MicroNews

San Francisco Microscopical Society Volume 8, #4 November 2013

Playing The Maker: Experimantal Microcosms and Micro-scale Imaging in Ecology

General Meeting: SFMS at UC Berkeley, Wednesday, November 9,
2063 Valley Life Sciences Building
7:30 PM, By **David Armitage, UC Berkeley**

Dave Armitage is our speaker and is also the recipient of the SFMS 2012 Grant.

We will meet in room 2063 VLSB (Valley Life Science Building) by 7 and tour his lab. at the west end of UC, Berkeley. .

Summary: Dave will introduce the concept of microcosms as a tool in ecological research, the history of these systems, and ongoing controversies surrounding them. He will discuss some of the research he is conducting in pitcher plant communities and his public outreach on his microscopic imaging blog. He will also discuss some of the upcoming microscopical techniques being employed by ecologists to study species interactions at the micro -scale.

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Steve Samuelsson, SFM S and NCSM member

Steve Samuelsson is a long-time Bay Area resident and microscopist. He is passionate about microscopical imaging and is a true morphologist.

Steve was first introduced to the field of electron microscopy while hitchhiking back to Berkeley from Stanford; more specifically, freeze-fracture transmission electron microscopy (FF/TEM). So taken by this cool technique, he requested permission to train with graduate students in thin section TEM and FF and used the former for his senior thesis and BS in Nutritional Sciences in 1975. After Cal Steve continued to work in the field as a Research Associate and Specialist at UCSF then, later at Stanford becoming a master of thin section ultrastructure, autoradiography (ARG) and negative stain techniques.

His graduate training started in physiology at Stanford but was interrupted as he moved to the east coast for positions in neuroanatomy, pharmacology and pathology as EM facility coordinator. Steve returned to graduate school in the new Membrane Biology Training Program at the University of Maryland in Baltimore.

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MICROSCOPY AT U. OF VICTORIA WORLD'S LARGEST

If it were easy to find all the news about microscopes in one place, filling the pages of Micro News would be done in one afternoon. Fortunately, difficult as it is to bring you an interesting newsletter, it is made somewhat easier when "reporters" send leads to something new and interesting in this broad field. My brother spotted a one page report in Popular Mechanics (March 2013, pp 112) regarding A Brief History of the Microscope. It devoted a single paragraph to each of the following dates: 1590, Janssen, 1609, Galileo, 1625, Faber, 1665, Hooke, 1676, Leeuwenhoek, 1931, Ruska & Knoll, 1955, Müller & Bahadur, 1971, The Andromeda Strain, 2000, CBS crime drama CSI, 2010, Ozcan, and 2012 Canada's U. of Victoria installs the Hitachi HE-3300 TEM (STEHM),

Skipping the 18th and 19th century as if no advances were made in microscopy is what popular literature tends to do in order to compress information into a single page. We know better but will not dwell on this oversight so that we can concentrate on our story, taking only a moment to mention the UCLA engineering professor, Aydogan Ozcan who invented a self contained, lensless microscope that uses light emitting diodes and a digital sensor to generate holographic images viewed on a tablet or a computer. It weighs about as much as a large egg! What a contrast is that tiny instrument to the 15 ft tall Hitachi.

The Scanning Transmission Electron Holography Microscope (STEHM) sits in a special building and is mounted on bed rock, isolated from the enclosing housing and operated remotely. The enclosure and special foundation cost 1.2 million dollars. It took eleven years to develop and install the microscope at the University of Victoria under the leadership of Dr. Rodney Herring, Director of UVic's Advanced Microscopy facility.

To function efficiently, the microscope has to be protected against vibrations, fluctuations in temperature and electromagnetic waves. Compared to normal vision of the human eye, the microscope is reported to see items 20,000,000 times larger. This also requires that observed objects have to be 1,000 times smaller than the diameter of a human hair.

The electron beam is collimated by 65 electromagnetic lenses compared to the 20 in a typical TEM. Its seven ton weight required a conforming foundation that isolates vibrations. H.S.

The HF-3300V scanning transmission electron holography microscope (STEHM) is now in operation at the University of Victoria. It is capable of resolving atoms at 40 picometers. That is an order of magnitude better than a standard electron microscope.

Decisions, Board Reports and the Changes Ahead

December 7th, 1941, is a day that has gone down in American history as a day of infamy. October 13, 2013 will not carry such a burden. It will be remembered as quite an ordinary day but SFMS members will note with some interest that changes occurred and were attended to by the five Board members and the two guest members who attended.

For the lunch hour, we sat and enjoyed soup and sandwiches as well as a fruit salad, tart apple slices and cookies. Even more important than the food was the good conversation, and exchange of news that was personal and not connected with the Society's business. We were a bit tardy in getting the Board meeting (October 13, 2013) started and quickly approved the minutes of the July 2, Board Meeting Minutes.

President Peter Werner reported that he had attended the Fermentation Festival in Sonoma where he had set up some microscopes.

BILL HILL, MARY ANN SCOTT, PETER WERNER
MYRON CHAN, HENRY SCHOTT

He then introduced and recommended SFMS's participation in **Science Festival/Discovery Days** sponsored by Bay Area Science. Discovery Days are held at a number of venues around the Bay to stimulate interest in science. The Board decided to participate at two locations. On Saturday, October 26, SFMS volunteers will be needed from 9:30 to 2:30 in N312, the North Science Building at California State University, East Bay in Hayward.

The second venue will be at AT & T Park in San Francisco on Saturday, November 2. The hours will probably be the same and if you receive notification by email from the Society, please look at these important messages.

Treasurer Myron Chan indicated that expenditures since the last board meeting were $169.28 while income was $48.00. Peter mentioned that he will purchase a special cutter for making filters for the organization as previously discussed.

He also introduced a new member, Sara Sandhu, who has experience with newsletters and is a student in the microscopy program at Merritt College. (See elsewhere in this issue.)

Henry Schott, Communications Secretary and Editor of Micro News, had built the agenda and therefore listed several areas on which to report. He distributed a copy of

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He perfected the Heuser/Reese quick-freeze/deep-etch technique for en-face, stereo imaging in combination with immunolabeling strategies for identifying cytoskeletal structures at the cell cortex. Grueling experiments were conducted to produce some of the first high-resolution images of actin-containing filaments at focal contacts and post-synaptic densities, cell membrane-associated specializations.

Steve won a fellowship in the Institute for Biophysical Research on Macromolecular Assemblies at Johns Hopkins to study the actin-binding protein, Tensin. From JHU he moved to the NIH to exploit the newly minted membrane dyes for live neuronal imaging in studies of synaptogenesis in mammalian nerve-muscle cultures. Not long after coming up to speed on these techniques he accepted a position to direct the microscopy lab in Drug Safety at Procter & Gamble Pharmaceuticals, Norwich, NY, with the mandate to focus on applied research for their anti-osteoporosis program. Risedronate was approved as an early bisphosphonate for the prevention of demineralization of cortical bone; Steve used light microscopy (LM) ARG to confirm this mechanism of action. P&GP moved him to headquarters outside of Cincinnati to continue work on therapies for muscle atrophy, angiogenesis, and

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Board Reports and the Changes Ahead, cont.

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his letter on behalf of SFMS to Mission Lab rejecting their application for a grant. The application had been recommended for funding by the subcommittee composed of SFMS members but board members who had the final say, rejected the grant proposal, concerned that the facility could not achieve a good instructional benefit with the instruments that they wanted to purchase. The board members did vote to provide Mission Lab of San Francisco with three dissecting microscopes that have been purchased for SFMS by Helmut Will, a former officer of the Society and a member for many years. They were delivered by the time you read this.

The response from Dan Sudran, Director of the Mission Lab program, was also distributed to the board members.

It should be noted that Mission Lab is a non-profit that sponsors a day of science activity primarily for middle school children. (See the article in this issue.) A visit to their web site is instructive and will clarify what they are able to do and will convey some of the excitement that such an experience elicits in middle-school students.

One item that Mission Lab requested was a polarizing microscope to look at samples of crystals in stones, such as granite. The grant proposal did not indicate that the staff had a clear idea what was required as a sample for inspection or how to integrate this experience into their curriculum. The Board recommended that the Society lend Mission Lab the one polarizing microscope we have with the prospect of making it a donation if it should prove useful. The stipulation was that a lesson plan be developed and used to help students understand what the instrument does and how it is used.

The need for a workshop in the proper use of a polarizing microscope was discussed and Peter volunteered to contact potential presenters and work out the logistics for such work shops. The main difficulty will be in having polarizing microscopes available at the workshop for participants to use.

Henry also reported on the progress being made in developing a digital record of the Society's records. The meeting records start in the late 1940's and are handwritten. The material up to 1965 has been transcribed, typed and is in electronic form. Much more remains to be done and major gaps need to be filled if we are to have a fairly accurate history of the revitalized society. Henry hopes to be able to devote time to this task in 2014.

The last item on which he reported was on the distribution of Micro News to other organizations including The New York Microscopical Society, The Microscopical Society of Southern California and others. One question that needs further consideration is how to successfully reach people who use microscopes and live here in the Bay Area.

The Board had previously decided to form a small committee to determine the parameters for the announcement of the 2014 Request for Proposals with a maximum grant of $5,000 to one recipient. Mary Ann Scott, Peter and Henry will meet on November 8 at 1648 Moreland in Alameda to formulate the

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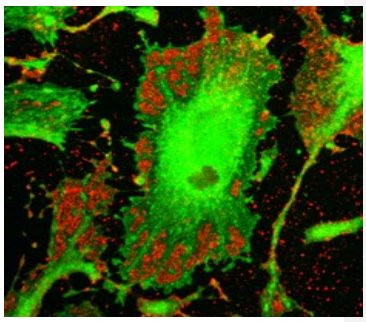
formulations; all exploiting microscopy, imaging and quantitative analysis.



With little interest in remaining in the MidWest, Steve joined crackerjack investigators at Eyetech Pharmaceuticals outside of Boston. Again, directing the microscopy and imaging function, he became a legacy of the Judah Folkman angiogenesis lineage in preclinical studies of vascular leakage of the retina and choroid. His team grew as microscopy became a key endpoint of drug discovery and development activities. Cytochemistry, fluorescence confocal and stereo light microscopy images begged for quantitative endpoints, which is where his group was already heading. After 4 years, and an IND [investigational new drug], IPO and approval of the drug Macugen, Eyetech was acquired by OSI Pharma; with time, the R&D group in New England was dissolved.

SRI, formerly Stanford Research Institute, has been a leading contract research organization for over 60 years. Advanced microscopy and imaging was not present in 2006 when Steve was recruited to Menlo Park. On a shoestring budget he created a Cell and Molecular Imaging function to

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The Mission Science Workshop by Dan Sudran, Apr. 16, 2009

I suppose that every new invention has a personal history behind it that defines it in so many important ways. My "invention" — the Mission Science Workshop — is no exception.

I began the Mission Science Workshop in my garage at 21st and Florida St. in the Spring of 1991. At that time I was an electronics technician in the City College of San Francisco (CCSF) engineering department. Being an electronics technician was itself a reinvention of myself that began in 1980 after a B.A. in history at the University of Chicago in 1966, a law degree from Northwestern University in 1969, 2 years as a VISTA lawyer in Idaho, 4 years as both a field organizer in Idaho and California, and the San Francisco boycott director for the United Farm Workers (1971-75), and a California artist-in-the schools folk singing with kids.

Coming from a progressive Jewish background with two social workers as parents, I grew up with the idea that the battle against injustice and oppression was a lifetime vocation and avocation to be taken on with great anticipation. The choice to return to school to get an electronics tech certificate was a detour from the organizing work -- but, as it turned out, only a temporary one. I had always envied other boys whose fathers knew how to fix things – the car, the TV, etc. Well, I felt like it was my time to learn a useful, handy profession. The wonderment about how machines and electronic instruments worked led, seemingly inevitably, to a fascination with how living things, the earth, light, the atmosphere, and many other things worked.

During this period, visits to the Exploratorium provided much fertilization, as did friendship with an Exploratorium physicist, Maurice Bazin, also an old hell-raiser/organizer (and devotee of Paolo Freire), who encouraged me to push forward with my idea of a neighborhood "Exploratorium" in the Mission District.

At the same time, I was volunteering with a friend who was a teacher at James Lick for Spanish-speaking students. I was her physics teacher and was absolutely delighted with the enthusiasm the kids had for all the things I showed them – they seemed even more curious than I was. But while I was there, I also observed the life of the regular science teachers at the school – overburdened with discipline problems, trying to teach a curriculum with methods that the kids seemed to have no interest in.

In contrast to this was my garage scene, which began as my private space to try some of the Exploratorium set-ups and invent some new experiments and exhibits, but which became a place to try out teaching with the boys and girls on my block, in a setting where the wonder of learning and discovery would not be strangled by the requirements of classroom management for a teacher facing 5 different groups of 25 kids 5 days a week.. Well that was the beginning of the beginning for me, as I saw how the kids just couldn't get enough of my garage, and would even look out for me as I came around the corner at

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announcement, revise the rules, and set the deadlines.

The Board then determined the program for the general membership meeting, (Please see page 1.)

We made no progress on revising the web site.

We decided to participate in the Bay Area Science Festival on October 26 and on November 2nd. Members are encouraged to help with our display of microscopic objects. We also will have a microscope set up sharing space with the California Likens Society at the Fungus Fair held on December 7 and 8 at SF County Fair Building, 1199 9th Ave, San Francisco, CA 94122. Once again, we will need people at the table to help with the viewing and answering questions about the Society.

Dr. Bill Heib, member and former officer was a guest at the board meeting and asked if the Board wanted to consider becoming associated with CHORI, the Children's Hospital Oak. Research Institute, suggesting that there could be some advantages. He also reminded us that he had proposed investments for some or all of the available fund of the Society that would create income in perpetuity.

Also discussed was the potential value of the 500 shares of the privately held U.S. Microscope Company. Inc.

Discussion of the January election of officers is described elsewhere in this issue.

The next Board meeting will be held on Friday 13th of December at 6 PM at 20 Drake Lane, starting with a light dinner. Call 510-339-9609 if you would like to have dinner with the group. H.S.

Science Workshop by Dan Sudran, cont.

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22nd street returning from work.

The next step for me was, as they say, a no-brainer. Don't wait – ORGANIZE! With the connivance of the CCSF chancellor and my boss in the Engineering Department, the garage went to the Mission Campus of City College in 1991 and then to the old auto shop at Mission High in 2004, where we are now located. And organizing has been much of the rest of the story – with principals, teachers, parents, and, of course, kids. Isn't education really just organizing after all?

Rather than pouring resources into webcasting a total eclipse of the sun from the Gobi desert in China or building science exhibits for museums all over the world (Exploratorium), or building and maintaining a four story rainforest (the Cal Academy), we have found our calling in an absolute fascination with developing ways in which Mission District school children and their teachers can indulge and develop their sense of wonder about their immediate world.

Our approximately 550 workshops per year (school day, afterschool, and summer) focus on the stuff of everyday life. Kids at Mission Science can observe and probe a burning candle, imagine the 80 million year old life story of a piece of chert from Bernal Heights or of serpentine from Potrero Hill, or compare the anatomy of California vertebrates using hundred of bones collected and cleaned from local farms, forests, beaches, butchers, and roadsides. **For teachers, I feel that these workshops are the best "doctorate" program that could possibly exist in learning how to teach science as experience and observation — that is, the real thing.**

We currently work with 20 schools in the Mission District and surrounding areas. From year to year we always have turnover and are looking for new school partners. **Please let us know if you are interested so we can send you information and meet with you and your school. Want to start a science workshop in your neighborhood? I'd love to help and have lots of extra bones, rocks, fossils, machines and ideas.** Please come by anytime M-F between 8 and 5. Our email is: msw@scienceworkshops.org and phone is 415-621-1240.

Dan Sudran is the founder and director of Mission Science Workshop. He can be reached at dsudran@ccsf.edu DS

SEVEN YEARS OF EDITING

Micro News

Volume I of our newsletter consisting of two issues is dated September & Nov. 2000 and was edited by Mikki McGee. Then came a hiatus of six years. With her help, publication restarted with Vol. 2. We are about to start Vol. 9 under the editorship of Sara Sandhu. She will need our support and contributions.

It has been a privilege to share Micro stories with you. Now we will have a new beginning.

Henry Schott

(Continued from page 4) C. elegans

provide quantitative imaging of preparations ranging from ceramic bits to nano-particles, to salt crystals. His primary functions were to perform strategic immunocytochemical experiments so to interrogate proteins in cells and tissues. Multispectral imaging and analysis were an integral part of his program along with creative electron microscopies for collaborations and contracts in and outside of the organization.

Steve is married to Deirdre Kennedy-Samuelsson, his life-long partner, a clinical social worker/ administrator and grant writer. Their two adult children live in Pennsylvania: Andrew (PhD/ MBA), a product manager with Olympus Corporation (yes, microscopes) north of Philly, and Laura, now a third year graduate student at UP is in sleep research and clinical psych. Steve and Deirdre live in unincorporated Menlo Park with Sofia, their white Lab, amongst rare fruit trees and an eclectic garden. A pseudo jock, Steve is a runner, cyclist, tennis player and (former) sailor and loves being active. He is mindful of our place in and with nature and practices 'mindfulness' and being 'present' in life and spirit and is particularly moved when exploring new environments.

Steve looks forward to the future for more developments and activities for microscopists in science. As an active member of the Northern California Society for Microsocpy, he welcomes communications from like-minded microscopists. He is interested in the viability of the SFMS and wishes to contribute to Board activities. +=+

Sara Sandhu.

Editor of Micro News

Greetings Readers!

It is an honor to introduce myself to the members of the San Francisco Microscopical Society. As many of you know, Henry is stepping down as Micro News Editor and I will be filling his position starting with the January 2014 issue.

My interest in microscopy stems from the Merritt Microscopy Program, from which I will be graduating as part of the fifth cohort next May. I was drawn to the fluorescence images illuminating the halls of Merritt College, and as I approach the end of my first semester, I am ever-grateful to be in the midst of a community dedicated to art, science, and public education.

My path is far from ordinary, but convention evolves with the times. I graduated from UC Berkeley in 2009, earning a B.A. in English, with an emphasis in Victorian literature. I immediately started working as the manager of a start-up café in North Oakland. Throughout my employment, I genuinely missed learning and found my way to Merritt College. The support and encouragement I receive from the biology department is immeasurable, and their efforts have encouraged me to devote my studies to education, particularly in enhancing the learning experience of K-12 students in the areas of microscopy and biological sciences.

I see this newsletter as an opportunity to call attention to the wonders of a world unseen, to pique interest in technologies pertaining to microscopy, and to provide knowledge and education to the public. I look forward to writing, to reading, and above all, to sharing your thoughts and ideas with you all.

Happy readings, Sara Sandhu

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SFMS

Stamp

Volume 8, #4 November 2013

FROM: **Micro News**
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MEMBERSHIP INFORMATION

To join the Society,:
fill in the form available on our web site at
www. sfmicrosoc.org
_Mail it to : SFMS Treasurer
435 Melrose Ave
San Francisco, CA 94127
Make check out to SFMS.
Dues are $12. per calendar year. Pay now for 2014
Life membership is $144.00

We are on the Web

WWW.SFMICROSOC.ORG

TO:

ELECTION OF OFFICERS: General Membership Meeting Wednesday, January 8, 2014

Our constitution requires us to hold elections every year and you can bet on it that this time there will be changes that rock the boat! Only members in good standing and attending the meeting can vote so you will see that any candidate for office will be there and so will his/her friends to vote. So please bring your 12 dollars in dues for 2014 if you have not paid by January. (Mail them in now to Myron Chan, Treasurer, 435 Melrose Ave, San Francisco, CA 94127)

Why will the boat be unsteady? President Peter Werner will step down but not out. He will be trying to get your vote to become *Vice President and Program Chair*. The position of *President* is therefore open to all members. The slate that will be placed before you will offer Myron Chan as *Treasurer* and Mary Ann Scott as *Recording Secretary.* You can run for those offices but we seldom have had such a horse race. The *Communication Secretary and Editor of Micro News*, Henry Schott, will leave the board and devote time to digitizing the historical documents of the Society while also overseeing the proposed 2014 Grant Program. Bill Hill will probably be placed in nomination for the position of Communication Secretary. Bill will feel good if there is someone who would like to run for the position that does not require much work but is best handled by someone who has good computer skills. Bill is deeply involved in the Lichen Society and has been most helpful on the board as Vice President.

The editing of Micro News will be taken over by Sara Sandhu, a new member, who has experience in publishing news letters and is currently enrolled in the Merritt Microscopy program.

While being President of the SFMS may seem daunting, It can be one of the less complex jobs if the president is supported by an effective and active board. Running for president should not scare anyone. It is manageable if you can delegate work, follow up on your commitments, and acquire and practice your leadership skills. To run for office, you may nominate yourself or be nominated by any other member. Write a short note as soon as possible to President Peter Werner at pgwerner@sonic.net or germpore@sonic.net.

The election will be a minor part of the evening, so count on being entertained and enjoy the meeting.