

23rd ASILOMAR CONFERENCE on MASS SPECTROMETRY

Sponsored by
American Society for Mass Spectrometry

MASS SPECTROMETRY IN CLINICAL CHEMISTRY AND MOLECULAR DIAGNOSTICS

Friday, September 14 - Tuesday, September 18, 2007
The Asilomar Conference Center, Pacific Grove, CA

Program Chairs

Alan Rockwood, PhD

*University of Utah School of Medicine
and ARUP Laboratories, Salt Lake City, Utah*

Ravinder J. Singh, PhD

Mayo Clinic, Rochester, Minnesota

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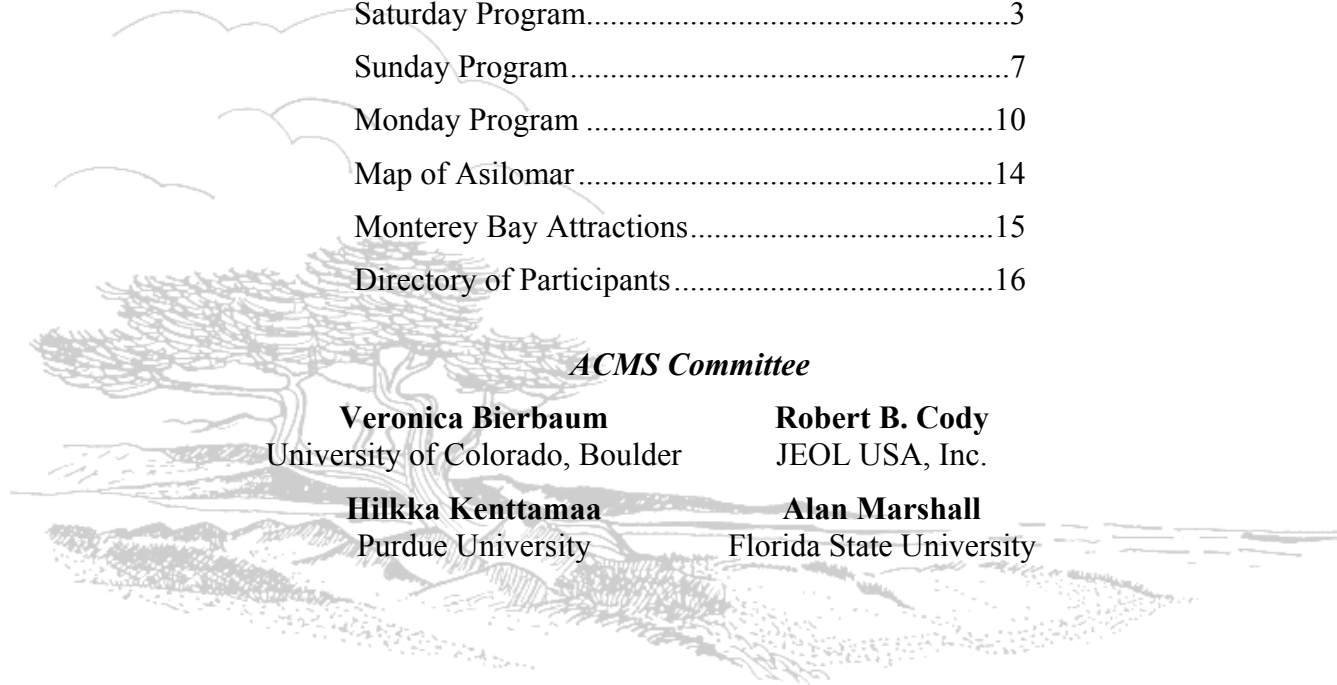
ACMS Committee

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University of Colorado, Boulder

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Purdue University

Alan Marshall
Florida State University



GENERAL INFORMATION

Continuing Education Credit Information

The American Association for Clinical Chemistry (AACC) designates this program for a maximum of 23.0 ACCENT(c) credit hours towards the AACC Clinical Chemist's Recognition Award. AACC is an approved provider of continuing education for clinical laboratory scientists in the states of California, Florida, Louisiana, Montana, Nevada, North Dakota, Rhode Island, and West Virginia.

If you are interested in receiving ACCENT credits, please sign the attendance roster located in the Registration area or in the Chapel (session room).

Internet Access. There is complimentary wi-fi access in the Administration Building.

Meals at Asilomar. For attendees lodging at Asilomar you will receive a meal ticket for all meals beginning with dinner on Friday and ending with lunch on Tuesday. For attendees staying off-site you will receive lunch tickets for Saturday, Sunday and Monday. Off site lodgers wishing to purchase breakfast or dinner meal tickets may purchase them at the Asilomar Conference Center registration area in the Administration Building.

To-Go Lunches at Asilomar. Should you wish to take your lunch to the beach, please go to the regular lunch window and request a "To-Go Lunch". Special box lunches (for pick-up at breakfast) are available, if reserved 48 hours in advance.

Poster Presenters. Please set up your poster display on Friday from 4:00 – 6:00 pm in the Chapel (side rooms). Poster locations will be indicated with a name tag.

Speakers. Please arrive in the Chapel, session room, 30 minutes prior to the start of the session to set up your laptop computer.

Survey. You will receive an email with a link to the online conference survey. Your feedback is appreciated.

Sunday Afternoon. There is a free afternoon scheduled for Sunday. Please see page 15 of this program for suggested activities or visit the Front Desk/Administration Hall building where many maps and brochures are available.

CONFERENCE SPONSORS

Evening Mixer Sponsors

Applied Biosystems
IBIS Biosciences
Thermo Scientific

Banquet Wine Sponsor

Waters Corporation

General Program Support

ARUP Laboratories
Proteomics Division, AACC

CONFERENCE INTRODUCTION

Mass Spectrometry in Clinical Chemistry and Molecular Diagnostics

There is an individual behind every sample tested in a clinical lab, and that person's medical care depends on the correctness and quality of result. This central fact distinguishes clinical mass spectrometry from all other applications of mass spectrometry. Traditionally, various other technologies, including chromatography and immunoassays (RIA, CIA and ICMA's), have been used to supply the physician with analytical information needed for patient care. However, large reference laboratories and medical centers have shown that mass spectrometry often provides better quality testing and improved patient care. Besides great success, clinical mass spectrometry provides its own unique challenges opportunities, both to the mass spectrometrists and to the clinical chemist. The 23rd Asilomar Conference will focus on mass spectrometry as practiced in the clinical world, including such diverse topics as current technologies, emerging technologies, automation, specific application examples, method validation, quality issues, medical issues, and other topics.

FRIDAY, SEPTEMBER 14, 2007

3:00 pm **Guest Room Check-in**, *Asilomar Main Lobby*

5:00 pm **Conference Registration**, *Asilomar Main Lobby*

6:00 – 7:00 pm **Asilomar dinner for on-site lodgers**, *Crocker Dining Hall.*
Asilomar meal ticket required.

Evening presenters should arrive in the Chapel (session room) at 6:30 pm to set up laptops.

7:00 – 10:00 pm **OPENING SESSION**, *Chapel*

Session Chairs: Alan Rockwood, PhD and Ravinder Singh, PhD

This session will be a short presentation on how mass spectrometry has added value to modern clinical chemistry. Dr. Henion has long been a leader in biomedical mass spectrometry and will present various applications of mass spectrometry used in clinical laboratories. Dr. Cantor will present examples demonstrating mass spectrometry's provision of advanced information for the sequencing of the gene, in comparison with existing clinical laboratory techniques.

7:00 – 7:10 pm Welcome and Introductory Remarks:
Alan L. Rockwood, PhD and **Ravinder Singh**, PhD

7:10 – 8:05 pm **Jack Henion**, PhD, Advion Biosciences, Inc.
Can Mass Spectrometry Add Value to Modern Clinical Chemistry?

8:05 – 9:00 pm **Charles Cantor**, PhD, SEQUENOM, Inc.,
Boston University School of Medicine
SNP Detection by Mass Spectrometry

9:00 – 9:15 pm **Panel Discussion**

9:15 – 10:00 pm **Beer & Wine Mixer** *sponsored by IBIS Biosciences*
Poster Viewing

SATURDAY MORNING, SEPTEMBER 15, 2007

7:30 – 8:30 am **Asilomar Breakfast for on-site lodgers, Crocker Dining Hall.**
Asilomar meal ticket required.

Morning presenters should arrive in the Chapel (session room) at 8:00 am to set up laptops.

8:30 am – 12:00 pm **SESSION I: Biomarker Applications and Genetic Testing, Chapel**
Session Chair: Leigh Anderson, PhD

This session will be a short tutorial emphasizing specific MS assays for quantitation of peptides and proteins, as well as genetic applications of mass spectrometry. Leigh Anderson is the founder of the Plasma Proteome Institute. The novelty of the session is that it will highlight an approach to develop and validate potential biomarkers. The challenges in this area will be clearly highlighted by the speakers.

8:30 – 9:05 am **Leigh Anderson**, PhD, Plasma Proteome Institute
Specific MS Assays for Peptides and Proteins Using Selected Reaction Monitoring and SISCAPA

9:05 – 9:40 am **Robert Plumb**, PhD, Imperial College London
The Application of High Resolution Liquid Chromatography and High Resolution Exact Mass Spectrometry to Investigate the Effects of Gut Microflora on Metabolism and Toxicity

9:40 – 9:50 am Break

9:50 – 10:25 am **Andrew Hoofnagle**, MD, PhD, Dept. of Laboratory Medicine, University of Washington Medical Center
Clinical Tumor Marker Quantitation with LC/MS/MS: Is There Hope?

10:25 – 11:00 am **Christie L. Hunter**, PhD, Applied Biosystems
Peptide MRM-based Assays in Plasma for Biomarker Verification Studies

11:00 – 11:35 am **Christiane Honisch**, PhD, SEQUENOM, Inc.
Automated Nucleic Acid Based Signature Sequence Analysis by MALDI-TOF Mass Spectrometry – A Comparative Sequence Analysis Tool

11:35 am – 12:00 pm **Panel Discussion**

12:10 pm – 1:00 pm **Asilomar Lunch for all participants, Crocker Dining Hall.**
Asilomar meal ticket required.

1:00 – 2:00 pm Break

SATURDAY AFTERNOON, SEPTEMBER 15, 2007

Afternoon presenters should arrive in the Chapel at 1:30 pm to set up laptops.

2:00 – 5:30 pm **SESSION II: Instrumentation and Automation**

Session Chair: Russell Grant, PhD

Use of appropriate instrumentation is key to all clinical applications of mass spectrometry. Furthermore, automation of instrumentation and detectors is the key to the throughput required in clinical laboratories. Automation in front of tandem mass spectrometry has made major advances and allows throughput of up to 2000 samples a day. General sample handling and preparation techniques will also be discussed.

- 2:00 – 2:45 pm **Russell Grant**, PhD, Labcorp, Inc./Esoterix
Application of Automation Tools in LC-MS/MS Assays for Clinical Diagnostics
- 2:45 – 3:30 pm **Scott Kuzdzal**, PhD, Perkin Elmer, Life & Analytical Sciences
Better Biomarkers by Bacon's Bees
- 3:30 – 3:45 pm **Panel Discussion**
- 3:45 – 4:00 pm Break
- 4:00 – 4:40 pm Poster Presentations**, each presentation is 5 minutes.
Number listed also refers to poster board space location.
1. **Pavel Aronov**, University of California, Davis
Metabolic Profiling of Major Vitamin D Metabolites Using Diels-Alder Derivatization and Ultra Performance Liquid Chromatography-Tandem Mass Spectrometry
 2. **David Johnson**, Women's and Children's Hospital
Chemical derivative design for high sensitivity, high throughput MS/MS clinical assays
 3. **Marta Kozak**, Thermo Fisher Scientific
LC-MS/MS Method for Quantitative Analysis of Tacrolimus, Sirolimus, Everolimus and Cyclosporin A in Whole Blood Using TurboFlow Technology
 4. **Mark Kushnir**, ARUP Laboratories
High Sensitivity Measurement of Estrogens in Serum by LC/MS/MS
 5. **Stephanie Marin**, ARUP Laboratories
Confirmation of Benzodiazepines in Urine, Serum, Plasma and Meconium by LC/MS/MS
 6. **Jim Settlege**, Taylor Technology
Superiority of gas chromatography/tandem mass spectrometry assay (GC/MS/MS) for estradiol for monitoring of aromatase inhibitor therapy.

Saturday Afternoon program continued on the next page.

SATURDAY AFTERNOON, SEPTEMBER 15, 2007, *continued*

7. **Robert White**, Taylor Technology

Quantitation of a Derivatized Synthetic Estrogen Extracted From Rat Serum Using Gas Chromatography Electron Capture Negative Ionization Tandem Mass Spectrometry (GC/ECNI/MS/MS)

8. **Bingfang Yue**, ARUP Laboratories

Direct Measurement of Three Free Thyroid Hormones in Serum by Equilibrium Dialysis (ED) and On-line Solid Phase Extraction (SPE)–Liquid Chromatography/Tandem Mass Spectrometry (LC-MS/MS)

4:40 – 5:30 pm **Poster Viewing**

5:30 – 6:00 pm **Break**

6:00 – 7:00 pm **Asilomar dinner for on site lodgers, Crocker Dining Hall.**
Asilomar meal ticket required.

SATURDAY EVENING, SEPTEMBER 15, 2007

Evening presenters should arrive in the Chapel (session room) at 6:30 pm to set up laptops.

7:00 – 10:00 pm **SESSION III: Metabolic Disorders**

Session Chair: Don Chace, PhD, MSFS

If you have been looking for a tutorial on newborn screening, biochemical genetics, and related topics, this is the right place to be. Especially relevant to this session is the ability of mass spectrometry to perform the simultaneous analysis of many analytes. The expertise of the speakers assures presentation of the latest developments in newborn screening, biochemical genetics, and related areas. Each speaker brings extensive experience to the session.

7:00 – 7:35 pm **Don Chace**, PhD, MSFS, Pediatrix Analytical
Beyond Newborn Screening: Clinical Mass Spectrometry
Application Expansion in the Next Ten Years

7:35 – 8:10 pm **Michael R. Morris**, PhD, Clinical Operations Group,
Waters Corporation
The Role of Time-of-flight Technology in Routine Clinical Applications

8:10 – 8:45 pm **Dietrich Matern**, MD, Mayo Clinic College of Medicine
Tandem Mass Spectrometry in Biochemical Genetics

8:45 – 9:00 pm **Panel Discussion**

9:00 – 10:00 pm **Informal Beer & Wine Mixer** *sponsored by Thermo Scientific*
Poster Viewing

SPONSOR OF SATURDAY EVENING MIXER



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Forensic toxicology

Clinical toxicology

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SUNDAY MORNING, SEPTEMBER 16, 2007

7:30 – 8:30 am **Asilomar Breakfast for on-site lodgers, Crocker Dining Hall.**
Asilomar meal ticket required.

Morning presenters should arrive in the Chapel (session room) at 8:00 am to set up laptops.

8:30 am – 12:05 pm **SESSION I: Quality, Clinical and Client Perspectives, and Unmet Needs**

Session Chair: Shalender Bhasin, MD

The speakers in this session will highlight the challenges of making accurate sex steroid measurements with the existing methodologies. This session will demonstrate that, for better patient care, it is critical for clinical laboratories to communicate with clinicians. Dr. Bhasin is a pioneer in research for use of testosterone as a therapeutic anabolic drug, and will make a case for the critical need of a standardized assay to decide judicious use of sex steroids supplementation. The session will also demonstrate that standardization across the laboratories is essential for sex steroid assays and implementation of state of the art technology, and explain how tandem mass spectrometry can achieve this goal. These discussions will place mass spectrometry in the larger medical context and highlight important issues perhaps less familiar to many mass spectrometrists. The session also covers method validation, a topic more crucial for clinical applications than perhaps any other field of mass spectrometry.

8:30 – 9:15 am **William Rosner, MD, St. Luke's-Roosevelt Hospital Center & College of Physicians and Surgeons, Columbia University**
Assays for Plasma Testosterone: What's the Problem?

9:15 – 10:00 am **Maria Ospina, PhD, Centers for Disease Control and Prevention**
The CDC Sex Steroid Harmonization Project

10:00 – 10:15 am **Break**

10:15 – 11:00 am **Shalender Bhasin, MD, Boston Medical Center**
Population-based Reference Ranges for Sex Steroid Assays: The Impact of Assay CV and Quality on Clinical Decision Making

11:00 – 11:45 am **Russell Grant, PhD, Labcorp, Inc./Esoterix**
Validation of Endogenous Quantitative Assays with LC-MS/MS Technologies

11:45 am – 12:05 pm **Panel Discussion**

12:10 pm – 1:00 pm **Asilomar Lunch for all participants, Crocker Dining Hall.**
Asilomar meal ticket required.

1:00 – 6:00 pm **Free Time, please see page 15 for sightseeing activities.**

6:00 – 7:00 pm **Asilomar dinner for on site lodgers, Crocker Dining Hall**
Asilomar meal ticket required.

SUNDAY EVENING, SEPTEMBER 16, 2007

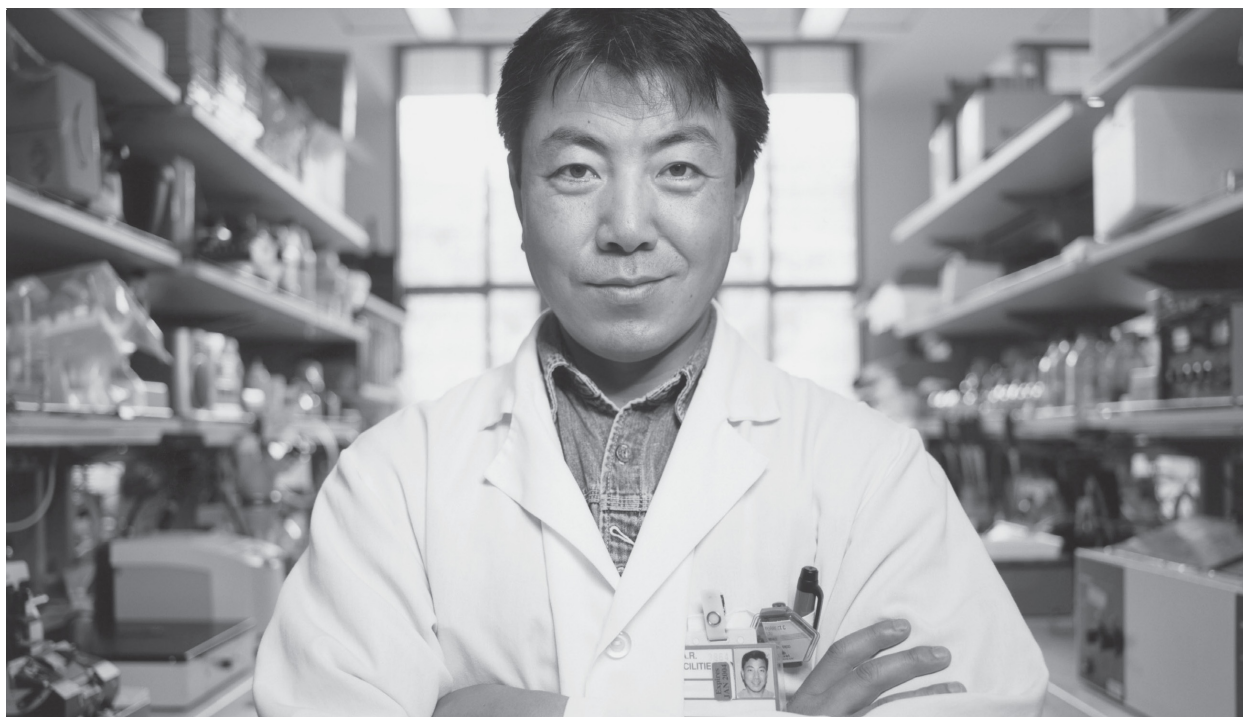
Evening presenters should arrive in the Chapel (session room) at 6:30 pm to set up laptops.

7:00 – 10:00 pm **SESSION II: Imaging and Emerging Technologies**

Session Chair: Pierre Chaurand, PhD

This session will be a short tutorial to familiarize participants with the basic knowledge and terminology necessary to understand and apply the principles of mass spectrometry in imaging. This session will highlight the role of mass spectrometry in making progress toward functional imaging using mass spectrometry. Dr. Omenn is the PI of the Michigan Life Sciences Corridor Proteomics Alliance for Cancer research program and leader of the international Human Proteome Organization (HUPO) Human Plasma Proteome Project. He will present the progress in the area of discovery from tumor tissues and plasma.

- | | |
|-----------------|---|
| 7:00 – 7:35 pm | Gilbert S. Omenn , MD, PhD, University of Michigan Medical School
<i>Biomarker Discovery from Tumor Tissues and Plasma</i> |
| 7:35 – 7:55 pm | Dean Hafeman , PhD, Protein Discovery Inc.
<i>High Throughput Biomarker Discovery and Small Molecule Quantification in Biological Tissues using Parallel Electrochromatographic Preparation</i> |
| 7:55 – 8:30 pm | Pierre Chaurand , PhD, Mass Spectrometry Research Center, Vanderbilt University
<i>Molecular Imaging of Tissue Sections by MALDI Mass Spectrometry</i> |
| 8:30 – 8:45 pm | Panel Discussion |
| 8:45 – 10:00 pm | Informal Beer & Wine Mixer <i>sponsored by Applied Biosystems</i>
Poster Viewing |



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MONDAY MORNING, SEPTEMBER 17, 2007

7:30 – 8:30 am **Asilomar Breakfast for on-site lodgers, Crocker Dining Hall.**
Asilomar meal ticket required.

Morning presenters should arrive in the Chapel (session room) at 8:00 am to set up laptops.

8:30 am – 12:05 pm **SESSION I: Endocrine, Drugs, and Toxicology**

Session Chair: Steven Soldin, PhD, FACB

The session will present examples of clinical tests performed by mass spectrometry in clinical laboratories. Highly targeted quantitative analysis of small molecules and elementals currently form the majority of validated clinical mass spectrometric applications. Various approaches and perspectives will be demonstrated by speakers to improve the diagnosis. Examples of the benefits and disadvantages of implementing mass spectrometry in clinical laboratories will be highlighted and demonstrated. The role of various mass spectrometry techniques, including GC-MS and ICPMS, in clinical laboratories will also be covered in this session.

8:30 – 9:15 am **Steven J. Soldin, PHD, FACB, Georgetown University**
Tandem Mass Spectrometry for Thyroid and Steroid Hormone Replacement

9:15 – 10:00 am **Mary F. Lopez, PhD, Thermo Fisher Scientific**
Targeted MS Quantitation of the Anti-aging Hormone Klotho

10:00 – 10:15 am **Break**

10:15 – 11:00 am **Robert A. Middleberg, PhD, NMS Laboratories**
The Role of Mass Spectrometry in TDM/Toxicology

11:00 – 11:45 am **Sum Chan, PhD, Quest Diagnostics**
Toxic Trace Elements and the Role of ICPMS

11:45 am – 12:05 pm **Panel Discussion**

12:05 – 1:00 pm **Asilomar lunch for all participants, Crocker Dining Hall.**
Asilomar meal ticket required.

1:00 – 2:00 pm **Break**

MONDAY AFTERNOON, SEPTEMBER 17, 2007

Afternoon presenters should arrive in the Chapel at 1:30 pm to set up laptops.

2:00 – 6:30 pm **SESSION II: Infectious Disease**

Session Chair: Steven Hofstadler, PhD

Approaches for infectious disease testing by mass spectrometry range widely, from those based on PCR amplifications and nucleic acid composition analysis to those based on analysis of intact bacterial cell preparations. This session will cover some of these applications, and will also discuss affinity mass spectrometry (AMS), a proteomics approach for selectively isolating target protein(s) from complex biological fluids for mass spectrometric analysis.

2:00 – 2:35 pm **Steven Hofstadler**, PhD, Ibis Biosciences

High Throughput Analysis of Nucleic Acids for the Identification and High Resolution Strain Typing of Bacterial and Viral Pathogens

2:35 – 3:10 pm **Clifton “Keith” Fagerquist**, PhD, Western Regional Research Center, U.S. Department of Agriculture

Identification of Clinical Isolates of Campylobacter (and Other Human Pathogens) by MALDI-TOF-MS

3:10 – 3:45 pm **Randall W. Nelson**, PhD, Intrinsic Bioprobes, Inc.

The Use of Mass Spectrometric Immunoassay in the Study of Disease

3:45 – 4:05 pm **Panel Discussion**

4:05 – 4:20 pm Break

4:20 – 5:05 pm Poster Presentations, each presentation is 5 minutes.

Number listed also refers to poster board space location.

9. **Ivana Bobeldijk**, TNO.NL

Comparison of lipid profiling methods: LC-MS vs. direct infusion MS

10. **R. Brent Dixon**, NC State University

Integrating Voltage-Assisted Hydrodynamic Devices to Efficiently Sample Biological Specimens

11. **Frank Kero**, University of Florida

Development of a novel screening method for the quality assurance of exhaled breath condensates in the clinical laboratory

12. **Hasmik Keshishnian**, Broad Institute

Limits of Quantitation for Low Abundance Proteins in Plasma by Targeted MS

13. **Jihyeon Lim**, Albert Einstein College of Medicine

Global Proteomic Analysis Can Predict Clinical Outcome and Disease Severity at Diagnosis in Head and Neck Squamous Carcinoma

Monday Afternoon program continued on the next page.

MONDAY AFTERNOON, SEPTEMBER 17, 2007, *continued*

14. **Muhammad Najam-ul-Haq**, University of Innsbruck
Diamond-Like-Carbon (DLC) as LDI and MALDI target for Metabolomics, Peptidomics and Proteomics

15. **Elizabeth Pattison**, ARUP Laboratories
LC/MS/MS Analysis of Urine Cortisol and Cortisone by utilizing high-Field Asymmetric waveform Ion Mobility Spectrometry (FAIMS)

16. **Drew Sauter**, Nanoliter LLC
Nanoliter Sample Handling: MALDI, Parallel LC/MALDI, Drug Delivery and Patient Sampling With Induction Based Fluidics. Why The Nanoliter Regime Has Merit.

17. **Sergey Sikora**, GenWay Biotech, Inc.
Digging deeper into proteome by IgY-immunoaffinity fractionation

5:05 – 6:00 pm **Poster Viewing**

6:00 – 6:30 pm **Break**

6:30 pm – The End **Banquet**, Seascope Room (adjacent to Crocker Dining Hall).
Banquet ticket required.
Wine served at the Banquet is sponsored by Waters Corporation.

Thanks, everyone, for a great conference!

TUESDAY MORNING, SEPTEMBER 18, 2007

Guest Room Check-Out time for on site lodgers is 12:00 pm.

7:30 – 9:00 am **Asilomar breakfast for on site lodgers**, Crocker Dining Hall.
Asilomar meal ticket required.

12:00 – 1:00 pm **Asilomar lunch for on site lodgers**, Crocker Dining Hall.
Asilomar meal ticket required.

SPONSOR OF MONDAY EVENING BANQUET WINE



[HYPOTHESIS]

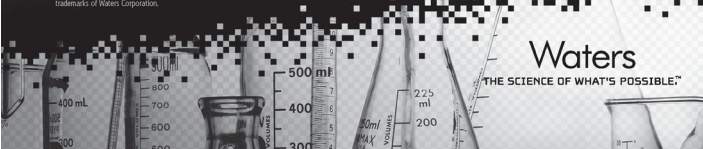
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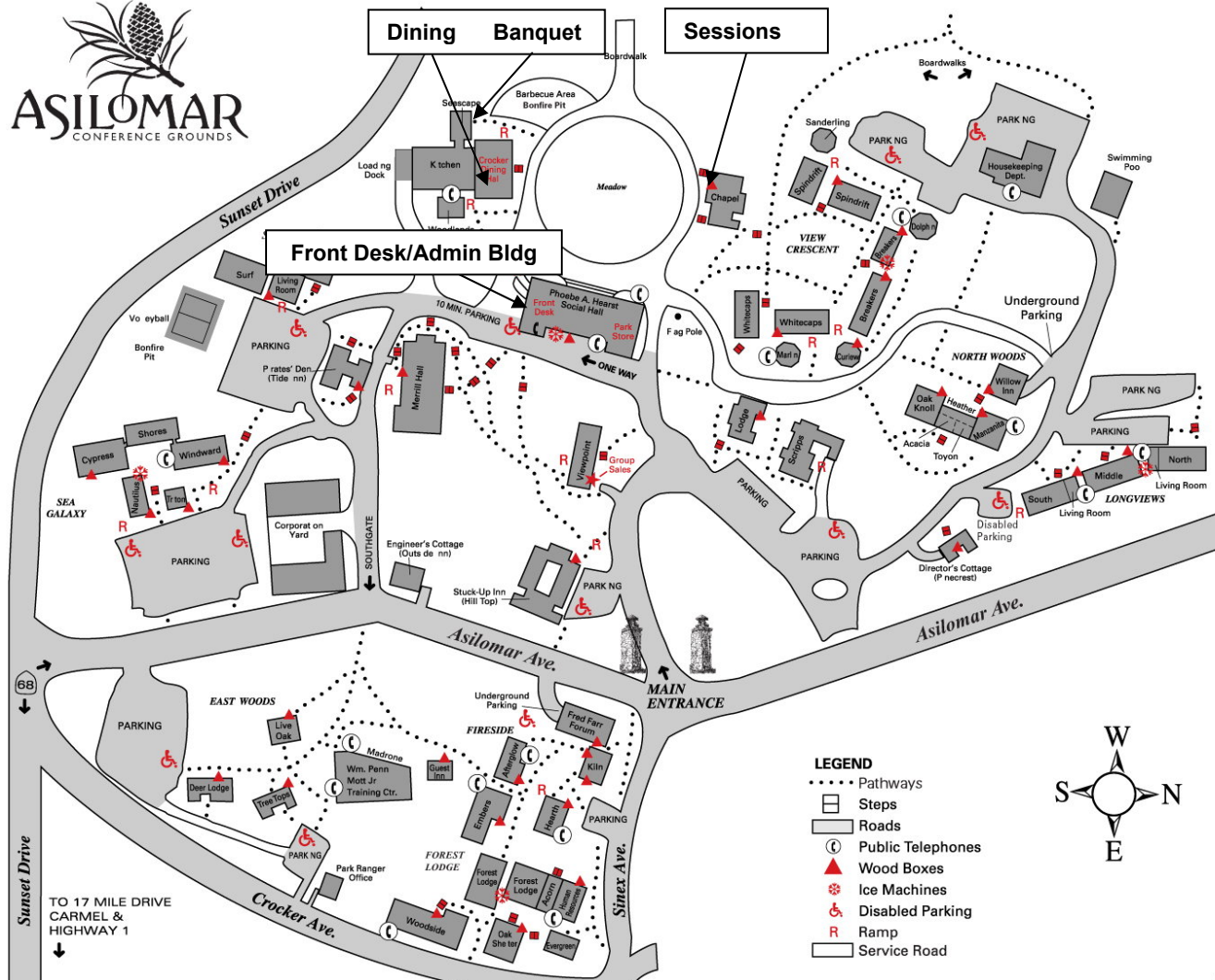
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MONTEREY BAY AREA ATTRACTIONS

The Monterey Peninsula is a perfect place for a romantic weekend or exciting adventure. There are so many year-round activities, that you're limited only by your time and sense of adventure.

From historic adobes and landmarks to Fisherman's Wharf and the Monterey Bay Aquarium, Monterey has something for everyone. Visit Steinbeck's Cannery Row, Colton Hall and the Monterey Museum of Art. Stroll the recreational trail along the coast or see the wildlife close-up on a kayak adventure on the Bay.

When in Pacific Grove don't forget to check out the Monarch butterflies which make PG home for the winter, Asilomar State Beach, historic bed and breakfast inns, Lover's Point and the Pacific Grove Museum of Natural History.

Pebble Beach attractions include the 17-Mile Drive, Stillwater Cove, the Lone Cypress and an array of world-class golf courses and hotels.

Carmel Valley is home to many wineries, farms, ranches and the beautiful Garland Ranch Regional Park.

And don't miss Big Sur with its Esalen Institute, Henry Miller Memorial Library, Point Sur Lighthouse, camping, hiking, beautiful redwood groves and excellent whale-watching.

Peninsula Attractions

Please visit www.monterey.com and click "Attractions" to view more details.

Carmel Walks	P.O. Box 975	Carmel, CA	(831) 642-2700
Chris' Whale Watching & Fishing Trips	48 Fisherman's Wharf	Monterey, CA	(831) 375-5951
Fishermans Wharf	140 W. Franklin St.	Monterey, CA	(831) 649-6544
Monterey Bay Aquarium	886 Cannery Row	Monterey, CA	(831) 648-4888
Monterey Bay National Marine Sanctuary	299 Foam St., Suite D	Monterey, CA	(831) 647-4201
Monterey Bay Scenic Tours	406 Calle Principal	Monterey, CA	(831) 372-6278
Monterey Bay Whale Watch	P.O. Box 52001	Pacific Grove, CA	(831) 375-4658
Monterey Wine Festival	140 W. Franklin St.	Monterey, CA	(831) 649-6544
National Steinbeck Center	One Main St.	Salinas, CA	(831) 775-4725
Pacific Yachting & Sailing	790 Mariner Park Wy	Santa Cruz, CA	(800) 374-2626
Santa Cruz Beach Boardwalk	400 Beach St.	Santa Cruz, CA	(831) 423-5590

Additional information on local sights and the Asilomar State Beach may be found in the Administration Building of the Asilomar Conference Center.