
BIOGRAPHICAL SKETCH

NAME: Lingxin Hao (Ph.D., University of Chicago)

eRA COMMONS USER NAME (credential, e.g., agency login): LHAO22

POSITION TITLE: Professor of Sociology

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
South China Normal University, China	Bachelor's	02/1982	English
Sun Yat-sen University, China	Master's	02/1985	Sociology
University of Chicago	Ph.D.	08/1990	Sociology
RAND Corporation	Postdoc	08/1995	Labor & Population

A. Personal Statement

Trained as a sociologist and social demographer in an interdisciplinary environment at the University of Chicago's PhD program and as a postdoc of the Labor and Population Program at RAND, I have led a wide variety of NICHD-funded interdisciplinary projects, collaborating with economists, demographers, epidemiologists, statisticians, and computational systems scientists. These experiences have placed me in an excellent position to take the Directorship of the Hopkins Population Center and to promote interdisciplinary population research.

Social inequality is the fundamental social cause of child development disparities. The inherent overlapping social and spatial structures of inequality has brought social, biomedical, and environmental exposures during the critical first 5 years of human life to the research forefront because of complex social-biological interaction, intergenerational transmission of disadvantages, and intra-generational cumulative disadvantages over the life course. From a population health perspective, I see the limitation of single disciplinary inquiry and the strength of combining expertise from often-isolated disciplines, namely sociology, epigenetics, biostatistics, and systems science.

I have collaborated successfully with Dr. Daniel Naiman, an applied mathematical scientist, in authoring two methodological monographs, *Quantile Regression* (2007) and *Assessing Inequality* (2010). In the past year I have intensive exchanges of research ideas and working on a pilot study with Dr. Tak Igusa, a system scientist, while co-advising a PhD student in Civil Engineering, who is the RA of my current R21 project on agent-based modeling of social networks and migration. In addition, I have been engaged in productive exchanges and a preliminary study with Dr. Xiaobin Wang on how to better integrate social sciences with epigenetic research. These rich interdisciplinary research experiences have prepared me to lead the HPC in stimulating and facilitating interdisciplinary research on demography, population health, and reproductive health.

B. Positions and Honors

Professional Positions

2015- Director, Hopkins Population Center, Johns Hopkins University
2003- Professor, Department of Sociology, Johns Hopkins University
1996- Research Associate, Hopkins Population Center, Johns Hopkins University
2001- Research Affiliate, Joint Center for Poverty Research, Northwestern University and University of Chicago
1998-2003 Associate Professor, Department of Sociology, Johns Hopkins University
1996-1998 Assistant Professor, Department of Sociology, Johns Hopkins University
1990-1997 Assistant to Associate Professor (with tenure), Department of Sociology, University of Iowa
1993-1995 Post-doctoral Fellow, Labor and Population Program, RAND Corporation
1993-1999 Consultant, Labor and Population Program, RAND Corporation
1985 Assistant Professor, Department of Sociology, Sun Yat-sen University, China

Professional Activities

- 2011- Chair, Overseas Advisory Board, China Labor-force Dynamics Survey, Sun Yat-sen University, China
- 2012-2016 Board member, Institute for Immigrant Research, George Mason University, U.S.A.
- 2010- Member, the Technical Review Committee for the National Longitudinal Surveys, the U.S. Bureau of Labor Statistics
- 2009-2016 Special Advisor, Advisory Board, Chinese General Social Survey (CGSS), Renmin University of China
- 2006-2011 Member, Special Emphasis Panel, NIH R03, R21, and R15 grant review committee (ZRG1 HOP B 90 S), the U.S. National Health Institute
- 2009 Member, Review Panel, NIH P01 grant review committee (ZHD1-DSR-W (LN), the U.S. National Health Institute
- 2010-2013 Editorial Board, *Sociological Methodology*
- 2001-2010 Editorial Board, *Journal of Marriage and Family*
- 2004-2007 Editorial Board, *Demography*
- 2001-2003 Editorial Board, *Sociology of Education*
- 1998-2001 Consulting Editor, *American Journal of Sociology*

Professional Services

- 2014-2017 Council member, Section on Methodology, American Sociological Association
- 2011-2013 President, North American Chinese Sociologist Association
- 2010-2014 Member, Committee on Mindel C. Sheps Award, Population Association of America
- 2009-2011 Board member, North American Chinese Sociologist Association
- 2009-2011 Member, Committee on Sections, American Sociological Association
- 2008-2009 Chair, Section on Children and Youth, American Sociological Association
- 2005-2007 Council member, Section on Children and Youth, American Sociological Association
- 2006-2008 Council member, Section on Methodology, American Sociological Association

Honors

- 2013-2014 Fulbright Senior Research Scholar
- 2011-2017 Guest Professor, Sun Yat-sen University, China
- 2010-2016 Wu Yuzhang Lecture Professor, Renmin University of China
- 2007 Resident Fellow, Spencer Foundation
- 2002-2003 Resident Fellow, Russell Sage Foundation
- 1991, 1993 Old Gold Fellowship, University of Iowa
- 1988-1990 Dissertation Fellowship, Hewlett Foundation
- 1986-1988 Ernest W. Burgess Research Fellowship, University of Chicago
- 1987 Honor's Pass, Ph.D. Special Field in Advanced Statistics
- 1986-1987 Far East Fund, University of Chicago

C. Contribution to Science

1. Interdisciplinary Research

Much of my innovative research has been borne out of interdisciplinary collaborations because they truly go far beyond the simple sum of multiple ideas. In addition of collaborating with Dr. Naiman in mathematical statistics in writing two methodological monographs to advance research on social inequality, I have jointly worked with economists (Dr. V Joseph Hotz, Dr. David Bishai, Dr. Richard Johnson), epidemiologists (Dr. Ronald Gray, Dr. Maria Wawer), demographer and public health scientist (Dr. Nan Astone), and computational systems scientist (Dr. Joshua Epstein). These collaborations have led to the award of 3 R01 NICHD grants and 1 R21 NICHD grant. Many of my publications are collective work from these projects.

Hao, Lingxin, V. Joseph Hotz and Ginger Z. Jin. 2008. "Games Parents and Adolescents Play: Risky Behavior, Parental Reputation, and Strategic Transfers." *Economic Journal* 118:515-555.

Hao, Lingxin, Nan M. Astone and Andrew J. Cherlin. 2007. "The Effects of Stringent Child Support and Welfare Policies on Non-marital, Teenage Childbearing." *Population Research and Policy Review* 26(3):235-257.

Hao, Lingxin, Nan M. Astone and Andrew J. Cherlin. 2004. "Adolescents' School Enrollment and Employment: Effect of State Welfare Policies." *Journal of Policy Analysis and Management* 23:697-721.

Porter, Laura, Lingxin Hao, David Bishai, David Serwadda, Maria J. Wawer, Thomas Lutalo, Ronald Gray, and The Rakai Project Team. 2004. "HIV Status and Union Dissolution in Sub-Saharan Africa: The case of Rakai, Uganda." *Demography* 41(3):465-482.

2. Social and spatial structure of inequality

Social inequality is structured socially, such as by SES, racial-ethnic hierarchy, and unmarried motherhood, and also spatially, such as by poverty concentration, racial residential and school segregation, and the global South-North divide. My conceptual framework to explain inequality is multilevel from the individual/family micro level to social institution macro level, and spatial structures of communities, regions, and nations. In 5 NSF-funded projects and a Russell Sage Foundation residential fellowship, I have investigated this area and published over 15 journal articles and a book on related topics.

Hao, Lingxin. 2007. *Color Lines, Country Lines: Race, Immigration, and Wealth Stratification in America*. New York: Russell Sage Foundation.

Hao, Lingxin and Siri Warkentien. 2015. "Uneven Hedging of Global Economic Risks: Are Skilled Immigrants Advantaged?" *Population, Space and Place* (DOI) 10.1002/psp.1913.

Hao, Lingxin. 2013. "Admission-Group Salary Differentials in the United States: The Significance of Labor Market Institutional Selection of High-Skilled Workers." *Journal of Ethnic and Migration Studies* 1337-1360. PMID: PMC4530639

Hao, Lingxin and Mary C. Brinton. 1997. "Productive Activities and Support Systems of Single Mothers." *American Journal of Sociology* 102(5):1305-1344.

3. Fundamental social causes of child development

My investigations of longitudinal child development in the cognitive, emotional, and social-behavioral domains center on the fundamental social causes, which are rooted in social and spatial inequality via family, school, and neighborhood processes where children are interacting with relevant adults and other children. A R01 NICHD project, a NSF project, and a Spenser Foundation research project and residential fellowship have supported this work and the resulting numerous journal articles.

Hao, Lingxin and Wei-Jun Jean Yeung. 2015. "Parental Spending on School-Age Children: The Role of SES, Race, and Parental Expectation." *Demography* 52(3):835-860. (DOI) 10.1007/s13524-015-0386-1. PMID: PMC446087

Hao, Lingxin and Han Soo Woo. 2012. "Distinct Trajectories in the Transition to Adulthood: Are Children of Immigrants Advantaged?" *Child Development* 83(5):1623-1639. PMID: PMC4479264

Hao, Lingxin and Suet-ling Pong. 2008. "The Role of School in Upward Mobility of Disadvantaged Immigrants' Children." *The ANNALS of the American Academy of Political and Social Science* 620(1):62-89.

Hao, Lingxin and Ross L. Matsueda. 2006. "Family Dynamics through Childhood: A Sibling Model of Behavior Problems." *Social Science Research* 35:500-524.

4. Population health

Under both broad and narrow definitions of health, my interest lies in the population-level patterns, causal relationships, and the intended and unintended consequences of policies targeting disadvantaged subpopulations. An R01 NICHD project and a NSF project provided the major support for this research. A dozen of my publications on this area features modeling the institutional and contextual constraints on population health.

Hao, Lingxin and Julie J. H. Kim. 2009. "Immigration and American Obesity Epidemic." *International Migration Review* 43(2):237-262.

Hao, Lingxin and Andrew J. Cherlin. 2004. "Welfare Reform and Teenage Pregnancy, Childbirth, and School Dropout." *Journal of Marriage and Family* 66:179-194.

Hao, Lingxin and Yukio Kawano. 2001. "Immigrants' Welfare Use and Opportunity for Coethnic Contact." *Demography* 38:375-389.

Hao, Lingxin and Richard Johnson. 2000. "The Economic, Social and Cultural Origins of Emotional Wellbeing: Comparison of Immigrants and Natives at Midlife." *Research on Aging* 22:599-629.

5. Quantitative and computational methodology

My training in the statistics and economics departments while in the University of Chicago and the labor and population program at RAND have given me an extraordinary foundation, from which I continue to adopt and further develop cutting-edge methodology. I see advances in methodology as necessary tools to advance social science research and I have kept up with major methodological improvements. Innovative substantive ideas require improved tools, the combination of which has carried my career far. An example is my ongoing R21 NICHD project on agent-based modeling of China's unprecedented rural-urban migration. I see computational demography and computational social science as an important bridge with systems science. This R21 project benefits the design of the current R01 application, which incorporates systems science.

Hao, Lingxin. 1997. "Using a Multinomial Logit Specification to Model Two Interdependent Processes with an Empirical Application." *Sociological Methods and Research* 26(1):80-117.

Hao, Lingxin and Eric Fong. 2011. "Linking Dichotomous Segregation with Multigroup Segregation: Weighted Segregation Ratios in Selected U.S Metropolitan Areas." *Social Science Research* 40(1):379-391.
PMCID: PMC4287408

Hao, Lingxin and Fu, Zhaohao. 2017. "Social Network Structure and Migration Perpetuation." Under review at *Demography*.

Fu, Zhaohao and Hao, Lingxin. 2017. "Agent-Based Modeling of China's Rural-Urban Migration and Social Network Structure." Under review at *Physica A*.

D. Research Support

Ongoing Research Support

Agent-Based Modeling of Internal Migration (PI: Hao)

National Institute of Health (NIH) R21 HD078808

09/2014 – 08/2017

Aim: Using computational simulation methods to model causes, process and consequences of the contemporary internal migration in China based on empirical calibrations and validations against the demographic reality.

Role: Principal Investigator

Student Migration and Education Segregation (PI: Hao)

National Science Foundation (NSF) SES1259530

05/2013 – 04/2016

Aim: Conduct a supplemental survey on children of rural migrants to a national survey of junior high students in China to investigate the conditions under which new forms of educational segregation emerge.

Role: Principal Investigator

Research Infrastructure for the Hopkins Population Center

National Institute of Health (NIH) R24HD042854-13

09/01/2014-08/31/2018

Aim: The major goals of the Hopkins Population Center (HPC) are to support the development of population research at Hopkins and to facilitate interdisciplinary collaboration across Hopkins schools and campuses.

Role: Principal Investigator

Completed Research Support (in the past three years)

Rural Migrant Children in China's Urban Schools (PI: Hao)

Senior Research Grant of the Fulbright Program

06/2014 – 08/2014

Aim: Conduct fieldwork in junior high schools at sites of rural migrant sending and receiving areas

Role: Principal Investigator

Immigration, College Education, and Wage Inequality in the U.S. (PI: Hao)

National Science Foundation (NSF) SES1020452

08/2010 – 07/2013

Aim: This project seeks to understand the impact of high-skilled immigration on wage inequality in the U.S.

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.

Follow this format for each person. DO NOT EXCEED FIVE PAGES.

NAME: Helleringer, Stephane

eRA COMMONS USER NAME (agency login): STEHEL

POSITION TITLE: Assistant Professor

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Ecole Normale Superieure, Cachan	BS	05/2000	Economics/Sociology
Universite Paris-X, Nanterre	MA	05/2001	Sociology
University of Pennsylvania, Philadelphia, PA	MA	05/2003	Demography
University of Pennsylvania, Philadelphia, PA	PHD	05/2007	Demography/Sociology

A. Personal Statement

I am a social demographer whose work focuses on 1) developing new methods to measure demographic trends in countries with limited vital registration, and 2) measuring the effects of social networks on health. I have conducted the Likoma Network Study, a unique study during which we mapped the complete networks of social and sexual relationships connecting the residents of Likoma (a small island of Lake Malawi). This study showed the pathways of HIV transmission in populations affected by generalized epidemics. It also highlighted the clustering of various health behaviors (e.g., HIV testing) within networks, and its potential impact on the effectiveness of health interventions. I have also recently tested several new measurement methods for key demographic parameters. For example, I have conducted a randomized trial of a new questionnaire to measure adult mortality in Senegal. That questionnaire significantly improved the completeness of death reports, and permitted more accurately measuring the extent of maternal mortality. I'm currently testing new strategies to improve the reporting of neonatal mortality, including for example the use of audio computer assisted self-interviewing (ACASI). Finally, I'm investigating whether the measurement of age can be improved in impoverished populations where few births are registered. To do so, I'm using newly developed facial recognition and automatic age estimation techniques. These techniques permit obtaining an age estimate solely on the basis of the photograph of an individual's face. They are widely used in a number of fields in high-income countries (e.g., human-computer interactions), but have never been used to strengthen demographic measurement in low-income countries. My work thus mobilizes cutting-edge techniques from a number of disciplines in the social sciences, but also from statistics (machine learning), computer science and engineering. I believe this interdisciplinary approach will help me play a key role in the proposed Scientific/technical core of the Hopkins Population Center.

- Helleringer S, Kohler HP. Sexual network structure and the spread of HIV in Africa: evidence from Likoma Island, Malawi. *AIDS*. 2007 Nov 12;21(17):2323-32. PubMed PMID: [18090281](#).
- Helleringer S, Pison G, Kanté AM, Duthé G, Andro A. Reporting errors in siblings' survival histories and their impact on adult mortality estimates: results from a record linkage study in Senegal. *Demography*. 2014 Apr;51(2):387-411. PubMed PMID: [24493063](#); PubMed Central PMCID: [PMC4487521](#).
- Helleringer S, Pison G, Masquelier B, Kanté AM, Douillot L, Duthé G, Sokhna C, Delaunay V. Improving the quality of adult mortality data collected in demographic surveys: validation study of a new siblings' survival questionnaire in Niakhar, Senegal. *PLoS Med*. 2014 May;11(5):e1001652. PubMed PMID: [24866715](#); PubMed Central PMCID: [PMC4035258](#).
- Helleringer S, Pison G, Masquelier B, Kanté AM, Douillot L, Ndiaye CT, Duthé G, Sokhna C, Delaunay V. Improving survey data on pregnancy-related deaths in low-and middle-income countries: a validation study in Senegal. *Trop Med Int Health*. 2015 Aug 7; PubMed PMID: [26250761](#).

B. Positions and Honors

Positions and Employment

2007 - 2008	Research Fellow (assigned to the Karonga Prevention Study), London School of Hygiene and Tropical Medicine, Chilumba
2008 - 2009	Postdoctoral researcher, University of Pennsylvania, Philadelphia, PA
2009 - 2014	Assistant Professor, Columbia University, Mailman School of Public Health, New York, NY
2015 - 2016	Assistant Professor, Johns Hopkins, Bloomberg School of Public Health, Baltimore, MD
2016 - 2016	Associate Professor, Johns Hopkins, Bloomberg School of Public Health, Baltimore, MD

Other Experience and Professional Memberships

Honors

C. Contribution to Science

- Improving the measurement of adult mortality in low-income countries: estimates of adult mortality in low-income countries are frequently obtained from survey data on the survival of a respondent's siblings. These siblings survival histories are frequently collected, for example, during the Demographic and Health Surveys (DHS). However, such data are affected by (sometimes large) reporting errors. I have extensively worked on a) documenting the magnitude of these errors, and b) devising new strategies to reduce these errors. During studies in Senegal, for example, I have linked survey data to data from longitudinal demographic surveillance systems to show that DHS questionnaires under-estimated the extent of adult mortality. I have then tested a new questionnaire against the DHS questionnaire during a randomized trial. This trial showed that it was possible to significantly increase the completeness and accuracy of siblings' survival histories through simple instrument modifications, including probes and a calendar format. The DHS have recently incorporated the probes we developed into its adult mortality questionnaire.
 - Helleringer S, Duthé G, Kanté AM, Andro A, Sokhna C, Trape JF, Pison G. Misclassification of pregnancy-related deaths in adult mortality surveys: case study in Senegal. *Trop Med Int Health*. 2013 Jan;18(1):27-34. PubMed PMID: [23130912](#); PubMed Central PMCID: [PMC3678730](#).
 - Helleringer S, Pison G, Kanté AM, Duthé G, Andro A. Reporting errors in siblings' survival histories and their impact on adult mortality estimates: results from a record linkage study in Senegal. *Demography*. 2014 Apr;51(2):387-411. PubMed PMID: [24493063](#); PubMed Central PMCID: [PMC4487521](#).
 - Helleringer S, Pison G, Masquelier B, Kanté AM, Douillot L, Duthé G, Sokhna C, Delaunay V. Improving the quality of adult mortality data collected in demographic surveys: validation study of a new siblings' survival questionnaire in Niakhar, Senegal. *PLoS Med*. 2014 May;11(5):e1001652. PubMed PMID: [24866715](#); PubMed Central PMCID: [PMC4035258](#).
 - Gerland P, Masquelier B, Helleringer S, Hogan D, Mathers CD. Maternal mortality estimates. *Lancet*. 2014 Dec 20;384(9961):2211. PubMed PMID: [25625396](#).
- The demographic impact of the West African Ebola outbreak: due to my interest in measuring mortality in populations with limited vital registration, I recently started investigating the impact of the 2014-2015 Ebola outbreak on mortality in Guinea, Liberia and Sierra Leone. Using existing life tables, along with estimates of key epidemiological parameters, I provided the first estimates of the impact of Ebola on life expectancy in affected countries. These estimates suggested that Ebola may have cut life expectancy by up to 5 years in Liberia and Sierra Leone, which would have brought life expectancy back to levels last experienced by these countries at the end of their respective civil wars.
 - Helleringer S, Grépin KA, Noymer A. Ebola virus disease in West Africa--the first 9 months. *N Engl J Med*. 2015 Jan 8;372(2):188-9. PubMed PMID: [25564905](#).
 - Helleringer S, Noymer A. Assessing the direct effects of the ebola outbreak on life expectancy in liberia, sierra leone and Guinea. *PLoS Curr*. 2015 Feb 19;7PubMed PMID: [25737805](#); PubMed Central PMCID: [PMC4339316](#).

- c. HELLERINGER S, NOYMER A. Magnitude of Ebola relative to other causes of death in Liberia, Sierra Leone, and Guinea. *Lancet Glob Health*. 2015 May;3(5):e255-6. PubMed PMID: [25889466](#).
3. Understanding networks of HIV transmission in generalized epidemics: I have initiated the Likoma Network Study (LNS), a unique study of sexual networks in Likoma, a small island of Lake Malawi. Whereas other sexual networks studies conducted in sub-Saharan settings focus on the personal networks of a sample of respondents, the LNS adopted a so-called "sociocentric" approach to reconstruct the full map of sexual networks at the population level. To do so, the LNS started with a census of the population of interest, and then elicited the names of the 5 most recent sexual partners of each inhabitant aged 18 and older. Through this process, we identified highly robust networks, through which more than 50% of the island population were connected. We also found that the networks were decentralized, rather than connected through a small number of high-activity individuals (e.g., sex workers, truck drivers). The LNS findings provide strong evidence on the network mechanisms through which HIV epidemics have become generalized in Malawi and other sub-Saharan countries.
 - a. HELLERINGER S, KOHLER HP. Sexual network structure and the spread of HIV in Africa: evidence from Likoma Island, Malawi. *AIDS*. 2007 Nov 12;21(17):2323-32. PubMed PMID: [18090281](#).
 - b. HELLERINGER S, KOHLER HP, CHIMBIRI A, CHATONDA P, MKANDAWIRE J. The Likoma Network Study: Context, data collection, and initial results. *Demogr Res*. 2009;21:427-468. PubMed PMID: [20179777](#); PubMed Central PMCID: [PMC2825888](#).
 - c. HELLERINGER S, KOHLER HP, KALILANI-PHIRI L. The association of HIV serodiscordance and partnership concurrency in Likoma Island (Malawi). *AIDS*. 2009 Jun 19;23(10):1285-7. PubMed PMID: [19455016](#); PubMed Central PMCID: [PMC2727130](#).
 - d. HELLERINGER S, MKANDAWIRE J, KALILANI-PHIRI L, KOHLER HP. Cohort Profile: The Likoma Network Study (LNS). *Int J Epidemiol*. 2014 Apr;43(2):545-57. PubMed PMID: [23543589](#); PubMed Central PMCID: [PMC3997370](#).
4. Improving the measurement of risky sexual behaviors: I have used the unique design of the Likoma Network Study (LNS) to validate and improve sexual behavior data reported during surveys. Indeed, during the LNS, both partners engaged in a relationship were potentially interviewed and asked to report on their relationship. By investigating discrepancies between multiple reports, it is thus possible to identify relationships and behaviors, which are poorly reported during standard surveys (e.g., demographic and health surveys). In particular, we investigated the reporting of partnership concurrency: we found that the partnership histories on which estimates of concurrency are based were particularly unreliable. Respondents often omit to report relationships, particularly if a relationship has been of short duration and has recently ended. We found that this led to under-estimating the prevalence of concurrency, but over-estimating the duration of overlap between partnership. We also showed that women significantly misreported the age of their partners during surveys, and suggested a new approach to measure the extent of sexual networking within couples.
 - a. HELLERINGER S, KOHLER HP, KALILANI-PHIRI L, MKANDAWIRE J, ARMBRUSTER B. The reliability of sexual partnership histories: implications for the measurement of partnership concurrency during surveys. *AIDS*. 2011 Feb 20;25(4):503-11. PubMed PMID: [21139490](#); PubMed Central PMCID: [PMC3378948](#).
 - b. HELLERINGER S, KOHLER HP, MKANDAWIRE J. Women underestimate the age of their partners during survey interviews: implications for HIV risk associated with age mixing in northern Malawi. *Sex Transm Dis*. 2011 Nov;38(11):1030-5. PubMed PMID: [21992979](#); PubMed Central PMCID: [PMC3241211](#).
 - c. HELLERINGER S, KOHLER HP. Role of concurrency in generalised HIV epidemics. *Lancet*. 2011 Nov 26;378(9806):1844-5; author reply 1845-6. PubMed PMID: [22118439](#).
 - d. HELLERINGER S, MKANDAWIRE J, KOHLER HP. A new approach to measuring partnership concurrency and its association with HIV risk in couples. *AIDS Behav*. 2014 Dec;18(12):2291-301. PubMed PMID: [24817498](#); PubMed Central PMCID: [PMC4496791](#).
 - a.

Complete List of Published Work in My Bibliography:

<http://www.ncbi.nlm.nih.gov/myncbi/stephane.helleringer.1/bibliography/42313670/public/?sort=date&direction=ascending>

D. Research Support

Current Research Support

UNICEF – West and Central African Regional Office

Helleringer, Stephane (PI)

02/01/16 – 06/30/2017

Measuring the impact of the Ebola outbreak on mortality in Guinea and Sierra Leone

Role: PI

R21AI127286

Helleringer, Stephane (PI)

06/23/2016—05/31/2018

Feasibility of measuring HIV-related mortality during population-based surveys in Africa

Role: PI

R21HD087811 –

Helleringer, Stephane (PI)

04/11/16—03/31/2018

Improving survey data on births and neonatal deaths in low-income countries

Role: PI

Hopkins Population Center – Pilot project

Helleringer, Stephane (PI)

07/01/15 – 06/30/17

Improving age ascertainment in demographic studies through machine learning and computer vision methods

Completed Research Support

R03 HD071122

Helleringer, Stephane (PI)

03/01/12-06/28/14

Sexual behaviors, sexual networks and reproductive health in Malawi

Role: PI

R03 HD071117

Helleringer, Stephane (PI)

09/28/11-08/31/13

Improving adolescent and adult mortality data in developing countries

Role: PI

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: Igusa, Takeru

eRA COMMONS USER NAME (credential, e.g., agency login): TIGUSA1

POSITION TITLE: Professor

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Harvard University	AB	06/1977	Applied Mathematics
University of California at Berkeley	PHD	06/1983	Civil Engineering
University of California at Berkeley	Postdoctoral Fellow	06/1985	Civil Engineering

A. Personal Statement

With my multi-disciplinary collaborative research experiences, I am ideally suited to lead the systems modeling and analysis efforts in the newly formed Science and Technology Core of the Hopkins Population Center.

Since 2010, I have been promoting systems science research and educational activities throughout Johns Hopkins. I worked with the deans in the schools of engineering, public health and medicine in identifying faculty members interested in incorporating systems science techniques and theory into their work. One of the first large funded activities that I helped initiate was an NIH center of excellence on Systems-Related Pediatric Obesity Research and Training, funded by NICHD and OBSSR through the U54 mechanism. For the first four years, I served as the Director of the Education and Training Core, which provided support and research mentorship for over 6 post-doctoral and 5 pre-doctoral trainees. The mandate of the Core was to train the next generation of public health researchers to advance the field of childhood obesity research through systems science methods. The trainees were drawn from engineering and public health, with the engineering students spending about a third of their time at the School of Public Health to ensure effective collaboration and cross-disciplinary learning. I am continuing to serve as a co-investigator on three of the science projects of the U54 as well as on a related U01 on computational models for obesity. Some examples of other projects where I have contributed my expertise in systems science are a CDC project involving epidemiologists, environmental health scientists and sociologists on models of community resilience to natural disasters, and an NIH project on forecasting epidemics using stochastic models. Examples of collaborative scientific output from these activities are described in Part C below.

My educational activities include the creation of a new course on systems modeling and analysis, which includes hands-on instruction on computational methods such as agent-based simulation and system dynamics. I have presented shortened versions in workshops for audiences in public health and medicine at Johns Hopkins and at the University of the Witwatersrand, Johannesburg, South Africa. These educational materials were also used in the online EdX course, "System Dynamics for Health Sciences," which was launched in August 2016.

A common thread in these efforts is in finding ways to use systems principles and analytical techniques from an engineering perspective to bring new insights into complex problems in the health sciences. Pre- and post-doctoral trainees are essential to these activities because of current lack of a research workforce that has expertise in systems science and public health. My work as the Director of the Education and Training Core in the U54 noted above exemplifies my approach towards integrating training with research.

B. Positions and Honors

Positions and Employment

1986 - 1992	Assistant Professor, Northwestern University, Department of Civil Engineering
1992 - 1996	Associate Professor, Northwestern University, Department of Civil Engineering
1996 - 1999	Professor, Northwestern, Department of Civil Engineering
1999 -	Professor, Johns Hopkins University, Department of Civil Engineering
2011 -	Professor (Joint Appointment), Johns Hopkins University, Department of Earth and Planetary Sciences
2011 - 2013	Associate Director, Johns Hopkins University, Systems Institute
2011 - 2015	Director of Education and Training, Johns Hopkins Global Obesity Prevention Center, Bloomberg School of Public Health
2013 -	Professor (Joint Appointment), Johns Hopkins University, Bloomberg School of Public Health, Department of International Health
2014 - 2014	Visiting Distinguished Scholar, University of the Witwatersrand, Johannesburg

Other Experience and Professional Memberships

1986 - 1995	Technical Committee on Probabilistic Methods, Engineering Mechanics Division, American Society of Civil Engineers (ASCE)
1990 - 1995	Book Review Editor, Journal of Engineering Mechanics, ASCE
1996 -	Technical Committee on Dynamics, Engineering Mechanics Division, ASCE
1998 - 2003	Associate Editor, Journal of Structural Engineering, ASCE
2008 -	Editorial Board Member, Journal of Structural Safety
2014 -	Member, International Council on Systems Engineering

Honors

1988	Presidential Young Investigator Award, National Science Foundation
1996	Engineering Teacher of the Year, Northwestern University
2002	Robert B. Pond, Sr. Excellence in Teaching Award, Johns Hopkins University

C. Contribution to Science

1. Systems science research in medicine and public health: I have been successful in using methods from systems science to create predictive models in several areas of medicine and public health. In the work with Dugas, et al., I collaborated with physicians in emergency medicine to develop a forecasting model for emergency department visits and hospitalizations due to seasonal influenza. In the papers with Wang, et al. and Gittelsohn, et al., I worked with obesity experts to develop models to simulate eating behaviors of children in urban environments. In all cases, I was able to enable the researchers in medicine and public health to become deeply involved in co-developing the systems science models, including the design of the model structure, data collection, model calibration, and interpretation of the results.
 - a. Dugas AF, Jalalpour M, Gel Y, Levin S, Torcaso F, Igusa T, Rothman RE. Influenza forecasting with Google Flu Trends. PLoS One. 2013;8(2):e56176. PubMed PMID: [23457520](#); PubMed Central PMCID: [PMC3572967](#).
 - b. Wang Y, Xue H, Chen HJ, Igusa T. Examining social norm impacts on obesity and eating behaviors among US school children based on agent-based model. BMC Public Health. 2014 Sep 6;14:923. PubMed PMID: [25194699](#); PubMed Central PMCID: [PMC4179850](#).
 - c. Gittelsohn J, Mui Y, Adam A, Lin S, Kharmats A, Igusa T, Lee BY. Incorporating Systems Science Principles into the Development of Obesity Prevention Interventions: Principles, Benefits, and Challenges. Curr Obes Rep. 2015;4(2):174-81. PubMed PMID: [26069864](#); PubMed Central PMCID: [PMC4452216](#).

- d. Beheshti, R, Igusa, T, Jones-Smith, J, Simulated models suggest that price per calorie is the dominant price metric that low-income individuals use for food decision-making”, *Journal of Nutrition*, 2016 (Epub ahead of print). DOI: [10.3945/jn.116.235952](https://doi.org/10.3945/jn.116.235952). PubMed PMID: [27655757](https://pubmed.ncbi.nlm.nih.gov/27655757/).
2. Novel applications of stochastic processes. My contributions in this area are in finding new ways to integrate the analysis of stochastic processes into a wide range of disciplines. This includes work with materials science experts in Liu, et al. for understanding the behavior of composites; collaboration with atmospheric scientists in Ryoo, et al. for tracing the stochastic trajectories of moisture-laden air parcels in the troposphere; work on classifying turbulent patterns with fluid dynamicists in Kermani, et al, and a multi-disciplinary project with Liu, et al. on human behavioral processes during natural disasters.
- a. Liu H, Arwade SR, Igusa T. Random composites characterization and damage estimation using Bayesian classifiers. *Journal of engineering mechanics*. 2007; (133):129-140.
- b. Ryoo JM, Igusa T, Waugh DW. PDFs of Tropical Tropospheric Humidity: Measurements and Theory. *Journal of climate*. 2009; 22:3357-3373.
- c. Kermani A, Khakpour HR, Shen L, Igusa T. Statistics of surface renewal of passive scalars in free-surface turbulence. *Journal of fluid mechanics*. 2011; (678):379-416.
- d. Liu, Z, Jacques, C, Szyniszewski, S, Guest, J, Schafer, B, Igusa, T, Mitrani-Reiser, J. Agent-Based Simulation of Building Evacuation after an Earthquake: Coupling Human Behavior with Structural Response. *Nat Hazards Rev*. 2016; 17(1): 04015019. [http://dx.doi.org/10.1061/\(ASCE\)NH.1527-6996.0000199](http://dx.doi.org/10.1061/(ASCE)NH.1527-6996.0000199)
3. Analysis of uncertainties: I have developed methods of analysis of uncertainties in complex systems with large numbers of variables. In Wan and Igusa, we assessed estimation errors that arise from optimization under uncertainty; in Fritz, et al. we developed predictive modeling tools for structural engineers faced with unconventional data sets; and in Jalalpour, et al., we introduced methods that could be used for the design of structures with significant uncertainties. The work with Lyon, et al. was a collaborative effort with researchers in child psychology. We developed a system dynamics tool for modeling the impact of universal depression screening while considering the impact of false positives.
- a. Wan Z, Igusa T. Statistics of Nadaraya-Watson estimator errors in surrogate-based optimization. *Optimization and Engineering*. 2006; (7):385-397.
- b. Fritz WP, Igusa T, Jones NP. Predictive models from statistically non-conforming databases. *Journal of Structural Engineering*. 2009; (135):567-575.
- c. Jalalpour M, Guest JK, Igusa T. Reliability-based topology optimization of trusses with stochastic stiffness. *Structural safety*. 2013; (43):41-49.
- d. Lyon AR, Maras MA, Pate CM, Igusa T, Vander Stoep A. Modeling the Impact of School-Based Universal Depression Screening on Additional Service Capacity Needs: A System Dynamics Approach. *Adm Policy Ment Health*. 2016 Mar;43(2):168-88. PubMed PMID: [25601192](https://pubmed.ncbi.nlm.nih.gov/25601192/); PubMed Central PMCID: [PMC4881856](https://pubmed.ncbi.nlm.nih.gov/PMC4881856/).

Complete List of Published Work in My Bibliography:

<https://www.ncbi.nlm.nih.gov/sites/myncbi/takeru.igusa.1/bibliography/49578477/public/?sort=date&direction=descending>

D. Research Support

Ongoing Research Support

U54HD070725, NIH/NICHD

Lee (PI)

09/22/11-12/31/17

Johns Hopkins Pediatric Obesity Research and Training Center

My roles are to lead the educational activities of the center, collaborate with public health researchers on developing systems science models for obesity and support the administrative activities of the Center.

Role: Faculty

U01HD086861, NIH/NICHD

Lee (PI)

09/27/15-07/31/20

Virtual Population Obesity Prevention (VPOP) Labs: Computational, Multi-Scale Models for Obesity Solutions

My role is as a part of an interdisciplinary team that will develop an agent-based model for designing and evaluating obesity interventions and policies.

Role: Faculty

R24HD042854, NIH/NICHD HPC Pilot Grant

Igusa (PI)

03/10/17-02/28/18

Systems Analysis of Inequality Propagation in Child Development

I am collaborating with a team of engineering students and a sociologist in exploring the pathways and system interactions that lead to inequality in child development.

Role: PI

Staurulakis Discovery Fund

Shah and Igusa (PI)

04/01/16 – 03/31/17

Optimizing detection of subclinical malignancy in systemic sclerosis

My role is to develop methods to assess and compare time-dependent risks of malignancy of a cohort at the JHU Scleroderma Center using autoantibody and other scleroderma-related information to identify subgroups with significantly elevated or reduced risks.

Role: PI

119801, MIT

Igusa (initiating PI, currently co-PI)

11/01/14-06/30/17

Clinical Trials System Project

I am one of the leaders of the research activities of this multi-institution project that currently includes Johns Hopkins, MIT and the Cleveland Clinic. We are using systems approaches to deconstruct the current state of practice of drug development and clinical trials and are exploring possible major changes that could lead to greater efficiencies and improved health impact. Funding is from Bloomberg Philanthropies and other sources.

Role: co-PI

104264 , CDC

Links (PI)

09/01/14-08/30/17

Towards a Community Resilience Index: Public Health Systems Preparedness and Emergency Response
My role is to develop system dynamics models of resilience that includes the feedback and interactions between the public health and other sectors within a community during post-event response and recovery.
Role: Faculty

1215872, NSF

Guikema (PI)

10/01/13-09/30/17

Hazards SEES Type 2: Modeling to Promote Regional Resilience to Repeated Heat Waves and Hurricanes
I will work in a multi-disciplinary team in developing agent-based models of the interaction of human behavior, infrastructure damage and hazard mitigation policy in response to repeated heat waves and hurricanes.
Role: Co-Investigator

Completed Research Support

JLGD-05, Jerome L. Green Foundation

Shah (PI)

01/01/14-12/31/14

Development of a Prediction Model to Quantify Malignancy Risk in Systemic Sclerosis
My role is to develop mathematical models for simulating the risk of cancer using information from clinical and biochemical datasets.
Role: Co-PI

U54HD070725-01, NIH/NICHD

Igusa (PI)

09/22/11-06/30/12

Johns Hopkins Pediatric Obesity Research and Training Center, Education and Training Core
My role in the first year of this U54 was to lead the design and implementation of an array of educational and training components to increase the number of health researchers with capacities in systems science who can advance our understanding of the causes of, and solutions to, the epidemic of childhood obesity
Role: PI

1262260, NSF

Igusa (PI)

07/15/13-06/30/16

Technology, Collaboration, and Learning Modeling Complex International Innovation
My role is to work with the co-PI, Dr. Danielle Wood of Aerospace Corporation and the PI of a parallel project, Prof. Dava Newman of Aeronautics and Astronautics and Engineering Systems at MIT, on developing systems models of innovation in nations seeking to develop aerospace technology.
Role: PI

0801471, NSF

Graham-Brady (PI)

07/01/08-06/30/14

IGERT - Modeling complex systems: the scientific basis of coupling multi-physics models at different scales
My role in this project is to explore the assimilation of data and models in multi-physics phenomena including statistical analysis of spatial-temporal data.
Role: Faculty

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: Elizabeth L. Ogburn

eRA COMMONS USER NAME (credential, e.g., agency login): eogburn

POSITION TITLE: Assistant Professor

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Harvard College	A.B.	06/03	Philosophy and Mathematics
Columbia University	M.S.	05/06	Statistical Genetics
Harvard University	Ph.D.	05/11	Biostatistics
Harvard School of Public Health	Postdoctoral	07/13	Biostatistics and Epidemiology

A. Personal Statement

My research is in causal inference and epidemiologic methods. Broadly, I am interested in developing methods for and describing the behavior of traditional statistical machinery when standard assumptions are not met, including a focus on the foundations of causal inference for new settings and datasets that are more complex than the traditional settings for causal inference methods.

Currently a major focus of my work is on analysis network data. I am working on methods for statistical inference when observations are dependent, with a dependence structure informed by network topology rather than Euclidean topology, and on how to identify causal effects when treatments exhibit interference (that is, when one subject's treatment may affect other subjects' outcomes) and outcomes exhibit contagion.

I have collaborated with epidemiologists on a series of papers assessing the population-level associations between various environmental exposures and maternal and birth outcomes. I am a member of the Data Analysis Center for the Environmental Influences on Child Health Outcomes Program, in which capacity I advise researchers and work on new methodology for combining and analyzing disparate data sources to assess the associations between environmental exposures and childhood health outcomes.

B. Positions and HonorsPositions and Employment

07/11-06/13 Research Fellow, Program on Causal Inference, Harvard School of Public Health (Advisor: Tyler VanderWeele)
07/13- Assistant Professor, Department of Biostatistics, Johns Hopkins University

Professional Service and Public Advisory Committees

03/12	Session Chair, Eastern North American Regional Meeting of the International Biometric Society
08/12	Session Chair, Joint Statistical Meetings
05/13	Planning Committee, Atlantic Causal Inference Conference
03/14	Session Organizer, Eastern North American Regional Meeting of the International Biometric Society
01/14-	Publications Officer, American Statistical Association, Section on Statistics in Epidemiology
09/14-	Associate Editor, <i>Journal of the American Statistical Association</i>
11/15-	Associate Editor, <i>Epidemiologic Methods</i>
12/15-	Associate Editor, <i>Journal of Causal Inference</i>
05/16	Planning Committee, Atlantic Causal Inference Conference
10/16-	Associate Editor, <i>Biostatistics</i>
07/17	Organizer, Institute for Mathematical Statistics New Researchers Conference

Ad hoc reviewer for: *American Journal of Epidemiology*, *Annals of Applied Statistics*, *Annals of Epidemiology*, *Biometrics*, *Biometrika*, *Epidemiology*, *Epidemiologic Methods*, *International Journal of Biostatistics*, *International Journal of Epidemiology*, *Journal of Clinical Epidemiology*, *Journal of Causal Inference*, *Journal of Machine Learning Research*, *Journal of the Royal Statistical Society: Series B*, *Journal of Statistical Research*, *Statistics in Medicine*, *Statistics and Probability Letters*

Honors

08/05-06/06	Peter J. Sharp Scholarship, Columbia University (<i>Full-tuition, merit-based scholarship</i>)
05/08	Robert Balentine Reed Prize for Excellence in Biostatistical Science, Department of Biostatistics, Harvard University (<i>Awarded for the highest score on the doctoral qualifying exam</i>)
06/11	Student Research Award, Graybill Conference on Modern Parametric Methods
06/11	Travel Award, Society for Epidemiologic Research
05/12	Thomas R. Ten Have Award, Atlantic Causal Inference Conference (<i>Awarded for exceptionally creative or skillful research on causal inference</i>)
05/12	Mathematics Travel Grant, Association for Women in Mathematics and Division of Mathematical Sciences of the National Science Foundation
08/12	Travel Award, 24th Annual Conference, International Society for Environmental Epidemiology
11/16	Kavli Fellow, National Academy of Sciences

C. Contribution to Science

1. Epidemiologic data is never perfectly clean; it is plagued by measurement error, selection bias, and other irregularities that can have unpredictable impacts on the estimation of causal effects. I proved analytic results characterizing the bias due to mismeasurement of confounders under certain assumptions about the measurement error process and about the effect of the confounder on the exposure and outcome. I also proved related results about the bias to causal mediation effect measures due to misclassification of a binary mediator. These results provide important formal foundations for commonly held intuitions about bias. In one instance my formal results contradicted claims in the extant epidemiologic literature; in other instances they filled in gaps in the literature. The results themselves are straightforward but the proofs are not trivial, relying on properties of convex combinations.
 - a. **Ogburn EL**, VanderWeele TJ. On the nondifferential misclassification of a binary confounder. *Epidemiology*. 2012 May;23(3):433-9. PMID: PMC3365922

- b. **Ogburn EL**, Vanderweele TJ. Bias attenuation results for nondifferentially mismeasured ordinal and coarsened confounders. *Biometrika*. 2013;100(1):241-248. PMID: PMC3761876
 - c. VanderWeele TJ, Valeri L, **Ogburn EL**. The role of measurement error and misclassification in mediation analysis: mediation and measurement error. *Epidemiology*. 2012 Jul;23(4):561-4. PMID: PMC3367328
 - d. **Ogburn EL**, VanderWeele TJ. Analytic results on the bias due to nondifferential misclassification of a binary mediator. *Am J Epidemiol*. 2012 Sep 15;176(6):555-61. PMID: PMC3530348
 - e. **Ogburn EL**. Commentary of “Mediation analysis without sequential ignorability: using baseline covariates interacted with random assignment as instrumental variables” by Dylan Small. *J Stat Res* 2012;46(2):105-111. PMID: pending
2. Networks, or collections of “nodes” and of “ties,” representing pairwise relations between nodes, can be crucial to understanding social, biological, and physical systems. Many aspects of networks are active areas of research, but there is a glaring hole in our ability to learn about network systems, namely a dearth of valid methods for statistical inference about observations associated with network nodes. Statistical inference is usually based on the assumption that the observations in a sample are independent with respect to the trait under study, but this assumption does not hold when the observations are linked to one another by social network ties and the trait of interest is affected by or related to those ties. New statistical methodology is needed in these settings, and my work focuses on developing the foundations for such methodology. In addition to the statistical challenges due to dependence across nodes, another challenge for causal inference using network data is the violation of one of the fundamental assumptions of traditional causal inference, namely that one subject’s treatment has no effect on another subject’s outcome. When this assumption is violated we say that interference is present, where interference is the effect of one subject’s treatment on another’s outcome. Different kinds of processes can result in interference, but the literature to date has not distinguished among them. I proposed classifying interference into three distinct causal mechanisms. I demonstrated how to represent each of these three mechanisms using directed acyclic graphs (DAGs), which are causal diagrams that aid in formally identifying causal effects (Pearl, 1995). Relatedly, I showed how DAGs can be used to discern assumptions under which contagion and infectiousness effects are identifiable. These are mediation effects defined by VanderWeele et al. (2012) to describe two distinct pathways by which one individual’s treatment for an infectious disease can affect another individual’s infectious disease outcome.
- a. **Ogburn EL**, VanderWeele TJ. Vaccines, Contagion, and Social Networks. *Annals of Applied Statistics*, in press. PMID: pending
 - b. VanderWeele TJ, **Ogburn EL**, Tchetgen Tchetgen EJ. Why and when “flawed” network analyses still yield valid tests of no contagion. *Stat Politics Policy*. 2012;3(1):Art. #4. doi:10.1515/2151-7509.1050. PMID: pending
 - c. **Ogburn EL**, VanderWeele TJ. Causal diagrams for interference. *Stat Sci*, in press. PMID: pending
3. Environmental exposures may affect entire communities or populations and may have, in the aggregate, substantial effects on population health. But assessing the impact of environmental exposures is particularly challenging precisely because they affect groups of people rather than individuals, making it difficult to isolate the effect of the exposure from the effects of other group-level covariates or confounders. I have worked with researchers to design analyses that best disentangle the effect of an environmental exposure of interest from other covariates, including the use of natural experiments.
- a. Casey JA, Morello-Frosch R, Mennitt DJ, Fristrup K, **Ogburn EL**, James P (in press). Inequity in noise pollution in the United States. *Environmental Health Perspectives*.

- b. Rasmussen SG, **Ogburn EL**, McCormack M, Casey JA, Bandeen-Roche K, Mercer DG, Schwartz BS (in press). Asthma exacerbations and unconventional natural gas development in the Marcellus Shale. *JAMA Internal Medicine*.
- c. Casey JA, Savitz DA, Rasmussen SG, **Ogburn EL**, Pollak J, Mercer DG, Schwartz BS (2015). Unconventional natural gas development and birth outcomes in Pennsylvania, USA. *Epidemiology*.
- d. Casey JA, **Ogburn EL**, Rasmussen SG, Irving JK, Pollak J, Locke PA, Schwartz BS (2015). Predictors of Indoor Radon Concentrations in Pennsylvania, 1989-2013. *Environmental Health Perspectives*.

A recent list of all published work is on my website: <http://www.eogburn.com/cv.html>

D. Research Support

Ongoing Research Support

ME-1310-07763 (Kass)

11/01/14 – 10/31/17

PCORI

Demonstrating Respect and Acceptable Consent Strategies: What Matters to Patients in PCOR?

PCOR can improve the quality of medical care. Current informed consent requirements, developed for riskier research, may not be a good fit for PCOR, while posing barriers to its efficient implementation. This study will examine patients' views about the acceptability of four, more or less streamlined, disclosure/consent approaches for PCOR. We will also examine patients' views of additional ways of demonstrating respect to patients in PCOR, beyond consent, including practices of engagement, transparency, and accountability (ETA).

Role: Co-Investigator

N00014-15-1-2343 (Ogburn)

05/01/15 – 04/30/18

Office of Naval Research

Valid Statistical Inference for Network Dependent Data

This project comprises a two-pronged approach to the development of statistical methods for network data. We develop methods to test for dependence that is informed by network topology and ad hoc, easy-to implement corrections to standard statistical inference procedures to account for such dependence. We will also develop new theoretical results for statistical dependence informed by network topology.

Role: PI

1R01KL122150-01A1 (Gittelsohn)

05/14/15 – 03/31/20

NIH/NHLBI

Multilevel Program & Policies to Reduce Chronic Disease for American Indians

OPREVENT2 is a chronic disease prevention program that works at multiple levels (tribal, worksites, food stores, schools, households) in six American Indian communities in Wisconsin and New Mexico. The program will work in partnership with tribal leaders to develop, enact and enforce policies and programs to reduce chronic diseases. The ultimate goal is to lead to significant and sustained reductions in obesity and other chronic diseases, such as diabetes and cancer.

Role: Co-Investigator

R01DA041736 (Solomon)

01/01/17 – 05/30/21

NIH/NIDA

Individual, Network and Spatial Drivers of HIV and HCV Among PWID in India

This multisite cohort study is designed to evaluate the role of individual-, network- and environmental factors on HIV/HCV incidence among people who inject drugs in three Indian cities. Additional objectives include the examination of the social diffusion of the HIV care continuum within drug using networks and the overlap of phylogenetic and self-reported network data in relation to HIV and HCV infection.

Role: Co-Investigator

U24OD023382 (Jacobson/Parker)

09/21/16 – 08/30/23

NIH

ECHODAC (Environmental Influences on Child Health Outcomes Data Analysis Center)

The ECHO Program will create an extensive resource for elucidating the roles of environmental and genetic characteristics that affect child health. The Data Analysis Center will advance ECHO research by providing state-of-the-art study designs and analyses, and by publicizing high quality, well documented ECHO data to promote informative analyses by the scientific community at-large.

Role: Co-Investigator

Completed Research Support

221360 (Tsai)

03/01/14 – 09/30/16

Mass General Hospital Sub – JHSPH PI: Ogburn

Health Outcomes, Progressive Entrepreneurship, and Networks (HopeNet): Microenterprise and Clean Water

The 'Emikago' Study was conceived to improve understanding of how people's structural embeddedness within several types of sociocentric support networks was associated with a variety of health-related outcomes, behaviors and attitudes among people in low-resource settings. This study proposed to develop a dataset characterizing the whole network structure of rural communities in Uganda with respect to key development issues.

Role: Co-Investigator

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. DO NOT EXCEED FIVE PAGES.

NAME: Mei-Cheng Wang

eRA COMMONS USER NAME (credential, e.g., agency login): mwang5

POSITION TITLE: Professor of Biostatistics

EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
National Tsing-Hua University, Taiwan	BS	1978	Mathematics
University of California, Berkeley, California	MS	1983	Statistics
University of California, Berkeley, California	PhD	1985	Statistics

A. Personal Statement

Dr. Wang is Professor of Department of Biostatistics, Johns Hopkins Bloomberg school of Public Health. She was one of the originators to study truncation, length-bias and prevalent sampling, and has contributed substantially to study analytical methods for recurrent events and recurrent marker process data with applications in prospective follow-up or longitudinal studies. Dr. Wang's research interests include failure time and survival analysis, longitudinal and recurrent event data, semiparametric inference, diagnostic testing and risk prediction, and sampling bias models. Dr. Wang is an elected fellow of the American Statistical Association (ASA) in 1998, an elected member of the International Statistical Institute (ISI) in 2015, and an elected fellow of the Institute of Mathematical Statistics (IMS) in 2017. She has provided considerable professional service to the statistical and scientific professions by participating in various scientific committees and panels, and serving as Associate Editor for statistical journals including JASA, Biometrics, Journal of Lifetime Data Analysis and Statistica Sinica. She is currently Editor-in-Chief of the Journal of *Statistics in Biosciences*. Dr. Wang's scientific collaboration includes considerable experience in environmental child health research, aging studies and Alzheimer's disease, AIDS, Cancer and mental health. She has served as principal investigator for multiple NIH R01 grants and Biostatistics Cores of large-scale program projects to develop statistical methods for longitudinal and survival data in health-related studies. Dr. Wang will be a leading statistician in the Sci&Tech Core of Hopkins Population Center and provide consulting and mentoring service to the center.

B. Positions and Honors**Positions and Employment**

1981-1985 Teaching Assistant/Research Assistant/Acting Instructor, Department of Statistics, University of California, Berkeley, California

1985-1991 Assistant Professor, Department of Biostatistics, School of Hygiene and Public Health, The Johns Hopkins University, Baltimore, Maryland

1991-1998 Associate Professor, Department of Biostatistics, School of Hygiene and Public Health, The Johns Hopkins University, Baltimore, Maryland

1998- Professor, Department of Biostatistics, School of Hygiene and Public Health, The Johns Hopkins University, Baltimore, Maryland

Other Experience and Professional Memberships

1990-Present	Member of Ad Hoc Committees for NIH study sections for AIDS and mental health research
1994-1998	Appointed Member, AIDS and Related Research Study Section 2. (ARRB), NIH.
1996	Program Chair of ENAR for American Statistical Association meeting in Chicago
1997-Present	Associate Editor, <i>Biometrics</i> (1997-2000); <i>J. Am. Stat. Assoc.</i> , Application & Case study Section (1996-1998); Associate Editor, <i>J. Am. Stat. Assoc.</i> , Theory-Method Section (1999-2002); Associate Editor, <i>LIDA</i> (1994-present); <i>Statistica Sinica</i> (2005-2008; 2011-present)
1999	Program Chair of ICOSA, 1999 ASA Meeting at Baltimore, Chair of ICOSA Publication Committee
2000	Chair of ICOSA Nomination Committee; 2000-2003 ICOSA Board Director
2004	Appointed Member, NSF Grant Review Panel, Statistics and Probability Screening Panel
2006	Appointed Member, NSF Review Committee of SAMSI
2014-Present	Mentoring Committee Member, Biostatistics and Bioinformatics Branch, NICHD, NIH
2014	Member, Review Panel of Centers for AIDS Research (CFAR), NIAID, NIH
2013-2016	IMS representative to CBMS (Conference Board of the Mathematical Sciences)
2015	Chair, ICOSA Biometrics Section
2015-Present	Co-Editor, <i>Statistics in Biosciences</i>
2017	Chair, Lifetime Data Analysis Interest group (LIDA-IG), American Statistical Association

HONORS AND AWARDS

2017	Elected Fellow of the Institute of Mathematical Statistics (IMS)
2015	Elected Member of the International Statistical Institute (ISI)
2013	National Tsinghua University College of Science Outstanding Alumni Award
2004	AMTRA (Advising, Mentoring, and Teaching Award), Johns Hopkins Bloomberg School of Public Health
1998	Elected Fellow of American Statistical Association (ASA)
1998	Member of Delta Omega Honorary Society, Public Health Alpha Chapter

C. Contribution to Science

C.1 Statistical Methodological Research

Truncation, length-bias and prevalent sampling. Dr. Wang was one of the originators to study analytical methods and theory for truncation, length-bias and prevalent sampling in prospective and retrospective studies, with emphasized applications to data collected through cohort studies or healthcare systems. Since her first paper on random truncation (Wang et al., 1986), she has independently explored and developed numerous methodologies and inferential results, and has made considerable contributions to the field. The research work started from her early work on nonparametric and semiparametric estimation of a distribution function in late 1980s, then extended to testing, competing risks, regression models and length-bias sampling in 1990s. In 2000s the work further integrated with research topics in other areas such as causal inference (Cheng and Wang, 2012, 2014) and biomarker risk assessment (Shanshan Li's PhD dissertation, manuscript under preparation). The research results were mostly published in leading journals such as *JASA*, *Biometrika*, *Biometrics* and *Annals of Statistics*. The methodologies developed along this direction are well connected to Dr. Wang's collaborative research via a broad array of data applications in areas including cancers, HIV-AIDS and aging studies, as evidenced by her collaborative papers published in numerous biomedical journals.

1. Wang MC, Jewell NP, Tsai WY (1986). Asymptotic properties of the product-limit estimate under random truncation. *Annals of Statistics* 14:1597-1605.
2. Wang, MC (1989). A semiparametric model for randomly truncated data. *Journal of the American Statistical Association* 84:742-748.
3. Wang MC (1991). Nonparametric estimation from cross-sectional survival data. *Journal of American Statistical Association* 86:130-143.
4. Wang MC (1996). Hazards regression analysis for length-biased data. *Biometrika* 83:343-354.

Recurrent gap time models and interval sampling. The article of Wang and Chang (1999) provided the first nonparametric approach to correctly estimate the recurrence survival function, which was often incorrectly estimated by practitioners using the Kaplan-Meier estimator (1958, JASA) from pooled recurrence times. The paper of Wang and Chang (1999) recognized the bias generated by intercepted sampling when observing recurrent gap time data. A nonparametric approach was proposed and it has led to subsequent research conducted by her advisees and other statisticians in the field (including practitioners in health service research). The problem of intercepted sampling extends from estimation inference to hypothesis testing and was studied in the paper of Wang and Chen (2000). On this topic, Dr. Wang has also supervised PhD dissertations to extend existing models/methods (Prentice et al. 1983; Wang and Chang, 1999) to regression model setting with structural and infinite nuisance parameters (Chang and Wang, 1999) and to bivariate gap time model (Huang and Wang, 2005). Population-based healthcare data provide comprehensive information on disease prevalence, incidence, mortality, morbidity, survival rate as well as patients' demographic and clinical characteristics. Collection of disease surveillance data is typically subject to the design of interval sampling, where the sampling criteria require study subjects diagnosed with a disease (such as breast or ovarian cancer) within a specific calendar time interval. For each enrolled subject, the time of initiating event (such as birth) is determined retrospectively and the subsequent failure event (such as death) is monitored during the course of follow-up. An important application is the SEER cancer registry data. This research topic was explored in the PhD dissertation of Hong Zhu under the supervision of Dr. Wang, where they investigated statistical methods and inference to study the joint survival function under a semi-stationary assumption and the association between bivariate survival data through a stationary copula model; the detailed work is summarized in the paper of Zhu and Wang (2012). The work was further extended by Zhu and Wang (2014) to nonparametric estimation of the association between bivariate failure times based on Kendall's tau, and to a nonparametric test of quasi-independence based on a bivariate conditional Kendall's tau.

1. Wang MC and Chang SH (1999). Nonparametric estimation of a recurrent survival function. *Journal of the American Statistical Association* 94:146-153.
2. Huang CY and Wang MC. (2005). Nonparametric estimation of a bivariate distribution of recurrence times. *Biometrics* 61, 392-402.
3. Zhu, H. and Wang M-C. (2012). Analyzing Bivariate Survival Data with Interval Sampling and Application to Cancer Epidemiology. *Biometrika* 99(2): 345-361. [PMCID 3635712]
4. Zhu H and Wang MC (2014). A Semi-Stationary Copula Model Approach for Bivariate Survival Data with Interval Sampling. *Biometrika*. 101 (3): 519-533.

Recurrent event/marker process in the presence of a terminal event. In the past 15 years, Dr. Wang has developed numerous nonparametric and semiparametric approaches for analyzing recurrent event data. Among the publications, some of the papers were published based on the first author's PhD dissertation work under Dr. Wang's supervision, in which case Dr. Wang typically served as the second author. Under the topic on 'Recurrent event/marker process in the presence of a terminal event,' three conceptually different approaches have been investigated: (i) Forward recurrent event/marker process, (ii) Backward recurrent event/marker process, (iii) Failure-time-adjusted recurrent event process.

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2. Wang MC and Chiang CT (2002). Nonparametric methods for recurrent event data with informative and non-informative censorings. *Statistics in Medicine* 21. p445-456.
3. Chan, G. and Wang M-C. (2010). Backward estimation of medical cost in the presence of a failure event. *Annals of Applied Statistics*, Vol. 4, No. 3, 1602-1620.
4. Chan, G. and Wang M-C. (2016). Modeling and estimating the terminal behavior of recurrent marker processes before failure events. *Journal of the American Statistical Association*. To appear.

Biomarkers and diagnostic testing. In recent years there has been a renewed interest in diagnostic testing, especially when biomarkers are involved. New technologies produce thousands of biomarkers that are potentially useful for disease diagnosis or treatment assignments. Rigorous evaluation of diagnostic tests and

biomarkers is a high priority in research. In the field ROC related techniques have played major roles for evaluating marker predictability as well as evaluating classification rules. Tree-based classifiers have been widely used in biomedical research when multiple (or high-dimensional) markers or multiple sources of information are available from subjects, but rigorous inferential results have been lacking regardless of popularity of ad hoc use of tree-based classifiers by practitioners. Using an arbitrarily combined and-or classifier (i.e., tree-based classifier), Wang and Li (2012, 2013) introduced ROC function together with a weighted ROC function (WROC) and their conjugate counterparts for examining the performance of multiple markers. Dr. Wang plans to continue the related research along this direction with her PhD students in the near future.

1. Wang M-C. and Li, S. (2012) Bivariate Marker Measurements and ROC Analysis. *Biometrics* 68 (4): 1207–1218. [PMCID 3530667]
2. Wang, M-C. and Li, S. (2013) ROC Analysis for Multiple Markers with Tree-Based Classification. *Journal of Lifetime Data Analysis*; 19(1):79-99. [PMCID 3633731].

C.2 Population Child Health Research

Dr. Wang has a long history collaborating with faculty and scientists at Johns Hopkins Bloomberg School of Public Health on numerous projects to study biomarkers, risk factors or treatment efficacy in relation to various child health outcomes.

1. O'Campo P, Xue X, Wang MC, Caughy M(1997). Neighborhood risk factors for low birth weight in Baltimore City: A multilevel analysis. *American Journal of Public Health* 87:1113-1118.
2. Wang G, Divall S, Radovick S, Paige D, Yi N, Hong X, Caruso D, Pearson, Wang MC, Zuckerman B, Cheng T and Wang X. (2014) Preterm birth and random plasma insulin levels at birth and in early childhood. *JAMA*. Vol 311, No. 6:587-596.
3. Ouyang F, Korrick S, Venners S.A., Zhang J, Wang MC, Christian P, Wang X (2014) Preconception serum 1,1,1-trichloro-2,2-bis(p-chlorophenyl)ethane and B-vitamin status: independent and joint effects on women's reproductive outcomes. *American Journal of Clinical Nutrition*. 100:1470–1478.
4. Li M., Fallin D., Riley A., Landa R., Walker S., Silverstein M., Caruso D., Pearson C, Kiang S., Dahm J., Hong X., Wang G., Wang MC., Zuckerman B., Wang X. (2016) The association of maternal obesity and diabetes with autism and other developmental disabilities. *Pediatrics*. Feb. 137(2).