Mathematical Sociologist

Message from the Chair: Murray Webster

Summer is when we catch up on scholarly and other projects, and when we get another reminder of just how long everything takes. One of our members, Bernard P. Cohen, used to speak of "the myth of the infinite summer." We were going to write up last year's data collection, write a proposal for August submission, prepare our chapter for someone's edited book, complete the overdue review for *SPQ*, write the paper we promised for the ASA meetings, catch up on House of Cards, read a couple of books for fun, and take a relaxing vacation

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UNC Charlotte

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University of Massachusetts

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Message from the Chair (continued)

For sure, this is when we think about what to do at Montreal. This year, all Mathematical Sociology activities are on Monday, August 14. Our Open Topic paper session #359 is at 10:30, room 512H. Alison Bianchi has organized the session with five papers showing uses of mathematics in informal, organizational, and military settings. Alex Hanna will preside at the session.

The Mathematical Sociology Awards Ceremony is at 4:30, followed by the Business Meeting at 5:30, room 520A. (The printed ASA Program lists Council Meeting at 4:30, but the online program correctly lists that time as Awards Ceremony.) Following prior years' practice, Council will meet at a different time and place. Our reception, with snacks and a cash bar, begins at 6:30, also in 520A. The ASA Preliminary Program lists many other sessions at which, judging by the paper titles, mathematical analyses are used as well.

I want to congratulate our award winners, who are listed in another part of this Newsletter. They continue to find new uses for mathematics in sociology, and to adapt techniques to new applications. Plan to attend the Awards Ceremony at 4:30 in 520A. The winners will receive recognition and the work for which we recognize them will be described. Of special interest, Lynn Smith-Lovin will receive the James S. Coleman Award for Distinguished Career Contributions to Mathematical Sociology. Lynn has brought mathematical approaches and clarifications to a wide range of topics in social psychology, emotion, and social structure.

I thank members of Council who retire from Council after this year's meetings: Douglas Heckathorn, Past Chair; James A. Kitts, Council; Amir Goldberg, Council; and Emily J. Smith, Student Representative. We congratulate and welcome the newly-elected officers of the Section (see page 10). Special thanks to Pamela Emanuelson and Diego F. Leal, who produced our Newsletter this year; Pam in the fall, and Diego in the Spring. And of course on August 14 I become Past Chair and we welcome Ken Land as Chair of the Section.

Our Section has a new home on the web! Matt Brashears devoted many hours to moving the site, with help from Carter T. Butts and Philip Bonacich. Carter and Phil previously managed the site at UCLA, and it now resides at the University of South Carolina. At some point we may wish to join other sections and move the hosting to ASA, but for now the site works well and is easy to access. I also am grateful to Barbara Meeker, who provided some lost earlier editions of materials from the site, which are now restored at our site. The web address is mnemonic: http://mathematicalsociology.org/

The Section remains strong, both financially and in terms of member participation and activity. It has been an honor for me to chair the Section this year, and to have been a Section member since a workshop in 1994 led to its formation. The Section will be in good hands with Ken Land as Chair and Carter T. Butts as Chair-Elect, and the new and returning Council members. See you in Montreal!

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An Appreciation of Geoffrey Tootell

Michael J. Lovaglia, University of Iowa

Geoffrey Howland Tootell, Professor of Sociology at San Jose State University, died on February 7, 2017, following complications of several surgeries. Geoff was a member of the Mathematical Sociology section since its founding in the 1990s. At San Jose State, Geoff guided several students through their M.A. degrees. Some of them subsequently earned Ph.D.'s at Stanford and are active in our Section, including Alison Bianchi, Paul T. Munroe, and me. Geoff had managed to wrangle the biggest office in the Sociology Department, which became the informal meeting place for his students who gathered at odd hours to "do sociology." When I took his Sociological Research course during an election year, we identified "bellwether precincts" and built a model to predict election results from them. We then identified respondents from precinct membership rolls, surveyed those respondents, and used the data to predict the election's outcome as accurately as some professional pollsters. Geoff's success placing students in elite graduate programs can be traced to his dictum that all students of sociology actively engage in sociological research.

Geoff was born in Rhode Island, February 14, 1927. He matriculated at Harvard in 1944, but interrupted his studies to join the Army, reaching Europe as part of the occupation force in Germany. He returned to Harvard, graduating in 1948, and earned his Ph.D. at Columbia. While at Harvard, Geoff became interested in formal theory (perhaps encouraged by Herbert Simon's formalization of some of Homans' ideas; ASR 1952). At Columbia, Geoff's first idea for a dissertation was to formalize Talcott Parsons' theories. Fortunately Buzz (Morris) Zelditch, then on the faculty at Columbia, convinced Geoff that was impractical and Geoff completed his dissertation on organizations. He later published some of that work with his advisor, Conrad Arensberg, in a book edited by Mirra Komarovsky. (Arensberg's 1942 book, Measuring Social Relations, was an early influence on Robert Freed Bales at Harvard.) Years later, with the mathematician Howard Swann at San Jose State, Geoff built an interaction laboratory, partly relying on what he had seen of Bales' laboratory. Following his Ph.D., Geoff was strongly urged to join the family business, Bemis, a packaging company, incorporated in 1885. He did, becoming Western Regional Manager, headquartered in Fremont, CA. Finding the business world not to his liking, Geoff left it and began teaching at St. Patrick's, a Catholic seminary in Menlo Park, CA. After a few years, he moved to San Jose State University, where he remained until his retirement in 1997.

At San Jose State, Geoff promoted formal theory and mathematical modeling. He audited mathematics courses, some of them taught by his friend and colleague Howard Swann, who had worked with Bales at Harvard. Geoff summarized his approach to sociological research in a biographical sketch to accompany his chapter, "Formalization and Inference" (with Alison Bianchi and Paul Munroe in The Growth of Social Knowledge edited by Szmatka and others, 2002): "I believe that the development of empirically sound formal theory is the only way that

sociology can advance sufficiently to fulfill its promise. Without a formal basis, we cannot be sure how predictions follow from assumptions, nor can we be sure that even good research methods offer a thorough test of a theory."

He also met the love of his life, his wife Linda, at San Jose State and they married in 1987. With his former wife, Geoff had five children and by now there are grandchildren and great-grandchildren. Geoff once said he got interested in sociology because he loved people, individually and in groups. He was strongly committed to social justice. One day in his youth, Geoff noticed a picket line of union workers striking one of the family businesses. He joined the line and was holding a picket sign when an older man who worked for his father approached. He looked hard at Geoff for a minute and then said, "Here is young Geoffrey, not a working man himself, but friend to the working man." At St. Patrick's, Geoff engineered a vote to establish an academic council with equal representation of students and faculty to oversee the curriculum. At San Jose State, he was one of the founders of the faculty union.

Geoff's students have gone on to doctoral study at Stanford, Iowa, UCLA, UC Davis, UC Riverside, Emory, and Brown, among other institutions. Geoff was a founder of the West Coast Conference on Small Group Research, and helped to bring that conference to sessions at ASA and regional meetings. He was a founding member of the Mathematical Sociology Section and endowed the Mathematical Sociology Dissertation Award that now confers a prize of $1500. (Geoff's gift made Mathematical Sociology one of the richest ASA Sections, despite also being one of the smallest sections.) He also envisioned a major prize for sociological research that would grow to rival the Nobel Prizes in resources and influence.

Geoff was modest and self-effacing in manner. He understood arguments faster than most people, but he almost never let them know that. "Could you explain to me how....?" was one of his phrases to gently correct someone's error. He was entirely committed to the discipline and to developing it, and to his students. He lives in the memory of those whose lives he touched; and, through the Dissertation Award, he will continue to impact the discipline and its students for many, many more years.

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ASA Mathematical Sociology Section Sessions

2017 ASA – Montreal

Monday, August 14. Palais des congrès de Montréal

Session Organizer: Alison J. Bianchi, University of Iowa.
Presider: Alex Hanna, University of Toronto.

10:30am-12:10pm (512H)
A Model for Innovation Diffusion with Intergroup Suppression. Joseph M. Whitmeyer, UNC Charlotte; Shariq Husain, Jawaharlal Nehru University.

Costly Communication? Situation Awareness and Tie Preservation in Disrupted Environments. Sean M. Fitzhugh, U.S. Army Research Laboratory; Arwen DeCostanza, U.S. Army Research Laboratory; Norbou Buchler, U.S. Army Research Laboratory; Diane Ungvarsky, U.S. Army Research Laboratory.

Linking Inputs, Outcomes, and their Distributions. Guillermina Jasso, New York University.

Mathematically Modeling How Bureaucrat-Civilian Interactions Affect International Travel and Migration Flows. Jacob Richard Thomas, University of California - Los Angeles.

On the Reliability of Friendship. Francis Lee, University of California-Irvine; Carter T. Butts, University of California - Irvine.

4:30-5:30pm (520A)
Section on Mathematical Sociology Awards Ceremony.

5:30-6:15pm (520A)
Section on Mathematical Sociology Business Meeting.

6:30-8:30pm (520A)
Section on Mathematical Sociology Reception. (Cash bar).

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Section Awards

James S. Coleman Distinguished Career Achievement Award

Lynn Smith-Lovin, Duke University

The committee members are pleased to announce that they have unanimously selected Lynn Smith-Lovin as this year's Career Award winner. The Committee noted that the Section has a number of highly qualified persons, but they all agreed that Lynn's important and extremely influential work, her promotion of formal theory to a diverse range of audiences (many of whom would not otherwise encounter it), and her record of support for young (and not so young) researchers seeking to use formal techniques in their own work more than warranted her selection as this year's James S. Coleman career award.

Committee Members: Carter T. Butts (Chair), Dawn Robinson, Lorien Jasny, Barbara Meeker, and Michael Lovaglia.

Outstanding Student Paper of the Year

"Structure of Capital Rejection"

Sosuke Okada, University of Arizona

Whereas the majority of the papers that were submitted for this year's prize either focused on a methodological contribution or on addressing a sociological problem, what made Okada's paper stand out is that it aspires to accomplish both at the same time. Okada draws on an established approach in mathematical sociology—blockmodeling— and, with a few modifications, applies it to survey data as a means to map the structures of cultural exclusion in Americans' cultural tastes. It is the combination of a sound mathematical approach and an important sociological question that led the committee to a consensus vote on this paper as this year's best submission.

Committee Members: Amir Goldberg (Chair), Neha Gondal, Dennis Feehan, Zack Almquist, and Charles Seguin.

Outstanding Dissertation in Progress

"The Social Origins of Opinion Dynamics: Consolidation, Structural Cohesion, and Political Polarization"

Jaemin Lee, Duke University

Scholars studying opinion polarization have largely focused on the macro-institutional forces (e.g., party sorting, media bias, social movements) or micro-interactional processes (e.g., echo chamber, homophily and distancing). This dissertation contributes to the literature by developing new communicative theories based on a premise that meso-level structures constrain interaction opportunities. The first half of this work focuses on "consolidation." According to Blau's theory, consolidation places constraints on forming "cross-cutting social circles" which, this dissertation argues, can be necessary to reach opinion consensus. To formalize this claim, this dissertation develops a computational model of the meso-level constraint that moderates the agent-level mechanisms—echo chamber, compromise, and distancing. Specifically, the model allows topological patterns and opinion formation to vary upon position alignment across multi-dimensions. Within this framework, this dissertation also investigates how the consolidation-intersection spectrum complicates the agent strategies and external shocks such as fake news. The second half of the dissertation addresses "cohesive nestedness" as a conversational pattern conducive to partisan issue alignment. Using Twitter text data around the 2016 presidential election, it is examined how embedded exchanges with multiple issues contribute to the emergence of polarized issue alignment. This study yields implications about the effective form of deliberation and the debates over the polarization trend in the US.

Committee Members: James A. Kitts (Chair), Alex Hanna, Kevin Lewis, Yongren Shi, and Emma Spiro

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Work by Members of Our Community

Frey, Vincenz and Arnout van de Rijt. 2016. "Arbitrary Inequality in Reputation Systems." Scientific Reports 6: 38304 Trust is an essential condition for exchange. Large societies must substitute the trust traditionally provided through kinship and sanctions in small groups to make exchange possible. The rise of internet-supported reputation systems has been celebrated for providing trust at a global scale, enabling the massive volumes of transactions between distant strangers that are characteristic of modern human societies. Here we problematize an overlooked side-effect of reputation systems: Equally trustworthy individuals may realize highly unequal exchange volumes. We report the results of a laboratory experiment that shows emergent differentiation between ex ante equivalent individuals when information on performance in past exchanges is shared. This arbitrary inequality results from cumulative advantage in the reputation-building process: Random initial distinctions grow as parties of good repute are chosen over those lacking a reputation. We conjecture that reputation systems produce artificial concentration in a wide range of markets and leave superior but untried exchange alternatives unexploited.

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Jasso, Guillermina. 2016. "Mathematical Sociology." In Janeen Baxter (ed.), Oxford Bibliographies in Sociology. New York: Oxford University Press.

Mathematical sociology is sociology expressed in the language of mathematics. It has no special subject matter or special domain, for all of sociology is its domain and all human behavioral and social phenomena are its subject matter. What is distinctive about mathematical sociology is its language, its vocabulary. While articles on particular topical domains expressed in ordinary language have sentences as their main elements—with a subject, a verb, perhaps an object, perhaps embellished with adjectives and adverbs—articles on particular topical domains expressed mathematically have equations as their main elements—a term to the left of the equals sign, to the right a term or terms linked by plus and minus signs, perhaps embellished with subscripts and superscripts. In the same way that sentences are combined into paragraphs, equations are combined into multi-equation models. And in the same way that nouns and verbs are modified by adjectives and adverbs, the terms in equations are modified by transformations and parameters. The task of mathematical sociology is mathematical statement of the terms and relations in all of sociology—from the foundational ideas of the discipline to the starting ideas for its subfields to the predictions and possibilities for all topical domains. Importantly, the task is not embraced for its own sake, though it would be easy to do so based on notions of parsimony, precision, and beauty. Rather, the task is embraced because mathematics is the tool par excellence for advancing knowledge. Two of the ways that mathematics shows its power for advancing knowledge pertain to sociological theory, that is to the very foundations of sociology. First, mathematics is a power tool for deriving testable predictions, including novel predictions, from the foundational postulates in the discipline and the starting ideas in its subfields. Second, mathematics is a power tool for theoretical unification, helping the discipline to reach the goal of understanding more and more by less and less.

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Drabowicz, Tomasz. 2017. "Social Theory of Internet Use: Corroboration or Rejection among the Digital Natives? Correspondence Analysis of Adolescents in Two Societies." Computers & Education 105: 57–67.

This paper tests a theory of social uses of the Internet (López-Sintas, Filimon, & García-Álvarez, 2012), inspired by the work of Bourdieu (1984, 1986, 1989), outside the Spanish national context in which it was initially formulated. Using the OECD's PISA 2012 data for Germany and Norway, it specifically seeks to uncover differences in patterns of Information and Communication Technologies usage among fifteen-year olds and the factors structuring those differences. Simple Correspondence Analysis has been used as the method of investigation. The results of the analysis show similarities between usage spaces in Germany and Norway; where the first, dominant dimension represents the frequency of digital use and the secondary dimension represents the type of frequent digital use. Furthermore, in both countries gender, migration background, family structure, the parents' level of education, material access to the Internet at home, and the number of books at home explain no more than 8.6 percent of the variance in digital usage. At face value, these results suggest that the theory of social uses of the Internet should be rejected when applied to the adolescents in the countries under investigation. The paper argues, however, that the results should rather be interpreted as an indirect corroboration of the theory, with age being one of the most significant aspects of an individual's social standing affecting digital use.

Mamada, Robert. "Potential Games and Competition in the Supply of Natural Resources." Dissertation Completed, School of Human Evolution and Social Change. Arizona State University

This dissertation discusses the Cournot competition and the tragedy of the commons by using potential games. The Cournot model is dependent upon how many firms there are, but many studies do not consider how the resultant equilibrium is sensitive to the change of the number of firms. Specifically, the Cournot model shows that a firm's best policy is to split into separate firms; however, in real life, we usually witness several firms attempt to merge and enjoy the monopoly profit by restricting the amount of output and raising the price. I solve this "contradiction" by using potential games. In addition, the tragedy of the commons is the term used to describe the overexploitation of open-access common-pool resources. Open-access encourages potential resource users to continue to enter the resource until rents are exhausted. The resulting level of resource use is higher than is socially optimal, and can lead to the collapse of the resource and the communities that depend on it. I evaluate the relation between the cost of resource use and the equilibrium number of resource users in open-access regimes, and find that costs of access and costs of production are sufficient to determine the equilibrium number of resource users.

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New Section Officers

Chair-Elect:

Carter T. Butts (University of California - Irvine)

My research involves the development and application of mathematical, computational, and statistical techniques to theoretical and methodological problems within the areas of social and biological network analysis, mathematical sociology, quantitative methodology, and human judgment and decision making.

Council Members:

Dawn T. Robinson (University of Georgia)

Dr. Robinson's research examines how macro-level social structures are produced, conserved, and altered during face-to-face interaction. Her latest project (with Lynn Smith-Lovin), funded by the Army Research Office, is on Computational Models of Cultural Meaning and Social Interaction. In includes refining representations of affective-linguistic culture in the U.S. and North Africa and developing new models for simulating cross-cultural interactions.

Kazuo Yamaguchi (University of Chicago)

Professor Yamaguchi is interested in statistical models for social data and mathematical models for social phenomena, the life course, rational choice, exchange networks, stratification and mobility, demography for family and employment, process of drug use progression. His current research focuses on models of exchange networks and women's occupational careers in Japanese society.

Student Representative:

Diego F. Leal (University of Massachusetts - Amherst)

I'm a Ph.D. candidate in Sociology at the University of Massachusetts - Amherst, and a student affiliate of the UMass Computational Social Science Institute. My research interests are in collective behavior and social network dynamics, including both statistical analysis and agent-based modeling.

Congratulations to them for the elections and thanks for their willingness to serve!

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Thank you for your timely contributions to the Spring/Summer Issue of the Mathematical Sociologist. Please continue to send us your announcements, articles, book reviews, conference announcements, etc. The more you are involved with the newsletter, the better it will be. Please feel free to send us your comments, concerns, corrections, or any ideas you have for the newsletter.

We also wanted to let our members know that the Section website (http://www.mathematicalsociology.org) is now housed in a server at the University of South Carolina. Thanks to the webmaster, Matt Brashears, for keeping the site up and running!

Have a great summer and watch your email for future newsletter editor requests.

Newsletter Co-Editors

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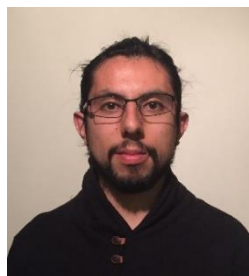
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Mission Statement of the Mathematical Sociology Section

The purpose of the Mathematical Sociology Section of the American Sociological Association is to encourage, enhance and foster research, teaching and other professional activities in mathematical sociology, for the development of sociology and the benefit of society, through organized meetings, conferences, newsletters, publications, awards and other means deemed appropriate by the Section Council. The Section seeks to promote communication, collaboration and consultation among scholars in sociology in general, mathematical sociology and allied scientific disciplines.

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