ISAC Presents e Wall of Histo

Honoring 60 years of discovery in cytometry

The history of any organization tells the story of its birth and development. ISAC has a long history beginning in the 1960s as a small group of individuals dedicated to the cause of cell analysis. It has grown into a large international organization with members from over 50 countries, with interests that span multiple technologies, all related to cell analysis.

The Wall of History, displayed in the ISAC booth at ISAC XXIII, May 20 – 24, 2006 in Quebec City, was designed to remind those who have participated in that history, to inform those who are new to the *Society*, and to excite those who have forgotten how much impact the *Society* has had on science. From its humble beginnings as part of the Engineering Foundation to its formation as the *Society for Analytical Cytology*, to the current *International Society for Analytical Cytology*, ISAC has become an influential voice in the world of cytomics.

In the display, each meeting of the *Society* was documented and the incoming President of the *Society* identified. Key discoveries or events such as the foundation of the Society journal <u>Cytometry</u> were noted. The official Society Historian, Phillip Dean, was responsible for accumulating the majority of Society history used in the display.

In addition to the ISAC Wall of History, Key Publications in Cytometry were presented, as well as important information on the Society's structure and function. Wallace Coulter's invention of the Coulter Counter was featured, as well as the invention of the electrostatic cell sorter by Mack Fulwyler.

J. Paul Robinson, President, ISAC Purdue University, 2007



The beginning ...

Meetings on Automatic (Analytical) Cytology

The first workshops and meetings in analytical cytology were sponsored by the Engineering Foundation in New York City. Sandford Cole was Director of Conferences of the Foundation. "Sandy" was a firm believer in the future of analytical cytology and in its ultimate benefit to society. His organizational skills, commitment, and support nurtured the formation of the Society and the establishment of analytical cytology as a recognized scientific discipline. At a general business meeting held in 1979, Sandford Cole was awarded an honorary membership in the Society.

The first recorded meeting on cytology automation was a workshop on "Automatic Cytology" held in Davos, Switzerland in September of 1970. The workshop was held in conjunction with an Engineering Foundation conference on automated multiphasic health testing.

The purpose of the workshop was to bring together some of the leading workers in automatic cytology to discuss the stateof-the-art and the near future of three general fields: automatic karyotyping, cervical smear analysis, and white blood cell differentiation. The meetings in this display are numbered with the first 6 meetings being Engineering Society meetings and SAC VII being the first meeting of the newly formed Society for Analytical Cytology.

Foundation Conference on Automated Cytology - July 26-30, 1971

The second meeting in the field was a full-fledged conference on automatic cytology, held under the auspices of the Engineering Foundation at New England College in Henniker, New Hampshire. Approximately 60 people attended.

The intent of this conference was to bring together leading research scientists and engineers in automatic cytology to discuss recent developments in the field. At that time, automatic cytology was understood to deal with the implementation of high-speed imaging systems and image processing and analysis for use in the field of biomedical research. Included in the attendees,

however, were several scientists working in the relatively new field of flow cytometry, including cell sorting. This may be the first formal conference at which this exciting new field was discussed.



Sandford S. Cole

Foundation Conference on Automated Cytology - Aug. 7-11, 1972



The second Engineering Foundation Conference on Automated Cytology was held at the Vermont Academy in Saxtons River, Vermont.

This meeting dealt primarily with the implementation of high speed imaging and image processing systems for use in biomedical pattern recognition However, the audience was larger (about 120) and the time allocated for discussion of flow systems technology was increased considerably. Techniques for sample preparation, cell delivery and transport, quantitative cytochemistry, and methods of sample analysis were discussed as related to programs in genetics, hematology, and gynecology (especially as related to cervical cancer).

All major companies who were selling or preparing to sell automatic hematology microscopes using pattern recognition methods attended the meeting.

Foundation Conference on Automated Cytology - Dec. 2-7, 1973



The Third Engineering Foundation Conference on Automated Cytology was held at the Asilomar Conference Grounds in Pacific Grove, California. Attendance at this conference was estimated to be about 200 and included many representatives from Europe.

An arrangement was made with Dr. P. Anderson, Editor of the Journal of Histochemistry and Cytochemistry (published by Williams and Wilkins Company, Baltimore) to publish the proceedings of the conference as a single issue of the journal, Vol. 22, No. 7 pp.

451-765 (1974). The strong technology orientation of these early conferences is reflected in the broad range of topics covered: Cytochemistry and Cell Preparation, Chromosomal and Cellular Image Analysis, Flow Analyzers and Cell Sorters, Standards and Statistics, and Integrated Systems.



"At the Third Engineering Foundation Conference on Automated (I and others working with Myron Block) did get to mingle with the Herzenbergs and their group, and with people from Los Alamos and Livermore, Tom and Donna Jovin and some folks from Europe also attended that meeting, but if I recall correctly, Wolfgang Göhde and his colleagues did not; the American and European flow people didn't get fully integrated until some of the European meetings a few years later."

-Howard Shapiro

The beginning ...

Foundation Conference on Automated Cytology - June 8-13, 1975

The Fourth Engineering Foundation Conference on Automated Cytology was also held at the Asilomar Conference Grounds. There were about 200 participants from 20 countries.

With the addition of a section on Flow System and Sorter Applications, applications of automated cytology began receiving more attention in the proceedings of this conference. There was also a workshop on clinical cytology which served to introduce the physicists, biologists and engineers to the practical problems experienced by cytopathologists.

Although imaging systems continued to play a major role in the conference, the impact of flow cytometry on the field of automated cytology was illustrated by the large number of papers presented on the subject. The importance of cytochemistry in the development of probes to be used in both image and flow cytometry was clear from the increased attention the field received at the conference.



Tom Jovin Meeting VI Chair

Foundation Conference on Automated Cytology - Dec. 12-17 , 1976



The Fifth Engineering Foundation Conference on Automated Cytology was held in Pensacola, Florida. The theme of this conference was "Where are we going?"

The technology was well advanced by this time, and although some new developments would be announced, the focus of the conference was on evaluation of progress to date in terms of the original cytological questions that gave rise to current technology and consideration of the broader questions in biology and medicine to which these skills could be brought to bear.

For this conference, workshops and the new "art form" of posters were used. They replaced the familiar formal platform paper presentations, with the hope that the new forum would provide greater opportunity to review new material. At this conference, discussions were begun on the possibility of forming a new society.



Mortimer Mendelson First President of SAC



Foundation Conference on Automated Cytology - April 23-29, 1978

The Sixth Engineering Foundation Conference on Automated Cytology was held at Schloss Elmau in Bavaria, Germany. To help provide funds for non-Europeans to attend the Schloss Elmau conference, four satellite meetings were organized:

- Pre-Conference Symposium on Cell Sorting and Recognition; Leiden, The Netherlands
- Practical Workshop on Cell Sizing; Martinsried-Munchen, West Germany
- Workshop on Automated Gynaecologic Cytology Systems; Edinburgh, Scotland
- Post-Conference EMBD Course on Cell Separation; Goettingen, West Germany

Additional funds were obtained from United States and West German governments and industries. This conference continued the use of posters (two formal sessions), and this time the authors were required to attend their posters for two hours during one of the sessions.

There were two sessions of workshops covering 20 subjects. To accommodate everything that the organizers wanted to cover, the conference was extended for one-half day, ending at noon on Saturday.

The first public meeting on forming a new society was held at this conference. The attendees voted to form the society. Mort Mendelsohn was elected the first President of the Society for Analytical Cytology (SAC).



Front Row: Leon Wheeless, Ted Young, Marvin Van Dilla, Dennis Rutovitz, Tom Jovin Back Row: Myron Melamed, Scott Cram, Sandy Cole, Mort Mendelsohn, Hans Aus, Klaus Goerttler, Jim Tucker, Paul Mullaney, Volker Kachel, Unidentified, Brian Mayall, Mack Fulwyler

SAC VII



The Seventh Engineering Foundation Conference on Automated Cytology was held in Asilomar, California, with approximately 275 attendees. This conference was co-sponsored by the new Society for Analytical Cytology (SAC).

This conference was devoted to overviews and new developments in automated cytology, including concepts, instrumentation, probes, and applications to biological and clinical problems. Formal plenary presentations covered the following topics: flow cytometry and sorting; scanning cytometry; cytometry probes; biological applications; and clinical applications.

The first Business Meeting of the Society for Analytical Cytology was held during this conference. It was announced at this time that the next conference would be called Automated Cytology VIII and would be sponsored by the Society for Analytical Cytology; the Engineering Foundation would no longer be a part of the conference series.

Papers from this and all succeeding conferences were published in the Society's new journal, Cytometry.





"The flow cytometric "world" in the 1970's was a small family where everybody knew each other. Every time we met at conferences or when visiting labs abroad, there was something new and exciting which had a great impact on our work. In addition, there was a close communication between the different research groups in the field."

-Ole Didrik Laerum

SAC VIII

Paul Mullaney, President Wentworth, New Hampshire May 19-25, 1981

Analytical Cytology VIII was held in Wentworth, New Hampshire, and had about 250 attendees, 120 of whom were Society members. Paul Mullaney became President during this Congress. He passed away during his term, and Leon Wheeless became President of SAC.

The philosophy of this meeting emphasized concise reviews in the plenary sessions, short talks for presentation of up-to-date research results, poster sessions for those wishing to present detailed points, and less formal workshops.

Topics were cancer detection and diagnosis; immunology and hematology; chromatin and chromosomes; cell growth and differentiation; technology of analytical cytology; and the coming decade: new applications of analytical cytology.



Paul Mullaney working on an early instrument (1970's)

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ANNOUNCEMENTS		
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Co-Sponsord by the Society of	Ar markital (Yolkay 2 and the Baginoering Foundation	
23–33, April, 1888, at	he Miranar Hoel, Santa Barbara, California	
Cytometry-measurement of cells and use	cellular components—is having an increasingly important impact in	
the chinical laboratory. Electronic cell counti	go ad sing as are routine, the backeyer differential count frequently	
This meeting will bring together scientists,	and engineera developing new cytometric approaches, manufactures	
building instruments, and laboratory cliniciat	and dimital existinits who apply them. The meeting will emphasize	
techniques ripe for dinical application. It will	be organized with morning planary sessions, evening workshops and	
applications in Hematology, Applications	chacke. Current Instrumentation, for the Future	
Applications in Hematology, Applications	Immunology and Microbiology, Applications in Oncology, and Nevel	
applications for credit for Constinuing Media	ald Education is perding through the University of California, San	
Attendance will be by invitation. For infor	mation and invitations plases on arti:	
The Engir	neering Foundation Conferences	
345 East 4	17 Street	
New York	., NY 10017	
Telephone	e (212) 644-7835; Telex 126 022	
Those who wish to speak at the plenary s	essions, contributed sessions, or workshops should contact either of	
the conference co-chairmen and indicate the	topic of their proposed presentation:	
Conference co-chairmen:		
Brian H. Mayall, M.D.	Laurence J. Marton, M.D.	
Biomedical Sciences Division	Department of Laboratory Medicine	
Lawrence Livermore National Laboratory	School of Medicine	
University of California	University of California	
Livermore, CA 94550	San Francisco, CA 94143	

"At Los Alamos Paul took me under his wing when I came to his lab as a graduate student. My assignment was to simulate and measure light scattering from mono-disperse cell populations such as white blood cells. At that time Paul was only about five years into his career and was already well published in light scattering. He had a fundamental understanding of the interaction of electric fields and how they interacted with the morphologies of the cell and of the roll of diffraction. In addition he was a skilled instrumentalist. His reputation extended throughout the flow cytometry community and in 1979 he was co-editor of the then definitive volume "Flow Cytometry and Sorting".

On the personal level Paul was always had time for me. He was encouraging. My technical discussions with him were always a learning experience for me. He had a good sense of humor. It's hard to see how I could have had a better advisor at that critical time in my career."

-Al Brunsting





SAC IX was held Oct. 18-23, 1982, in Schloss Elmau, West Germany. It was a combined international conference and was titled Analytical Cytology and Cytometry IX and the 6th International Symposium on Flow Cytometry. This conference was the first SAC conference to be held in Europe.

Major topics covered at this conference were biological challenges, quantitative cytometry in modern biology, techniques in cytometry, and analytical cytology in disease detection and management. A satellite conference with 75 attendees was held in Munich before the Schloss Elmau Conference. The symposium focused on cytometric approaches to biological dosimetry, and resulted in a book on the subject.

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It was at this time that the Society for Analytical Cytology recognized the importance of clinical applications in cytometry. The first clinical cytometry meeting was organzied by the society at the Miramar Hotel, Santa Barbara, California on April 25-30, 1982. Over 100 participants attended the meeting and it included both flow and imaging components.

SAC X

Paul K. Horan, President

Asilomar, California June 3-8, 1984

Analytical Cytology X was held at the Asilomar Conference Grounds in Pacific Grove, California. The conference attracted more than 400 attendees, more than double the number that were at Schloss Elmau for SAC IX.

The program included five plenary sessions, four poster sessions, and three workshops. This conference was the first to include tutorial sessions (five of them), which were intended to provide an opportunity for new workers in the field of analytical cytology to obtain an introduction to different aspects of the field. These sessions were the first to be presented each day. Another feature added for this conference was formal presentations by the industrial exhibitors.

Paul K. Horan was elected President. One of his major contributions was getting SAC to join the National Committee for Clinical Laboratory Standards (now the Clinical and Laboratory Standards Institute). With his leadership, SAC provided committee members with expertise to spearhead generation of the first consensus quidelines for flow cytometric testing in clinically relevant

areas such as CD4/CD8 immunophenotyping, leukemia/lymphoma, and phenotyping.

The Society began to take a serious position on standards. This included clinically related standards as well as data structure standards with the publication of FCS 1.0 by Murphy and Chused.

LETTER TO THE EDITOR DNA Flow Cytometry of Paraffin-Embedded Tissue wid W. Hedley, Michael L. Friedlander, Ian W. Taylor, Catherine A. Rugg, and Elizabeth A. Muserowe

lan P. Line Inc

SPECIAL REPORT Convention on Nomenclature for DNA Cytometry

ng Hiddemann, Johannes Schumann, Michael Andreeff, Barthel Barlogie, Chester J. He Robert C. Leif, Brian H. Mayall, Robert F. Murphy, and Avery A. Sandberg



CYTOMETRIC AND CYTO

TECHNICAL NOTE A Proposal for a Flow Cytometric Data File Sta

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SAC XI



Analytical Cytology XI was held on November 17-22, 1985, in Hilton Head, South Carolina. Approximately 48D people attended this conference. Donna Arndt-Jovin, Research Scientist, at Max Planck Institute for Biophysical Chemistry, became President of ISAC.

Following the pattern established at the earlier conferences, each day was begun with a plenary session. The meeting started on a Sunday and finished on Friday afternoon – a total of 5 and a half days. At this conference, workshops and industrial sessions were held in the afternoon and poster sessions in the evening. The meetings began at 8:30 am with a plenary session and concluded with poster sessions from 7:30 to 10:30 pm. The social hour was from 10:30pm to 11:30pm.....these were the days when meetings were 15 hour days!!!

The sponsors were divided into 3 categories, Patrons, Contributors and Friends.

Patrons: Smith Kline and French Laboratories, Enka, Smith Kline Beckman Corporation, and Johnson and Johnson

Contributors: Becton-Dickinson, Coulter Electronics EPICS Division, and Geomatric Data

Friends: Ortho Diagnostic Group, Coherent Laser, E.I Dupont De Nemours & Co., Eli Lilly CO, Instrumentation Laboratory Inc., Merc Sharp and Dohm, Molecular Probes, Bristol Meyers Co., and Dage-MTI, Inc.



Practical Flow Cytometry

Howard M. Shapiro

Alan R. Liss, Inc

Howard Shapiro's Classic was first published in 1985.

"I remember comina across a little group sitting on the floor listening to Howard as he played his quitar. Since I walked in at the middle of the song, at first I really could not get the "gist" of what it was about. Then I heard snippets of "lasers", "photons", funny rhymes about the most scientific of terms and data. This particular song was a very fast-paced tempo and you had to pay close attention to catch every nuance. That song was one of Howard's best and an absolute "hoot" --especially for a newbie scientist in the field as I was at the time. That was when I knew I had found the right field of science to be in and the right place to be!"

—Anne Hurley



SAC XII

Scott Cram-President Cambridge, England

The XII International Meeting of the Society for Analytical Cytology was held at Cambridge University, Cambridge, England, on Aug. 9-15, 1987. The meeting had about 670 participants, 300 of them SAC members.

August 9-15, 1987

This 3rd meeting of ISAC in Europe brought almost 700 participants together in an academic atmosphere oozing with tradition. The meeting venue was a huge success due in large part by the unflagging organizational zeal of Jim Watson. The obvious growth in the field as well as the concomitant diversification of interest areas necessitated a rethinking of the meeting structure away from the "engineering conference" format. Thus the first 2 ½ days were structured in parallel morning symposia of 50-100 participants on the topics of (AI) Cancer Therapy; (A2) Clinical Diagnosis; (B) Cytogenetics; (C) Cellular Receptors; (D) Hematopoiesis; (E) Immunology; (F) Image Processing; (GI) Flow Cytometry Hardware Development; and (G2) Flow Cytometry Software Development. The last 2 ½ days comprised 5 plenary sessions for all the attendees with lectures directed toward new horizons as well as initiation

of the tradition of distinguished lecturer series with Nobel Laureate César Milstein and Laureate-to-be, Sydney Brenner. Nearly 600 posters, grouped under 13 different topics, were on display all week to facilitate viewing and discussion. The afternoons were free for informal discussions while punting on the Cam, sitting on the grounds, wandering the by-ways of Cambridge. Before the scientific meeting began, there was a memorable Congress-only organ concert in King's College Chapel. The meeting came to a dramatic conclusion with a very formal dinner seated under a magnificent tent, on the college greens and served by the college staff in elegant style.

Scott Cram, a charter member of SAC, was elected President, after having also held the office of Secretary/Treasurer ('78-'85). He served in the role of Group Leader, Division Director, and Program Director for the DOE Office of Science Programs, a collection of programs that supported biosciences, chemistry, physics, and theory at Los Alamos National Laboratories.



Nobel Laureate César Milstein



"There are many [significant career moments] starting with my first exposure to flow microfluorometry (FMF) in 1968 and continuing today. The opportunity to present lectures and laboratory sessions around the world has been rewarding. especially when helping a new convert realize the power of single cell analysis as contrasted with bulk/average cell measurements."

—Scott Cram



September 4-9, 1988

The International Conference on Analytical Cytology XIII was held at the Beaver Run Resort, and was attended by about 800 participants, 600 from the United States and the remainder mostly from Europe. This was the first SAC meeting to benefit from professional organizers led by Jean Parker. Flow cytometric hardware and software developments were a central highlight along with newly emerging concepts in image analysis. NASA played an interesting role in the meeting as they asked the society to sponsor and take a lead in designing a flow cytometer that would fly on the space station.

This conference introduced a new format. Each day started with a plenary session of 1 hour and 20 minutes. The plenary session was followed by several parallel sessions covering distinctly different subjects; e.g., clinical applications in cancer, cytogenetics, and immunology. The SAC Distinguished Lecturer was Isaiah J. Fidler who spoke on "The Origin and Biology of Cancer Metastasis" (see below).

Parallel sessions were also held in the evenings. Poster sessions were held in the afternoons. Another innovation was the tutorial session on Sunday. Four scientific and two commercial tutorials were offered to conference attendees. These sessions were designed to provide attendees with either an introduction to, or detailed training in, specific subjects.

Social activities included a fun run with specially designed t-shirts featuring a running beaver (Beaver Run Resort!) and entertainment by the famous Koshari Indian Dancers from La Junta, Colorado. The low oxygen tension in Breckenridge provided some challenges and served as a reminder of what happy hour is all about at high altitude.

Ken Ault was elected president. It was during this time that SAC became ISAC. The Society had always had a large fraction of European members and had a growing number of members from Asia, but it had nevertheless been primarily a North American organization. With the name change to the International Society for Analytical Cytology,

a plan was developed for alternating American and European meetings as well as changing the administrative structure to be more international. ISAC obtained for the first time a professional administrative staff and professional help in organizing finances and meetings which had become too large and complex to be put together by the current president acting alone. Ken Ault played a key part in the transition of SAC to ISAC and from a more or less home-grown group with common interests to a substantial international professional society.

At this time began the growth of interest in clinical flow cytometry and in image cytometry. As these areas developed, it was a challenge to keep the Society together, to include those with clinical interests and those interested in new technologies, and to maintain the highly collaborative interactions between the physicists and engineers, the biologists, and the clinicians.



"The first night in Breckenridge, we had an open discussion regarding DNA preparation methods for flow cytometry. The meeting was totally packed and none of us had acclimated to the high altitude yet. We could not speak without gasping, we had bloody noses, but we argued and discussed the topic for hours as only ISAC passion and conviction dictated!"

-Anne Hurley



ISAC XIV

Ole D. Laerum, President Asheville, North Carolina

March 18-23, 1990

The International Conference on Analytical Cytology XIV was attended by 911 registered participants from 25 countries. The conference was held at the Grove Park Inn, Asheville, North Carolina. The unusual and striking intimacy between the building and its natural environment is one of the factors of the continued success of the Grove Park Inn and perhaps the chief factor in its architectural significance.

The format of the conference was essentially the same as for the Breckenridge conference and included 213 speakers and more than 350 posters. Significant at this conference were the discussions leading to revision of the Society's Constitution and Bylaws, and the official name change of the Society to the International Society for Analytical Cytology. The XIV meeting started at 8:30am with symposia, and ended with poster sessions from 7:30 to 10:30pm. The social hour was 10:30 to 11:30 pm....every night for 5 nights. The meeting started

on Sunday and finished on Friday. Long meeting! Plenary sessions covered the topics of New Fluorescent Probes, Image Cytometry New Technologies Genetic and Mol Bio Cell Bio Clinical Developments.

DANGII
Image: Image

International

Asheville, North Carolin

Asheville

FINAL PROGRAM

Conference

Cytology

on Analytical

XIV March 18-23, 1990

Laser poster made by Terry Fetterhoff (then at Boehringer Mannheim, Indianapolis) and distributed at this meeting. Contributed by Dave Coder

ISAC XV

Bart Gledhill, President Bergen, Norway August 25-30, 1991

The XV Congress of the International Society for Analytical Cytology had about 75D participants from 26 countries. The conference started with two days of tutorials: commercial tutorials on Saturday and scientific tutorials on Sunday. The main conference was held in the Grieg Hall with some parallel sessions held in nearby hotels.

Monday through Friday were started with "eye-opener sessions" which were intended to be introductory or refresher lectures. They were followed by plenary sessions in the mornings and parallel sessions in the afternoon; evenings were unscheduled.

Modifications of the Constitution and Bylaws were approved in 1991. One change separated the roles of Secretary and Treasurer, with Phillip Dean and Alan Landay being elected to these positions, respectively. The Secretary and Treasurer

were elected to three-term periods of service (~41/2 years) to be staggered such that both offices would not become vacant the same year. It was felt that this was a sufficient period of time to establish the continuity of Society memory. Bart Gledhill was elected Society President. Terms of service for the President and Councilors were not changed.

One thing that distinguished the Bergen meeting was the cost of drinks! It was saved by Coulter's EPICS Division head Bob Auer who opened up a suite in a hotel with an open bar. It was packed wall-to-wall every night.





Chairman: Ole Didrik Laerum Exhibits and Corporate Committee Chairman: Tore Lindmo Tutorials and Parallel Sessions: Ole Petter Clausen

Tutorials and Parallel Sessions: Ole Petter Clausen Scientific Posters: Harald Steen Local Arrangements: Robert Bjerknes

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Gerard Brugal	Chester Herman		
Ole Petter Clausen	Dick Killander		
Philip Dean	Jorgen Larsen		
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Harry Crissman	Anne Hurley		
Joe Gray	Marc Lalande		

Francesco Mauro Harald Steen Tore Lindmo Gunter Valet Iwao Nishiya Jan Visser Michael Ormerod I. Ted Young

President-elect: Bart Gledhil Past-President: Ken Ault

Tore Lindmo Francesco Mauro Hans Tanke

"There were 6 or 7 people from my lab at the Bergen meeting it was really expensive... I think we were all in shock at the cost of food and drink... but Bob Auer from **Coulter Electronics** saved the day - he opened a suite in one of the hotels and had an open bar..... and it was filled with ISAC members every night...it must have cost him a fortune but it saved the meeting from social disaster!"

-J. Paul Robinson

ISAC XVI

Zbigniew Darzynkiewicz, President Colorado Springs. Colorado

March 21-26, 1993

The XVI International Congress of the International Society for Analytical Cytology was attended by about 900 participants from 32 countries.

On Sunday afternoon, this conference introduced a special program of lectures for individuals wishing a concise introduction to the field. The topics were Flow Cytometry, Image Cytometry, In Situ Hybridization, and Clinical Cytometry. The lectures proved to be very popular, especially among the Society's newer members.

Commercial and scientific tutorials were held on Saturday and Sunday. Each day began with an eye-opener lecture on new technologies in cytometry (e.g., virtual reality, nanotechnology, and biotechnology), followed by a plenary session.

Late mornings were filled with either poster or workshop sessions, which continued into the afternoon. Evenings were reserved for more plenary sessions or workshops. There was a return to Congress workshops (32 of them) in an effort to provide more time for attendees to focus on up-to-the-minute issues, interests and problems.

This congress was also the forum for discussions by members of the Society interested in clinical applications of cytometry, which ultimately led to the formation of the Clinical Cytometry Division of the Society. Another innovation at this Congress was the announcement of several new Society awards, including the Presidents Award for Excellence, and the Exceptional Student Award. These awards were for \$1000 each and were funded by a donation of the entire Royalties from The Handbook of Flow Cytometry Methods, J. Paul Robinson, editor.

HANDBOOK of FLOW FLOW CYTOMETRY METHODS

J. Paul Robinson, Editor Associate Editors: Zbigniew Darzynkiewicz, Phillip Dean, Lynn Dressler;

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17. Temporal resolution (lifetimes) in solution. Imaging (microscopy), and flow cytometry. J.R. Lakowicz 18. Flow injection cytanalysis: An automated technique for study of kinetics of cell staining and immunochemistry by cytometry and microscopy. J. Ruzikla

"Cytometry allows one to quantitatively analyze individual cells, assess heterogeneity of cell populations, detect cells with rare properties, identify cell subpopulations differing in particular attributes, correlate expression of particular attributes with each other in the same cells thus exploring their causeeffect relationship. and separate (sort) individual cells with desired properties. Not a single of the above goals, which are of utmost importance in biology and medicine, can be achieved by other methodologies. It is not surprising, therefore, that applications of cytometry had tremendous impact on progress in immunology, cell biology (cell proliferation/cell cycle, cell signaling, necrobiology), cancer research, and clinical medicine."

–Zbigniew Darzynkiewicz



The XVII International Congress on Analytical Cytology had 860 registered participants from 32 countries.

This Congress used basically the same format as the Colorado Springs Congress. Major events during the Congress were a symposium on heterogeneity of tumor cell populations and a plenary session on apoptosis, both very active fields of research.

For the first time, abstracts could be submitted electronically through a server at the Los Alamos National Laboratory. Following recent developments in the Society, clinical topics were very prominent. The Clinical Cytometry Division played an active role in the organization of the clinical segments of the Congress. The Robert Hooke Distinguished Lecturer was David H. Beach who spoke on "The Cell Cycle and Cancer."

Honorary Fellow of the Society Awards were presented to K. Goerttler and to Marvin Van Dilla. Distinguished Service Awards were presented to Mack Fulwyler and J. Schumann. A new award, the Presidential Award for Excellence, was presented to Steve Lockett. Another new

award, the Outstanding Student Award, was presented to Alan Jones. Francesco Mauro became ISAC President. He had played an important role in bringing European members into the Society in the early years.





"The programming team that coded Attractors and the Macintosh version of Paint-A-Gate was also there to demonstrate these softwares. As a long-time Paint-A-Gate user and early adopter of Attractors I had come to know them. One programmer was using his free time to optimize Paint-A-Gate on his laptop. Each day when I bumped into him he would cheerfully tell me how many percent faster he had made the program run after a night of coding in his hotel room. He did manage to find some time for fun, though. He lasted one round of drinks at a local establishment -- generously provided by the Cytomation representative before saying his good nights ... so he could retire early to his room for more programming!"

- Eric Van Buren

ISAC XVIII

Joe Gray, President

April 13-18, 1996

Rimini, Italy

This meeting was organized by Joe Gray, President of the Society, in a departure from the past, when the scientific program was organized by the outgoing President. At this Congress, the Council decided that the President-Elect would be responsible for the scientific program of future congresses.

The meeting featured plenary lectures on analytical cytology technology, four Frontiers lectures on emerging technologies, parallel symposia, and scientific and commercial tutorials. In addition, in another departure from the past, the program included five biological themes: Biological Dosimetry, Analytical Cytology Technology, Cell Cycle, Tumor Heterogeneity, and Immunology/Hematopoiesis/AIDS.

The meeting was also unusual in that the entire congress was sited in one building, the Palacongressi; this had not been achieved for many years.

Honorary Fellow of the Society Awards were presented to Mortimer L. Mendelsohn and to Myron R. Melamed, the Presidential Award for Excellence was awarded to John P. Nolan, and Outstanding Student Awards were presented to Cordelia Langford and Iona E. W. O'Brien.

INTERNATIONAL SOCIETY FOR ANALYTICAL CYTOLOGY

ORGANIZING COMMITTEE President, Keynote, Frontier Sessions: Francesco Mauro Chair, Scientific Sessions: Joe Gray Co-Chair: Maria Pallavicini Theme Organizers: e Urganizers: Biological Dosimetry: Bart Gledhill, Marcello Spano Cell Cycle: Mike Ormerod, Zbigniew Darzynkiewicz Solid Tumors: Ken Bauer, Jim Watson Immunology/Henatopoiesis/AIDS: Maria Pallavicini, Martine Raphael Analytical Cytology Technology: Jim Jett, Hans Tanke SYMPOSIA ORGANIZER: Dan Pinkel Tutorials: Hans Tanke, Nigel Carter Posters: Marco Vitale, Walter Giaretti Exhibits: Leon Wheeless, Marcello Spano, Stefano Papa

Corporate Committee: Stefano Papa Local Arrangements: Stefano Papa Audio/Visual: Marco Vitale

ITALIAN STEERING COMMITTEE Chair: Francesco Mauro Stefano Papa, Raffaele De Vita, Marcello Spano, Marco Vitale, Walter Giaretti

EXECUTIVE COMMITTEE President: Francesco Mauro President-Elect: Joe Gray Secretary: Phillip N. Dean Tr Past President: Zbigniew Darzynkiewicz COUNCILORS

Betsy Ohlsson-Wilhelm

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Francis Lacombe

Treasurer: Lisa Staiano-Coico Michael Ormerod

Stefano Papa Doug Swartzendruber Hiromitsu Nakauchi Günter Valet Maria Pallavicini

tometry

The XVIII Congress of the International **Society for Analytical** Cytology



The Broadmoor Hotel was an outstanding venue for the ISAC XIX Congress, as it was previously for ISAC XVI. The ISAC XIX meeting was organized by incoming president James Watson. It began with a day of tutorials, followed by the official congress opening on Sunday. The Keynote address was given by Martin Raff, entitled "Cell Number Control," followed by five Frontiers session on Molecular Pharmacology (Victor Ling), Genomics, Molecular Cytogenetics and Cytometry (Joe Gray), Cancer Therapies (Frank McCormick), Cell Growth (Carlos Cordon-Cardo), and Cell Death (Gerard Evan). The remainder of the Congress included several small parallel plenary sessions, as well as regular parallel sessions, to cover the broad range of scientific issues addressed by cytometry.

The Robert Hooke Distinguished Lecture, given by Ed Weiler, was entitled "The HUBBLE Telescope" and was a fascinating introduction to the power of space exploration using optical technologies. In Memoriam Wallace Coulter 1913–1998

1998 Wiley-Liss Inc

Wallace Coulter was a simple man with humility, a self-described Arkansas farm boy, but im, each new day presented the promise of fresh discovery. He combined a distinctive v

which provided breefs for all of marked. Bildsory will records breefs for all of marked. Bildsory will records the genuits for downring situations and then presenting breakthrough analyses that pushed the boundaries of science ever forward. After all, his discovery of the Coulter Principle hunched the modern hematogic alignosis industry and in ording, fundamentally changed the prescience calibactory mellection. The first "Coulter Counter" was also the first commercial flow cytometer, Thin was followed by 77 patterns, granted over more than 40 years of While was an over the first commercial flow cytometer, then was also flowed by 77 patterns, granted over more than 40 years of the future waves of application. For Wallner, it was not reangly simply to market partners, the challenger was also user by Net. So, 18, not appropring that was estimated in the data by the relative of the future waves of application. The Wallner, it was not encough simply to market generative the challenger was also user by Net. So, 18, not appropring that was estimated waves of the future waves that appropring the tay was produced as a produced wave the encounted of all here the same condition. Wallace was not wave by Net. So, 18, not an appropring that was preduced before the human condition. Wallace haves patief people veryes, no he did. Let was stempt to carry on his inflation, to build upon the scientific and the instruction of Bohama conductor conters.

The Exceptional Student Award was presented to Karen K. Cornell; the President's Award for Excellence was presented to Thomas W. McCloskey. Distinguished Service Awards were made to Phillip N. Dean and Barton L. Gledhill.

Three very distinguished members of the society were made Honorary Fellows of the Society - Louis A. Kamentsky, Wolfgang Göhde, and Leonard A. Herzenberg.



ISAC XX

Lisa Staiano-Coico, President Montpellier, France

May 20-25, 2000

The Congress was held at Le Corum International Congress Center in Montpellier, France. There were 14 tutorials offered on the day prior to the 4 days of Congress. The first day program began with 5 Frontiers sessions that covered Plant Biology (Steve Kay), Marine Science (Louis Legendre), Cell Cycle Regulation (Andrew Koff), Cytometry (Steve Quake) and Oncology (Hsing-Jien Kung). The morning session of each day were Technical Plenary sessions – two on Microarray technology, one on technical advances on Flow Cytometry, one on Cell Cycle Regulation and one on Clinical Cytometry. Parallel sessions and workshops filled in the conference.

The Hooke Lecturer was Sir John Maddox, Editor of Nature for over 22 years, whose

lecture on "Where Science is Heading" was well received.

ISAC established a task force to evaluate its strategic goals over the course of this presidency. It was the time that Cytomics was recognized as being a developing field.





"Cytometry & cytomics constitute imperative essentials for the resolution of the molecular biocomplexity of cells, tissues, organs and organisms."

– Günter Valet





This meeting was planned by Harry Crissman, who did an excellent job bringing together a record number of attendees in what was one of ISAC's most successful meetings ever.

The ISAC XXI meeting was distinguished by the presence of Nobel Laureate Peter Doherty, winner of the 1996 Nobel Prize for Physiology and Medicine. Peter gave the keynote lecture on "Visualization of Cell-Mediated Immunity." This meshed very well with the drive of the Society toward the Cytomics era, as he was able to identify how new Cytomics tools were solving an age old problem in immunology.

The Robert Hooke Distinguished Lecture was given by the renowned scientist and commentator Lord Robert Winston, who gave a challenging lecture on "The Ethics of Human Stem Cell Research."

As in previous years, all of the Frontiers lectures were on the first day of the congress, with a plenary session each day. The area of Cytomics was a primary topic for the XXI congress, with two main symposia on the area as well as an excellent session in the interfacing of imaging and flow.

The President's Award for Excellence was awarded to Nada Boustany. The exceptional Student Award was presented to both Arancha Rodriguez-Caballero and Paula Ludovico. Stephen Lockett was awarded the Janis Giorgi Huang Foundation Scientist of the Year Award with Distinguished Service Awards going to Zbigniew Darzynkiewicz and Ian T. Young. The newly established Membership Award for recognition of exceptional service to the cytometric community was awarded to Howard Shapiro.



Keynote Address Visualization of Cell-Mediated Immunity Peter C. Doherty



Peter C. Doherty, winner of the 1996 Nobel Prize for Physiology and Medicine, was educated in veterinary science at the University of Queensland and received his Ph.D. in pathology from the University of Edinburgh. He has held positions at the Moredun Research Institute in Edinburgh, the Wistar Institute in Philadelphia, and the Australian National University in Canberra. In 1988, Dr. Doherty was appointed chairman. Department of Immunology at St. Jude's Children's Research Hospital in Memphis, a position he currently holds. In addition to the

Nobel Prize, awards received by Dr. Doherty include the Paul Ehrlich Prize, Germany; the Gairdner International Award, Medical Science; and the Albert Lasker Basic Medical Research Award. He is a Fellow of the Royal Society of London and foreign associate to the National Academy of Sciences.

"When I was just starting my PhD I had been struggling to set up our flow cytometer and had been cleaning the flow cell without realising the data acquisition was still running. My supervisor walked into the lab and said 'Oh, what a nice light scatter peak'. I didn't have the heart to tell him it was a measurement of me cleaning the flow cell!"

-Anonymous

ISAC XXII

Maria Pallavicini, President

Montpellier, France May 22-27, 2004

This Congress was held at Le Corum, and was run by Maria Pallavicini. It was another excellent set of discussions cytomic technologies. The Society entered a critical stage of maturation as a Society, as it recognized the demands of the 21st century. The emergence of biological imaging and the integration of cytomic technologies has been a driving force for change in the Society.

The Keynote lecture was provided by Roger Brent and was titled "The Alpha Project and the Dream of Predictive Biology." It was followed by Frontiers lectures on Nanocrystals (A. Paul Alivistos), Spectral Imaging (Yuval Garini) and 4pi Microscopy (Stefan Hell). Each day had 6 parallel sessions devoted to specific areas of interest to the Society and Plenary sessions on Computational Biology, Systems Biology, Stem Cell Biology and Clinical Cytometry rounded out the meeting.

The Robert Hooke Distinguished Lecture was given by John Mattick, titled "Programming of the Autopoietic Development of Complex Organisms: The Hidden Layer of Noncoding RNA."



John Mattick

ISAC XXIII

J. Paul Robinson, President

The ISAC XXIII meeting was attended by 1410 people from 33 countries. It was organized by President-Elect J. Paul Robinson, who established the first ISAC booth. Placed centrally in the exhibition hall, the ISAC booth became a central meeting place, and the site of special activities, including Howard Shapiro's impromptu concert. The ISAC booth also introduced the Wall of History – an attempt to personalize the development and maturation of the Society from the early days of the Engineering Foundation meetings to the current international consortium of research and clinical scientists. The booth featured a chronological history of the Society, historic photos, Cytometry publications, Society information, and a special exhibition containing some early Coulter Counters and the only remaining components of one of the original hand-built cell sorters built in 1967 by Mack Fulwyler. The Fulwyler instrument on display was essentially the same as the original 1965 cell sorter and was kindly donated by Dr. Boris Rotman of Brown University, where the instrument was located from 1967 to 2005.

Quebec City, Canada

May 20-24, 2006

Two pre-Congress courses were offered, directed by ISAC's emerging leaders. These short courses complemented the Congress by offering opportunities for members to learn different analytical approaches. The meeting also initiated a full evening Session entirely devoted to a Resource Managers' Workshop.

The scientific program changed significantly for this Congress, with emphasis on bringing the entire Congress together for more sessions as a whole. One Frontiers session and one Plenary session per day were designed to bring Congress attendees together twice daily. The scientific program was organized

around three themes – biological sciences, clinical sciences, and cytometric technology – and included a daily parallel session as well as workshops. The Program had an increased emphasis on imaging, as a result of ISAC's Strategic Planning. Two highlights were Roger Tsien's Keynote and Stephen Lewis' Robert Hooke Distinguished Lecture.

Winner of the Exceptional Student award was Jennifer Lemon, the President's Award of Excellence went to Zachary Pincus, Distinguished Service Awards went to Brian Mayall and Ole Didrick Laerum and Membership Awards went to Günter K. Valet and Michael G. Omerod. A new award was initiated at this congress. The Fulwyler Award for Innovative Excellence was awarded to Zbigniew Darzynkiewicz.



Stephen Lewis



MACK FULWYLER Innovator, Inventor, and Pidneer

Mack Fulwyler's invention of the electrostatic cell sorter may well be one of the most significant inventions in the field of cell analysis. While there are many outstanding inventors and scientists in the Society, it was Mack Fulwyler whose transformational innovation made possible the development of the field. Mack said it best:

...there was no stated need for a cell sorter. Nobody expressed the idea that it was necessary or important to biology.

However, following his invention of the electrostatic cell sorter came many wonderful enhancements such as immunophenotyping, DNA analysis, cellular function assays, and of course, the Human Genome Project.

> The sorter presented at ISAC XXIII and pictured here was built in 1967 by Mack Fulwyler. It was shipped to Brown University to the laboratory of Dr. Boris Rot man, where it was operated for 38 years. It cost \$5000 to build. This unit had some slight modifi cations from the original instrument built in 1965. This instrument is the only surviving version of the original invention, and is undoubtedly of tremendous historic value. It will ultimately be donated to the Smithsonian Institution.



"This was Mack's very brilliant idea, and he ran with the ball pretty much by himself. He did something I admire very much in science. He combined 2 totally disconnected ideas, the Coulter Counter (invented by Wallace Coulter) which counts red blood cells, and the ink jet oscillograph (invented by Dick Sweet), for an entirely different purpose, namely, sorting cells."

-Marvin Van Dilla



Key Papers in Cytometry

1934: Photoelectric measurement of cells in a capillary. Moldavan, A. Photo-Electric Technique For The Counting Of Microscopical Cells. Science 1934: 188-189.

1941: Fluorescence antibody technique developed.

Coons, AH., Creech, HJ., and Jones, RN. Immunological Properties of an Antibody Containing a Flugrescent Group, Proc. Soc. Exp. Biol. Med. 1941; 47:200-202.

1941: Nucleic acids shown necessary for protein synthesis.

Caspersson, T. Studien über den Eiweißumsatz der Zelle, Naturwissenschaften 1941: 29:3 33-43.

1941: Ilterine cancer detection.

Papanicolaou, GN., Traut, HF. The Diagnostic Value of Vaginal Smears in Carcinoma of the Uterus. Am J. Obst Gynec 1941; 42:193. Papanicolaou, GN. Some Improved Methods for Staining Vaginal Smears. J Lab Clin Med 1941; 26:1200.

1944: DNA is carrier of genetic information - Discovery of the "Transforming Principle."

Avery, DT, MacLeod, CM, and McCarty, M. Studies on the Chemical Nature of the Substance Inducing Transformation of Pneumococcal Types. Journal of Experimental Medicine. 1944, 79, 2:137-158,

1947: Photoelectric particle counting.

Gucker, FT, Pickard, HB, and D'Konski, CT. A Photoelectric Instrument for Comparing the Concentrations of Very Dilute Aerosols, and Measuring Low Light Intensities. J. Am. Chem. Soc. 1947: 69, 2, 429 - 438, Gucker, FT. D'Konski, CT. Pickard, HB, and Pitts, JN. A Photoelectronic Counter for Colloidal Particles, J. Am. Chem. Soc. 69, 10, 2422 - 2431, 1947.

1949: Particle counting by Coulter volume.

Coulter, WH. Means For Counting Particles Suspended In A Fluid. U.S. Patent #2,656,508. Application August 27, 1949. Patented October 20, 1953.

1950: DNA and RNA shown to increase in actively growing cells. Caspersson, T. Cell Growth and Cell Function, A Cytochemical Study. 1950. Norton, NY.

1950: Uterine cancer detection using fluorescence microscopy.

Friedman, HP Jr. The Use of Ultraviolet Light and Fluorescent Dyes in the Detection of Uterine Cancer by Vaginal Smear. Am J Obst Gynec 1950; 59:852.

1953: Hydrodynamic focusing for reproducible delivery of cells in a fluid. Crosland-Taylor, P.J. A Device For Counting Small Particles Suspended In A Fluid Through A Tube. Nature 1953:171, 37-38.

1955: Automated scanning instrument for screening cytological smears

Tolles WE. The Cytoanalyzer: An Example Of Physics In Medical Research. Trans N Y Acad Sci 1955; 17:250–256.

1961: First use of fluorescence for quantitation.

Rotman, B. Measurement Of Activity Of Single Molecules Of -D-Galactosidase. Biochemistry 1961; 47: 1981-1991.

1963: First use of absorption for cancer cell detection. Kamentsky, LA, Derman, H, and Melamed, MR. Ultraviolet Absorption in Epidermoid Cancer Cells. Science 1963; 142:1580-1583.

1964: Electrostatic principle for ink jet.

Sweet, RG. High Frequency Recording with Electrostatically Deflected Ink Jets. Review of Scientific Instruments 1965; 36(2):131-136.

1964: Acridine orange differentiation of leukocytes.

Hallerman, L, Thom, R, Gerhartz, H. Elektronische Differentialzählung von Granulocyten und Lymphocyten nach intravitaler Fluorochromierung mit Acridinorange. Verh Deutsch Ges Inn Med 1964; 70:217. Kosenow, W. Die Fluorochromierung mit Acridinorange, eine Methode zur Lebendbeobachtung gefärbter Blutzellen. Acta Haemat 1952; 7:217.

1964: Need for automated imaging established.

Ingram, M, and Preston Jr., K. The Importance of Automatic Pattern Recognition Techniques in Early Detection of Altered Blood Cell Production. Ann NY Acad Sci 1964; 113:1066.

1965: Electrostatic cell sorter invented. Fulwyler, MJ. Particle Separator. U.S. Patent #3,380,584. Application June 4, 1965. Patented April 20, 1968.

Particle separator in principle capable of separating by volume, optical density or fluorescence.

Fulwyler, MJ. An Electronic Particle Separator with Potential Biological Application. Los Alamos Scientific Laboratory Annual Report of the Biological and Medical Research Group (H-4) of the Health Division, July 1964 through June 1965, Written July 1965

Fulwyler, MJ. Electronic Separation of Biological Cells by Volume. Science 1965; 150: 910-911.

1965: Spectrophotometry of cells.

Kamentsky, LA, Melamed, MR and Derman, H. Spectrophotometer: New Instrument for Ultrarapid Cell Analysis. Science 1965; 150:630-631.

1966: Fluorogenic esters in mammalian cells.

Rotman, B and Papermaster, BW. Membrane Properties of Living Mammalian Cells as Studied by Enzymatic Hydrolysis of Fluorogenic Esters. Proceedings of the National Academy of Sciences of the United States of America, 1966, Vol. 55, No. 1, 134-141.

1967: Fluorescence flow cytometry – first paper.

Van Dilla, MA, Mullaney, PF, and Coulter, JR. The Fluorescent Cell Photometer: A New Method for the Rapid Measurement of Biological Cells Stained with Fluorescent Dyes. Los Alamos Scientific Laboratory Annual Report of the Biological and Medical Research Group (H-4) of the Health Division, July 1966 through June 1967. Written September 1967.

1968: Automated imaging.

Ingram, M, Norgren, PE, Preston Jr., K. Automatic Differentiation of White Blood Cells. Image Processing in Biological Science, D.M. Ramsey (ed.), University of California Press. Los Angeles, pp. 97--117, 1968.Wald N, and Preston Jr., K. Automatic screening of metaphase spreads for chromosome analysis. Image Processing in Biological Science, D.M. Ramsey (ed.), University of California Press, Los Angeles, pp 9-34, 1968. Ingram, M, and Preston Jr., K. Automatic Analysis of Blood Cells. Sci Amer 1970; 223(5):72.

1968: Fluorescence flow cytometry patent. Göhde W. Automatisches Meß- und Zählgerät für die Teilchen einer Dispersion. German Patent #DE1815352, priority date Dec. 18, 1968. 1968: Scanning vs flow for cancer cytology. Wied, GL and Bahr, GF, Eds. Automated Cell Identification and Cell Sorting. 1970. Academic Press, NY. (Proceedings of 1968 Conference in Chicago). Dittrich W, and Göhde W. Impulsfluorimetrie bei Einzelzellenin Suspensionen. Z Naturforsch 1969; 24b: 360-1. Van Dilla, MA, Truiillo, TT, Mullanev, PF, and Coulter, JR, Cell Microfluorometry: A Method for Rapid Fluorescence Measurement, Science 1969; 163:1213-1214. Mullaney, PF, Van Dilla, MA, Coulter, JR and Dean, PN, Cell Sizino; A Light Scattering Photometer for Rapid Volume Determination, Review of Scientific Instruments, 1969; 40(3): 1029-1032. Hulett, HR, Bonner, WA, Barrett, J, and Herzenberg, LA. Cell Sorting: Automated Separation of Mammalian Cells as a Function of Intracellular Fluorescence. Science 1969; 166: 747-749. 1977: Fluorescence activated cell sortir Bonner, WA, Hulett, HR, Sweet, RG, and Herzenberg, LA. Fluorescence Activated Cell Sorting. Review of Scientific Instruments 1972; 43 (3): 404-409. 1973: Doublet discrimination pater Göhde W. Process for automatic counting and measurement of particles. US patent #4,021,117, priority date Jun 23, 1973 (DE). 1974: Mathematical analysis of DNA distribution Dean PN, Jett JT. Mathematical analysis of DNA distributions derived from flow microfluorometry. J Cell Biol 1974: 60: 523. 1975: Monoclonal antibodies – invention. Kohler G. Milstein C. Continuous cultures of fused cells secreting antibody of predefined specificity. Nature Lon, 1975; 256:495-497. 1977: Two color fluorescence compensation. Loken, MR, Parks, DR, Herzenberg, LA. Two-color immunofluorescence using a fluorescence-activated cell sorter. J. Histochem. Cytochem. 1977; 25: 899-907. 1978: Radiation collector methods – three patents. Hogg, WR and Brunsting, A. Ellipsoid-conic radiation collector method. US Patent # 4,189,236 Ellipsoid radiation collector apparatus and method. US Patent # 4,189,543. Mirror image ellipsoid radiation collector and method. US Patent # 4,188,542. 1979: Monoclonal antibodies – use in flow cytometry. Kung, PC, Goldstein, G, Reinherz, E, and Schlossman, SF. Monoclonal Antibodies Defining Distinctive Human T Cell Surface Antigens. Science 1979; 206:347.Reinherz, E and Schlossman, SF. The Differentiation And Function Df Human T Lymphocytes. Cell 1980; 19:821. 1979: Flow imaging Kachel, V, Benker, G, Lichtnau, K, Valet, G and Glossner, E. Fast Imaging In Flow: A Means Of Combining Flow-Cytometry And Image Analysis. J Histochem Cytochem. 1979; 27(1):335-41. 1979: Radiant energy reradiating flow cell system – pati Brunsting, A, and Hogg, WR. Radiant Energy Reradiating Flow Cell System And Method. US Patent #4,523,841. Hedley DW, Friedlander ML, Taylor IW, Rugg CA, and Musgrove EA. Method For Analysis Of Cellular DNA Content Of Paraffin Embedded Pathological Material Using Flow Cytometry. J Histochem Cytochem 1983; 31:1333-1335. Hedley DW, Triedlander ML, Taylor IW, Rugg CA, and Musgrove EA. DNA Flow Cytometry Df Paraffin-Embedded Tissue. Cytometry 198; 5(6):660. 1984: Convention on nomenclature for DNA cvt Hiddemann, W, Schumann, J, Andreeff, M, Barlogie, B, Herman, CJ, Leif, RC, Mayall, BH, Murphy, RF, and Sandberg, AA Convention On Nomenclature For DNA Cytometry. Cytometry 5(5) 1984, 445-446. Murphy, RF and Chused, TM. A Proposal for a Flow Cytometric Data File Standard. Cytometry 1984; 5:553-555. Parks DR, Hardy RR, Herzenberg LA. Three-Color Immunofluorescence Analysis Of Mouse B-Lymphocyte Subpopulations. Cytometry 1984, 5(2):159-68. Watson, JV. Time, a Quality-Control Parameter in Flow Cytometry. Cytometry 1987; 8:646-649. Gray, JW, Dean, PN, Fuscoe, JC, Peters, DC, Trask, BJ, van den Engh, GJ, and Van Dilla, MA. High-Speed Chromosome Sorting. Science 1987; 238:323-329. Watson, JV. Flow Cytometry Chamber With 4# Light Collection Suitable For Epifluorescence Microscopes. Cytometry 1989; 10(6): 681-688. Data File Standards Committee of the Society for Analytical Cytology. Data File Standard for Flow Cytometry. Cytometry 1990; 11:323-332. J. Paul Robinson, J.P., Maguire, D., King, G., Kelley, S. and Durack, G. Integration Of A Barcode Reader With A Commercial Flow Cytometer. Cytometry 1992; 13(2):193-197. Roederer, M. De Rosa, S Gerstein, R, Anderson, M, Bigos, M, Stovel, R, Nozaki, T, Parks, DR, Herzenberg, L, and Herzenberg, L. 8 Color, 10-Parameter Flow Cytometry To Elucidate Complex Leukocyte Heterogeneity. Cytometry 1997; 29:328-339. De Rosa, S.C., Herzenberg, L.A. & Roederer, M. 11-Color, 13-Parameter Flow Cytometry: Identification Of Human Naive T Cells By Phenotype, Function, And T-Cell Receptor Diversity. Nat. Med. 2001; 7: 245–248.

2004: Seventeen-colour flow cytometry.

Perfetto SP, Chattopadhyay PK, Roederer M. Seventeen-Colour Flow Cytometry: Unravelling The Immune System. Nat Rev Immunol. 2004; 4(8):648-55.

ISAC AWARDS

The first award made by the Society was to Sanford Cole, Director of Conferences of the Engineering Foundation of New York. "Sandy" was a firm believer in the future of analytical cytology and in its ultimate benefit to society. At a general business meeting held in 1979, Sanford Cole was awarded an honorary membership in the Society, with the following statement: "His organizational skills, commitment, and support have nurtured the formation of the Society and the establishment of analytical cytology as a recognized scientific discipline."

In 1992, the Council of the Society established two awards to be made to Society members.

The Honorary Fellow of the Society award was established to recognize significant contributions to the Society. It was renamed Membership Award in 2002.

The Distinguished Service Award was established to honor those individuals who served the Society in a major role, provided major support to the Society and its members, or made a significant contribution to the success of the Society.

The Outstanding Student Poster Award is a competitive award given to one or more student poster presenters at each Congress.

The Society established two additional awards in 1994: the Presidential Award for Excellence and the Dutstanding Student Award. The Council felt that to assure the long term growth and prosperity of the Society there must be a steady infusion of new scientists into the field of analytical cytology. These awards were established to provide encouragement for younger scientists to enter the field and to recognize excellence in their activities. These competitive awards include a substantial monetary prize. The funding for these awards was provided entirely by the donation of all the royalties from the Handbook of Flow Cytomety Methods, edited by J. Paul Robinson.

The Presidential Award for Excellence is presented to one or more of the outstanding younger members of the Society. To be eligible, a candidate must be a member of the Society, out of post-doctoral training for no more than 5 years, have presented at national and international meetings, have published in refereed journals, and attend the Society's congress. In addition, the candidate must submit a brief paper on the subject of a poster presented at the congress

The Dutstanding Student Award recognizes continuing outstanding performance by a student with service to the field and to the Society. To be eligible for this award, a candidate must be a member of the Society, be a pre-doctoral student, and follow a field of study in any physical or natural science with a goal of working in analytical cytology. In addition, the candidate must submit a brief paper on the subject of a poster presented at the congress. It was renamed Exceptional Student Award in 1998.

The Janis Giorgi Scientist of the Year Award, was created from funds from the Huang Foundation in honor of long-time ISAC member Janis Giorgi who passed away in 2000. She devoted a great deal of time to mentoring younger members and was a role model to a generation of female scientists. The award recognizes an outstanding junior scientist who has made seminal contributions to the field of cytometry/cytomics.

The Best Paper in Cytometry Award was established in 2003, to recognize the best paper appearing in Cytometry, as judged by the editors and associate editors.

The ISAC Scholars program was established to encourage and maintain younger membership in ISAC by funding ISAC membership dues. This program is intended to enhance the number of young members of the Society, and to provide an opportunity for all young members to be mentored in the skills of leadership. Several pharmaceutical companies generously support this program.

The Fulwyler Award for Innovative Excellence was established in the memory of Mack J. Fulwyler, the inventor of the electrostatic cell sorter, recognizes an individual who has demonstrated outstanding innovation by invention, or in a career of innovative science. A recipient need not be a member of the Society. The first Awardee in 2006 was Zbigniew Darzynkiewicz.

1993

Honorary Fellow of the Society - J. Sebastian (Bas) Ploem Distinguished Service Award - Wallace Coulter and Bernard Shoor Dutstanding Student Poster Award - Bruce Dien and James Mullikin

1994

Honorary Fellow of the Society - Klaus Goerttler and Marvin A. Van Dilla Distinguished Service Award - Mack J. Fulwyler and Johannes Schumann Presidential Award for Excellence - Stephen Lockett Outstanding Student Award - Allan Jones

1996

Honorary Fellow of the Society - Myron Melamed and Mortimer L. Mendelsohn

Distinguished Service Award - Leon L. Wheeless

Presidential Award for Excellence - John P. Nolan

Outstanding Student Award - Cordelia Langford and Iona Elizabeth Weir Outstanding Student Poster Award - Suet-Feung Chin, Laleh Daneshvar, Jeannette Drew, Injgerd Lien, Mariette Van De Corput, and Astrid Visser

1998

Honorary Fellow of the Society - Louis A. Kamentsky, Wolfgang Göhde, and Leonard A. Herzenberg Distinguished Service Award - Phillip N. Dean and Barton L. Gledhill President's Award of Excellence: Thomas W. McCloskey Exceptional Student Award: Karen K. Cornell Dutstanding Student Poster Award: Arvind Natarajan

2000

Honorary Fellow of the Society - Harry A. Crissman, Harald B. Steen Distinguished Service Award - L. Scott Cram, Carleton W. Stewart Presidential Award for Excellence - Graeme Hodgson Exceptional Student Award - Stephanie Sincock Dutstanding Student Poster Award - Louise Affleck, Cristina Prudencio

2002

Membership Award (Honorary Fellow of the Society) - Howard Shapiro Distinguished Service Award - Zbigniew Darzynkiewicz, Ian T. Young Presidential Award for Excellence - Nada Boustany Exceptional Student Award - Arancha Rodriguez-Caballero, Paula Ludovico

Outstanding Student Poster Award -Carl Bortner, Katrien Vermeulen Janis Giorgi Scientist of the Year Award – Stephen Lockett

2004

Membership Award - Anne A. Hurley Distinguished Service Award - James V. Watson Presidential Award for Excellence - Antoine Snijders Exceptional Student Award - Ann Van Driessche Dutstanding Student Poster Award - David Diaz, Feimo Shen, Peter Szaniszlo, Barbara Zsebik Janis Giorgi Scientist of the Year Award –Ilesh V. Jani Best Paper in Cytometry - Asifa S. Haider

2006

Membership Award: Günter Valet and Michael Ormerod Distinguished Service Award: Brian Mayall and Ole Didrik Laerum Presidential Award for Excellence - Zachary Pincus Exceptional Student Award - Jennifer Lemon Outstanding Student Poster Award - Younes Leysi-Derilou Best Paper in Cytometry- Steven M. Chan, Janelle A. Olson, Paul J. Utz Fulwyler Award for Innovative Excellence - Zbigniew Darzynkiewicz ISAC Scholars - Dario Coletti, Tytus Bernas, Dominik Lenz, Lori Yang, Ryan Brinkman, Claudio Panzarella, Reiner Schulte, Laura Adang (2006-2011). Alireza Ardjmand Ghahestani; Ji Fan; Michael Lewis; Sach Jayasinghe; Zaha Al-Makhlafi; Zoe Cohen (2007-2012).

Phil Dean, ISAC Historian

In June, 1997, the ISAC Council established the positions of ISAC Historian, and ISAC Archivist. Longtime (Charter) member Philip Dean, former ISAC Secretary, who had been fulfilling these roles unofficially, was appointed to both positions. Since that time, he has continued to play an important role in documenting the events and business of the Society. He also reviewed old records, and wrote an extensive history of the Society, and analysed and summarized statistics on membership and international diversity. Much of the material in the preceding pages is based upon his work, and we gratefully acknowledge his efforts to preserve the history of the society for future members.

<image>

Phil Dean, ISAC Historian

Phil began his career in the Air Force as a specialist in the field of Radiation Effects. Following discharge from active duty, he started work at the Los Alamos National Laboratory where he continued his work in radiation effects and later became involved with the Flow Cytometry Group.

It was at this time that he developed methods and software for the analysis of DNA distributions. Subsequently, Phil Dean transferred to the Biomedical Research Program at Lawrence Livermore National Laboratory, where he continued to work on the development of flow cytometry and cell sorter instruments as well as data analysis software. He also continued a project begun at Los Alamos, to develop an anthropometric phantom to calibrate detectors used for the measurement of plutonium in the human lung. With the help of the Hazards Control Department, he completed the project, which resulted in the standard phantom used throughout the world for this purpose. He participated in the development of multi-parameter cell sorting and its use in flow karyotyping and the sorting of single chromosome types, as well as indexed sorting. In data analysis, he developed a method for the analysis of dual-parameter data on chromosomes. More recently his efforts expanded into image cytometry where his specialty was in optical sectioning and 3D reconstruction. He retired from the laboratory in 1993 but continues to work there as a participating guest.

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