Keynote Speaker

09:30-10:15, November 7

Dr. Huey-Jen Jenny Su

President, National Cheng Kung University

Dr. Huey-Jen Su is currently a Distinguished Professor of Environmental Health of the National Cheng Kung University in Taiwan. Trained at the Harvard School of Public Health, Dr. Su has engaged most of her research efforts on the topic of air pollution related health effects, with particular emphasis on the rising global concerns on airborne microbial hazards. She was an expert committee member for preparing the report of "WHO Guidance for Biological Agents in the Indoor Environment".

In recent years, Dr. Su has extended her investigation into the health outcomes attributable to global environmental changes. Dr. Su has also served at the National Committee for Air Pollution Abatement as well as National Council for Sustainable Development where she advised and supervised the national programs on assessing health risks associated with environmental exposures.

In addition to her academic concentrations and accomplishments where international collaboration was always a strong component throughout, Dr. Su has been actively involved in international projects of professional, non-profit, or non-government nature. The opportunities and experiences had brought her in connection with people and organizations of various clusters, including academia, industry, art, conservation, among others. As of February 2015, Dr. Su took the mantle of NCKU President as the first female President of its 85-year-long history. In July 2015, Dr. Su was elected as a chairperson of Foundation for International Cooperation in Higher Education of Taiwan.

Data-Informed Decision Making in Public Health:
Case Study in Tainan

Dr. Huey-Jen Jenny Su
President, National Cheng Kung University

Data is an invaluable and persuasive presentation for all sectors concerned. Being data-informed is about striking a balance in which own expertise and understanding of information acts as great a role in the decisions as the information itself. From a public-health standpoint, to promote the data-informed decision making is even more critical in light of rapidly changing environment. In 2015, the worst dengue epidemic seen in a century was experienced in Tainan, a southern city of Taiwan, and resulted in 0.52% death among 22,777 confirmed cases. Our university (NCKU) facilitated the overall strategic design and implementation of local government to manage the further outbreak in strengthening disease surveillance, monitoring medical adverse events, informing transmission models, and tracking patient sentiments and mobility through real-time application of massive data. It effectively improves the predictive model, and lowered the potential risk. Moreover, the challenge also successfully fostered young talents across all disciplinary in the university to identify a brand-new opportunity of complimenting each other's expertise for innovative solution never seen before. It is foreseeable that the data revolution will vastly improve the point-data resolution and timeliness of available epidemiological information. With hybrid systems advancing rather than abandoning traditional surveillance systems, there comes better prospects for achieving more accurate infectious diseases models, including effective forecasts toward emerging or re-emerging mosquito-borne diseases like Zika virus.

Keynote Speaker

10:15-11:00, November 7

Dr. David S. H. Rosenthal

Founding Chief Scientist, LOCKSS Program

Stanford University Libraries

With Vicky Reich, Dr. David S. H. Rosenthal co-founded the LOCKSS (Lots Of Copies Keep Stuff Safe) Program at the Stanford University Libraries and recently retired after nearly two decades as its Chief Scientist.

The LOCKSS Program pioneered the distributed approach to digital preservation, providing open-source software that communities can use to build networks that preserve digital content such as journals, books, web archives, data and digitized collections against a broad range of threats.   Experience shows that operator error is a major cause of data loss.   Nodes in LOCKSS networks are independently administered and do not trust each other to defend against operator error and other threats.   The paper describing how this works won a "Best Paper" award from the prestigious SOSP conference, and is part of the program's long record of peer-reviewed publication.   Against the Trusted Repository Audit Criteria the technology gained the first and still the only perfect score.   The program has been financially self-sustaining for a decade.

Dr. Rosenthal has an M.A. from Trinity College, Cambridge and a Ph.D. from Imperial College, London.   He was part of the IBM-funded Andrew Project at Carnegie-Mellon University, which pioneered campus-wide networking.   As a Distinguished Engineer at Sun Microsystems, he played a major role in developing Version 11 of the X Window System, only now being phased out after 30 years providing the user interface technology for Unix-like system such as Linux.   He also worked on Sun's GX series of graphics chips, which led to becoming employee #4 and Chief Scientist at NVIDIA, by far the world's most successful graphics chip company.

He has published extensively on computer graphics, operating systems and digital preservation, is a named inventor on 24 US patents, and blogs on digital preservation and scholarly communication.

The Amnesiac Civilization

Dr. David S. H. Rosenthal
Founding Chief Scientist, LOCKSS Program
Stanford University Libraries

What is the data that informs a society? It is easy to think that it is just numbers, timely statistical information of the kind that drives Google Maps' real-time traffic display. But the rise of text-mining and machine learning means that we must cast our net much wider. Historic and textual data is equally important. It forms the knowledge base on which civilization operates.

For nearly a thousand years this knowledge base has been stored on paper, an affordable, durable, write-once and somewhat tamper-evident medium. For more than five hundred years it has been practical to print on paper, making Lots Of Copies to Keep Stuff Safe. LOCKSS is the name of the program at the Stanford Libraries that Vicky Reich and I started in 1998. We took a distributed approach; providing libraries with tools they could use to preserve knowledge in the Web world. They could work the way they were used to doing in the paper world, by collecting copies of published works, making them available to readers, and cooperating via inter-library loan. Two years earlier, Brewster Kahle had founded the Internet Archive, taking a centralized approach to the same problem.
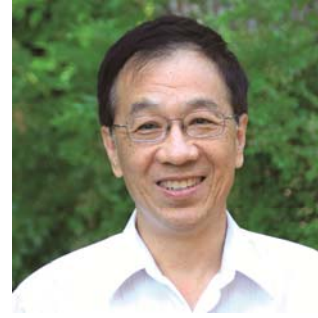
Why are these programs needed? What have we learned in the last two decades about their effectiveness? How does the evolution of Web technologies place their future at risk?

Keynote Speaker

Dr. Yang-Chih Fu

Research Fellow, Institute of Sociology

Academia Sinica

Dr. Yang-chih Fu gained fieldwork experience in both social surveys and participant observation in Taiwan before receiving graduate training in sociology at the University of Chicago. These experiences and training have inspired and guided the overall empirical studies that he has developed throughout his career as a sociologist at Academia Sinica. Among his research interests, Dr. Fu focuses on urbanism and lifestyles, social network studies, and social media, mostly by analyzing data from large-scale social surveys. He also develops contact diaries that help build actual and comprehensive archives to capture the dynamics of personal networks and social interactions in everyday life. Such a contact-based approach extends the basic unit of social network analyses from tie to contact and helps researchers better explore patterns of interactions and networking on social media. His major contributions utilizing this innovative approach have been published in the flagship journal of social network studies, *Social Networks*, among others.

To help track long-term changes in Taiwan society, over the past decade, Dr. Fu has served as both PI and co-PI of the Taiwan Social Change Survey, an annual survey series that has accumulated over 120,000 successful interviews since 1985. As a delegate to the International Social Survey Programme, Dr. Fu has been a member of both the Standing Committee and the Methodology Committee. He has co-authored and co-edited books (in Chinese) on social surveys and co-edited *Social Capital and Its Institutional Contingency* (Routledge) and *The Sage Handbook of Survey Methodology*.

In addition to conducting various research projects, Dr. Fu has also taught at National Taiwan University and spent significant efforts on serving the academic community. At the Academia Sinica he has served as the Director of the Office of Survey Research (now Center for Survey Research) and the Director of the Institute of Sociology. For two years, he was Director General of the Department of Humanities and Social Sciences, National Science Council (now Ministry of Science and Technology). These administrative duties have helped Dr. Fu broaden his vision of conducting interdisciplinary research on social networks in the digital era.

Tracking Social Interactions with Data from Sampling Surveys, Contact Diaries, and Social Media

Dr. Yang-Chih Fu

Research Fellow, Institute of Sociology, Academia Sinica

As building blocks that link the individual to society, social interactions are intriguing yet difficult to observe and interpret. Due to the complexity of human nature and social circumstances, researchers have found it particularly challenging to transform social interactions into hard data for scientific analysis. This talk highlights and compares three approaches of collecting and analyzing quantitative data about how people contact or connect with one another: sampling surveys, contact diaries, and social media.

For nearly half a century, large-scale social surveys have generated patterns of interpersonal contacts and social networks based on probability sampling and questionnaire interviewing. Even though sampling procedures often yield representative samples that facilitate statistical inferences to populations of interests, social surveys may suffer from recall bias, social desirability, and limited depth of data. In contrast, contact diaries, a powerful though rarely used unconventional approach, dig deep into the complex circumstances around interpersonal contacts in everyday life. The resulting longitudinal diary logs help build actual and comprehensive databases of social interactions from a small group of participants.
While both sampling surveys and contact diaries rely on elaborate research designs that require participants' efforts to provide data, the digital era offers an unprecedented opportunity to study social interactions based on data automatically recorded on social media, as well as data collected via sensors and other electronic devices. By integrating existing approaches of collecting designed data into the emerging approach of studying recorded data on social media, sociologists can join data scientists to apply both theoretical reasoning and methodological rigor to better understand social interactions in the 21st century.

Keynote Speaker

09:45-10:30, November 8

Prof. Ruth Mostern

Associate Professor, Department of History,

and Director, World History Center, University of Pittsburgh

Ruth Mostern joins us as Associate Professor of World History, on leave in AY 2016-17. Mostern is a specialist in spatial and environmental history focusing on imperial China and the world. An interdisciplinary scholar with research interests bridging the humanities, social sciences, information science and environmental science, she has authored one book and edited another and has completed two major digital publications and eighteen articles. She has raised approximately $1.8 million in extramural funding and currently holds grants from both the National Endowment for the Humanities and the National Science Foundation.

Mostern's current research reconstructs the environmental history of the Yellow River as a human and natural system. She is studying the entire river basin (which stretches from the Tibetan plateau to the Pacific Ocean) during a timeframe of approximately 5,000 years in order to assess when, and to what degree, human activity in the upper and middle reaches of the river increased the risk of flooding on the densely populated lower course of the river. She is creating a digital atlas that includes a GIS (a digital mapping system) and database of the dates and locations of disasters and civil engineering works in the river basin. This data-rich atlas will support interdisciplinary advances in the understanding of large-scale human-environmental impact.

Meanwhile, Mostern is also a leading collaborative initiative to create a world-historical "gazetteer" that can facilitate the geocoding of linked open data for large-scale and long-term historical analysis.

Worlds Full of Places: Toward a Global Ecology of Historical Gazetteers

Prof. Ruth Mostern

Associate Professor, Department of History, and Director, World History Center,
University of Pittsburgh

Writing about the concept of place in 1975, the renowned cultural geographer Yi-fu Tuan famously explained that "the fireplace and the home are both places. Neighborhood, town, and city are places; a distinctive region is a place, and so is a nation." For that reason, he concluded, "as centers of meaning the number of places in the world is enormous and cannot be contained in the largest gazetteer."

Tuan's insight challenges me to think about place as a historian, and as a world historian in particular. Places are made into centers of meaning by means of purposeful and historical work which occurs in a context of social power, and which transpires over a span of time. The study of place names is the story of that work. Places also gain meaning because they are entangled in dense webs of relationships: with one another in itineraries and hierarchies, with their own many names and histories, and with events, texts, people, things and data that are particularly associated with them. In the age of the digital humanities and spatial history, Tuan's insight sets an agenda for data modeling, database design, and a linked data infrastructure for semantically linking names with other information.

Moreover, Tuan is correct that no gazetteer can be complete, because it is impossible to contain the entirety of human knowledge in a single publication. The implausible alternative is the fictional useless map imagined by Jorge Luis Borges, "whose size was that of the Empire, and which coincided point for point with it." On the other hand, it is now possible, in the world of networked knowledge organization systems that we now inhabit, to foster the development of a great many small gazetteers. Each of these can depict a collection of information that some developer considers to be meaningful. What is then needed is to design systems that allow these gazetteers to be searched and used together.

This talk reviews current research, development and prospects in gazetteer theory, design, and networking. It explains why attention to place names is a matter of enduring importance in the digital and spatial humanities, introduces exemplars and publications about gazetteers, and showcases new and emerging work including my own World Historical Gazetteer project.

Keynote Speaker

09:00-09:45, November 9

Prof. Min-Fu Hsu

Distinguished Professor, Department of Architecture

National Cheng Kung University

      Graduated with a Bachelor and Master of Science degree from the Department of Architecture of National Cheng Kung University (NCKU), Taiwan, Professor Hsu went to UK to pursue a doctoral degree in Architecture at the University of Edinburgh. Upon graduation, Professor Hsu returned back to NCKU in 1986 to assume the position of Associate Professor and attained his full Professor position six years later. Apart from providing advisory services to various local government offices, Professor Hsu has taken on various positions in the University administrations. For instance, from 1993 to 1996, he was the Head of Department of Architecture and between 2003 and 2009, he was the Dean of School of Planning and Design. During his academic stint, he has been actively involved with the conservation and rehabilitation works of domestic built heritage and the scientific applications of modern technologies on the historic structures. In recognition of his 35 years of academic contributions, Professor Hsu achieved the Distinguished Professor position in 2014.

My Experience on the Application of 3D Digital Data on Cultural Heritage Cases in Taiwan

Prof. Min-Fu Hsu
Distinguished Professor,
Department of Architecture, National Cheng Kung University

The concept of national digital archive took off ever since the Taiwanese National Science Council initiated the "National Digital Archives Program" in 2002 and the "National Science and Technology Program for e-Learning" in 2003. Since then, our team began to apply the 3D laser scanning technique to archive and digitalize our nation's precious cultural assets, and at the same time, to apply these digitalized imagery data for other related research studies.

For more than a decade, our research team has been actively exploring different ways in applying the 3D digital technologies on the conservation of various types of cultural heritage in Taiwan. In this presentation, I will share our experience of applying the digitalized imagery data on four aspects, namely, the digital documentation of historic buildings and cultural assets, the challenges of documenting mural painting digitally through time, the digital revival of traditional carpentry wisdom and artefact and lastly, the application of 3D simulations for the conservation of historic buildings.

Having successfully accomplished various projects using 3D digital imagery technology for historic buildings, we hoped the digital information that has been established for the various cultural assets could become a fundamental basis for future research and that the systematic research protocols that we set out from the various projects could be applied to other aspects of studies nation-wide.

Dr. Ling-Jyh Chen

Associate Research Fellow,

Institute of Information Science, Academia Sinica

Dr. Ling-Jyh Chen received the B.Ed. degree in information and computer education from National Taiwan Normal University in 1998, and the M.S. and Ph.D. degrees in computer science from University of California at Los Angeles in 2002 and 2005 respectively. He joined the Institute of Information Science of Academia Sinica as Assistant Research Fellow in 2005, and became an Associate Research Fellow in 2011. He is jointly appointed as Associate Research Fellow at the Research Center for Information Technology Innovation of Academia Sinica, and as Associate Professor at the Department of Computer Science and Information Engineering of National Taiwan Normal University. His research interests are networked sensing systems, wireless and mobile networks, and social computing.

Dr. Chen has over 100 technical publications in international journals, international conferences, and book chapters. He is on the Editorial Board of several international journals. He has served on the technical program committee of over 100 international conferences, and chaired/co-chaired tens of international conferences. He received the Best Paper Award in IWSEC 2008, and was recognized as Exemplary Reviewer of IEEE Communications Letters in 2010. His current project is a participatory sensing system, called AirBox, for PM2.5 monitoring, and the project has deployed more than 2,500 devices in 30 countries. The AirBox project has become the most popular PM2.5 open data portal in the world. Dr. Chen is an honorary member of Phi Tau Phi Scholastic Honor Society, a Senior Member of IEEE, and a Life Member of ACM and IICM.

Making Sense of Internet of Things: Using AirBox as an Example

Dr. Ling-Jyh Chen

Associate Research Fellow

Institute of Information Science, Academia Sinica

With emerging concerns of air pollution and recent advances in Internet of Things (IoT) technology, air quality monitoring has become one of the most important IoT applications in many countries and major cities. One of the most successful systems of this kind is the AirBox project, which is based in Taiwan and operated in a grassroot fashion, and it has deployment more than 2,500 nodes in 30 countries in just one year. The system is also notable for its extremely high deployment density and data frequency, as most of the participating nodes are located in Taiwan and with a high sample rate. In this talk, we present the development of this AirBox project in detail, and we demonstrate several data analysis work that we have carried out for data visualization, anomaly detection, data forecast, and other advanced data services. We also discuss challenges and opportunities for making sense of Internet of Things data based on the lessons learned from the AirBox project.