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

Mount St. Helens from OHSU, March 8, 2005
Photo by Craig Dorrell

Date: March 17-18, 2006

Location: OHSU Old Library, Portland, Oregon

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"

Fred Battrell, "Cytometry at point of use: the state of the art in microfluidics"
David Galbraith, "GFP, microarrays, and other extenders of the cytometry platform"
Howard Shapiro, "'Personal' cytometry – it ain't necessarily flow"

Brent Wood, "Validation of multicolor work"
Tony Bakke, "Intracellular staining – problems and solutions"
James Huang, "Residual disease detection for lymphoma, leukemia, and myeloma"

Friday sessions from 8:30am to 7pm, Saturday from 9:00am – 2pm. In addition to plenary sessions, concurrent sessions include workshops and discussions on a range of topics, including isotype controls and stem cells. Posters and vendor talks will be presented. Also, FloCyte Associates, Inc. is offering a one day course, "Multiparameter flow and compensation", on March 16 at a discounted price for meeting registrants. For course registration, contact Sue DeMaggio at flocyte@flocyte.com. Conference registration, thanks to the generous support of sponsors, is free (registration is required for a discount on the course and for lunch). For registration, or for further information on any of the above, contact conference organizer, Allan Kachelmeier, at kachelme@oshu.edu or 503-494-2361.

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Portland in the morning fog

Thursday, March 16

Advanced users course, “Multiparameter flow and compensation”. Discount for conference registrants. Register with Sue DeMaggio at flocyte@flocyte.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) and ‘The pros, cons, and alternatives to isotype controls’ (Brent Wood and Jennifer Wilshire).

Quantitation plenary

Peter Rabinovitch, PhD, MD, Professor of Pathology, University of Washington, **“DNA content and cell cycle analysis: how something so simple can be so hard”**

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”**

Luncheon roundtable discussions

Concurrent sessions include ‘The hyperlog/ bi-exponential – Is log obsolete?’ and ‘Seeing and sorting stem cells’ (Ger van den Engh).

New technology plenary

Fred Battrell, PhD, Vice President of Operations, Chief Technology Officer, Micronics, Inc., **“Cytometry at point of use: state of the art in microfluidics”**

David Galbraith, PhD, Professor of Plant Sciences, University of Arizona, **“GFP, microarrays, and other extendors of the cytometry platform”**

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

Afternoon break and vendor talks

Concurrent with vendor talks is a concurrent session, ‘Cytometry for biologists’ (David Galbraith).

Posters and technique workshops

Concurrent with the poster sessions are ‘The latest on quantum dots’, ‘Probes for microscopy and imaging’, and several technique talks.

Saturday, March 18

Clinical and validation plenary

Brent Wood, MD, PhD, Director, Hematopathology Laboratory, University of Washington, **“Validation of multicolor work”**

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”**

Concurrent sessions

Concurrent sessions on Saturday morning continue the validation, intracellular staining, and MRD talks. A computer lab will be set up for those wishing to experiment with new multicolor analysis software.

Registration and posters

Registration is free, and necessary if you want to eat lunch or take the advanced flow course at a discount. Early registration is advised. You can register by contacting the conference organizer, Allan Kachelmeier, at kachelme@ohsu.edu or 503-494-2361. Maps and information on hotels, parking, and things to do in Portland will be sent on request.

There is space and time for 20 posters. If you wish to present a poster and talk, please contact Allan at the above address for more details.

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The reason why we are on a higher imaginative level is not because we have finer imagination, but because we have better instruments.

-Alfred North Whitehead

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.

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.

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.

Bob Hoffman, PhD, BD Biosciences, currently a BD Fellow in the Advanced Technolgy 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.

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.

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.

Brent Wood, MD, PhD, directs the Hematopathology Laboratory at the University of Washington, which serves as 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.

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.

Tony Bakke, PhD, Professor of Pathology and Scientific Director, Clinical Immunology, OHSU. Tony's research interests include clinical markers of disease progression in regulatory T cells in combined HCV-HIV infection. His talk on intracellular staining will address problem areas related to effective staining, and will present solutions to deal with problems such as changes in flow characteristics and high background.

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 - the 8-9 color analyses done highlight the importance of how the cells are measured.

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, a hands-on opportunity using multicolor software. Participants are encouraged to bring their own data sets.

Sponsors include Oregon Stem Cell Center, Bd Biosciences (sponsoring Bob Hoffman), Molecular Probes (sp. Howard Shapiro), CompuCyte Corp. (sp. Ed Luther), Cytopeia Inc. (sp. Ger van den Engh), Micronics Inc. (sp. Fred Battrell), OHSU Department of Pathology (Saturday lunch), iCyt Mission Technology, Amnis Corp., Beckman Coulter, Cytek Development, Dako A/S, DeNovo Software, Evident Technologies, Evotec Technologies, Luminex Corp., Miltenyi Biotec, Spherotech Inc., Tree Star Inc., Union Biometrica, Verity Software House, and FloCyte Associates.