SoCal Flow Cytometry Association SUMMIT 2015

April 23-24, 2015
Beckman Center
University of California, Irvine

SoCal Flow Cytometry Association SUMMIT 2015

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Southern California Flow Cytometry Association

presents

SoCal Flow SUMMIT 2015

April 23-24, 2015

Hosted by the Sue & Bill Gross CIRM Stem Cell Research Center
University of California, Irvine

Researchers from the Southland's regional research centers, clinical laboratories and biomedical industries join together to share their contributions to Cytometry, and network to enhance learning opportunities in the region.

Progam Highlights

(see pages 12-13 for full program)

SUMMIT 2014 Day One
April 23, 2015
8:15am - 5:15pm

Poster Session / Happy Hour
Buffet Dinner
Everyone is welcome
April 23, 2015
5:20pm - 8:30pm

SUMMIT 2014 Day Two
April 24, 2015
8:15am – 4:15pm

Concurrent Pre-Summit Courses by
Excyte Expert Cytometry and FloCyte Associates*(see page 3)*

Invited Speakers:

J Philip McCoy, Jr., PhD, Keynote Speaker: "Flow Cytometry in Translation Medicine: Three Vignettes"

Nora Heisterkamp, PhD: "Use of flow cytometry to evaluate the potential of ex vivo expanded human natural killer cells for therapy of B cell precursor acute lymphoblastic leukemia."

Matthew Inlay, PhD: "Mapping the embryonic origins of hematopoietic stem cells"

John Joslin, PhD: "Development of a fully automated ultra-high throughput flow cytometry screening system to enable novel drug discovery"

Rong Lu, PhD: "In Vivo Coordination of Mouse Hematopoietic Stem Cells"

Pat Simms, MS: "Analysis of exosomes using imaging flow cytometry – A shared resource facility story"

Gold Sponsor Presentations
by Affymetrix/eBioscience, Beckman Coulter, BD Bioscience, Bio-Rad, Cell Signalling Technologies, De Novo Software, EMD Millipore, Thermo Fisher Scientific

April 22 Concurrent Pre-meeting Training Courses
Hosted by the Sue & Bill Gross CIRM Stem Cell Research Center

Separate registration required

Excyte Cytometry, "Advanced Data Analysis"
FloCyte Associates, "Compensation and Multiparameter Strategies"

Welcome to SoCal Flow SUMMIT 2015

The Program Committee of the Southern California Flow Cytometry Association is pleased to present its annual meeting- SoCal Flow SUMMIT 2015, to be held on April 23-24, 2015 at the Beckman Center, University of California at Irvine. Now in its fourth year, the SoCal Flow Cytometry Association's membership has grown and includes both new and expert flow cytometry users from Southern California's academic institutions, regional research centers, clinical laboratories and leading biomedical industries.

We hope that you will all enjoy this exciting two-day meeting which includes scientific talks from invited speakers, vendor presentations, a poster session, and a Happy Hour and dinner reception open to all attendees. We take this opportunity to thank all our generous vendor sponsors who made this event possible.

As an ISAC affiliate, SoCal Flow is able to offer eight credits towards ICCE certification. In addition, we are pleased to be able to offer up to six hours of CEU's made available by FloCyte Associates. This year we have organized two pre-event cytometry training courses offered by Excyte and Flocyte, which are hosted by the Sue and Bill Gross CIRM Stem Cell Research Institute of UC Irvine. Also, SoCal Flow has provided two scholarships to attend these courses.

We welcome all members to this exciting event for networking, sharing and education with colleagues from across the Southern California counties. Enjoy!

Southern California Flow Cytometry Association
Program Committee

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Beckman Research Institute/City of Hope

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About

The Southern California Flow Cytometry Association (SoCal Flow) brings together research, clinical, and biomedical scientists from Los Angeles, Kern, San Luis Obispo, Santa Barbara, San Bernardino, Riverside, Orange County, San Diego and Imperial counties. The Association reaches out to members to enhance collaborations, for brainstorming ideas, asking questions and communicating with each other via its message board. SoCalFlow provides opportunities to further the education of its members by hosting scientific talks, workshops and training courses to keep members abreast of recent developments and advances in the field of cytometry. The inaugural November 2011 SUMMIT at USC-HSC campus was made possible by generous vendor support. The success of SUMMIT 2011, 2013, and 2014 has made possible SUMMIT 2015.

The Southern California Flow Cytometry Association is incorporated in the state of California as a tax-exempt corporation, and is non-profit 501 (c) 6 trade association. The Association is an affiliate of the International Society for the Advancement of Cytometry (ISAC). By attending this meeting all registered attendees will automatically become members of the Southern California Flow Cytometry Association unless they choose to opt-out. The committee encourages all SUMMIT 2015 attendees to partake of this association and become active networking members of the Southern California Flow Cytometry Community. During the SUMMIT, there will be a twenty minute annual meeting of the Association. We hope that you will participate in this meeting and feel free to give feedback on what you would like to see the Association presenting.

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Congratulations to our Training Scholarship Winners

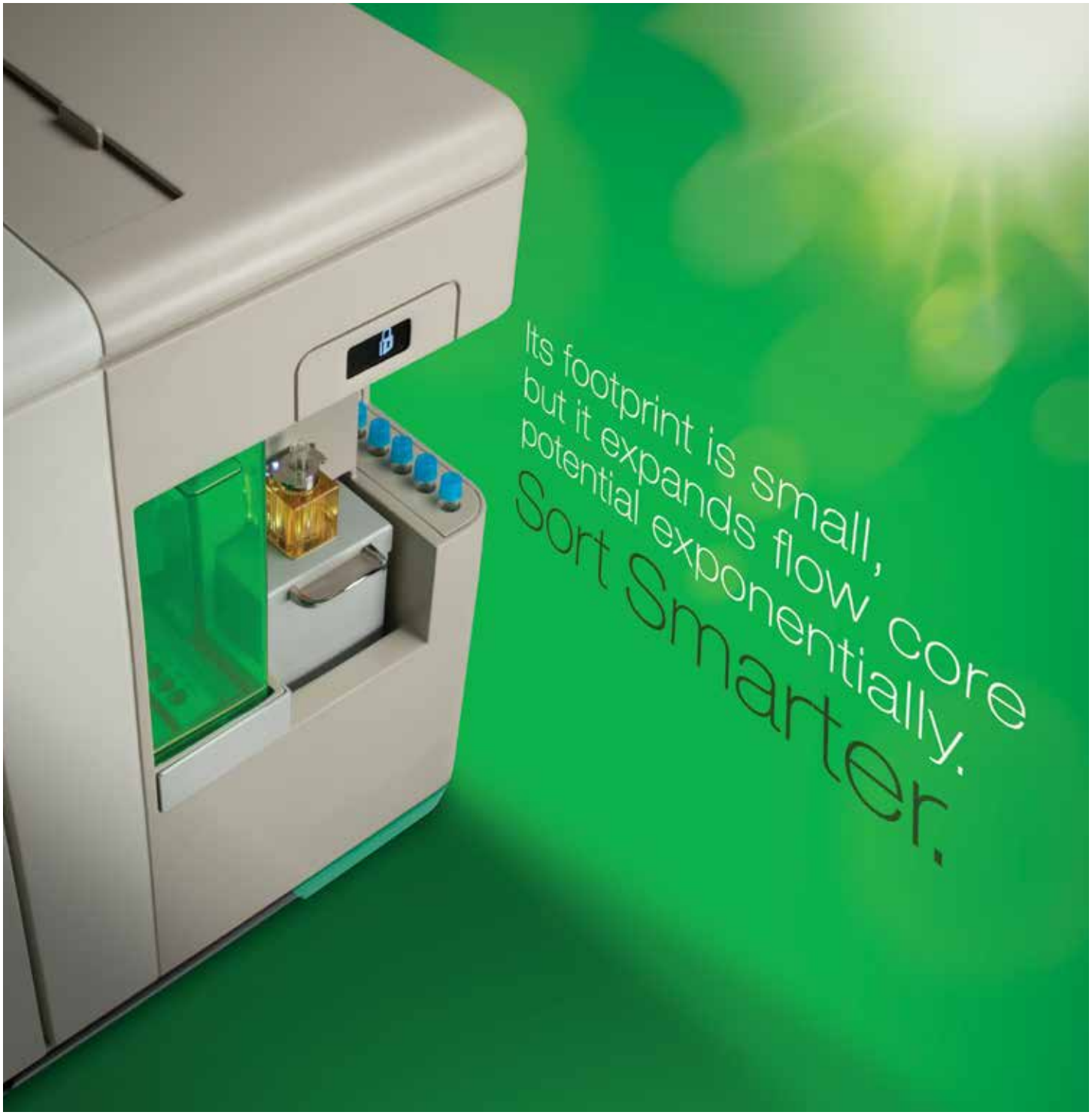
SoCal Flow Scholarship Recipient
FloCyte Training
Terry-Ann Milford, MLS (ASCP)
Graduate Student
Center for Health Disparities and Molecular Medicine
Loma Linda University

Marylou Ingram Scholarship Recipient
ExCyte Training
Derek Banyard, MD, MBA
Research Fellow
California Institute for Regenerative Medicine
Center for Tissue Engineering, Dept of Plastic Surgery
University of California, Irvine

This year, the SoCal Flow Cytometry Association awarded two competitive scholarships: The SoCal Flow Cytometry Association Scholarship and the Marylou Ingram Scholarship. These scholarships are awarded for flow cytometry training during SUMMIT 2015 for students currently enrolled in a Southern California university and researchers or clinical personnel of a Southern California facility. The Marylou Ingram Scholarship honors the memory of a remarkable female scientist and mentor, and is awarded to a deserving Sourthern California scientist.

Marylou Ingram, M.D. 1920-2013

Marylou Ingram dedicated her life to science and the pursuit of knowledge. Her professional career spanned nearly 70 years and as a medical doctor her focus was in academic medicine, medical research, and teaching. Her research focused on experimental hematology, radiation biology, cellular biology, and immunology. Her innovations and pioneering work led to the discovery and development of several technologies including automated image analysis systems for the identification and enumeration of hematopoetic cells and the Histoid Bioreactor which results in the formation of 3D tumor models. Marylou has been described as an amazing woman with a zest for life and compassion for her fellow man and as an incredible mentor. As an early female scientist, she paved the way for subsequent generations of women to dream and become scientists as well.



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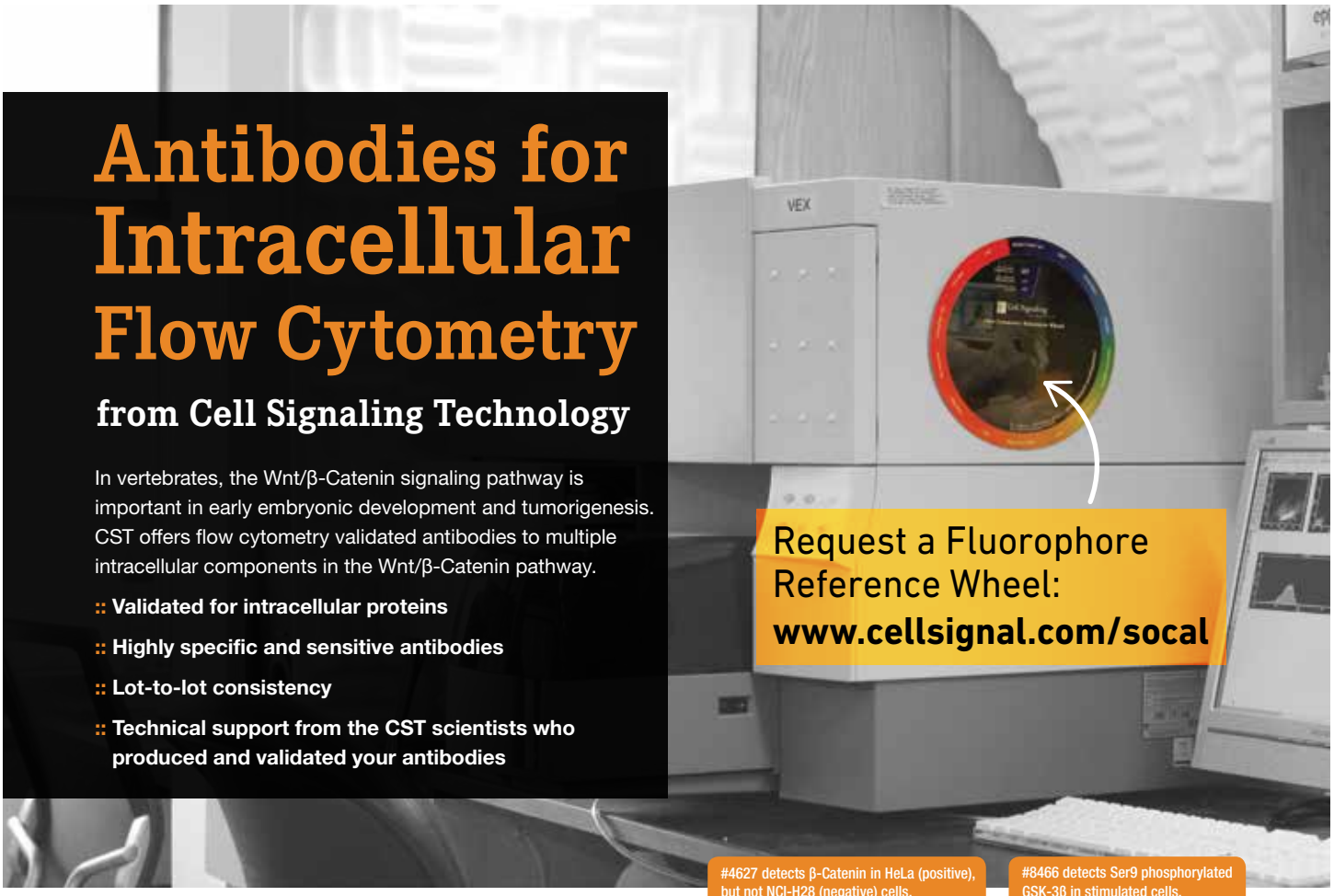

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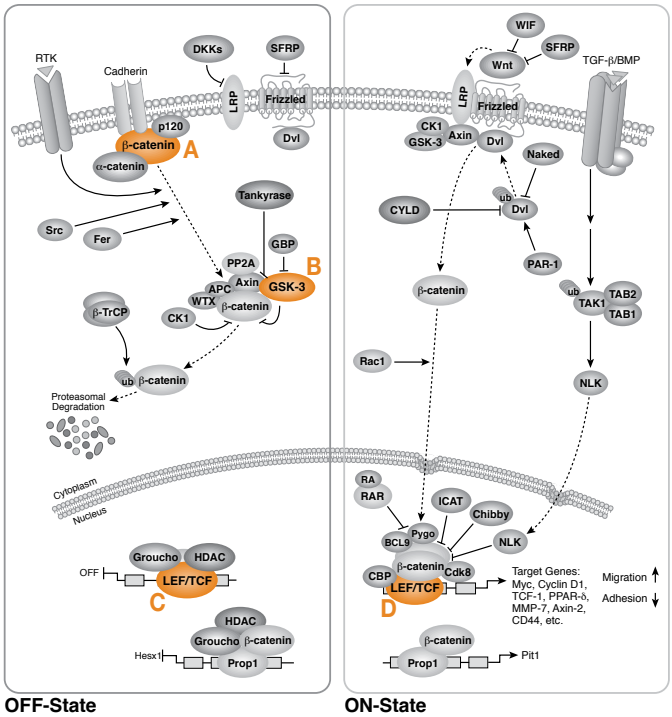
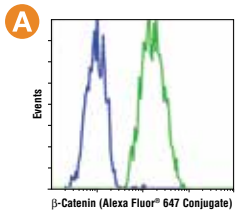


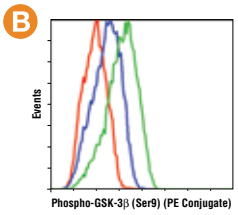
OFF-State **ON-State**

#4627 detects β-Catenin in HeLa (positive), but not NCI-H28 (negative) cells.

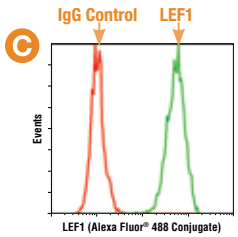
#8466 detects Ser9 phosphorylated GSK-3β in stimulated cells.



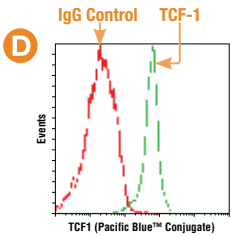
β-Catenin (L54E2) Mouse mAb (Alexa Fluor® 647 Conjugate) #4627: Analysis of NCI-H28 cells (blue) and HeLa cells (green).



Phospho-GSK-3β (Ser9) (D85E12) XP® Rabbit mAb (PE Conjugate) #8466: Analysis of NIH/3T3 cells treated with hPDGF-BB #8912 and λ phosphatase (red), untreated (blue), or treated with hPDGF-BB #8912 only (green).



LEF1 (C12A5) Rabbit mAb (Alexa Fluor® 488 Conjugate) #8490: Analysis of Jurkat cells using #8490 (green) compared to Rabbit (DA1E) mAb IgG XP® Isotype Control (Alexa Fluor® 488 Conjugate) #2975 (red).



TCF1 (C63D9) Rabbit mAb (Pacific Blue™ Conjugate) #9066: Analysis of Jurkat cells using #9066 (green) compared to Rabbit (DA1E) mAb IgG XP® Isotype Control (Pacific Blue™ Conjugate) #9078 (red).

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SoCal Flow SUMMIT 2015 Program

Thursday, April 23, 2015

8:15am – 9:00am	Registration, Full Breakfast with coffee service
9:00am – 9:10am	Opening Remarks
9:15am – 10:05am	Nora Heisterkamp, PhD, Professor, USC/CHLA *"Use of Flow Cytometry to Evaluate the Potential of Ex-Vivo Expanded Human NK Cells for Therapy of B Cell Acute Lymphoblastic Leukemia"*
10:10am – 10:30am	Drake J. Smith, BS, Graduate Student, UCLA, *"Genetic Engineering of Hematopoietic Stem Cells to Generate Invariant Natural Killer T Cells"*
10:35am – 10:45am	Barb Seredick, Senior Product Application Specialist, Thermo Fisher Scientific, *"The Attune NxT Acoustic Focusing Cytometer, an Affordable, High Performance Analyzer"*
10:50am – 11:30pm	Coffee Break (Posters and Vendor Tables)
11:35am – 12:00am	Shabnam Shalapour, PhD, Post Doctoral Fellow, UCSD, "*Identification of Tumor-Infiltrating Lymphocytes by Direct Detection of Cytokine mRNA and Protein by Flow Cytometry*". Affymetrix/eBioscience
12:05pm – 12:25pm	Wei-Le Wang, MS, Graduate Student, BRI-COH, *"Control of Mammalian Hematopoiesis and Immune Response by MicroRNA-142"*
12:30pm – 12:45pm	Andrew Lister, PhD, Marketing Manager Research Products, Beckman Coulter, *"Moving the Goal Posts: The Cytoflex Cytometer Improves the Game"*
12:45pm – 2:00pm	Buffet Lunch (1:15-2:00pm Bronze face-time)
2:05pm – 2:55pm	John Joslin, PhD, Research Investigator, Novartis *"Development of a Fully Automated Ultra-High Throughput Flow Cytometry Screening System to Enable Novel Drug Discovery"*
3:00pm – 3:15pm	Tanya Tolmachoff, MT (ASCP), Director Sales and Marketing, De Novo Software,*"Highlights of FCS Express 5"*
3:15pm – 4:00pm	Coffee break (Posters and Vendor tables)
4:00pm – 4:20pm	SoCal Flow Business Meeting
4:25pm – 5:15 pm	Keynote Speaker J. Phillip McCoy Jr., PhD, Senior Scientist, NIH, *"Flow Cytometry in Translation Medicine: Three Vignettes"*
5:20pm – 6:20pm	Happy Hour/Poster Session. Everyone is Welcome
6:20pm – 8:30pm	Buffet DINNER

Abstracts for the oral poster presentations are available at www.socalflow.org

SoCal Flow SUMMIT 2014 Program

Friday, April 24, 2015

8:15am – 9:00am	Registration, Full Breakfast with coffee service
9:00am-9:05am	Opening remarks / Announcements
9:05am – 9:30am	Lisa Bellemare, MS, Technical Application Specialist, BD Bioscience, *"Incorporating Intracellular Flow Cytometry into Multicolor Panel Design"*
9:35am - 10:25am	Rong Lu, PhD, Assistant Professor, USC. *"In-Vivo Coordination of Mouse Hematopoietic Stem Cells"*
10:30am – 10:45am	Matt Alexander, PhD, Senior Cell Biology Systems Specialist, Bio-Rad, *"Bio-Rad S3e: Self Service Sorting for the Core or Individual Lab"*
10:45am – 11:20am	Coffee break (Posters and Vendor tables)
11:20am – 11:40am	Alborz Karimzadeh,BS, Graduate Student, UCI, *"CD11a and EPCR as High Resolution Markers to Identify Long-Term Hematopoietic Stem Cells"*
11:45am – 12:35pm	Pat Simms, MS, Core Manager, Loyola University *"Analysis of Exosomes Using Imaging Flow Cytomery – A Shared Resource Facility Story". Sponsored by EMD Millipore.*
12:40pm – 1:05pm	Erica L. Stone, PhD, Assistant Professor, Wistar, *"Regulation of T Helper Cell Differentiation and Function by the Transcription Factor FOXO1"*, EMD Millipore
1:05pm – 2:35pm	Buffet Lunch (1:50 - 2:35 Bronze face-time)
2:40pm – 3:30pm	Matthew Inlay, PhD, Assistant Professor, UCI, *"Mapping the Embryonic Origins of Hematopoietic Stem Cells"*
3:35pm – 3:55pm	Alexandra Lee, MS, Bioinformatics Analyst, J. Craig Venter Institute, *"High-Dimensional Single Cell Data Analysis: Methods and Cyberinfrastructure"*
4:00pm – 4:15pm	Jessica McClure-Kuhar, BS, West Coast Regional Manager, Cell Signalling Technologies, *"Analysis of signaling pathways, intracellular protein expression, and epigenetic markers using flow cytometry"*
4:15pm – 4:30pm	Adjourn; Raffle, coffee and take down posters

Abstracts for the oral poster presentations are available at www.socalflow.org

Speakers and Abstracts

J Philip McCoy, Jr., Ph.D.
Keynote Speaker
Senior Scientist, Hematology Branch, National Heart, Lung, and Blood Institute, National Institutes of Health, Bethesda, MD

"Flow Cytometry in Translation Medicine: Three Vignettes"

Translational science is a field of investigation focused on understanding and turning observations in the laboratory or clinic into interventions that improve the health, including diagnostic testing, novel therapies, medical procedures, and behavioral modifications. Flow cytometry can play a pivotal role in many aspects of translational medicine and can be crucial in discovering or validating new biomarkers or therapies. In the context of ongoing work at NIH, I will present three examples of flow cytometry in translational medicine, with each vignette describing a separate, but ultimately inter-related, endeavor. In the first scenario, an observation was made during the analysis of circulating endothelial cells that a small proportion of lymphocytes in the peripheral circulation of healthy donors also stained for CD146, the putative endothelial marker. Subsequent detailed studies of CD146+ cells revealed that this was not an artifact but rather this staining identified a population of highly pro-inflammatory, Th17-like cells with enhanced abilities to bind to, and cross endothelial monolayers. These cells are increased in a number of autoimmune diseases and have been demonstrated to be predominant populations in psoriasis and rheumatoid arthritis and may prove to be a target for therapy in these diseases. In the second scenario, while there is a strong tendency to study a given population of cells in specific diseases, as described above, it is being increasing appreciated that the components of the immune system are inter-related and act in a coherent manner; and therefore must be studied in a more holistic manner. To this end, CD146, from the first vignette, was incorporated into a comprehensive leukocyte immunophenotyping panel (CLIP) consisting of fourteen fifteen color tubes. The CLIP panel is designed to simultaneously provide a broad and deep phenotyping profile of the immune system in healthy and disease. Current protocols are ongoing using this panel to study a variety of diseases. This comprehensive CLIP panel is quite useful in identifying and examining new cellular phenotypes in the context of numerous other leukocyte populations, however this endeavor is constrained by the primarily manual methods of data analysis that are currently performed. In the third scenario, bioinformatic approaches are being evaluated using the data from the CLIP panel as well as genomic and clinical data to better understand the relevance of the CLIP data and the role of the phenotypes in system immunology. The ultimate goal of this approach is to develop an integrative approach for understanding and using data from various platforms for the better understanding of human health and disease.

Speakers and Abstracts (continued)

Nora Heisterkamp, PhD
Professor of Research Pediatrics and Pathology, University of Southern California/ CHLA
"Use of flow cytometry to evaluate the potential of ex vivo expanded human natural killer cells for therapy of B cell precursor acute lymphoblastic leukemia."

Many monoclonal antibody-based therapies for cancer depend on the presence of functional effector cells such as macrophages or natural killer (NK) cells for activity. However, because precursor B-lineage acute lymphoblastic leukemia (pre-B ALL) skews normal hematopoietic development, patients have immune cell deficiencies. Also chemotherapy can further reduce normal immune cell function. This could present a problem if monoclonal antibodies that stimulate antibody-mediated cellular cytotoxicity (ADCC) would be used for treatment of pre-B ALL. We therefore first used FACS to determine if pre-B ALL patient samples at diagnosis, post-induction and relapse contain detectable numbers of CD56+ cells. We then co-cultured whole bone marrow and peripheral blood samples from patients at various stages of treatment with artificial antigen-presenting K562 clone 9.mbIL-21 cells. We were able to selectively expand CD56+ immune effector cells from such samples. Since cell numbers were limited, we made use of flow cytometry to characterize the phenotype and activity of the outgrowing cells. Expanded CD56+, CD3- NK cells showed increased expression of the activating NK cell receptors NKG2D and NKp46, and had high levels of CD16. We measured CD107a surface expression as a widely used, validated readout for functional NK cell activity. Intracellular IFNg was also assessed using flow cytometry on permeabilized cells. Amplified CD56+CD3- cells had spontaneous and anti-BAFF-R mAb-stimulated ADCC activity against autologous ALL cells, which could be further enhanced by IL15. Importantly, matched CD56+ effector cells also killed autologous ALL cells grown out from leukemia samples of the same patient, through both spontaneous as well as antibody-dependent cellular cytotoxicity. Expanded NK cells could be used in future applications to eradicate so-called minimal residual disease in the bone marrow of pre-B ALL patients. Therefore we also initiated experiments to model this complex environment ex vivo. Results of experiments in which we used flow cytometry to track expanded NK cells, pre-B ALL cells and stromal cells in a three-cell type co-culture system will be discussed.

Matthew Inlay, PhD
Assistant Professor, Department of Molecular Biology & Biochemistry, UC Irvine
"Mapping the embryonic origins of hematopoietic stem cells"

All blood cells, including those of the immune system, are generated from hematopoietic stem cells (HSCs). As such, HSCs possess incredible regenerative potential. However, Efforts to generate therapeutic HSCs from pluripotent stem cell lines have largely been unsuccessful, in part due to our incomplete understanding of (and inability to replicate in culture) the natural pathway by which HSCs emerge during embryonic development. We have discovered a marker, CD11a, which allows for the purification of adult HSCs as well as an embryonic population that may be a precursor to HSCs in the embryo. We have performed functional characterization and lineage-tracing analyses to confirm in vivo that this population can give rise to adult HSCs, and to identify its site of origin within the developing embryo. Our data suggest we have identified the embryonic cell type that gives rise to HSCs, allowing us to dissect the molecular events that lead to the generation of the first HSCs in development.

Speakers and Abstracts (continued)

John Joslin, PhD
Research Investigator, Genomics Institute of the Novartis Research Foundation
"Development of a fully automated ultra-high throughput flow cytometry screening system to enable novel drug discovery"

The ability to run high content phenotypic screens provides many advantages in drug discovery. Phenotypic screens can be run without prior understanding of the target and with primary cells that closely mimic the therapeutic setting. An additional advantage is that phenotypic screens often enable multiple parameters that can be read from a single experiment. The disadvantage of running high content phenotypic screens is that these assays tend to be slow, expensive, and limited by the throughput of readers available for high throughput screening. The use of automation and miniaturization into 1536 well plates can both increase the throughput and decrease the cost significantly. However, the industry is still plagued by relatively low throughput high content readers. While high content is often synonymous with imaging, here we demonstrate the capabilities of using flow cytometry in a true high throughput manner. We have developed a fully automated flow cytometry sampling workflow that is compatible with 1536 or 384 well plates. Progressive high-content screening systems have been demonstrated to process up to 50,000 wells/day on a routine basis with screening campaigns into the millions of wells, but this has been limited to adherent cells. We will describe an industry first automated screening system dedicated to processing and reading suspension cells using flow cytometry. The custom samplers are fully integrated into a GNF Systems ultra-high throughput screening system and feed three Beckman Coulter CyAn cytometers. Our current system can read a 384 well plate in 15 min and a 1536 well plate in less than an hour. This allows for a throughput of approximately 40,000 wells per day with less than one full time employee overseeing the system. Also presented will be an overview of informatics tools used to process the large amount of data in real-time and in a fully automated workflow. As a result of this effort, we are running high throughput flow cytometry phenotypic screens across multiple disease areas to enable novel drug discovery at Novartis.

Rong Lu, PhD
Assistant Professor, Department of Stem Cell Biology and Regenerative Medicine
University of Southern California, Keck School of Medicine
"In Vivo Coordination of Mouse Hematopoietic Stem Cells"

Hematopoietic stem cells (HSCs) sustain the blood and immune systems through a complex differentiation process. While this process has been extensively characterized at the population level, little is known about the lineage commitment of individual HSCs. In particular, how these stem cells, few in number and residing in different bones, are coordinated in regenerating a common blood pool remains an unsolved question. To address this question, we have recently developed a single cell tracking system using genetic barcodes and high-throughput sequencing. This experimental system provides the first single cell perspective of in vivo HSC differentiation. We show that individual HSCs follow distinct and mutually compensating lineage commitment paths that diverge at defined differentiation stages and lead to the production of distinct quantities and varieties of blood cells. In preconditioned mice used in virtually all HSC studies, a small subset of HSCs produces the majority of blood cells. Moreover, individual HSCs differentially contribute to various types of blood cells. Conversely, when mice are not conditioned, all HSCs uniformly differentiate and equally contribute to measured blood lineages. This surprising contrast, along with other findings that I will present, is unexpected and unobtainable from conventional studies. Our results demonstrate the compelling synergy between systems biology and single cell analysis, and provide a new approach to studying stem cells and tissue regeneration at a refined resolution.

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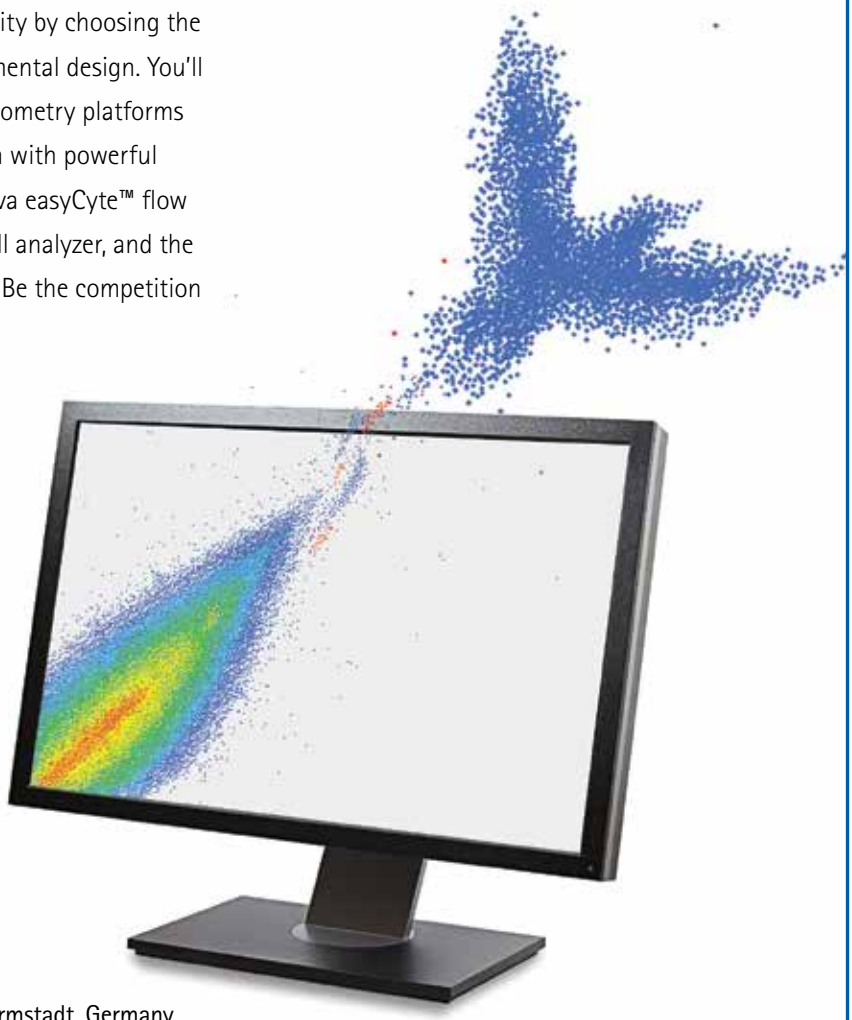

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Speakers and Abstracts (continued)

Pat Simms, MS
Manager, Loyola University Flow Cytometry Core Facility
"Analysis of exosomes using imaging flow cytometry – A shared resource facility story"
Sponsored by EMD Millipore

Microvesicles (MV) have emerged as important inter-cellular communicators. These microparticles are membranous vesicles which may contain RNA, DNA and/or proteins, and may also express cell surface antigens. Biological signals communicated by MV have been implicated in many disease processes. There are efforts to harness MV as therapeutic vectors to deliver drugs to target cells or as a biological adjuvant. The size of these particles, ranging from 0.05-1 micron, is below the usual sensitivity of a commercially available flow cytometer. This has stimulated the flow cytometry community to devise methods to analyze and quantify their uptake in various cell types. Several projects at our institution have a component that includes analysis of MV. In an effort to assist in the analysis, the Core Facility began analysis of these particles using flow cytometric approach, but was not successful. However, the Amnis ImageStream imaging flow cytometer has sufficient sensitivity to detect very small fluorescently labeled particles. After establishing the detection sensitivity for fluorescence and size, we determined that the MV could be detected if the membrane was fluorescently labeled. We established and standardized a protocol that permits the quantitation of labeled MV in suspension. We then measured the uptake of MV by tumor cells. Labeled MV were cultured with tumor cells lines, and the uptake of the MV was analyzed. The internalized MV were quantitated, both by the change in fluorescence and the spot count difference. Storage of these labeled MV in various conditions did not affect the uptake of the exosomes. However, the uptake of MV was inhibited when target cells were incubated at 4o C. MV were then cultured with several different uroepithelial cell lines to determine if the assay is able to detect differences in MV uptake. In another case, we determined the uptake of exosomes from serum of control or head and neck cancer patients by subsets of peripheral blood mononuclear cells (PMBC). PBMC were cultured in the presence of exosomes for a variety of time points. PBMC were subsequently stained for subsets (T cells, B cells, NK cells, Monocytes and dendritic cells) and exosome uptake was determined for each subset. In monocytes and dendritic cells, the change in fluorescence was significant, and spot counts were possible. In non-phagocytic lineages, spot formation could not be determined. However, there was a change in the fluorescence of these cells, indicating that there was a small uptake of exosomes. In another project, MV were derived from GFP-expressing cells constructed with SP15 viral protein that directs GFP to the cell surface. These GFP positive MV were incubated with microspheres coated with fluorescence labeled antibodies to specific MV antigens, and analyzed by image flow cytometry.

Poster Presentation Competition Winners

SoCal Flow invited undergraduate and graduate students, post-docs and non-management rank professionals (industry or academic) to submit an abstract for the Poster Session. Four poster were selected to present their work orally at the summit. The winners are:

Drake J. Smith, BS, Graduate Student, Dr. Lili Yang Laboratory, Eli and Edythe Broad Center for Regenerative Medicine and Stem Cell Research, Department of Microbiology, Immunology and Molecular Genetics, Howard Hughes Medical Institute, University of California, Los Angeles, "*Genetic engineering of hematopoietic stem cells to generate invariant natural killer T cells*"

Wei-Le Wang, MS, Graduate Student, Dr. Mark Boldin Laboratory, Department of Molecular and Cellular Biology, Beckman Research Institute/City of Hope Medical Center, "*Control of mammalian hematopoiesis and immune response by microRNA-142*"

Alborz Karimzadeh, BS, Graduate Student, Dr. Matthew Inlay Laboratory, Molecular Biology & Biochemistry Dept., University of California, Irvine, "*CD11a and EPCR as high-resolution markers to identify long-term hematopoietic stem cells*"

Alexandra Lee, MS, Bioinformatics Analyst, Dr. Richard Scheuermann Laboratory, Department of Bioinformatics, J. Craig Venter Institute, "*High-Dimensional Single Cell Data Analysis: Methods and Cyberinfrastructure*"

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Shabnam Shalapour, PhD, Post Doctoral Fellow, UCSD "Identification of Tumor-Infiltrating Lymphocytes by Direct Detection of Cytokine mRNA and Protein by Flow Cytometry".

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Lisa Bellemare, MS, Technical Application Specialist, "Incorporating Intracellular Flow Cytometry into Multicolor Panel Design".

Beckman Coulter:
Andrew Lister, Marketing Manager Research Products, "Moving the Goal Posts: The Cytoflex Cytometer Improves the Game".

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Matt Alexander, PhD, Senior Cell Biology Systems Specialist, "Bio-Rad S3e: Self Service Sorting for the Core or Individual Lab".

Cell Signaling Technologies:
Jessica McClure-Huhar, BS, West Coast Regional Manager, "Analysis of signaling pathways, intracellular protein expressions, and epigenetic markers using flow cytometry".

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Tanya Tolmachoff, MT (ASCP), Director Sales and Marketing, "Highlights of FCS Express 5".

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Erica L. Stone, PhD, Assistant Professor, Wistar, "Regulation of T Helper Cell Differentiation and Function by the Transcription Factor FOXO1".

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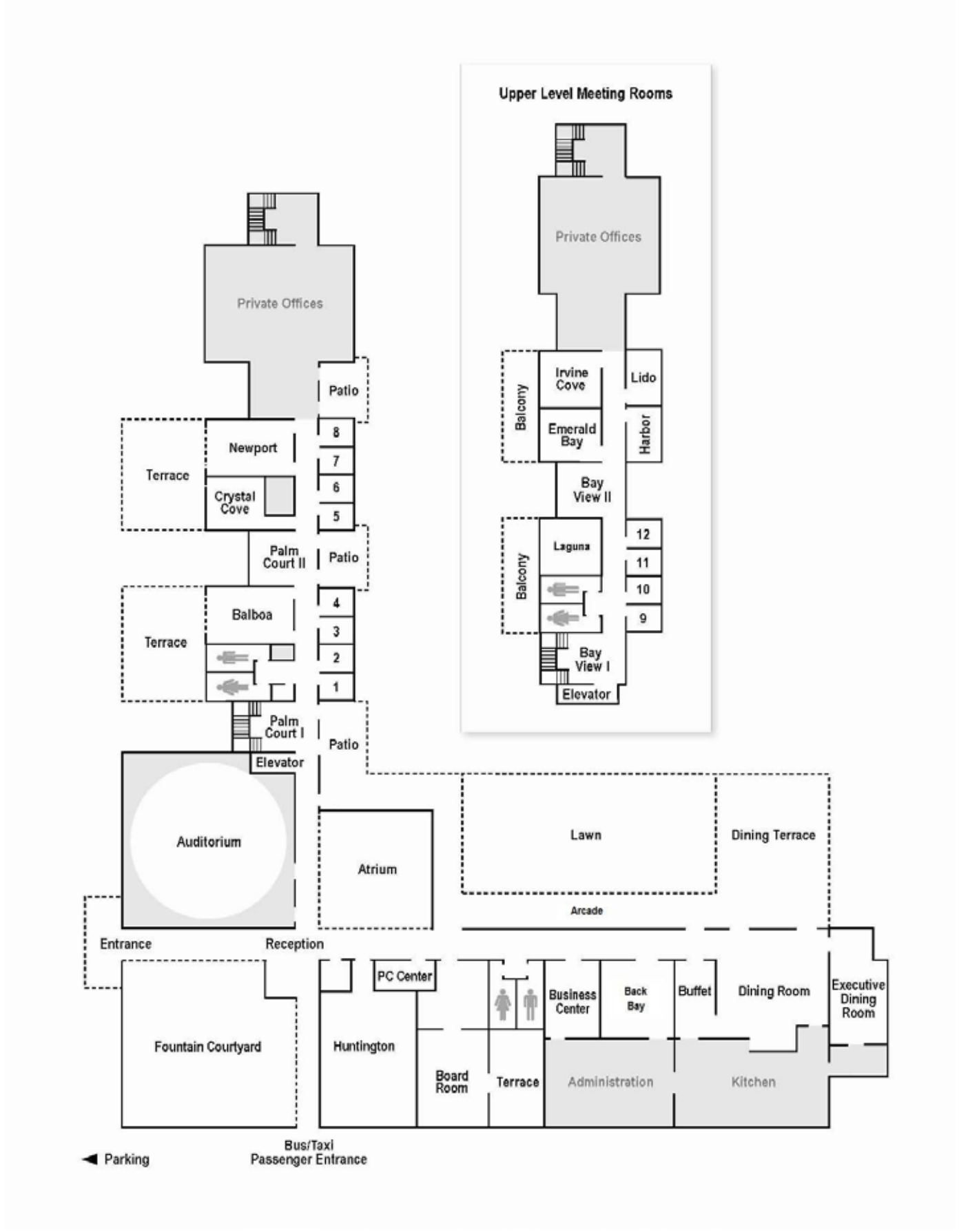
Barb Seredick, Senior Product Application Specialist, "The Attune NxT Acoustic Focusing Cytometer, an Affordable, High Performance Analyzer".

Beckman Center Floor Plan



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