MicroNews

San Francisco Microscopical Society Volume 11, #1 January 2016

SFMS make it count in 2016

YOUR CONTRIBUTION IS ESSENTIAL

GENERAL MEMBERSHIP MEETING

January 13, 2016

Come to Merritt College, Wednesday, January 13, 6-9 PM, 12,500 Campus Drive in Oakland and learn about the new microscopy and histotech facilities. Doors open at 6:00 in Room S 117, first floor, of the Barbara Lee Health Sciences building. Peter will conduct a tour and assisted by Myron Chan there will be a hands-on workshop in basic specimen preparation and on Kohler illumination and alignment using a mirror and external lamp.

Directions: Located at the SW corner of the campus, the new building has two adjoining parking lots with the south parking lot the most convenient of the two. Bring with you $2.– in quarters for a parking permit from the dispensing machine. From this parking lot, enter the side of the building on the second floor, turn right in the corridor and walk to the end of the hall to find the elevator. Descend to the first floor by elevator or stairs. Room S 117 will be on your right when you exit the elevator.

SFMS General Meeting and Workshop in Microscopy Techniques will also include, if time allows, a demo of making and installing darkfield and Rheinberg filters by Peter Werner. **SFMS members will also be voting to elect the 2016 Board**, so SFMS members are strongly encouraged to attend and vote and volunteer to serve on a committee.

INSIDE

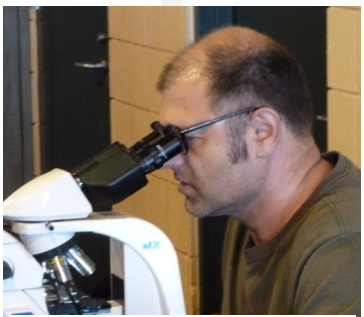
Inside this issue:

PRESIDENT'S MESSAGE

Greetings SFMS members!

The last year has been a *regrouping phase* for our Society. In 2014-2015, we had very few meetings, but during this 2015-2016 year, we have renewed our active program of at least five meetings per year. We hope you will find them interesting and attend them regularly.

Over the last year, we had some trouble scheduling events, in no small part because there have been significant changes in our usual venues, the Randall Museum and the Merritt College Biological Sciences building. The Randall Museum is closed for over a year at its Corona Heights location, and will be renovated and rebuilt as a new, modern facility. The Randall will reopen in December 2016. In the meantime, it has moved to a smaller, temporary location at Mission Arts Center located at 745 Treat St. SFMS has donated $5,000 to the Randall Museum Friends to help with this rebuilding effort, and we look forward to regularly using the new facility once it reopens. At Merritt College, the Science Division has recently completed a move into the new Barbara Lee Science and Allied Health Center,



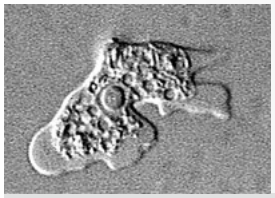
President Peter Werner

(Continued on page 3)

N. fowleri AMOEBA IS NASTY!

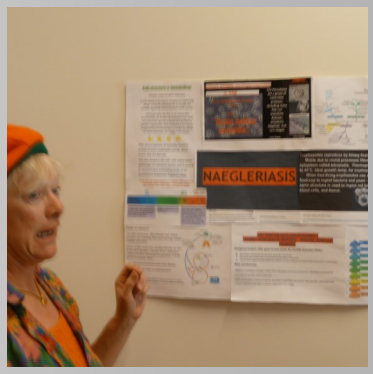
This should send shivers down your spine. It fortunately does not seem to be living in salt water so after reading this you may want to restrict your aquatic experiences to ocean swimming or the great salt sea in Utah. I'm getting ahead of the story so let me retrace my steps. Listed in the last issue of the Micro News were all the activities and meetings in which SFMS was going to participate. On October 31, 2015, Merritt College held its Bio-Fest celebration in its new Science and Health building, an imposing four stories building that also houses the microscopy and tissue culture program on its lowest floor. Since this is the campus where I spent most of my teaching career, I was interested in seeing this new facility. The four-story building is built into the hillside so that the main entrance is on the third floor, level with the top of the hill near one of the parking lots. The *Festivities* were held in the entrance corridor where tables were set up in order to interest students and parents oriented to various occupations in the health sciences. President Peter Werner had a series of microscopes set up to advertise the microscopy program as well as SFMS. On the wall were some posters prepared by a student.

Peter, posters and microscopes.



Naegleria fowleri in its trophozoite stage.

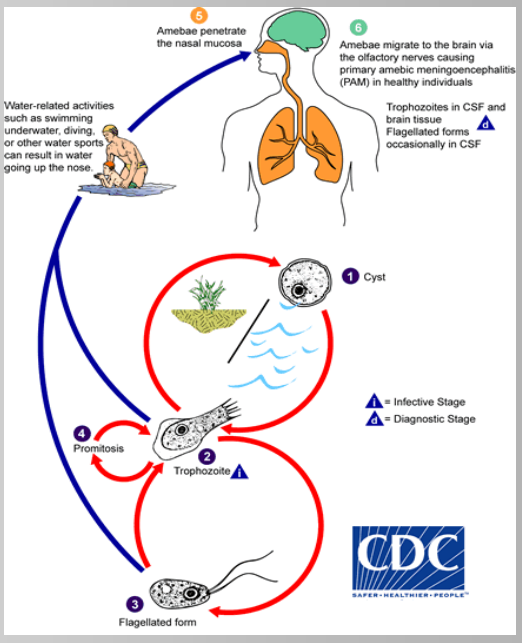
The posters dealt with a free-living protist *Naegleria fowleri* responsible for primary amoebic meningoencephalitis (PAM). This protozoan is known in as the brain-eating amoeba. N. fowleri invades the brain by way of the olfactory nerve by entering the nose and penetrating the olfactory mucosa where the nerve endings are located. The amoebae pass through the same openings in the cribriform plate of the ethmoid bone of the skull that admit the nerve fivers and them migrate to the olfactory bulbs and to other regions of the brain where they feed on nerve tissue resulting in necrosis and bleeding. The initial symptoms include changes in taste and smell, fever, nausea, vomiting and a stiff neck. Death occurs usually in from seven to fourteen days later.



In the period between 1962 and 2015 the Center for Disease Control (CDC) received 133 reports with most cases in the Southern U.S. including Arizona, Florida and Texas. Pakistan identified 69 cases from 2012 to 2014, likely from ablution.

The organism seems to prefer small shallow ponds and lakes that are warm. If you are tempted to swim in these waters, one recommendation is to wear nose clips to reduce the chance of water reaching the upper portions of the nasal cavity.

HS



MYXOMYCETES

Sometime in the summer of 2015 I received an e-mail announcing an opening day exhibit at the library of the University of Washington Horticulture Department in Seattle. I happened to be on their list to receive this invitation due to my membership in the Lichen Society. The event fell on my brother's 91st birthday and since he lives in Seattle, it seemed an opportune occasion to visit and take part in both events, his birthday and the opening of this special exhibit on the Myxomycetes, also known as slime-molds. You may not have noticed these unique life forms in your garden or along some forest path but they are there if you look hard enough. Chances are good that their spores lie dormant in every garden, meadow and forest soil. Do not confuse them with the ordinary fungi. They have qualities quite apart from the fungi and have been regularly confused with these organisms because they also form what appear to be mycelia, thread-like strands that spread out from a central area, and fruiting bodies that fill with spores that are spread by wind and water in order to distribute the species to new sources of nutrients. One characteristic that is not observed in the fungi is pulsing waves that are observable with patient study or with time-lapse photography of a growing colony. The pulsing stops as the colony enters the spore-forming phase.

By Angela Mele

The exhibit had all the earmarks of festivity with outsized photographs of specimens, books, magazines and pamphlets containing information of on the Myxomycetes, both current and historic, and video recordings running in a continuous loop showing time-lapse photos of the peculiar pulsing behavior of this organism. YouTube also has a number of videos that are worth viewing in order to better understand these organisms. Take a moment to enjoy viewing these films for a much better understanding of the Myxomycetes than what words alone can provide. Two ladies in costumes suggesting spore-forming sporangia by their headdress greeted arriving guests at the door. One of them was Angela Mele, the artist responsible for the biological drawings and paintings in the exhibit. Food and beverages were also available, including a tasty chocolate cake artfully concocted and decorated into an imaginative slime mold. One microscope provided a magnified view of a plasmodium, the vein-like network of cytoplasm that develops from a spore that finds a moist and nutrient-rich environment. A specimen sealed into a small box with a glass window formed by a microscope slide showed fruiting

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a beautiful new building with modern laboratory facilities. The building includes several rooms devoted entirely to microscopy and histotechnology, and SFMS will probably be using this facility for hands-on workshops soon.

SFMS has held-two very good events so far this year. In September, Miko Nadel presented his research on the lichens of São Tomé and Príncipe, and then led a workshop on microscopy and microtechnique of lichens, demonstrating a number of simple sectioning and mounting techniques that are applicable to a variety of organisms. In November, Dr. Greg Antipa presented a fascinating talk on his research on the ultratructure and morphogenesis of ciliates, such as *Conchophthirus*; his talk pointed to a number of unknowns in cytoskeletal morphogenesis that could be promising directions for future research in cell biology.

SFMS has also been active in public outreach events. As of this writing, we've participated in, and exhibited at the Farm to Fermentation Festival, the Bay Area Science Festival Discovery Days, the Merritt College BioFest, and the Mycological Society of SF Fungus Fair. We have also been invited by the UC Berkeley Art Museum to put on a special event this coming spring tied into their *Architecture of Life* exhibit, and to participate in the Grand Opening Community Day at the museum on January 31st.

Our board has embarked on several projects over the past year. We are currently in the process of acquiring a slide collection from which Society members can borrow sets of slides. Our collection will include a high-quality stage micrometer and several hard-to-find diatom test slides that can be used to calibrate and test the resolution of personal microscopes. We are finally, after much delay, building an updated and modern website with the help of talented web-

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MYXOMYCETES, cont.

(Continued from page 3)

bodies projecting from a small branch. A series of panels displayed in accordion-like posters (see illustrations) provided a lot of interesting images and information.

The slime molds are in a class called Mycomycetes. The name is derived from Greek roots for slime, myxa, and fungi, myketes, and was coined by the German naturalist Johann H. F. Link in 1833, although for a time prior to the 1970s Mycetozoa was favored as a name because of their creeping stage. Today the slime molds are classified in a major group, the eukarya (or eukaryotes) that includes plants and animals. Wikipedia can provide you with a more detailed taxonomic schema.

Growing slime molds requires patience and a moist chamber easily constructed from a moist kitchen-paper-towel and a wide-mouth jar. Petri dishes are ideal but not necessary. Use distilled water or rain water if available to avoid chlorine as a contaminant. Add to this chamber some dead bark, small twigs, pieces of leaves or surface soil. Small is better than large quantities. Mark the date on the jar or in your log and wait patiently for several weeks checking frequently to observe for changes and adding moisture if needed. Remember that living forms require nutrients. Experiment with flakes of oatmeal (three are enough) that can provide needed energy and nutrients.

Posters by Angela Mele

Note the gigantic plasmodium wall covering in the background and the accordion-pleated two-sided display on the book case.

The life cycle of some slime molds are so unusual that they challenge our imagination. Single cells with a flagellum originate from spores that germinate. These behave much like amoeba feeding on bacteria and other microorganisms. In the presence of ample food they reproduce by ordinary cell division. Stimulated by a release of cyclic AMP, probably produced by a mass of cells that have exhausted their food supply, these individual cells stream towards this concentration source until there are many thousands of cells aggregating into a single mass that becomes visible to the naked eye forming a slug-like creature one to two millimeter long. It does have an anterior-posterior orientation and even some differentiation in that the anterior is lighter in color and exhibits behavioral differences when compared with the larger posterior portion. When in motion, the anterior raises slightly above the substrate and then touches down as if feeling for the ground before moving over that space.

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site designer and past Mycological Society of San Francisco President Terri Beausejour. The new website will be structured in such a way that it is far easier for us to update than has been the case with our old website, and will allow us to keep members and the general public fully updated on the Society's activities. It will serve as a place where members can display their images, as well as sere as a portal to the many now-scattered sources of information on amateur microscopy. Look for it at the beginning of 2016.

The board has also been actively working on a program for the coming year that will include a mix of interesting speakers, and hands-on microscope activities and workshops. We need input from our members. What kind of speakers and/or activities would you like to see? Are there public events in which SFMS should be participating that we are not involved in currently? What role should SFMS play in the larger Bay Area scientific, technical, and naturalist community? We are always looking for ideas and for ways we can better meet our members' needs, and raise our profile with the public. Your input is vital if the Society is going to meet the needs of both professional and amateur members.

We are always looking for new members for the SFMS Board, and I strongly encourage any member who is interested to come forward and volunteer. All positions are potentially open, including that of President – some long-term board members may be stepping down, and others (such as myself) would gladly shift positions to bring in new officers with a fresh perspective. We need you.

Any feedback, such as that solicited above, can be sent via the SFMicrosoc Yahoo group (sfmicrosoc-noreply (at) yahoogroups DOT com), or to me (germpore (at) sonic DOT net). We look forward to hearing from our members, and seeing you at upcoming meetings! PW

Peter Werner, President

(Continued from page 4)

Time lapse photography by John Bonner at Princeton University (YouTube) show these slug like creatures meeting up with each other and fusing into one organisms. Other slugs split at the anterior end into two branches, left and right, each then continue in opposite direction dividing the mass of cells into two. The plasticity of this body-form seems so fluid that no one organism can claim to be an individual or original. They all are masses of amoeboid cells who leave a thin slime trail behind on the path that they randomly traverse in the form of a slug until they find just the right environment consisting of light and heat in which to complete their life cycle.

Poster by Angela Mele

The anterior cell mass that has functioned as a sensory receptor and path-finder now undertakes the building of a stalk that raises the cells that will form the capsule and the spores above the substrate. The stalk is a few millimeters long and is composed of dead cells. The spores develop within a capsule that bursts open when fully mature releasing the spores into the environment to be transported by wind, water and insects to new locations. The sporangia of some species are brightly colored but most are a dark brown.

It is an oversimplification to call a slime mold <u>one</u> organism. The spore produces an ameba-like cell that can move in its moist environment by flowing and engulfing any bacteria it encounters. Thus it has the properties of protozoa in that it imitates the amoebae. It can associate with other similar cells forming in aggregate a 'plasmodium', a blob of jelly where the individual cells have dissolved their cell membranes except for the outermost surface and have formed a syncytial structure that sends out from its center streams of cytoplasm in search of nutrients. A syncytium has many nuclei and other cell structures but the delineation between nuclei formed by the cell membrane is absent. In the animal kingdom, skeletal muscle fibers form a syncytial structure composed of many sarcomeres, units that can shorten when stimulated by nerve impulses, formed into long fibers surrounded by nuclei and other cell structures. Thus, we humans also have syncytial structures in our voluntary or skeletal muscles.

In the Myxomycetes there is also a form of communication that is ripe for greater research. To form fruiting bodies and spores, cells have to differentiate and assume distinct roles such as stems, capsules and spores. How a swarm of amoeboid cells reorganizes into distinct body parts, each essential to achieve the final aim of producing the reproductive function deserves close attention in order to understand the evolutionary process that has resulted in some nine hundred species. HS

BAMPFA

Opens January 31, 2016

<u>UC, Berkeley Art Museum & Pacific Film Archive</u>

2155 Center Street, Berkeley

Architecture of Life

The inaugural exhibition BAMPFA's landmark new building, Architecture of Life explores the ways that architecture—as concept, metaphor, and practice—illuminates various aspects of life experience.

Sunday, January 31, 11 AM-11PM: UC Berkeley Art Museum Community Day. The first general public viewing of the newly reopened Berkeley Art Museum and Pacific Film Archive (BAMPFA), including a first look at the inaugural exhibition, **Architecture of Life**, exploring structures and patterns in natural objects, living organisms, and the mind. SFMS will have a small microscopy exhibit previewing and publicizing a larger microscopy exhibition at BAMPFA later this Spring (date still to be determined), in conjunction with the Architecture of Life exhibit. Event will be held at the new BAMPFA building, 2155 Center Street (between Oxford & Shattuck, just to the west of UC campus), Berkeley, CA.

By Angela Mele

HOW TO GET HELP IN MICROSCOPY

If you are faced with a microscopy problem, one easy way to get support is to ask for a response on Micrscope@ yahoogroups.com, a good place to post microscopy questions. Here is an actual example of what the response was to a posting.

THE PROBLEM:
Making a slide of branching conidiophores.
Posted by: Peter Werner

I've been trying to make mounts of Penicillium roquefortii from blue cheese, so that I can view the branching conidiophores and attached chains of conidia. The problem is, when making a squash or smear mount in a liquid medium, the conidia wash off of the conidiophores, leaving me with a huge mass of spores floating around, and a few conidiophores stripped of conidial chains. This takes place not only when I mount them in an aqueous solution, but even in lactoglycerol + cotton blue, which I've read is the preferred solution for mounting Penicillium and similar molds. Any tips on making a mount so I can actually see the intact structures would be greatly appreciated. Peter G. Werner

PROCEDURE : RESPONSE by Charles Guevara

"Hi, Peter (the once: aka germpore). As a hobbyist mind you...I make wet mounts with a tiny fluid drop on a microscope slide inverted and close above the molded food source. I use really gentle stab into the mold carpet, lift the probe needle off the mold carpet and touch the lifted materials to the slides droplet.
Often at least a few areas of your wet-mount will depict 'normal morphology'. Cheese is so opaque and greasy...consider transfer of a tiny lifted sample to a small square of suitable paper (presumably something non-linty, along the lines of lens paper or bibulous paper) or other transmitted light friendly substrate...which you have first soaked in a weak homogenate of the cheese parent mold carpet...have these surrogate 'microscope ready ' squares in a moist setting (sealed Tupperware in the fridge where your blue cheese mold was growing....vrs room temperature...hey, I'm a hobbyist."

PROCEDURE RESPONSE by H. Schott, (found on line)

This product is intended to be used primarily with pure cultures, although certain specimens may be examined directly using this stain. Method of Use: Place a drop of Lactophenol Cotton Blue Stain in the center of a clean slide. Remove a fragment of the fungus colony 2-3mm from the colony edge using an inoculating or teasing needle or MycoMount™ adhesive strips (Cat. no. MM40). Place the fragment in the drop of stain and tease gently. Apply a coverslip. Do not push down or tap the cover slip as this may dislodge the conidia from the conidiophores. Examine the preparation under low and high, dry magnification for the presence of characteristic mycelia and fruiting structures. Consult appropriate references for diagnostic features of fungi isolated in clinical and non-clinical specimens.
https://groups.yahoo.com/neo/groups/Microscope/

CALENDAR

January 3, 2016, Sunday, The Eleventh annual Point Reyes National Seashore Fungus Fair at Bear Valley Visitor's Center, 10 am to 4 pm. Debbie Viess presents at 2:00 PM a whirlwind tour of interesting fungi from around the country. David Rust will talk about some of the "do's" and many of the "don'ts" of edible mushrooms at noon.

January 13, 2016, Wednesday, General Membership Meeting at Merritt College in Oakland. (Please see page 1)

Your SFMS Board Actions

Held Sunday, November 22, 2015, 3:00 PM (Prepared by HS)

All board members were present. Guests present were Terri Beauséjour and Henry Schott.

President Peter Werner reported that SFMS took part in a number of events that are also recorded in the President's Report (see page1). He gave a more detailed account of the General Membership meeting where Dr. Gregory Antipa made an excellent presentation on the anatomical studies that he and others conducted on the ultratructure and morphogenesis of ciliate *Conchophthirus*. There are many questions that still remain on the cytoskeletal morphogenesis of ciliates but the excellent images he presented helped to give the audience a better understanding. Bill Hill pointed out that these types of scholarly meetings were "*exactly what we should be doing*."

The treasurer, Myron Chan, reported that we had spent $1,250.- as authorized by the Board. A summary review of the 2015 expenditures will be published in the March 2016 issue of Micro News.

Africa Williams, Corresponding Secretary, presented a list of organizations that we should be contacting and with which we could cooperate. For example, J. & W Laboratories has a program called I-Fuse that provides used and refurbished microscopes to middle-school classrooms. We should build more extensive mailing lists e-mail lists and connect with Yahoo and Google Social Media, Twitter, Snapcheck, Periscope and Facebook to become better known.

Mary Ann, Recording Secretary, has not been able to prepare the past minutes for approval by the board due to illness.

Terri Beauséjour reported on progress on the Webb site and Bill Hill suggested that we have a page devoted to **"What's New?"** The discussion included becoming familiar with Periscope and Microbe Hunter.

Africa Williams, Corresponding Secretary, presented her proposal for the position of **Executive Secretary** that would be a half-time position devoted to raising awareness in the community of the role and service that SFMS can play, increase donations and seek grants to develop and carry out educational workshops involving microscopy for underserved students, and produce exhibits and museum-like displays for public areas promoting microscopy. Her presentation provided a lot of ideas including creating a category of Professional Membership with dues of $100.-/yr. but required an investment of $49,000.- with much involvement and participation of other Society members. The board took no action on her proposal.

The date for the next General Membership meeting was set for Wednesday, January 13, 2016 but no date was set for the next board meeting. The board adjourned at 5.52 PM.

A FREE MEALTICKET?

It is a natural inclination to hope for the best and to keep our nose to the grindstone or to say this strange expression in another way "to mind our own business". But what exactly is our own business?

We live in a society that is larger than our immediate neighborhood and that requires us to be active in many spheres where we are not exactly "the expert". We vote to elect city, county, state and national politicians, often without having met the candidates or even knowing much about their track records or their affiliations. We have only a limited sense of their responsibilities, especially if we have never held office in any organization.

SFMS can be a good training ground for individuals who are supporting members of a worth-while organization. We need officers and committee members to keep the Society growing and serving our membership. The entire board is asking you, yes, you the reader, to run for office or volunteer to be a committee member and be involved in our growth and development.

Our constitution requires us to hold elections every January for all board members but only members that are present at the meeting can vote. To hold office you must be a member. The treasurer would "jump for joy" to get your $12.00 dues, unchanged for many years because we are frugal. To run for office you must meet this difficult requirement: *You must be willing to serve one year*. You nominate yourself at the January meeting and state the office in which you are interested. Experience is not required. We all will help you be successful. SFMS is a great training ground for gaining valuable experience that can serve you on the job and in the community.

The Board "offices" are: ***President***, spokesperson for SFMS and general motivator for all activities, ***Vice president*** who takes care of all vice and skullduggery (did you actually read this far?) and is program chair, ***Treasurer*** who looks after dues and writes checks, ***Recording Secretary*** who keeps the minutes of board meetings, and ***Communicating Secretary*** who looks after publications and exterior or interior communications. Everyone helps the president run the Society. The constitution spells out these jobs in a bit more detail. We need you to be more active. HS

A BARGAIN—JOIN NOW

Where else but in our society would you learn about slime molds and other such loveable creatures? Who else arouses your interest more by sending you a fun-filled newsletter four times a year that will make reasonable good fodder for your own slime mold growing surface in a moist chamber? How else will you impress your friends that you have more information on microscopes than they have as a result of reading this unique "zine"? It is time to join so fill in the form below and mail it to SFMS Treasurer with your dues ($12 for one year, $24 for two years, $36 for three years, $144.– for life). If you prefer, copy the same information onto any sheet of paper and include the dues. You will receive an acknowledgement. We are an IRS recognized non-profit organization and therefore your dues are most likely tax deductible. Please consult a tax attorney if in doubt.

_____

Print First, Middle, Last Name

_____

Address—# & Street

_____

City, State and 5 & 4 code Zipp

_____

e-mail (to notify you of special events and general meetings)

Do you own microscopes? What kind? _____

_____

_____

We can help you buy a microscope. Do you need our advice? _____

If you have a special interest or past experience related to light microscopy, optics, imaging, electron-microscopy, photography or a related field, please describe it below.

_____

_____

_____

_____ Thank you. Please enclose your dues.

Mail to:

SFMS Treasurer, 435 Melrose Ave, San Francisco, CA 94127

SFMS

Stamp

Volume 11, #1 January 2016

FROM: **Micro News**
San Francisco Microscopical Society
20 DRAKE LANE
OAKLAND CA 94611-2613

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 2016
Life membership is $144.00

We are on the Web

WWW.SFMICROSOC.ORG

TO:

HOLOGRAMS USEFUL IN REMOTE AREAS WHERE THERE ARE NO MICROSCOPES.

Cell phones are now computers in their own right if they contain the proper software. Talk to them, even if not connected to another party, and they will convert what they hear into text that you can store or send as you choose.

U.C. L. A. professor Aydogan Ozcan, has developed an attachment to a cellphone that creates a hologram image of specimens on a microscope slide. The advantage of a hologram is that is can be produced in much less time and can be analyzed by a computer for relevant information. Because of the high-density of information in a hologram, such images can be produced without lenses and can then be magnified with software. Provided there is cellular telephone service, such images can be gathered by ordinary people with minimal medical training and forwarded to health specialists for analysis for diseases such as malaria or other blood-borne pathogens. For more information watch the following YouTube video.

https://www.youtube.com/watch?v=7FQUHhdGUII

MENTORING

Look around and be observant. That is good advice to any young person who would like to become a scientist or pursue a STEM-based (Science, Technology, Engineering, Mathematics) career. It always helps to have a mentor as well. Mentoring takes very little effort and yet brings great rewards in satisfaction and in spreading knowledge. Have you mentored someone lately? There are countless opportunities to do so in your community. Look around and you will find organizations that need your skills or clients that need mentoring.

CAN A NEW MICROSCOPE HELP?

You have had a small stroke or you are the victim of cerebral palsy or some other neuromuscular disorder and as a result you now have some involuntary spastic muscular responses. Science News recently described a microscope that straps to the body and penetrates through the skin by one centimeter with a sharp short needle that is multifunctional. It is able to deliver light as well as collect it and is thus able to look at the sarcomere, the contractile unit of skeletal muscles, observing it during contractile cycles. The needle also can remove obscuring blood leakage and act as an electrode to cause single twitch responses in the muscle-motor unit which consists of the neuron and the muscle fiber that it controls. The muscle fiber is composed of many small sarcomeres each shortening when stimulated by impulses from the single neuron. The team headed by Mark Schnitzer of Stanford University designed this palm-sized device. *16 Dec. 2015 Neuron*.

FROM THE STANFORD FACULTY WEB SITE: **Fiber optic fluorescence microendoscopy.** The Schnitzer group has recently invented two forms of fiber optic fluorescence imaging. which enable minimally invasive in vivo imaging of cells in deep (brain) areas. The Schnitzer group has begun to examine human nervous tissues. For example, microendoscopy has recently provided the first images of sarcomeres in live human subjects, and we are now working with collaborators to bring this imaging capability into the neurology clinic for applications regarding neuromuscular disorders. *Edited for available space*.