



MicroNews

San Francisco Microscopical Society

Volume 5, #3 September 2010

Welcome To New Members

We are pleased to introduce several new members who have joined the Society. We hope that their busy lives will permit them to attend some of our meetings.

Biology Department, Merritt College Faculty:

Dr. Nancy Rauch,
Dr. Hank Fabian
Dr. Gisel Giorgi

David Anderson, Student

John Bergman.

NEW BOARD OF SFMS DIRECTORS FORMED AT AUGUST OPEN MEETING

The resignation of some board members and the unwillingness of members to run for office in January 2010 resulted in the absence of a board with only one elected officer, the treasurer Myron Chan. The membership was invited to attend a lunch meeting of the society held on August 21 in Oakland. The delicious meal was enjoyed by a small but interested group. The conversation turned to the future of the society and to the need to get a new generation of microscopists active in the aims of SFMS. Fortunately, there were some people at the table ready to take up the challenge when Bill Hill ably presented the case for preserving and evolving the society.

While there is a natural reluctance to assume an office, the

case for future benefits from such experience was made by Scott Miller who came down from Sacramento to participate. (He had recently returned from Hawaii and brought with him a sample of sand from one of the famous beaches. We enjoyed a brief diversion seeing the tiny grains that appeared to be a mixture of black volcanic lava and white to grey fragments of coral.)

By three PM we had, as if by magic, appointed a five member board, something that the society has not had for several years. As a first action, the board helped the program chair devise a program for the next meeting and also decided to hold it on WEDNESDAY when there would be fewer conflicts with other meetings and schedules. Our September 15

meeting will come one day later than what you have become used to. Please mark your calendar. This will also give us a chance to use the Buckley room which has not been available to us on second Tuesdays for the past two years. The advantage for using this room is that it contains our microscopes so bring something microscopic to share.

The board also started discussions on improving the web site and making documents available on line. including this newsletter, for those who prefer electronic documents. This will be a saving in postage and paper, a good conservation mechanism.

The officers are a mix of both new and old so continuity of

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SFMS President: Peter Werner

Peter was born and raised in the Bay Area. From an early age, his interest in natural science expressed itself in hunting and identifying mushrooms. He served on the Council of the San Francisco Mycological Society of San Francisco (2002-05) and was a member since the early '80s. He continues to be active in mycology. He majored in Botany at the

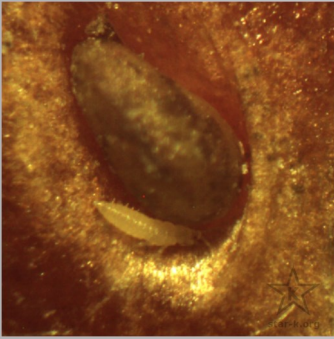
University of Washington in Seattle where he earned his B.S. and continued his graduate studies in mycology in the laboratory of Dr. Howard Whistler. Dr. Whistler was a Professor of Botany at the University of Washington and passed away in 2007. Peter learned to use an SEM in a project in wetland mycorrhizae under Dr. Estella Leopold. He continued graduate work in mycology at

SF State University.

As a member of the first cohort of the Microscopy Program at Merritt College he had the opportunity to help set up the new microscopes as they arrived over a period of month. Now he continues to be an instructional assistant as the third cohort begins its journey through the intensive

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Strawberries:



Strawberry seed & insect

The image shows a small insect, species unknown, that lives on strawberries. We regularly eat such insects with raw food without harm. Pesticides that we do not wash off are surely much more harmful. <http://star-k.org/cons-vegdetail.php?ID=48> is the source of the micrograph and the following: *The following guidelines apply to produce grown*

and purchased in the United States. Checking procedures in other countries may be different.

Fresh Strawberries

1. Fill basin with water and mild soap or special veggy wash (such as Tsunami 100).

Note: When using soap, use only a food grade cleanser that meets all

federal, state, and local regulations. The water should have enough soap to make it feel slippery.

2. Soak strawberries while agitating the water.

3. Rinse strawberries under a stream of water.

4. It is preferable to cut off the top with a small amount of the flesh.

Strawberries may now be used. (Thanks Myron)

Peter Werner President SFMS



(Continued from page 1)

one-year program under the guidance of Dr. Giselle Giorgi. He is also enrolled in the six-week program at Ohlone where he will refresh his knowledge of the SEM under Ed Duarte.

"I'm glad to be involved in getting the (SFMS) group active again. Getting amateur naturalists and scientific groups such as MSSF, the Bay Area Mycological Society, California Native Plant Society, Insect Sciences Museum, and others, such as the California Lichen Society, together with professionals provides a great potential for cross fertilization of ideas and for sharing knowledge. This will benefit all of us."

(Continued from page 1)

tradition and procedure will be assured while at the same time new ideas will be voiced and new challenges brought to the table. The board hopes that you will be pleased with the results of their actions and look forward to your vote of confidence in the January 2011 elections.

President Peter Werner's credentials are described elsewhere in this publication but you will recall that his presentation to the society was well received in May. Bill Hill agreed to withdraw his resignation and continue as Program Chair and Vice President. He may do the detail work of organizing the meetings but it is up to the entire board and the SFMS members to provide the ideas and contacts for presenters so, as you read this, make a mental note of who and what should make an interesting presentation and send the information to Bill Hill.

Myron Chan, who was elected treasurer, will continue to look after membership recruitment, dues and the funds that make our activities possible.

Debbi Brusco, one of our newer members has agreed to be the recording secretary. Her recording of the meetings of the board will be both our conscience and our memory. If we get nothing done, or say we will do something and then fail to carry through, it will be in the record for everyone to see.

Henry Schott, will continue to be the editor of the Micro News under the board title of Publication Secretary and Editor, Micro News, formerly the Corresponding Secretary. There was very little correspondence in recent years as communications switched to e-mail and group notifications through Yahoo.

The board generally meets once before each meeting or at least three times a year. All members have a right to attend board meetings and may present agenda

items to any officer 10 or more days in advance of any board meeting.

January was a low point when the economy of the nation was severely depressed and the Society seemed to lack leadership. Now, in August, things are beginning to look up in the nation and we, as a group, can refresh our belief that SFMS can play a useful role in our lives by providing knowledge and fellowship.

Your editor at HSCOTT@AOL.COM wants to hear from you. What will make us more useful in the communities where we live? What interests you and how can we bring about more participation? We are only limited by our imagination and energy. We can be purposeful in helping people better understand science and instrumentation used in microscopy. It is time to magnify our commitment to SFMS from the microscopic to the macroscopic!

The Editor

COMMUNICATIONS

Enormous Microscopic Evening by Phil Ross

Hello SFMS members:
I hope all is well with you.

The preparations are under way for the LA version of Enormous Microscopic Evening, which will take place this November 6th at the Hammer Museum. I am contacting you to see if you would forward along the information about this to your members, and to see if the Bay Area Microscopical Society would be interested in participating again.

I have attached the call for participation, and the larger event description. Let me know if you would like to talk about this further. And, people can always go to our website to learn more.

www.crittersalon.blogspot.com

Best,
Phil Ross

(We took part in the SF event and gained new members as well as some interesting contacts.)

Fred Martin, New SFMS Member

<martin_fred@hotmail.com>
Tue, Mar 2, 2010 8:22 pm

Hello Henry – thanks for the welcome letter confirming my SFMS membership. To fill you in on more of my background: I have had a long time general interest in microscopy (jr high, high school era), but more recently, I did indeed complete part I of the Merritt College program, and am currently working on Part II.

I've had my own business/IT consulting gig for ~12 years, and now am contemplating changing to a new career presently.

I'm currently interning at the Cell/Molecular Imaging Center at SFSU...I'm also taking some biotech classes at Ohlone College.

Not sure where this all may lead yet, but I am really enjoying the learning and the new challenges.

I'll be sure to drop by and introduce myself at the SFMS there on 3/10.

Thanks, Fred

Mike Zack, Member, SFMS

Hi Henry,
Not sure if this email will find you. I found your email on line.

My life has been very hectic over the past few years, but I have been making great progress. I am now a professor at my alma matter university. The position is very demanding on the teaching side of things. I have decided to make students aware of the amazing research that they can partake of while still a student and within a few years of their being at UWSP. I have developed a program here that is very unusual. I am still pursuing nanowire development and have come up with a new method for growing patterned nanowires of most any material where a clean room is not needed after a template has been made. As a result, NSF has just awarded me a CAREER Award which is extremely rare at undergraduate only institutions.

There is one interesting image that I just had published. Check out <http://www.sciencemag.org/cgi/>

content/full/327/5968/954
There was a cool technique that I learned about from the San Francisco Microscopical Society where an intense light is projected through a slit with a microscope focused on that plane. The object is then raised through that plane of light resulting in high resolution image without a the limitation of depth of field.

Does that sound familiar? If so, do you know what it is called or have a publication describing it? I remember that the image was of a fly. It looked like SEM image, but with all the natural colors. If this doesn't seem familiar, would you have Helmut's contact info or (Tom?) Hoover or Mike Kan's contact info? Hope all is well there, Best,

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Communications: Mike Kan

Myron, March 7, 2010

This meeting is a bit out of the way for me, not driving and or owning an automobile. Merritt College is up a steep grade in the Oakland hills. Taking the bus adds time to getting there.

Things have been running on the loose and informal since there has been no one running for a new president of SF Microscopy Society and the group seems so small.

I have allowed my member-

ship payment slide since the society has no home facility and there have been no "Members-only activities or special interest working groups". Thus, I saw no membership value in the society since so far there have been only very general interest free lecture topics for public.

I was hoping as a member to have an influence to the society's direction but was very upset that my wishes and desire to input changes have been largely ignored.

There had been a consideration to move the meetings to a tinkerspace that would have largely unrestricted hours, (Henry Schott and Bill Hill has visited the space) but that looks like that it has been dropped aside.

My desire is to show that microscopy can be both affordable and of great utility to the public especially to the impoverished or people of ordinary means. That program would

include environmental, nutritional and health assays. There seems to be a lack of that information both on the web as well as the libraries (*on these topics**).

However, I cannot do it alone and the value of the society is its members (*and*) to be able to form working groups within.

Take care Mike Kan

*edit.

Snow algae

describes cold-tolerant algae and cyanobacteria that grow on snow and ice during alpine and polar summers. Visible algal blooms may be called red snow or water-melon snow. These extremophilic organisms are studied to understand the glacial ecosystem.

Wikipedia

Darwin Reports Finding Snow Agae

"...Neither plant nor bird, except a few condors wheeling around the higher pinnacles, distracted my attention from the inanimate mass." (Referring to the Chilean Cordillera or mountains). "I felt glad that I was alone: it was like watching a thunderstorm, or hearing in full orchestra a chorus of the Messiah."

"On several patches of the snow I found the *Protococcus nivalis*, or red snow, so well known from the accounts of Arctic navigators. My attention was called to it, by observing the footsteps of the mules stained a pale red, as if their hoofs had been slightly bloody. I at first thought that it was owing to dust blown from the surrounding mountains of red porphyry; for from the magnifying power of the crystals of snow, the groups of these microscopical plants appeared like coarse particles. The snow was colored only where it had thawed very rapidly, or had been accidentally crushed. A little rubbed on paper gave it a faint rose tinge mingled with a little brick-red. I afterwards scraped some off the paper, and found that it consisted of groups of little spheres in colourless cases, each the thousandth part of an inch in diameter." Charles Darwin. Pp 322 *The Voyage of the 'Beagle'*

Willard Wigan - Artist

Art Meets Science

In the January 2010 issue (Vol 5, #1) we published a picture of a carved image of the Statue of Liberty—unusual in that it was minute—it fit nicely in the eye of a needle. I was unaware of the artist. In the meantime his work was exhibited in NY and additional information became available including the following from TED:

"Many pieces created by Willard are virtually invisible to the naked eye yet, when viewed through high power magnification, the effect on the viewer is truly mesmerizing. Willard, who is completely self

taught, has baffled medical science and has been the subject of many discussions among micro-surgeons, nanotechnologists and at universities worldwide. His work is both inspirational and ground breaking in both artistic and scientific spheres.

Given the demands Willard places on his body and mind, it is unpredictable how long Willard's exceptional talent will last, but ultimately his unique and exclusive creations will outlive him for generations to come.

Willard's gift has been recognized by the world leading Technology, Entertainment, Design institute, (www.ted.com)

where Willard was invited as a guest speaker to the world conference in July 2009'."



Uredo nivalis Bauer 1819, *Sphaerella nivalis* (Bauer) Sommerfelt 1824, *Protococcus nivalis* Agardh 1824, *Haematococcus nivalis* Flotow 1844 and others)

Snow algae have been described in the Arctic and on Arctic sea ice, and from Greenland, the Antarctic, Alaska, the west coast and east coast of North America, the Himalayas, Japan, New Guinea, Europe (Alps, Scandinavia and Carpaths), China, Patagonia in Chile and the South Orkney Islands.

More famously, red snow was mentioned in Jules Verne's book "The Desert of Ice", which describes an expedition to the North Pole, decades before such were possible. Verne notes that the red snow effect is caused by fungi, and was known in Switzerland and Baffin Bay.

Wikipedia.

Deconvolution of Fluorescence Microscope Imagery.

Modern microscopy has made great strides to capture and clear up images made with light microscopes. When I was a graduate student at UC Berkeley I drew India ink image constructed by painstakingly viewing a slide and focusing repeatedly at multiple levels to capture information that was only available if you carefully traced an object from its lowest level to the surface of the microtome sliced preparation. It was laborious and at best, an approximation of what one could see. It trained the eye and the

hand to see what the microscope slide held but it required an inordinate amount of time to produce a good, printable image. Photography was available but there was no effective way to capture the depth needed to get the whole picture. That is what the instructor told us.

In the January 2010 issue of (Vol. 18, #1) of *Microscopy Today*, David C. S. Biggs authored *A Practical Guide to Deconvolution of Fluorescence Microscope Imagery* that clear-

ly explains how it is now possible to capture multiple images along the "z" axis, that is the vertical axis. The blurring that inevitably occurs in light microscopes can be removed through the use of computer algorithms. Since images are digitized, information is characterized by what an individual pixel contains. Deconvolution algorithms (linear or non-linear) "attempt to restore the true image intensities from the observed data".

The article is the clearest explanation of deconvolution that I have come across in my reading but it is still quite complex for someone who does not engage in that type of microscopy. That it yields stunning images is obvious and nicely illustrated in the article. HS

Franciscus Cornelis Donders: *Annals of Optics*

Franciscus Cornelis Donders was born in Tilburg, Holland, in 1818. His interest in medical science led him to become one of the founders of ophthalmology with Van Graefe and Helmholtz. He rose to the rank of professor of Physiology in Utrecht. His reputation as an expert on



eye diseases gave him international status. He directed the Netherlands Hospital for Eye Diseases. He introduced prismatic and cylindrical lenses for the treatment of astigmatism.

(Adapted from Wikipedia)

Astigmatism: An optical system with **astigmatism** is one where rays that propagate in two perpendicular planes have different foci. If an optical system with astigmatism is used to form an image of a cross, the vertical and horizontal lines will be in sharp focus at two different distances. The term comes from the Greek α - (α -) meaning "without" and $\sigma\tau\acute{\iota}\gamma\mu\alpha$ (*stigma*), "a mark, spot, puncture".

The Science of Green Microbes (excerpt of the work by Terry Hazen, PhD)

(This is an excerpt of a longer article by Bijal Trivedi posted on the UC news site. Its interest to microscopists is that it shows how chemistry and biology play a role in biological remediation such as we are currently seeing in the BP oil spill.) In March, Hazen's team began the largest chromium bioremediation effort at Hanford to date by shooting

55 gallons of lactate into one of the wells. Lactate — a compound similar to the one that builds up in your muscles when you exercise — is an environmentally friendly food that allows bacteria to grow and multiply. The team will pump the liquid 40 feet down into the aquifer where it will disperse over an area about 50 by 100 feet — creating a

treatment zone. Hazen's approach exploits a fundamental mechanism of metabolism. When humans digest food, they take electrons from the foods they eat and pass them off to the oxygen they breathe in. Similarly, microbes in the soil metabolize the nutrients that come through the wells, strip off some of the elec-

trons and, through a series of chemical reactions, transfer the electrons to an electron acceptor. But different microbes have evolved to breathe different substances. Some microbes breathe oxygen, some nitrate, some carbon dioxide, and others breathe chromium. Once the oxygen in the

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Sept. 15 Meeting
WEDNESDAY

Is it tough to get a job in microscopy? Are there opportunities for well prepared individuals? Who are the microscope users and what industries need trained microscopist? These and related issues will be discussed by a panel of employed and unemployed individuals who have made microscopy as their career choice.

Please support them by listening and adding your ideas.

Any open space in this newsletter calls to me to be filled with something worthy of you, kind reader, so do not be surprised if in my reading I come across something that remotely relates to microscopy and therefore immediately triggers in this editor the urge to relate it to you.

The Greeks have a great heritage in their ancient culture where such luminaries as Socrates and Plato provided outstanding examples of mental prowess. So too did Archimedes who was a genius of a different kind. His mathematics and inventions surpassed those of all previous Greeks and the rest of humanity. In utility, the Archimedean screw that lifted water by turning a handle provided an efficient means of irrigation and the bailing of a ship's hold previously requiring much lifting in buckets.

All original writing by Archimedes long ago disintegrated into dust. Papyrus rolls do not have a long life. Fortunately, some of his treatises were copied onto parchment

made from the skins of sheep, lambs or calves. Parchment, while expensive to make, has a long life if properly cared for. Because it was expensive, monks recycled old documents and reused the cleaned sheets of parchment. They would unbind old books, cut the folio or two-page sheet in half, and fold the resulting sheet so that it could be bound into a new smaller book. The result was a palimpsest, a reconstructed book with possibly a total new use. Such was the case with a book that was sold by Christie's auction house in 1998. It was turned into a Eucologian, a liturgical guide in the Eastern Orthodox Church. What had been erased was some of Archimedes writings *On Floating Bodies*, *On Spirals*, *On the Equilibrium of Planes* and perhaps the sole surviving copy of *Methods of Mechanical Theorems*. It sold for \$2 million dollars (plus 10% for the house) to a Silicon Valley entrepreneur (possibly Jeff Bezos, founder of Amazon.com) who preferred to remain anonymous.

The history of the book has been traced back to 1229 and is beautifully described in ***Eureka Man: The Life and Legacy of Archimedes*** by Alan Hirshfeld, Walker Pub. 2009. The original parchment that had been meticulously erased still had ghostly writing since all the ink could not be removed from the animal tissue that forms the parchment.

"Abigail Quandt ... attempted to free the manuscript from its sewn binding that researchers might glimpse text formerly hidden within the book's spine.... Quandt was dismayed to find that many of the quires had been not only sewn together but glued." The glue was modern PVA, "almost impossible to remove without taking with it pieces of parchment. Aided by a microscope, Abigail Quandt patiently brushed a solution of isopropynol and water onto pieces of adhesive, then tweezed the softened flakes off the fragile matrix of the parchment. The entire process took four years, the final glue fragment removed in late 2004." pp 197-198

BERKELEY LAB OPEN HOUSE—October 2

The lab is excited to announce that Berkeley Lab will be hosting its first Open House in nearly a decade on October 2 from 10 a.m. to 3 p.m.. The registration website <http://www.lbl.gov/openhouse/> has just been launched and as a Friend of Berkeley Lab, we want you to be the first to know so that you can register now. Follow the links and learn more about what we have planned for that day. There will be interactive, easy-to-understand and instructive exhibits on everything from cool roofs and biofuels to smart windows and supernovas. Visitors can talk directly with scientists and ask questions about their research, check out a cosmic ray detector, sequence DNA, create and measure their own seismic waves, build a motor at the Family Adventure Zone, or take a tour of the Advanced Light Source, one of the world's brightest sources of ultraviolet and soft x-ray beams, among numerous other activities. Performances, displays, demonstrations, lectures, tours and food vendors will also be featured. Please note that the day will be split into a morning and afternoon session. If you have questions about the event, please contact Lyn Hunter at: lhunter@lbl.gov

COPY THIS PAGE AND SEND IT TO A FRIEND OR COLLEAGUE, HAND IT TO A MICROSCOPIST, GIVE IT TO A SCIENCE-ORIENTED TEEN OR A SCIENCE TEACHER. HELP US GROW! THE MORE INTERESTED MEMBERS WE HAVE THE MORE INTERESTING MEETINGS WE CAN SPONSOR.

Why should I join?

Join NOW and be a member through December 2011 for only \$12

If you are an amateur:

- Participate in exploration and discovery at our meetings and fieldtrips.
- Develop a new and fascinating hobby.
- Borrow a microscope to take home before buying your own.
- Learn how to buy a good microscope.
- Discover your micro-world at home.
- Help children understand science.
- Receive information, science articles, reports of meetings and activities of interest to members and microscopists.

If you are a professional:

- Enjoy the company of professionals attending Society meetings.
- Use our research grade Zeiss Ultraphot III microscope available to members who have participated in a training session.
- Share in the tradition of scientific objectivity and serious endeavor with other professionals.
- Improve the public's understanding of microscopy and scientific endeavors.
- Add the Society to your resume.

Copy or fill in this half page:

Membership Application

San Francisco Microscopical Society

Instructions: Please provide all requested and marked with (*) information, if available, and enclose the \$12.00 dues for the calendar year 2011 or pay \$144 for Life Membership.

We welcome all interested individuals of any age.

Enclose a business card if available.

*Print your name: First, Middle, Last

*Print street address or mailing PO Box

*City *State Zip 5 + 4

*Print your e-mail

()

*Home phone

()

*Cell Phone

URL

Occupation

Age or Birth date

If you own one or more microscopes, briefly describe what you have and use the back for additional space. What is your special interest in microscopy?

Mail to: Myron Chan, SFMS Treasurer
435 Melrose Ave
San Francisco, CA 94127

SFMS will meet on Wednesday, September 15, 7:30 PM at the Randall Museum in San Francisco. .

We will meet on Wednesday because that will reduce conflicts with other groups that regularly meet on the second Tuesday.

**Randall Museum, Buckley Room, 199. Museum Way
See info on Page 6. SEE YOU THERE!**

Micro News is published four times each calendar year, January, March, September and November.

FROM:

Micro News

San Francisco Microscopical Society
Henry Schott, Editor
20 Drake Lane
Oakland, CA 94611-2613

TO:

MEMBERSHIP INFORMATION

To join the Society, fill in the form in this issue and mail it to
SFMS Treasurer
435 Melrose Ave.
San Francisco, CA 94127-2217
with your annual 2011 dues of \$12.— made out to SFMS.

Life membership is \$144.00

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soil runs out, the microbes that breathe nitrate thrive. Hanford soil is rich in nitrate because it was used to process nuclear material and then dumped. Once nitrate runs low, then chromium-breathers dominate. These microbes will use the lactate and channel their electrons to chromium VI, converting it to chromium III (which is actually an essential element in the human diet, with a recommended daily intake). When the chromium VI runs out, which is Hazen's goal, then mi-

crobes breathing iron, sulfate and carbon dioxide dominate, sequentially converting these substances into iron II, hydrogen sulfide (the rotten egg gas) and methane. So when Hazen smells rotten egg gas, he knows that the chromium has been modified. Chromium III doesn't disappear. But rather than leaching into the water and flowing into the river, it sticks to the soil. Hazen says the site will need perpetual monitoring as shifting environmental conditions — in particular the oxygen and nitrate levels — could kick the chromi-

um back to its more dangerous state. Manipulating a cast of thousands of different types of bacteria to perform a set task is a huge leap forward in bioremediation. It is only in the last 10 to 15 years that scientists have had the technology to even identify the thousands of species of microbes living down there. "Giving the microbes the right food to do the job — he's been one of the masters at making that happen," Arkin says. Long-term, difficult experiments like the one at Hanford are what compels Ter-

ry Hazen, says Judy Wall, a biochemist at the University of Missouri and a collaborator. "Terry can anticipate the trajectory of an experiment, ask long-term questions and collect a range of data that can still be mined years down the road with new technology," she says. "That really takes great insight and long-term vision."

(Terry Hazen now leads the ecology department, the environmental biotechnology center and the microbial communities department of the Joint BioEnergy Institute at Berkeley.)