Standards, Numbers, and New Technology: Flow Cytometry Evolving

Cascade Cytometry User’s Group, in association with Northwest Cytometry User’s Group, is hosting the 2006 Northwest Regional Cytometry Meeting

Cytometry is a-changin’, and these are exciting times, with changes afoot on many fronts. There are many opportunities to bring cytometry to a new group of researchers and clinicians, and to extend current uses, with developments in imaging and scanning cytometry, lab-on-chips, microarrays, high throughput screening, bead-based assays, and, not least, new reagents. But, as with all expansions, there are risks in opportunity. In this meeting we will be fostering lines of communication, exploring common ground, bringing to the fore new technology and the needs of new and longtime users, while seeking ways to avert a “Babel” of incompatible standards. What is needed in the end is a tractable cytometry, both more quantitative and extendable. Join us in this important discussion on Standards in Cytometry.

Plenary session talks

Ed Luther, “Enumeration and quantification: comparing flow and imaging cytometry”
Bob Hoffman, “Standardization over time and across platforms”
Peter Rabinovitch, “DNA content and cell cycle analysis: so simple yet so hard”
Ed Walker, “Memory T cells: taking the right measure of them”
Ger van den Engh, “Quantitation: the polarization wildcard”

William Fleming, “Flow cytometry: a stem cell biologist’s perspective”
Brent Wood, “Validation of multicolor work”
David Galbraith, “GFP, microarrays, and other extenders of the cytometry platform”
Howard Shapiro, “‘Personal’ cytometry – it ain’t necessarily flow”
Louis Picker, “Flow cytometric evaluation of SIV pathogenesis and immunity”
Tony Bakke, “Intracellular staining – problems and solutions”
James Huang, “Residual disease detection for lymphoma, leukemia, and myeloma”
Fred Battrell, “Cytometry at point of use: the state of the art in microfluidics”
Michael Loken, “Evaluation of myelodysplasia by flow cytometry”

Date: March 17-18, 2006
Location: OHSU Old Library, Portland, Oregon
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Schedule of events

**Thursday, March 16**
Advanced users course, "Multiparameter flow and compensation". Discount for conference registrants. Register with Sue DeMaggio at flo cyt e@flo cyt e.com.

**Friday, March 17**

**Standardization plenary**
Ed Luther, Principal Scientist, Strategic Scientific Development, CompuCyte Corp., "Enumeration and quantification: comparing flow and imaging cytometry"
Bob Hoffman, BD Biosciences, “Standardization over time and across platforms”

**Morning break and concurrent sessions**
Concurrent sessions include a standardization workshop (Bob Hoffman and David Basiji), “Pros, Cons, and alternatives to isotype controls” (Brent Wood and Jennifer Wilshire), and ‘The varieties of sorting’.

The following two plenary sessions are concurrent.

**Quantitation plenary**
Brent Wood, MD, PhD, Director, Hematopathology Laboratory, University of Washington, “Validation of multicolor work”
Ed Walker, PhD, Chief, Laboratory of Immunological Monitoring, EACRI, Providence Hospital, “Memory T cells: taking the right measure of them”
Ger van den Engh, Research Professor of Oceanography, University of Washington, “Quantitation: the polarization wildcard”

**Biological applications plenary**
William Fleming, PhD, MD, Associate Professor of Medicine, OHSU, “Flow cytometry: a stem cell biologist's perspective”
Peter Rabinovitch, PhD, MD, Professor of Pathology, University of Washington, “DNA content and cell cycle analysis: so simple yet so hard”
David Galbraith, PhD, Professor of Plant Sciences, University of Arizona, “GFP, microarrays, and other extenders of the cytometry platform”

**Luncheon roundtable discussions**
Concurrent sessions include ‘The hyperlog/ bi-exponential – Is log obsolete?’ and ‘Seeing and sorting stem cells’ (Ger van den Engh, Phil Streeter, William Fleming).

**Keynote addresses**
Howard Shapiro, MD, well-known as the author of Practical Flow Cytometry, “Personal' cytometry – it ain't necessarily flow”

**Afternoon break and technology workshop**
Concurrent with the technology forums is a concurrent session, ‘Cytometry for biologists’ (David Galbraith).

**Posters and technique workshops**
Concurrent with the poster sessions are ‘The latest on quantum dots' and several technique talks.

**Saturday, March 18**

**Clinical plenary**
Tony Bakke, PhD, Scientific Director, Clinical Immunology, OHSU, “Intracellular staining – problems and solutions”
James Huang, MD, Medical Director, Clinical Flow Cytometry, OHSU, “Residual disease detection for lymphoma, leukemia, and myeloma”
Fred Battrell, PhD, Vice President of Operations, Chief Technology Officer, Micronics, Inc., “Cytometry at point of use: state of the art in microfluidics”
Michael Loken, PhD, President, HematoLogics, Inc., “Evaluation of myelodyplasia by flow cytometry”

**Afternoon session**
A computer lab will be set up for those wishing to experiment with new multicolor analysis software.
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Ed Luther, Principal Scientist, Strategic Scientific Development, CompuCyte Corporation. Ed will present comparative results from mouse spleen cells, analyzed as a suspension by flow, as a tissue section in imaging cytometry, and by high resolution confocal microscopy, in terms of quantitative information obtained and contribution to understanding the biology.

Bob Hoffman, PhD, BD Biosciences, currently a BD Fellow in the Advanced Technology Group, has been developing flow cytometry instrumentation for nearly 30 years, with recent interests focused on simpler instruments and improved performance standards. He will discuss the fundamental characteristics of flow cytometers, how to measure them, and how to use the information to predict performance and to compare and monitor results.

Brent Wood, MD, PhD, directs the Hematopathology Laboratory at the University of Washington, a reference laboratory specializing in immunophenotyping of leukemias and lymphomas. As multicolor flow is increasingly used in both research and clinical practice, issues of quality control and performance validation become increasingly important. In his talk, Brent will emphasize the advantages and disadvantages of multicolor cytometry from a QC and validation perspective.

Ed Walker, PhD, Chief, Laboratory of Immunological Monitoring, EACRI, Providence Hospital. Ed’s research program involves monitoring anti-tumor responses in patients on vaccine trials. He will present results which call into question current models of central memory, effector memory, and effector CD8+ T cells obtained from 3-4 color analysis - 8-9 color analyses highlight the importance of how the cells are measured.

Ger van den Engh, PhD, Research Professor, School of Oceanography, University of Washington, and founder of Cytopeia, Inc. Widely known for having developed the first commercial high-speed sorter. Ger’s dominant interest of late is isolation of microorganisms from ocean samples. He will discuss how anisotropic emission, in combination with polarization-sensitive detectors, impacts brightness measurements.

William Fleming, MD, PhD, Associate Professor of Medicine, OHSU, has been interested in the close functional relationship between hematopoiesis and blood vessel formation. He will discuss the challenges of using cell sorting to define stem/progenitor cell function in the bone marrow and in solid tissues.

Peter Rabinovitch, MD, PhD, Professor of Pathology, University of Washington. Active in flow cytometry for 25 years, his strongest interest has been measurement of DNA content and cell proliferation, complementing his research in the biology of aging, and his study of preneoplastic gastrointestinal diseases, ulcerative colitis, and Barrett’s esophagus. Peter will review state of the art solid tissue DNA content and cell cycle analysis, as well as discuss challenges to adoption of these methods in clinical practice.

David Galbraith, PhD, Professor, Plant Sciences, University of Arizona. David’s research program has involved development of several new methods, including methods for analysis of ploidy, sorting large particles, and incorporation of digital signal processing, as well as microarray analysis and methods for examining nuclear RNA transcript patterns. He will describe how flow cytometry can be integrated with recent advances in biological technologies to provide a unique insight into living organisms.

Howard Shapiro, MD, best known as the author of Practical Flow Cytometry, now in its 4th edition. Trained in biophysics, surgery, and oncology, Howard has been involved in development of cytometric instrumentation for almost 40 years, and currently consults with investigators in academia, government, and industry. Flow cytometers, as they currently are, are expensive and complex. But it is possible to make many of the same measurements with smaller, simpler, less costly imaging systems using LEDs for illumination and CCDs for detection. This could bring the benefits of cytometry to more people in more places.

Louis Picker, MD, Vaccine and Gene Therapy Institute, Oregon National Primate Center, is an internationally recognized expert in human and non-human primate T cell immunology. His lab has been working on defining the mechanisms of T cell memory to chronic viral pathogens, and were the first to quantify and characterise antigen-specific memory T cell responses using cytokine flow cytometry. His talk will focus on the application of flow cytometry to quantitative analysis of overall and virus-specific immunity in non-human primates, with particular emphasis on new approaches to defining T cell dynamics on a systemic level.

Tony Bakke, PhD, Professor of Pathology and Scientific Director, Clinical Flow Cytometry and Immunology, OHSU. Tony’s research interests include development of new clinical markers of disease. Currently he is using FRET and multi-color flow to enhance detection of these markers. His talk on intracellular staining will address problem areas related to effective staining, high background, and changes in scatter characteristics.

James Huang, MD, Medical Director, Clinical Flow Cytometry, OHSU, is interested in validation of biomarkers, and in evaluation of drug sensitivity. James will review the data on sensitivity and the specificity of immunophenotypic signatures of residual disease, and will discuss strategies to use in detecting a rare population in a heterogeneous clinical sample. In addition, after his talk, he will conduct a computer tutorial for clinical laboratory technicians and hematopathologists (others are welcome), a hands-on opportunity using multicolor software. Participants are encouraged to bring their own data sets.

Fred Battrell, PhD, Chief Technology Officer for Micronics, Inc., is spearheading projects to advance micro flow cytometry for point of use / care applications, and is also Micronics’ lead investigator on a Bill and Melinda Gates Foundation grant to develop a point of care system to detect rapid onset fevers. For the cytometric applications, end product objectives include ease of use, time to result, enhanced CVs, and lower cost per test than macro systems. He will describe the technology, as well as discuss diagnostic and theranostic uses.

Michael Loken, PhD, President, HematoLogics, Inc. began his work in flow cytometry in 1973 on the first fluorescence activated cell sorter. The techniques he developed to simultaneously quantify multiple antibodies have been universally adopted. He was also the first to show neoplastic cells exhibit aberrant antigen expression, and these results have been applied to diagnosis of hematological abnormalities. In his talk he will be extending these results to the diagnosis and prognosis of myelodysplasia.
Registration for ‘Standards, Numbers, and New Technology: Flow Cytometry Evolving’

Registration is free thanks to the generous support of the sponsors listed below. Registration is also necessary if you want to eat lunch or take the advanced flow course at a discount. Early registration is advised – the advantages of early registration include an information packet on presentations. You can register by faxing in the form below or by contacting the conference organizer, Allan Kachelmeier, at kachelme@ohsu.edu or 503-494-1516. Maps and information on hotels, parking, and things to do in Portland will be sent on request.

2006 Northwest Regional Cytometry Meeting
Registration form – Fax to 503-418-5044

Name________________________________________  Affiliation______________________________________________
Address_____________________________________________________  Phone_________________________________
Email address__________________________________  Do you plan on doing a poster? ___ Do you need hotel info? ____

Information below is surveyed only for planning purposes.
Which sessions will you be attending?  Friday_____  Saturday_____  Saturday afternoon software workshop____
Will you be joining us for lunch?  Friday_____  Saturday____  Do you prefer vegetarian? _____
Will you also be registering for the advanced flow course on the 16th? ______

If you had to pick 3 from the following list of concurrent sessions to attend, which would they be? Please don’t bias your show of interest by looking at the present schedule – the schedule can be adjusted. Note: not all sessions are going to make it through the selection process.

Standardization workshop (Bob Hoffman, David Basiji)  FACS, HTS, and bead-based assays
Pros, cons, and alternatives to isotype controls (Brent Wood, Jennifer Wilshire)  The varieties of sorting
The hyperlog/biexponential – Is log obsolete?  DNA content and cell cycle analysis workshop (Peter Rabinovitch)
Seeing and sorting stem cells (Ger van den Engh)  Reagents and the limits of instrumentation
Cytometry for biologists (David Galbraith)  Precis on B & Q
The latest on quantum dots  What aspects of software should be standardized? (Ryan Brinkman)
What aspects of software should be standardized? (Ryan Brinkman)

Do you have other suggestions for concurrent session topics? _______________________________________________________

Fax this to 503-418-5044, and you are registered. Thanks for your time.