

International Molecular Pathological Epidemiology Meeting

IMPEM

Series

THE THIRD INTERNATIONAL MOLECULAR PATHOLOGICAL EPIDEMIOLOGY (MPE) MEETING



May 12-13, 2016

JIMMY FUND AUDITORIUM
DANA-FARBER CANCER INSTITUTE



May 12th, 2016

Dear Colleagues,

WELCOME to The Third International Molecular Pathological Epidemiology (MPE) Meeting!

As one of the Conference Co-Chairs (with Peter T Campbell), I welcome you to this unique meeting! The number of registrants has far exceeded 100, from about 15 countries, and 15 US States! I hope that you find this transdisciplinary meeting to be an active and informative forum for exchanging viewpoints and generating new ideas.

I would like to invite you to be the lead author(s) of this meeting proceeding. If you are interested, please approach me and take notes during the meeting. We wrote the meeting proceeding of the Second International Molecular Pathological Epidemiology (MPE) Meeting (Ogino S et al. Cancer Causes Control 2015; see the next page), which has attracted great attentions.

If you are interested in getting involved in the International MPE Meeting Series, please approach me or other program committee members. There are plenty of opportunities to get involved in this young growing meeting series.

For this third meeting, you can see that discussion topics are wide, including pathology, epidemiology, biostatistics, bioinformatics, immunology, and even health disparities. Nonetheless, our central theme is to develop integrative science for better understanding of health and diseases. We hope that, even if we cannot be an expert in all of these areas, we can work together to address challenges and take advantages of opportunities.

As one specific project which will be discussed, there is no research guideline specific in this MPE field. One of the goals of the meeting is to develop a draft of the research guideline in MPE.

I would like to thank Peter Campbell as a Co-Chair, all members of the Program Committee, all of the speakers, moderators and discussants, all members of my MPE laboratory, Division of MPE Molecular Pathological Epidemiology of the Brigham and Women's Hospital, the Dana-Farber Cancer Institute (which provides the Jimmy Fund Auditorium as our venue), and Dana-Farber Harvard Cancer Center. Without the supports of all of these contributors, this meeting would not have been possible. I also thank Dr. Zhi Rong (Ziron) Qian and Ms. Tracy Baker, who compiled this program book.

Wishing you a very productive and enjoyable meeting for the two days!

Best regards,



Shuji Ogino, MD, PhD
Conference Co-Chair
The Third International Molecular Pathological Epidemiology (MPE) Meeting

Proceedings of the second international molecular pathological epidemiology (MPE) meeting

Shuji Ogino^{1,2,3} · Peter T. Campbell⁴ · Reiko Nishihara^{2,3,5,6} · Amanda I. Phipps^{7,8} · Andrew H. Beck^{9,10} · Mark E. Sherman^{11,12} · Andrew T. Chan^{13,14} · Melissa A. Troester¹⁵ · Adam J. Bass^{2,10} · Kathryn C. Fitzgerald^{3,6} · Rafael A. Irizarry^{5,16} · Karl T. Kelsey¹⁷ · Hongmei Nan¹⁸ · Ulrike Peters^{7,8} · Elizabeth M. Poole¹⁴ · Zhi Rong Qian² · Rulla M. Tamimi^{3,14} · Eric J. Tchetgen Tchetgen^{3,5} · Shelley S. Tworoger^{3,14} · Xuehong Zhang¹⁴ · Edward L. Giovannucci^{3,6,14} · Piet A. van den Brandt¹⁹ · Bernard A. Rosner^{5,14} · Molin Wang^{3,5,14} · Nilanjan Chatterjee¹² · Colin B. Begg²⁰

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Abstract Disease classification system increasingly incorporates information on pathogenic mechanisms to predict clinical outcomes and response to therapy and intervention. Technological advancements to interrogate omics (genomics, epigenomics, transcriptomics, proteomics, metabolomics, metagenomics, interactomics, etc.) provide widely open opportunities in population-based research. Molecular pathological epidemiology (MPE) rep-

resents integrative science of molecular pathology and epidemiology. This unified paradigm requires multidisciplinary collaboration between pathology, epidemiology, biostatistics, bioinformatics, and computational biology. Integration of these fields enables better understanding of etiologic heterogeneity, disease continuum, causal inference, and the impact of environment, diet, lifestyle, host factors (including genetics and immunity), and their interactions on disease evolution. Hence, the Second International MPE Meeting was held in Boston in December 2014, with aims to: (1) develop conceptual and practical

Shuji Ogino, Peter T. Campbell, Reiko Nishihara, Amanda I. Phipps, Bernard A. Rosner, Molin Wang, Nilanjan Chatterjee, and Colin B. Begg have contributed equally to this study.

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Program Committee

Conference Co-Chairs: Shuji Ogino, Peter T Campbell

Andrew Beck	Colin Begg	Nilanjan Chatterjee
Edward Giovannucci	Rafael Irizarry	N Sertac Kip
Aya Kuchiba	Paul Lochhead	Nadine McCleary
Liam Murray	Reiko Nishihara	Ulrike Peters
Amanda Phipps	Elizabeth Poole	Zhi Rong Qian
Timothy Rebbeck	Mark Sherman	Stephanie Smith-Warner
Eric Tchetgen Tchetgen	Melissa Troester	Piet van den Brandt
Tyler VanderWeele	Molin Wang	Xuehong Zhang

Awards committee

Peter Campbell (Chair), Andrew Beck, Colin Begg, Aya Kuchiba, Paul Lochhead, Reiko Nishihara, Amanda Phipps, Timothy Rebbeck, Stephanie Smith-Warner, Molin Wang, Kana Wu, Xuehong Zhang

Meeting Secretary: Tracy Baker (tracy_baker@dfci.harvard.edu)

Program book design: Zhirong Qian, Yan Shi, Mancang Gu

Introduction and Goals of The International Molecular Pathological Epidemiology (MPE) Meeting Series

The International Molecular Pathological Epidemiology (MPE) Meeting Series has been open to research community around the world, with free registration. The First and Second International MPE Meetings were successfully held in Boston, MA, USA, in April 2013 and December 2014, respectively.

As an important premise of epidemiology, individuals with the same disease generally have similar causes, and exhibit a similar disease evolution. In the past few decades, our knowledge on disease pathogenesis has improved considerably, and disease classification has also transformed, incorporating molecular mechanisms of disease. As a result, Pathology and Epidemiology have now been integrated into the single unified field of Molecular Pathological Epidemiology (MPE). This has opened enormous opportunities.

To advance integrative molecular and population-level health science and address the unique research challenges specific to the field of MPE requires bringing together experts in various fields including pathology, epidemiology, biostatistics, computational biology, bioinformatics, genomics, immunology, and nutritional and environmental sciences. This effort of integrating seemingly divergent fields can lead to a greater understanding of pathogenic processes, and the impact of environmental, dietary, lifestyle, and genetic factors and their interactions. Brainstorming and discussion fostered by the MPE Meeting will lead to the development of new methodologies to address the unique research questions and challenges in this emerging field. Our specific aims of the MPE Meeting are to:

1. Develop methods to integrate pathology and epidemiology
2. Link pathogenic insights to population impact
3. Educate next generation scientists

This unique meeting can provide an unprecedented opportunity for interdisciplinary collaboration and integration of multiple diverse fields. Eventually, we aim to establish the MPE Meeting as a regular annual science forum, where we can advance population science, and optimize our training and education systems for 21st century medicine and public health.

Meeting Agenda

May 12

7:30-	Registration	
8:15-8:40	Updates of MPE	Peter Campbell, chair
8:15-8:25	Welcome, and Introduction to MPE	Shuji Ogino and Peter Campbell
8:25-8:40	MPE of microRNA profiling in normal and neoplastic colon tissue	Martha Slattery
8:40-9:10	MPE pooling project	Stephanie Smith-Warner, chair
8:40-8:55	Genetics and Epidemiology of Colorectal Cancer Consortium (GECCO) update on targeted sequencing of colorectal cancer	Ulrike Peters
8:55-9:10	Discussion	
9:10-9:25	Break	
9:25-10:20	Special topics: cancer immunology	Amanda Phipps, chair
9:25-9:40	Learning to read immunological memory using immunosequencing	Harlan Robins
9:40-9:55	Using pathological analysis to guide immunotherapy	Gordon Freeman
9:55-10:05	"Immuno-MPE" can analyze etiologic heterogeneity of immune response to tumor	Shuji Ogino
10:05-10:20	Discussion	
10:20-10:35	Break	
10:35-10:55	MPE of cancer disparities	Xuehong Zhang, chair
10:35-10:50	Molecular epidemiology of cancer disparities	Timothy Rebbeck
10:50-10:55	Discussion	
10:55-11:30	Special topics	Timothy Rebbeck, chair
10:55-11:10	Computational modeling to identify optimum dosing schedules for non-small cell lung cancer	Franziska Michor
11:10-11:15	Discussion	
11:15-11:25	Molecular imaging in future population screening	Alexei Bogdanov
11:25-11:30	Discussion	
11:30-11:40	Group Photos	
11:40-12:20	Lunch	
	Free lunch boxes are available for poster presenters, speakers, committee members, and chairs at Yawkey Conference Center (307-308) Poster presenters put their posters.	
12:20-13:50	Poster session and networking (Yawkey Conference Center 307 and 308, 3rd Floor of Yawkey Building, across one bridge from Jimmy Fund Bldg) <u>(See the map in the page11)</u>	
	Poster presenters take out posters at 1:50pm. After the poster session, Awards Committee members, poster referees, will hand their score sheets to Peter Campbell or Shuji Ogino	

14:00-15:00	Statistical advances in MPE	Molin Wang, chair
14:00-14:15	Risk predictiveness and etiologic heterogeneity: strategies for distinguishing cancer subtypes	Colin Begg
14:15-14:30	Developing sub-type specific model for absolute risk for cancer	Nilanjan Chatterjee
14:30-14:45	Causal interactions for outcome heterogeneity	Tyler VanderWeele
14:45-15:00	Discussion	
15:00-15:15	Break	
15:15-16:15	Computational biology	Reiko Nishihara, chair
15:15-15:30	Using networks to probe the patient-specific spectrum of disease states	John Quackenbush
15:30-15:45	High dimensional epigenomic analysis	Rafael Irizarry
15:45-16:00	High-precision functional profiling of microbial communities and the human microbiome	Curtis Huttenhower
16:00-16:15	Discussion	
16:15-16:30	Break	
16:30-17:30	Proffered papers part 1 (4 high impact study abstracts) (12 min + 3 min QA)	Liz Poole, chair
16:30-16:45	A review of statistical methods for evaluating etiologic heterogeneity	Emily Zabor
16:45-17:00	Estimation of Missing Values for Gene Interaction Data coming from High Throughput Technologies	Gashaw Mekuria
17:00-17:15	Dealing with missing subtypes using auxiliary case covariates	Daniel Nevo
17:15-17:30	Molecular analyses of histopathologic morphologic features in breast cancer	Jan Heng
17:45-	Networking Dinner	
	<u>(a map indicating restaurant places is on the last page of the program book)</u>	
	Fugakyu, 20-min walk (booked for 20)	
	Sichuan Gourmet, 15-min walk (booked for 20)	
	Below are restaurants not booked:	
	Longwood Grille, 2-min walk	
	Bertucci's, 5-min walk	
	TGI Fridays, 10-min walk	
	Il Mondo Pizzeria, 10-min walk	
	Squealing Pig, 10-min walk	
	Gyukaku, 15-min walk	
	Sichuan Garden, 20-min walk	
	Yokohama, 20-min walk (if you want alcohol, you need to bring one yourself)	
	There are other restaurants around eg, near the Fenway Park (ballpark for Boston Red Sox).	

May 13

- 7:30-** **Registration**
- 8:00-8:15** **Awards Committee chair and members will meet if needed**
- 8:15-9:15** **Proffered papers part 2 (4 high impact study abstracts) (12min + 3min QA) N Sertac Kip, chair**
- 8:15-8:30 Computational pathology identifies stromal inflammation as a prognostic biomarker in squamous cell carcinoma of the lung **Daniel Xia**
- 8:30-8:45 Cisplatin response prediction in recurrent bladder cancer using biochemically-inspired machine learning **Peter Rogan**
- 8:45-9:00 Low-dose aspirin, PTGS2 (COX-2) expression and survival in stage II & III colon cancer **Helen Coleman**
- 9:00-9:15 (best scored abstract) Aspirin use and risk of colorectal cancer according to immune reaction to tumor **Yin Cao**
- 9:15-9:35** **Open discussion Part 1: illustration of MPE studies from beginning to end** (presented and chaired by **Peter Campbell**)
The basic goals of this session are to show basic and practical principles of real-world MPE research, and to discuss how MPE studies can/should be conducted
- 9:35-9:45** **Presentation of MPE Trainee Award, MPE Rising Investigator Award, and MPE Minority Scholar Award**
- 9:45-10:00** **Break**
- 10:00-12:00** **Open discussion (Part 2) of generalized issues relevant to MPE**
The basic goals of this session are to take advantages of resources, and to address challenges
- 10:00-10:20 Interdisciplinary education and training (led by **Jan Heng, Sertac Kip, and Mingyang Song**)
- 10:20-10:40 Study design and statistical methods (led by **Colin Begg, Nilanjan Chatterjee, and Molin Wang**)
- 10:40-11:00 Opportunities and challenges in pathology in epidemiologic research (led by **Andrew Beck, Sertac Kip, and Zhirong Qian**)
- 11:00-11:20 MPE consortium building (led by **Ulrike Peters and Stephanie Smith-Warner**)
- 11:20-11:40 Opportunities and challenges in health disparities and MPE (led by **Timothy Rebbeck**)
- 11:40-12:00 Emerging technologies, new areas of investigation, and our future (led by **Andrew Beck, Alexei Bogdanov and Liz Poole**)
- 12:00-12:30** **Lunch (Room D1130 DFCI) available for business meeting attendees**
- 12:30-14:10** **Business meeting (Room D1130, DFCI)****
- 12:30-12:35 Group photos
- 12:35-12:50 Relationships with other societies, consortia, organizations, and groups (led by **Timothy Rebbeck, and Stephanie Smith-Warner**)
- 12:50-13:05 Assessment of The Third International MPE Meeting (led by **Amanda Phipps, Molin Wang and Xuehong Zhang**)
- 13:05-13:25 Planning the Fourth International MPE Meeting (led by **Peter Campbell, Colin Begg and Reiko Nishihara**)
- 13:25-13:40 Meeting Grant (led by **Shuji Ogino and Peter Campbell**)
- 13:40-14:10 Meeting proceeding and Research Guideline Development (led by **Shuji Ogino and Timothy Rebbeck**)
- 14:10- Meeting conclusion*

*Room booked until 3pm for other work-group meetings and networking purposes

**Conference call: Toll Free Number 1-888-646-5977
Toll Number 1- 517-345-2363
Participant Passcode is: 2868102