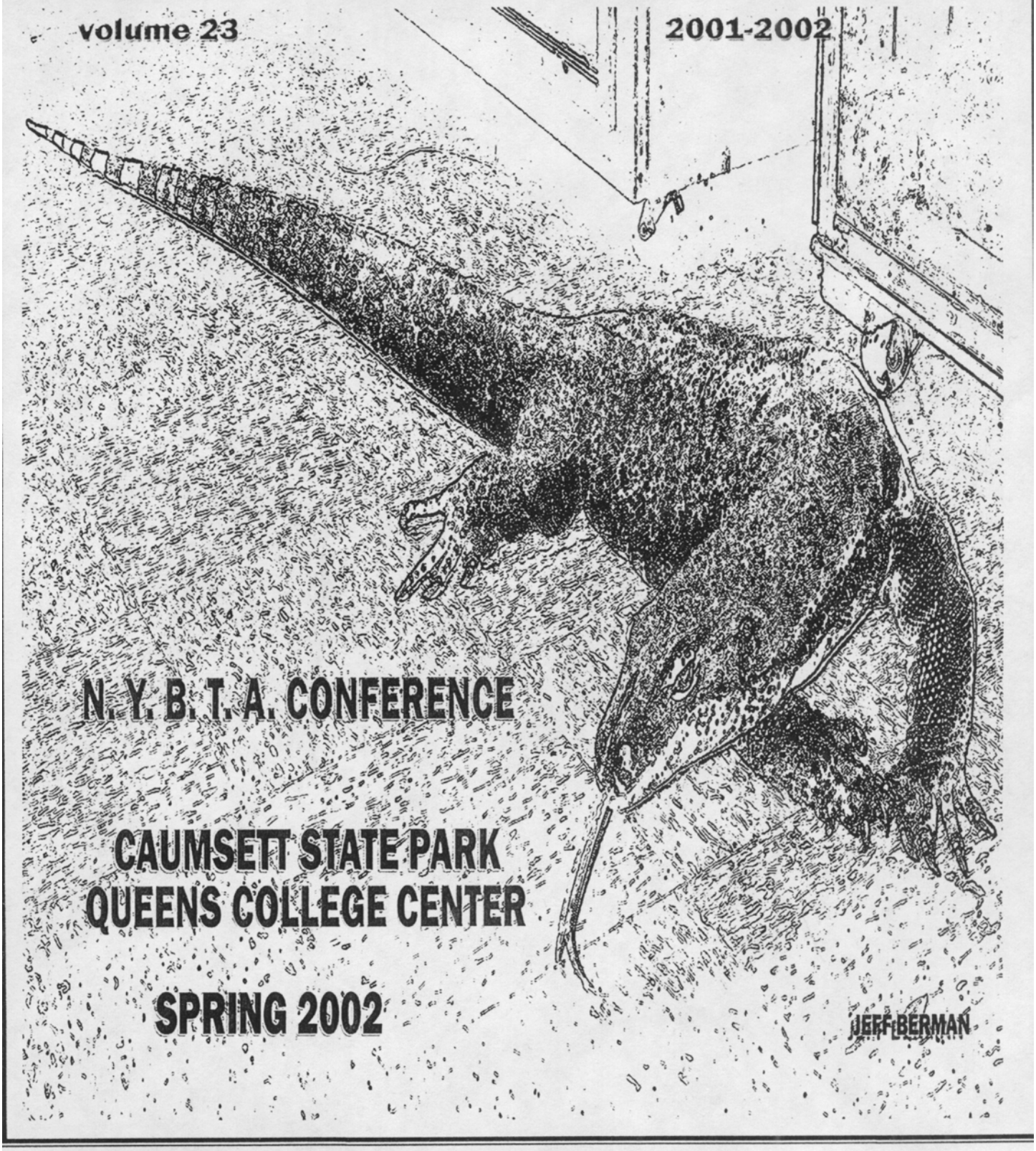
ADAPTATION

A PUBLICATION OF THE NEW YORK BIOLOGY TEACHERS ASSOCIATION

volume 23 2001-2002



ADAPTATION, EDITOR

JOHN T. CUNNINGHAM
BROOKLYN TECHNICAL HIGH SCHOOL
S.ELLIOTT PLACE & DEKALB AVENUE
BROOKLYN, NY 11217(718) 858-5150

NYBTA PROFILE

The **NEW YORK BIOLOGY TEACHERS ASSOCIATION** is a non-profit organization of professional biology and science educators in New York City and the metropolitan area. Founded in 1899, the Association is an affiliate of the **National Association of Biology Teachers (NABT)**, and a member organization of the **Science Council of New York City (SCONYC).**

Through its programs and activities, NYBTA assists in the professional growth of those Biology teachers, who are working in our school systems, and provides a climate in which biology teachers can enjoy "doing science". Through publications and mailings, the organization hopes to voice the concerns of science educators in and around the city. NYBTA gives its membership opportunities to meet each other and share thoughts and ideas relative to all biology educators.

Some of the special services and programs of the Association are the following: **Executive Board; Monthly Meetings; Special Events**; **Annual Techniques Meeting; Otto Burgdorf Student Science Conference and Competition;** and the **Annual Awards Social**.

Representatives of NYBTA meet with their counterparts from the National Association of Biology Teachers, National Science Teachers Association, and the Science Teachers Association of New York State. In addition, as a member of the Science Council of New York City, NYBTA plays a major role in the city-wide science efforts that include the annual **SCONYC CONFERENCE** attended by hundreds of science teachers.

NYBTA is an organization that is different, educational, meaningful, and active. The New York Biology Teachers Association offers its members activities beyond their school, opportunities to exercise their creativity, and occasions to share and develop their expertise.

STATEMENT OF IDENTIFICATION
ADAPTATION is the publication of the New York Biology Teachers Association, PO Box 360192, Brooklyn, New York 11236

BASIC SKILLS IN SCIENCE (*#66)*

by
DON ABRAMSON

NEWSWORTHY NONSENSE

It can't be me. I mean everyone who knows me will testify how quiet and reserved I am. So it must be my typewriter. I suspect it has been invaded by some alien spirit. Read on; you decide.

1. Avian Adventures:

The news agency Reuters reported the following item that appeared in the eminently respected journal *Nature:*
"An African bird, the *Buffalo Weaver*, has developed a false penis to improve its chances in the intense competition for a mate." (There's just no way I'm going to speculate about this.)

2. Poignant Poetry:

1959, Niagra
1999, Viagra

3. Aching Arches:

Your feet contain 52 bones, 66 joints and more than 100 tendons, muscles and ligaments. (At the end of the school day, how could they all hurt simultaneously?)

4. Tonsorial Terrorist:

Joe, my barber, knows that I teach biology. That might explain why, when I ask him to cut my hair a little shorter than usual, he responds, "Not to worry. I'll just do a little pruning." (Anybody for a slightly used scalp?)

5. Toadstool Terminology:

A mushroom walked into a bar and asked for a beer. When the bartender refused him saying, "We don't serve anyone like you," the mushroom complained, "Why not? I'm a fun guy."

6. Editorial Enlightenment:

The gossip going around in publishing circles is that a biology teacher who expects to make a million dollars writing a science book "must believe in God."

7. Doughboy Dinners:

The dietary mainstay for American soldiers in their trenches during World War I was beans – breakfast, lunch and dinner – beans, and then more beans. Is it any wonder that they were always being cautioned to keep their gas masks handy? And oh, by the way, adding onions to beans does *not* produce tear gas.

8. Canine Confusion:

A mother cat and her son were walking through an alley when they were suddenly set upon by a very large, ferocious dog. Instantly, the mother cat reared up and barked loudly into the dog's face. Startled, the dog turned around and fled. "See?" the mother cat said to her son, "I told you it's always an advantage to know a second language."

9. Henhouse Heroics:

For some unexplained reason this chicken farmer had a population explosion. He thereupon explained to a neighbor, "My coop runneth over."

He suspected that the problem could be laid at the door of one particularly oversexed rooster. Castrating this unfortunate individual would hopefully change him into a consultant.

10. Massage Message:

The advertisement read, "When you need us, we knead you." Unfortunately, one practitioner couldn't seem to keep her customers. Apparently, she was rubbing them the wrong way.

11. Misguided Math:

Have you ever pondered over the mathematical ability of an amoeba? Just recall that it is an organism that must divide in order to multiply.

(Enough, but before I exile my typewriter to some remote wilderness, here's the last one):

12. Prudish Pachyderm:

London (AP) One of Europe's largest bull elephants is undergoing sex therapy to stimulate interest in his heavyweight harem.

The managing director of the involved wildlife park called in a psychologist when 28 year old Sahib showed no interest in females Milli, Toto and Chikki. The four ton elephant had arrived in the park two months ago after having been brought up in a circus where he had been reprimanded if he showed any interest in the female elephants. "There are years of repression to unwind, so it is a big job," the director said.

Don Abramson is the former A.P. Science at an NYC high school. He is currently an adjunct lecturer in the Biology Department at Queens College, C.U.N.Y., and winner of their $5.000 teacher of the year award

Who is this person, and why does she seem to be rubbing this monitor lizard the right way?

GUIDELINES FOR ADAPTATION

Authors & Contributors

- **WRITE AN ARTICLE OR SHORT REPORT ON A BIOLOGICAL TOPIC**
- **SUBMIT A RESEARCH REPORT OR LAB EXERCISE / DEMONSTRATION**
- **SEND IN PHOTOGRAPHS OF NATURE OR BIOTOPIC**
- **IF YOU CAN DRAW – SEND IN NATURE OR BIOLOGY SUBJECTS**
- **HAVE A COMMENTARY OR LETTER TO SHARE WITH MEMBERS**
- **INFORMATION ON EVENTS OF INTEREST TO ANNOUNCE / NOTE**

Articles, Reports, Exercises, Letters, Commentaries or Demos should be 1 – 5 pages including photos and / or diagrams (Longer features will also be considered for publication)

Photographs: Hard copy - black / white or color and 3x5, 4x6, or 5x7, or*.jpg

Authors and those submitting features or photos etc. should identify themselves with title, school affiliation, and brief job description

All text submitted must be TYPED – DOUBLE-SPACED with 1" margins on standard 8.5 x 11 paper. If possible, include the work identified on an IBM / PC formatted disk that can be read into WordPerfect for DOS or Windows, MS Word for Windows, MS Publisher or ASCII standard form.

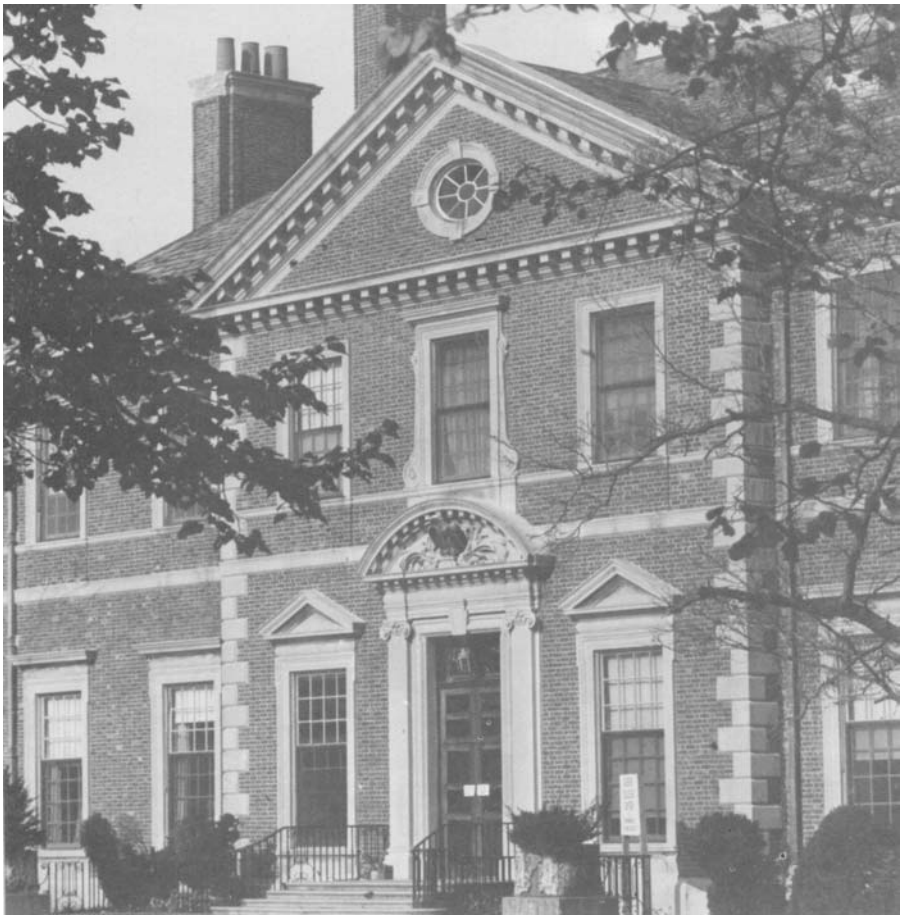
Initial queries and proposals may be submitted to the editor's snail-mail OR Email address (cleverpig@msn.com)

Send to:

John Cunningham
ADAPTATION Editor / NYBTA
C/O Brooklyn Technical High School
29 Fort Greene Place, Room 2S12B
Brooklyn, NY 11217

NYBTA DOES CAUMSETT

By John Cunningham



In April of this year, some of the more intrepid members gathered at the tip of Lloyd's Neck on Long Island's North Shore and were treated to an uncommonly beautiful day's worth of hiking, sightseeing and natural beauty. It was the time of year that inspired Chaucer to lament the drought of March, and cheer on the way that every vein is finally bathed in such liquor as engendered is the flower.

As most native Long Islanders know, it is thanks to the land grants of yore and a pile of upper crust money, that the North Shore has preserved much of the natural condition of these ecosystems, from Cold Spring Harbor to Jamesport.

The 1600 acre Park is about 5 miles north of Huntington Village, and spans two miles or so of Long Island Sound shoreline. Queens College leases the 80- year- old mansion above, built by JR Pope for Marshall Field III's gentleman's farm. It's salt marsh, woodlands, upland meadows and freshwater pond offer numerous opportunities for every level of eco-study, from elementary to college.

The Center, which can accommodate up to 50 students overnight provides lab and classroom space and can be used for conferences. Naturalists on staff can accompany groups of students on learning tours about habitats. There is even a Field Center for school groups where environmental programs and classes, with lots of hands- on activities for every age...

You can pet the birds in the care of the aviary, as Amanda is doing with the above owl, who didn't seem to mind a bit. We all shied away from this level of affection with the caged bald eagles out back, behind the mansion; was it because they always seem to be frowning, or was it simply an effort on our part not to demystify the almighty buck?

During the summer, courses are offered in teacher training, botany, entomology, and landscape arts.

We were lucky enough to have Peter Schmidt (Director) and Pia Terranova (deeply committed staff member) as our tour guides.

That's last year's president, Norm Cohn on the far left of the photo above, and the artist for our cover, Jeff Berman on the far right. Peter, our guide at the time is sitting on the fence, and that's Amelia Anderson, center. Jeff's wife, Rose is next to John Cunningham.

We visited just about every corner of the Park, and still felt refreshed when it was over, perhaps in part due to their positive, outgoing way and the breath-taking aspect of our surroundings.

Of course, and despite the dangerous demeanor of the resident monitor lizard pictured on the cover of this year's ADAPTATION, the creature was downright accommodating, even to the point of permitting several of us to pick her up. It was unusual to hold a cold living thing in one's arms, weighing in at what felt like 50 lbs. The skin was scaly and rough, and it continually probed the air before it with a long, trifurcated blue tongue.

The full name of the facility is the Center for Environmental Teaching

and Research at Caumsett State Park. When (not if) you avail yourself of this resource, ask where the Park got its name, and remember that Native Americans had their industries too, in a location that still preserves the hard stone of Jurassic strata in this, the greater Connecticut area of our tectonic plate.

Stephen S. Yaeger, artist for many-an-ADAPTATION-cover, still volunteers to share his talent with NYBTA members, and we hope to see more of his life-like images in the future.

President's Letter

November 2002

Dear Colleague,

Welcome to another year of NYBTA activities. I hope you are looking forward to participating in the varied events that will be held in the upcoming months which will be held at different locations in New York City and the surrounding counties.

As you know, NYBTA memberships expire on December 31, 2002. If you have not already renewed your membership, please take the opportunity to do so now using the membership form at the bottom of this letter. Renewing now will ensure that you continue to receive activity notices via first class mail.

If you are a new teacher looking for ideas for creative lessons, an experienced teacher wishing to hone your skills, or a retired teacher keeping up with the latest developments, NYBTA is for you. We provide all that and more in a friendly and sociable atmosphere. Join us!

Some of the activities that we have scheduled for the year ahead include

How Our Flora and Fauna Survive the Winter (Central Park)
Living Environment Workshop
Forensic Science: The Real CSI (Laboratory Tour)
Wetlands Discovery Field Trip
Glowing Deep Sea Discoveries/Vanderbilt Planetarium
Full Moon Over Orchard Beach – Horseshoe Crab Mating Walk
Oktoberfest- A Weekend of Activities in the Lower Hudson Valley
Annual Techniques Meeting including a Living Environment Workshop

There will be no charge for NYBTA members for these activities.

I look forward to seeing you at our upcoming events.

Yours truly,

Jennifer McHugh

Jennifer McHugh

The *Very* Small World of Dr. Beck

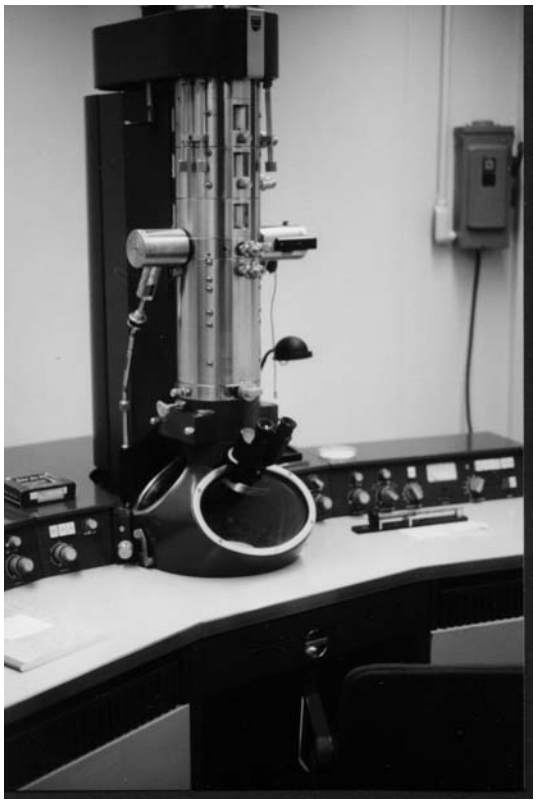
How many people do you know who not only spout the advantages of the electron microscope in their Living Environment classrooms, but also have pushed the buttons, turned the knobs and have successfully generated images 20,000 times their original size?

A select number of NYBTA members can now proudly say that they have prepared specimens, walked through the process of freeze-drying and cutting them with hand-made microtomes, and generated digital images of them on a state-of-the-art instrument.

The instrument was a scanning electron microscope (SEM), the next step up from the transmission EM, which itself was a major leap beyond the LM (compound light microscope). We learned that resolution of any of these is a function of the wavelength of the medium used to illuminate a specimen. In a nutshell, light waves are bulls in the microscopic china shop, compared to the wave characteristics of electrons (Thank you, Max Plank).

When it comes to contrast, where light microscopists have been fiddling for years with dyes and stains, the TEM folks went straight to heavy metals. Electrons can't pass through uranium, osmium & lead, and specimens take them up differentially, yielding those great images from the past half–a–century.

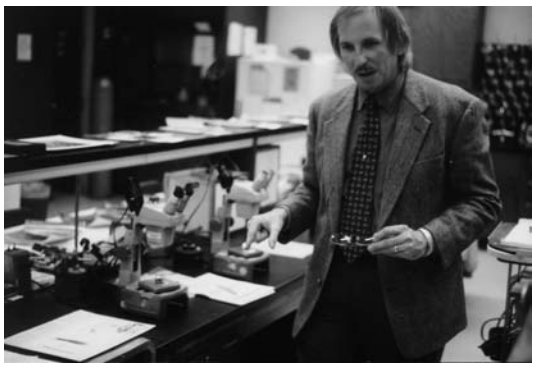
The SEM's electron beams don't pass through the specimen, but are bounced off its surface, back to a fluorescent screen, where – depending on the depths and heights of its topography - the pixels are either black or white as a result.



No stains are needed, but SEM specialists have found that sputtering gold atoms on the surfaces of specimens has an enhancing effect on the process. Like the TEM, the SEM uses electromagnetic lensing, not glass, to make the electrons behave the way they must in order to magnify an image.

Scanning the surface of an item for magnification presents many & more fun opportunities than blasting light or sub-atomic particles through the poor thing, in hopes that the stopped ones will give a little contrast. A scan generator strikes the surface with a beam in a raster pattern, in synchrony with the viewer's cathode ray tube electron gun, so that magnification is achieved by simply scanning a smaller area. We did this with our jaws dropping throughout the entire process.

Like the electrons in his charge, Dr. Beck is in a continuous hurry. His hands are full, his presentations partially fund his work, his delivery is engagingly kind and any fortunate enough to be where he is simply counts themselves lucky.



One senses immediately that the opportunity to prepare and look this close at anything on the face of the earth entitles one to focus on nearer and nearer points in the possible future, as time and money rush by.

Sadly, electrons fly best in a vacuum, so nothing alive gets to be seen. Due to the fact that cell death immediately releases enzymes that tear apart the delicate structures we want to see, preparing a specimen becomes a race against its own self-destruction. The tissue in question is minced into tiny cubes with a razor, soaked in an aldehyde, and fixed with an osmium oxide. It's then dehydrated enough to soak up the resins in which it will be cut with a glass edge custom-made by the student.

After the ridiculously thin slices of tissue floated out from our ultramicrotomes, we walked two inches above the carpet over to the viewing room, where we made JPEG files out of intestinal microvilli and laughed nervously at the 30,000 X magnifications possible in an afternoon's work.

There would have been room for nearly ten more students that evening. Professor Steven Beck invited us back whenever NYBTA deemed the time might be right. We couldn't thank him enough. He just needs a little advance notification, to get things just right.

--John Cunningham

ADAPTATION

Dear Advertising Division:

ADAPTATION is a publication of the New York Biology Teachers Association. Its distribution includes:

- members of the Association
- science department supervisors of junior and senior high schools of New York City public, private and parochial schools
- private, public and parochial schools of Westchester and Nassau Counties
- biology departments of New York City's two- and four- year colleges
- participants in the Annual Convention of the Science Council of New York City (S.C.O.N.Y.C.)

The New York Biology Teachers Association invites you to place ads in ADAPTATION on an issue-by-issue basis. Ad artwork and form should be sent "**copy size ready**". Please note the current rates:

Full Page	**$60.00 per issue**	**-**	**submit 8" X 11" ONLY**
Half Page	**$30.00 per issue**	**-**	**submit 8" X 6" or Submit 4" X 10" ONLY**
Quarter page	**$20.00 per issue**	**-**	**submit 4" X 5" ONLY**

Payments should me made payable to the New York Biology Teachers Association, and may be made for up to four issues in advance . Send payment, ad copy and bottom form to:

John Cunningham
Brooklyn Technical High School
29 Fort Greene Place, Room 2S12B
Brooklyn, NY 11217

Company_____
Address_____
_____
Contact Person_____**Phone ( )** _____
Amount Enclosed_____**for # issues**_____
Ad page size:_____

RECENT ADVANCES IN SCIENCE

By John Cunningham

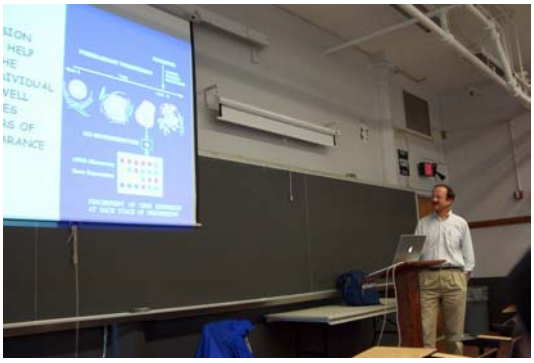
Malka Moscona is impossible to refuse. At least three Nobel Prize winners, and numerous young wizards on the front lines of Evo-Devo research will attest to this fact.

Once a month, at least 30 or forty lifelong learners - NYC biology teachers and their students - meet in Main Hall on the NYU campus at Washington Square to witness yet another work-in progress designed to bring us up to date on the latest things that biologists can possibly do.

What's Evo-Devo, boys-n'-girls? Put evolution research in the same bag as molecular genetics and developmental inquiry, shake well and bake for three hours on a Saturday morning, and out comes the reason for never moving to Kansas. Genetic mutation is now too vague an idea for evolution biologists to play with. Using butterfly eyespots, cavefish with genes like *sonic hedgehog*, and nematodes with unusual *vulvae*, scientists are now in search of the least-variable gene in a developmental sequence of expression, instead of the proverbial "missing link."

.

On November 16th of this year, **Dr. Harold Varmus** graced the podium and walked us all through the latest directions in cancer research and therapy. He ought to know. President and CEO of the Sloane Kettering Research Institute and Nobel Laureate, he put us all at ease with his teacherly perception of audience. Questions from students and teachers alike were courteously and informatively fielded.



Dr. Varmus informed us that it takes multiple mutations along a cell's "decision tree" (…do I grow, develop, differentiate or die…) to deliver the hallmarks of cancer: excessive growth and successful avoidance of apoptosis (programmed cell death). He suggests that educators wanting to learn more about the genomic attack on cancer visit the Cancer Genome Anatomy Project (NCI/CGAP) web page.

We learned that cancers involving a single gene are more testable than polygenic cancers. Further complicating discovery and treatment tactics is the fact that multiple protein signaling pathways obfuscate all gene candidates.

Hands flew into the air during the entire three hours, as we excitedly scribbled and gazed back & forth from screen to lecturer. Dr. Moscona had done it again: She found another brilliant researcher who spoke directly to our need to know.

Of course, the prime directive of all good conferences and workshops was dutifully observed, as well: free breakfast. Dr. Moscona's only request of those teachers trailing students was to refrain from gobbling it all up in seconds and thirds before the rest of us get at it.

The R.A.I.S. season was opened two years ago with a bang: **Steven J. Gould** spoke about the importance of evolutionary biology in teaching. Sitting 10 feet away from one of our heroes and talking shop was a morning few of us will forget. Further, since his passing the sense of losing a brilliantly sympathetic colleague overshadows the loss of his active contributions to biological and geological science.

This year was kicked off with "DNA Day", a full-day collection of lectures and laboratory visits based on the genome, its perseverance and versatility of molecular information:

Claude Desplan, Professor in NYU's Department of Biology opened with a talk on the several genome projects and their consequences for our life. Dr. Desplan's rich French accent lured us into structural genomics – the broad view of genome searches – and passed the EST's (expresses sequence tags. He introduced us to the Gene Finder, an exhaustive list of all known genes.

His central idea was to make sense of this gigantic gaggle of data. Knowing the sequences, how do we find what parts encode for the proteins of which we are made? Structural genomics has had a lot of successes, and now has led to functional genomics; when and where are genes expressed? Developmental and comparative evolutionary genetics were discussed at length. The use of restriction maps, or "fingerprints," and their overlaps to establish "contigs" was compared with more recent "shotgun" techniques that use machines to assemble genomes using fluorescence instead of radioactive labels. We learned that the process is aided by the fact that our species went through a "bottleneck" in its evolution, thus limiting our natural variations. From this perspective, it looks as if evolution is less of a "new gene" process than it is a matter of duplications of sequences.

Disotell, Desplan, Fitch & Moscona, grabbing a slice during break

Dr. Fabio Piano then spoke on the early embryogenesis of *C. elegans*, the favorite nematode of biologists. He pointed out the ways that this worm, like all of us, must determine which is front, back, top, bottom, left and right as we grow.

Fabio & Malka

As with all of the scientists that give of their time in R.A.I.S., Dr. Piano spent less time on the facts than how he gets them through ingeniously constructed research. The scientific method leaps out of these situations, one after another, making it so much easier to teach it. "Functional genomics takes into account gene sequences, loci, protein shapes, binding requirements, non-code roles, gene regulation, scaffolding and buffering effects of other genes. We have maps now, but what we really need is an atlas."

David Fitch, Ph.D., a long-term participant in R.A.I.S. and expert on cell fates in *C. elegans* development, delivered "DNA, the Most Important Living Fossil." The mechanics of making phylogenetic decisions when faced with nucleic acids instead of bones has all the earmarks of systematics. The old distinctions between the homologous and the analogous still work, and sequences of base pairs can be seen that way, too.

Dr. Fitch sets up homologous sequences and performs a phenetic analysis; he'll look for the number of differences every 10 characters, and then infer the least

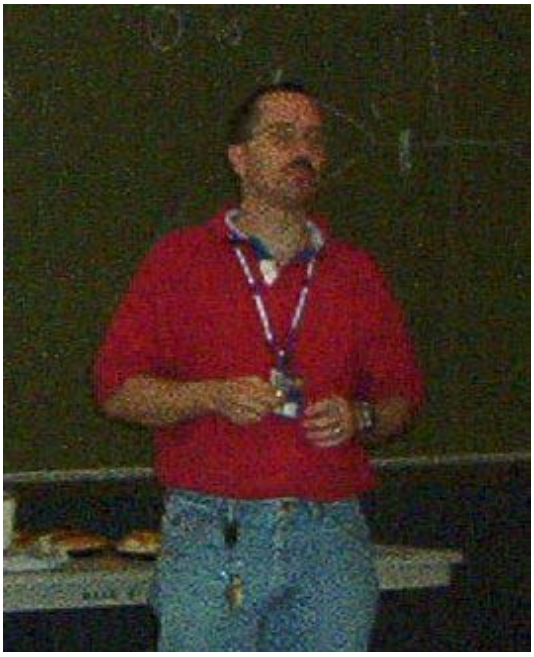
dissimilar to be the most closely related. It is here that our textbooks run out of steam. Most are lost in a financial dream of the past, which is rapidly being forgotten by real science. The jump into cladistics, a taxonomic method catching on in many of the world's great museums (including our own American Museum of Natural History), occurs where Dr. Fitch uses "parsimony criteria" for testing his phylogenetic hypotheses of molecules:

Cladograms showing shared derived characters can be made with molecules as easily as species by assuming that the hypothesis that predicts the least number of evolutionary changes best explaing the data, because change is rare. The cladogram with the least number of changes proposes the most number of changes that are shared due to ancestry instead of convergence.

Does this seem somehow familiar, yet just a bit incomprehensible? Suffice it to say that using the scientific method always does, to those who shun it. What seems impossible on a Saturday morning before coffee becomes pleasingly simple in the presence of master teachers like David Fitch; well placed slides in flawless PowerPoint, several sips of caffeine, and a room full of teachers are once again galloping ahead of their students.

The bottom line is that the evolution of novelty, for Evo-Devo specialists is the result of a chromosomal dance between gene sharing, splicing and duplication. Whole genome duplication gives many possibilities, while single gene duplication gives alternate possibilities for protein synthesis. Playing with the DNA sequences behind existing proteins on closely related species when one knows how genes are coaxed to express themselves in development can bring out meaningful and fascinating patterns in evolution. Often a pattern of ancestry can boil down to something as simple as a delay in expression due to a duplication of genetic material in the sequence that codes for a protein.

Dr. Todd Disotell closed the day with a romp through the latest tricks in handing Human and Neanderthal DNA by molecular evolution experts.



Notwithstanding the brow ridge evidence we find every day on the NYC subways, no one seems to be able to make a molecular connection between *sapiens* and *neanderthalensis*. Dr. Disotell reported on the work of mitochondrial DNA researchers like Rebecca Khan and Linda Vigilante, whose parsimonious approaches led to Africa, as the fossils do. The fact that African M-DNA has many more variations that that of existing human gene pools outside of that continent

points mathematically to an approximate date of no more than 100 thousand years since we all began diverging from each other genetically. This even emerges from studies on the Y-chromosome. “We just don’t find ‘old’ genes anywhere,” is the verdict of Dr. Disotell.

The advent of PCR has enabled Todd and his colleagues to examine Neanderthal sequences, with a result of there being no overlap in ranges of variation for the same genes in modern humans. He admits that the trading of human females as chattel over the past 600,000 years may have a confounding effect on these hypotheses…

Last month’s R.A.I.S. brought the work of **Dr. Joseph Ledoux** before a packed classroom of NYC teachers. The Physiological Basis of Emotions” was the topic, and his specialty is the fear response in higher mammals. The only frightening thing about the lecture was the evidence for how well-conserved the molecules for the brain’s amygdala functions are, across species.

Dr. Ledoux, as all of the professors who have been bring us up to date in Bio-science, is very accessible. We flooded him with questions he answered with ease, at a personal level, about the molecular workings of the emoting brain.

“Your mind is slow, but your brain is fast,” he said, when comparing the paths of information flow to and from the amygdala. Depending on the “loudness” of the conditioning, one reacts immediately through the amygdala, with obvious disadvantages. The more thought-permitting (ie, neocortical) pathways ramify into everything from admirable discretion to blithering paranoia. He showed us research on action potentials of single neurons in the lateral amygdala as it affects learning. If weak and strong stimulae occur concomitantly, the cell responds to the weak stimulus: In other words, after being bitten, you’ll fear the dog alone. His data also shows that stress can reactivate extinguished fear responses.

His work with voltage-gated channels in nerve-transmission pathways had us nearly hypnotized with its clarity of design. He treats the organism as far more than the sum of its parts. We discussed the generation of a “self” through the interaction of hard-wired responses of an organism with its ability to rewire experience through the happenstance creation of new synaptic pathways. The conversation was based purely on research in protein-manufacture within integrated systems of synaptic plasticity.

To say that he made us thoughtful was an understatement. We found ourselves caught up in the possibilities for scientific research design around shared inputs: Identical brain systems processing the same event, versus unique brain systems processing the same event. The most pregnant pause emerged when we realized that negative

experiences can easily result in patterns of learning behavior that continue through life. How many of us teach with kindness and affection? How many rely on fear? The reductionist notion that synapses somehow encode the self was compared with the idea of a self that is an integrated representation across brain stems.

None of us wanted to go home. I suppose that it will be the same in the coming months, for this FREE Saturday morning series. And as of this month, Dr. Moscona has permission from the Board of Ed to offer New Teacher Credit (3 hours) for each seminar! Here is the schedule:

December 14, 2002:
How Do Synapses Form Between Motor Neurons and Skeletal Muscle Cells? NYU's Main Building, Room 408.
Steve Burden, PhD

February 8, 2003:
T cells: Differentiation, Effecter Functions, and Roles in HIV Pathogenesis.
Dan Littman, PhD

March 8, 2003:
Keratinocyte Stem Cell: Identification and Clinical Applications.
Tung-Tien Sun, MD

April 12, 2003:
How to Build a Brain.
Gordon Fishell, PhD

May 17, 2003:
Stem Cells.
Gordon Keller, PhD

NEW YORK BIOLOGY TEACHERS ASSOCIATION MEMBERSHIP FORM

Affiliated with the National Association of Biology Teachers.
Member Association of the Science Council of New York City.

Please Print; your Email address saves paper & postage!

New Member __
Renewal __

Last Name _____ First Name _____

Your Address _____

City _____ State _____ Zip Code _____

Home Phone _____

Email _____

School or Affiliation _____

Affiliation Address _____

City _____ State _____ Zip Code _____

Affiliation Phone/Fax_____

Affiliation Email _____

Send Mail to home _____ or affiliation _____

Fees:
$0.00 retired members
$5.00 full-time undergraduate student in United States
$5.00 first-time member in the United States
$20.00 renewal membership in United States
$40.00 international membership

Send check or money order payable to NYBTA to:
NYBTA/Membership
PO Box 360192
Brooklyn, NY 11236-0192

Suggestions:
What activities would you like to see during the coming year?_____

_____

_____

Would you like to serve on one of our committees?_____

_____

BURGDORF MADNESS

Thanks to P. Serfaty, A. Weseley & K. Prabhakar

Last year's 56th Burgdorf Annual Student Science Research competition netted plenty of entrants, from schools all over the New York Area. Thanks to the Herculean efforts of our revival committee – Phyllis Serfaty, Allyson Weseley and Kumkum Prabhakar, - all the applications were sent out, papers were sorted and sent out to the judges, and awards were generated and presented in a aggrandizing format.

This month, they announce the 57th Burgdorf Competition: "The goal of the conference is to offer guidance and motivation to the many young people attending. It is our hope that the Research Competition finalists will serve as positive role models for other aspiring research students. To accomplish these gals, sessions have been carefully thought out and designed to encourage constructive exchange between presenter and participants. Our Student Finalists will present their actual research projects as well as the rich variety of experiences they had while pursuing their work. It has been our experience that the enthusiasm and attitude of these Finalists is quite contagious.

"We strongly urge active participation in the conference by all students intending to conduct research at the high school level in the biological, behavioral and environmental sciences.

"The judging limit is six papers per judge; each paper will be evaluated by three judges. Due to a lack of qualified judges, Mathematics, Earth Science and Space Science papers are not eligible for this competition.

"All schools which are submitting papers are courteously requested to provide at least one judge for every five papers that are entered."

What our committee tactfully failed to mention is that all this work is done for absolutely no compensation, and ultimately reflects a constant state of mind of true NYBTA members: willingness to put out energy for the sake of enriched biological education. Are you one of these people? If you are, and by some chance didn't apply or renew membership, there's a form in this issue. Please join and be a part of this 100 year old organization for teachers and their students.

The list of awardees from last year's Competition is a pleasingly long one. The School/Teacher connection is followed by students' names and the category of award presented:

SCHOOL	SPONSR	STUDENT	CAT.
Randolph	Cassar	Mirza	H Men
Randolph	Cassar	Jimenez	Partic
Randolph	Cassar	Piler	H Men
Randolph	Cassar	Brown	Partic
Randolph	Cassar	Housen	Hmen
Lincoln	Goldberg	Burlaceno	Hi Hn
Baldwin	McGrath	Prabhakar	Hon
Bayside	Berman	Zhang	Hon
Env Stud	O'Herlihy	Bansu	Merit
Flatbush	Fruchter	Hersh	Merit

Fran Lew	Watins	Shen	Hi Hn
Fran Lew	Watins	Bansal	Hon
Fran Lew	Watins	Smallhome	Merit
Fran Lew	Watins	Pete	Hmen
Fran Lew	Watins	Manzano	Hmen
Fran Lew	Watins	Chen	Merit
Fran Lew	Watins	Goginenei	3Gen
Fran Lew	Watins	Grover	Merit
Fran Lew	Watins	Daglyan	Hon
Fran Lew	Watins	Khandai	Merit
Fran Lew	Watins	Zhang	2Eco
Fran Lew	Watins	David	Merit
Gar City	Bergman	Schroder	1Gen
Gar City	Bergman	Catalano	Hon
GNS	Hersh	Rafii	3Med
GNS	Hersh	Bass	Hmen
GNS	Hersh	Schultz	Hmen
GNS	Hersh	Mehta	1Bcm
GNS	Hersh	Wissner-G	2Med
Great NS	Hersh	Chang	Hi Hn
Hlth Prof	Mohmdn	Bang	3Mic
Hlth Prof	Mohmdn	Tabassum	3Eco
Hksville	McHugh	Dolezal	Merit
Hksville	McHugh	Jacob	Hon
J Madison	Kaye	Iryna	Merit
J Madison	Steven	Yang	2Gen
J Madison	Kaye	Petrorichev	Hon
Lynbrook	Shanker	Gorin	HiHn
MagDavid	Kaye	Lieb	Hon
MagDavid	Kaye	Safdieh	Merit
PortRich	Ascher	Tesoriero	Partic
Roslyn	Kutscher	Stern	1Beh
Roslyn	Kutscher	Pinchasick	3Beh
Roslyn	Kutscher	Repole	2Beh
Roslyn	Kranz	Schechter	Partic
Roslyn	Kranz	Kanis	HiHn
Roslyn	Kutscher	Aronson	Hon
Roslyn	Kutscher	Arduini	Merit
Schrieber	Serfaty	Meltzer	Merit
Schrieber	Serfaty	Merkelson	Hon
Schrieber	Serfaty	Schenendrf	Hon
Schrieber	Serfaty	Ansel	1Eco
Schrieber	Serfaty	Bradstadter	HiHn
Schrieber	Serfaty	Bernstein	1Med
Schrieber	Serfaty	Koo	Hon
Wagner	Cohen	Thakkar	Hon
Syosset	Satz	Tam	Hon
Syosset	Satz	Ruberman	Hon
Syosset	Satz	Chowdhury	HiHn
Td Harris	Brustein	Kalla	Hon
Td Harris	Brustein	Tusher	1Med
Td Harris	Brustein	Nguyen	2Mic
Td Harris	Brustein	Roy	HiHn
Td Harris	Brustein	Lee	Hon
Td Harris	Brustein	Gaffney	HiHn
Td Harris	Brustein	Nadel	HiHn
Td Harris	Brustein	Lemon	Hon
Td Harris	Brustein	Kim	Partic
Td Harris	Brustein	To	Hon
Td Harris	Brustein	Cohen	1Mic
Td Harris	Brustein	Niyazaia	HiHn
Td Harris	Brustein	Chin	HiHn
Td Harris	Brustein	Bajwa	2Mic
Td Harris	Brustein	Dklenna	Hon
Td Harris	Brustein	Jun	HiHn

The Burgdorf Committee needs Judges. “We have been highly successful in that our competition has provided a forum to recognize the efforts of some of the area’s most talented youth.

“Judging is performed according to a simple set of criteria with values assignes in a variety of areas. In the past, over 100 professionals have volunteered to rate research papers…

The continued success of our program depends on developing a large pool of dedicated professionals willing to help…If you volunteer, we will send you approximately five papers in your area of expertise. You will have three weeks in which to read the papers. Please help…”

You can contact Phyllis Serfaty at

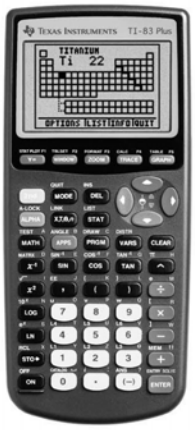
P. D. Schreiber High School:
101 Campus Drive
Port Washington, NY 11050

Let her know your area of expertise:

Archaeology	Botany
Behavioral Science	Genetics
Biochemistry	Ecology
Medicine	Microbiology
Zoology	Any Others?

--John Cunningham

Critical elements for teaching and learning science in successful classrooms everywhere.



Technology they can hold will help you teach concepts they can grasp. The TI handheld technology used in schools everywhere is an essential addition to science classes. The TI-83 Plus, America's best-selling graphing calculator, helps students explore science concepts like never before. Pair it with a data collection device like our CBL2™. Or use our specially designed software applications, including the Periodic Table, Science Tools and Fundamental Topics in Science. You'll discover that handheld technology is a portable and affordable alternative to desktop computers.

No one gives you more elements for a successful science classroom. TI's educator support programs, including professional development services and workbooks, make it easy and effective to implement TI technology in your science classroom. To signup for TI's free science e-mail updates, specific to your discipline, visit us online at **education.ti.com/scienceupdates**.

E-MAIL: ti-cares@ti.com • CALL: 1-800-TI-CARES • VISIT: education.ti.com

connectingminds™

TEXAS INSTRUMENTS

ROCKEFELLER'S SCIENCE OUTREACH

(Thanks to Bonnie Kaiser, PhD)

For over 12 years, Dr. Kaiser has been writing grants in support of the dream of connecting teachers and research scientists *in laboratories*. Largely due to her harvesting of funds from such organizations as the National Science Foundation and the Howard Hughes Medical Institute, dozens of teachers have been hooked up with scientists in labs on the campus of the Rockefeller University, on New York's East Side.

This is hopefully the first of a series of articles that will appear in ADAPTATION, as biology teachers from the NY area step forward with accounts of their experiences in the outreach programs that are blossoming thanks to the savvy grant-writing of concerned professionals. Jay Dubner of Columbia's outreach program and Adele Kupfer of Project S.T.I.R. (that places teachers in applied labs and industry) are two others whose brilliant RFP's have netted bucks for doing the same.

This issue's focus on Rockefeller's outreach program is accompanied by a printout of the teacher applications downloadable from Rockefeller's web site: http://www.rockefeller.edu/outreach/

Don't expect to be accepted into the program on the first try. There are more and more applicants every year, while the number of labs at the University seems to have stabilized. Each application is reviewed by a panel of teachers and scientists. When approved, the application circulates around the related labs on the campus until it finds a willing home.

Once accepted, the teacher is entitled to a stipend for working in the lab for a period of 8 weeks each summer, for two years. During that time, and as long after as the teacher deems possible, the teacher is a "Fellow" of the program, and generally gains a great deal of professional satisfaction from the meetings and communications over the years after lab work. In a sense, the teacher becomes a member of what can best be described as an academic family.

Receipt of each summer's stipend is conditional on the teacher's production of an Action Plan, that delineates what the teacher intends to do with the experiences gained in the lab. While this seems at first to be an onerous task, help sessions during the course of the summer and the sheer desire of most intelligent people to want to make sense of a fascinating experience change the task into a preoccupation that ends all too son.

Most teachers who have availed themselves of the opportunity to be in the thick of scientific problem solving consider the experience to have totally changed their teaching experience. It marks the end of scattered, day-to-day didactics and the beginning of truly exciting, hands-on, well-informed scientific instruction.

--John Cunningham

The Rockefeller University
Science Outreach Programs
National Science Teacher Application

Please print legibly or type responses and return 4 copies to:

Bonnie Kaiser, Ph.D., Director of Science Outreach Programs
The Rockefeller University, 1230 York Avenue -- Box 53
New York, New York 10021-6399
Phone: (212) 327-7431 - Fax: (212) 327-7519 - Office: NR412
Email: bonnie@rockvax.rockefeller.edu - URL: http://www.rockefeller.edu/outreach/

To preservice and inservice elementary, middle, junior-high, and high school science teachers:

The Rockefeller University Science Outreach Program invites you to apply for a limited number of stipends to gain laboratory research experience for 6 - 7 weeks this summer and next. If accepted, you will join a diverse group of science teachers who, while doing research, work with each other and with faculty, graduate students, postdocs and noted educators to translate their research experience into active learning for students. Your professional development is a key factor in this process and you will be encouraged to develop workshops for your colleagues. Preservice teachers can earn up to $3,500 and inservice teachers can earn $5,000 over a flexible seven-week period. Our program aligns with the National Science Education Standards for Professional Development.

Teachers write a Research Report each summer and develop an Action Plan throughout the year for classroom implementation. Upon presentation of an acceptable Action Plan with a budget, teachers receive a generous supply allowance to help implement their ideas. They also receive funding to give Peer Workshops. During the summer, teachers meet weekly to discuss science education reform, program evaluation, and common interests. Teachers attend our ScienTific Reading And Writing (STRAW), course, receive training in lab safety, and use of electronic mail and Internet resources. By fostering teacher-mentor partnerships, Outreach aims to establish school-university partnerships to help improve science education for all students.

BY FEBRUARY 1ST, please send the following as a packet , to the address given above:

- **The completed application, volunteer health information form and essay. A resume may be included. Send the original plus 3 copies (4 TOTAL)**

- **Two sealed letters of recommendation from a professional colleague, thesis advisor, chairman, and/or principal which must be on school or corporate letterhead. (We will make the necessary copies.)**

- **For inservice teachers, a substantive letter of commitment from the principal or head of school, which can be incorporated into the letter of recommendation. (We will make the necessary copies.)**

All teachers who have applied in the past and could not be accepted are strongly encouraged to REAPPLY. Include an updated resume and two new letters of recommendation.

The Program encourages applications from women and underrepresented minorities, or those who teach a substantial number of disadvantaged students, and is seeking partnerships with inner-city public schools. Decisions should be made in April. Because of very limited staff, we regret that we cannot notify all applicants, therefor **please keep in touch with us**.

This application may be copied and more than one science teacher may apply from a school. More than one preservice teacher may also apply, but must be enrolled in a graduate program at the time. If a question does not apply to you, please write "N/A" for "Not Applicable." In answering questions about associations, activities, achievements, you may exclude those activities, etc. which indicate your union status, age, race, national origin, religion, sexual orientation, citizenship or disability. Science Outreach is conducted under the auspices of the Head of the Laboratory of Neuroendocrinology, Professor Bruce S. McEwen. Please print or type responses and direct any questions to the Director, Dr. Bonnie Kaiser at (212) 327-7431. **Due by February 1st**.

❒ I am a Preservice Teacher ❒ I am an Inservice Teacher

Name:_____

Home Address:_____

City:_____State:_____Zip:_____

Home Phone:_____ Work Phone:_____

Electronic Mail Address:_____Fax:_____

Institution:_____

Institution Address:_____

City:_____State:_____Zip:_____

Social Security Number:_____Position:_____

For inservice, what grades and subjects do you teach? For preservice, what do you anticipate that to be?

(Anticipate) teaching:_____Grades:_____

Subjects:_____

Are you authorized to work in the United States? ❒ Yes ❒ No

What is your school profile (percent minorities?) ___% (Minorities include American Indian ___%,

Alaskan Native ___%, Black ___%, Hispanic ___%, Pacific Islander/Asian ___%) **This must be answered.**

Do you have a master's degree in a science? ❒ Yes (What science?) _____❒ No

Give the full title ofdegree:_____

How many years do you have of: Advanced pedagogical training? _____Teaching experience?_____

In what professional societies are you a member? ❒NSTA ❒ NABT ❒ACS ❒NYAS ❒SCONYC ❒APS ❒Other: _____

What periodicals do you read/use in your teaching? ❒ NYTimes *Science Times* ❒ Science News ❒ Scientific American ❒ Science Teacher ❒ HHMI ❒ Other, including Video, Software, E-mail, Web-sites, Museum Programs:

_____

_____

Do you have, or are you maintaining, any connections with local universities? ❒ Yes ❒ No
If yes, please describe the nature of the connection:

_____

Have you attended any workshops for teachers? ❒ Yes ❒ No If yes, please describe:

_____

Have you given any workshops for teachers? ❒ Yes ❒ No If yes, please describe including an estimate of the number of teachers in each workshop:

_____

_____

List graduate and undergraduate education. Begin with the most current.

Name and location	Dates(Month/Year) From	To	Degree

List all full and part-time jobs you have held. Begin with the most current.

Position	Employer	Dates (Month/Year) From	To	Hours per week

List extracurricular activities: _____

_____

Have you earned awards or honors, including participation in other programs?

_____

_____

Is there anything else you would like us to know about you? If so, please indicate it below &/or include your resume:

_____

_____

Essay Question:

What is inquiry-based learning? Do you imagine that scientific inquiry as it occurs in laboratory research differs from inquiry as practiced in a classroom setting? How do imagine they differ? Do you have any opportunities to teach content by the process of scientific inquiry? How do you think schools might support inquiry-based learning? How might you measure that any change is occurring in student learning from one year to the next?

If you use any terms such as, *constructivist learning, hands-on, portfolio assessment*, etc. please give an example of what you mean. If possible, please try to include quantitative as well as qualitative measures of student outcomes.

(Please type or print your response on 8.5 by 11 inch paper with your name at the top of each page.)

My signature below indicates that all information included above is correct and honest to the best of my knowledge.

Signature:_____ Date:_____

Federal, New York State and New York City Laws prohibit discrimination in employment on the basis of age, race, color, national origin, citizenship, religion, sex, sexual orientation, veteran or marital status and disability. The Rockefeller University is an Affirmative Action/Equal Opportunity Employer.

The Rockefeller University Volunteer Health Information Form

In order to ensure that potential health risks associated with some types of laboratory work are reduced to as low as possible, The Rockefeller University provides the following occupational health related information and requires declaration by all potential volunteers that they meet minimum immunization status.

- While laboratories are inherently safe work areas, they do contain recognized hazards, including chemical, radioactive and biological ones. Through compliance with University safety policies and procedures, you will minimize your risk of exposure to unsafe levels of these hazards. Volunteers still must be aware of the fact that exposure to these hazards may result in recognizable signs and symptoms, including allergic reactions, headaches, nausea, lightheadedness, respiratory irritation, and coughing, and the volunteers must report these appropriately.
- The most common hazards of work with laboratory animals are traumatic injury (from a bite or scratch) and allergic reactions. Either of these must be reported as soon as possible. Anyone who works with laboratory animals must recognize that virtually all laboratory animal species can carry pathogens which are infectious to humans. Inoculated animals readily transmit viruses to cagemates by inhalation and contact with urine, feces, sputum, etc. Caution should be taken when working with any animal.
- All volunteers must report any injury sustained while on the University campus to their supervisors and to the University's Occupational Health Service (OHS) office. In addition, the volunteer must report any symptoms or illnesses related to the work environment to the OHS and their supervisors. If the injury/illness/symptom occurs outside of normal business hours, the volunteer must report to the Nursing Station on the 3rd floor of the University Hospital building.

DECLARATIONS (check all boxes that apply)

☐ I hereby attest and assert that I have completed the full course of the hepatitis B virus (HBV) vaccination. I understand that HBV vaccination is not a 100% guarantee of immunity against HBV and that I may still be at risk of acquiring the infection.

☐ I hereby attest and assert that I have been offered but have declined vaccination against hepatitis B from my own physician or healthcare provider. I understand that should my volunteer position involve exposure to blood or other potentially infectious materials at The Rockefeller University I may be at risk of acquiring Hepatitis B virus (HBV) infection, a serious disease.

☐ I hereby attest and assert that I have initiated the HBV vaccination on [enter date} _____ and intend to complete the full series in accordance with the timetable recommended by my physician/healthcare provider. I understand that without completed the full series, I may still be at risk of acquiring Hepatitis B virus (HBV) infection, a serious disease.

☐ I hereby attest and assert that I have received a tetanus/diptheria vaccination within the last ten years.

Volunteer name:_____

Volunteer signature:_____Date:_____

ADAPTATION

A PUBLICATION OF THE NEW YORK BIOLOGY TEACHERS ASSOCIATION

CONTENTS, Volume 23 **2001- 2002**

New York Biology Teachers Association
P.O. BOX 360192
BROOKLYN, NEW YORK 11236

NONPROFIT ORG.
U.S. POSTAGE
PAID
BROOKLYN, NY
PERMIT NO.
2623