Preliminary Program

IBS ENAR

# ENAR
# 2015
## SPRING MEETING
With IMS & Sections of ASA

# MARCH 15–18
Hyatt Regency Miami | Miami, FL

## EARLY BIRD DEADLINE
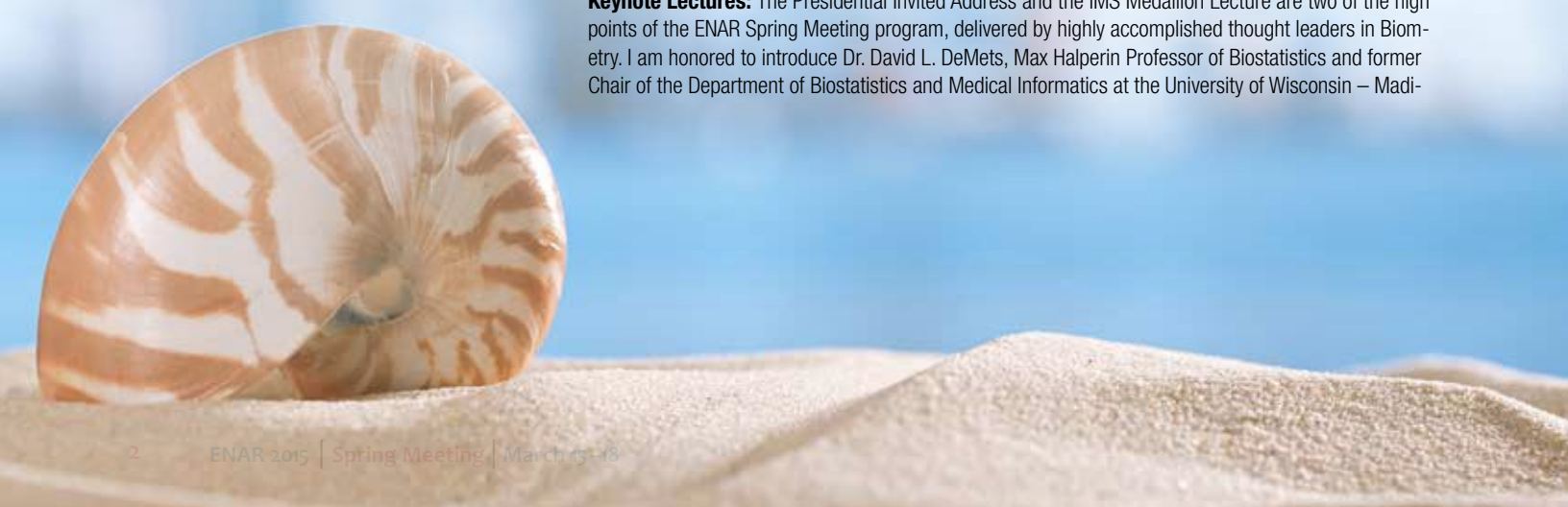# FEBRUARY 8, 2015

# WELCOME

**¡Bienvenidos a Miami!** It is my great pleasure to introduce the 2015 ENAR Spring Meeting to be held at the Hyatt Regency Miami, in Miami, FL, from March 15-18. The ENAR Spring Meeting brings together researchers and practitioners from academia, industry and government, connected through a common interest in Biometry. It offers a unique opportunity for learning new exciting methods and software, hearing about interesting and impactful applications, meeting new people (including prospective employers and job candidates), reconnecting with friends, and, this year, getting a break from the cold and snowy winter. The ENAR Spring Meeting only happens through the diligent work of a large number of people who organize and contribute to the program, plan and oversee the meeting logistics, and help with sponsorship – my heartfelt gratitude to all of them.

**Scientific Program:** Through the leadership of Program Chair Mithat Gönen, of Memorial Sloan-Kettering Cancer Center, and Associate Chair Brisa Sánchez, of the University of Michigan School of Public Health, and with contributions from many of you, the Program Committee (with representatives from different ASA sections) has created an outstanding invited program. The sessions cover a wide range of topics of great interest to both researchers and practitioners, such as, data sciences (big data), genomics, clinical trials, neuroimaging, biomarkers, health policy, electronic health records, ecology, and epidemiology. The IMS invited program, assembled under the leadership of IMS Program Chair Lurdes Inoue, of the University of Washington, also features an exciting array of sessions that nicely complement and promote synergies with the ENAR invited program.

Poster presentations will, once again, be a vibrant part of the scientific program. In addition to contributed and invited posters (the latter first featured in the 2014 meeting), the 2015 ENAR Spring Meeting introduces a novelty: **Contributed oral poster sessions**, in which presenters will be able to give a two-minute elevator-speech on the highlights of their posters. The contributed oral sessions, to be held on Monday, will be organized by themes, will feature two invited posters from well-known researchers, and will run parallel to the rest of the sessions in the scientific program. As in previous years, the regular contributed and invited posters will be presented Sunday evening, during the Opening Mixer. The highly popular ENAR Regional Advisory Board (RAB) poster competition will include contributed posters from the Sunday session only.

**Educational Program:** Be sure to take advantage of the unique and varied learning opportunities that the 2015 ENAR Spring Meeting has to offer through its superb program of short courses, tutorials and roundtables, assembled by the Educational Advisory Committee. Presented by well-known experts in their respective fields, the short courses and tutorials will cover a variety of topics of great interest to meeting attendees, including: Bayesian methods in drug development, personalized medicine trial designs, analysis of brain imaging data, data sciences and high performance statistical computing, early phase clinical trials, statistical leadership and influence, graphics for clinical trial data, and software applications for group sequential and adaptive designs, Bayesian modeling and analysis, and multiplicity problems. A favorite of many who come to the meeting, roundtable luncheons will also be featured in the program. Distinguished statisticians from academia, government, and industry will lead the luncheon discussions on topics ranging from how to publish without perishing to innovations in drug development to Bayesian evidence synthesis.

**Keynote Lectures:** The Presidential Invited Address and the IMS Medallion Lecture are two of the high points of the ENAR Spring Meeting program, delivered by highly accomplished thought leaders in Biometry. I am honored to introduce Dr. David L. DeMets, Max Halperin Professor of Biostatistics and former Chair of the Department of Biostatistics and Medical Informatics at the University of Wisconsin – Madi-

son, as the 2015 Presidential Invited Speaker. His lecture will be on "Big Data, Big Opportunities, Big Challenges." Prof. DeMets has been an inspirational role model for more than a generation of biostatisticians working in clinical research across academia, government, and industry. His pioneering and highly impactful research in group sequential designs during his tenure at the National Heart, Lung and Blood Institute, at NIH, the creation of the Department of Biostatistics at the University of Wisconsin, and his seminal work in establishing statistical leadership in drug regulatory sciences and practice (including, literally, writing the book on Data Monitoring Committees), are just a few of his many achievements. He is a past-president of ENAR and the Society for Clinical Trials, as well as an Elected Fellow of the International Statistics Institute, the American Statistical Association, the Association for the Advancement of Science, the Society for Clinical Trials and the American Medical Informatics Association. In 2013, he was elected as a member of the Institute of Medicine.

**The IMS Medallion Lecture,** entitled "Uncertainty Quantification in Complex Simulation Models Using Ensemble Copula Coupling," will be presented by Dr. Tilmann Gneiting, Group Leader at the Heidelberg Institute for Theoretical Studies (HITS) and Professor of Computational Statistics at the Karlsruhe Institute of Technology (KIT) in Germany. Prof. Gneiting has held faculty positions in the Department of Statistics at the University of Washington, where he remains affiliate faculty, and at the Institute for Applied Mathematics at Heidelberg University. He serves as Editor for Physical Science, Computing, Engineering, and the Environment at the Annals of Applied Statistics.

**Additional Meeting Activities:** The 2015 ENAR Spring Meeting will feature a host of other activities in addition to the scientific and educational programs. On Saturday, March 14, there will be the Junior Researchers Workshop, organized under the leadership of Kimberly Drews, George Washington, University. The Fostering Diversity in Biostatistics Workshop, organized by Simone Gray, of the Centers for Disease Prevention and Control, and Sean Simpson, of Wake Forest School of Medicine, will be held on Sunday, March 15. Both workshops are quite popular and have quickly filled to capacity in past meetings – if interested in participating, make sure to register early.

**The Student Mixer** on Monday evening and the Tuesday luncheon event organized by the Council of Emerging and New Statisticians (CENS) will provide ample networking opportunities for students and recent graduates. Meeting attendees seeking employment and prospective employers will benefit from the vibrant Career Placement Center. Be sure to visit the exhibitors' area to browse the latest books and software in your field.

A perennial favorite among many attendees, the **Tuesday night social event** for the 2015 meeting will take place at sea: a dinner cruise aboard the Biscayne Lady yacht. We will be picked up by boat at the Riverwalk in front of the hotel and will enjoy a memorable evening of breathtaking views of the Miami skyline, great food, nice conversation, music and dancing. Boat cruises have sold out quickly in previous ENAR meetings held in Florida, so sound statistical inference suggests that you should get your tickets early.

**Meeting Venue:** The conference will be held at the Hyatt Miami Regency hotel located by the Miami Riverwalk, in the downtown area. The hotel is within walking distance from the bustling Mary Brickell district, with its shops, restaurants, and nightlife. South Beach, showcasing beautiful Art Deco architecture, is a short cab drive away and so is Calle Ocho, in the heart of Little Havana.

**Acknowledgements:**
This meeting would not happen without the dedication and leadership of Kathy Hoskins, the ENAR Executive Director. Kathy is the institutional memory of ENAR and each year patiently guides incoming presidents-elect, like myself, on the how-to's of organizing the Spring Meeting. My heartfelt thanks to Kathy and the ENAR team, Challee Blackwelder and Katie Earley, for all the great work they have put into the meeting organization.

I am also very grateful to the Local Arrangements Committee, led (for a second time) by Tulay Koru-Sengul, of the University of Miami Miller School of Medicine, for their critical work towards the success of the ENAR meeting.

## *Hope to see you all in beautiful Miami for the 2015 ENAR Spring Meeting!*

Sincerely,

**José Pinheiro**
*2015 ENAR President*

**Kathy Hoskins**
*ENAR Executive Director*

**ENAR**

# ENAR 2015

## SPRING MEETING

With IMS & Sections of ASA

# MARCH 15–18

Hyatt Regency Miami ❙ Miami, FL

# ENAR 2015

## GENERAL INFORMATION

## SPRING MEETING
## MARCH 15–18

### Location

**Hyatt Regency Miami**

400 SE Second Avenue | Miami, FL 33131–2197

Phone: (305)–358–1234 | http://miamiregency.hyatt.com

### Registration Hours

Saturday, March 14 | 3:00 pm to 5:00 pm

Sunday, March 15 | 7:30 am to 6:00 pm

**What is included in the Registration Fee?** The meeting registration fee includes all refreshment and beverage breaks, and the opening mixer. The registration fee, less a $100 administrative fee, is refundable if written notice of cancellation is received by **February 8, 2015**.

### Meeting Registration Fees

|  | RECEIVED | |
| --- | --- | --- |
|  | **BY Feb. 8** | **AFTER Feb. 8** |
| ENAR/WNAR/IBS Member | $ 400 | $ 475 |
| ASA Member (Not a Member of ENAR/WNAR/IBS) | $ 540 | $ 615 |
| IMS Member (Not a Member of ENAR/WNAR/IBS) ($420 – $20 IMS contribution = $400) | $ 400 | $ 475 |
| Student Member | $ 165 | $ 175 |
| Guest Fee | $ 75 | $ 85 |
| Nonmember (Of Any Participating Society) | $ 590 | $ 665 |
| Student Nonmember | $ 200 | $ 210 |

# Short Course Registration Fees

| | RECEIVED | | | |
|---|---|---|---|---|
| | **BY Feb. 8** | | **AFTER Feb. 8** | |
| | **HALF DAY** | **FULL DAY** | **HALF DAY** | **FULL DAY** |
| Member | $ 225 | $ 325 | $ 250 | $ 350 |
| NonMember | $ 275 | $ 375 | $ 300 | $ 400 |
| | *See Pages 27–29 for Course Details* | | | |
| | *Register for Two Half Day Courses and Save!* *Savings Information Provided on Page 43* | | | |

## New Member Reception, Opening Mixer, and Poster Session

A new member reception will be held from 7:30 to 8:00 pm on Sunday, March 15. All new ENAR members are cordially invited to attend. The Opening Mixer and Poster Session (included in the registration fee) will take place from 8:00 to 11:00 pm on Sunday, March 15.

## Council for Emerging and New Statisticians (CENS)

CENS is dedicated to better informing ENAR about the needs of students and recent graduates. The goal at the 2015 Spring Meeting is to improve the networking experience for all attendees.

CENS will organize lunches on Tuesday, March 17, 2015 for groups of attendees that share similar interests. The goal is to help attendees meet and network with each other. Although CENS will help to coordinate lunch at local restaurants, please note that lunch is at your own expense and CENS will not be able to cater to special dietary requirements. Closer to the meeting time, CENS will email all attendees interested in this networking event to request information to set up the groups and the lunch reservations. Students and recent graduates are especially encouraged to sign up for this networking event.

## Roundtable Luncheons

This year, the roundtable luncheons will be held on Monday, March 16, from 12:15 to 1:30 pm. Space for each roundtable is limited and pre-registration is recommended. The fee is $40 per person and includes lunch. For topic information. Please see pages 123-125.

## Short Courses

The 2015 ENAR meeting will begin with an exciting set of short courses on Sunday, March 15. See the chart above for the registration fees for these Short Courses. Be sure to register in advance, since courses close once they are full. Use either the registration form on page 117 or the electronic registration form on the ENAR website.

## Tutorials

Tutorials will be offered on Monday and Tuesday, and are held concurrent with the scientific program. These offerings provide a presentation of a continuing education topic in a briefer time period (1 hour and 45 minutes). Fees for the tutorials are $75 for members ($85 after February 8, 2015) and $85 for non-members ($95 after February 8, 2015). The student registration fee for the tutorials is $40 ($50 after February 8, 2015). Be sure to register in advance, since tutorials will close once they are full.

## Hotel Accommodations
## Hyatt Regency Miami

400 SE Second Avenue | Miami, FL 33131–2197

Phone: (305)–358–1234

http://miamiregency.hyatt.com

## CENS Student Mixer

All students are invited to attend the CENS student mixer on Monday, March 16, from 5:30 to 6:30 pm. *Registration is not required.*

## Placement Service

ENAR will conduct a job placement service at the 2015 Spring Meeting. Additional information and registration forms are located on pages 128-129.

### Parking at the Hyatt Regency Miami

The hotel offers on-site self-parking at the rate of $19 per day. Valet parking is also available for a fee of $35 per day. *These parking rates are not inclusive of tax.*

### Room Reservations

ENAR has negotiated a group hotel room rate of **$199.00** for single and double occupancy rooms.

**Cut-off date:** All reservations must be made by **February 16, 2015**. To receive this special ENAR meeting rate, you should make your reservations directly with the Hyatt Regency Miami at (305) 358 1234 Be sure to mention that you are with the ENAR 2015 Spring Meeting when you make your reservations.

You may also make your reservations online by visiting: **https://resweb.passkey.com/Resweb.do?mode=welcome_gi_new&groupID=24890129**

Please make your reservations early, as all hotel rooms are reserved on a first-come, first-served basis.

## Transportation
### From the Miami Airport (MIA):

**Super Shuttle Service:** This is a 24-hour service to the hotel and is approximately $20 per person. Guests should go to the Super Shuttle station located at the Van/Limo booth directly outside of the lower level baggage claim area of the airport near curbside pickup. *The Super Shuttle Service uses blue vans with yellow lettering that indicate Super Shuttle.*

**Taxi Service:** A Miami Airport taxi is approximately $25-$30 one-way.

### From the Fort Lauderdale Airport (FLL):

The recommended shuttle company is **Go Shuttle**

*No reservation is required from the airport to hotel but is required from the hotel to airport (24 hours notice required).*

Go Shuttle contact: 954-561-8888

**Taxi Service:** A Fort Lauderdale taxi is approximately $75-$80 one way.

## Metrorail and Metromover

There are 22 Metrorail stations throughout Miami-Dade County.

The fare for the Metrorail is currently $2.25 one way.

The Metromover which adjoins the Metrorail at "Government Center" is free of charge.

Trains serving the MIA Metrorail station are marked ORANGE LINE. Metrorail Orange line provides services to/from MIA and the Hyatt Regency Miami with only $2.25 one way.

One should take the Metrorail orange line at MIA Metrorail station, get off the "Government Center" and take the Metromover "Inner Loop" to "Knight Center" station that adjoins the hotel at the Bank of America by tunnel.

Riding Metromover is free of charge but riding Metrorail from airport will cost $2.25 one way.

## Tuesday Evening Networking and Dinner Event

### Biscayne Lady Dining Yacht

We have arranged an evening of dining and networking with your colleagues while cruising beautiful Biscayne Bay. Enjoy a magical setting enhanced by amazing city sights and bay lights. We'll cruise along Biscayne Bay as you enjoy superb cuisine in a setting of elegant service and modern design, accompanied by exceptional views of Miami.

This optional event includes a private 3-hour cruise as well as a full buffet dinner.

*(Please note that there will be a cash bar and that the registration fee does not include the cost of alcoholic beverages.)*

## Abstract Book Go Green & Save

At this year's spring meeting, you have the option of receiving the abstract book in hard copy, or Go Green and opt for online access only. There is an additional charge of $5.00 for the hard copy version of the final program book. Attendees that choose to receive the online version of the full program will also receive a booklet containing all session and speaker names, session times, and talk locations.

# Welcome to Miami!

**Miami is a global metropolis with booming international business, vibrant culture, and some of the best beaches in the world.**

**Much of Miami's appeal is due to its diverse neighborhoods, which range from the towering skyscrapers of downtown Miami to the Cuban community of Little Havana or to the trendy Miami Beach neighborhood of South Beach. People from all over the world come to enjoy the sunny weather, spicy nightlife and fine dining!**

Miami has a cuisine that is uniquely its own. With the diversity of its people comes a blend of flavors – Latin, Caribbean and US – known as Floribean. Miami also has outstanding restaurants of every kind, from Italian to Thai. If you're feeling barbeque, try a nostalgic and delicious landmark next door to Datran Center Skyscrapers, Shorty's Bar-B-Q. When touring South Beach, take a rest and people-watch for a while at the News Café while enjoying their twenty-four hour breakfast and decadent desserts. If you're willing to wait (no reservations!), satisfy your seafood desire by going to Joe's Stone Crab, a restaurant famous for stone crab claws and claims to be the place where this tasty treat was first discovered. Can't decide? Then take a Miami Culinary Tour – a Miami food tour adventure tasting delicious foods around the city's historic neighborhoods.

No matter what kind of entertainment grabs your interest, Miami has it covered. Fulfill your desire for cultural programs at the Adrienne Arsht Center for the Performing Arts; Broadway shows, dance productions and concerts are on the schedule at this beautiful facility located less than two miles from the Hyatt Regency Miami. Head across the Bay to South Beach to experience the Art Deco District, where the largest collection of Art Deco architecture in the world can be found. Experience a different kind of pool at Coral Gables Venetian Pool, the only swimming pool on the National Register of Historic Places that's chlorine-free and fed with cool spring water.

**Of course, there is always the beach – take an afternoon and find a spot along Miami's gorgeous shoreline and soak up the sun!**

Blessed with a warm climate and unrivaled ocean access, America's southernmost resort city is also a sought-after international recreation destination. Miami caters to action-oriented visitors from around the globe with some of the world's top golf, tennis and sporting facilities. Add sparkling waters that are a magnet for boating enthusiasts, fishermen, divers and water sports aficionados to the equation and it is easy to see why Miami is a number one choice for active travelers of all ages and skill levels. So to really experience South Florida, you must get out on the water! Rent a boat, see manatees in the wild at Coral Gables, swim with dolphins, or take a windsurfing lesson — **it's all here!**

## Brickell
Miami's financial district, just south of Downtown, offers some of the best nightlife and dining the city has to offer. Visit some of the neighborhood's best restaurants like Perricone's, Brickell Burger and Beer, and La Lupita. See the high rises and condo complexes of Miami's young professionals or check out Blue Martini or Fado Irish Pub for drinks and dancing. You don't want to miss the 'Manhattan of the South'.

## Bayside Market
Experience the best food, fun, and shopping Miami has to offer! You will certainly enjoy the open-air feeling of this Miami shopping mall, a short walk or Metromover ride from the Hyatt, with over 150 stores while walking under the palm trees. One of the most interesting features

of this Downtown Miami location is probably the Biscayne Bay and Miami Skyline view you will get, so even if your purpose is not to spend a big amount of money, go by and check it out. It's also ideal for finding boat tour operators, enjoying live night entertainment, and taking tours to Miami's celebrities' homes.

## Jungle Queen Riverboat Cruise

For more than 50 years, visitors have traveled on this stately riverboat. Tours sail past estates while an entertaining monologue by the captain points out the homes of the famous and the infamous. On three-hour day tours or four-hour dinner voyages you can sail to an island where you will dine amid tropical foliage. Evening cruises feature a dinner of barbecued ribs and shrimp, with a variety revue and sing-along cruising back. There may even be a sighting of macaws and rare birds from all over the world, alligator wrestling, and Seminole Indians. The 550 passenger riverboat also includes a stop off at the Jungle Queen Indian Village, a beautiful tropical island.

## Vizcaya Museum And Gardens

Vizcaya is one of South Florida's leading attractions. Built by agricultural industrialist James Deering, Vizcaya Museum & Gardens features a main house, ten acres of formal gardens, a rockland hammock (native forest), and soon-to-be-restored historic village. Its art and furnishings portray 400 years of European history and provide a window to both the history of Miami, graced by the villa since its completion in 1916; and to the Italian Renaissance, represented in the Museum's architecture. First, you'll pass through Vizcaya's lush subtropical forest and approach the Main House along a walkway lined with fountains and foliage. The inside of the house is filled with treasures from around the world. Hear Vizcaya's 1917 pipe organ played Monday through Friday from 12 noon to 12:30 pm. Outside, you'll enjoy spectacular views of Biscayne Bay, colorful orchids in the David A. Klein Orchidarium, and the serene gardens and the statues that inhabit them. Located in the southern side of Miami in Coconut Grove, Vizcaya welcomes visitors every day except Tuesdays from 9:30 am to 4:30 pm.

## Coral Castle Museum

Located near Homestead, the castle is comprised of numerous coral stones, each weighing several tons. Many of the castle structures are notable, including machines to tell time, home-made air conditioners, and a nine-ton revolving door. To this day, no one knows how Edward Leedskalnin created the Coral Castle. Built under the cover of night and in secret, at a time when there were no modern construction conveniences, Ed would only say that he knew "the secret of the pyramids." Visit this site and try to figure out the mystery.

## Everglades National Park

This national park protects the southern 25 percent of the original everglades and has a subtropical climate, a broad, shallow river, and a variety of plant and animal life that makes this a must visit. Wildlife species include the Florida Panther, American Crocodile, and West Indian Manatee. If you enter through the Flamingo Main Entrance, make sure to stop and take the 45-minute walk around the Anhinga Trail, a partially paved trail with a boardwalk that stretches out over the water. Or, rent a bike and take the 15 mile trail around Shark Valley. These are both good spots to see alligators in their natural habitat!

# ENAR 2015

# Program Committee

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**Mithat Gönen**
Memorial Sloan-Kettering
Cancer Center

## Program Co-Chair

**Brisa N. Sánchez**
University of Michigan

## IMS Program Chair

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University of Washington

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ASA Biometrics Section

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ASA Statistics and the
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Section

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at Chapel Hill
ASA Statistics in Imaging
Section

**TingTing Zhang**
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ASA Statistical Learning
and Data Mining Section

**Rebecca Andridge**
Ohio State University
ASA Survey Research Methods
Section

**Nancy Petersen**
US Department of Veterans
Affairs
ASA Statistical Programmers
Section

## 2015 ENAR Program Committee

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Food and Drug Administration

**Yevgen Tymofyeyev**
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**Ronglai Shen**
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Cancer Center

**Laura White**
Boston University

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**José Pinheiro**
2015 ENAR President
Johnson & Johnson

**Rick Chappell**
University of Wisconsin,
Madison

### Local Arrangements Chair

**Tulay Koru-Sengul**
University of Miami

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2015 ENAR President
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**Rick Chappell**
University of Wisconsin,
Madison

**Telba Irony**
Food and Drug Administration

**Dionne Price**
Food and Drug Administration

**Bhramar Mukherjee**
University of Michigan

**Gordon Lan**
Johnson & Johnson

### ENAR Student Awards 2015

**Daniel F. Heitjan**
Chair
University of Pennsylvania

### ENAR Diversity Workshop 2015

**Simone Gray**
Co-Chair
Centers for Disease
Control and Prevention

**Sean L. Simpson**
Co-Chair
Wake Forest School
of Medicine

### ENAR Workshop for Junior Biostatisticians in Health Research

**Kimberly Drews**
George Washington University

### ENAR Executive Team

**Kathy Hoskins**
Executive Director

**Katie Earley**
Program Manager

**Challee Blackwelder**
Administrator

# ENAR 2015

## Presidential Invited Speaker

### David L. DeMets, Ph.D.

Max Halperin Professor of Biostatistics
University of Wisconsin-Madison

### Big Data, Big Opportunities, Big Challenges

Since the 1950's, biostatisticians have been successfully engaged in biomedical research, from laboratory experiments to observational studies to randomized clinical trials. We owe some of that success to the early pioneers, especially those biostatisticians who were present at the National Institutes of Health (NIH). They created a culture of scientific collaboration, working on the methodology as needed to solve the biomedical research problems in design, conduct and analysis. Over the past 5 decades, we have experienced a tremendous increase in computational power, data storage capability and multidimensionality of data, or "big data". Some of this expansion has been driven by genomics.

At present, we have the opportunity to contribute to the design and analysis of genomic data, data stored in the electronic health record and continued needs of clinical trials for greater efficiency. However, with these opportunities, we have serious challenges starting with the fact that we need to develop new methodology to design and analyze the "big data" bases. The demand for quantitative scientists exceeds the supply and there is no strategic national plan to meet these demands.

Federal funding for biomedical research has been flat and likely to remain so for several years, impacting both the ability to train additional quantitative scientists and provide them with research funding for new methodologies. We face new or more public scrutiny, demanding that our data and analysis be shared earlier and earlier, even as the data are being gathered such as in clinical trials. Litigation is now part of our research environment. We will examine some of these issues and speculate on ways forward.

## Biography

David L. DeMets, PhD is currently the Max Halperin Professor of Biostatistics and former Chair of the Department of Biostatistics and Medical Informatics at the University of Wisconsin - Madison. He received his PhD in biostatistics in 1970 from the University of Minnesota. Following a postdoctoral appointment at the National Institutes of Health (1970-72), he spent ten years (1972-1982) at the National Heart, Lung and Blood Institute at the National Institutes of Health where he was a member of and later became chief of the Biostatistics Branch. In 1982, he joined the University of Wisconsin and founded the Department of Biostatistics and Medical Informatics which he chaired until 2009.

He has co-authored four texts, *Fundamentals of Clinical Trials, Data Monitoring in Clinical Trials: A Case Studies Approach* and *Data Monitoring Committees in Clinical Trials: A Practical Perspective, and Statistical Methods for Clinical Trials.* He has served on numerous NIH and industry-sponsored Data Safety and Monitoring Committees for clinical trials in diverse disciplines. He served on the Board of Directors of the American Statistical Association, as well as having been President of the Society for Clinical Trials and President of the Eastern North American Region (ENAR) of the Biometric Society. In addition he was Elected Fellow of the International Statistics Institute in 1984, the American Statistical Association in 1986, the Association for the Advancement of Science in 1998, the Society for Clinical Trials in 2006 and the American Medical Informatics Association in 2008. In 2013, he was elected as a member of the Institute of Medicine. His research interests include the design, data monitoring and analysis of clinical trials, especially large Phase III randomized clinical trials. He is well known for his work on sequential statistical methods for monitoring interim data for early evidence of intervention benefit or possible harm.

# ENAR
# 2015
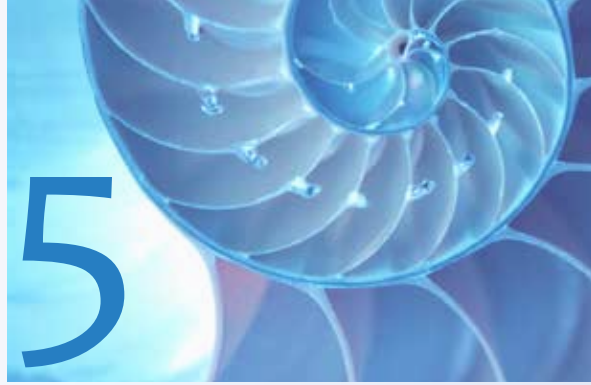
## IMS Medallion Lecture

### Tilmann Gneiting, Ph.D.

Heidelberg Institute for Theoretical Studies (HITS)
Karlsruhe Institute of Technology (KIT)

### Uncertainty Quantification in Complex Simulation Models Using Ensemble Copula Coupling

Critical decisions frequently rely on high-dimensional output from complex computer simulation models that show intricate cross-variable, spatial and/or temporal dependence structures, with weather and climate predictions being key examples. There is a strongly increasing recognition of the need for uncertainty quantification in such settings, for which we propose and review a general multi stage procedure called ensemble copula coupling (ECC), proceeding as follows.

1. Generate a raw ensemble, consisting of multiple runs of the computer model that differ in the inputs or model parameters in suitable ways.

2. Apply statistical postprocessing techniques, such as Bayesian model averaging or nonhomogeneous regression, to correct for systematic errors in the raw ensemble, to obtain calibrated and sharp predictive distributions for each univariate output variable individually.

3. Draw a sample from each postprocessed predictive distribution.

4. Rearrange the sampled values in the rank order structure of the raw ensemble, to obtain the ECC postprocessed ensemble.

The use of ensembles and statistical postprocessing have become routine in weather forecasting over the past decade. We show that seemingly unrelated, recent advances can be interpreted, fused and consolidated within the framework of ECC, the common thread being the adoption of the empirical copula of the raw ensemble. In some settings, the adoption of the empirical copula of historical data offers an attractive alternative. In a case study, the ECC approach is applied to predictions of temperature, pressure, precipitation, and wind over Germany, based on the 50-member European Centre for Medium-Range Weather Forecasts (ECMWF) ensemble. This is joint work with Roman Schefzik and Thordis Thorarinsdottir.

## Biography

Tilmann Gneiting is Group Leader at Heidelberg Institute for Theoretical Studies (HITS) and Professor of Computational Statistics at Karlsruhe Institute of Technology (KIT) in Germany. In 1997, he obtained a PhD in Mathematics at Bayreuth University with Peter Huber as supervisor. Subsequently, he held faculty positions in the Department of Statistics at the University of Washington (1997-2009), where he remains affiliate faculty, and at the Institute for Applied Mathematics at Heidelberg University (2009-2013). Tilmann's research focuses on the theory and practice of forecasting, and spatial and spatio-temporal statistics, with applications to meteorological, hydrologic, and economic problems, among others. His work on probabilistic forecasting is supported by an Advanced Grant from the European Research Council. Tilmann also serves as Editor for Physical Science, Computing, Engineering, and the Environment at the Annals of Applied Statistics (2011-2014).

# ENAR 2015

## Program Summary

## SUNDAY, MARCH 15

| 7:30 am – 6:30 pm | CONFERENCE REGISTRATION |
|---|---|

| 8:00 am – 12:00 pm | **SHORT COURSES** |
|---|---|
| **SC4:** | Personalized Medicine and Dynamic Treatment Regimes |

| 8:00 am – 5:00 pm | **SHORT COURSES** |
|---|---|
| **SC1:** | Bayesian Clinical Trials |
| **SC2:** | Statistical Methods for fMRI and EEG Data Analysis |
| **SC3:** | Design Considerations in Early Phase Clinical Trials: Phase I, Phase I/II Trials |

| 12:30 am – 5:30 pm | DIVERSITY WORKSHOP |
|---|---|

| 1:00 pm – 5:00 pm | **SHORT COURSES** |
|---|---|
| **SC5:** | Data Science and High-Performance Statistical Computing |

| 3:00 pm – 6:00 pm | EXHIBITS OPEN |
| --- | --- |
| 4:30 pm – 7:00 pm | ENAR EXECUTIVE COMMITTEE MEETING *(by Invitation Only)* |
| 4:00 pm – 6:30 pm | PLACEMENT SERVICE |

| 8:00 pm – 11:00 pm | **SOCIAL MIXER AND POSTER SESSION** |
| --- | --- |
| **1.** | Posters: Latent Variable and Mixture Models |
| **2.** | Posters: Imaging Methods and Applications |
| **3.** | Posters: Clinical Trials, Adaptive Designs and Applications |
| **4.** | Posters: Survival Analysis |
| **5.** | Posters: Causal Inference |
| **6.** | Posters: Statistical Genetics, GWAS, and 'omics Data |
| **7.** | Posters: Methodology and Applications in Epidemiology, Environment, and Ecology |
| **8.** | Posters: Variable Selection and Methods for High Dimensional Data |
| **9.** | Posters: Bayesian Methods and Computational Algorithms |

# MONDAY, MARCH 16

| | |
|---|---|
| 7:30 a.m – 5:00 pm | CONFERENCE REGISTRATION |
| 7:30 am – 5:00 pm | SPEAKER READY ROOM |
| 9:00 am – 5:00 pm | PLACEMENT SERVICE |
| 8:30 am – 5:30 pm | EXHIBITS OPEN |

| | |
|---|---|
| 8:30 am – 10:15 am | **TUTORIAL** |
| **T1:** | Group Sequential Designs Using the gsDesign R Package and Web Interface |

## SCIENTIFIC PROGRAM

**10.** Advances in Patient-Centered Outcomes (PCOR) Methodology

**11.** Looking Under the Hood: Assumptions, Methods and Applications of Microsimulation Models to Inform Health Policy

**12.** Optimal Inference for High Dimensional Problems

**13.** Lifetime Data Analysis Highlights

**14.** Recent Advances and Challenges in the Design of Early Stage Cancer Trials

**15.** Large Scale Data Science for Observational Healthcare Studies

**16.** Contributed Papers: Competing Risks

**17.** Contributed Papers: Applications and Methods in Environmental Health

**18.** Contributed Papers: Statistical Methods for Genomics

**19.** Contributed Papers: Spatial and Spatio-Temporal Methods and Applications

**20.** Contributed Papers: Case Studies in Longitudinal Data Analysis

**21.** Contributed Papers: Meta Analysis

**22.** Contributed Papers: Semi-Parametric Methods

| | |
|---|---|
| 9:30 am – 4:30 pm | PLACEMENT SERVICE |
| 10:15 am – 10:30 am | REFRESHMENT BREAK WITH OUR EXHIBITORS |

| | |
|---|---|
| 10:30 am – 12:15 pm | **TUTORIAL** |
| | **T2:** Graphics for Clinical Trials |

**SCIENTIFIC PROGRAM**

**23.** Trends and Innovations in Clinical Trial Statistics: "The Future ain't What it Used to be"

**24.** Causal Inference in HIV/AIDS Research

**25.** Open Problems and New Directions in Neuroimaging Research

**26.** Statistical Methods for Understanding Whole Genome Sequencing

**27.** Doing Data Science: Straight Talk from the Frontline

**28.** IMS Medallion Lecture

**29.** In Memory of Marvin Zelen: Past, Present and Future of Clinical Trials and Cancer Research

**30.** Contributed Papers: Methods for Clustered Data and Applications

**31.** Contributed Papers: GWAS

**32.** Contributed Papers: Applications, Simulations and Methods in Causal Inference

**33.** Contributed Papers: Adaptive Designs and Dynamic Treatment Regimes

**34.** Contributed Papers: Survival Analysis and Cancer Applications

**INVITED AND CONTRIBUTED ORAL POSTERS**

**35.** Oral Posters: Methods and Applications in High Dimensional Data and Machine Learning

| 12:15 pm – 1:30 pm | ROUNDTABLE LUNCHEONS |
| 12:30 pm – 4:30 pm | REGIONAL ADVISORY BOARD (RAB) LUNCHEON MEETING *(by Invitation Only)* |

| 1:45 pm – 3:30 pm | **TUTORIAL** |

**T3:** Statistical Leadership in Research and the Important Role of Influence

**SCIENTIFIC PROGRAM**

**36.** Recent Research in Adaptive Randomized Trials with the Goal of Addressing Challenges in Regulatory Science

**37.** Statistical Innovations in Functional Genomics and Population Health

**38.** Big Data: Issues in Biosciences

**39.** Recent Advances in Statistical Ecology

**40.** New Analytical Issues in Current Epidemiology Studies of HIV and Other Sexually Transmitted Infections

**41.** Statistical Advances and Challenges in Mobile Health

**42.** Contributed Papers: Survey Research

**43.** Contributed Papers: Graphical Models

**44.** Contributed Papers: Joint Models for Longitudinal and Survival Data

**45.** Contributed Papers: Functional Data Analysis

**46.** Contributed Papers: Methods in Causal Inference: Instrumental Variable, Propensity Scores and Matching

**47.** Contributed Papers: Covariates Measured with Error

**INVITED AND CONTRIBUTED ORAL POSTERS**

**48.** Oral Posters: Clinical Trials

| 3:30 pm – 3:45 pm | REFRESHMENT BREAK WITH OUR EXHIBITORS |

| 3:45 pm – 5:30 pm | **TUTORIAL** |
|---|---|
| **T4:** | A Tutorial for Multisequence Clinical Structural Brain MRI |

**SCIENTIFIC PROGRAM**

**49.** CENS Invited Session — Careers in Statistics: Skills for Success

**50.** Analysis Methods for Data Obtained from Electronic Health Records

**51.** Statistical Challenges of Survey and Surveillance Data in US Government

**52.** Reconstructing the Genomic Landscape from High-Throughput Data

**53.** Statistical Methods for Single Molecule Experiments

**54.** Subgroup Analysis and Adaptive Trials

**55.** Contributed Papers: Methods to Assess Agreement

**56.** Contributed Papers: Methylation and RNA Data Analysis

**57.** Contributed Papers: New Developments in Imaging

**58.** Contributed Papers: Latent Variable and Principal Component Models

**59.** Contributed Papers: Developments and Applications of Clustering, Classification, and Dimension Reduction Methods

**60.** Contributed Papers: Survival Analysis: Methods Development and Applications

**INVITED AND CONTRIBUTED ORAL POSTERS**

**61.** Oral Posters: GWAS and Meta Analysis of Genetic Studies

| 5:30 pm – 6:30 pm | CENS STUDENT MIXER |
|---|---|
| 6:30 pm – 7:30 pm | PRESIDENT'S RECEPTION *(by Invitation Only)* |

# TUESDAY, MARCH 17

| | |
|---|---|
| 7:30 am – 5:00 pm | CONFERENCE REGISTRATION |
| 7:30 am – 5:00 pm | SPEAKER READY ROOM |
| 8:30 am – 5:30 pm | EXHIBITS OPEN |
| 9:30 am – 3:30 pm | PLACEMENT SERVICE |

| 8:30 am – 10:15 am | **SCIENTIFIC PROGRAM** |
|---|---|
| **62.** | Statistical Inference with Random Forests and Related Ensemble Methods |
| **63.** | Mediation and Interaction: Theory, Pratice and Future Directions |
| **64.** | Motivation and Analysis Strategies for Joint Modeling of High Dimensional Data in Genetic Association Studies |
| **65.** | Recent Developments on Inference for Possibly Time-Dependent Treatment Effects with Survival Data |
| **66.** | *Journal of Agricultural, Biological and Environmental Statistics* (JABES) Highlights |
| **67.** | Estimation and Inference for High Dimensional and Data Adaptive Problems |
| **68.** | Contributed Papers: Novel Methods for Bioassay Data |
| **69.** | Contributed Papers: Infectious Disease |
| **70.** | Contributed Papers: Variable Selection |
| **71.** | Contributed Papers: Modeling Health Data with Spatial or Temporal Features |
| **72.** | Contributed Papers: Advances in Longitudinal Modeling |
| **73.** | Contributed Papers: Causal Inference: Average and Mediated Effects |
| **74.** | Contributed Papers: Variable Selection with High Dimensional Data |

| | |
|---|---|
| 10:15 am – 10:30 am | REFRESHMENT BREAK WITH OUR EXHIBITORS |
| 10:30 am – 12:15 pm | **75.** PRESIDENTIAL INVITED ADDRESS |
| 12:30 pm – 4:30 pm | REGIONAL COMMITTEE LUNCHEON MEETING *(by Invitation Only)* |

| | |
|---|---|
| 1:45 pm – 3:30 pm | **TUTORIAL** |
| | **T5:** Bayesian Computation Using Proc MCMC |
| | **SCIENTIFIC PROGRAM** |
| | **76.** Recent Advances in Dynamic Treatment Regimes |
| | **77.** Predictive Models for Precision Medicine |
| | **78.** Electronic Health Records: Challenges and Opportunities |
| | **79.** Cost-Effective Study Designs for Observational Data |
| | **80.** Advanced Machine Learning Methods |
| | **81.** Statistical Analysis for Deep Sequencing Data in Cancer Research: Methods and Applications |
| | **82.** Spatial and Spatio-Temporal Modeling |
| | **83.** Contributed Papers: Study Design and Power |
| | **84.** Contributed Papers: Missing Data |
| | **85.** Contributed Papers: Innovative Methods for Clustered Data |
| | **86.** Contributed Papers: Biopharmaceutical Applications and Survival Analysis |
| | **87.** Contributed Papers: Computational Methods |

| | |
|---|---|
| 3:30 pm – 3:45 pm | REFRESHMENT BREAK WITH OUR EXHIBITORS |

| 3:45 pm – 5:30 pm | **TUTORIAL** |
| --- | --- |
| **T6:** | Graphical Approaches to Multiple Test Problems |

| | **SCIENTIFIC PROGRAM** |
| --- | --- |
| **88.** | Biostatistical Methods for Heterogeneous Genomic Data |
| **89.** | Innovative Approaches in Competing Risk Analysis |
| **90.** | Biomarker Evaluation in Diagnostics Studies with Longitudinal Data |
| **91.** | Solving Clinical Trial Problems by Using Novel Designs |
| **92.** | Ensuring Biostatistical Competence Using Novel Methods |
| **93.** | Methodological Frontiers in the Analysis of Panel Observed Data |
| **94.** | Contributed Papers: Ordinal and Categorical Data |
| **95.** | Contributed Papers: Statistical Genetics |
| **96.** | Contributed Papers: Ecology and Forestry Applications |
| **97.** | Contributed Papers: Pooled Biospecimens and Diagnostic Biomarkers |
| **98.** | Contributed Papers: Multiple Testing and Variable Selection |
| **99.** | Contributed Papers: Parameter Estimation in Hierarchical and Non Linear Models |

| 5:30 pm – 6:30 pm | ENAR BUSINESS MEETING *(Open to all ENAR Members)* |
| --- | --- |
| 6:30 pm – 9:30 pm | TUESDAY NIGHT EVENT<br>*Dinner Cruise on the Biscayne Lady* |

# WEDNESDAY, MARCH 18

| | |
|---|---|
| 7:30 am – 12:00 noon | SPEAKER READY ROOM |
| 7:30 am – 9:00 am | PLANNING COMMITTEE<br>*(by Invitation Only)* |
| 8:00 am – 12:30 pm | CONFERENCE REGISTRATION |
| 8:00 am – 12:00 pm | EXHIBITS OPEN |

| | |
|---|---|
| 8:30 am – 10:15 am | **SCIENTIFIC PROGRAM** |
| **100.** | New Statistical Methods in the Environmental Health Sciences |
| **101.** | Novel Phase II and III Clinical Trial Designs for Cancer Research that Incorporate Biomarkers and Nonstandard Endpoints |
| **102.** | Novel Statistical Methods to Decipher Gene Regulation Using Sequence Data |
| **103.** | Flow Cytometry: Data Collection and Statistical Analysis |
| **104.** | Statistical Methods in Chronic Kidney Disease |
| **105.** | Challenging Statistical Issues in Imaging |
| **106.** | Statistical Methods for Predicting Subgroup Level Treatment Response |
| **107.** | Contributed Papers: ROC Curves |
| **108.** | Contributed Papers: Personalized Medicine and Biomarkers |
| **109.** | Contributed Papers: Time Series Analysis and Methods |

| | |
|---|---|
| 10:15 am – 10:30 am | REFRESHMENT BREAK WITH OUR EXHIBITORS |

| 10:30 am – 12:15 pm | **SCIENTIFIC PROGRAM** |
|---|---|
| **110.** | Incorporating Biological Information in Statistical Modeling of Genome-Scale Data with Complex Structures |
| **111.** | Emerging Issues in Clinical Trials and High Dimensional Data |
| **112.** | Advances in Repeated Measures and Longitudinal Data Analysis |
| **113.** | Advances in Modeling Zero-Inflated Data |
| **114.** | New Developments in Missing Data Analysis: from Theory to Practice |
| **115.** | Environmental Methods with Deterministic and Stochastic Components |
| **116.** | Bayesian and non-parametric Bayesian Approaches to Causal Inference |
| **117.** | Design of Multiregional Clinical Trials: Theory and Practice |
| **118.** | Contributed Papers: Multivariate Survival Analysis |
| **119.** | Contributed Papers: Constrained Inference |
| **120.** | Contributed Papers: Nonparametric Methods |

# ENAR 2015

## Scientific Program

## SUNDAY, MARCH 15

**8:00 am – 11:00 pm**

### POSTER PRESENTATIONS

### 1. POSTERS:
### Latent Variable and Mixture Models

Sponsor: **ENAR**

#### 1a. INVITED POSTER:
#### Assessment of Dimensionality Can Be Distorted by Too Many Zeroes: An Example from Psychiatry and a Solution Using Mixture Models

**Melanie M. Wall\***, Columbia University
Irini Moustaki, London School of Economics

#### 1b. Local Influence Diagnostics for Hierarchical Count Data Models with Overdispersion and Excess Zeros

**Trias Wahyuni Rakhmawati\***, Universiteit Hasselt
**Geert Molenberghs**, Universiteit Hasselt and Katholieke Universiteit Leuven
**Geert Verbeke**, Katholieke Universiteit Leuven and Universiteit
**Hasselt Christel Faes**, Universiteit Hasselt and Katholieke Universiteit Leuven

#### 1c. Finite Multivariate Mixtures of Skew-t Distributions with Collapse Clusters with Application in Forestry

**Josef Hoefler\*** and **Donna Pauler Ankerst**, Technical University Munich

#### 1d. Weibull Mixture Regression for Zero-Heavy Continuous Substance Use Outcomes

**Mulugeta Gebregziabher\***, **Delia Voronca** and **Abeba Teklehaimanot**,
Medical University of South Carolina
**Elizabeth J. Santa Ana**, Ralph H. Johnson Department of Veterans
Affairs Medical Center

#### 1e. Model-Free Estimation of Time-Varying Correlation Coefficients and their Confidence Intervals with an Application to fMRI Data

**Maria A. Kudela\*** and **Jaroslaw Harezlak**, Indiana University
**Richard M. Fairbanks** School of Public Health, Indianapolis
**Martin Lindquist**, Johns Hopkins Bloomberg School of Public Health

### 1f. Zero-and-One Inflated Beta Regression with Mixed Effects for Modeling Relative Frequency of Condom Use in Men Who Have Sex with Men (MSM) in Ghana

**Nanhua Zhang***, Cincinnati Children's Hospital Medical Center
**Yue Zhang**, University of Cincinnati
**LaRon E. Nelson**, University of Rochester

### 1g. Inference for the Number of Topics in the Latent Dirichlet Allocation Model via a Pseudo-Marginal Metropolis-Hastings Algorithm

**Zhe Chen*** and **Hani Doss**, University of Florida

### 1h. Applying a Stochastic Volatility Model to US Stock Markets with a UMM Undergraduate Student

**Jong-Min Kim*** and **Li Qin**, University of Minnesota, Morris

### 1i. A Mixture Model of Heterogeneity in Treatment Response

**Hongbo Lin*** and **Changyu Shen**, Indiana University School of Medicine and Richard M. Fairbanks School of Public Health, Indianapolis

### 1j. Bayesian Random Graph Mixture Model for Community Detection in Weighted Networks

**Christopher Bryan**t*, **Mihye Ahn**, **Hongtu Zhu** and **Joseph Ibrahim**, University of North Carolina, Chapel Hill

### 1k. Time Series Forecasting Using Model-Based Clustering and Model Averaging

**Fan Tang*** and **Joseph Cavanaugh**, University of Iowa

### 1l. Multilevel Functional Principal Components Analysis of Surfaces with Application to CT Image Data of Pediatric Thoracic Shape

**Lucy F. Robinson***, **Jonathan Harris** and **Sriram Balasubramanian**, Drexel University

### 1m. A New Approach for Treatment Noncompliance with Structural Zero Data

**Pan Wu***, Christiana Care Health System

## 2. POSTERS:
## Imaging Methods and Applications
Sponsor: **ENAR**

### 2a. INVITED POSTER:
### Determining Multimodal Neuroimaging Markers of Parkinson's Disease

**DuBois Bowman***, Columbia University
**Weingiong Xue**, Boehringer Ingelheim
**Daniel Drake**, Columbia University

### 2b. Segmentation of Intracerebral Hemorrhage in CT Scans Using Logistic Regression

**John Muschelli***, Johns Hopkins Bloomberg School of Public Health
**Natalie Ullman** and **Daniel Hanley**, Johns Hopkins School of Medicine
**Ciprian M. Crainiceanu**, Johns Hopkins Bloomberg School of Public Health

**★** = Presenter    ■ = Student Award Winner

### 2c. Relating Multi-Sequence Longitudinal Data from MS Lesions on Structural MRI to Clinical Covariates and Outcomes

**Elizabeth Sweeney\***, Johns Hopkins Bloomberg School of Public Health
**Blake Dewey** and **Daniel Reich**, National Institute of Neurological Disease and Stroke, National Institutes of Health
**Ciprian M. Crainiceanu**, Johns Hopkins Bloomberg School of Public Health
**Russell Shinohara**, University of Pennsylvania
**Ani Eloyan**, Johns Hopkins Bloomberg School of Public Health

### 2d. Using Multiple Imputation to Efficiently Correct Magnetic Resonance Imaging Data in Multiple Sclerosis

**Alicia S. Chua\***, **Svetlana Egorova**, **Mark C. Anderson**, **Mariann Polgar-Turcsanyi**, **Tanuja Chitnis**, **Howard L. Weiner**, **Charles R. Guttmann**, **Rohit Bakshi** and **Brian C. Healy**, Brigham and Women's Hospital, Boston

### 2e. Background Adjustment and Voxelwise Inference for Template-Based Gaussian Mixture Models

**Meng Li\*** and **Armin Schwartzman**, North Carolina State University

### 2f. Fast, Fully Bayesian Spatiotemporal Inference for fMRI

**Donald R. Musgrove\***, **John Hughes** and **Lynn E. Eberly**, University of Minnesota

### 2g. Bayesian Spatial Variable Selection for Ultra-High Dimensional Neuroimaging Data: A Multiresolution Approach

**Yize Zhao\***, Statistical and Applied Mathematical Sciences Institute
**Jian Kang** and **Qi Long**, Emory University

### 2h. Analysis of High Dimensional Brain Signals in Designed Experiments Using Penalized Threshold Vector Autoregression

**Lechuan Hu\*** and **Hernando Ombao**, University of California, Irvine

### 2i. Spatially Weighted Reduced-Rank Framework for Neuroimaging Data with Application to Alzheimer's Disease

**Mihye Ahn\***, University of Nevada, Reno
**Haipeng Shen** and **Chao Huang**, University of North Carolina, Chapel Hill
**Yong Fan**, University of Pennsylvania
**Hongtu Zhu**, University of North Carolina, Chapel Hill

### 2j. Highly Adaptive Test for Group Differences in Brain Functional Connectivity

**Junghi Kim\*** and **Wei Pan**, University of Minnesota

### 2k. Pre-Surgical fMRI Data Analysis Using a Spatially Adaptive Conditionally Autoregressive Model

**Zhuqing Liu\*** and **Veronica J. Berrocal**, University of Michigan
**Andreas J. Bartsch**, University of Heidelberg
**Timothy D. Johnson**, University of Michigan

### 2l. Semiparametric Bayesian Models for Longitudinal MR Imaging Data with Multiple Continuous Outcomes

**Xiao Wu\***, University of Florida
**Michael J. Daniels**, University of Texas, Austin

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★ = *Presenter* ■ = *Student Award Winner*

**2m. Improving Reliability of Subject-Level Resting-State Brain Parcellation with Empirical Bayes Shrinkage**

**Amanda F. Mejia***, **Mary Beth Nebel** and **Haochang Shou**,
Johns Hopkins University
**Ciprian M. Crainiceanu**, Johns Hopkins Bloomberg School of Public Health
**James J. Pekar**, Johns Hopkins University School of Medicine
**Stewart Mostofsky**, **Brian Caffo** and **Martin Lindquist**, Johns Hopkins University

## 3. POSTERS:
## Clinical Trials, Adaptive Designs and Applications
Sponsor: **ENAR**

**3a. INVITED POSTER:**
**The Role of Statisticians in Regulatory Drug Safety Evaluation**

**Clara Kim*** and **Mark Levenson**, U.S. Food and Drug Administration

**3b. Analyzing Multiple Endpoints in a Confirmatory Randomized Clinical Trial: An Approach that Addresses Stratification, Missing Values, Baseline Imbalance and Multiplicity for Strictly Ordinal Outcomes**

**Hengrui Sun***, University of North Carolina, Chapel Hill
**Atsushi Kawaguchi**, Kyoto University, Japan
**Gary Koch**, University of North Carolina, Chapel Hill

**3c. Comparing the Statistical Power of Analysis of Covariance after Multiple Imputation and the Mixed Model in Testing the Treatment Effect for Pre-Post Studies with Loss to Follow-Up**

**Wenna Xi***, **Michael L. Pennell**, **Rebecca R. Andridge** and **Electra D. Paskett**,
The Ohio State University

**3d. Extending Logistic Regression Likelihood Ratio Test Analysis to Detect Signals of Vaccine-Vaccine Interactions in Vaccine Safety Surveillance**

**Kijoeng Nam***, U.S. Food and Drug Administration
**Nicholas C. Henderson**, University of Wisconsin, Madison
**Patricia Rohan**, **Emily Jane Woo** and **Estelle Russek-Cohen**,
U.S. Food and Drug Administration

**3e. Dose-Finding Approach Based on Efficacy and Toxicity Outcomes in Phase I Oncology Trials for Molecularly Targeted Agents**

**Hiroyuki Sato***, Pharmaceuticals and Medical Devices Agency
**Akihiro Hirakawa**, Nagoya University Graduate School of Medicine
**Chikuma Hamada**, Tokyo University of Science

**3f. Effect Size Measures and Meta-Analysis for Alternating Treatment Single Case Design Data**

**D Leann Long***, Mathew Bruckner, **Regina A. Carroll** and **George A. Kelley**,
West Virginia University

**3g. Clinical Trials with Exclusions Based on Race, Ethnicity, and English Fluency**

**Brian L. Egleston***, **Omar Pedraza**, **Yu-Ning Wong**, **Roland L. Dunbrack Jr.**,
**Eric A. Ross** and **J. Robert Beck**, Fox Chase Cancer Center, Temple University

✱ = Presenter    ■ = Student Award Winner

**3h. Comparing Four Methods for Estimating Optimal Tree-Based Treatment Regimes**

**Aniek Sies*** and **Iven Van Mechelen**, Katholieke Universiteit Leuven

**3i. Comparing Methods of Adjusting for Center Effects Using Pediatric ICU Glycemic Control Data**

**Samantha Shepler***, **Scott Gillespie** and **Traci Leong**, Emory University

**3j. Bayesian Dose Finding Procedure Based on Information Criterion**

**Lei Gao***, Sanofi
**William F. Rosenberger**, George Mason University
**Zorayr Manukyan**, Pfizer Inc.

**3k. The Relationship among Toxicity, Response, and Survival Profiles Ultimately Influence Calling a Beneficial Experimental Drug Favorable Under Standard Phase I, II, and III Clinical Trial Designs**

**Amy S. Ruppert*** and **Abigail B. Shoben**, The Ohio State University

**3l. Dose-Finding Using Hierarchical Modeling for Multiple Subgroups**

**Kristen May Cunanan*** and **Joseph S. Koopmeiners**, University of Minnesota

**3m. Detecting Outlying Trials in Network Meta-Analysis**

**Jing Zhang***, University of Maryland
**Haoda Fu**, Eli Lilly and Company
**Bradley P. Carlin**, University of Minnesota

**3n. INVITED POSTER:
Subgroup Analysis in Confirmatory Clinical Trials**

**Brian Millen***, Eli Lilly and Company

## 4. POSTERS:
## Survival Analyses

Sponsor: **ENAR**

**4a. INVITED POSTER:
Time Dependent Covariates in the Presence of Left Truncation**

**Rebecca A. Betensky***, Harvard School of Public Health

**4b. On the Estimators and Tests for the Semiparametric Hazards Regression Model**

**Seung-Hwan Lee***, Illinois Wesleyan University

**4c. A Martingale Approach to Estimating Confidence Band with Censored Data**

**Eun-Joo Lee***, Millikin University

**4d. Novel Image Markers for Non-Small Cell Lung Cancer Classification and Survival Prediction**

**Hongyuan Wang***, University of Kentucky
**Fuyong Xing** and **Hai Su**, University of Florida
**Arnold Stromberg**, University of Kentucky
**Lin Yang**, University of Florida

**4e. Generalized Estimating Equations for Modeling Restricted Mean Survival Time Under General Censoring Mechanisms**

**Xin Wang\*** and **Douglas E. Schaubel**, University of Michigan

**4f. Generalized Accelerated Failure Time Spatial Frailty Model**

**Haiming Zhou\***, **Timothy Hanson** and **Jiajia Zhang**, University of South Carolina

**4g. Penalized Variable Selection in Competing Risks Regression**

**Zhixuan Fu\***, Yale University
**Chirag R. Parikh**, Yale University School of Medicine
**Bingqing Zhou**, Yale University

**4h. Statistical Modeling of Gap Times in Presence of Panel Count Data with Intermittent Examination Times: An Application to Spontaneous Labor in Women**

**Ling Ma\*** and **Rajeshwari Sundaram**, Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health

**4i. Competing Risks Model of Screening and Symptoms Diagnosis for Prostate Cancer**

**Sheng Qiu\*** and **Alexander Tsodikov**, University of Michigan

**4j. Joint Modeling of Recurrent Event Processes and Intermittently Observed Time-Varying Binary Covariate Processes**

**Shanshan Li\***, Indiana University Richard M. Fairbanks School of Public Health, Indianapolis

**4k. Composite Outcomes Versus Competing Risks**

**Paul Kolm\***, Christiana Care Health Systems

**4l. Quantile Regression Models for Interval-Censored Failure Time Data**

**Fang-Shu Ou\***, **Donglin Zeng** and **Jianwen Cai**, University of North Carolina, Chapel Hill

**4m. Empirical Likelihood Confidence Bands for the Difference of Survival Functions Under the Proportional Hazards Model**

**Mai Zhou** and **Shihong Zhu\***, University of Kentucky

## 5. POSTERS:
## Causal Inference

Sponsor: **ENAR**

**5a. INVITED POSTER:**
**A Causal Framework for Meta Analyses**

**Michael E. Sobel\***, **David Madigan** and **Wei Wang\***, Columbia University

**5b. The Principal Direction of Mediation**

**Oliver Chen\***, **Elizabeth Ogburn**, **Ciprian Crainiceanu**, **Brian Caffo** and **Martin Lindquist**, Johns Hopkins Bloomberg School of Public Health

**5c. Dynamic Marginal Structural Models to Test the Benefit of Lung Transplantation Treatment Regimes**

**Jeffrey A. Boatman\*** and **David M. Vock**, University of Minnesota

★ = Presenter     ■ = Student Award Winner

**5d. A Model Based Approach for Predicting Principal Stratum Membership in Environmental Interventions**

**Katherine E. Freeland***, Johns Hopkins Bloomberg School of Public Health

**5e. Propensity Score Approach to Modeling Medical Cost Using Observational Data**

**Jiaqi Li*** and **Nandita Mitra**, University in Philadelphia
**Elizabeth Handorf**, Fox Chase Cancer Center
**Justin Bekelman**, University in Philadelphia

**5f. Generalizing Evidence from Randomized Trials Using Inverse Probability of Selection Weights**

**Ashley L. Buchanan***, **Michael G. Hudgens** and **Stephen R. Cole**, University of North Carolina, Chapel Hill

**5g. Racial Disparities in Cancer Survival: A Causal Inference Perspective**

**Linda Valeri***, **Jarvis Chen**, **Nancy Krieger**, **Tyler J. VanderWeele** and **Brent A. Coull**, Harvard School of Public Health

## 6. POSTERS:
## Statistical Genetics, GWAS, and 'Omics Data
Sponsor: **ENAR**

**6a. A Data-Adaptive SNP-Set-Based Association Test of Longitudinal Traits**

**Yang Yang*** and **Peng Wei**, University of Texas Health Science Center at Houston
**Wei Pan**, University of Minnesota

**6b. Genetic Analysis of Data from Structured Populations**

**Yogasudha Veturi*** and **Gustavo de los Campos**, University of Alabama at Birmingham

**6c. Mapping Disease Susceptibility Loci for Multiple Complex Traits with U-Statistics**

**Ming Li***, University of Arkansas for Medical Sciences
**Changshuai Wei**, University of North Texas
**Qing Lu**, Michigan State University

**6d. Permutation-Based Test Statistics for Intermediate Phenotypes in Genome-Wide Association Studies**

**Wei Xue*** and **Eric Bair**, University of North Carolina, Chapel Hill

**6e. Statistics for Genetic Association in the Presence of Covariates — Genome Scanning Considerations**

**Hui-Min Lin***, **Eleanor Feingold** and **Yan Lin**, University of Pittsburgh

**6f. Power and Sample Size Determination for Time Course Microarray Differential Expression Studies: A False Discovery Rate and Permutation-Based Simulation Method**

**Joanne C. Beer***, University of Pittsburgh
**Thuan Nguyen**, **Kemal Sonmez** and **Dongseok Choi**, Oregon Health & Science University

★ = *Presenter*  ■ = *Student Award Winner*

### 6g. Functional Random Field Models for Association Analysis of Sequencing Data

**Xiaoxi Shen***, Michigan State University
**Ming Li**, University of Arkansas for Medical Sciences
**Zihuai He**, University of Michigan
**Qing Lu**, Michigan State University

### 6h. Quantifying Uncertainty in the Identification of Proteins, Post-Translational Modifications (PTMs) and Proteoforms

**Naomi C. Brownstein*** and **Xibei Dang**, Florida State University
National High Magnetic Field Lab
**Eric Bair**, University of North Carolina, Chapel Hill
**Nicolas L. Young**, Florida State University National High Magnetic Field Lab

### 6i. A Statistical Pipeline for Studying Co-Regulated Genes Using Single-Cell RNA-Seq Data

**Ning Leng*** and **Li-Fang Chu**, Morgridge Institute for Research
**Yuan Li**, University of Wisconsin, Madison
**Peng Jiang**, **Chris Barry**, **Ron Stewart** and **James Thomson**,
Morgridge Institute for Research
**Christina Kendziorski**, University of Wisconsin, Madison

### 6j. Outlier Detection for Quality Control in Flow Cytometry Using Compositional Data Analysis

**Kipper Fletez-Brant***, Johns Hopkins University
**Josef Spidlen** and **Ryan Brinkman**, BC Cancer Agency
**Pratip Chattopadhyay**, National Institutes of Health

### 6k. Power Analysis for Genome-Wide Association Study in Biomarker Discovery

**Wenfei Zhang***, **Yuefeng Lu**, **Yang Zhao**, **Vincent Thuillier**, **Jeffrey Palmer**,
**Sherry Cao**, **Jike Cui**, **Stephen Madden** and **Srinivas Shankara**, Sanofi

### 6l. Differential Dynamics in Single-Cell RNA-Seq Experiments

**Keegan D. Korthauer*** and **Christina Kendziorski**,
University of Wisconsin, Madison

### 6m. Experimental Design for Bulk Single-Cell RNA-Seq Studies

**Rhonda L. Bacher*** and **Christina Kendziorski**,
University of Wisconsin, Madison

### 6n. A Hierarchical Mixture Model for Joint Prioritization of GWAS Results from Multiple Related Phenotypes

**Cong Li***, Yale University
**Can Yang**, Hong Kong Baptist University
**Hongyu Zhao**, Yale School of Public Health

### 6o. Nonparametric Tests for Differential Enrichment Analysis with Multi-Sample ChIP-Seq Data

**Qian Wu***, BioStat Solution
**Kyoung-Jae Won** and **Hongzhe Li**, University of Pennsylvania

### 6p. Analysis of Mass Spectrometry Data and Preproccesing Methods for Metabolomics

**Leslie Myint*** and **Kasper Hansen**, Johns Hopkins University

★ = *Presenter*    ■ = *Student Award Winner*

## 7. POSTERS:
## Methodology and Applications in Epidemiology, Environment, and Ecology

Sponsor: **ENAR**

### 7a. INVITED POSTER:
### Carpe Diem! Biostatisticians Impacting the Conducting and Reporting of Clinical Studies

**Sally Morton\***, University of Pittsburgh

### 7b. On Stratified Bivariate Ranked Set Sampling with Optimal Allocation for Naive and Ratio Estimators

**Lili Yu**, **Hani Samawi**, **Daniel Linder**, **Arpita Chatterjee**, **Yisong Huang\*** and **Robert Vogel**, Georgia Southern University

### 7c. Approximate Bayesian Model Choice for Historical Influenza Data from Tristan da Cunha

**Xing Ju Lee\***, **Christopher C. Drovandi** and **Anthony N. Pettitt**, Queensland University of Technology

### 7d. Comparisons of the Cancer Risk Estimates between Excess Relative Risk and Relative Risk Models: A Case Study

**Shu-Yi Lin\***, Taipei City Hospital, Taiwan

### 7e. A Regression Based Spatial Capture-Recapture Model for Estimating Species Density

**Purna S. Gamage\***, **Souparno Ghosh**, **Philip S. Gipson** and **Gregory Pavur**, Texas Tech University

### 7f. Application of the Use of Percentage Difference from Median BMI to Overcome Ceiling Effects in Adiposity Change in Children

**Christa Lilly\*** and **Lesley Cottrell**, West Virginia University
**Karen Northrup** and **Richard Wittberg**, Wood County School System

### 7g. A Multi-Pathogen Hierarchical Bayesian Model for Spatio-Temporal Transmission of Hand, Foot and Mouth Disease

**Xueying Tang\***, **Nikolay Bliznyuk**, **Yang Yang** and **Ira Longini**, University of Florida

### 7h. Evaluating Risk-Prediction Models Using Data from Electronic Health Records

**Le Wang\***, **Pamela A. Shaw**, **Hansie Mathelier**, **Stephen E. Kimmel** and **Benjamin French**, University of Pennsylvania

### 7i. A Bayesian Model for Identifying and Predicting the Spatio-Temporal Dynamics of Re-Emerging Urban Insect Infestations

**Erica Billig\***, **Michael Levy**, **Michelle Ross** and J**ason Roy**, University of Pennsylvania

### 7j. Semi-Markov Models for Interval Censored Transient Cognitive States with Back Transitions and a Competing Risk

**Shaoceng Wei\*** and **Richard Kryscio**, University of Kentucky

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**\*** = *Presenter*   ■ = *Student Award Winner*

### 7k. Growth Curves for Cystic Fibrosis Infants Vary in the Ability to Predict Lung Function

**Yumei Cao*** and **Raymond G. Hoffmann**, Medical College of Wisconsin
**Evans M. Machogu**, Indiana University School of Medicine
**Praveen S. Goday** and **Pippa M. Simpson**, Medical College of Wisconsin

### 7l. An Examination of the Concept of Frailty in the Elderly

**Felicia R. Griffin***, **Daniel L. McGee** and **Elizabeth H. Slate**,
Florida State University

### 7m. Efficiencies from Using Entire United States Responses in Predicting County Level Smoking Rates for West Virginia Using Publicly Available Data

**Dustin M. Long*** and **Emily A. Sasala**, West Virginia University

### 7n. Optimally Combined Estimation for Tail Quantile Regression

**Kehui Wang***, North Carolina State University
**Huixia Judy Wang**, The George Washington University

## 8. POSTERS:
## Variable Selection and Methods for High Dimensional Data
Sponsor: **ENAR**

### 8a. Bayes Factor Consistency Under g-prior Linear Model with Growing Model Size

**Ruoxuan Xiang***, **Malay Ghosh** and **Kshitij Khare**, University of Florida

### 8b. Variable Selection for Cox Proportional Hazard Frailty Model

**Ioanna Pelagia*** and **Jianxin Pan**, The University of Manchester,
United Kingdom

### 8c. Fused Lasso Approach to Assessing Data Comparability with Applications in Missing Data Imputation

**Lu Tang*** and **Peter X.K. Song**, University of Michigan

### 8d. Multiple Imputation Using Sparse PCA for High-Dimensional Data

**Domonique Watson Hodge*** and **Qi Long**, Emory University

### 8e. Topic Modeling for Signal Detection of Safety Data from Adverse Event Reporting System Database

**Weizhong Zhao***, **Wen Zou** and **James J. Chen**, U.S. Food
and Drug Administration

### 8f. Building Risk Models with Calibrated Margins

**Paige Maas***, National Cancer Institute, National Institutes of Health
**Yi-Hau Chen**, Academia Sinica
**Raymond Carroll**, Texas A&M University
**Nilanjan Chatterjee**, National Cancer Institute, National Institutes of Health

### 8g. Categorical Predictors and Pairwise Comparisons in Logistic Regression via Penalization and Bregman Methods

**Tian Chen*** and **Howard Bondell**, North Carolina State University

★ = Presenter     ■ = Student Award Winner

**8h. Comparison of Step-Wise Variable Selection, BImmLasso, and GMMBoost for Identification of Predictor Interactions Associated with Disease Outcome**

**Yunyun Jiang\*** and **Bethany Wolf**, Medical University of South Carolina

**8i. Shrinkage Priors for Bayesian Learning from High Dimesional Genetics Data**

**Anjishnu Banerjee\***, Medical College of Wisconsin

**8j. Functional Principal Component Analysis to Fifty-Eight Most Traded Currencies Based on Euro**

**Jong-Min Kim**, University of Minnesota, Morris
**Ali H. AL-Marshadi**, King Abdulaziz University
**Junho Lim\***, University of Minnesota, Morris

## 9. POSTERS:
## Bayesian Methods and Computational Algorithms
Sponsor: **ENAR**

**9a. INVITED POSTER:**
**Nonparametric Bayes Models for Modeling Longitudinal Change in Association among Categorical Variables**

**Tsuyoshi Kunihama**, Duke University
**Amy Herring\***, University of North Carolina, Chapel Hill
**David Dunson**, Duke University
**Carolyn Halpern**, University of North Carolina, Chapel Hill

**9b. Regression Model Estimation and Prediction Incorporating Coefficients Information**

**Wenting Cheng\***, **Jeremy M.G. Taylor** and **Bhramar Mukherjee**, University of Michigan

**9c. Cross-Correlation of Change Point Problem**

**Congjian Liu\***, Georgia Southern University

**9d. Bayesian Network Models for Subject-Level Inference**

**Sayantan Banerjee\***, **Han Liang** and **Veerabhadran Baladandayuthapani**, University of Texas MD Anderson Cancer Center

**9e. Algorithms for Constrained Generalized Eigenvalue Problem**

**Eun Jeong Min\*** and **Hua Zhou**, North Carolina State University

**9f. CycloPs: A Cyclostationary Algorithm for Automatic Walking Recognition**

**Jacek K. Urbanek\*** and **Vadim Zipunnikov**, Johns Hopkins Bloomberg School of Public Health
**Tamara B. Harris**, National Institute on Aging, National Institutes of Health
**Nancy W. Glynn**, University of Pittsburgh
**Ciprian Crainiceanu**, Johns Hopkins Bloomberg School of Public Health
**Jaroslaw Harezlak**, Indiana University School of Medicine

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★ = *Presenter*    ▇ = *Student Award Winner*

**9g. Simulation-Based Estimation of Mean and Variance for Meta-Analysis via Approximate Bayesian Computation (ABC)**

**Deukwoo Kwon\*** and **Isildinha M. Reis**, University of Miami

**9h. The Effects of Sparsity Constraints on Inference of Biological Processes in Stochastic Non-Negative Matrix Factorization of Expression Data**

**Wai S. Lee\***, **Alexander V. Favorov** and **Elana J. Fertig**, Johns Hopkins University
**Michael F. Ochs**, The College of New Jersey

**9i. Bayesian Sample Size Determination for Hurdle Models**

**Joyce Cheng\***, **David Kahle** and **John W. Seaman**, Baylor University

**9j. Fast Covariance Estimation for Sparse Functional/Longitudinal Data**

**Luo Xiao\***, Johns Hopkins University
**David Ruppert**, Cornell University
**Vadim Zipunnikov** and **Ciprian Crainiceanu**, Johns Hopkins Bloomberg School of Public Health

**9k. Prior Elicitation for Logistic Regression with Data Exhibiting Markov Dependency**

**Michelle S. Marcovitz\*** and **John Seaman Jr.**, Baylor University

★ = Presenter    ■ = Student Award Winner

# MONDAY, MARCH 16

## 8:30 am – 10:15 am

### 10. Advances in Patient-Centered Outcomes (PCOR) Methodology

Sponsors: **ENAR**, **ASA Biometrics Section**, **ASA Section on Statistics in Epidemiology**

Organizers: **Qi Long**, Emory University and **Jason Gerson**, Patient-Centered Outcomes Research Institute

Chair: **Qi Long**, Emory University

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| 8:30 | **PCORI Funding Opportunities for Biostatisticians** <br><br> **Jason Gerson***, Patient-Centered Outcomes Research Institute (PCORI) |
| 8:55 | **Causal Inference for Effectiveness Research in Using Secondary Data** <br><br> **Sebastian Schneeweiss***, Harvard University |
| 9:20 | **Optimal, Two Stage, Adaptive Enrichment Designs for Randomized Trials, Using Sparse Linear Programming** <br><br> **Michael Rosenblum***, Johns Hopkins Bloomberg School of Public Health <br> **Xingyuan Fang** and **Han Liu**, Princeton University |
| 9:45 | **Treatment Effect Inferences Using Observational Data when Treatments Effects are Heterogeneous Across Outcomes: Simulation Evidence** <br><br> **John M. Brooks*** and **Cole G. Chapman**, University of South Carolina |

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| 10:10 | **Floor Discussion** |

### 11. Looking Under the Hood: Assumptions, Methods and Applications of Microsimulation Models to Inform Health Policy

Sponsors: **ENAR**, **ASA Section on Statistics in Epidemiology**

Organizer: **Ann Zauber**, Memorial Sloan Kettering Cancer Center

Chair: **Eric (Rocky) Feuer**, National Cancer Institute, National Institutes of Health

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| 8:30 | **Introduction to the CISNET Program and Population Comparative Modeling** <br><br> **Eric J. Feurer***, National Cancer Institute, National Institutes of Health |
| 8:50 | **Microsimulation Modeling to Inform Health Policy Decisions on Age to Begin, Age to End, and Intervals of Colorectal Cancer Screening** <br><br> **Ann G. Zauber***, Memorial Sloan Kettering Cancer Center |
| 9:10 | **Role of Calibration and Validation in Developing Microsimulation Models** <br><br> **Carolyn M. Rutter***, RAND Corporation |
| 9:30 | **Using Microsimulation to Assess the Relative Contributions of Screening and Treatment in Observed Reductions in Breast Cancer Mortality in the United States** <br><br> **Donald A. Berry***, University of Texas MD Anderson Cancer Center |

✱ = *Presenter*   ■ = *Student Award Winner*

**9:50**     **Synthesis of Randomized Controlled Trials of Prostate Cancer Screening to Assess Impact of PSA Testing Using Microsimulations**

**Ruth Etzioni\*** and **Roman Gulati**, Fred Hutchinson Cancer Research Center
**Alex Tsodikov**, University of Michigan
**Eveline Heijnsdijk** and **Harry de Koning**, Erasmus University

**10:10**     **Floor Discussion**

## 12. Optimal Inference for High Dimensional Problems

Sponsors: **ENAR, ASA Biometrics Section**

Organizer: **Jelena Bradic**, University of California, San Diego

Chair: **Jelena Bradic**, University of California, San Diego

**8:30**     **A Non-Parametric Natural Image for Decoding Visual Stimuli from the Brain**

**Yuval Benjamini\***, Stanford University
**Bin Yu**, University of California, Berkeley

**8:55**     **Does $\ell_q$ Minimization Outperform $\ell_1$ Minimization?**

**Arian Maleki\***, Columbia University

**9:20**     **Inference in High-Dimensional Varying Coefficient Models**

**Mladen Kolar\***, University of Chicago
**Damian Kozbur**, ETH, Zurich

**9:45**     **Feature Augmentation via Nonparametrics and Selection (FANS) in High Dimensional Classification**

**Jianqing Fan**, Princeton University
**Yang Feng**, Columbia University
**Jiancheng Jiang**, University of North Carolina, Charlotte
**Xin Tong\***, University of Southern California

**10:10**     **Floor Discussion**

## 13. Lifetime Data Analysis Highlights

Sponsors: **ENAR, ASA Biometrics Section, Lifetime Data Analysis**

Organizer: **Mei-Ling Ting Lee**, University of Maryland

Chair: **Ruth Pfeiffer**, National Cancer Institute, National Institutes of Health

**8:30**     **Modeling the "Win Ratio" in Clinical Trials with Multiple Outcomes**

**David Oakes\***, University of Rochester

**8:55**     **A Model for Time to Fracture with a Shock Stream Superimposed on Progressive Degradation: The Study of Osteoporotic Fractures**

**Xin He\***, University of Maryland, College Park
**G. A. Whitmore**, McGill University
**Geok Yan Loo**, University of Maryland, College Park
**Marc C. Hochberg**, University of Maryland, Baltimore
**Mei-Ling Ting Lee**, University of Maryland, College Park

**\*** = *Presenter*    ■ = *Student Award Winner*

**9:20**    **Joint Rate Models for Bivariate Recurrent Events with Frailty Processes**

**Mei-Cheng Wang\***, Johns Hopkins University

**9:45**    **Efficient Estimation of the Cox Model with Auxiliary Landmark Time Survival Information**

**Chiung-Yu Huang\***, Johns Hopkins University
**Jing Qin**, National Institute of Allergy and Infectious Diseases, National Institutes of Health
**Huei-Ting Tsai**, Georgetown University

**10:10**    **Floor Discussion**

## 14. Recent Advances and Challenges in the Design of Early Stage Cancer Trials

Sponsors: **ENAR, ASA Biopharmaceutical Section**

Organizer: **Ken Cheung**, Columbia University

Chair: **Ken Cheung**, Columbia University

**8:30**    **Motivating Sample Sizes in One- and Two-Agent Phase I Designs via Bayesian Posterior Credible Intervals**

**Thomas M. Braun\***, University of Michigan

**8:55**    **Beyond the MTD: Personalized Medicine and Clinical Trial Design**

**Daniel Normolle\***, **Brenda Diergaarde** and **Julie Bauman**, University of Pittsburgh

**9:20**    **Understanding the Toxicity Profile of Novel Anticancer Therapies**

**Shing M. Lee\***, Columbia University

**9:45**    **Simple Benchmark for Planning and Evaluating Complex Dose Finding Designs**

**Ken Cheung\***, Columbia University

**10:10**    **Floor Discussion**

## 15. Large Scale Data Science for Observational Healthcare Studies

Sponsor: **IMS**

Organizers: **Marc Suchard**, University of California, Los Angeles and

**David Madigan**, Columbia University

Chair: **Martin Schuemie**, Johnson & Johnson

**8:30**    **Beyond Crude Cohort Designs: Pharmacoepidemiology at Scale**

**Marc A. Suchard\***, University of California, Los Angeles

**8:55**    **Honest Inference from Observational Database Studies**

**David Madigan\***, Columbia University

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**\*** = *Presenter*    ■ = *Student Award Winner*

| 9:20 | **Safety Analysis Strategies for Comparing Two Cohorts Selected from Healthcare Data using Propensity Scores** |
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| | **William DuMouchel\*** and **Rave Harpaz**, Oracle Health Sciences |
| 9:45 | **Interpretable Feature Creation and Model Uncertainty in Observational Medical Data** |
| | **Tyler McCormick\***, and **Rebecca Ferrell**, University of Washington |

| 10:10 | **Floor Discussion** |
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## 16. CONTRIBUTED PAPERS:
### Competing Risks

Sponsor: **ENAR**

Chair: **Domonique Watson Hodge**, Emory University

| 8:30 | **Extending Fine and Gray's Model: General Approach for Competing Risks Analysis** |
|---|---|
| | **Anna Bellach\***, University of Copenhagen and University of North Carolina, Chapel Hill<br>**Jason Peter Fine**, University of North Carolina, Chapel Hill<br>**Ludger Rüschendorf**, Albert Ludwigs University of Freiburg im Breisgau<br>**Michael R. Kosorok**, University of North Carolina, Chapel Hill |
| 8:45 | **Non-Parametric Cumulative Incidence Estimation Under Misclassification in the Cause of Failure** |
| | **Giorgos Bakoyannis\***, Indiana University<br>**Menggang Yu**, University of Wisconsin<br>**Constantin T. Yiannoutsos**, Indiana University<br>**Constantine Frangakis**, Johns Hopkins University |
| 9:00 | **Efficient Estimation of Semiparametric Transformation Models for the Cumulative Incidence of Competing Risks** |
| | **Lu Mao**■ and **Danyu Lin**, University of North Carolina, Chapel Hill |
| 9:15 | **Joint Dynamic Modeling of Recurrent Competing Risks and a Terminal Event** |
| | **Piaomu Liu\*** and **Edsel Peña**, University of South Carolina, Columbia |
| 9:30 | **Dynamic Prediction of Subdistribution Functions for Data with Competing Risks** |
| | **Qing Liu\*** and **Chung-Chou H. Chang**, University of Pittsburgh |
| 9:45 | **Competing Risks Regression using Pseudo-Values Under Random Signs Censoring** |
| | **Tianxiu Wang\*** and **Chung-Chou H. Chang**, University of Pittsburgh |
| 10:00 | **Kernel Score Test for Progression Free Survival** |
| | **Matey Neykov\*** and **Tianxi Cai**, Harvard University |

★ = Presenter   ■ = Student Award Winner

## 17. CONTRIBUTED PAPERS: Applications and Methods in Environmental Health

Sponsor: **ENAR**

Chair: **Yang Yang**, University of Texas Health Science Center at Houston

**8:30** **Methodology for Quantifying the Change in Mortality Associated with Future Ozone Exposures Under Climate Change**

**Stacey E. Alexeeff\***, **Gabriele G. Pfister** and **Doug Nychka**, National Center for Atmospheric Research

**8:45** **Estimation of Environmental Exposure Distribution Adjusting for Dependence between Exposure Level and Detection Limit**

**Yuchen Yang\***, **Brent Shelton** and **Tom Tucker**, University of Kentucky
**Li Li,** Case Western Reserve University
**Richard Kryscio** and **Li Chen**, University of Kentucky

**9:00** **Spatial Confounding, Spatial Scale and the Chronic Health Effects of Coarse Thoracic Particulate Matter**

**Helen Powell\*** and **Roger D. Peng**, Johns Hopkins Bloomberg School of Public Health

**9:15** **Estimating the Causal Effect of Coal Burning Power Plants on $CO_2$ Emissions**

**Georgia Papadogeorgou\***, **Corwin Zigler** and **Francesca Dominici**, Harvard School of Public Health

**9:30** **Temporal Aspects of Air Pollutant Measures in Epidemiologic Analysis: A Simulation Study**

**Laura F. White\*** and **Jeffrey Yu**, Boston University
**Bernardo Beckerman** and **Michael Jerrett**, University of California, Berkeley
**Patricia Coogan**, Boston University

**9:45** **Bayesian Models for Multiple Outcomes in Domains with Application to the Seychelles Child Development Study**

**Luo Xiao**, Johns Hopkins Bloomberg School of Public Health
**Sally W. Thurston\***, University of Rochester
**David Ruppert**, Cornell University
**Tanzy M.T. Love** and **Philip W. Davidson**, University of Rochester

**10:00** **Analysis of 26 Million Area VOC Observations for the Prediction of Personal THC Exposure Using Bayesian Modeling**

**Caroline P. Groth\***, University of Minnesota
**Sudipto Banerjee**, University of California, Los Angeles
**Gurumurthy Ramachandran** and **Ian Reagen**, University of Minnesota
**Richard Kwok**, National Institute of Environmental Health Sciences, National Institutes of Health
**Aaron Blair**, National Cancer Institute, National Institutes of Health
**Dale Sandler** and **Lawrence Engel**, National Institute of Environmental Health Sciences, National Institutes of Health
**Mark Stenzel** and **Patricia Stewart**, Stewart Exposure Assessments, LLC

## 18. CONTRIBUTED PAPERS:
## Statistical Methods for Genomics

Sponsor: **ENAR**

Chair: **Wenna Xi**, The Ohio State University

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|---|---|
| 8:30 | **Structured Sufficient Dimension Reduction in Genomics** |
| | **Yang Liu***, **Francesca Chiaromonte** and **Bing Li**, The Pennsylvania State University |
| 8:45 | **Identification of Consistent Functional Modules** |
| | **Xiwei Chen***, **David L. Tritchler**, **Jeffrey C. Miecznikowski** and **Daniel P. Gaile**, State University of New York at Buffalo |
| 9:00 | **A Mediation-Based Integrative Genomic Analysis of Lung Cancer** |
| | **Sheila Gaynor*** and **Xihong Lin**, Harvard University |
| 9:15 | **Nonparametric Failure Time Analysis with Genomic Applications** |
| | **Cheng Cheng***, St. Jude Children's Research Hospital |
| 9:30 | **An Omnibus Test for Differential Abundance Analysis of Microbiome Data** |
| | **Jun Chen***, Mayo Clinic, Rochester
**Emily King**, Iowa State University
**Diane Grill** and **Karla Ballman**, Mayo Clinic, Rochester |
| 9:45 | **Sparse Analysis for High Dimensional Data with Application to Data Integration** |
| | **Sandra Addo Safo***, Emory University
**Jeongyoun Ahn**, University of Georgia |
| 10:00 | **Robust Inference of Chromosome 3D Structure Using Hi-C Chromatin Interaction Data** |
| | **Kai Wang*** and **Kai Tan**, University of Iowa |

## 19. CONTRIBUTED PAPERS:
## Spatial and Spatio-Temporal Methods and Applications

Sponsor: **ENAR**

Chair: **Mulugeta Gebregziabhe**, Medical University of South Carolina

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|---|---|
| 8:30 | **A Semiparametric Approach for Spatial Point Process with Geocoding Error in Case-Control studies** |
| | **Kun Xu*** and **Yongtao Guan**, University of Miami |
| 8:45 | **Semiparametric Nonseparable Spatial-Temporal Single Index Model** |
| | **Hamdy Fayez Farahat Mahmoud*** and **Inyoung Kim**, Virginia Tech |
| 9:00 | **Statistical Analysis of Feed-Forward Loops Arising from Aging Physiological Systems** |
| | **Jonathan (JJ) H. Diah***, **Feiran Zhong** and **Arindam RoyChoudhury**, Columbia University |

★ = *Presenter*   ■ = *Student Award Winner*

**9:15**    **Bayesian Computation for Log-Gaussian Cox Processes: A Comparative Analysis of Methods**

**Ming Teng***, University of Michigan
**Farouk S. Nathoo**, University of Victoria
**Timothy D. Johnson**, University of Michigan

**9:30**    **The Joint Asymptotics for Estimating the Smoothness Parameters of Bivariate Gaussian Random Process**

**Yuzhen Zhou*** and **Yimin Xiao**, Michigan State University

**9:45**    **Covariance Tapering for Anisotropic Nonstationary Gaussian Random Fields with Application to Large Scale Spatial Data Sets**

**Abolfazl Safikhani*** and **Yimin Xiao**, Michigan State University

**10:00**    **Dynamic Nearest Neighbor Gaussian Process Models for Large Spatio-Temporal Datasets**

**Abhirup Datta***, University of Minnesota
**Sudipto Banerjee**, University of California, Los Angeles
**Andrew O. Finley**, Michigan State University

## 20. CONTRIBUTED PAPERS: Case Studies in Longitudinal Data Analysis

Sponsor: **ENAR**

Chair: **Zhe Chen**, University of Florida

**8:30**    **Using the Sigmoid Mixed Models for Longitudinal Cognitive Decline**

**Ana W. Capuano***, **Robert S. Wilson** and **Sue E. Leurgans**, Rush University Medical Center
**Jeffrey D. Dawson**, University of Iowa
**Donald Hedeker,** University of Chicago

**8:45**    **Short-Term Blood Pressure Variability over 24 hours Using Mixed-Effects Models**

**Jamie M. Madden***, **Xia Lee**, **Patricia M. Kearney** and **Anthony P. Fitzgerald**, University College Cork, Ireland

**9:00**    **A Longitudinal Modelling Case Study in Renal Medicine and an Associated R Package**

**Ozgur Asar***, Lancaster University
**Peter J. Diggle**, Lancaster University and University of Liverpool
**James Ritchie** and **Philip A. Kalra**, University of Manchester

**9:15**    **A Likelihood Ratio Test for Nested Proportions**

**Yi-Fan Chen***, University of Illinois, Chicago
**Jonathan Yabes** and **Maria Brooks**, University of Pittsburgh
**Sonia Singh**, Royal Children's Hospital
**Lisa Weissfeld**, Statistics Collaborative Inc.

**9:30**  **Bayesian Nonparametric Quantile Regression Models: An Application to a Fetal Growth Study with Ultrasound Measurements**

**Sungduk Kim*** and **Paul S. Albert**, Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health

**9:45**  **Modeling Repeated Labor Curves in Consecutive Pregnancies: Individualized Prediction of Labor Progression from Previous Pregnancy Data**

**Olive D. Buhule*** and **Paul S. Albert**, Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health
**Alexander C. McLain**, University of South Carolina
**Katherine Grantz**, Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health

**10:00**  **An Example of Unconstrained Model for Covariance Structure for Multivariate Longitudinal Data: Major League Baseball Batter's Salary with the Weighted Offensive Average**

**Chulmin Kim***, University of West Georgia

## 21. CONTRIBUTED PAPERS:
## Meta Analysis

Sponsor: **ENAR**

Chair: **Joanne C. Beer**, University of Pittsburgh

**8:30**  **Meta-Analysis Sparse K-Means Framework for Disease Subtype Discovery When Combining Multiple Transcriptomic Studies**

**Zhiguang Huo*** and **George Tseng**, University of Pittsburgh

**8:45**  **Meta Analysis: A Causal Framework, with Application to Randomized Studies of Vioxx**

**Michael E. Sobel***, **David Madigan** and **Wei Wang**, Columbia University

**9:00**  **A Bayesian Hierarchical Model for Network Meta-Analysis of Diagnostic Tests**

**Xiaoye Ma**■ and **Haitao Chu**, University of Minnesota
**Yong Chen**, University of Texas Health Science Center, Houston
**Joseph Ibrahim**, University of North Carolina, Chapel Hill

**9:15**  **Inference for Correlated Effect Sizes Using Multiple Univariate Meta-Analyses**

**Yong Chen**, **Yi Cai*** and **Chuan Hong**, University of Texas Health Science Center, Houston
**Dan Jackson**, Cambridge Institute of Public Health

**9:30**  **Detecting Outlying Studies in Meta-Regression Models Using a Forward Search Algorithm**

**Dimitris Mavridis**, University of Ioannina
**Irini Moustaki***, London School of Economics
**Melanie Wall**, Columbia University
**Georgia Salanti**, University of Ioannina

★ = Presenter  ■ = Student Award Winner

**9:45**  **Comparing Multiple Imputation Methods for Systematically Missing Subject-Level Data**

**David M. Kline\***, **Eloise E. Kaizar** and **Rebecca R. Andridge**, The Ohio State University

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**10:00**  **Floor Discussion**

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## 22.  CONTRIBUTED PAPERS: Semi-Parametric Methods

Sponsor: **ENAR**

Chair: **Laura H. Gunn**, Stetson University

**8:30**  **Understanding Gaussian Process Fits Using an Approximate Form of the Restricted Likelihood**

**Maitreyee Bose\*** and **James S. Hodges**, University of Minnesota

**8:45**  **Mitigating Bias in Generalized Linear Mixed Models: The Case for Bayesian Nonparametrics**

**Joseph L. Antonelli**■, **Sebastien Haneuse** and **Lorenzo Trippa**, Harvard School of Public Health

**9:00**  **An Estimated Likelihood Estimator by Extracting Auxiliary Information under Outcome Dependent Sample Design**

**Wansuk Choi\*** and **Haibo Zhou**, University of North Carolina, Chapel Hill

**9:15**  **Estimation, IID Representation and Inference for the Average Outcome Under Stochastic Intervention on Dependent Data**

**Oleg Sofrygin\*** and **Mark J. van der Laan**, University of California, Berkeley

**9:30**  **Empirical Likelihood-Based Inference for Partially Linear Models**

**Haiyan Su\***, Montclair State University

**9:45**  **Bayesian Nonparametric Methods for Testing Shape Constraint for Longitudinal Data**

**Yifang Li\***, North Carolina State University
**Sujit Ghosh**, North Carolina State University & Statistical and Applied Mathematical Sciences Institute

**10:00**  **Hypothesis Testing in Semi-Parametric Discrete Choice Model**

**Yifan Yang\*** and **Mai Zhou**, University of Kentucky

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# MONDAY, MARCH 16

**10:15 – 10:30 pm** — **Refreshment Break with Our Exhibitors**

**10:30 am – 12:15 pm**

## 23. Trends and Innovations in Clinical Trial Statistics: "The Future ain't What it Used to be"

Sponsors: **ENAR**, **ASA Biopharmaceutical Section**

Organizer: **Olga Marchenko**, Quintiles

Chair: **Olga Marchenko**, Quintiles

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| 10:30 | **"The Future Ain't What it Used to be" (Yogi Berra). Have Statisticians Received the Memo?**<br><br>**Nevine Zariffa\***, AstraZeneca Pharmaceuticals |
| 11:00 | Panelists:<br><br>**Sara Hughes**, GlaxoSmithKline<br><br>**Dominic Labriola**, Bristol-Myers Squibb<br><br>**Lisa LaVange**, U.S. Food and Drug Administration<br><br>**Shiferaw Mariam**, Janssen R&D<br><br>**Jerry Schindler**, Merck<br><br>**Venkat Sethuraman**, Bristol-Myers Squibb<br><br>**Frank Shen**, AbbVie<br><br>**Anastasios (Butch) Tsiatis**, North Carolina State University |
| 12:00 | **Floor Discussion** |

## 24. Causal Inference in HIV/AIDS Research

Sponsors: **ENAR**, **ASA Section on Statistics in Epidemiology**

Organizer: **Michael Hudgens**, University of North Carolina, Chapel Hill

Chair: **Michael Hudgens**, University of North Carolina, Chapel Hill

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|---|---|
| 10:30 | **Representing Unmeasured Confounding in Causal Models for Observational Data**<br><br>**Joseph W. Hogan\***, Brown University<br>**Dylan Small**, University of Pennsylvania |
| 10:55 | **Inverse Probability of Censoring Weights under Missing Not at Random with Application to CD4 Outcomes in HIV-Positive Patients in Kenya**<br><br>**Judith J. Lok\***, Harvard School of Public Health<br>**Constantin T. Yiannoutsos**, Indiana University Fairbanks School of Public Health<br>**Agnes Kiragga**, Infectious Diseases Institute, Kampala, Uganda<br>**Ronald J. Bosch**, Harvard School of Public Health |

| 11:20 | **Doubly Robust Instrumental Variable Estimation for Outcome Missing Not at Random** |
|---|---|
| | **BaoLuo Sun\***, **Lan Liu**, **James Robins** and **Eric Tchetgen Tchetgen**, Harvard School of Public Health |
| 11:45 | **Estimating Prevention Efficacy Among Compliers in HIV Pre-Exposure Prophylaxis (PrEP) Trials** |
| | **James Dai\*** and **Elizabeth Brown**, Fred Hutchinson Cancer Research Center and University of Washington |

| 12:10 | **Floor Discussion** |
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## 25. Open Problems and New Directions in Neuroimaging Research

Sponsors: **ENAR**, **ASA Mental Health Statistics Section**,

**ASA Section on Statistics in Imaging**

Organizers: **Hernando Ombao**, University of California, Irvine and

**Martin Lindquist**, Johns Hopkins University

Chair: **Timothy Johnson**, University of Michigan

| 10:30 | **Problems in Structural Brain Imaging: Wavelets and Regressions on Non-Euclidean Manifolds** |
|---|---|
| | **Moo K. Chung\***, University of Wisconsin-Madison |
| 10:55 | **Open Problems and New Directions in Modeling Electroencephalograms** |
| | **Hernando Ombao\***, University of California, Irvine |
| 11:20 | **Open Problems and New Directions in functional Magnetic Resonance Imaging (fMRI)** |
| | **Martin A. Lindquist\***, Johns Hopkins University |
| 11:45 | **Empirical Bayes Methods Leveraging Heritability for Imaging Genetics** |
| | **Wesley Kurt Thompson\***, University of California, San Diego |

| 12:10 | **Floor Discussion** |
|---|---|



★ = *Presenter* ■ = *Student Award Winner*

## 26. Statistical Methods for Understanding Whole Genome Sequencing

Sponsors: **ENAR**, **ASA Biometrics Section**

Organizer: **Jeffrey Leek**, Johns Hopkins University

Chair: **Ingo Ruczinski**, Johns Hopkins University

**10:30**    **Group Association Test Using a Hidden Markov Model for Sequencing Data**

**Charles Kooperberg\***, **Yichen Cheng** and **James Y. Dai**, Fred Hutchinson Cancer Research Center

**10:55**    **Variant Calling and Batch Effects in Deep Whole-Genome Sequencing Data**

**Margaret A. Taub\***, Johns Hopkins University
**Suyash S. Shringarpure**, Stanford University
**Rasika A. Mathias** and **Ingo Ruczinski**, Johns Hopkins University
**Kathleen C. Barnes**, Johns Hopkins University and The CAAPA Consortium

**11:20**    **Flexible Probabilistic Modeling of Genetic Variation in Global Human Studies**

**John Storey\***, Princeton University

**11:45**    **Allele Specific Expression to Identify Causal Functional QTLs**

**Barbara Englehardt\***, Princeton University

**12:10**    **Floor Discussion**

## 27. Doing Data Science: Straight Talk from the Frontline

Sponsors: **ENAR**, **ASA Statistical Programmers Section**

Organizer: **Bhramar Mukherjee**, University of Michigan

Chair: **Bhramar Mukherjee**, University of Michigan

**10:30**    **Doing Data Science**

**Rachel Schutt\***, Newscorp

**11:00**    Discussant:

**Sumanta Basu**, University of California, Berkeley

**11:30**    Discussant:

**Beka Steorts**, Carnegie Mellon University

**12:00**    **Floor Discussion**

**✱** = *Presenter*    ■ = *Student Award Winner*

## 28. IMS Medallion Lecture

Sponsor: **IMS**

Organizer: **Lurdes Y.T. Inoue**, University of Washington

Chair: **Lurdes Y.T. Inoue**, University of Washington

**10:30** **Uncertainty Quantification in Complex Simulation Models Using Ensemble Copula Coupling**

**Tilmann Gneiting***, Heidelberg Institute for Theoretical Studies (HITS) and Karlsruhe Institute of Technology (KIT)
**Roman Schefzik**, Heidelberg University
**Thordis L. Thorarinsdottir**, Norwegian Computing Center

## 29. Panel Discussion: In Memory of Marvin Zelen: Past, Present and Future of Clinical Trials and Cancer Research

Sponsor: **ENAR**

Organizer: **Xihong Lin**, Harvard University

Chair: **Xihong Lin**, Harvard University

**10:30** **Colin Begg**, Memorial Sloan Kettering Cancer Center

**Dave DeMets**, University of Wisconsin, Madison

**Ross Prentice**, Fred Hutchison Cancer Center

**Victor De Gruttola**, Harvard Chan School of Public Health

**12:00** **Floor Discussion**

## 30. CONTRIBUTED PAPERS: Methods for Clustered Data and Applications

Sponsor: **ENAR**

Chair: **Sung Won Han**, New York University

**10:30** **Multivariate Modality Inference with Application on Flow Cytometry**

**Yansong Cheng***, GlaxoSmithKline
**Surajit Ray**, University of Glasgow

**10:45** **Second-Order Models of Within-Family Association in Censored Disease Onset Times**

**Yujie Zhong*** and **Richard J. Cook**, University of Waterloo

**11:00** **Estimation of the Prevalence of Disease Among Clusters Using Random Partial-Cluster Sampling**

**Sarah J. Marks***, **John S. Preisser**, **Anne E. Sanders** and **James D. Beck**, University of North Carolina, Chapel Hill

**11:15** **Testing Homogeneity in a Contaminated Normal Model with Correlated Data**

**Meng Qi*** and **Richard Charnigo**, University of Kentucky

**★** = *Presenter*    ■ = *Student Award Winner*

**11:30**  **On the Use of Between-within Models to Adjust for Confounding due to Unmeasured Cluster-Level Covariates**

Babette A. Brumback* and **Zhuangyu Cai**, University of Florida

**11:45**  **Estimating the Effects of Center Characteristics on Center Outcomes: A Symbolic Data Approach**

**Jennifer Le-Rademacher***, Medical College of Wisconsin

**12:00**  **A Robust and Flexible Method to Estimate Association for Sparse Clustered Data**

**Lijia Wang*** and **John J. Hanfelt**, Emory University

## 31. CONTRIBUTED PAPERS: GWAS

Sponsor: **ENAR**

Chair: **Luis G. Neon-Novelo**, University of Louisiana at Lafayette

**10:30**  **Gene-Disease Associations via Sparse Simultaneous Signal Detection**

**Sihai Dave Zhao***, University of Illinois at Urbana-Champaign
**Tony Cai** and **Hongzhe Li**, University of Pennsylvania

**10:45**  **Statistical Tests for the Detection of Shared Common Genetic Variants between Heterogeneous Diseases Based on GWAS**

**Julie Kobie***, University of Pennsylvania
**Sihai Dave Zhao**, University of Illinois at Urbana-Champaign
**Yun R. Li**, **Hakon Hakonarson** and **Hongzhe Li**, University of Pennsylvania

**11:00**  **Testing Class-Level Genetic Associations Using Single-Element Summary Statistics**

**Jing Qian***, **Eric Reed** and **Sara Nunez**, University of Massachusetts, Amherst
**Rachel Ballentyne**, **Liming Qu** and **Muredach P. Reilly**, University of Pennsylvania
**Andrea S. Foulkes**, Mount Holyoke College

**11:15**  **Set-Based Tests for Genetic Association in Longitudinal Studies**

**Zihuai He***, **Min Zhang**, **Seunggeun Lee** and **Jennifer A. Smith**, University of Michigan
**Xiuqing Guo**, Harbor-UCLA Medical Center
**Walter Palmas**, Columbia University
**Sharon L.R. Kardia**, **Ana V. Diez Roux** and **Bhramar Mukherjee**, University of Michigan

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| 11:30 | **GPA: A Statistical Approach to Prioritizing GWAS Results by Integrating Pleiotropy and Annotation** |
|---|---|
| | **Dongjun Chung***, Medical University of South Carolina<br>**Can Yang**, Hong Kong Baptist University<br>**Cong Li**, **Joel Gelernter** and **Hongyu Zhao**, Yale University |
| 11:45 | **Optimum Study Design for Detecting Imprinting and Maternal Effects Based on Partial Likelihood** |
| | **Fangyuan Zhang***, The Ohio State University<br>**Abbas Khalili**, McGill University<br>**Shili Lin**, The Ohio State University |
| 12:00 | **Analysis of Genomic Data via Likelihood Ratio Test in Composite Kernel Machine Regression** |
| | **Ni Zhao*** and **Michael C. Wu**, Fred Huectchinson Cancer Research Center |

## 32. CONTRIBUTED PAPERS:
## Applications, Simulations and Methods in Causal Inference

Sponsor: **ENAR**

Chair: **Luojun Wang**, The Pennsylvania State University

| 10:30 | **Estimating the Fraction who Benefit from a Treatment, Using Randomized Trial Data** |
|---|---|
| | **Emily J. Huang*** and **Michael A. Rosenblum**, Johns Hopkins University |
| 10:45 | **Sensitivity Analyses in the Presence of Effect Modification in Observational Studies** |
| | **Jesse Y. Hsu***, **Dylan S. Small** and **Paul R. Rosenbaum**,<br>University of Pennsylvania |
| 11:00 | **The Causal Effect of Gene and Percentage of Trunk Fat Interaction on Physical Activity** |
| | **Taraneh Abarin***, Memorial University |
| 11:15 | **A Simulation Study of a Multiply-Robust Approach for Causal Inference with Binary or Continuous Missing Covariates** |
| | **Jia Zhan***, **Changyu Shen** and **Xiaochun Li**, Indiana University School of Medicine and Richard M. Fairbanks School of Public Health<br>**Lingling Li**, Harvard Medical School and Harvard Pilgrim Health Care Institute |
| 11:30 | **The Impact of Unmeasured Confounding in Observational Studies** |
| | **Zugui Zhang*** and **Paul Kolm**, Christiana Care Health System |
| 11:45 | **Flexible Models for Estimating Optimal Treatment Initiation Time for Survival Endpoints: Application to Timing of cART Initiation in HIV/TB Co-Infection** |
| | **Liangyuan Hu*** and **Joseph W. Hogan**, Brown University |
| 12:00 | **Double Robust Goodness-of-Fit Test of Coarse Structural Nested Mean Models with Application to Initiating HAART in HIV-Positive Patients** |
| | **Shu Yang*** and **Judith Lok**, Harvard School of Public Health |

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## 33. CONTRIBUTED PAPERS:
## Adaptive Designs and Dynamic Treatment Regimes

Sponsor: **ENAR**

Chair: **Xiaoqing Zhu**, Michigan State University

**10:30** **A Bayesian Optimal Design in Two-Arm, Randomized Phase II Clinical Trials with Endpoints from Exponential Families**

**Wei Jiang\***, **Jo A. Wick**, **Jianghua He**, **Jonathan D. Mahnken** and **Matthew S. Mayo**, University of Kansas Medical Center

**10:45** **A Novel Method for Estimating Optimal Tree-Based Treatment Regimes in Randomized Clinical Trials**

**Lisa L. Doove\***, Katholieke Universiteit Leuven
**Elise Dusseldorp**, Leiden University
**Katrijn Van Deun**, Tilburg University
**ven Van Mechelen**, Katholieke Universiteit Leuven

**11:00** **Longitudinal Bayesian Adaptive Designs for the Promotion of more Ethical Two Armed Randomized Controlled Trials: A Novel Evaluation of Optimality**

**Jo Wick\***, University of Kansas Medical Center
**Scott M. Berry**, Berry Consultants
**Byron Gajewski**, **Hung-Wen Yeh**, **Won Choi**, **Christina M. Pacheco** and **Christine Daley**, University of Kansas Medical Center

**11:15** **Identifying a Set that Contains the Best Dynamic Treatment Regimes**

**Ashkan Ertefaie\***, University of Pennsylvania
**Tianshuang Wu** and **Inbal Nahum-Shani**, University of Michigan
**Kevin Lynch**, University of Pennsylvania

**11:30** **Optimal Dynamic Treatment Regimes for Treatment Initiation with Continuous Random Decision Points**

**Yebin Tao\*** and **Lu Wang**, University of Michigan
**Haoda Fu**, Eli Lilly and Company

**11:45** **Statistical Inference for the Mean Outcome Under a Possibly Non-Unique Optimal Treatment Strategy**

**Alexander R. Luedtke\*** and
**Mark J. van der Laan**,
University of California, Berkeley

**12:00** **Sequential Advantage Selection for Optimal Treatment Regime**

**Ailin Fan\***, **Wenbin Lu**
and **Rui Song**,
North Carolina
State University

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## 34. CONTRIBUTED PAPERS:
## Survival Analysis and Cancer Applications

Sponsor: **ENAR**

Chair: **James Lymp**, Genentech

| | |
|---|---|
| 10:30 | **Regression Analysis of Informative Current Status Data under Cure Rate Model** |
| | **Yeqian Liu***, University of Missouri, Columbia<br>**Tao Hu**, Capital Normal University, China<br>**Jianguo Sun**, University of Missouri, Columbia |
| 10:45 | **The Historical Cox Model** |
| | **Jonathan E. Gellar***, Johns Hopkins Bloomberg School of Public Health<br>**Fabian Scheipl**, LMU Munich<br>**Mei-Cheng Wang**, Johns Hopkins Bloomberg School of Public Health<br>**Dale M. Needham**, Johns Hopkins School of Medicine<br>**Ciprian M. Crainiceanu**, Johns Hopkins Bloomberg School of Public Health |
| 11:00 | **Bayesian Analysis of Survival Data Under Generalized Extreme Value Distribution with Application in Cure Rate Model** |
| | **Dooti Roy***, University of Connecticut<br>**Vivekananda Roy**, Iowa State University<br>**Dipak Dey,** University of Connecticut |
| 11:15 | **Joint Semiparametric Time-to-Event Modeling of Cancer Onset and Diagnosis When Onset is Unobserved** |
| | **John D. Rice*** and **Alex Tsodikov**, University of Michigan |
| 11:30 | **A Multiple Imputation Approach for Semiparametric Cure Model with Interval Censored Data** |
| | **Jie Zhou***, **Jiajia Zhang**, **Alexander C. McLain** and **Bo Cai**, University of South Carolina, Columbia |
| 11:45 | **A Flexible Parametric Cure Rate Model with Known Cure Time** |
| | **Paul W. Bernhardt***, Villanova University |
| 12:00 | **Change-Point Proportional Hazards Model for Clustered Event Data** |
| | **Yu Deng***, **Jianwen Cai** and **Donglin Zeng**, University of North Carolina, Chapel Hill<br>**Jinying Zhao**, Tulane University |

## 35. INVITED AND CONTRIBUTED ORAL POSTERS: Methods and Applications in High Dimensional Data and Machine Learning

Sponsor: **ENAR**

Chair: **Sarah Ratcliff**, University of Pennsylvania

### 35a. INVITED POSTER:
**Machine Learning Methods for Constructing Real-Time Treatment Policies in Mobile Health**

**Susan Murphy*** and **Yanzhen Deng***, University of Michigan

### 35b. INVITED POSTER:
**Predicting Strokes Using Relational Random Forests**

**Zach Shahn**, **Patrick Ryan** and **David Madigan***, Columbia University

### 35c. Network-Constrained Group LASSO for High Dimensional Multinomial Classification with Application to Cancer Subtype Prediction

**Xinyu Tian***, Stony Brook University
**Jun Chen**, Mayo Clinic
**Xuefeng Wang**, Stony Brook University

### 35d. Two Sample Mean Test in High Dimensional Compositional Data

**Yuanpei Cao***, University of Pennsylvania
**Wei Lin**, Peking University
**Hongzhe Li**, University of Pennsylvania

### 35e. Classifications Based on Active Set Selections

**Wen Zhou***, Colorado State University
**Stephen Vardeman**, **Huaiqing Wu** and **Max Morris**, Iowa State University

### 35f. Application of a Graph Theory Algorithm in Soft Clustering

**Wenzhu Mowrey***, Albert Einstein College of Medicine
**George C. Tseng**, University of Pittsburgh
**Lisa A. Weissfeld**, Statistics Collaborative, Inc.

### 35g. Testing for the Presence of Clustering

**Erika S. Helgeson*** and **Eric Bair**, University of North Carolina, Chapel Hill

### 35h. Variable Selection and Sufficient Dimension Reduction for High Dimensional Data

**Yeonhee Park*** and **Zhihua Su**, University of Florida

### 35i. Variable Selection for Treatment Decisions with Scalar and Functional Covariates

**Adam Ciarleglio***, New York University School of Medicine
**Eva Petkova**, New York University School of Medicine and
**Nathan S. Kline** Institute for Psychiatric Research
**R. Todd Ogden**, Columbia University
**Thaddeus Tarpey**, Wright State University

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**35j. MOPM: Multi-Operator Prediction Model Based on High-Dimensional Features**

**Hojin Yang\***, **Hongtu Zhu** and **Joseph G. Ibrahim**, University of North Carolina, Chapel Hill

**35k. Structured Sparse CCA for High Dimensional Data Integration**

**Sandra Safo\*** and **Qi Long**, Emory University

**35l. SPARC: Optimal Estimation and Asymptotic Inference Under Semiparametric Sparsity**

**Yang Ning\*** and **Han Liu**, Princeton University

**35m. Local-Aggregate Modeling for Big-Data via Distributed Optimization: Applications to Neuroimaging**

**Yue Hu**■, Rice University
**Genevera I. Allen**, Rice University, Baylor College of Medicine and Texas Children's Hospital

**35n. Residual Weighted Learning for Estimating Individualized Treatment Rules**

**Xin Zhou\*** and **Michael R. Kosorok**, University of North Carolina, Chapel Hill

**35o. Integrative Multi-Omics Clustering for Disease Subtype Discovery by Sparse Overlapping Group Lasso and Tight Clustering**

**SungHwan Kim**■, **YongSeok Park** and **George Tseng**, University of Pittsburgh

**35p. Identifying Predictive Markers for Personalized Treatment Selection**

**Yuanyuan Shen\*** and **Tianxi Cai**, Harvard University

# MONDAY, MARCH 16

**12:15 – 1:30 pm** — Roundtable Luncheons

**1:45 – 3:30 pm**

## 36. Recent Research in Adaptive Randomized Trials with the Goal of Addressing Challenges in Regulatory Science

Sponsors: **ENAR**, **ASA Biopharmaceutical Section**

Organizer: **Michael Rosenblum**, Johns Hopkins University

Chair: **Michael Rosenblum**, Johns Hopkins University

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|---|---|
| 1:45 | **Adaptive Enrichment with Subpopulation Selection at Interim** |
| | **Sue-Jane Wang*** and **Hsien-Ming James Hung**, U.S. Food and Drug Administration |
| 2:10 | **Post-Trial Simulation of Type I Error for Demonstration of Control of Type I Error** |
| | **Scott M. Berry***, Berry Consultants |
| 2:35 | **Bayesian Commensurate Prior Approaches for Pediatric and Rare Disease Clinical Trials** |
| | **Bradley P. Carlin*** and **Cynthia Basu**, University of Minnesota<br>**Brian Hobbs**, University of Texas MD Anderson Cancer Center |
| 3:00 | **Identifying Subpopulations with the Largest Treatment Effect** |
| | **Iván Díaz*** and **Michael Rosenblum**, Johns Hopkins Bloomberg School of Public Health |

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| 3:25 | **Floor Discussion** |

## 37. Statistical Innovations in Functional Genomics and Population Health

Sponsor: **ENAR**

Organizers: **Hua Tang**, Stanford University and **Lihong Qi**, University of California, Davis

Chair: **Marc Coram**, Stanford University

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|---|---|
| 1:45 | **Quality Preserving Databases: Statistically Sound and Efficient Use of Public Databases for an Infinite Sequence of Tests** |
| | **Saharon Rosset***, Tel Aviv University<br>**Ehud Aharoni** and **Hani Neuvirth**, IBM Research |
| 2:05 | **Fused Lasso Additive Model** |
| | **Ashley Petersen**, **Daniela Witten*** and **Noah Simon**, University of Washington |

★ = *Presenter*   ■ = *Student Award Winner*

| 2:25 | **Imputing Transcriptome in Inaccessible Tissues in and Beyond the GTEx Project via RIMEE** |
|------|---|
| | **Jiebiao Wang**, **Dan Nicolae**, **Nancy Cox** and **Lin S. Chen***, University of Chicago |

| 2:45 | **A Bayesian Method for the Detection of Long-Range Chromosomal Interactions in Hi-C Data** |
|------|---|
| | **Zheng Xu** and **Guosheng Zhang**, University of North Carolina, Chapel Hill |
| | **Fulai Jin**, Ludwig Institute for Cancer Research |
| | **Mengjie Chen** and **Patrick F. Sullivan**, University of North Carolina, Chapel Hill |
| | **Zhaohui Qin**, Emory University |
| | **Terrence S. Furey**, University of North Carolina, Chapel Hill |
| | **Ming Hu**, New York University |
| | **Yun Li***, University of North Carolina, Chapel Hill |

| 3:05 | **Fine Mapping of Complex Trait Loci with Coalescent Methods in Large Case-Control Studies** |
|------|---|
| | **Ziqan Geng**, University of Michigan |
| | **Paul Scheet**, University of Texas MD Andersen Cancer Center |
| | **Sebastian Zöllner***, University of Michigan |

| 3:25 | **Floor Discussion** |
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## 38. Big Data: Issues in Biosciences

Sponsors: **ENAR**, **ICSA**

Organizers: **Charmaine Dean**, University of Western Ontario, **Zhezhen Jin**, Columbia University and **Hongyu Zhao**, Yale University

Chair: Charmaine Dean, University of Western Ontario

| 1:45 | **Big Genomics Data Analytics** |
|------|---|
| | **Haiyan Huang*** and **Bin Yu**, University of California, Berkeley |

| 2:15 | **Recalculating the Relative Risks of Air Pollution to Account for Preferential Site Selection** |
|------|---|
| | **James V. Zidek***, University of British Columbia |
| | **Gavin Shaddick**, University of Bath |

| 2:45 | **Functional Data Analysis for Quantifying Brain Connectivity** |
|------|---|
| | **Hans-Georg Mueller*** and **Alexander Petersen**, University of California, Davis |
| | **Owen Carmichael**, Louisiana State University |

| 3:15 | **Floor Discussion** |
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★ = *Presenter*    ■ = *Student Award Winner*

## 39. Recent Advances in Statistical Ecology

Sponsor: **ENAR**

Organizer: **Mahlet Tadesse**, Georgetown University

Chair: **Mahlet Tadesse**, Georgetown University

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|---|---|
| 1:45 | **Efficient Spatial and Spatio-Temporal False Discovery Rate Control** |
| | **Ali Arab***, Georgetown University |
| 2:10 | **Mixture of Inhomogeneous Matrix Models for Species-Rich Ecosystems** |
| | **Frederic Mortier***, CIRAD — Tropical Forest Goods and Ecosystem Services Unit |
| 2:35 | **Spatio-Temporal Modeling of Multiple Species Migration Flow** |
| | **Trevor Oswald*** and **Christopher K. Wikle**, University of Missouri, Columbia |
| 3:00 | **Statistical Modeling of Spatial Discrete and Continuous Data in Ecology** |
| | **Jun Zhu***, University of Wisconsin, Madison |

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| 3:25 | **Floor Discussion** |

## 40. New Analytical Issues in Current Epidemiology Studies of HIV and Other Sexually Transmitted Infections

Sponsor: **ENAR**

Organizer: **Xiangrong Kong**, Johns Hopkins University

Chair: **Kellie Archer**, Virginia Commonwealth University

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|---|---|
| 1:45 | **Temporal Dynamic Models** |
| | **Hormuzd Katki***, National Cancer Institute, National Institutes of Health |
| 2:05 | **Combining Information to Estimate Adherence in Trials of Pre-Exposure Prophylaxis for HIV Prevention** |
| | **James Hughes***, University of Washington |
| 2:25 | **Analysis of Longitudinal Multivariate Outcome Data from Couples Cohort Studies: Application to HPV Transmission Dynamics** |
| | **Xiangrong Kong***, Johns Hopkins University |
| 2:45 | **Sample Size Methods for Estimating HIV Incidence from Cross-Sectional Surveys** |
| | J**acob Moss Konikoff*** and **Ron Brookmeyer**, University of California, Los Angeles |
| 3:05 | **Development of Accurate Methods to Estimate HIV Incidence in Cross-Sectional Surveys** |
| | **Oliver B. Laeyendecker***, National Institute of Allergy and Infectious Diseases, National Institutes of Health |

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| 3:25 | **Floor Discussion** |

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## 41. Statistical Advances and Challenges in Mobile Health

Sponsor: **IMS**

Organizer: **Susan Murphy**, University of Michigan

Chair: **Brian Caffo**, Johns Hopkins University

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|---|---|
| 1:45 | **Micro-Randomized Trials and mHealth** |
| | **Peng Liao**, **Pedja Klasjna**, **Ambuj Tewar**i and **Susan Murphy\***, University of Michigan |
| 2:10 | **Not Everybody, but Some People Move Like You** |
| | **Ciprian M. Crainiceanu\***, Johns Hopkins Bloomberg School of Public Health |
| 2:35 | **Supporting Health Management in Everyday Life with Mobile Technology** |
| | **Predrag Klasnja\***, **Susan A. Murphy** and **Ambuj Tewari**, University of Michigan |
| 3:00 | **Measuring Stress and Addictive Behaviors from Mobile Physiological Sensors** |
| | **Santosh Kumar\***, University of Memphis<br>**Emre Ertin**, The Ohio State University<br>**Mustafa al'Absi**, University of Minnesota<br>**David Epstein** and **Kenzie Preston**, National Institute on Drug Abuse, National Institutes of Health<br>**Annie Umbricht**, Johns Hopkins University |
| 3:25 | **Floor Discussion** |

## 42. CONTRIBUTED PAPERS: Survey Research

Sponsor: **ENAR**

Chair: **Stacey E Alexeeff**, National Center for Atmospheric Research

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|---|---|
| 1:45 | **Ordinal Bayesian Instrument Development: New Kid on the Patient Reported Outcome Measures Block** |
| | **Lili Garrard\***, University of Kansas Medical Center<br>**Larry R. Price**, Texas State University<br>**Marjorie J. Bott**, University of Kansas<br>**Byron J. Gajewski**, University of Kansas Medical Center |
| 2:00 | **Quantifying Parental History in Survey Data** |
| | **Rengyi Xu\***, **Sara B. DeMauro** and **Rui Feng**, University of Pennsylvania |
| 2:15 | **Bayesian Nonparametric Weighted Sampling Inference** |
| | **Yajuan Si\***, University of Wisconsin, Madison<br>**Natesh S. Pillai**, Harvard University<br>**Andrew Gelman**, Columbia University |
| 2:30 | **How to Best Compute Propensity Scores in Complex Samples in Relation to Survey Weights** |
| | **Keith W. Zirkle\*** and **Adam P. Sima**, Virginia Commonwealth University |

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**\*** = *Presenter*  ■ = *Student Award Winner*

| 2:45 | **Multiple Imputation of the Accelerometer Data in the National Health and Nutrition Examination Survey** |
|---|---|
| | **Benmei Liu\***, **Mandi Yu**, **Barry I. Graubard** and **Richard Troiano**, National Cancer Institute, National Institutes of Health |
| | **Nathaniel Schenker**, National Center for Health Statistics, Centers for Disease Control and Prevention |
| 3:00 | **Split Questionnaire Survey Design in the Longitudinal Setting** |
| | **Paul M. Imbriano\*** and **Trivellore E. Raghunathan**, University of Michigan |

| 3:15 | **Floor Discussion** |
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## 43. CONTRIBUTED PAPERS:
## Graphical Models
Sponsor: **ENAR**

Chair: **Sheila Gaynor**, Harvard University

| 1:45 | **Regression Analysis of Networked Data** |
|---|---|
| | **Yan Zhou**■ and **Peter X.K. Song**, University of Michigan |
| 2:00 | **Integrative Analysis of Genetical Genomics Data Incorporating Network Structure** |
| | **Bin Gao\*** and **Yuehua Cui**, Michigan State University |
| 2:15 | **Estimating a Graphical Intra-Class Correlation Coefficient (GICC) Using Multivariate Probit-Linear Mixed Models** |
| | **Chen Yue\***, **Shaojie Chen**, **Haris Sair**, **Raag Airan** and **Brian Caffo**, Johns Hopkins University |
| 2:30 | **Estimation of Directed Subnetworks in Ultra High Dimensional Data for Gene Network Problem** |
| | **Sung Won Han\*** and **Hua (Judy) Zhong**, New York University |
| 2:45 | **Longitudinal Graphical Models: Optimal Estimation and Asymptotic Inference** |
| | **Quanquan Gu\***, **Yuan Cao**, **Yang Ning** and **Han Liu**, Princeton University |
| 3:00 | **Jointly Estimating Gaussian Graphical Models for Spatial and Temporal Data** |
| | **Zhixiang Lin\*** and **Tao Wang**, Yale University |
| | **Can Yang**, Hong Kong Baptist University |
| | **Hongyu Zhao**, Yale University |

| 3:15 | **Floor Discussion** |
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**✷** = *Presenter*   ■ = *Student Award Winner*

## 44. CONTRIBUTED PAPERS:
## Joint Models for Longitudinal and Survival Data

Sponsor: **ENAR**

Chair: **Kun Xu**, University of Miami

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|---|---|
| 1:45 | **Joint Modeling of Bivariate Longitudinal and Bivariate Survival Data in Spouse Pairs**<br><br>**Jia-Yuh Chen\*** and **Stewart J. Anderson**, University of Pittsburgh |
| 2:00 | **Joint Model of Bivariate Survival Times and Longitudinal Data**<br><br>**Ke Liu\*** and **Ying Zhang**, University of Iowa |
| 2:15 | **Dynamic Prediction of Acute Graft-versus-Host Disease with Time-Dependent Covariates**<br><br>**Yumeng Li\*** and **Thomas M. Braun**, University of Michigan |
| 2:30 | **The Joint Modelling of Recurrent Events and Other Failure Time Events**<br><br>**Luojun Wang\*** and **Vernon M. Chinchilli**, The Pennsylvania State University |
| 2:45 | **A Bayesian Approach for Joint Modeling of Longitudinal Menstrual Cycle Length and Fecundity**<br><br>**Kirsten J. Lum\***, Johns Hopkins University and Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health<br>**Rajeshwari Sundaram** and **Germaine M. Buck Louis**, Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health<br>**Thomas A. Louis**, Johns Hopkins University and U.S. Census Bureau |
| 3:00 | **Joint Analysis of Multiple Longitudinal Processes and Survival Data Measured on Nested Time-Scales Using Shared Parameter Models: An Application to Fecundity Data**<br><br>**Rajeshwari Sundaram\***, Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health<br>**Somak Chatterjee**, George Washington University |

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| 3:15 | **Floor Discussion** |

## 45. CONTRIBUTED PAPERS:
## Functional Data Analysis

Sponsor: **ENAR**

Chair: **Ana W. Capuano**, Rush University Medical Center

| | |
|---|---|
| 1:45 | **Generalized Multilevel Function-on-Scalar Regression and Principal Component Analysis**<br><br>**Jeff Goldsmith\***, Columbia University<br>**Vadim Zipunnikov** and **Jennifer Schrack**, Johns Hopkins University |
| 2:00 | **Inference on Fixed Effects in Complex Functional Mixed Models**<br><br>**So Young Park\*** and **Ana-Maria Staicu**, North Carolina State University<br>**Luo Xiao** and **Ciprian Crainiceanu**, Johns Hopkins Bloomberg School of Public Health |

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| 2:15 | **Generalized Function-on-Function Regression** |
|---|---|
| | **Janet S. Kim***, **Ana-Maria Staicu** and **Arnab Maity**, North Carolina State University |
| 2:30 | **Variable Selection in Function-on-Scalar Regression** |
| | **Yakuan Chen***, **Todd Ogden** and **Jeff Goldsmith**, Columbia University |
| 2:45 | **Bayesian Adaptive Functional Models with Applications to Copy Number Data** |
| | **Bruce D. Bugbee***, **Veera Baladandayuthapani** and **Jeffrey S. Morris**, University of Texas MD Anderson Cancer Center |
| 3:00 | **Functional Bilinear Regression with Matrix Covariates via Reproducing Kernel Hilbert Space with Applications in Neuroimaging Data Analysis** |
| | **Dong Wang**, University of North Carolina, Chapel Hill **Dan Yang***, Rutgers University **Haipeng Shen** and **Hongtu Zhu**, University of North Carolina, Chapel Hill |
| 3:15 | **Simultaneous Confidence Bands for Derivatives of Dependent Functional Data** |
| | **Guanqun Cao***, Auburn University |

## 46. CONTRIBUTED PAPERS: Methods in Causal Inference: Instrumental Variable, Propensity Scores and Matching

Sponsor: **ENAR**

Chair: **Ozgur Asar**, Lancaster University

| 1:45 | **Methods to Overcome Violations of an Instrumental Variable Assumption: Converting a Confounder into an Instrument** |
|---|---|
| | **Michelle Shardell***, National Institute on Aging, National Institutes of Health |
| 2:00 | **Assessing Treatment Effect of Thiopurines on Crohn's Disease from a UK Population-Based Study Using Propensity Score Matching** |
| | **Laura H. Gunn***, Stetson University **Sukhdev Chatu**, St. George's University Hospital London **Sonia Saxena** and **Azeem Majeed**, Imperial College London **Richard Pollok**, St. George's University Hospital London |
| 2:15 | **Semiparametric Causal Inference in Matched Cohort Studies** |
| | **Edward H. Kennedy**■ and **Dylan S. Small**, University of Pennsylvania |
| 2:30 | **Revisiting the Comparison of Covariate Adjusted Logistic Regression versus Propensity Score Methods with Few Events per Covariate** |
| | **Fang Xia***, **Phillip J. Schulte** and **Laine Thomas**, Duke University School of Medicine |
| 2:45 | **Bayesian Latent Propensity Score Approach for Average Causal Effect Estimation Allowing Covariate Measurement Error** |
| | **Elande Baro***, **Yi Huang** and **Anindya Roy**, University of Maryland Baltimore County |

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| 3:00 | **Comparative Performance of Multivariate Matching Methods that Select a Subset of Observations** |
|------|---|
|      | **Maria de los Angeles Resa\*** and **Jose R. Zubizarreta**, Columbia University |
| 3:15 | **Improving Treatment Effect Estimation in the Presence of Treatment Delay through Triplet Matching** |
|      | **Erinn M. Hade\*** and **Bo Lu**, The Ohio State University<br>**Hong Zhu**, University of Texas Southwestern Medical Center |

## 47. CONTRIBUTED PAPERS:<br>Covariates Measured with Error

Sponsor: **ENAR**

Chair: **Xiaoye Ma**, University of Minnesota

| 1:45 | **Locally Efficient Semiparametric Estimators for Proportional Hazards Models with Measurement Error** |
|------|---|
|      | **Yuhang Xu\*** and **Yehua Li**, Iowa State University<br>**Xiao Song**, University of Georgia |
| 2:00 | **Separating Variability in Practice Patterns from Statistical Error: An Opportunity for Quality Improvement** |
|      | **Laine Thomas\*** and **Phillip J. Schulte**, Duke University |
| 2:15 | **Goodness-of-Fit Testing of Error Distribution in Linear Errors-in-Variables Model** |
|      | **Xiaoqing Zhu\***, Michigan State University |
| 2:30 | **Estimating Recurrence and Incidence of Preterm Birth in Consecutive Pregnancies Subject to Measurement Error in Gestation: A Novel Application of Hidden Markov Models** |
|      | **Paul S. Albert\***, Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health |
| 2:45 | **Multi-State Model with Missing Continuous Covariate** |
|      | **Wenjie Lou\***, **Richard J. Kryscio** and **Erin Abner**, University of Kentucky |
| 3:00 | **Weighted l1-Penalized Corrected Quantile Regression for High Dimensional Measurement Error Models** |
|      | **Abhishek Kaul\*** and **Hira L. Koul**, Michigan State University |

| 3:00 | **Floor Discussion** |
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## 48. INVITED AND CONTRIBUTED ORAL POSTERS: Clinical Trials

Sponsor: **ENAR**

Chair: **Reneé Moore**, North Carolina State University

### 48a. INVITED POSTER:
#### Split-Sample Based and Multiple Imputation Estimation and Computation Methods for Meta-Analysis of Clinical Trial Data and Otherwise Hierarchical Data

**Geert Molenbergs***, Universiteit Hasselt
**Geert Verbeke**, Katholieke Universiteit Leuven
**Michael G. Kenward**, London School of Hygiene and Tropical Medicine
**Wim Van der Elst** and **Lisa Hermans**, Universiteit Hasselt
**Vahid Nassiri**, Katholieke Universiteit Leuven

### 48b. INVITED POSTER:
#### Over-Parameterization in Adaptive Dose-Finding Studies

**John O'Quigley***, Universite Pierre et Marie Curie
**Nolan A. Wages** and **Mark R. Conaway**, University of Virginia
**Ken Cheung**, Columbia University
**Ying Yuan**, University of Texas MD Anderson Cancer Center
**Alexia Iasonos**, Memorial Sloan Kettering Cancer Center

### 48c. Improving Some Clinical Trials Inference by Using Ranked Axillary Covariate

**Hani Samawi***, **Rajai Jabrah**, **Robert Vogel** and **Daniel Linder**, Georgia Southern University

### 48d. Direct Estimation of the Mean Outcome on Treatment when Treatment Assignment and Discontinuation Compete

**Xin Lu***, Emory University
**Brent A. Johnson**, University of Rochester

### 48e. Bayesian Interim Analysis Methods for Phase Ib Expansion Trials Enable Earlier Go/No-Go Decisions in Oncology Drug Development

**James Lymp***, **Jane Fridlyand** and **Hsin-Ju Hsieh**, Genentech
**Daniel Sabanes Bove** and **Somnath Sarkar**, F. Hoffmann-La Roche

### 48f. Unified Additional Requirement in Consideration of Regional Approval for Multi-Regional Clinical Trials

**Zhaoyang Teng***, Boston University
**Yeh-Fong Chen**, The George Washington University
**Mark Chang**, AMAG Pharmaceuticals and Boston University

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**48g. Efficiencies of Bayesian Adaptive Platform Clinical Trials**

**Ben Saville\*** and **Scott Berry**, Berry Consultants

**48h. A Bayesian Semiparametric Model for Interval Censored Data with Monotone Splines**

**Bin Zhang**, Cincinnati Children's Hospital Medical Center
**Yue Zhang\***, University of Cincinnati

**48i. Comprehensive Evaluation of Adaptive Designs for Phase I Oncology Clinical Trials**

**Sheau-Chiann Chen\***, Vanderbilt University
**Yunchan Chi**, National Cheng Kung University
**Yu Shyr**, Vanderbilt University

**48j. The Impact of Covariate Adjustment at Randomization and Analysis for Binary Outcomes**

**Katherine Nicholas\*** and **Valerie Durkalski**, Medical University of South Carolina

**48k. Statistical Inference for Composite Outcomes Based on Prioritized Components**

**Ionut Bebu\*** and **John M. Lachin**, The George Washington University

**48l. The Impact of Covariate Misclassification Using Generalized Linear Regression Under Covariate-Adaptive Randomization**

**Liqiong Fan\*** and **Sharon D. Yeatts**, Medical University of South Carolina

**48m. Non-Inferiority Test Based on Transformations**

**Santu Ghosh\***, Wayne State University
**Arpita Chatterjee**, Georgia Southern University
**Samiran Ghosh**, Wayne State University

**48n. Taking Clinical Significance into Consideration in Sample Size Calculation**

**Guochen Song\*** and **Eric Groves**, Quintiles

**48o. Methods Accounting for Mortality and Missing Data in Randomized Trials with Longitudinal Outcomes**

**Elizabeth A. Colantuoni\***, Johns Hopkins Bloomberg School of Public Health
**Chenguang Wang**, Johns Hopkins School of Medicine
**Daniel O. Scharfstein**, Johns Hopkins Bloomberg School of Public Health

**48p. A Semiparametric Bayesian Approach Using Historical Control Data for Assessing Non-Inferiority in Three Arm Trials**

**Arpita Chatterjee\***, Georgia Southern University
**Santu Ghosh** and **Samiran Ghosh**, Wayne State University

**48q. Design Parameters and Effect of the Delayed-Start Design in Alzheimer's Disease**

**Guoqiao Wang\*** and **Richard E. Kennedy**, University of Alabama, Birmingham
**Lon S. Schneider**, University of Southern California
**Gary R. Cutter**, University of Alabama, Birmingham

# MONDAY, MARCH 16

**3:30 – 3:45 pm — Refreshment Break with Our Exhibitors**

**3:45 – 5:30 pm**

## 49. CENS Invited Session — Careers in Statistics: Skills for Success

Sponsor: **ENAR**

Organizer: **Vivian Shih**, AstraZeneca

Chair: **Michael McIsaac**, Queen's University

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|---|---|
| 3:45 | **How to be Successful in Oral and Written Communications as a Biostatistician** |
| | **Peter Grant Mesenbrink\***, Novartis Pharmaceuticals Corporation |
| 4:15 | **Navigating the Academic Jungle Without Going Bananas** |
| | **Amy H. Herring\***, University of North Carolina, Chapel Hill |
| 4:45 | **What am I Going to be When I Grow Up? Evolving as a Statistician** |
| | **Nancy L. Geller\***, National Heart, Lung and Blood Institute, National Institutes of Health |

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| 5:15 | **Floor Discussion** |

## 50. Analysis Methods for Data Obtained from Electronic Health Records

Sponsors: **ENAR**, **ASA Biometrics Section**, **ASA Section on Statistics in Epidemiology**

Organizer: **Sebastian Haneuse**, Harvard University

Chair: **Sebastian Haneuse**, Harvard University

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| 3:45 | **Improving the Power of Genetic Association Tests with Imperfect Phenotype Derived from Electronic Medical Records** |
| | **Jennifer A. Sinnott\*** and **Wei Dai**, Harvard School of Public Health<br>**Katherine P. Liao** and **Elizabeth W. Karlson**, Brigham and Women's Hospital<br>**Isaac Kohane**, Harvard Medical School<br>**Robert Plenge**, Merck Research Laboratories<br>**Tianxi Cai**, Harvard School of Public Health |
| 4:15 | **Nonparametric Estimation of Patient Prognosis with Application to Electronic Health Records** |
| | **Patrick J. Heagerty\*** and **Alison E. Kosel**, University of Washington |
| 4:45 | **Mining EHR Narratives for Clinical Research** |
| | **Enedia Mendonca\***, University of Wisconsin, Madison |

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| 5:15 | **Floor Discussion** |

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## 51. Statistical Challenges of Survey and Surveillance Data in US Government

Sponsors: **ENAR**, **ASA Section on Statistics in Defense and National Security**, **ASA Survey Research and Methodology Section**

Organizer: **Simone Gray**, Centers for Disease Control and Prevention

Chair: **Betsy (Cadwell) Gunnels**, Centers for Disease Control and Prevention

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| 3:45 | **Using Venue-Based Sampling to Recruit Hard-to-Reach Populations** |
| | **Maria Corazon B. Mendoza***, **Chris Johnson**, **Brooke Hoots** and **Teresa Finlayson**, Centers for Disease Control and Prevention |
| 4:10 | **Development of Guidelines for the Presentation of Data from the National Health and Nutrition Examination Survey** |
| | **Margaret Devers Carroll***, National Health and Nutrition Examination Survey, Centers for Disease Control and Prevention |
| 4:35 | **Data Swapping Methods for Statistical Disclosure Limitation** |
| | **Guangyu Zhang***, **Joe Fred Gonzalez**, **Anna Oganyan** and **Alena Maze**, National Center for Health Statistics, Centers for Disease Control and Prevention |
| 5:00 | **Practical Approaches to Design and Inference Through the Integration of Complex Survey Data and Non-Survey Information Sources** |
| | **John L. Eltinge***, U.S. Bureau of Labor Statistics<br>**Rachel M. Harter**, RTI International |
| 5:25 | **Floor Discussion** |

## 52. Reconstructing the Genomic Landscape from High-Throughput Data

Sponsors: **ENAR**, **ASA Biometric Section**

Organizers: **Adam Olshen**, University of California, San Francisco and **Ronglai Shen**, Memorial Sloan Kettering Cancer Center

Chair: **Adam Olshen**, University of California, San Francisco

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|---|---|
| 3:45 | **Copy Numbers in Circulating Tumor Cells (CTCs) Using DNA-Seq** |
| | **Henrik Bengtsson***, University of California, San Francisco |
| 4:10 | **DNA Copy Number Analyses for Family Based Designs** |
| | **Ingo Ruczinski***, Johns Hopkins University |
| 4:35 | **Reconstructing 3-D Genome Configurations: How and Why** |
| | **Mark Robert Segal***, University of California, San Francisco |
| 5:00 | **A Latent Variable Approach for Integrative Clustering of Multiple Genomic Data Types** |
| | **Ronglai Shen***, Memorial Sloan-Kettering Cancer Center |
| 5:25 | **Floor Discussion** |

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## 53. Statistical Methods for Single Molecule Experiments

Sponsors: **ENAR**, **ASA Biometric Section**

Organizer: **Ying Hung**, Rutgers University

Chair: **Jeff C.F. Wu**, Georgia Institute of Technology

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|---|---|
| 3:45 | **Walking, Sliding, and Detaching: Time Series Analysis for Cellular Transport in Axons** <br><br> **John Fricks\***, **Jason Bernstein** and **William Hancock**, The Pennsylvania State University |
| 4:10 | **Analyzing Single-Molecule Protein-Targeting Experiments via Hierarchical Models** <br><br> **Samuel Kou\*** and **Yang Chen**, Harvard University |
| 4:35 | **Computational Identification of Cell Populations from Cytometry Data: Methods, Applications, and Infrastructure** <br><br> **Yu Qian\*** and **Hyunsoo Kim**, J. Craig Venter Institute <br> **Shweta Purawat**, University of California, San Diego <br> **Rick Stanton**, J. Craig Venter Institute <br> **Ilkay Altintas**, University of California, San Diego <br> **Richard H. Scheuermann**, J. Craig Venter Institute |
| 5:00 | **Hidden Markov Models with Applications in Cell Adhesion Experiments** <br><br> **Jeff C. F. Wu\***, Georgia Institute of Technology <br> **Ying Hung**, Rutgers University |
| 5:25 | **Floor Discussion** |

## 54. Subgroup Analysis and Adaptive Trials

Sponsor: **IMS**

Organizer: **Donatello Telesca**, University of California, Los Angeles

Chair: **Donatello Telesca**, University of California, Los Angeles

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|---|---|
| 3:45 | **A Bayes Rule for Subgroup Reporting — Bayesian Adaptive Enrichment Designs** <br><br> **Peter Mueller\***, University of Texas, Austin |
| 4:15 | **Subgroup-Based Adaptive (SUBA) Designs for Multi-Arm Biomarker Trials** <br><br> **Yanxun Xu**, University of Texas, Austin <br> **Lorenzo Trippa**, Harvard University <br> **Peter Mueller**, University of Texas, Austin <br> **Yuan Ji\***, NorthShore University HealthSystem and University of Chicago |
| 4:45 | **Detection of Cancer Subgroup Associated Alternative Splicing** <br><br> **Jianhua Hu\***, University of Texas MD Anderson Cancer Center <br> **Xuming He**, University of Michigan |
| 5:15 | **Floor Discussion** |

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## 55. CONTRIBUTED PAPERS:
## Methods to Assess Agreement

Sponsor: **ENAR**

Chair: **Yansong Cheng**, GlaxoSmithKline

**3:45** **Kappa Statistics for Correlated Matched-Pair Categorical Data**

**Zhao Yang***, University of Tennessee Health Science Center
**Ming Zhou**, Bristol-Myers Squibb

**4:00** **Sample Size Methods for Constructing Confidence Intervals for the Intra-Class Correlation Coefficient**

**Kevin K. Dobbin*** and **Alexei C. Ionan**, University of Georgia

**4:15** **Statistical Methods for Assessing Reproducibility in Multicenter Neuroimaging Studies**

**Tian Dai*** and **Ying Guo**, Emory University

**4:30** **Nonparametric Regression of Agreement Measure Between Ordinal and Continuous Outcomes**

**AKM F. Rahman***, **Limin Peng**, **Ying Guo** and **Amita Manatunga**, Emory University

**4:45** **Inter-Observer Agreement for a Mixture of Data Types**

**Shasha Bai***, University of Arkansas for Medical Sciences
**Marcelo A. Lopetegui**, The Ohio State University

**5:00** **Assessing Reproducibility of Discrete and Truncated Rank Lists in High-Throughput Studies**

**Qunhua Li***, The Pennsylvania State University

**5:15** **Exponentiated Lindley Poisson Distribution**

**Mavis Pararai*** and **Gayan Liyanag**, Indiana University of Pennsylvania
**Broderick Oluyede**, Georgia Southern University


## 56. CONTRIBUTED PAPERS:
## Methylation and RNA Data Analysis

Sponsor: **ENAR**

Chair: **Babette A Brumback**, University of Florida

**3:45** **Identify Differential Alternative Splicing Events from Paired RNA-Seq Data**

**Cheng Jia*** and **Mingyao Li**, University of Pennsylvania

**4:00** **Functional Normalization of 450k Methylation Array Data Improves Replication in Large Cancer Studies**

**Jean-Philippe Fortin**■, Johns Hopkins Bloomberg School of Public Health
**Aurelie Labbe**, McGill University
**Mathieu Lemire**, Ontario Institute of Cancer Research
**Brent W. Zanke**, Ottawa Hospital Research Institute
**Thomas J. Hudson**, Ontario Institute of Cancer Research
**Elana J. Fertig**, Johns Hopkins School of Medicine
**Celia MT Greenwood**, Jewish General Hospital Montreal
**Kasper D. Hansen**, Johns Hopkins Bloomberg School of Public Health

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| 4:15 | **Detecting Differentially Methylated Regions (DMRs) by Mixed-Effect Logistic Model** |
|------|------|
| | **Fengjiao Hu*** and **Hongyan Xu**, Georgia Regents University |

| 4:30 | **Penalized Modeling for Variable Selection and Association Study of High-Dimensional MicroRNA Data with Repeated Measures** |
|------|------|
| | **Zhe Fei***, University of Michigan |
| | **Yinan Zheng**, Northwestern University |
| | **Wei Zhang**, University of Illinois, Chicago |
| | **Justin B. Starren** and **Lei Liu**, Northwestern University |
| | **Andrea A. Baccarelli**, Harvard School of Public Health |
| | **Yi Li**, University of Michigan |
| | **Lifang Hou**, Northwestern University |

| 4:45 | **Comparison of Paired Tumor-Normal Methods for Differential Expression Analysis of RNA-Seq Data** |
|------|------|
| | **Janelle R. Noel***, **Alice Wang**, **Rama Raghavan** and **Prabhakar Chalise**, University of Kansas Medical Center |
| | **Byunggil Yoo**, Childrens Mercy Hospital Kansas City |
| | **Sumedha Gunewardena**, Kansas Intellectual and Developmental Disabilities Research Center |
| | **Jeremy Chien** and **Brooke L. Fridley**, University of Kansas Medical Center |

| 5:00 | **Detecting Differential Alternative Splicing with Biological Replicates between Two Groups from RNA-Seq Data** |
|------|------|
| | **Yu Hu***, **Cheng Jia**, **Dwight Stambolian** and **Mingyao Li**, University of Pennsylvania |

| 5:15 | **Functional Region-Based Test for DNA Methylation** |
|------|------|
| | **Kuan-Chieh Huang*** and **Yun Li**, University of North Carolina, Chapel Hill |

## 57. CONTRIBUTED PAPERS: New Developments in Imaging

Sponsor: **ENAR**

Chair: **Sihai Dave Zhao**, University of Illinois

| 3:45 | **Estimating Dynamics of Whole-Brain Functional Connectivity in Resting-State fMRI by Factor Stochastic Volatility Model** |
|------|------|
| | **Chee-Ming Ting***, Universiti Teknologi Malaysia, Malaysia |
| | **Hernando Ombao**, University of California, Irvine |
| | **Sh-Hussain Salleh**, Universiti Teknologi Malaysia, Malaysia |

| 4:00 | **Kernel Smoothing GEE for Longitudinal fMRI Studies** |
|------|------|
| | **Yu Chen***, **Min Zhang** and **Timothy D. Johnson**, University of Michigan |

| 4:15 | **A Hierarchical Bayesian Model for Studying the Impact of Stroke on Brain Motor Function** |
|------|------|
| | **Zhe Yu***, University of California, Irvine |
| | **Raquel Prado**, University of California, Santa Cruz |
| | **Erin Burke Quinlan**, **Steven C. Cramer** and **Hernando Ombao**, University of California, Irvine |

★ = *Presenter*    ■ = *Student Award Winner*

| 4:30 | **Source Estimation for Multi-Trial Multi-Channel EEG Signals: A Statistical Approach** |
|---|---|
| | **Yuxiao Wang\*** and **Hernando Ombao**, University of California, Irvine<br>**Raquel Prado**, University of California, Santa Cruz |
| 4:45 | **Fiber Direction Estimation in Diffusion MRI** |
| | **Raymond K. W. Wong\***, Iowa State University<br>**Thomas C. M. Lee**, **Debashis Paul** and **Jie Peng**, University of California, Davis |
| 5:00 | **An Exploratory Data Analysis of EEGs Time Series: A Functional Boxplots Approach** |
| | **Duy Ngo\*** and **Hernando Ombao**, University of California, Irvine<br>**Marc G. Genton** and **Ying Sun**, King Abdullah University of Science and Technology |
| 5:15 | **A Bayesian Functional Linear Cox Regression Model (BFLCRM) for Predicting Time to Conversion to Alzheimer's Disease** |
| | **Eunjee Lee**■, **Hongtu Zhu** and **Dehan Kong**, University of North Carolina, Chapel Hill<br>**Yalin Wang**, Arizona State University<br>**Kelly Sullivan Giovanello** and **Joseph Ibrahim**, University of North Carolina, Chapel Hill |

## 58. CONTRIBUTED PAPERS:
## Latent Variable and Principal Component Models

Sponsor: **ENAR**

Chair: **Jesse Y Hsu**, University of Pennsylvania

| 3:45 | **A Latent Variable Model for Analyzing Correlated Ordered Categorical Data** |
|---|---|
| | **Ali Reza Fotouhi\***, University of The Fraser Valley |
| 4:00 | **Estimation of Branching Curves in the Presence of Subject Specific Random Effects** |
| | **Angelo Elmi\***, The George Washington University<br>**Sarah J. Ratcliffe** and **Wensheng Guo**, University of Pennsylvania |
| 4:15 | **Composite Large Margin Classifiers with Latent Subclasses for Heterogeneous Biomedical Data** |
| | **Guanhua Chen**■, Vanderbilt University<br>**Yufeng Liu** and **Michael R. Kosorok**, University of North Carolina, Chapel Hill |
| 4:30 | **Evaluation of Covariate-Specific Accuracy of Biomarkers without a Gold Standard** |
| | **Zheyu Wang\***, Johns Hopkins University<br>**Xiao-Hua Zhou**, University of Washington |
| 4:45 | **Linear Mixed Model with Unobserved Informative Cluster Size: Application to a Repeated Pregnancy Study** |
| | **Ashok K. Chaurasia\***, **Danping Liu** and **Paul S. Albert**, Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health |

| 5:00 | **A Semiparametric Model of Estimating Non-Constant Factor Loadings** |
|---|---|
| | **Zhenzhen Zhang\*** and **Brisa Sanchez**, University of Michigan |
| 5:15 | **Nested Partially-Latent Class Models (npLCM) for Estimating Disease Etiology in Case-Control Studies** |
| | **Zhenke Wu\*** and **Scott L. Zeger**, Johns Hopkins University |

## 59. CONTRIBUTED PAPERS:
## Developments and Applications of Clustering, Classification, and Dimension Reduction Methods

Sponsor: **ENAR**

Chair: **Taraneh Abarin**, Memorial University

| 3:45 | **Separable Spatio-Temporal Principal Component Analysis** |
|---|---|
| | **Lei Huang**■, Johns Hopkins University |
| | **Philip T. Reiss**, New York University School of Medicine |
| | **Luo Xiao**, **Vadim Zipunnikov**, **Martin A. Lindquist** and **Ciprian Crainiceanu**, Johns Hopkins University |
| 4:00 | **Penalized Clustering Using a Hidden Markov Random Field Model: Detecting State-Related Changes in Brain Connectivity** |
| | **Yuting Xu\*** and **Martin Lindquist**, Johns Hopkins University |
| 4:15 | **Clustering of Brain Signals Using the Total Variation Distance** |
| | **Carolina Euán\***, Centro de Investigación en Matemáticas (CIMAT), A.C. |
| | **Hernando Ombao**, University of California, Irvine |
| | **Joaquin Ortega**, Centro de Investigación en Matemáticas (CIMAT), A.C. |
| | **Pedro Alvarez-Esteban**, Universidad de Valladolid, Spain |
| 4:30 | **Impact of Data Reduction on Accelerometer Data in Children** |
| | **Daniela Sotres-Alvarez\*** and **Yu Deng**, University of North Carolina, Chapel Hill |
| | **Guadalupe X. Ayala**, San Diego State University |
| | **Mercedes Carnethon**, Northwestern University |
| | **Alan M. Delamater**, University of Miami |
| | **Carmen R. Isasi**, Albert Einstein College of Medicine |
| | **Sonia Davis** and **Kelly R. Evenson**, University of North Carolina, Chapel Hill |
| 4:45 | **Learning Logic Rules for Disease Classification: With an Application to Developing Criteria Sets for the Diagnostic and Statistical Manual of Mental Disorders** |
| | **Christine M. Mauro**■, Columbia University |
| | **Donglin Zeng**, University of North Carolina, Chapel Hill |
| | **M. Katherine Shear** and **Yuanjia Wang**, Columbia University |

**\*** = Presenter   ■ = Student Award Winner

| 5:00 | **Characterizing Types of Physical Activity: An Unsupervised Way** |
|---|---|

**Jiawei Bai\***, **Luo Xiao**, **Vadim Zipunnikov** and **Ciprian M. Crainiceanu**,
Johns Hopkins University

| 5:15 | **Simultaneous Model-Based Clustering and Variable Selection: Extension to Mixed-Distribution Data** |
|---|---|

**Katie Evans**, Dupont
**Tanzy M.T. Love\*** and **Sally W. Thurston**, University of Rochester

## 60. CONTRIBUTED PAPERS: Survival Analysis: Methods Development and Applications

Sponsor: **ENAR**

Chair: **Jo Wick**, University of Kansas Medical Center

| 3:45 | **Predictive Model and Dynamic Prediction for Recurrent Events with Dependent Termination** |
|---|---|

**Li-An Lin\***, **Sheng Luo** and **Barry Davis**, University of Texas Health Sciences
Center at Houston

| 4:00 | **An Extended Self-Triggering Model for Recurrent Event Data** |
|---|---|

**Jung In Kim\***, **Feng-Chang Lin** and **Jason Fine**, University of North Carolina,
Chapel Hill

| 4:15 | **A Pairwise-Likelihood Augmented Estimator for the Cox Model Under Left-Truncation** |
|---|---|

**Fan Wu\*** and **Sehee Kim**, University of Michigan
**Jing Qin**, National Institute of Allergy and Infectious Diseases,
National Institutes of Health
**Yi Li**, University of Michigan

| 4:30 | **Rank-Based Testing Based on Cross-Sectional Survival Data with or without Prospective Follow-Up** |
|---|---|

**Kwun Chuen Gary Chan\***, University of Washington
**Jing Qin**, National Institute of Allergy and Infectious Diseases,
National Institutes of Health

| 4:45 | **Computation Efficient Models for Fitting Large-Scale Survival Data** |
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**Kevin He\***, **Yanming Li**, **Ji Zhu** and **Yi Li**, University of Michigan

| 5:00 | **Multiple Imputation for Interval Censored Data with Time-Dependent Auxiliary Variables Using Incident and Prevalent Cohort Data** |
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**Wen Ye\*** and **Douglas Schaubel**, University of Michigan

| 5:15 | **Model Flexibility for Regression Analysis of Survival Data with Informative Interval Censoring** |
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**Tyler Cook\*** and **Jianguo Sun**, University of Missouri, Columbia

## 61. INVITED AND CONTRIBUTED ORAL POSTERS: GWAS and Meta Analysis of Genetic Studies

Sponsor: **ENAR**

Chair: **Mary Sammel**, University of Pennsylvania

### 61a. INVITED POSTER:
Hypothesis Testing for Sparse Signals in Genetic Association Studies

**Xihong Lin***, Harvard University

### 61b. INVITED POSTER:
Meta-Analysis of Gene-Environment Interaction in Case-Control Studies by Adaptively Using Gene-Environment Correlation

**Bhramar Mukherjee***, **Shi Li**, **John D. Rice**, **Jeremy MG Taylor**, **Heather Stringham** and **Michael L. Boehnke**, University of Michigan

### 61c. Partial Linear Varying Index Coefficient Model for Gene-Environment Interactions

**Xu Liu*** and **Yuehua Cui**, Michigan State University

### 61d. Tree-Based Model Averaging Approaches for Modeling Rare Variant Association in Case-Control Studies

**Brandon J. Coombes*** and **Saonli Basu**, University of Minnesota
**Sharmistha Guha**, Fair Isaac Corporation
**Nicholas Schork**, J. Craig Venter Institute

### 61e. A Functional Approach to Association Testing of Multiple Phenotypes in Sequencing Studies

**Sneha Jadhav*** and **Qing Lu**, Michigan State University

### 61f. Analysis of Sequence Data Under Multivariate Trait-Dependent Sampling

**Ran Tao***, **Donglin Zeng**, **Nora Franceschini** and **Kari E. North**, University of North Carolina, Chapel Hill
**Eric Boerwinkle**, University of Texas Health Science Center
**Dan-Yu Lin**, University of North Carolina, Chapel Hill

### 61g. Meta-Analysis of Complex Diseases at Gene Level by Generalized Functional Linear Models

**Ruzong Fan*** and **Yifan Wang**, Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health
**Haobo Ren**, Regeneron Pharmaceuticals, Inc.
**Yun Li**, University of North Carolina, Chapel Hill
**Christopher Amos**, Dartmouth Medical School
**Wei Chen**, University of Pittsburgh
**Momiao Xiong**, University of Texas, Houston
**Jason Moore**, Dartmouth Medical School

**✷** = *Presenter*  ■ = *Student Award Winner*

**61h. Gene Level Meta-Analysis of Quantitative Traits by Functional Linear Models**

**Yifan Wang\*** and **Ruzong Fan**, Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health
**Michael Boehnke**, University of Michigan
**Wei Chen**, University of Pittsburgh
**Yun Li**, University of North Carolina, Chapel Hill
**Momiao Xiong,** University of Texas, Houston

**61i. A New Estimating Equation Approach for Secondary Trait Analyses in Genetic Case-Control Studies**

**Xiaoyu Song\***, **Iuliana Ionita-Laza** and **Ying Wei**, Columbia University

**61j. Novel Statistical Model for GWAS Meta-Analysis and Its Application to Trans-Ethic Meta-Analysis**

**Jingchunzi Shi\*** and **Seunggeun Lee**, University of Michigan

**61k. Multiple Phenotype Association Testing Based on Summary Statistics in Genome-Wide Association Studies**

**Zhonghua Liu\*** and **Xihong Lin**, Harvard School of Public Health

**61l. A New Approach for Detecting Gene-by-Gene Interactions Through Meta-Analyses**

**Yulun Liu\***, University of Texas, Health Science Center at Houston
**Paul Scheet**, University of Texas MD Anderson Cancer Center
**Yong Chen**, University of Texas, Health Science Center at Houston

**61m. Genome-Wide Association Studies for Functional Valued Traits**

**Han Hao\*** and **Rongling Wu**, The Pennsylvania State University

**61n. Kernel-Based Testing for Nonlinear Effect of a SNP-Set under Multiple Candidate Kernels**

**Tao He\***, **Ping-Shou Zhong** and **Yuehua Cui**, Michigan State University

**61o. A General Framework of Gene-Based Association Tests for Correlated Case-Control Samples**

**Han Chen\***, **Chaolong Wang** and **Xihong Lin**, Harvard School of Public Health

**61p. Algorithm to Compute the Identity Coefficients at a Particular Locus Given the Marker Information**

**J Concepcion Loredo-Osti\*** and **Haiyan Yang**, Memorial University

**61q. Estimating the Empirical Null Distribution of Maxmean Statistics in Gene Set Analysis**

**Xing Ren\*** and **Jeffrey Miecznikowski**, University at Buffalo, SUNY
**Song Liu** and **Jianmin Wang**, Roswell Park Cancer Institute

**61r. USAT: A Unified Score-Based Association Test for Multiple Phenotype-Genotype Analysis**

**Debashree Ray\*** and **Saonli Basu**, University of Minnesota

# TUESDAY, MARCH 17

**8:30 – 10:15 am**

## 62. Statistical Inference with Random Forests and Related Ensemble Methods

Sponsor: **ENAR**

Organizer: **Giles Hooker**, Cornell University

Chair: **Trevor Hastie**, Stanford University

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| 8:30 | **Detecting Feature Interactions in Bagged Trees and Random Forests** |
| | **Lucas K. Mentch*** and **Giles Hooker**, Cornell University |
| 8:55 | **Consistency of Random Forests** |
| | **Gerard Biau***, **Erwan Scornet** and **Jean-Philippe Vert**, Pierre and Marie Curie University |
| 9:20 | **Asymptotic Theory for Random Forests** |
| | **Stefan Wager***, Stanford University |
| 9:45 | **Variable Selection with Bayesian Additive Regression Trees** |
| | **Shane T. Jensen***, **Justin Bleich**, **Adam Kapelner** and **Edward I. George**, University of Pennsylvania |

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| 10:10 | **Floor Discussion** |

## 63. Mediation and Interaction: Theory, Practice and Future Directions

Sponsors: **ENAR**, **ASA Biometrics Section**, **ASA Section on Statistics in Epidemiology**

Organizers: **Brisa Sanchez**, University of Michigan and **Melody Goodman**, Washington University in St. Louis

Chair: **Brisa Sanchez**, University of Michigan

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| 8:30 | **A Unification of Mediation and Interaction: A Four-Way Decomposition** |
| | **Tyler J. VanderWeele***, Harvard University |
| 9:00 | **Recent Developments for Mediation Analysis: Can We Do Better?** |
| | **Eric Tchetgen Tchetgen***, Harvard University |
| 9:30 | **Integrative Analysis of Complex Genetic, Genomic and Environmental Data Using Mediation Analysis** |
| | **Xihong Lin***, Harvard University |
| 10:00 | Discussant: |
| | **Bhramar Mukherjee**, University of Michigan |

★ = *Presenter*    ■ = *Student Award Winner*

## 64. Motivation and Analysis Strategies for Joint Modeling of High Dimensional Data in Genetic Association Studies

Sponsors: **ENAR**, **ASA Biometrics Section**

Organizer: **Saonli Basu**, University of Minnesota

Chair: **Weihua Guan,** University of Minnesota

**8:30**  **Region-Based Test for Gene-Environment Interactions in Longitudinal Studies**

**Zihuai He**, **Min Zhang\***, **Seunggeun Lee** and **Jennifer Smith**, University of Michigan
**Xiuqing Guo**, Harbor-UCLA Medical Center
**Walter Palmas**, Columbia University
**Sharon L.R. Kardia**, **Ana V. Diez Roux** and **Bhramar Mukherjee**, University of Michigan

**8:55**  **Strategies to Improve the Power of Pathway Analysis in Genetic Association Studies**

**Kai Yu\***, **Han Zhang**, **Jianxin Shi** and **Nilanjan Chatterjee**, National Cancer Institute, National Institutes of Health

**9:20**  **A Unified Test for Population-Based Multiple Correlated Phenotype-Genotype Association Analysis**

**Saonli Basu\*** and **Debashree Ray**, University of Minnesota

**9:45**  **Modelling Multiple Correlated Genetic Variants**

**Sharon R. Browning\***, University of Washington

**10:10**  **Floor Discussion**

## 65. Recent Developments on Inference for Possibly Time-Dependent Treatment Effects with Survival Data

Sponsors: **ENAR**, **ASA Biometrics Section**

Organizer: **Song Yang**, National Heart, Lung and Blood Institute,

National Institutes of Health

Chair: **Song Yang**, National Heart, Lung and Blood Institute,

National Institutes of Health

**8:30**  **Threshold Regression for Lifetime Data**

**Mei-Ling Ting Lee\***, University of Maryland, College Park
**George A. Whitmore**, McGill University, Canada

**8:55**  **Hypothesis Testing for an Extended Cox Model with Time-Varying Coefficients**

**Ying Q. Chen\***, Fred Hutchinson Cancer Research Center

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★ = *Presenter*   ■ = *Student Award Winner*

**9:20**  **Time-Dependent Cut Point Selection for Biomarkers in Censored Survival Data**

**Zhezhen Jin\***, Columbia University

**9:45**  **Inference on the Summary Measures of Treatment Effect with Survival Data When There is Possibly Treatment by Time Interaction**

**Song Yang\***, National Heart, Lung and Blood Institute, National Institutes of Health

**10:10**  **Floor Discussion**

## 66. *Journal of Agricultural, Biological and Environmental Statistics* (JABES) Highlights

Sponsors: **ENAR**, **JABES**

Organizer: **Montserrat Fuentes**, North Carolina State University

Chair: **Murali Haran**, The Pennsylvania State University

**8:30**  **Limited-Information Modeling of Loggerhead Turtle Population Size**

**John M. Grego\*** and **David B. Hitchcock**, University of South Carolina

**8:55**  **Nonlinear Varying-Coefficient Models with Applications to a Photosynthesis Study**

**Damla Senturk\***, University of California, Los Angeles
**Esra Kurum**, Medeniyet University
**Runze Li**, The Pennsylvania State University
**Yang Wang**, China Vanke

**9:20**  **Multilevel Latent Gaussian Process Model for Mixed Discrete and Continuous Multivariate Response Data**

**Erin M. Schliep\***, Duke University
**Jennifer A. Hoeting**, Colorado State University

**9:45**  **Analysis of Variance of Integro-Differential Equations with Application to Population Dynamics of Cotton Aphids**

**Jianhua Huang\***, Texas A&M University

**10:10**  **Floor Discussion**

✱ = *Presenter*  ■ = *Student Award Winner*

## 67. Estimation and Inference for High Dimensional and Data Adaptive Problems

Sponsor: **IMS**

Organizer: **Noah Simon**, University of Washington

Chair: **Michael Wu,** Fred Hutchinson Cancer Research Center

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| 8:30 | **A Flexible Framework for Sparse Additive Modeling** |
| | **Noah Simon***, University of Washington |
| 8:55 | **Inference for Regression Quantiles After Model Selection** |
| | **Jelena Bradic***, University of California, San Diego <br> **Mladen Kolar**, University of Chicago |
| 9:20 | **False Discovery Rate Control for Spatial Data** |
| | **Alexandra Chouldechova***, Carnegie Mellon University |
| 9:45 | **Conditional or Fixed? Different Philosophies in Adaptive Inference** |
| | **Max Grazier-G'sell*** and **Ryan Tibsharani**, Carnegie Mellon University |

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| 10:10 | **Floor Discussion** |

## 68. CONTRIBUTED PAPERS: Novel Methods for Bioassay Data

Sponsor: **ENAR**

Chair: **Zhao Yang**, University of Tennessee

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| 8:30 | **drLumi: Tools for the Analysis of the Multiplex Immunoassays in R** |
| | **Hector Sanz*** and **John Aponte**, Universitat de Barcelona, Spain <br> **Jaroslaw Harezlak** and **Magdalena Murawska**, Indiana University Fairbanks School of Public Health, Indianapolis <br> **Ruth Aguilar**, **Gemma Moncunill** and **Carlota Dobaño**, Universitat de Barcelona, Spain <br> **Clarissa Valim**, Harvard School of Public Health |
| 8:45 | **A Bayesian Analysis of Bioassay Experiments** |
| | **Luis G. Leon-Novelo***, University of Louisiana at Lafayette <br> **Andrew Womack**, Indiana University <br> **Hongxiao Zhu** and **Xiaowei Wu**, Virginia Polytechnic Institute and State University |
| 9:00 | **Compound Ranking Based on a New Mathematical Measure of Effectiveness Using Time Course Data from Cell-Based Assays** |
| | **Francisco J. Diaz***, University of Kansas Medical Center |
| 9:15 | **Nonparametric Classification of Chemicals using Quantitative High Throughput Screening (qHTS) Assays** |
| | **Shuva Gupta***, National Institute of Environmental Health Sciences, National Institutes of Health <br> **Soumendra Lahiri**, North Carolina State University <br> **Shyamal Peddada**, National Institute of Environmental Health Sciences, National Institutes of Health |

★ = *Presenter* ■ = *Student Award Winner*

**9:30** **Robust Bayesian Methods for the Inverse Regression with an Application to Immunoassay Experiments**

**Magdalena Murawska**, Indiana University Fairbanks School of Public Health, Indianapolis
**Hector Sanz**, **Ruth Aguilar**, **Gemma Moncunill**, **Carlota Dobaño** and **John Aponte**, Universitat de Barcelona, Spain
**Clarissa Valim**, Harvard School of Public Health
**Jaroslaw Harezlak***, Indiana University Fairbanks School of Public Health, Indianapolis

**9:45** **Estimating the Prevalence of Multiple Diseases via Two-Stage Hierarchical Pooling**

**Md S. Warasi*** and **Joshua M. Tebbs**, University of South Carolina
**Christopher McMahan**, Clemson University

**10:00** **A Ballooned Beta Regression Model and Its Application to Bioassay Data**

**Min Yi*** and **Nancy Flournoy**, University of Missouri, Columbia

## 69. CONTRIBUTED PAPERS:
## Infectious Disease

Sponsor: **ENAR**

Chair: **Jean-Philippe Fortin**, Johns Hopkins Bloomberg School of Public Health

**8:30** **Viral Genetic Linkage Analysis in the Presence of Missing Data**

**Shelley Han Liu*** and **Gabriel Erion**, Harvard University
**Vladimir Novitsky** and **Victor DeGruttola**, Harvard School of Public Health

**8:45** **A Bayesian Approach to Estimating Causal Vaccine Effects on Binary Post-Infection Outcomes**

**Jincheng Zhou***, Minneapolis Medical Research Foundation, University of Minnesota
**Haitao Chu**, University of Minnesota
**Michael G. Hudgens**, University of North Carolina, Chapel Hill
**M. Elizabeth Halloran**, Fred Hutchinson Cancer Research Center and University of Washington

**9:00** **Exploring Bayesian Latent Class Models as a Potential Statistical Tool to Estimate Sensitivity and Specificity in Presence of an Imperfect or No Gold Standard.**

**Jay Mandrekar***, Mayo Clinic

**9:15** **Modeling and Inference for Rotavirus Dynamics in Niger**

**Joshua Goldstein***, **Murali Haran** and **Matthew Ferrari**, The Pennsylvania State University

★ = *Presenter*    ■ = *Student Award Winner*

| 9:30 | **Comparison of Group Testing Algorithms for Case Identification in the Presence of Dilution Effect** |
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**Dewei Wang\***, University of South Carolina
**Christopher S. McMahan** and **Colin M. Gallagher**, Clemson University

| 9:45 | **Cholera Transmission in Ouest Region of Haiti: Dynamic Modeling and Prediction** |
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**Alexander Kirpich\***, **Alex Weppelmann**, **Yang Yang** and **Ira Longini**, University of Florida

| 10:00 | **Floor Discussion** |
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## 70. CONTRIBUTED PAPERS: Variable Selection

Sponsor **ENAR**

Chair: **Angelo Elmi**, The George Washington University

| 8:30 | **Weak Signal Identification and Inference in Penalized Model Selection** |
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**Peibei Shi**■ and **Annie Qu**, University of Illinois, Urbana-Champaign

| 8:45 | **Feature Screening for Time-Varying Coefficient Models Ultra-High Dimensional Longitudinal Data** |
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**Wanghuan Chu\***, **Runze Li** and **Matthew Reimherr**, The Pennsylvania State University

| 9:00 | **A Regularized Approach for Simultaneous Estimation and Model Selection for Single Index Models** |
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**Longjie Cheng\***, Purdue University
**Peng Zeng**, Auburn University
**Yu Zhu**, Purdue University

| 9:15 | **Multi-Step LASSO** |
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**Haileab Hilafu\***, University of Tennessee

| 9:30 | **Bayesian Hierarchical Variable Selection Incorporating Multi-Level Structural Information** |
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**Changgee Chang\***, Emory University
**Yize Zhao**, Statistical and Applied Mathematical Sciences Institute
**Qi Long**, Emory University

| 9:45 | **Model Selection for Protein Copy Numbers in Populations of Microorganism** |
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**Burcin Simsek\***, **Hanna Salman** and **Satish Iyengar**, University of Pittsburgh

| 10:00 | **Globally Adaptive Quantile Regression with Ultra-High Dimensional Data** |
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**Qi Zheng\*** and **Limin Peng**, Emory University
**Xuming He**, University of Michigan

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## 71. CONTRIBUTED PAPERS:
## Modeling Health Data with Spatial or Temporal Features

Sponsor: **ENAR**

Chair: **Guanhua Chen**, Vanderbilt University

**8:30**    **Modeling of Correlated Objects with Application to Detection of Metastatic Cancer Using Functional CT Imaging**

**Yuan Wang\***, **Brian Hobbs**, **Jianhua Hu** and **Kim-Anh Do**, University of Texas MD Anderson Cancer Center

**8:45**    **A Spatially Varying Coefficient Model with Partially Unknown Proximity Matrix for the Detection of Glaucoma Progression Using Visual Field Data**

**Joshua L. Warren\***, Yale School of Public Health
**Jean-Claude Mwanza**, University of North Carolina, Chapel Hill
**Angelo P. Tanna**, Northwestern University
**Donald L. Budenz**, University of North Carolina, Chapel Hill

**9:00**    **Mapping and Measuring the Effect of Privatization on Alcohol and Violence: Does it Really Matter?**

**Loni Philip Tabb\*** and **Tony H. Grubesic**, Drexel University

**9:15**    **Modeling Adolescent Health Data Using a Binary Spatial-Temporal Generalized Method of Moments Approach**

**Kimberly Kaufeld\***, Statistical and Applied Mathematics Institute and North Carolina State University

**9:30**    **A Piecewise Exponential Survival Model with Change Points for Evaluating the Temporal Association of World Trade Center Exposure with Incident Obstructive Airway Disease**

**Charles B. Hall\***, Albert Einstein College of Medicine
**Xiaoxue Liu**, **Rachel Zeig-Owens**, **Mayris P. Webber**, **Jessica Weakley** and **Theresa M. Schwartz**, Montefiore Medical Center
**David J. Prezant**, Fire Department of the City of New York

**9:45**    **Distributed Lag Models: Examining Associations between the Built Environment and Health**

**Jonggyu Baek\***, **Brisa N. Sanchez** and **Veronica J. Berrocal**, University of Michigan
**Emma V. Sanchez-Vaznaugh**, San Francisco State University

**10:00**    **Cluster Detection Test in Spatial Scan Statistics: ADHD Application**

**Ahmad Reza Soltani\*** and **Suja Aboukhamseen**, Kuwait University

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## 72. CONTRIBUTED PAPERS:
### Advances in Longitudinal Modeling

Sponsor: **ENAR**

Chair: **Li-An Lin**, University of Texas Health Science Center, Houston

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| 8:30 | **Conditional Modeling of Longitudinal Data with Terminal Event**<br><br>**Shengchun Kong\***, Purdue University<br>**Bin Nan** and **Jack Kalbfleisch**, University of Michigan |
| 8:45 | **A Marginalized Multilevel Model for Bivariate Longitudinal Binary Data**<br><br>**Gul Inan\*** and **Ozlem Ilk Dag**, Middle East Technical University, Turkey |
| 9:00 | **Augmented Beta Rectangular Regression Models: A Bayesian Perspective**<br><br>**Jue Wang\*** and **Sheng Luo**, University of Texas Health Science Center, Houston |
| 9:15 | **Rank-Based Regression Models for Longitudinal Data**<br><br>**Rui Chen**, **Tian Chen\*** and **Xin Tu**, University of Rochester |
| 9:30 | **Markov Chains and Continuous Time Multi-State Markov Models Comparisons in Longitudinal Clinical Analysis**<br><br>**Lijie Wan\***, **Richard J. Kryscio** and **Erin Abner**, University of Kentucky |
| 9:45 | **Applications of Multiple Outputation for the Analysis of Longitudinal Data Subject to Irregular Observation**<br><br>**Eleanor M. Pullenayegum\***, Hospital for Sick Children |
| 10:00 | **A Hidden Markov Model Approach to Analyze Longitudinal Ternary Outcome Disease Stage Change Subject to Misclassification**<br><br>**Julia Benoit\***, University of Houston<br>**Wenyaw Chan**, University of Texas Health Science Center School of Public Health |

## 73. CONTRIBUTED PAPERS:
### Causal Inference: Average and Mediated Effects

Sponsor: **ENAR**

Chair: **Jeff Goldsmith**, Columbia University

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| 8:30 | **Instrumental Variable Estimation of the Marginal Average Effect of Treatment on the Treated**<br><br>**Lan Liu\***, **Baoluo Sun**, **James Robins** and **Eric Tchetgen Tchetgen**, Harvard University |
| 8:45 | **Within-Subject Designs for Causal Mediation Analysis**<br><br>**Yenny Webb-Vargas\***, **Martin A. Lindquist** and **Elizabeth A. Stuart**, Johns Hopkins Bloomberg School of Public Health<br>**Michael E. Sobel**, Columbia University |
| 9:00 | **Mediation Analysis of a Set of Correlated Predictors Using Weighted Quantile Sum Regression Method**<br><br>**Bhanu Murthy Evani\*** and **Robert A. Perera**, Virginia Commonwealth University<br>**Chris Gennings**, Icahn School of Medicine at Mount Sinai |
| 9:15 | **Bayesian Semiparametric Latent Mediation Model**<br><br>**Chanmin Kim\***, Harvard University<br>**Michael J. Daniels**, University of Texas, Austin<br>**Yisheng Li**, University of Texas MD Anderson Cancer Center |

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| 9:30 | **Accounting for Uncertainty in Confounder Selection when Estimating Average Causal Effects in Generalized Linear Models** |
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| | **Chi Wang***, University of Kentucky<br>**Corwin Matthew Zigler**, Harvard School of Public Health<br>**Giovanni Parmigiani**, Dana-Farber Cancer Institute and Harvard School of Public Health<br>**Francesca Dominici**, Harvard School of Public Health |
| 9:45 | **Variable Selection for Estimating Average Causal Effects** |
| | **Douglas Galagate***, U.S. Census Bureau |
| 10:00 | **Estimating Mediation Effects Under Correlated Errors with an Application to fMRI** |
| | **Yi Zhao**■ and **Xi Luo**, Brown University |

## 74. CONTRIBUTED PAPERS:
## Variable Selection with High Dimensional Data

Sponsor: **ENAR**

Chair: **Tanujit Dey**, Cleveland Clinic

| 8:30 | **Empirical Likelihood Tests for Coefficients in High Dimensional Linear Models** |
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| | **Honglang Wang***, **Ping-Shou Zhong** and **Yuehua Cui**, Michigan State University |
| 8:45 | **TPRM: Tensor Partition Regression Models with Applications in Imaging Biomarker Detection** |
| | **Michelle F. Miranda***, **Hongtu Zhu** and **Joseph G. Ibrahim**, University of North Carolina, Chapel Hill |
| 9:00 | **A Boosting-Based Variable Selection Method for Survival Prediction with Genome-Wide Gene Expression Data** |
| | **Yanming Li***, **Kevin He**, **Yi Li** and **Ji Zhu**, University of Michigan |
| 9:15 | **Statistical Inference in High-Dimensional M-Estimation** |
| | **Hao Chai*** and **Shuangge Ma**, Yale University |
| 9:30 | **Augmented Weighted Support Vector Machines for Missing Covariates** |
| | **Thomas G. Stewart**■, **Michael C. Wu** and **Donglin Zeng**, University of North Carolina, Chapel Hill |
| 9:45 | **A Bayesian Adaptive Shrinkage Method for Well-Formulated Models** |
| | **Andrew Womack**, Indiana University, Bloomington<br>**Daniel Taylor-Rodriguez***, Statistical and Applied Mathematics Institute and Duke University<br>**Claudio Fuentes**, Oregon State University |

| 10:00 | **Floor Discussion** |
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★ = *Presenter*    ■ = *Student Award Winner*

# TUESDAY, MARCH 17

**10:15 – 10:30 am** — Refreshment Break with Our Exhibitors

## 10:30 am – 12:15 pm

### 75. Presidential Invited Address

Sponsor: **ENAR**

Organizer/Chair: **José Pinheiro**, Johnson & Johnson PRD

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| **10:30** | Introduction |
| **10:35** | Distinguished Student Paper Awards |
| **10:45** | **Big Data, Big Opportunities, Big Challenges** |
| | **David L. DeMets**, Ph.D., Max Halperin Professor of Biostatistics, University of Wisconsin, Madison |

## 1:45 – 3:30 pm

### 76. Recent Advances in Dynamic Treatment Regimes

Sponsors: **ENAR**, **ASA Biometrics Section**

Organizer: **Yingqi Zhao**, University of Wisconsin, Madison

Chair: **Yingqi Zhao**, University of Wisconsin, Madison

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| **1:45** | **The LIBERTI Trial for Discovering a Dynamic Treatment Regimen in Burn Scar Repair** |
| | **Jonathan Hibbard** and **Michael R. Kosorok***, University of North Carolina, Chapel Hill |
| **2:10** | **From Idealized to Realized: Estimating Dynamic Treatment Regimens from Electronic Medical Records** |
| | **Erica EM Moodie*** and **David A. Stephens**, McGill University |
| **2:35** | **Adaptive Treatment and Robust Control** |
| | **Robin Henderson***, Newcastle University, UK |
| **3:00** | **Methods to Increase Efficiency of Estimation When a Test Used to Decide Treatment Has No Direct Effect on the Outcome** |
| | **James M. Robins***, Harvard University |

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| **3:25** | **Floor Discussion** |

★ = *Presenter*   ■ = *Student Award Winner*

## 77. Predictive Models for Precision Medicine

Sponsors: **ENAR**, **ASA Biometrics Section**, **ASA Mental Health Statistics Section**, **ASA Statistical Programmers Section**

Organizers: **Suchi Saria**, Johns Hopkins University and **Peter Mueller**, University of Texas, Austin

Chair: Peter Mueller, University of Texas, Austin

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| 1:45 | **The Power of Electronic Medical Records as Data-Gathering Tools for the Creation of (a) Longitudinal Personalized Near-Real-Time Predictions of Adverse Outcomes and (b) Data-Driven Advice Systems for Medical Decision-Making** |
| | **David Draper***, University of California, Santa Cruz and eBay Research Labs |
| 2:10 | **Assessing Illness Severity from Electronic Health Data** |
| | **Suchi Saria***, Johns Hopkins University |
| 2:35 | **Toward Individualizing Health Care: Statistical Opportunities** |
| | **Yates Coley**, **Zhenke Wu** and **Scott L. Zeger***, Johns Hopkins University |
| 3:00 | **Dancing with Black Swans: A Computational Perspective on Suicide Risk Detection** |
| | **Truyen Tran***, Deakin University and Curtin University, Australia **Santu Rana**, **Wei Luo**, **Dinh Phung** and **Svetha Venkatesh**, Deakin University, Australia **Richard Harvey**, Barwon Health, Australia |
| 3:25 | **Floor Discussion** |

## 78. Electronic Health Records: Challenges and Opportunities

Sponsors: **ENAR**, **ASA Biometrics Section**, **ASA Section on Statistics in Epidemiology**

Organizer: **Paramita Saha Chaudhuri**, Duke University

Chair: **Paramita Saha Chaudhur**i, Duke University

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| 1:45 | **Trials and Tribulations in Trials Using EHR Data** |
| | **Meredith Nahm Zozus***, Duke University |
| 2:10 | **Statistical Methods for Dealing with Non-Random Observation of Laboratory Data in EHRs** |
| | **Jason A. Roy***, University of Pennsylvania |
| 2:35 | **Extending Bayesian Networks to Estimate Conditional Survival Probability Using Electronic Health Data** |
| | **David M. Vock***, **Julian Wolfson**, **Sunayan Bandyopadhyay**, **Gediminas Adomavicius** and **Paul E. Johnson**, University of Minnesota **Gabriela Vazquez-Benitez** and **Patrick J. O'Connor**, HealthPartners Institute for Education and Research |

★ = *Presenter*    ■ = *Student Award Winner*

| 3:00 | **Tracking and Predicting Disease from the Electronic Medical Record** |
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| | **Joseph Edward Lucas***, Duke University |

| 3:25 | **Floor Discussion** |
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## 79. Cost-Effective Study Designs for Observational Data

Sponsor: **ENAR**

Organizer: **Patrick Heagerty**, University of Washington

Chair: **Patrick Heagerty**, University of Washington

| 1:45 | **Design and Analysis of Retrospective Studies for Longitudinal Outcome Data** |
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| | **Jonathan S. Schildcrou**t* and **Nathaniel D. Mercaldo**, Vanderbilt University School of Medicine |
| 2:15 | **On the Analysis of Hybrid Designs that Combine Group- and Individual-Level Data** |
| | **Sebastien Haneuse*** and **Elizabeth Smoot**, Harvard School of Public Health |
| 2:45 | **Test-Dependent Sampling Design and Semi-Parametric Inference for the ROC Curve** |
| | **Haibo Zhou***, University of North Carolina, Chapel Hill<br>**Beth Horton**, University of Virginia |
| 3:15 | Discussant: |
| | **Paul Rathouz**, University of Wisconsin, Madison |

## 80. Advanced Machine Learning Methods

Sponsors: **ENAR**, **ASA Statistical Learning and Data Mining Section**

Organizer: **Peiyong (Annie) Qu**, University of Illinois, Champaign-Urbana

Chair: **Peiyong (Annie) Qu**, University of Illinois, Champaign-Urbana

| 1:45 | **A New Approach to Variable Selection via Algorithmic Regularization Paths** |
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| | **Yue Hu**, Rice University<br>**Genevera I. Allen***, Rice University and Baylor College of Medicine |
| 2:10 | **Link Prediction for Partially Observed Networks** |
| | **Yunpeng Zhao**, George Mason University<br>**Yun-Jhong Wu**, **Elizaveta Levina** and **Ji Zhu***, University of Michigan |
| 2:35 | **Graphical Regression** |
| | **Hsin-Cheng Huang**, Academia Sinica, Taiwan<br>**Xiaotong Shen*** and **Wei Pan**, University of Minnesota |
| 3:00 | **Penalized Maximum Likelihood Estimation on a Two-Layered Network** |
| | **George Michailidis***, University of Michigan |

| 3:25 | **Floor Discussion** |
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★ = *Presenter*  ■ = *Student Award Winner*

## 81. Statistical Analysis for Deep Sequencing Data in Cancer Research: Methods and Applications

Sponsor: **ENAR**

Organizer: **Li-Xuan Qin**, Memorial Sloan Kettering Cancer Center

Chair: **Yen-Tsung Huang**, Brown University

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| 1:45 | **A Statistical Method for Detecting Differentially Expressed Mutations Based on Next-Generation RNAseq Data** |
| | **Pei Wang***, Icahn School of Medicine at Mount Sinai |
| | **Rong Fu**, University of Washington |
| | **Ziding Feng**, University of Texas MD Anderson Cancer Center |
| 2:10 | **Accounting for Differential Coverage in Comparing Mutation Prevalence** |
| | **George W. Wright***, National Cancer Institute, National Institutes of Health |
| 2:35 | **Bayesian Nonparametric Models for Differential Expression Using Sequencing Data** |
| | **Subharup Guha***, University of Missouri |
| | **Veera Baladandayuthapani**, University of Texas MD Anderson Cancer Center |
| 3:00 | **Understanding microRNA Sequencing Data Distribution** |
| | **Li-Xuan Qin***, Memorial Sloan Kettering Cancer Center |
| | **Tom Tuschl**, Rockefeller University |
| | **Sam Singer**, Memorial Sloan Kettering Cancer Center |

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| 3:25 | **Floor Discussion** |

## 82. Spatial and Spatio-Temporal Modeling

Sponsor: **IMS**

Organizer: **Jonathan Stroud**, The George Washington University

Chair: **Jonathan Stroud**, The George Washington University

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| 1:45 | **Spatial Local Gradient Models of Biological Invasions** |
| | **Joshua Goldstein**, **Murali Haran*** and **Ottar N. Bjornstad**, The Pennsylvania State University |
| | **Andrew M. Liebhold**, U.S. Forest Services |
| 2:10 | **A Generalized Conditionally Autoregressive (CAR) Model** |
| | **Veronica J. Berrocal***, University of Michigan |
| | **Alan E. Gelfand**, Duke University |

★ = *Presenter*  ■ = *Student Award Winner*

| 2:35 | **Multivariate Spatial Modeling of Conditional Dependence in Microscale Soil Elemental Composition Data** |
|---|---|
| | **Joseph Guinness\***, **Montserrat Fuentes**, **Dean Hesterberg** and **Matthew Polizzotto**, North Carolina State University |
| 3:00 | **Gaussian Process Models for Emulating Spatial Computer Model Output** |
| | **Dave M. Higdon\***, Los Alamos National Laboratory and Virginia Tech **Mengyang Gu**, Duke University |

| 3:15 | **Floor Discussion** |
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# 83. CONTRIBUTED PAPERS: Study Design and Power

Sponsor: **ENAR**

Chair: **Shelley Han Liu**, Harvard University

| 1:45 | **Comparison of Risk Estimates Derived from Full Cohort, Sub-Sample, and Nested Case-Cohort Methodologies** |
|---|---|
| | **Kathleen A. Jablonski\*** and **Madeline M. Rice**, The George Washington University |
| 2:00 | **Power Estimation for Ordinal Categorical Data in the Presence of Non Proportional Odds** |
| | **Roy N. Tamura\*** and **Xiang Liu**, University of South Florida |
| 2:15 | **Single Arm Phase II Cancer Survival Trial Designs** |
| | **Jianrong John Wu\***, St. Jude Children's Research Hospital |
| 2:30 | **Empirical Determination of Statistical Power and Sample Size for RNA-Seq Studies** |
| | **Milan Bimali\***, **Jonathan D. Mahnken** and **Brooke L. Fridley**, University of Kansas Medical Center |
| 2:45 | **Functional Signal-to-Noise Ratio Analysis with Applications in Quantitative Ultrasound** |
| | **Yeonjoo Park\*** and **Douglas G. Simpson**, University of Illinois, Urbana-Champaign |
| 3:00 | **Analysis of a Non-Mortality Outcome in Clinical Trial of a Potentially Lethal Disease** |
| | **Roland A. Matsouaka\***, Duke University **Rebecca Betensky**, Harvard University |
| 3:15 | **Sample Size Determination Based on Quantile Residual Life** |
| | **Jong Hyeon Jeong\***, University of Pittsburgh |

## 84. CONTRIBUTED PAPERS:
## Missing Data

Sponsor: **ENAR**

Chair: **Shengchun Kong**, Purdue University

**1:45**    **A Mixed Effects Model for Incomplete Data with Experiment-Level Abundance-Dependent Missing-Data Mechanism**

**Lin S. Chen** and **Jiebiao Wang***, University of Chicago
**Xianlong Wang**, Fred Hutchinson Cancer Research Center
**Pei Wang**, Icahn Medical School at Mount Sinai

**2:00**    **Multiple Imputation for General Missing Patterns in the Presence of High-Dimensional Data**

**Yi Deng*** and **Qi Long**, Emory University

**2:15**    **A Mixed-Effects Model for Nonignorable Missing Longitudinal Data**

**Xuan Bi*** and **Annie Qu**, University of Illinois, Urbana-Champaign

**2:30**    **EM Algorithm in Gaussian Copula with Missing Data**

**Wei Ding*** and **Peter X.K. Song**, University of Michigan

**2:45**    **On Identification Issues with Binary Outcomes Missing Not at Random**

**Jiwei Zhao***, University at Buffalo, SUNY

**3:00**    **Kenward-Roger Approximation for Linear Mixed Models with Missing Covariates**

**Akshita Chawla*** and **Tapabrata Maiti**, Michigan State University
**Samiran Sinha**, Texas A&M University

**3:15**    **Nonparametric Sequential Multiple Imputation for Survival Analysis with Missing Covariates**

**Paul Hsu**, University of Arizona
**Mandi Yu***, National Cancer Institute, National Institutes of Health

## 85. CONTRIBUTED PAPERS:
## Innovative Methods for Clustered Data

Sponsor: **ENAR**

Chair: **Gul Inan**, Middle East Technical University

**1:45**    **Correlation Structure Selection Penalties for Improved Inference with Generalized Estimating Equations**

**Philip M. Westgate*** and **Woodrow W. Burchett**, University of Kentucky

**2:00**    **Handling Negative Correlation and/or Overdispersion in Gaussian and Non-Gaussian Hierarchical Data**

**Geert Molenberghs***, Hasselt University and Leuven University

**2:15**    **Reflecting the Orientation of Teeth in Random Effects Models for Periodontal Outcomes**

**Rong Xia***, **Thomas M. Braun** and **William V. Giannobile**, University of Michigan

★ = *Presenter*    ■ = *Student Award Winner*

| 2:30 | **Detecting Heterogeneity Based on Effect Size of Response Measures** |
|------|------|

**Xin Tong\***, University of South Carolina, Columbia

| 2:45 | **Statistical Methods for Manifold-Valued Data from Longitudinal Studies** |
|------|------|

**Emil A. Cornea\***, **Hongtu T. Zhu** and **Joseph G. Ibrahim**, University of North Carolina, Chapel Hill

| 3:00 | **Analyzing Dependent Data using Empirical Likelihood and Quadratic Inference Function** |
|------|------|

**Chih-Da Wu\***, University of North Carolina, Chapel Hill
**Naisyin Wang**, University of Michigan

| 3:15 | **Fast Estimation of Regression Parameters in a Broken Stick Model for Longitudinal Data** |
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**Ritabrata Das\***, **Moulinath Banerjee** and **Bin Nan**, University of Michigan

## 86. CONTRIBUTED PAPERS: Biopharmaceutical Applications and Survival Analysis

Sponsor: **ENAR**

Chair: **Chanmin Kim**, Harvard University

| 1:45 | **Pseudo-Value Approach for Testing Conditional Residual Lifetime for Dependent Survival and Competing Risks Data** |
|------|------|

**Kwang Woo Ahn\*** and **Brent R. Logan**, Medical College of Wisconsin

| 2:00 | **Fallback Type FDR Controlling Procedures for Testing a Priori Ordered Hypotheses** |
|------|------|

**Anjana Grandhi\***, **Gavin Lynch** and **Wenge Guo**, New Jersey Institute of Technology

| 2:15 | **Parametric Inference on Quantile Residual Life** |
|------|------|

**Kidane B. Ghebrehawariat\***, **Ying Ding** and **Jong-Hyeon Jeong**, University of Pittsburgh

| 2:30 | **Study Design Issues in Precision Study for Optical Coherence Tomography Device** |
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**Haiwen Shi\***, U.S. Food and Drug Administration

| 2:45 | **Modeling Gap Times between Recurrent Infections after Hematopoietic Cell Transplant** |
|------|------|

**Chi Hyun Lee\*** and **Xianghua Luo**, University of Minnesota
**Chiung-Yu Huang**, Johns Hopkins University

| 3:00 | **Assessing Treatment Effects with Surrogate Survival Outcomes Using an Internal Validation Subsample** |
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**Jarcy Zee\***, Arbor Research Collaborative for Health
**Sharon X. Xie**, University of Pennsylvania

| 3:15 | **Inference Concerning the Difference between Two Treatments in Clinical Trials** |
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**Krishna K. Saha\***, Central Connecticut State University

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## 87. CONTRIBUTED PAPERS:
### Computational Methods

Sponsor: **ENAR**

Chair: **Sonja Grill**, Technische Universität München

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|---|---|
| 1:45 | **DNase2TF: An Efficient Algorithm for Footprint Detection** |
| | **Songjoon Baek\***, **Myong-Hee Sung** and **Gordon L. Hager**, National Cancer Institute, National Institutes of Health |
| 2:00 | **Spectral Properties of MCMC Algorithms for Bayesian Linear Regression with Generalized Hyperbolic Errors** |
| | **Yeun Ji Jung\*** and **James P. Hobert**, University of Florida |
| 2:15 | **Group Fused Multinomial Regression** |
| | **Brad Price\***, University of Miami<br>**Charles J. Geyer** and **Adam J. Rothman**, University of Minnesota |
| 2:30 | **Analysis of MCMC Algorithms for Bayesian Linear Regression with Laplace Errors** |
| | **Hee Min Choi\***, University of California, Davis |
| 2:45 | **On the Use of Cauchy Prior Distributions for Bayesian Binary Regression** |
| | **Joyee Ghosh\***, University of Iowa<br>**Yingbo Li**, Clemson University<br>**Robin Mitra**, University of Southampton |
| 3:00 | **Fast, Exact Bootstrap Principal Component Analysis for p > 1 million** |
| | **Aaron Fisher\***, **Brian Caffo**, **Brian Schwartz** and **Vadim Zipunnikov**,<br>Johns Hopkins University |

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| 3:15 | **Floor Discussion** |

✱ = *Presenter*    ■ = *Student Award Winner*

# TUESDAY, MARCH 17

**3:30 – 3:45 pm — Refreshment Break with Our Exhibitors**

**3:45 – 5:30 p.m**

## 88. Biostatistical Methods for Heterogeneous Genomic Data

Sponsor: **ENAR**

Organizer: **Wei Sun**, University of North Carolina, Chapel Hill

Chair: **Wei Sun**, University of North Carolina, Chapel Hill

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| 3:45 | **Investigating Tumor Heterogeneity to Identify Etiologically Distinct Sub-Types**<br><br>**Colin B. Begg\***, Memorial Sloan Kettering Cancer Center |
| 4:10 | **Statistical Challenges in Cancer Research: Heterogeneity in Functional Imaging and Multi-Dimensional Omics Data**<br><br>**Kim-Anh Do\***, **Thierry Chekouo**, **Francesco Stingo**, **Brian Hobbs**, **Yuan Wang** and **Jianhua Hu**, University of Texas MD Anderson Cancer Center<br>**James Doecke**, CSIRO, Australian e-Health Research Centre, Brisbane, Australia |
| 4:35 | **Accounting for Cellular Heterogeneity is Critical in Epigenome-Wide Association Studies**<br><br>**Rafael Irizzary\***, Harvard University |
| 5:00 | **Modelling Sources of Variability in Single-Cell Transcriptomics Data**<br><br>**Sylvia Richardson\***, MRC Biostatistics Unit Cambridge, UK<br>**Catalina Vallejos**, MRC Biostatistics Unit Cambridge and European Bioinformatics Institute, Hinxton, UK<br>**John Marioni**, European Bioinformatics Institute, Hinxton, UK |
| 5:25 | **Floor Discussion** |

## 89. Innovative Approaches in Competing Risk Analysis

Sponsors: **ENAR**, **ASA Biometrics Section**

Organizer: **Xu Zhang**, University of Mississippi Medical Center

Chair: **Xu Zhang**, University of Mississippi Medical Center

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| 3:45 | **Flexible Modeling of Competing Risks and Cure Rate**<br><br>**Qi Jiang** and **Sanjib Basu\***, Northern Illinois University |
| 4:15 | **Competing Risks Prediction in Two Time Scales**<br><br>**Jason Fine\***, University of North Carolina, Chapel Hill |

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**4:45**  **Checking Fine and Gray's Subdistribution Hazards Model with Cumulative Sums of Residuals**

**Jianing Li**, Medical College of Wisconsin
**Thomas H. Scheike**, University of Copenhagen
**Mei-Jie Zhang***, Medical College of Wisconsin

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**5:15**  **Floor Discussion**

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## 90. Biomarker Evaluation in Diagnostics Studies with Longitudinal Data

Sponsors: **ENAR, ASA Biometrics Section**, **ASA Mental Health Statistics Section**, **ASA Statistical Programmers Section**

Organizer: **Zheyu Wang**, Johns Hopkins University

Chair: **Zheyu Wang**, Johns Hopkins University

**3:45**  **Combination of Longitudinal Biomarkers with Missing Data**

**Danping Liu***, Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health

**4:05**  **Measures to Evaluate Biomarkers as Predictors of Incident Cases**

**Chao-Kang Jason Liang*** and **Patrick J. Heagerty**, University of Washington

**4:25**  **Prediction Accuracy of Longitudinal Marker Measurement**

**Paramita Saha Chaudhuri***, McGill University
**Patrick Heagerty**, University of Washington

**4:45**  **Estimating Time-Dependent Accuracy Measures for Survival Outcome Under Two-Phase Sampling Designs**

**Dandan Liu***, Vanderbilt University
**Tianxi Cai**, Harvard University
**Anna Lok**, University of Michigan
**Yingye Zheng**, Fred Hutchinson Cancer Research Center

**5:05**  **Compression of Longitudinal Genomic Biomarkers for Diagnosis Study**

**Le Bao*** and **Xiaoyue Niu**, The Pennsylvania State University
**Kayee Yeung**, University of Washington

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**5:25**  **Floor Discussion**

★ = *Presenter*   ■ = *Student Award Winner*

## 91. Solving Clinical Trial Problems by using Novel Designs

Sponsors: ENAR, ASA Biopharmaceutical Section

Organizer: Anastasia Ivanova, University of North Carolina, Chapel Hill

Chair: Gheorge Doros, Boston University

**3:45** **Some Design Approaches to Address Missing Data Due to Early Discontinuation in Clinical Trials**

**Sonia M. Davis\***, University of North Carolina, Chapel Hill

**4:15** **Introduction to the Sequential Enriched Design**

**Yeh-Fong Chen\***, U.S. Food and Drug Administration
**Roy Tamura**, University of South Florida

**4:45** **Integrity and Efficiency of Enrichment and Adaptive Trial Design and Analysis Options to Enable Accurate and Precise Signal Detection**

**Marc L. de Somer\***, PPD

**5:15** **Floor Discussion**

## 92. Ensuring Biostatistical Competence using Novel Methods

Sponsor: **ENAR**

Organizer: **Lisa Sullivan**, Boston University

Chair: **Lisa Sullivan**, Boston University

**3:45** **What do Non-Biostatistics Concentrators Need from the Introductory Biostatistics Course?**

**Jacqueline N. Milton\***, Boston University

**4:15** **Creating the Integrated Biostatistics-Epidemiology Core Course: Challenges and Opportunities**

**Melissa D. Begg\***, **Roger D. Vaughan** and **Dana March**, Columbia University

**4:45** **Meeting Public Health Career Goals: Course Options in Biostatistics and Epidemiology**

**Marie Diener-West\***, Johns Hopkins Bloomberg School of Public Health

**5:15** Discussant:

**Lisa Sullivan**, Boston University

## 93. Methodological Frontiers in the Analysis of Panel Observed Data

Sponsor: **IMS**

Organizer: **Rebecca Hubbard**, University of Pennsylvania

Chair: **Rebecca Hubbard**, University of Pennsylvania

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| 3:45 | **Second-Order Models of within-Family Association in Censored Disease Onset Times**<br>**Yujie Zhong*** and **Richard J. Cook**, University of Waterloo |
| 4:10 | **Modeling Cognitive States in the Elderly: The Analysis of Panel Data Using Multi-State Markov and Semi-Markov Processes**<br>**Richard J. Kryscio***, University of Kentucky |
| 4:35 | **Multi-State Models: A Variety of Uses**<br>**Vern Farewell***, MRC Biostatistics Unit, Cambridge, UK |
| 5:00 | **Computationally Simple State Occupancy Probability Estimates for Multi-State Models Under Panel Observation**<br>**Andrew Titman***, Lancaster University |

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| 5:25 | **Floor Discussion** |

## 94. CONTRIBUTED PAPERS: Ordinal and Categorical Data

Sponsor: **ENAR**

Chair: **Haileab Hilafu**, University of Tennessee

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| 3:45 | **Explicit Estimates for Cell Counts and Modeling the Missing Data Indicators in Three-Way Contingency Table by Log-Linear Models**<br>**Haresh D. Rochani***, **Robert L. Vogel**, **Hani M. Samawi** and **Daniel F. Linder**, Georgia Southern University |
| 4:00 | **Additive Interactions and the Metabolic Syndrome**<br>**Matthew J. Gurka*** and **Baqiyyah N. Conway**, West Virginia University<br>**Michael E. Andrew** and **Cecil M. Burchfiel**, National Institute for Occupational Safety and Health (NIOSH)<br>**Mark D. DeBoer**, University of Virginia |
| 4:15 | **Flexible Link Functions in Nonparametric Binary Regression with Gaussian Process Priors**<br>**Dan Li*** and **Xia Wang**, University of Cincinnati<br>**Lizhen Lin**, University of Texas, Austin<br>**Dipak K. Dey**, University of Connecticut |
| 4:30 | **Penalized Non-Linear Principal Components Analysis for Ordinal Variables**<br>**Jan Gertheiss***, Georg August University, Germany |

**✶** = *Presenter*   ■ = *Student Award Winner*

| 4:45 | **Covariance Estimation of Proportion for Missing Dichotomous and Ordinal Data in Randomized Longitudinal Clinical Trial** |
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| | **Siying Li\*** and **Gary Koch**, University of North Carolina, Chapel Hill |
| 5:00 | **Bayesian Nonparametric Multivariate Ordinal Regression** |
| | **Junshu Bao\*** and **Timothy E. Hanson**, University of South Carolina |

| 5:15 | **Floor Discussion** |
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## 95. CONTRIBUTED PAPERS:
## Statistical Genetics

Sponsor: **ENAR**

Chair: **Chi Wang**, University of Kentucky

| 3:45 | **Testing Calibration of Risk Models at Extremes of Disease Risk** |
|------|---|
| | **Minsun Song\***, National Cancer Institute, National Institutes of Health |
| | **Peter Kraft** and **Amit D. Joshi**, Harvard School of Public Health |
| | **Myrto Barrdahl**, German Cancer Research Center (DKFZ) |
| | **Nilanjan Chatterjee**, National Cancer Institute, National Institutes of Health |
| 4:00 | **PLEMT: A Novel Pseudolikelihood Based EM Test for Homogeneity in Generalized Exponential Tilt Mixture Models** |
| | **Chuan Hong**■ and **Yong Chen**, University of Texas School of Public Health, Houston |
| | **Yang Ning**, Princeton University |
| | **Shuang Wang**, Columbia University |
| | **Hao Wu**, Emory University |
| | **Raymond J. Carroll**, Texas A&M University |
| 4:15 | **Regression-Based Methods to Map Quantitative Trait Loci Underlying Function-Valued Phenotypes** |
| | **Il Youp Kwak\***, University of Minnesota |
| | **Karl W. Broman**, University of Wisconsin, Madison |
| 4:30 | **A Framework for Classifying Relationships Using Dense SNP Data and Putative Pedigree Information** |
| | **Zhen Zeng\*** and **Daniel E. Weeks**, University of Pittsburgh |
| | **Wei Chen**, Children's Hospital of Pittsburgh of UPMC |
| | **Nandita Mukhopadhyay** and **Eleanor Feingold**, University of Pittsburgh |
| 4:45 | **A Negative Binomial Model-Based Method for Differential Expression Analysis Based on NanoString nCounter Data** |
| | **Hong Wang\***, **Arnold Stromberg** and **Chi Wang**, University of Kentucky |
| 5:00 | **Two-Stage Bayesian Regional Fine Mapping of a Quantitative Trait** |
| | **Shelley B. Bull\***, University of Toronto and Lunenfeld-Tanenbaum Research Institute |
| | **Zhijian Chen**, Lunenfeld-Tanenbaum Research Institute |
| | **Radu V. Craiu**, University of Toronto |
| 5:15 | **Optimal Ranking Procedures in Large-Scale Inference: Thresholding Families and the r-value** |
| | **Nicholas C. Henderson\*** and **Michael A. Newton**, University of Wisconsin, Madison |

★ = *Presenter*   ■ = *Student Award Winner*

## 96. CONTRIBUTED PAPERS:
### Ecology and Forestry Applications

Sponsor: **ENAR**

Chair: **Min Wang**, Michigan Technological University

**3:45** **A Statistical Framework for the Genetic Dissection of Evolution Induced by Ecological Interactions**

**Cong Xu\***, The Pennsylvania State University
**Libo Jiang** and **Meixia Ye**, Beijing Forestry University
**Rongling Wu**, The Pennsylvania State University

**4:00** **Analysis of Variance of Integro-Differential Equations with Application to Population Dynamics of Cotton Aphids**

**Xueying Wang**, Washington State University
**Jiguo Cao\***, Simon Fraser University
**Jianhua Huang**, Texas A&M University

**4:15** **New Insights into the Usefulness of Robust Singular Value Decomposition in Statistical Genetics: Robust AMMI and GGE Models**

**Paulo Canas Rodrigues\***, Federal University of Bahia, Brazil
**Andreia Monteiro** and **Vanda M. Lourenço**, Nova University of Lisbon, Portugal

**4:30** **A Robust Mixed Linear Model for Heritability Estimation in Plant Studies**

**Vanda M. Lourenço\***, Nova University of Lisbon, Portugal
**Paulo C. Rodrigues**, Federal University of Bahia, Brazil
**Miguel S. Fonseca** and **Ana M. Pires**, University of Lisbon, Portugal

**4:45** **Relating Developmental Transcription Factors (TFs) Based on Drosophila Embryonic Gene Expression Images**

**Siqi Wu\*** and **Antony Joseph**, University of California, Berkeley
**Ann Hammonds**, **William Fisher**, **Richard Weiszmann** and **Susan Celniker**, Lawrence Berkeley National Laboratory
**Bin Yu**, University of California, Berkeley
**Erwin Frise**, Lawrence Berkeley National Laboratory

**5:00** **Cancer Incidence and Superfund Sites in Florida**

**Emily Leary\***, University of Missouri
**Alexander Kirpich**, University of Florida

**5:15** **Floor Discussion**

★ = *Presenter*    ■ = *Student Award Winner*

## 97. CONTRIBUTED PAPERS:
## Pooled Biospecimens and Diagnostic Biomarkers

Sponsor: **ENAR**

Chair: **Qingning Zhou**, University of Missouri

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|---|---|
| 3:45 | **Hierarchical Group Testing for Multiple Infections**<br><br>**Peijie Hou**■ and **Joshua M. Tebbs**, University of South Carolina<br>**Christopher R. Bilder**, University of Nebraska, Lincoln |
| 4:00 | **Keeping Risk Calculators Current**<br><br>**Donna Pauler Ankerst***, Technical University Munich and University of Health Science Center at San Antonio<br>**Andreas Strobl**, Technical University Munich |
| 4:15 | **Evaluation of Multiple Biomarkers in a Two-Stage Group Sequential Design with Early Termination for Futility**<br><br>**Nabihah Tayob***, **Kim-Anh Do** and **Ziding Feng**, University of Texas MD Anderson Cancer Center |
| 4:30 | **Flexible and Accessible Semi-Parametric Methods for Analyzing Pooled Biospecimens**<br><br>**Emily M. Mitchell***, Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health<br>**Robert H. Lyles** and **Amita K. Manatunga**, Emory University<br>**Enrique F. Schisterman**, Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health |
| 4:45 | **Estimating Individualized Diagnostic Rules in the Era of Personalized Medicine**<br><br>**Ying Liu**■ and **Yuanjia Wang**, Columbia University<br>**Chaorui Huang**, Cornell University<br>**Donglin Zeng**, University of North Carolina, Chapel Hill |
| 5:00 | **Analysis of Unmatched Pooled Case-Control Data**<br><br>**Neil J. Perkins***, **Emily M. Mitchell** and **Enrique F. Schisterman**, Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health |
| 5:15 | **Estimating TP53 Mutation Carrier Probability in Families with Li-Fraumeni Syndrome Using LFSpro**<br><br>**Gang Peng*** and **Jasmina Bojadzieva**, University of Texas MD Anderson Cancer Center<br>**Mandy L. Ballinger**, Peter MacCallum Cancer Centre, Melbourne, Australia<br>**David M. Thomas**, The Kinghorn Cancer Centre and Garvan Institute, Sydney, Australia<br>**Louise C. Strong** and **Wenyi Wang**, University of Texas MD Anderson Cancer Center |

## 98. CONTRIBUTED PAPERS:
## Multiple Testing and Variable Selection

Sponsor: **ENAR**

Chair: **Lee H Dicker**, Rutgers University

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|---|---|
| 3:45 | **Bayes Factor Approaches for Hypothesis Testing in ANOVA Models**<br><br>**Min Wang***, Michigan Technological University |
| 4:00 | **A Multifunctional Bayesian Procedure for Detecting Copy Number Variations from Sequencing Read Depths**<br><br>**Yu-Chung Wei***, U.S. Food and Drug Administration and National Chiao Tung University, Taiwan<br>**Guan-Hua Huang**, National Chiao Tung University, Taiwan |
| 4:15 | **Inferring the Global Genetic Architecture of Gene Transcripts from Ultrahigh-Dimensional Molecular Data**<br><br>**Kirk Gosik*** and **Rongling Wu**, The Pennsylvania State University |
| 4:30 | **Statistical Inference for High Dimensional Linear Regression with Linear Constraints and Application to Microbiome Study**<br><br>**Pixu Shi***, **Anru Zhang** and **Hongzhe Li**, University of Pennsylvania |
| 4:45 | **Taking into Account Overrepresented Patterns in Gene Expression Analysis**<br><br>**Megan Orr*** and **Ekua Bentil**, North Dakota State University |
| 5:00 | **Bayesian Screening for Group Differences in Methylation Array Data**<br><br>**Eric F. Lock***, University of Minnesota |
| 5:15 | **Incorporating ENCODE Information into SNP-Based Phenotype Prediction**<br><br>**Yue-Ming Chen*** and **Peng Wei**, University of Texas School of Public Health, Houston |

## 99. CONTRIBUTED PAPERS:
## Parameter Estimation in Hierarchical and
## Non-Linear Models

Sponsor: **ENAR**

Chair: **Jingjing Yin**, Georgia Southern University

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|---|---|
| 3:45 | **A Hierarchical Bayesian Method for Well-Mixed and Two-Zone Models in Industrial Hygiene**<br><br>**Xiaoyue Zhao***, **Susan Arnold**, **Dipankar Bandyopadhyay** and **Gurumurthy Ramachandran**, University of Minnesota<br>**Sudipto Banerjee**, University of California, Los Angeles |
| 4:00 | **Parameter Estimation: A Bayesian Inference Approach**<br><br>**Romarie Morales***, Arizona State University |
| 4:15 | **Bias and Confidence Interval Correction in Four Parameter Logistic Models**<br><br>**Bronlyn Wassink*** and **Tapabrata Maiti**, Michigan State University |

★ = Presenter    ■ = Student Award Winner

**4:30**   **Robust Mixed-Effects Model for Clustered Failure Time Data:**
           **Application to Huntington's Disease Event Measures**

**Tanya P. Garcia***, Texas A&M University
**Yanyuan Ma**, University of South Carolina
**Yuanjia Wang** and **Karen Marder**, Columbia University

**4:45**   **Stacked Survival Models for Censored Quantile Regression**

**Kyle Rudser***, University of Minnesota
**Andrew Wey**, University of Hawaii
**John Connett**, University of Minnesota

**5:00**   **The CoGaussian Distribution: A Model for Right Skewed Data**

**Govind S. Mudholkar** and **Ziji Yu***, University of Rochester
**Saria S. Awadalla**, University of Chicago

**5:15**   **Floor Discussion**

# WEDNESDAY, MARCH 18

**8:30 – 10:15 am**

## 100. New Statistical Methods in the Environmental Health Sciences

Sponsors: **ENAR**, **ASA Biometrics Section**

Organizers: **Brisa Sanchez** and **Peter X.K. Song**, University of Michigan

Chair: **Wen Ye**, University of Michigan

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|---|---|
| 8:30 | **Dynamic Location Data and Exposure to Environmental Pathogens**<br>**Lance A. Waller***, Emory University<br>**Mevin B. Hooten**, Colorado State University |
| 8:55 | **New Statistical Models to Detect Vulnerable Prenatal Window to Carcinogenic Polycyclic Aromatic Hydrocarbons on Fetal Growth**<br>**Lu Wang***, University of Michigan |
| 9:20 | **Dimension Reduction for Spatially Misaligned Multivariate Air Pollution Data**<br>**Adam Szpiro***, University of Washington |
| 9:45 | **Evaluating Alterations in Regression Coefficients Directed by Toxicant Mixtures**<br>**Peter X.K. Song***, University of Michigan<br>**Shujie Ma**, University of California, Riverside |

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|---|---|
| 10:10 | **Floor Discussion** |

## 101. Novel Phase II and III Clinical Trial Designs for Cancer Research that Incorporate Biomarkers and Nonstandard Endpoints

Sponsor: **ENAR**

Organizer: **Sujata Patil**, Memorial Sloan Kettering Cancer Center

Chair: **Nichole Carlson**, University of Colorado, Denver

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|---|---|
| 8:30 | **Novel Phase II and III Designs for Oncology Clinical Trials, with a Focus on Biomarker Validation**<br>**Daniel J. Sargent***, Mayo Clinic |
| 8:55 | **Stratified Single Arm Phase 2 Design for Finding a Biomarker Group that Benefits from Treatment**<br>**Irina Ostrovnaya*** and **Emily Zabor**, Memorial Sloan Kettering Cancer Center |

★ = *Presenter*    ■ = *Student Award Winner*

| 9:20 | **Lung-MAP: A Phase II/III Biomarker-Driven Master Protocol for Second Line Therapy of Squamous Cell Lung Cancer** |
|---|---|
| | **Mary W. Redman***, Fred Hutchinson Cancer Research Center |
| 9:45 | **Randomized Phase II Design to Study Therapies Designed to Control Growth of Brain Metastases in Cancer Patients** |
| | **Sujata M. Patil***, Memorial Sloan-Kettering Cancer Center |

| 10:10 | **Floor Discussion** |
|---|---|

## 102. Novel Statistical Methods to Decipher Gene Regulation using Sequence Data

Sponsor: **ENAR**

Organizer: **Hongyu Zhao**, Yale University

Chair: **Hongyu Zhao**, Yale University

| 8:30 | **On the Detection of Nonlinear and Interactive Relationships in Genomic Data** |
|---|---|
| | **Bo Jiang** and **Jun Liu***, Harvard University |
| 8:55 | **Statistical Analysis of Differential Alternative Splicing Using RNA-Seq Data** |
| | **Mingyao Li***, **Yu Hu** and **Cheng Jia**, University of Pennsylvania |
| 9:20 | **A Case Study of RNA-Seq Data in Breast Cancer Patients** |
| | **Wei Sun***, University of North Carolina, Chapel Hill |
| 9:45 | **Unit-Free and Robust Detection of Differential Expression from RNA-Seq Data** |
| | **Hui Jiang***, University of Michigan |

| 10:10 | **Floor Discussion** |
|---|---|

## 103. Flow Cytometry: Data Collection and Statistical Analysis

Sponsor: **ENAR**

Organizer: **Monnie McGee**, Southern Methodist University

Chair: **Monnie McGee**, Southern Methodist University

| 8:30 | **Flow, Mass and Imaging Cytometry for Single Cell Analysis: A Fertile Field for Biostatistics Research** |
|---|---|
| | **Richard H. Scheuermann***, J. Craig Venter Institute and University of California, San Diego |
| | **Yu Qian**, J. Craig Venter Institute |
| | **Chiaowen Hsiao**, University of Maryland, College Park |
| | **Monnie McGee**, Southern Methodist University |

| 8:55 | **Bimolecular Reaction, Data Types, and an Alternative Model to the Smoluchowski Theory** |
|---|---|
| | **Hong Qian***, University of Washington |

| 9:20 | **Mapping Cell Populations in Flow Cytometry Data for Cross-Sample Comparison Using the Friedman-Rafsky Test** |
|---|---|
| | **Chiaowen Joyce Hsiao***, University of Maryland, College Park |
| | **Mengya Liu**, Southern Methodist University |
| | **Rick Stanton**, J. Craig Venter Institute |
| | **Monnie McGee**, Southern Methodist University |
| | **Yu Qian**, J. Craig Venter Institute |
| | **Richard H. Scheuermann**, J. Craig Venter Institute and University of California, San Diego |

| 9:45 | **A Novel Approach to Modeling Immunology Data Derived from Flow Cytometry** |
|---|---|
| | **Jacob A. Turner***, Baylor Institute for Immunology Research |

| 10:10 | Discussant: |
|---|---|
| | **Monnie McGee**, Southern Methodist University |

## 104. Statistical Methods in Chronic Kidney Disease

Sponsor: **ENAR**

Organizer: **Dawei Xie**, University of Pennsylvania

Chair: **Wensheng Guo**, University of Pennsylvania

| 8:30 | **Joint Modeling of Kidney Function Decline, End Stage Kidney Disease (ESRD), and Death with Special Consideration of Competing Risks** |
|---|---|
| | **Dawei Xie*** and **Wensheng Guo**, University of Pennsylvania |
| | **Wei Yang**, Merrill Lynch |
| | **Qiang Pan**, University of Pennsylvania |

| 9:00 | **Joint Multiple Imputation for Longitudinal Outcomes and Clinical Events which Truncate Longitudinal Follow-Up** |
|---|---|
| | **Bo Hu***, Cleveland Clinic |
| | **Liang Li**, University of Texas MD Anderson Cancer Center |
| | **Tom Greene**, University of Utah |

| 9:30 | **Modeling the Effect of Blood Pressure on Disease Progression in Chronic Kidney Disease Using Multistate Marginal Structural Models** |
|---|---|
| | **Alisa J. Stephens***, **Wei Peter Yang** and **Marshall M. Joffe**, University of Pennsylvania |
| | **Tom H. Greene**, University of Utah |

| 10:00 | **Dynamic Prediction of Clinical Events Using Longitudinal Biomarkers in a Cohort Study of Chronic Renal Disease** |
|---|---|
| | **Liang Li***, University of Texas MD Anderson Cancer Center |

★ = *Presenter*     ■ = *Student Award Winner*

## 105. Challenging Statistical Issues in Imaging

Sponsors: **ENAR**, **ASA Section on Statistics in Imaging**,
**ASA Statistical Learning and Data Mining Section**

Organizer: **Haipeng Shen** and **Hongtu Zhu**, University of North Carolina, Chapel Hill

Chair: **Hongtu Zhu**, University of North Carolina, Chapel Hill

**8:30** **Relating Developmental Transcription Factors Based on Drosophila Embryonic Gene Expression Images**

**Bin Yu\***, University of California, Berkeley

**8:55** **Analysis of Point Pattern Imaging Data using Log Gaussian Cox Processes with Spatially Varying Coefficients**

**Timothy D. Johnson\***, University of Michigan
**Thomas E. Nichols**, University of Warwick

**9:20** **Fiber Direction Estimation in Diffusion MRI**

**Raymond Wong\***, Iowa State University

**9:45** **FVGWAS: Fast Voxelwise Genome Wide Association Analysis of Large-Scale Imaging Genetic Data**

**Hongtu Zhu\*** and **Meiyang Chen**, University of North Carolina, Chapel Hill
**Thomas Nichols**, University of Warwick
**Chao Huang**, **Yu Yang** and **Zhaohua Lu**, University of North Carolina, Chapel Hill
**Qianjing Feng**, Southern Medical University
**Rebecca C. Knickmeyer**, University of North Carolina, Chapel Hill

**10:10** **Floor Discussion**

## 106. Statistical Methods for Predicting Subgroup Level Treatment Response

Sponsor: **IMS**

Organizer: **Tianxi Cai**, Harvard University

Chair: **Jennifer Anne Sinnot**, Harvard School of Public Health

**8:30** **A Regression Tree Approach to Identifying Subgroups with Differential Treatment Effects**

**Wei-Yin Loh\***, University of Wisconsin, Madison

**8:55** **Increasing Efficiency for Estimating Treatment-Biomarker Interactions with Historical Data**

**Jeremy MG Taylor\***, **Philip S. Boonstra** and **Bhramar Mukherjee**,
University of Michigan

**9:20** **Feature Elimination for Reinforcement Learning Methods**

**Sayan Dasgupta\***, Fred Hutchinson Cancer Research Center
**Michael R. Kosorok**, University of North Carolina, Chapel Hill

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**\*** = *Presenter*   ■ = *Student Award Winner*

**9:45**  **Adaptive Designs for Developing and Validating Predictive Biomarkers**

**Noah Simon**, University of Washington
**Richard M. Simon***, National Cancer Institute, National Institutes of Health

**10:10**  **Floor Discussion**

## 107. CONTRIBUTED PAPERS:
## ROC Curves

Sponsor: **ENAR**

Chair: **Philip M Westgate**, University of Kentucky

**8:30**  **Improved Estimation of Diagnostic Cut-Off Point Associated with Youden Index Using Ranked Set Sampling**

**Jingjing Yin***, **Hani Samawi**, **Chen Mo** and **Daniel Linder**, Georgia Southern University

**8:45**  **A Better Confidence Interval for the Sensitivity at a Fixed Level of Specificity for Diagnostic Tests with Continuous Endpoints**

**Guogen Shan***, University of Nevada Las Vegas

**9:00**  **Simpson's Paradox in the IDI**

**Jonathan Chipman***, Vanderbilt University
**Danielle Braun**, Dana-Farber Cancer Institute

**9:15**  **A Nonparametric Test Based on t-Distribution for Comparing Two Correlated C Indices with Right-Censored Survival Outcome or AUCs with Dichotomous Outcome**

**Le Kang*** and **Shumei Sun**, Virginia Commonwealth University

**9:30**  **Latent Mixture Models for Ordered ROC Curves Using the Scale Mixture of Normal Distributions**

**Zhen Chen*** and **Sungduk Kim**, Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health

**9:45**  **Least Squares ROC Method for Tests with the Absence of the Gold Standard**

**Larry Tang***, George Mason University and National Institutes of Health Clinical Center
**Minh Huynh**, Department of Labor and National Institutes of Health Clinical Center
**Xuan Che** and **Elizabeth K. Rasch**, Epidemiology and Biostatistics, National Institutes of Health Clinical Center
**Ao Yuan**, Georgetown University

**10:00**  **Floor Discussion**

***** = Presenter    ■ = Student Award Winner

## 108. CONTRIBUTED PAPERS:
## Personalized Medicine and Biomarkers

Sponsor: **ENAR**

Chair: **Anjana Grandhi**, New Jersey Institute of Technology

**8:30**    **Using Decision Lists to Construct Interpretable and Parsimonious Treatment Regimes**

**Yichi Zhang**■, **Eric Laber**, **Anastasios Tsiatis** and **Marie Davidian**, North Carolina State University

**8:45**    **Synthesizing Genetic Markers for Incorporation into Clinical Risk Prediction Tools**

**Sonja Grill***, Technical University Munich, Germany
**Donna P. Ankerst**, Technical University Munich, Germany and University of Texas Health Science Center at San Antonio

**9:00**    **A PRIM Approach to Predictive-Signature Development for Patient Stratification**

**Gong Chen***, Roche TCRC, Inc.
**Hua Zhong**, New York University School of Medicine
**Anton Belousov**, Roche Diagnostics GmbH
**Viswanath Devanarayan**, AbbVie, Inc.

**9:15**    **On Estimation of Optimal Treatment Regimes for Maximizing t-Year Survival Probability**

**Runchao Jiang**■, **Wenbin Lu**, **Rui Song** and **Marie Davidian**, North Carolina State University

**9:30**    **Evaluation of Novel Biomarkers when Limited by Small Sample Size**

**Bethany J. Wolf***, **John Christian Spainhour** and **Jim C. Oates**, Medical University of South Carolina

**9:45**    **Calibrate Variations in Biomarker Measures for Improving Prediction**

**Cheng Zheng***, University of Wisconsin, Milwaukee
**Yingye Zheng**, Fred Hutchinson Cancer Research Center

**10:00**    **Building Small, Robust Gene Signatures to Predict Prognosis**

**Prasad Patil*** and **Jeffrey T. Leek**, Johns Hopkins University

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## 109. CONTRIBUTED PAPERS:
## Time Series Analysis and Methods

Sponsor: **ENAR**

Chair: **Haiwen Shi**, U.S. Food and Drug Administration

**8:30**  **Robust Portfolio Optimization Under High Dimensional Heavy-Tailed Time Series**

**Huitong Qiu\*** and **Fang Han**, Johns Hopkins University
**Han Liu**, Princeton University
**Brian Caffo**, Johns Hopkins University

**8:45**  **Change-Point Detection in EEG Spectra for Informed Frequency Band Selection**

**Anna Louise Schroeder\***, London School of Economics
**Hernando Ombao**, University of California, Irvine

**9:00**  **Time Series Analysis for Symbolic-Valued Data**

**S. Yaser Samadi\***, Southern Illinois University
**Lynne Billard**, University of Georgia

**9:15**  **High Dimensional State Space Model with L-1 and L-2 Penalties**

**Shaojie Chen\*** and **Joshua Vogelstein**, Johns Hopkins University
**Seonjoo Lee**, Columbia University
**Martin Lindquist** and **Brian Caffo**, Johns Hopkins University

**9:30**  **Autoregressive Models for Spherical Data with Applications in Protein Structure Analysis**

**Daniel Hernandez-Stumpfhauser\***, University of North Carolina, Chapel Hill
**F. Jay Breidt** and **Mark van der Woerd**, Colorado State University

**9:45**  **Modeling Serial Covariance Structure in Semiparametric Linear Mixed-Effects Regression for Longitudinal Data**

**Changming Xia\***, University of Rochester Medical Center
**Hua Liang**, The George Washington University
**Sally W. Thurston**, University of Rochester Medical Center

**10:00**  **Floor Discussion**

ENAR
2015

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# WEDNESDAY, MARCH 18

**10:15 – 10:30 am — Refreshment Break with Our Exhibitors**

**10:30 am – 12:15 pm**

## 110. Incorporating Biological Information in Statistical Modeling of Genome-Scale Data with Complex Structures

Sponsor: **ENAR**

Organizer: **Mingyao Li**, University of Pennsylvania

Chair: **Mingyao Li**, University of Pennsylvania

**10:30**  **Prioritizing GWAS Results by Integrating Pleiotropy and Annotation**

**Hongyu Zhao\***, Yale School of Public Health
**Dongjun Chung**, Medical University of South Carolina
**Can Yang**, Hong Kong Baptist University
**Cong Li** and **Qian Wang**, Yale University
**Joel Gelernter**, Yale School of Medicine

**10:55**  **Challenges and Solutions for Whole Exome Sequence Analysis for Pedigree and External Control Data**

**Daniel J. Schaid\***, Mayo Clinic

**11:20**  **Big Data Methods for Dissecting Variations in High-Throughput Genomic Data**

**Fang Du**, **Bing He** and **Hongkai Ji\***, Johns Hopkins Bloomberg School of Public Health

**11:45**  **Model-Based Approach for Species Quantification and Differential Abundance Analysis Based on Shotgun Metagenomic Data**

**Hongzhe Li\***, University of Pennsylvania

**12:10**  **Floor Discussion**

## 111. Emerging Issues in Clinical Trials and High Dimensional Data

Sponsors: **ENAR**, **ASA Biopharmaceutical Section**

Organizer: **Qingxia (Cindy) Chen**, Vanderbilt University

Chair: **Qingxia (Cindy) Chen**, Vanderbilt University

**10:30**  **Assessing Covariate Effects with the Monotone Partial Likelihood Using Jeffreys' Prior in the Cox Model**

**Ming-Hui Chen\***, University of Connecticut
**Mario de Castro**, Universidade de Sao Paulo
**Jing Wu** and **Elizabeth D. Schifano**, University of Connecticut

★ = *Presenter* ■ = *Student Award Winner*

**10:55** **Assessing Temporal Agreement between Central and Local Progression-Free Survival Times**

**Donglin Zeng\*** and **Emil Cornea**, University of North Carolina, Chapel Hill
**Jun Dong** and **Jean Pan**, Amgen Inc.
**Joseph Ibrahim**, University of North Carolina, Chapel Hill

**11:20** **Statistical Design of Non-Inferiority Multiple Region Clinical Trials to Assess Global and Consistent Treatment Effects**

**Guoqing Diao\***, George Mason University
**Donglin Zeng** and **Joseph G. Ibrahim**, University of North Carolina, Chapel Hill
**Alan Rong**, **Oliver Lee** and **Kathy Zhang**, Amgen Inc.
**Qingxia Chen**, Vanderbilt University

**11:45** **Bayesian Shrinkage Methods for High Dimensional Data**

**Joseph G. Ibrahim\*** and **Hongtu Zhu**, University of North Carolina, Chapel Hill
**Zakaria Khondker**, Medivation, Inc.
**Zhaohua Lu**, University of North Carolina, Chapel Hill

**12:10** **Floor Discussion**

## 112. Advances in Repeated Measures and Longitudinal Data Analysis

Sponsor: **ENAR**

Organizer: **Sanjoy Sinha**, Carleton University

Chair: **Sanjoy Sinha**, Carleton University

**10:30** **Joint Modelling of Different Types of Longitudinal Data with Outliers and Censoring**

**Lang Wu\***, University of British Columbia

**10:55** **A Hidden Markov Model for Non-Ignorable Non-Monotone Missing Longitudinal Data for Medical Studies of Quality of Life**

**Kaijun Liao**, Hisun Pharmaceuticals USA
**Qiang Zhang**, Radiation Therapy Oncology Group
**Andrea B. Troxel\***, University of Pennsylvania Perelman School of Medicine

**11:20** **Inverse Weighted Estimating Equations for Repeated Measures in Tranfusion Medicine**

**Richard Cook\***, University of Waterloo

**11:45** **Joint Modelling of Nonignorable Missing Longitudinal Outcomes and Time-to-Event Data**

**Sanjoy Sinha\***, Carleton University

**12:10** **Floor Discussion**

✱ = *Presenter*    ■ = *Student Award Winner*

## 113. Advances in Modeling Zero-Inflated Data

Sponsors: **ENAR**, **ASA Mental Health Statistics Section**

Organizer: **Brian Neelon**, Duke University

Chair: **James O'Malley**, Dartmouth University

**10:30**    **Bayesian Two-Part Spatial Models for Semicontinuous Data**

**Brian Neelon***, Duke University
**Li Zhu**, University of Pittsburgh
**Sara Benjamin**, Duke University

**10:55**    **Zero-Inflated Frailty Model for Recurrent Event Data**

**Lei Liu***, Northwestern University
**Xuelin Huang**, University of Texas MD Anderson Cancer Center
**Alex Yaroshinsky**, Vital Systems Inc.

**11:20**    **Two-Part Models for Rolling Admission Group Therapy Data**

**Lane F. Burgette*** and **Susan M. Paddock**, RAND Corporation

**11:45**    **A Marginalized Two-Part Model for Semicontinuous Data**

**Valerie A. Smith***, Center for Health Services Research in Primary Care, Durham VAMC and University of North Carolina, Chapel Hill
**John S. Preisser**, University of North Carolina, Chapel Hill
**Brian Neelon**, Duke University
**Matthew L. Maciejewski**, Center for Health Services Research in Primary Care, Durham VAMC

**12:10**    **Floor Discussion**

## 114. New Developments in Missing Data Analysis: From Theory to Practice

Sponsors: **ENAR**, **ASA Survey Research and Methodology Section**

Organizer: **Lihong Qi**, University of California, Davis

Chair: **Yi Li**, University of Michigan

**10:30**    **Competing Risks Regression with Missing Data in the Prognostic Factors**

**Federico Ambrogi***, University of Milan
**Thomas H. Scheike**, University of Copenhagen

**10:55**    **Comparison of Multiple Imputation via Chained Equations and General Location Model for Accelerated Failure Time Models with Missing Covariates**

**Lihong Qi***, University of California, Davis
**Yulei He**, Centers for Disease Control and Prevention
**Rongqi Chen**, **Ying-Fang Wang** and **Xiaowei Yang**, University of California, Davis

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✱ = *Presenter*    ■ = *Student Award Winner*      <span style="color:#0070a0">**Preliminary Program**</span>    <span style="color:#c0006f">**113**</span>

**11:20**   **The Effect of Data Clustering on the Multiple Imputation Variance Estimator**

**Yulei He\***, **Iris Shimizu**, **Susan Schappert**, **Nathaniel Schenker**, **Vladislav Beresovsky**, **Diba Khan** and **Roberto Valverde**, Centers for Disease Control and Prevention

**11:45**   **Fractional Hot Deck Imputation for Multivariate Missing Data in Survey Sampling**

**Jae kwang Kim\*** and **Wayne A. Fuller**, Iowa State University

**12:10**   **Floor Discussion**

## 115. Environmental Methods with Deterministic and Stochastic Components

Sponsor: **ENAR**

Organizer: **Ed Boone**, Virginia Commonwealth University

Chair: **Ed Boone**, Virginia Commonwealth University

**10:30**   **High Resolution Nonstationary Random Field Simulation**

**William Kleiber\***, University of Colorado, Boulder

**10:50**   **Estimating Parameters in Delay Differential Equation Models**

**Liangliang Wang\*** and **Jiguo Cao**, Simon Fraser University

**11:10**   **Zero-Inflated Spatial Temporal Models for Exploring Trend in Comandra Blister Rust Infection in Lodge Pole Pine Trees**

**Cindy Feng\***, University of Saskatchewan

**11:30**   **A Spatio-Temporal Approach to Modeling Spatial Covariance**

**Ephraim M. Hanks\***, The Pennsylvania State University

**11:50**   **Incorporating Covariates in Deterministic Environmental Models**

**Edward L. Boone\***, Virginia Commonwealth University
**Ben Stewart-Koster**, Australian Rivers Institute at Griffith University

**12:10**   **Floor Discussion**

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## 116. Bayesian and Non-Parametric Bayesian Approaches to Causal Inference

Sponsor: **IMS**

Organizer: **Peter Mueller**, University of Texas, Austin

Chair: **Peter Mueller**, University of Texas, Austin

**10:30**  **A Framework for Bayesian Nonparametric Inference for Causal Effects of Mediation**

**Chanmin Kim**, Harvard University
**Michael J. Daniels***, University of Texas, Austin
**Jason Roy**, University of Pennsylvania

**10:55**  **A Bayesian Nonparametric Causal Model for Regression Discontinuity Designs**

**George Karabatsos***, University of Illinois, Chicago
**Stephen G. Walker**, University of Texas, Austin

**11:20**  **Evaluating the Effect of University Grants on Student Dropout: Evidence from a Regression Discontinuity Design Using Bayesian Principal Stratification Analysis**

**Fan Li***, Duke University
**Alessandra Mattei** and **Fabrizia Mealli**, University of Florence

**11:45**  **Bayesian Nonparametric Estimation for Dynamic Treatment Regimes with Sequential Transition Times**

**Yanxun Xu*** and **Peter Mueller**, University of Texas, Austin
**Abdus S. Wahed**, University of Pittsburgh
**Peter F. Thall**, University of Texas MD Anderson Cancer Center

**12:10**  **Floor Discussion**

## 117. Design of Multiregional Clinical Trials: Theory and Practice

Sponsor: **ENAR**

Organizer: **Gordon Lan**, Janssen Research & Development

Chair: **Gordon Lan**, Janssen Research & Development

**10:30**  **Random Effects Models for Multiregional Clinical Trial Design and Analysis**

**Gordon Lan***, Janssen Research & Development

**11:15**  **Consistency of Treatment Effect in Multiregional Clinical Trials**

**Joshua Chen***, Sanofi Pasteur

**11:50**  Discussant:

**Fei Chen**, Janssen R&D, Johnson & Johnson

**12:05**  **Floor Discussion**

**★** = *Presenter*  ■ = *Student Award Winner*

## 118. CONTRIBUTED PAPERS:
## Multivariate Survival Analysis

Sponsor: **ENAR**

Chair: **Minsun Song**, National Cancer Institute, National Institutes of Health

**10:30**   **A Sieve Semiparametric Maximum Likelihood Approach for Regression Analysis of Bivariate Interval-Censored Failure Time Data**

**Qingning Zhou\***, University of Missouri
**Tao Hu**, Capital Normal University
**Jianguo Sun**, University of Missouri

**10:45**   **Methods for Contrasting Gap Time Hazard Functions**

**Xu Shu\*** and **Douglas E. Schaubel**, University of Michigan

**11:00**   **Using Full Cohort Information to Improve the Effciency of Multivariate Marginal Hazard Model for Case-Cohort Studies**

**Hongtao Zhang\***, **Jianwen Cai**, **Haibo Zhou** and **David Couper**, University of North Carolina, Chapel Hill

**11:15**   **Marginal Models for Restricted Mean Survival with Clustered Time to Event Data Using Pseudo-Values**

**Brent R. Logan\*** and **Kwang Woo Ahn**, Medical College of Wisconsin

**11:30**   **Semi-Parametric Modeling of Bivariate Recurrent Events**

**Jing Yang\*** and **Limin Peng**, Emory University

**11:45**   **Analysis of a Composite Endpoint Under Different Censoring Schemes for Component Events via Multiple Imputation**

**Yuqi Chen\***, University of California, Santa Barbara
**Chunlei Ke**, Amgen Inc.
**Jianming Wang**, Celgene Corporation

**12:00**   **Quantile Regression for Survival Data with Delayed Entry**

**Boqin Sun\*** and **Jing Qian**, University of Massachusetts, Amherst

## 119. CONTRIBUTED PAPERS:
## Constrained Inference

Sponsor: **ENAR**

Chair: **Emily Leary**, University of Missouri

**10:30**   **Order Statistics from Lindley Distribution and their Applications**

**Khalaf S. Sultan\*** and **Wafaa S. AL-Thubyani**, College of Science
King Saud University, Saudi Arabia

**10:45**   **CLME: A Tool for Inference in Linear Mixed Effects Models Under Inequality Constraints**

**Casey M. Jelsema\*** and **Shyamal D. Peddada**, National Institute of Environmental Health Sciences, National Institutes of Health

**11:00**   **Benchmarked Bayesian Methods in Multiplicative Unit-Level Models**

**Jiyoun Myung\***, University of Florida

★ = *Presenter*   ■ = *Student Award Winner*

| 11:15 | **Order-Constrained Bayesian Nonparametric Modeling of Correlated Three-Way ROC Surfaces** |
|---|---|
| | **Beomseuk Hwang\*** and **Zhen Chen**, Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health |
| 11:30 | **Partial Likelihood Estimation of Isotonic Proportional Hazards Models** |
| | **Yunro Chung\***, **Anastasia Ivanova**, **Michael Hudgens** and **Jason Fine**, University of North Carolina, Chapel Hill |
| 11:45 | **Nonparametric Tests of Uniform Stochastic Ordering** |
| | **Chuan-Fa Tang\***, **Joshua M. Tebbs** and **Dewei Wang**, University of South Carolina |
| 12:00 | **Covariate Balanced Restricted Randomization: Optimal Designs, Exact Tests, and Asymptotic Properties** |
| | **Jingjing Zou\*** and **Jose R. Zubizarreta**, Columbia University |

## 120. CONTRIBUTED PAPERS: Nonparametric Methods

Sponsor: **ENAR**

Chair: **Nabihah Tayob**, University of Texas MD Anderson Cancer Center

| 10:30 | **Nonparametric and Semiparametric Estimation in Multiple Covariates** |
|---|---|
| | **Richard Charnigo\***, University of Kentucky<br>**Limin Feng**, Intel Corporation<br>**Cidambi Srinivasan**, University of Kentucky |
| 10:45 | **Nonparametric Empirical Bayes via Maximum Likelihood for High-Dimensional Classification** |
| | **Lee H. Dicker\***, Rutgers University<br>**Sihai D. Zhao**, University of Illinois, Urbana-Champaign<br>**Long Feng**, Rutgers University |
| 11:00 | **Nonparametric Inference for an Inverse-Probability-Weighted Estimator with Doubly Truncated Data** |
| | **Xu Zhang\***, University of Mississippi Medical Center |
| 11:15 | **Scalable Bayesian Nonparametric Learning for High-Dimensional Lung Cancer Genomics Data** |
| | **Chiyu Gu** and **Subharup Guha\***, University of Missouri<br>**Veerabhadran Baladandayuthapani**, University of Texas MD Anderson Cancer Center |
| 11:30 | **A Test For Directional Departure From Loewe Additivity** |
| | **Mingyu Xi\***, University of Maryland, Baltimore County |
| 11:45 | **Estimation and Confidence Bands for Nonparametric Regression with Functional Responses and Multiple Scalar Covariates** |
| | **Andrada E. Ivanescu\***, Montclair State University |
| 12:00 | **Nonparameteric Bayesian Analysis of The 2 Sample Problem with Censoring** |
| | **Kan Shang\*** and **Cavan Sheerin Reilly**, University of Minnesota |

# ENAR 2015
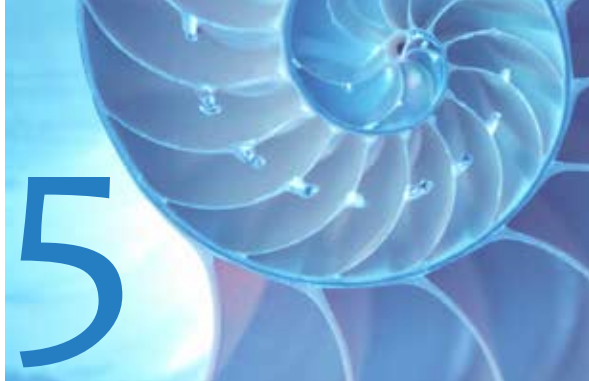
## Short Courses

| | REGISTRATION PAYMENT RECEIVED | | | | | |
|---|---|---|---|---|---|---|
| | BY February 8 | | | AFTER February 8 | | |
| | HALF DAY | SECOND HALF DAY | FULL DAY | HALF DAY | SECOND HALF DAY | FULL DAY |
| Member | $ 225 | $ 190 | $ 325 | $ 250 | $ 215 | $ 350 |
| Nonmember | $ 275 | $ 240 | $ 375 | $ 300 | $ 265 | $ 400 |

## SC1:
## Bayesian Clinical Trials
### FULL DAY | 8:00 am to 5:00 pm

### David Draper
University of California, Santa Cruz

### Overview
Experiments that would today be recognized as clinical trials have been performed at least since the 1740s (with James Lind's demonstration that citrus fruits cure scurvy). From the late 19th century through the 1990s, sound inferential design and analysis of clinical trials has largely been based on the frequentist probability paradigm, but there has been a recent recognition that Bayesian methods can offer significant advantages in both design and analysis.

### The course
– Optimal Bayesian design of clinical trials: sequential designs, adaptive designs; the use of Bayesian decision theory for optimal design
– Optimal Bayesian analysis of clinical trial outcomes: what optimal analysis is, when it can be achieved, and how to achieve it when it's possible

– Well-calibrated Bayesian clinical trial analyses; appropriate use of prior distributions
– Drawing valid causal conclusions with Bayesian analyses of observational clinical studies
– Bayesian meta-analysis for combining information

## SC2:
## Statistical Methods for fMRI and EEG Data Analysis
### FULL DAY | 8:00 am to 5:00 pm

### Martin Lindquist
Johns Hopkins School of Public Health

### Hernando Ombao
University of California, Irvine

### Overview
This course will cover the state-of-the-art techniques and statistical approaches for analyzing fMRI and EEG data. Though there are many types of brain imaging modalities, these two are the most common. This course will be scheduled for 4 hours and will be divided into 2 parts: the first devoted to analyzing fMRI data and the second to EEG data.

**The topics in the fMRI section include:**

(a) an overview of the acquisition and reconstruction of fMRI data

(b) overview of the physiological basis of the fMRI signal

(c) common experimental designs

(d) pre-processing steps

(e) methods for localizing areas activated by a task

(f) connectivity analysis

(g) prediction and brain decoding.

**The topics for the EEG section are:**

(a) overview of the physiological basis of the EEG signal

(b) common experimental designs

(c) pre-processing steps including artifact rejection and filtering

(d) spectral analysis

(e) coherence and connectivity analysis

(f) statistical approaches to modeling variation across trials and subjects

(g) source localization.

## SC3:
## Design Considerations in Early Phase Clinical Trials: Phase I, Phase I/II Trials
### FULL DAY | 8:00 am to 5:00 pm

### John O'Quigley
University Pierre and Marie Curie, Paris, France

### Alexia Iasonos
Memorial Sloan Kettering Cancer Center

### Overview
This course will cover design considerations specific to Phase I and Phase I/II clinical trials, dose finding studies in humans (not in healthy volunteers), in various disease settings. The topic is receiving increased attention in the statistical literature and as a result there exist several new designs that can be made use of in any given situation. The workshop will start with a review of the aims of Phase I trials, Phase I trials with expansion cohorts, Ph I/II trials and provide a link between the aims, designs, and

methods of analysis. The workshop will focus on more advanced statistical topics such as studies involving more than one drug or schedule, patient heterogeneity, and bridging studies. Monitoring safety and efficacy simultaneously in dose expansion cohorts or as part of a Phase I/II trial will also be discussed as Phase I trials are increasingly including aiming to further characterize the toxicity and efficacy profile. Illustrations on how to use model based designs, implement and carry out a model based Phase I trial in practice will be provided based on actual studies from oncology. Computational considerations and available software will also be discussed.

### The course
– Overview of Phase I designs

– Basic theory of model based designs

– How good can a design be? Defining optimal performance

– Approaches to non-binary outcomes

– More complex problems: drug combinations, patient heterogeneity

– Dose expansion cohorts

– Phase I/II; estimating toxicity and efficacy in the presence of bivariate endpoints

– Statistical Theory (retrospective vs. prospective analysis, convergence, model robustness)

– Protocol development, review of available software

## SC4:
## Personalized Medicine and Dynamic Treatment Regimes
### HALF DAY | 8:00 am to 12:00 noon

### Marie Davidian
North Carolina State University

### Butch Tsiatis
North Carolina State University

### Overview
Personalized medicine is focused on making treatment decisions for an individual patient based on his/her genetic/genomic, clinical, and other characteristics. Traditional approaches to this goal seek to develop new treatments that are tailored to specific subgroups of patients with unique characteristics. An alternative objective is to determine the best treatment for each patient, not only those in a small subgroup, to the benefit of the entire patient population.

This course will take this point of view and introduce basic concepts and methods for discovery of dynamic treatment regimes based on data. In the simplest case of a single treatment decision, a dynamic treatment regime

is a rule that assigns treatment to patients based on their own characteristics, and the goal is to find the optimal regime, that leading to the greatest benefit if followed by all patients. In chronic diseases and disorders such as cancer, treatment decisions may be made at multiple time points. In this setting, a dynamic treatment regime is a set of sequential such decision rules corresponding to each decision point, and the optimal regime is the set of rules that would lead to greatest benefit if followed over the entire course of decision making by all patients.

## SC5:
## Data Science and High-Performance Statistical Computing
### HALF DAY | 1:00 pm to 5:00 pm

### Marc A. Suchard
UCLA School of Public Health

### Martijn J. Schmuemie
Johnson & Johnson

### Overview
Healthcare data are a prime research target for the Data Sciences because most databases are not only massive in size, but also very highly complex due to issues in sampling, the recording process, dependency through time and across individuals, and privacy in biomedicine. The size and complexity of these data present challenges to traditional statistical analysis that require novel method development and high-performance computing for scalability.

This course explores recent advances in large-scale statistical inference in healthcare as an example of Big Data in the Data Sciences. The course takes 4 hours and is divided into didactic lectures and hands-on, computing tutorials. Topics include massive observational healthcare databasing and wrangling, scaling inference tools that incorporate complex data structure, and high-performance implementation using emerging computing technology. To this end, participants will use and develop open-source R packages, learn important design patterns for statistical computing, and discuss delegation of performance dependent hot-spots to C/C++ with multi-core and many-core parallelization (including on graphics processing units).

# ENAR 2015

## Tutorials

| | REGISTRATION PAYMENT RECEIVED | |
| --- | --- | --- |
| | **BY February 8** | **AFTER February 8** |
| | T1–T6 | T1–T6 |
| Member | $ 75 | $ 85 |
| Nonmember | $ 85 | $ 95 |
| Student | $ 40 | $ 50 |

## Monday, March 16

### T1:
### Group Sequential Designs Using the gsDesign R Package and Web Interface

**8:30 am – 10:15 am**

**Keaven Anderson**
Merck Research Laboratories

#### Description
Group sequential design is the most widely-used and well-accepted form of adaptive design for confirmatory clinical trials. It controls Type I error for multiple analyses of a primary endpoint during the course of a clinical trial and allows early, well-controlled evaluation of stopping for strong efficacy results or futility. This tutorial will review the basics of group sequential theory and demonstrate common applications of the method. The R package gsDesign and its graphical user interface will be demonstrated to provide the user with an easy-to-use, open source option for designing group sequential clinical trials. The user should leave the tutorial with an ability to propose effective group sequential design solutions to confirmatory clinical trial design. Topics covered include: application of spending functions for selection of appropriate timing and levels of evidence for early stopping; confidence intervals; conditional power, predictive power and prediction intervals; time-to-event endpoints, including stratified populations and power for meta-analyses; binomial endpoints; superiority and non-inferiority designs; information-based sample size re-estimation and conditional power designs for sample size re-estimation; generation of publication-quality tables, figures and documents describing designs.

### T2:
### Graphics for Clinical Trials

**10:30 am to 12:15 pm**

**Frank E. Harrell Jr.**
Vanderbilt University School of Medicine

#### Description
This tutorial deals with some of the graphical displays that are useful for reporting clinical trial results and for data monitoring committee reports. Emphasis is placed on replacing tables with graphics, new graphical displays for adverse events, longitudinal data, subject enrollment and exclusions, and reproducible

reporting using R, LaTeX, and knitr. The philosophy of the approach is that tables should only support graphics, and they should be hyperlinked to graphics rather than appearing in the main report. Information that supports graphics such as definitions and sample sizes are pop-ups in the pdf report. More details are available at biostat.mc.vanderbilt.edu/Greport.

## T3:
## Statistical Leadership in Research and the Important Role of Influence

**1:45 pm – 3:30 pm**

### Bill Sollecito
University of North Carolina, Chapel Hill

### Lisa LaVange
Food and Drug Administration

### Description
This tutorial will first define leadership and its importance for statisticians; various leadership styles and skills will be introduced. The concept of emergent leadership will be illustrated using the research team environment as an example of how statisticians can develop leadership skills. The important role of influence as a leadership skill will be given special emphasis as a way to develop leadership abilities and as a way to have a greater impact on the teams and organizations in which statisticians work.

## T4:
## A Tutorial for Multisequence Clinical Structural Brain MRI

**3:45 pm – 5:30 pm**

### Ciprian Crainiceanu, Ani Eloyan, Elizabeth Sweeney, and John Muschelli
Johns Hopkins University

### Description
High resolution structural magnetic resonance imaging (sMRI) is used extensively in clinical practice, as it provides detailed anatomical information of the living organism, is sensitive to many pathologies, and assists in the diagnosis of disease. Applications of sMRI cover essentially every part of the human body from toes to brain and a wide variety of diseases from stroke, cancer, and multiple sclerosis (MS), to internal bleeding and torn ligaments. Since the introduction of MRI in the 1980s, the noninvasive nature of the technique, the continuously improving resolution of images, and the wide availability of MRI scanners have made sMRI instantly recognizable in the popular literature. Indeed, when one is asked to have an MRI in a clinical context it is almost certainly an sMRI. These images are fundamentally different from functional MRI (fMRI) in size, complexity, measurement target, type of measurement, and intended use. While fMRI aims to study brain activity, sMRI reveals anatomical information. This distinction is important as the scientific problems and statistical techniques for fMRI and sMRI analysis differ greatly, yet confusion between the two continues to exist in the statistical literature and among reviewers. Despite the enormous practical importance of sMRI, few biostatisticians have made research contributions in this field. This may be due to the subtle aspects of sMRI, the relatively flat learning curve, and the lack of contact between biostatisticians and the scientists working in clinical neuroimaging. Our goal is reduce the price of entry, accelerate learning, and provide the information required to progress from novice to initiated sMRI researcher. This tutorial will provide a gentle introduction to high resolution multisequence structural MRI (sMRI) using several data sets. The tutorial will provide hands-on training in a variety of image processing techniques including: data structure and visualization, data storage and management, inhomogeneity correction, spatial interpolation, skull stripping, spatial registration, intensity normalization, lesion segmentation and mapping, and cross-sectional and longitudinal analysis of images. The tutorial will use R and several other free specialized brain imaging software.

# Tuesday, March 17

## T5:
## Bayesian Computation using PROC MCMC

**1:45 pm – 3:30 pm**

### Fang Chen
SAS Institute Inc.

### Description
The MCMC procedure is a general purpose Markov chain Monte Carlo simulation tool designed to fit a wide range of Bayesian models, including linear or nonlinear models, multi-level hierarchical models, models with nonstandard likelihood function or prior distributions, and missing data problems. This tutorial provides a quick and gentle introduction to PROC MCMC and demonstrates its use with a series of applications, such as Monte Carlo simulation, various regression models, sensitivity analysis, random-effects models, and predictions.

Increasingly, Bayesian methods are being used by statisticians in the pharmaceutical field to handle industry-specific problems. This tutorial will also present a number of pharma-related data analysis examples and case studies, including network meta-analysis, power prior, and missing data analysis. This tutorial is intended for statisticians who are interested in Bayesian computation. Attendees should have a basic understanding of Bayesian methods (the tutorial does not allocate time covering basic concepts of Bayesian inference) and experience using the SAS language. This tutorial is based on SAS/STAT 13.2.

## T6:
## Graphical Approaches to Multiple Test Problems

**3:45 pm – 5:30 pm**

### Dong Xi
Novartis Pharmaceuticals

### Description
Methods for addressing multiplicity are becoming increasingly more important in clinical trials and other applications. In the recent past, several multiple test procedures have been developed that allow one to map the relative importance of different study objectives as well as their relation onto an appropriately tailored multiple test procedure, such as fixed-sequence, fallback, and gate keeping procedures. In this tutorial we focus on graphical approaches that can be applied to common multiple test problems, such as comparing several treatments with a control, assessing the benefit of a new drug for more than one endpoint, and combined non-inferiority and superiority testing. Using graphical approaches, one can easily construct and explore different test strategies and thus tailor the test procedure to the given study objectives. The resulting multiple test procedures are represented by directed, weighted graphs, where each node corresponds to an elementary hypothesis, together with a simple algorithm to generate such graphs while sequentially testing the individual hypotheses. We also present several case studies to illustrate how the approach can be used in clinical practice. In addition, we briefly consider power and sample size calculation to optimize a multiple test procedure for given study objectives. The presented methods will be illustrated using the graphical user interface from the gMCP package in R, which is freely available on CRAN.

# ENAR 2015
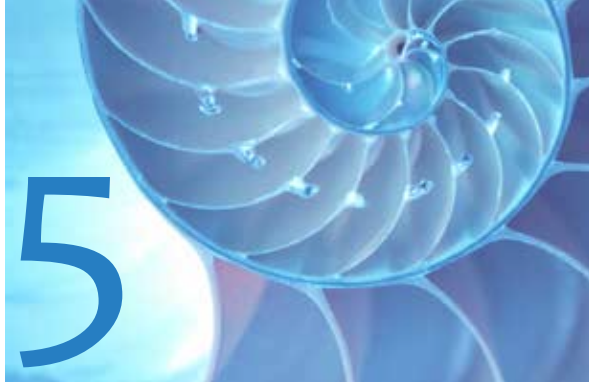
## Roundtables

## Monday, March 16 | 12:15pm – 1:30pm
Registration Is Required: $40

### R1:
### Survival Strategies for Junior Researchers: Can You Have It All?

**Bhramar Mukherjee**
University of Michigan School of Public Health

### Description
As soon as you get a "real job" after completing your doctoral or post-doctoral training, the expectations and responsibilities from your employer increase dramatically. Unfortunately, this critical time window of establishing yourself in the profession also coincides with the phase when demands from your personal life escalate. I will share some useful strategies for time management, carefully selecting research problems as a junior researcher, establishing independence from your advisor, prioritizing in terms of teaching, research, collaboration and professional service opportunities and ultimately for trying to strike a work-life balance.

It is a complex multi-dimensional optimization problem with non-linear constraints, and while there is no uniform and obvious solution that works for everybody, we can take advantage of shared experiences and existing resources to maximize our chance of success, in both personal and professional terms. This discussion will be relevant for senior graduate students, post-doctoral researchers, junior researchers in both industry and academia who are planning to enter/have recently entered the work force.

### R2:
### New Trends and Innovations in Science and Practice of Clinical Trials

**Olga Marchenko**
Quintiles

### Description
The intent of this roundtable discussion is to highlight, share, and discuss the views on some new trends and innovations in science and practice of clinical trials. Specific topics of this discussion will include:

– Innovative designs (e.g., adaptive designs, biomarker-driven designs) where are they today?

– Statistical and other applications on smart phones to collect data (e.g., patient diary), to adjust doses (e.g., a dose for diabetes patients), to analyze data (e.g., simple summaries and graphics) just an idea or the reality?

– Statistical and operational simulations why do we need them?

– Predictive analytics to improve operational support should we statisticians step up?

SOLD OUT

SOLD OUT

# R3:
# The Role of Statisticians at the FDA

## Dionne L. Price
Food and Drug Administration

## Description
The Food and Drug Administration (FDA) is composed of seven centers which collectively employ over 250 statisticians. Statisticians at the FDA are an integral part of multidisciplinary teams dedicated to assuring the safety and efficacy of human and veterinary drugs, biological products, medical devices, our nation's food supply, cosmetics, and products that emit radiation. Statisticians analyze and evaluate data, provide leadership, promote innovation in study designs and statistical techniques, and conduct methodological research aimed at addressing the many complex issues that arise in a regulatory environment. FDA statisticians utilize their statistical training and knowledge to directly impact the public health. Roundtable participants will learn the role of statisticians at the FDA and potential paths to successful careers with the Agency.

# R4:
# Applying Bayesian Evidence Synthesis in Comparative Effectiveness Research

## David Ohlssen
Novartis Pharmaceuticals

## Description
Motivated by the use of evidence based medicine to evaluate health technology, there has been an enormous increase in the use of quantitative techniques that allow data to be combined from a variety of sources. In a drug development setting, there has been a number of recent key works: The recommendations on the use and application of network meta-analysis were recently presented by the ISPOR task force; From a regulatory perspective, the work of the Canadian agency (Indirect Evidence: Indirect Treatment Comparisons in Meta-Analysis) and the US NICE Evidence synthesis series have recently been published; Further, the FDA also started a number of recent projects on comparative effectiveness research as part of a plan to enhance regulatory science. By drawing on examples from a drug development setting, this roundtable aims to discuss these recent advances.

# R5:
# Survival Skills for Biostatisticians in Academic Medical Centers

## Mithat Gönen
Memorial Sloan-Kettering Cancer Center

## Description
Biostatisticians in academic medical centers face different challenges than their counterparts in universities and academia. This will be an informal discussion of these challenges. Possible topics to be covered include the double-edged nature of collaborative work, managing the collaborations to sustain funding, find intellectual fulfillment (in particular for one's own methodological work), avoiding being overwhelmed and demotivated by the amount and nature of collaborations, gaining acceptance as an intellectual contributor (as opposed to being a p-value generator) from one's collaborators and striking work-life balance.

# R6:
# Working as a Statistician at the Center for Devices at the FDA

## Telba Irony
Food and Drug Administration

## Description
In this round table, I will discuss the life of statistician at the Center for Devices and Radiological Health, highlighting the fact that the statistician is a problem solver, who must be interested in science and teaching, and could aspire to leadership positions.

# R7:
# Writing Collaborative Grant Applications: Tips and Strategies

## Brisa Sánchez
University of Michigan School of Public Health

## Description
One of the key aspects of a biostatistics career in academia, and surely the most fun, is participation in collaborative research and writing grant proposals to support that research. In this round table we will discuss the range of contributions statisticians make to the grant writing process, share tips and strategies to make the process more efficient, and discuss how participation in collaborative grant proposals can enhance the biostatistician's methodological research.

## R8:
## Interplay Between Adaptive Design Features and Complex Study Subjectives, Case Studies and Tools

**Yevgen Tymofyeyev**
Janssen Research & Development

### Description

The current state of available commercial implementations of adaptive designs software covers substantial practical needs. On the other hand, there are also practical situations where a need exists for custom-made programming to satisfy requirements and special features of a particular study or program. Such cases are hard to envision up-front in order to warrant a commercial off-the-shelf tool. An example could be a study with multiple doses of the active drug, multiple comparators and several primary endpoints, where the corresponding multiple tests can be organized into some logical structure resolved by the application of a gatekeeping- type procedure, to address the multiple testing problem. This roundtable is intended to share experiences of interesting case studies addressing not only statistical design and simulation components, but also logistical implementation issues and interactions with regulatory agencies.

## R9:
## Publishing Without Perishing: Strategies for Success in Publishing in (Bio)statistical Journals

**Marie Davidian**
North Carolina State University

### Description

Contributing to the advance of our discipline through publication of articles in peer-reviewed journals is a fundamental expectation for both junior and not-so junior biostatistical researchers alike. Success in publishing one's work ensures that it will be widely disseminated to researchers and practitioners who stand to benefit. In addition, funding agencies and academic institutions place considerable importance on a successful record of publication. Accordingly, understanding the peer review and publication process at top journals and mastering the art of writing an effective journal article are keys to success in publishing. How does one determine the best outlet for one's work? What are the essential elements of a successful journal article? How does one maximize the chance of acceptance? What strategies can ensure that a published paper is read and cited? How does one make optimal use of limited space and additional supplementary material in conveying the message? What are the roles of the editor, associate editor, and referees? What considerations do editors use when evaluating a paper? This roundtable will provide a forum for candid discussion of these
and other questions.

# ENAR
# 2015

## Special Opportunities for Our Student Members

### Participate in Student-Focused Elements of the Scientific Program

**The Sunday night mixer** presents an ideal opportunity to obtain feedback on your work in our Annual ENAR Poster session. This year we will conduct our fourth Poster Competition for the session. Prizes will be announced within topical areas in the Tuesday morning Presidential Invited Address session. A student winner will be selected within each topical area. Watch for details on entering the competition on the website when the meeting registration goes live.

### Educational and Professional Development Opportunities

Be sure to take advantage of the educational offerings to be held during the meeting – short courses, tutorials, and roundtable discussions (see pages 27–35).

### Network with Your Fellow Students

Back by popular demand, a CENS mixer will be held during the evening of **Monday, March 16, 2015**. This is a great way to meet and greet your students from other graduate programs. Don't miss this opportunity to begin building connections with your future colleagues and friends.

### Join Us for the Tuesday Evening Dinner and Social Event

Reduced registration fee offered to students to attend (see page 8).

# ENAR 2015
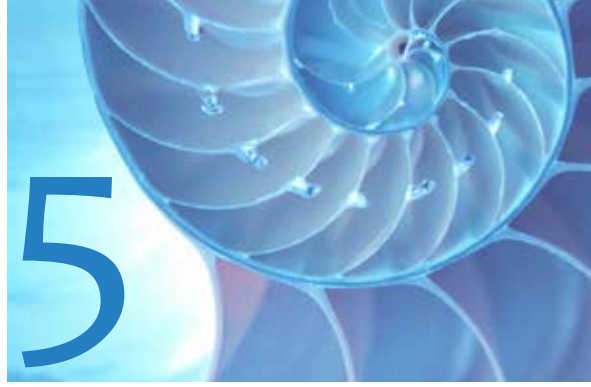
## Career Placement Services

### Sunday, March 15 | 4:00pm – 6:30pm
### Monday, March 16 | 9:30am – 4:30 pm
### Tuesday, March 17 | 9:30am – 3:30pm

### General Information

The ENAR 2015 Career Placement Service helps match applicants seeking employment and employers. The service includes online registration and electronic uploading and distribution of applicant and employer materials through a password-protected online web-based facility. Visit the ENAR website at: **www.enar.org/meetings2015/career_center** to register for the placement center. Job announcements and applicant information can be readily accessed electronically, applicant information will be opened prior to the meeting, and materials will remain available online after the meeting. ENAR provides separate large reading/planning rooms for employers and applicants to review materials, dedicated placement center personnel onsite, and optional private interview rooms available for employers Employer and applicant reading/planning rooms are equipped with a small number of computers with internet connections, and printers. However, to make the most efficient use of the Placement Center, we recommend that participants register listings in advance of the meeting to maximize visibility, explore the database before the meeting, and, if attending, have a laptop computer on-site.

### Employers

Each year numerous qualified applicants, many approaching graduation, look to the ENAR Placement Center to begin or further their careers. Organizations including government agencies, academic institutions, and private pharmaceutical firms all utilize the ENAR Career Placement Service. ENAR recognizes the value the Career Placement Service provides to members and, to make it more efficient and effective for both employers and applicants, uses an electronic registration process and an online database of applicant resumes. All registered employers will receive full access to the placement center for up to 3 company representatives, up to 4 job postings, pre-meeting access to the online applicant database of resumes, full conference registration for up to 3 representatives, and access to the employer placement center room. ENAR is also offering those organizations seeking private interview rooms the option to reserve a private room for interviews in 4-hour increments.

### Employer Registration

The registration fee for employers includes full access for up to four position postings and up to 3 representatives, pre-meeting access to the online applicant database of resumes, up to 3 full conference registrations, and access to the employer placement center room.

### Employer Resource Area

ENAR will provide internet access, laptops, and printers available in the employer resource room for viewing the applicant resume database. However, for most efficient use we recommend employers have on-site access to a personal laptop computer.

## Interview Suites

For an additional fee, employers may reserve private interview suites each day on a first-come, first-served basis.

## Applicants

If you have an interest in a career in biometrics, you can utilize the ENAR Career Placement Center to get started or get ahead. Many employers attend the ENAR Spring Meeting each year seeking qualified applicants. All registered applicants may register for up to three job classification types, and receive full access to the placement center applicant room and the online employer job posting database. Please note that to fully utilize the online database, we recommend applicants register in advance to maximize visibility, explore the database shortly before the meeting and, if attending, have a laptop computer on-site. If you are planning to interview and participate on-site you must also register for the conference and pay the meeting registration fee.

### Applicant Registration

The ENAR Career Placement Center provides opportunities for qualified applicants to meet employers and learn about organizations employing biostatisticians.

### Visibility to Employers

The Online Applicant database is made available to all employers prior to the opening of the placement center.

### Applicant Resource Area

ENAR will have internet access, three laptops, and printers in the applicant room for viewing the employer job posting database. However, for most efficient use we recommend applicants have on-site access to a personal laptop computer.

## Employer | Registration Instructions, Deadlines, and Fees

ALL employers must FULLY complete an online Employer Form located at: **www.enar.org/meetings2015/career_center** for each position listing. Attachments may be included.

|  | DEADLINES | |
|---|---|---|
|  | BY Feb. 8 | AFTER Feb. 8 |
| Employer<br>*3 reps/4 job postings* | $ 1550 | $ 1675 |
| Private Inverview Room<br>*Per 4-hour increments* | $ 250 | n/a |
| Additional Representatives<br>*Cost per person includes conference registration* | $ 500 | $ 550 |
| Additional Job Postings | $ 100 | $ 150 |

## Applicant | Registration Instructions, Deadlines, and Fees

ALL applicants must FULLY complete an online Applicant Form located at: **http://www.enar.org/CareerCenter/** for each job classification.

|  | DEADLINES | |
|---|---|---|
|  | BY Feb. 8 | AFTER Feb. 8 |
| Regular Registration | $ 50 | $ 60 |
| Student Registration | $ 25 | $ 35 |

## Applicants

**PLEASE NOTE:** If you are planning to interview and participate on-site you **must** also register for the conference and pay the meeting registration fee.

# ENAR 2015 SPRING MEETING

# Registration Form

PLEASE PRINT OR TYPE

FIRST NAME _____  MIDDLE INITIAL _____  LAST NAME _____

HIGHEST DEGREE: ❑ BACHELORS ❑ MASTERS  ❑ DOCTORATE OR MEDICAL DEGREE  ❑ OTHER _____

NAME FOR BADGE IF DIFFERENT _____  SPOUSE/GUEST NAME FOR BADGE _____

ORGANIZATION _____

MAILING ADDRESS _____  CITY _____  STATE _____  ZIP CODE _____  COUNTRY _____

DAYTIME PHONE _____  FAX _____  E-MAIL _____

## Membership in Participating Societies (Check all that apply.)
❑ ENAR  ❑ WNAR  ❑ ASA  ❑ IMS  ❑ IBS

## Meeting Fees (To be paid by all applicants.)
Registration fees, less a $100 administrative fee, will be refunded if written notice is received by **February 8, 2015**. Requests for refunds will not be honored after **February 8, 2015**. No refunds will be issued for cancellation of short courses, tutorials, roundtables or the social event.

## Meeting Registration Fees
❑ ENAR/WNAR/IBS Member
**$400** ($475 after 2/8)  $ _____

❑ ASA Member (not a member of ENAR/WNAR/IBS)
**$540** ($615 after 2/8)  $ _____

❑ IMS Member (not a member of ENAR/WNAR/IBS)
$420 – $20 IMS contribution = **$400** ($475 after 2/8)  $ _____

❑ Nonmember (in any participating society)
**$590*** ($665 after 2/8)  $ _____
*Includes membership in ENAR through December 31, 2015

❑ Student (With letter from major professor verifying status.)
**$165** ($175 after 2/8)  $ _____

❑ Nonmember Student (With letter from major professor verifying status.)
**$200** ($210 after 2/8)  $ _____

❑ Guest
**$75** ($85 after 2/8)  $ _____

## Short Courses
The short courses will be held on Sunday, March 15. (Indicate short course number.)

❑ Member (participating society)  SC _____  SC _____
Full Day: **$325** ($350 after 2/8)  $ _____
Half Day: **$225** ($250 after 2/8)  $ _____
Second Half Day: **$190** ($215 after 2/8)  $ _____

❑ Nonmember*  SC _____  SC _____
Full Day: **$375** ($400 after 2/8)  $ _____
Half Day: **$275** ($300 after 2/8)  $ _____
Second Half Day: **$240** ($265 after 2/8)  $ _____

## Tutorials
The tutorials will be held on Monday, March 17 & Tuesday, March 18.

| | Member | Nonmember | Student |
|---|---|---|---|
| T1 | ❑ **$75** ($85 after 2/8) | ❑ **$85** ($95 after 2/8) | ❑ **$40** ($50 after 2/8) |
| T2 | ❑ **$75** ($85 after 2/8) | ❑ **$85** ($95 after 2/8) | ❑ **$40** ($50 after 2/8) |
| T3 | ❑ **$75** ($85 after 2/8) | ❑ **$85** ($95 after 2/8) | ❑ **$40** ($50 after 2/8) |
| T4 | ❑ **$75** ($85 after 2/8) | ❑ **$85** ($95 after 2/8) | ❑ **$40** ($50 after 2/8) |
| T5 | ❑ **$75** ($85 after 2/8) | ❑ **$85** ($95 after 2/8) | ❑ **$40** ($50 after 2/8) |
| T6 | ❑ **$75** ($85 after 2/8) | ❑ **$85** ($95 after 2/8) | ❑ **$40** ($50 after 2/8) |

## Roundtables
The roundtables will be held on Monday, March 17. Space is limited. Preregistration is required. Indicate the number of your 1st, 2nd, and 3rd choices:

1st # _____  2nd # _____  3rd # _____

Fee: $40  $ _____
Please make lunch vegetarian ❑ YES ❑ NO

## Council for Emerging and New Statisticians (CENS) Lunch, Tuesday, March 17
I would like to join a group of attendees for a Tuesday networking lunch (at my own expense). ❑ YES ❑ NO

## Final Program Go Green & Save!
I would like to receive the Final Abstract Book (please check one) in
❑ Hard Copy – $5 ❑ Go Green — Online Only – (no additional charge)

## Tuesday Night Event & Dinner on the Biscayne Lady, March 17
❑ Regular: $95  $ _____
❑ Student: $50  $ _____

## Membership
❑ YES, I want to renew my 2015 ENAR membership or become an ENAR member. *Renew by 12/31/2014 and save $20.00 annually!*

❑ Regular Member: $120 (when paid by 12/31/2014)  *$140 **After 12/31/14**
Includes electronic access to the *Biometrics* Journal, *JABES* Journal and *Biometric Bulletin* Newsletter

❑ Regular Member: $130 (when paid by 12/31/2014)  *$150 **After12/31/14**
Includes print subscription of one journal
either ❑ *Biometrics* Journal or ❑ *JABES* Journal, and *Biometric Bulletin* newsletter

❑ Regular Member: $140 (when paid by 12/31/2014)  *$160 **After 12/31/14**
Includes print subscriptions to *Biometrics* Journal, *JABES* Journal, and *Biometric Bulletin* newsletter

❑ Student Member: $20
Includes electronic access to the *Biometrics* Journal, *JABES* Journal and *Biometric Bulletin* Newsletter

## TOTAL PAYMENT
$ _____

## FORM OF PAYMENT
❑ Check*  ❑ Money Order*  ❑ MasterCard  ❑ Visa  ❑ AmEx

*The check or money order should be in U.S. currency, payable to ENAR.

### Credit Card Information

CARD NO. _____  EXP. DATE _____

NAME ON CARD _____  SIGNATURE _____

**The International Biometric Society**

**ENAR**

# Membership Application

Eastern North American Region (ENAR) I 12100 Sunset Hills Road, Suite 130 I Reston, VA 20190
Tel: 703–437–4377 I Fax: 703–435–4390 I E-mail: enar@enar.org

PLEASE PRINT OR TYPE

**Please Check One:** ❑ New Member          ❑ Renewal

FIRST NAME _____ MIDDLE INITIAL _____ LAST NAME _____

DEGREE _____ TITLE _____

MAILING ADDRESS _____

CITY _____ STATE _____ ZIP CODE _____ COUNTRY _____

DAYTIME PHONE _____ FAX _____ E-MAIL _____

## MEMBERSHIP TYPE

❑ **Regular Member:** $140
Includes electronic access to the *Biometrics* Journal, *JABES* Journal and *Biometric Bulletin* Newsletter

❑ **Regular Member:** $150
Includes print subscription of one journal, **either** ❑ *Biometrics* Journal or ❑ *JABES* Journal, and *Biometric* Bulletin newsletter

❑ **Regular Member:** $160
Includes print subscriptions to *Biometrics* Journal, *JABES* Journal, and *Biometric Bulletin* newsletter

❑ **Supporting Member:** $30

❑ **Student Member:** $20
Includes electronic access to the *Biometrics* Journal, *JABES* Journal and *Biometric Bulletin* Newsletter

I certify that _____ is a full-time student.

Signature: _____ Title: _____

A Regular Member who is a member of a Region/National Group, termed Region/Group [R], may elect to become a Supporting Member in another Region/National Group, termed Region/National Group [S]. Supporting Members will pay the International portion of the dues once and pay the additional Regional dues only to Region/National Group [S]. A Regular Member may become a Supporting Member of more than one Region or National Group. A Regular Member At-large may also become a Supporting Member in a Region/National Group of their choice. Supporting Members may not vote or hold any office in Regions/National Groups they support.

## PLEASE INDICATE TWO AREAS OF INTEREST

❑ Agriculture (01)
❑ Animal and Veterinary Science (02)
❑ Clinical Trials (03)
❑ Epidemiology (04)

❑ Genetics and Heredity (05)
❑ Molecular Biology and Biotechnology (06)
❑ Toxicology (07)

## NATURAL RESOURCES

❑ Ecology (08)          ❑ Forestry (11)
❑ Entomology (09)     ❑ Wildlife (12)
❑ Fisheries (10)

## PAYMENT INFORMATION

❑ Enclosed is my **Check**, payable to ENAR *(Remittance accepted only in US currency)*

❑ Please **charge** my membership dues to: ❑ Visa ❑ MasterCard ❑ AmEx

CARD NO. _____ EXP. DATE _____

NAME ON CARD _____ SIGNATURE _____

**MAIL TO:**

Wachovia Bank/ENAR
P.O. Box 758929
Baltimore, MD 21275–8929

**ENAR**

12100 Sunset Hills Road
Suite 130
Reston, Virginia 20190

Phone 703-437-4377
Fax 703-435-4390
www.enar.org