Vehicles*
Editors: Kara Kockelman and Steve Boyles
Publisher: www.createspace.com
Description: Smart-driving technologies will transform our transportation systems, catalyzing significant mobility, safety, and environmental impacts. Technologies alone are not enough for an optimal transport future: innovative operational strategies, thoughtful policymaking, and strategic investments are needed. This book investigates a variety of smart-transport technologies, policies, and practices for local streets and highways using driverless or autonomous vehicles (AVs), connected vehicles (CVs), roadside equipment, smartphones, and algorithms. Chapter authors explore ideas and equipment for more efficient intersection and network operations for connected and fully-automated vehicle (CAV) operations, alongside a suite of behavioral and traffic-flow forecasts for regions and nations under a variety of vehicle mixes (smart plus conventional, semi-autonomous versus fully autonomous, connected but not automated). The authors also suggest proactive policymaking for vehicle- and occupant-licensing, liability, privacy standards, and micro-tolling, as technologies become publicly available and travel behaviors change. For a free digital version of this book, visit the editor's website: http://www.caee.utexas.edu/prof/kockelman/public_html/CAV_Book2018.pdf



Title: *The Economics of Transportation Systems: A Reference for Practitioners*
Editors: Kara Kockelman, T. Donna Chen, Katie A. Larsen, and Brice G. Nichols
Publisher: www.createspace.com
Description: The Economics of Transportation Systems: A Reference for Practitioners is a comprehensive guide to economic principles and analysis methods designed with the practicing engineer in mind. Unlike traditional economics texts which focus heavily on economic theory, this Reference illustrates economic concepts through transportation applications and case studies, covering a wide range of topics including: • Transportation costs and benefits • Transportation pricing • Regulation and competition • Location choices, land values, wages, and economic development • Investment and financing • Project evaluation • Economic impact analysis • Econometric data analysis The Reference is concisely tailored for busy professionals seeking an understanding of economics principles specifically within the transportation context. Due to a variety of time and data constraints, many transportation practitioners' decision-making processes are not formally documented and emerge via "engineering judgment." However casual in nature, the wisdom behind such judgment comes from past experiences and is rooted in economic considerations and consequences. From travel time savings to job creation (both direct and indirect), income growth to property value changes, motor vehicle crashes to air quality and noise impacts, and microeconomic choices to macroeconomic shifts, transportation policies and investments carry great weight. Where formally assembled data is available, economic analysis tools allow decision-makers to comprehensively evaluate projects. For large projects with significant costs and many others closely scrutinized by the public, practitioners feel more confident about decisions with backed by thorough quantitative analysis. Even when data are lacking and/or decision impacts are minor, a basic

understanding of various economic principles will aid transportation professionals in anticipating the direction and general magnitude of project (and policy) effects. Such understanding helps identify key project impacts and leads to more educated and robust decision-making. This Reference is designed to introduce transportation practitioners to the underlying economic realities of their profession. Ultimately, good engineering judgment, which is vital to defensible and optimal decision-making, relies in large part on good economic judgment. A digital version of this publication can be found for free here:
http://www.caee.utexas.edu/prof/kockelman/TransportationEconomics_Website/TranspEconReference.pdf

Call for Submissions to NARSC Graduate Student Paper Competitions

The North American Regional Science Council Graduate Student Paper Award contest is held annually in conjunction with the North American Meetings of the Regional Science Association International. This contest encourages the participation of young scholars by providing a forum for paper presentation and discussion by senior scholars in the field of regional science. Two separate competitions are held for graduate student papers:

1) **Graduate-Student-Author Paper Competition**: Eligibility for the award is limited to current Masters and PhD students, and/or recent graduates who completed their degrees after August 1, 2019. **Co-authored papers are acceptable; however, all authors listed on a paper must meet the eligibility criteria above.**

2) **Graduate-Student-Led Paper Competition**: Eligibility for the award requires that the paper's "primary author" be a current Masters or PhD student, or a recent graduate who completed his/her degree after August 1st, 2019. **Papers with senior co-authors are acceptable; however, most of the substantive work and contribution of the paper must be directly attributable to an author who meets the eligibility criteria above.**

The 2020 contest will be held in conjunction with the annual North American Meetings of the Regional Science Association International, to be held in San Diego, CA.

Acceptance of the paper requires the following:

1. Individuals should submit a digital copy of their paper formatted using the Papers in Regional Science guidelines.

2. A cover letter from their academic advisor confirming the author(s) meet the eligibility for the competition selected.

For the **Graduate-Student-Author Paper Competition, the cover letter should state that the graduate students meet the eligibility criteria. In addition, the advisor should address that he/she will not be included in the authorship should the paper be published.**

For the **Graduate-Student-Led Paper Competition**, the cover letter should state the approximate percentages of the substantive work (ideas, methods, and applications) and contribution that are

directly attributable to the primary author (a student or recent graduate). In addition, **the cover letter should state that the graduate students meet the eligibility criteria**; and the advisor should agree to have the student(s) remain as the first author(s) should **the paper be published**.

3. **The paper must be presented at the conference by one of the student authors.** Abstracts are due on **July 5, 2020**. The relevant box should be ticked/checked on the abstract submission page indicating the paper is submitted as part of the student paper competition.

4. The full paper and accompanying academic advisor's cover letter are due on **August 1, 2020**. Both, full paper and advisor's cover letter, should be submitted in electronic format to:

Graduate Student-Authored Paper Competitions Chair: **Elizabeth Delmelle**, e-mail: edelmell@uncc.edu

Graduate Student-Led Paper Competitions Chair: **Isabelle Nilsson**, e-mail: inilsso1@uncc.edu

5. For each of the competitions, up to five finalists will be selected from all of the submissions. Each finalist will present their papers in one of two special sessions at the annual North American Meetings of RSAI. **All finalists should attend the Awards Luncheon. This is held on the Saturday of the conference.**

If you have any further questions about the NARSC Graduate Student Paper Award contests, please contact the proper individual listed above according to the type of paper being submitted.