



The California Tech

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PASADENA, CALIFORNIA

JANUARY 13, 2003

Curiosity, Controversy Swirl In Activist Couple's Mideast Account

By PHIL ERNST

Last Wednesday, students and faculty packed into Baxter Auditorium to hear Jewish-American Adam Shapiro's and Palestinian-American Huwaida Arraf's eyewitness accounts of "occupied Palestine" through the lens of their first-hand testimony of Palestinian life in the West Bank and Gaza Strip.

Although the duo impressed upon the audience the Palestinian minority's struggle since Israel's inception, they focused most acutely on the current "Intifada" that has claimed countless lives on both sides of the embittered Arab-Israeli conflict.

Huwaida Arraf opened the forum by speaking about her love and devotion for the Palestinian people. She argued that the "Israeli occu-

pation of the Palestinian territories" has greatly oppressed her people and that the Israeli army committed atrocious civil rights violations, which, she said, the international community has largely ignored. Arraf pointed to Palestinian land "confiscated by the Israeli government," Palestinian houses demolished by Israeli bulldozers and her view of Israel's instituted checkpoints as a deliberate insult to Palestinian society.

She also spoke about a wall that Israel was building around the West Bank in order to separate the Jewish and Palestinian populations. Lashing out at Israel's claim justification of national defense, she called the wall an "apartheid wall" and said that it had sown new seeds of hate in an already virulent conflict.



Palestinian activist Huwaida Arraf presses for an end to what she termed Israeli occupation of her people's land.

Bogaard Plots Parking, Subway in Ramo Speech

By ADAM SEARS

Last Thursday evening in Ramo Auditorium, Pasadena mayor Bill Bogaard delivered his annual "State of the City" address. Apparently, Pasadena isn't quite where it was last year.

The mayor cited population growth, public works projects and auspicious budgetary plans in his generally optimistic outlook for Pasadena in the backdrop of a heated mayoral election slated for March 4.

The event began with a stunning collection of songs performed by the Caltech Chamber Singers. Afterwards, the audience was walked through the Pledge of Allegiance by local Girl Scout Troop 228 and the mayor proceeded to outline the government's major issues; accomplishments within the Pasadena area. Expansion and budget status topped his list of important topics.

The city has been growing at an accelerated rate since the turn of the century, Bogaard said. With presently over 800 units of housing built annually, there hasn't been a year as active in decades. He acknowledged the complaints about the large amount of ongoing construction around town, but insisted that everything was proceeding normally and would in fact strengthen the downtown area.

On the same theme, he emphasized the importance of structured and thoughtful expansion. The city

is doing its best to arrange housing in areas close to public transportation and commerce. The Metro Gold Line, linking Pasadena and Los Angeles, should be finished by the summer of 2003. With a commute of less than half an hour, students should be able to get all the way to downtown L.A. Several stations are also being built at strategic areas in Pasadena, including one near Caltech, to support local demands.

The administration has also identified 200 more potential spots for parking in Old Pasadena, in a move to relieve congestion.

Several monumental projects have recently finished construction. The completion of the Caltech Broad Center, as well as the Pasadena Bioscience Center, which is supported in part by Cal. Poly., Pomona, Cal. State, L.A., Pasadena City College and the city, go a long way towards bolstering the local biotechnology economy. The city hopes to see an influx of personnel from the training programs of PBC, in addition to technological exchange in the private sector through the Broad Center. Mayor Bogaard reiterated plans to renovate the historic City Hall, as well as to increase financing for public parks.

Despite the draw of a minor celebrity, many in the sparsely packed Ramo Auditorium attended for different reasons. "I came for them," explained Geology Professor

Furthermore, she maintained that because "Palestinian lives are worthless to the Israeli government," the Israeli army had found no qualms with imposing curfews on Palestinians living in the West Bank, which had confined Palestinians to their homes for days at a time.

Arraf also solicited the audience to join her organization, the International Solidarity Movement, to campaign for the Palestinian cause. She maintained that it was the re-

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BIOLOGY PROF. EARNS NOTED PLANCK AWARD

BJORKMAN AMONG 12 WINNERS

Recognized for Work On Immune System's Molecular Mechanics

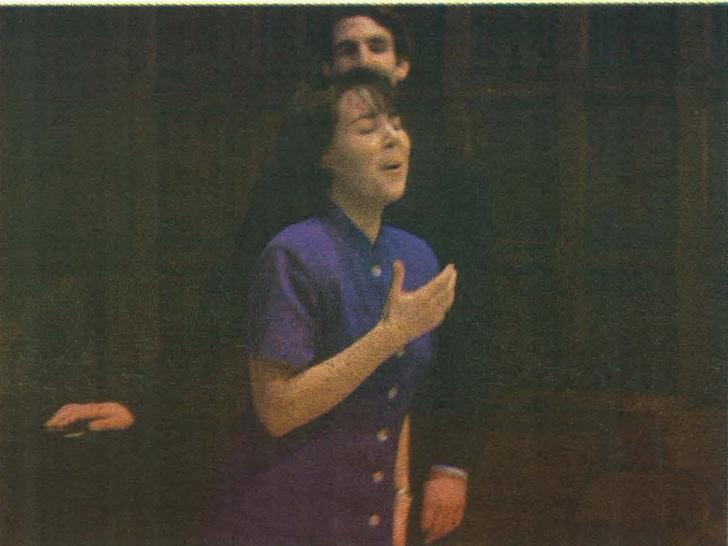
By ROBERT LI

Pamela Bjorkman, biology professor and current executive officer for biology, won the Max Planck Research Award last month for her work on the molecular mechanisms of the human immune system.

She was one of 12 scientists worldwide to receive the award. Given out by the Max Planck Society annually since 1990, the Max Planck Research Award for International Cooperation is sponsored by the German Ministry for Education and Research and the Alexander von Humboldt Foundation.

Winners of the award are chosen for their "exceptional and internationally recognized achievements" in one of six categories: life sciences and medicine; chemistry; pharmacy and physics; astronomy and geosciences; mathematics and

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D. Korta/The California Tech
A resident artist performs an opera piece to a full crowd in Dabney Lounge at last Tuesday's free recital, "Opera's Greatest Hits."

L.A. Opera Serenades Dabney in Open Recital

By LEA HILDEBRANDT

Last Tuesday, the L.A. Opera delivered an open recital in Dabney Lounge. The program, entitled "Opera's Greatest Hits," started at noon and lasted for about an hour.

The performers were Resident Artists Jessica Rivera, a soprano, Luis Contreras, a tenor, and Davit Babinet, a baritone, as well as pianist Daniel Faltus. Justifying the event's title, they performed pieces from myriad famous operas—Verdi's *Rigoletto*, Puccini's *Madam Butterfly* and Gianni Schicci and Tchaikovsky's *Eugene Onegin*—and closed the program with a trio from the last act of Rossini's *The Barber of Seville*.

The audience's response was very positive. At the beginning of the program by some pleasantly funny remarks about opera from the pianist served to lighten up the performance. Additionally, the exceptionally high, noted quality of the singing as well as the acting of the performers maintained this pleasant atmosphere and prompted the audience to laugh at times and to respond to each performance with enthusiastic applause.

The program was well attended; the visitors, a majority of whom seemed to be undergraduates, filled

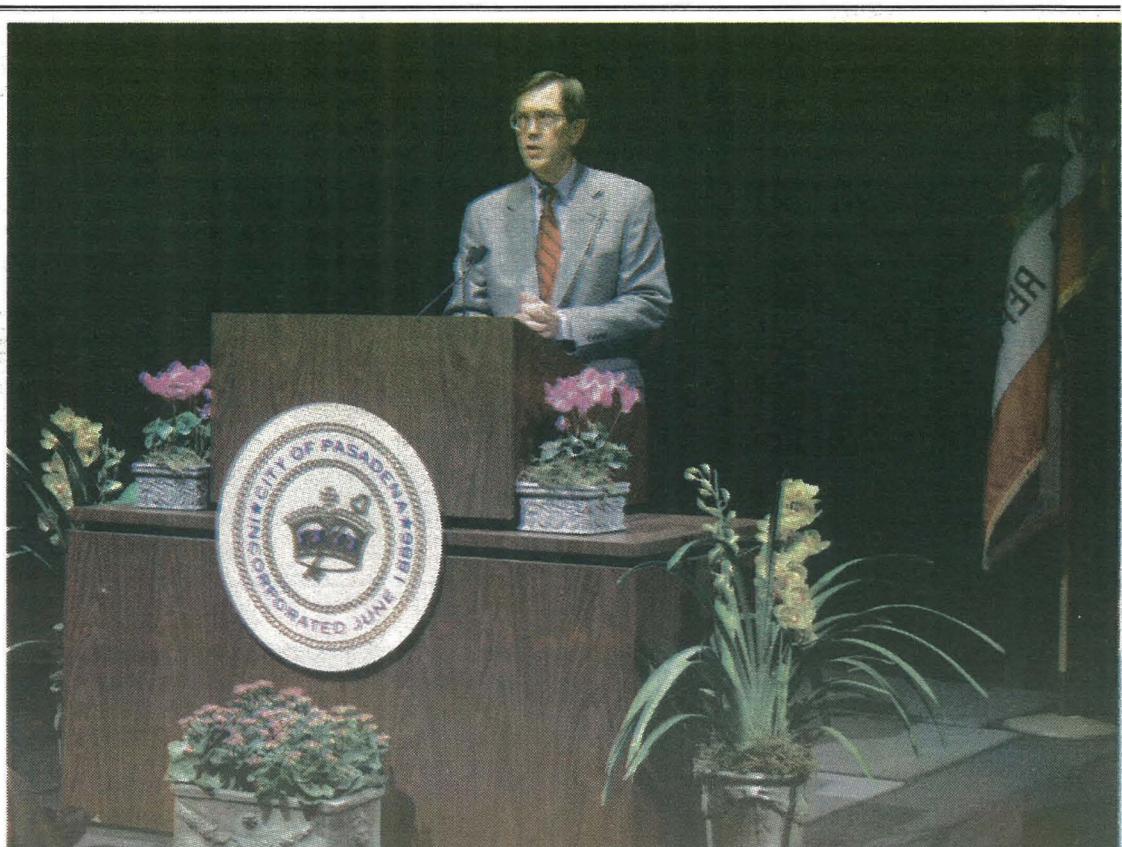
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almost all of the seats in Dabney Lounge. This event was sponsored by the L.A. Opera in conjunction with Caltech's Students Affairs and it was organized by the Caltech Opera Club.

The Caltech Opera Club started off last year when Angela Wood, who has been a career counselor at Caltech for four years, organized the first meeting. Since then, the club has been meeting once a month during lunch. The meetings are enriched through the presence of guest speakers. So far, all of the guest speakers have been from the Los Angeles Opera, but the members of the club are also hoping to recruit speakers from the San Diego Opera and opera societies in the Los Angeles area.

The guest speakers usually talk about upcoming works of the LA Opera and bring musical samples. The visits are aimed at accomplishing one of the goals of the Caltech Opera Club: to learn more about opera and thereby enhancing the opera-going experience. The other goal of the club is broader: to increase interactions among all members of the Caltech community.

At the first meeting, only members of Ms. Wood's office were



D. Korta/The California Tech
Pasadena Mayor Bill Bogaard presents his annual "State of the City" address in Ramo Auditorium this past Thursday.

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D. Korta/The California Tech
The Caltech Chamber Singers provide entertainment for the crowd during the mayor's "State of the City" address.

FINANCES, FUTURE UNDERLINE 'STATE OF CITY' ADDRESS

EMPHASIZES CITY GROWTH, PUBLIC WORKS

City Councilmen, Officials On Parade at Ramo Auditorium

Continued from Page 1, Column 2

George Rossman '71, as he pointed to the Caltech Chamber Singers. Other public officials, school superintendents and city councilmen showed up to support the mayor and answer relevant questions.

Still more came to advance their own personal projects. Mayoral Candidate Philip Koebel arrived, loaded with business cards to distribute and ready to talk. Other representatives, from an initiative called the City of Learning were not only willing to talk but also gave out stickers and spoke after the main ceremony. The City of Learning's goal is to encourage an environment of learning for all ages, based on local resources and where citizens are encouraged to take note of educational needs.

Many in the crowd, like Dr. Rossman, were disappointed at the lack of emphasis on crucial issues surrounding the Pasadena community. Bing Huo '06 couldn't make it to the meeting, but was glad that the mayor had reported on several important upcoming projects. "I saw the Gold Line construction during Prefrosh Weekend last year. It's pretty exciting," he said. Though not as interested in the City Hall renovation, Huo thought the Gold Line would be worth its wait.

Study Describes Role of Blood Flow in Heart Development

By ROBERT TINDOL

In a triumph of bioengineering, an interdisciplinary team of California Institute of Technology researchers has imaged the blood flow inside the heart of a growing embryonic zebra fish. The results demonstrate for the first time that the very action of high-velocity blood flowing over cardiac tissue is an important factor in the proper development of the heart—a result that could have profound implications for future surgical techniques and even for genetic engineering.

In last Thursday's issue of the journal *Nature*, investigators reported on two interrelated advances in their work on *Danio rerio*, an animal reaching only two inches in length as an adult but a model of choice for research in genetic and developmental biology. First, the team was able to get very-high-resolution motion video, through the use of confocal microscopy, of the tiny beating hearts that are less than the diameter of a human hair. Second, by surgically blocking the flow of blood through the hearts, the researchers were able to demonstrate that a reduction in "shear stress," or the friction imposed by a flowing fluid on adjacent cells, will cause the growing heart to develop abnormally.

The result is especially important, says co-lead author Jay Hove, because it shows that more detailed studies of the effect of shear force might be exploited in the treatment of human heart disease.

Because diseases such as congestive heart failure are known to cause the heart to enlarge due to constricted blood flow, a better understanding of the precise mechanisms of the blood flow could perhaps lead to advanced treatments to counteract the enlargement.

Also, Hove says, a better understanding of

Caltech Swimming Steams Pool With Slate of Victories

By TAMMY MA

The Caltech Swimming and Diving Team is off to an amazing start this season. After a busy weekend with two meets—one against Whitman College from Washington on Friday and another Saturday morning against Redlands University, the team is now posting a four-and-one record for men and three-and-two for women.

Said coach Clint Dodd, "[Our meet against Redlands] was a little understaffed. But it gave us a chance to swim off-events. The effort was definitely there and I'm very pleased with the team's performance. This year, our team is a little light in breaststrokers and distance swimmers, but we're strong everywhere else. Our diving has also really improved with the addition of freshmen Eason, Katz and Pelletier. We now also have Lisa Seeman, who has already set the school record in the 100- and 200-yard breaststrokes."

Against Whitman College, Jason Lee '05 had a strong showing, coming in first in both the 200 Free with a 2:05.89 and the 100 Fly with a 1:01.59. Jim Rebisco '04 showed a 22.60 in the 50 Free and a 53.32 in the 100 Free, also placing him first in both events. Logan Linderman '05 pulled off an exciting and surprise first place win in the 100 Breast with a 1:11.19. The men won this meet, 148 to 63.

On the women's side, Jacki Wilbur '04 had a strong showing with a 2:04.67 in the 200 Free—first place—and a 1:05.64 in the 100 Back, also first. Saskya Byerly '03 won the 100 Free with a 59.11. Natalie Kruk '06 has proven to be a very versatile swimmer, placing first in all three of her events: the 50 Free, with a 27.25; the 100 Fly, with a 1:09.29; and the 500 Free, with a 5:47.98. The women won, 138 to 96.

Commented team co-captain Rachel Thessin '03, "We've had two strong years of freshmen so now there are a lot of good freshmen and sophomore swimmers. We've always had the same number of fast swimmers, but now we have the depth to back them up by filling in the second and third places."

Added co-captain Wilbur, "Our team has to be one of the most committed out of all the sports. We have more both morning and afternoon practices and at least one meet a week. The season's not that long but we work really hard during it."

Despite a loss to Redlands of 62 to 179 for the women and 46 to 159 for the men, the team remains hopeful of keeping up a winning record for the rest of the season. Remarked swimmer Jim Rebisco, "Redlands got lucky, but we'll get them at [the] SCIA Championships in February."

The team will host another home meet next Wednesday against Pomona Pitzer at 5:00 p.m.

Continued on Page 8, Column 1



T. Ma/The California Tech
In a meet against Redlands last Saturday, swimmers dive into the pool in the 500 Freestyle. Caltech lost this meet, 62-179 for women and 46-159 for men.

Altos, Sopranos and "The Barber of Seville"

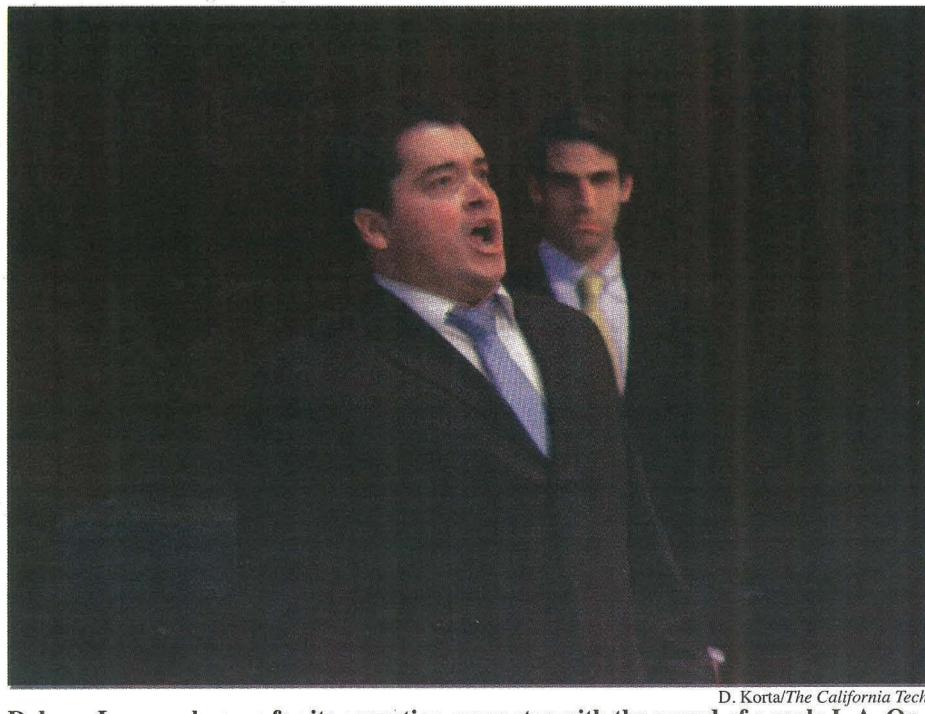
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present. But by now, staff members, faculty as well as students have attended meetings. Maria Ho '05 has been assisting Ms. Wood in advertising and in organizing the club's activities.

The club plans to follow up the Dabney performance with its next meeting two weeks from Wednesday in the usual Chris Brennen Conference room. The day's topics will be Rossini and *The Barber of Seville*. To this end, the guest speaker will present excerpts from this opera and tell interesting stories about the composer Rossini.

Ms. Wood has also been active in the Opera League of Los Angeles. Through her, the L.A. Opera had known about the Caltech Opera Club; as such, this special performance came as an offer through their education department to support the club as well as to provide a nice community and educational service.

In Ms. Wood's words, "Caltech has a nice tradition of presenting chamber, choral and orchestral programs. Hosting the Los Angeles Opera further enriches our overall cultural program."



D. Korta/The California Tech
Dabney Lounge, known for its acoustics, resonates with the sound of a male L.A. Opera singer performing "The Barber of Seville."

The California Tech

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Shapiro, Arraf Press for Palestinian Peace Before Mixed Caltech Crowd

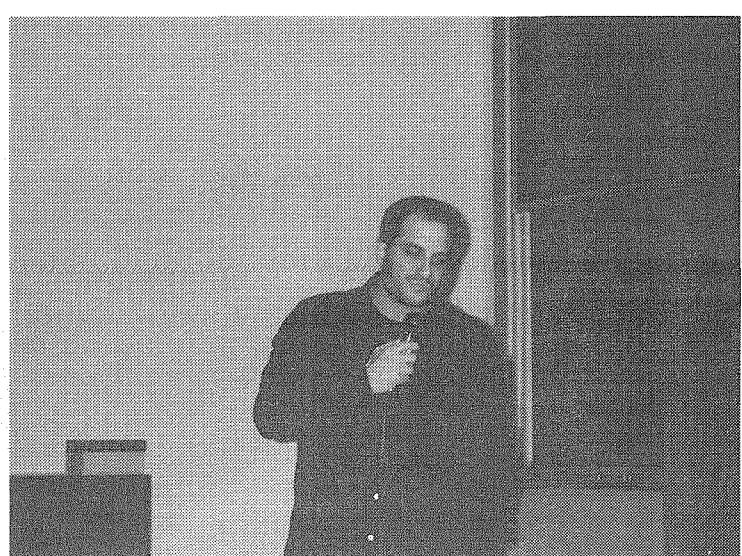
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sponsibility of the international community to raise awareness of the Palestinian situation.

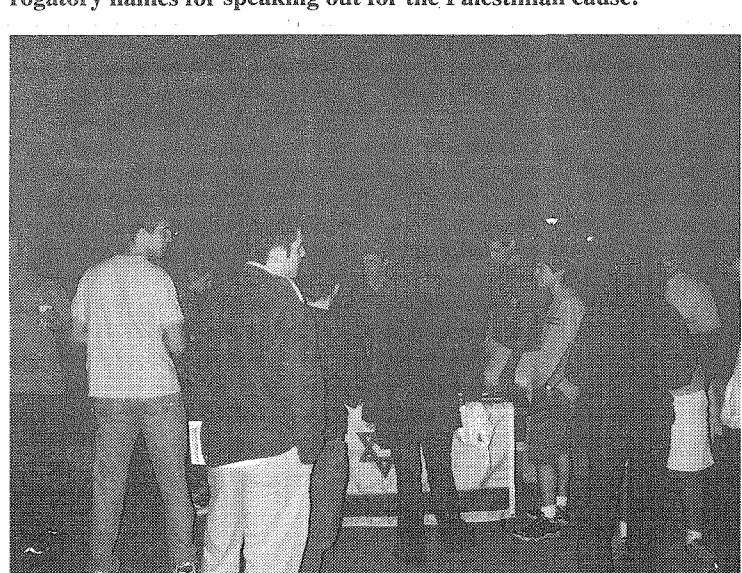
"If you believe that it is an injustice for Palestinians to be killed for working in their own olive fields," she said, "then you must come and help." Although she said that the situation despite her efforts is worsening, she remains hopeful. It is the effort of the internationals who come to the territories and put their lives in danger to stand up for what they believe that truly "brightens [her] life."

Shapiro, Arraf's husband, opened his monologue reminiscing on the derisions and name-callings he has endured from the international community for speaking out for the Palestinian cause. Shapiro, who made headlines last year for helping Palestinian Liberation Organization leader Yasser Arafat during the Israeli siege of his Ramallah compound, said that regardless of what is said about him, he is a "human being first" and feels a moral obligation to stand for what he believes right.

MIDEAST CONFLICT: AMERICAN FRONT



J. Mao/The California Tech
Jewish-American Adam Shapiro recounts how he has been called derogatory names for speaking out for the Palestinian cause.



J. Mao/The California Tech
Audience members crowd around the Caltech Hillel table after the talk. There, supporters of Israel share their views.

CALTECH CONVENTIONAL WISDOM WATCH



Culture Comes to Caltech: The Los Angeles Opera comes to Caltech to give a free Opera recital. It's about time students started giving the arts a little more credit.

Arraf Time: A rough time in Baxter for peace activists Shapiro and Arraf. Some agree the Israelis should start Sharon's the wealth and stop acting like babies, while others say the Palestinians are the true *infantadas*.

Feisty PCs: So I was doing the *Tech* on my PC and suddenly it's like, "bleep bleep bleep," and the whole thing's gone! The PC devoured my *Tech*. And it was a really good *Tech*. It was kind of... a bummer.

His interest in the conflict, said Shapiro, is rooted in his work with "Seeds of Peace," a conflict resolution organization between Palestinians and Israelis. He has engaged intently in dialogue with representatives from both sides of the conflict over the past two years.

Extrapolating on his wife's comments about Israeli occupation, Shapiro recounted his experience "enjoying twelve straight days of curfew" with his Palestinian friends. People were afraid to open their doors, he said, because they feared being shot by Israeli snipers.

Along these lines, he also told a story about a Palestinian woman who was killed for doing laundry on her balcony past curfew. Calling the occupation "the worst form of oppression imaginable," he called for involvement from the international community. "Either we stand for occupation or we stand for freedom for everybody," he maintained.

After Shapiro finished, moderator Galen Loram '05 opened the floor to questions. Most questioners seemed to aim their queries at

extreme controversial, often evoking hissing, loud outbursts of praise or both from the audience.

Many questions posed by supporters of Israel pertained to the issue of how Israel could realistically make peace with a people who carried out suicide bombings and, in the questioners' words, taught their Palestinian children to hate Israeli citizens. Arraf and Shapiro fiercely rejected claims such as these, arguing that it is the Israelis who were the "real terrorists" and that it was because of the occupation that some Palestinians carried out such bombings.

Asked about the attacks, Arraf maintained that she was against all forms of violence and that she "does not hate Jews and only wants Israel to treat her people as equals."

After the discussion, the audience was greeted outside Baxter Auditorium by pro-Palestinian and pro-Israeli activists.

Ardent to the end, the Israeli crowd distributed flyers tagging Israel the only nation in the Middle East which is democratic and which supports freedom of ideas and civil rights. "Israel is a blessing to the Middle East," shouted Hillel co-president Abe Fetterman '05. "It wants to live in peace with the Palestinians. It has always tried and will continue to try."

A grass-roots Palestinian peace group and Amnesty International joined Hillel on the lawn outside Baxter, each advocating its own ideas for a new Mideast peace.

BOD READIES BROAD BYLAW AMENDMENTS

By TED JOU

At the January 10 meeting of the ASCIT Board of Directors, four amendments to the ASCIT Bylaws were submitted for a vote slated for a week from Wednesday.

The first amendment replaces the freshman director at large with a director at large whose main responsibility is the oversight of student representatives to outside committees.

The current version of this amendment came about after many hours of discussion between the BoD and the Interhouse Committee on the night of last Monday. Since committee appointments have historically been a shared responsibility, the current amendment represents a compromise.

While the IHC takes full responsibility for interviewing and appointing to most of the committees, the ASCIT BoD takes responsibility for managing the appointees and holding them accountable.

The second creates a director of publications who would take over all of the duties currently assigned to the upperclass director at large.

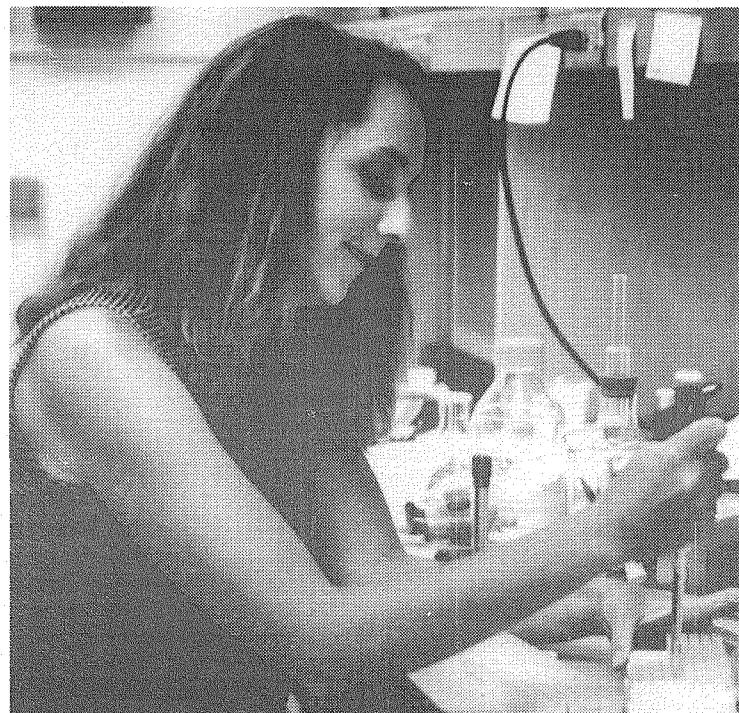
The third creates provisions in the Bylaws for recognizing the *donut* web site as an ASCIT Publication and specifies that the *Totem* should be published once a year.

The fourth mandates that the weekly ASCIT "minutes"—the secretary's recount of each Friday's BoD meeting—be published every week in *The California Tech* and that corporate bylaws and resolutions and executive committee rulings be published online and in the *little t*.

WHAT DO YOU THINK?

Comment on this omnibus package of bylaw amendments.

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Courtesy of P. Bjorkman

Caltech's own Professor in Biology Pamela Bjorkman conducts research in her lab. She is among 12 winners of the prestigious Max Planck Research Award.

Autoimmune Disease Meets Match in Prof. Bjorkman

Continued from Page 1, Column 3

computer sciences; humanities; or engineering. The prize comes with a cash award of 125,000 euros—approximately \$132,000—to each award recipient with the goal of promoting greater cooperation between German and non-German scientists.

In giving the Life Sciences and Medicine Award to Dr. Bjorkman, the selection committee cited her contributions to the field of molecular immunology and specifically her work on major histocompatibility complex (MHC) molecules and on how their structure relates to function.

MHC molecules are proteins found on the outside of almost all human cells whose purpose is to allow the body's T-cells to distinguish between normal host cells and foreign cells such as those which are cancerous or have been infected by viruses.

Dr. Bjorkman has identified the person-specific uniqueness of these MHC molecules and the body's perception of non-host MHC molecules as alien, among other problems, as two of the leading causes of organ rejection in medical patients.

MHC molecules function by taking short peptides from digested proteins within the cell and presenting them on the surface so that receptors on the T-cell then bind and determine if the cell is host or non-host.

In the late '80s, Dr. Bjorkman was the first to determine the crystal structure of the MHC protein. Her later work showed that MHC molecules presented not only alien peptides but endogenous peptides as well. Since endogenous peptides can sometimes be mistakenly identified as alien—and, as a consequence, targeted by the immune

system—her research, according to Dr. Bjorkman, provides a "molecular explanation for the origin of autoimmune disease."

Commenting on her award, Dr. Bjorkman cited the high level of the support she received at Caltech as well as the many opportunities for cooperation among people of different disciplines.

She plans to use the 125,000 euros of prize money to research the structure of viral proteins that mimic human proteins.

Dr. Bjorkman came to Caltech in 1989 after earning her Ph.D. in biochemistry from Harvard and doing her postdoctoral work at Stanford.

"Pamela has long been a leader among the world's structural biologists and this prestigious award from Germany's Max Planck Institute shows that she is internationally recognized as such," said Elliot Meyerowitz, biology professor and department chairman. "Her work has led to a detailed understanding, at the atomic level, of how our immune systems recognize foreign proteins such as those made by disease-causing organisms."



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Calling begins in January

Contact Elin
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Revel: One, Two, Three... Go!

Dean's Crystal Ball Points to Fast, Furious 21st Century

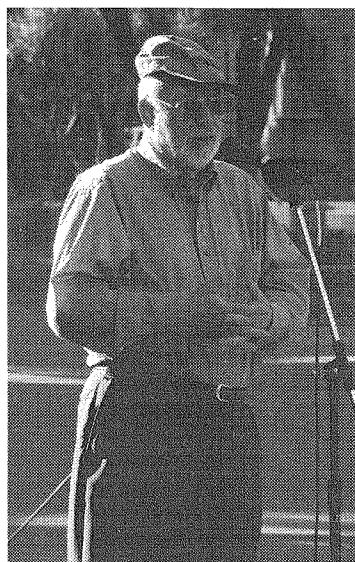
By JEAN-PAUL REVEL

One, two, three... go! The new century is launched, how well remains to be seen. But then it would have been hard at the beginning of 1903 to foresee what did transpire during the 20th century.

Should one take as an omen that so early in the year we already have a 200 meter asteroid making a close approach to earth and missing it? A good omen, considering that this one anyway is not supposed to ever come crashing down on top of us.

The page has been turned, the celebration is over. So is the Rose Parade and the New Year's football game and, as usual—mostly—it was a gorgeous day in Southern California. Fewer people came than were expected, I discover in the *Star News* of the Friday before last. That made me feel better in a sick kind of way. All I know is that there was a game and a parade, but somehow this year I could not find it in myself to be excited or even mildly interested in these yearly exercises of end-of-year celebrations. Whatever: may 2003 be good to you, may 2003 be good to all of us.

Of course wishing is one thing, but it will be necessary for each of us to work hard to make these wishes materialize. The best that can be wished for is the strength and the determination to work towards our own betterment and the betterment of all Humanity and the Home Planet. Why in the Dickens is it that



Peace on Earth, so widely pined for, is so difficult to achieve? We owe it to ourselves and those who'll come after us.

We owe it to our predecessors, the newest and oldest representative of whom is *Sahelanthropus tchadensis* as represented by Touma, appropriately meaning "hope for life" in the

"Is it an omen that we already have a 200-meter asteroid making a close approach to earth?"

Goran language of ancient and dried up Lake Chad in Western Africa. Touma is between six and seven million years old. It is believed by its discoverers to be a hominid human ancestor, because of its flat face and un-sharp canines, characteristics unlike those of apes. Its discovery occupies 10th place in the "breakthroughs of the year" as determined by the editors of *Science* magazine. If that is number 10... what are the other breakthroughs of the year?

The supposedly cloned baby trumpeted about by the Raelians is not one of them, no. It is too unlikely a claim to withstand investigation and it seems that in fact investigation is being blocked; also, on a more practical note, the news broke after *Science* must have finalized the issue in which they published the list of achievements for 2002.

Number nine is the discovery, in the retina, of light receptors separate from the rods and the cones that are used to make images. It seems that some of the ganglion cells, most of which act as a relay passing visual information from rods and cones to the brain, contain a pigment which makes them light sensitive. These light sensitive ganglion cells connect to the region of the brain that houses the circadian clock we all carry with us.

Number eight is something which I would have thought to rate much more highly and that is the coming of age of adaptive optics. The images produced by Caltech's twin Keck 10-meter telescopes in Ha-

wai and the European Southern Observatory Very Large Telescope array of four 8.2-meter mirrors are extraordinary, once the blurring caused by atmospheric instability is corrected for.

Number seven is another coming-of-age story, that of cryoelectron tomography, which allows observations of cell structures in their native, if frozen, state. Await great things from the microscope in the Broad lab, oh ye Techers.

And for those of us who relish that pepper, Mexican, Chinese or Thai—try the latter's new addition to the Chandler dining hall menu, by the way—there is something hot also, number six on the list. It is now well established that specific ion-channels are at the basis for signaling the presence of specific molecules in a cell's environment.

It now seems that the same channels that respond to capsaicin, the molecule behind chili pepper hotness, also respond to warm temperatures. Another channel in the mouth and skin responds both to menthol and cool temperatures. Similar channels respond to pheromones: male mice lacking the lat-

"Apparently, electron neutrinos 'change flavor' as they travel and arrive on earth."

ter channel cannot distinguish other males from females... and that brings me to the flicks—not pornography, but images produced in attoseconds—millionths of a millionth of a millionth of a second—Chemistry Professor Ahmed Zewail got the Nobel a few years ago for his work with femtosecond—10⁻¹⁵ second—pulses.

Breakthrough number five is in another area in which Caltech scientists have been leaders: studies of anisotropy in the cosmic background, giving information about events ever closer to the time of the Big Bang itself.

Number three has to do with continuing the analysis of the genomes of yet more organisms. The list now includes the genome of the Mos-

quito Anopheles Gambiae and its malaria-causing parasite Plasmodium falciparum, as well as rapid progress on the genomes of two strains of rice, one more strain of Anthrax and a bacterium.

There is also now a high quality draft sequence for the mouse genome and a less well-documented rat genome, in addition to a sequence for the puffer fish, which has the smallest known genome among vertebrates, with work begun on the chimp, corn and the poplar. All of which will bear fruit in the future and will likely be the basis for "breakthroughs" in understanding, if not listing in magazines, in the future.

Breakthrough number two is the work on the neutrino, particularly finding why fewer neutrinos reach earth than originate in solar nuclear reactions. Apparently electron neutrinos "change flavor" as they travel and arrive on earth as a mix of electron, tau and mu neutrinos.

But the number-one breakthrough was very surprising to me, not because it does not deserve recognition, but because, in my myopic view, it has not as yet produced as fundamentally important a gain in understanding than most of the other breakthroughs have.

Number one, according to *Science*, is the discovery of new roles for RNA. Up to now RNA has been seen as the medium which directs the assembly of proteins. Messenger RNA is copied from DNA and then modified to represent only the coding sequence of the DNA. This message then directs the assembly of proteins by controlling the sequential addition of amino acids, carried by transfer RNA, while residing on RNA "machines"—ribosomes.

It now turns out that RNAs are involved in many other aspects of cell function. Small snippets of RNA sequence can drastically inhibit the genes that helped generate the RNA originally. This promises to be a versatile tool for interfering with the expression of individual genes, in a manner much simpler than the lengthy and complex "knockout" procedures used at present. In addition other small pieces of RNA control the state of DNA—eu- versus hetero-chromatin—and so can control what genes are expressed and which cannot.

But most of that and more is a promissory note for the future. To the future!

A bientot.

SHAPIRO, ARRAF SPEECH DRAWS HARSH CRITIQUE

Aronin Questions Reaction to Hissing

Shapiro: Hypocrite?

Dear editors,

At the SASS presentation on Wednesday, I found one incident particularly striking. At a few points during the event, there was hissing from the crowd in response to what the speakers said. The audience was fairly warned that such behavior was unacceptable and informed that if they acted disrespectfully, they would be removed. After another incident of hissing, one man was singled out and, apparently incorrectly, accused by another audience member. The accused defended himself and prevented his removal, but people continued on to say that it came from his general direction. Mr. Shapiro, to my astonishment, then said something to the effect of, "I heard it from your side of [Baxter Auditorium]. If I hear something over there again, I'll assume it's you [out of a hundred people]." Is that justice? Or hypocrisy?

Ben Aronin '05

Question of the Week

Which side started the Israeli-Palestinian conflict? And today, which side is morally obligated to make the larger concession?

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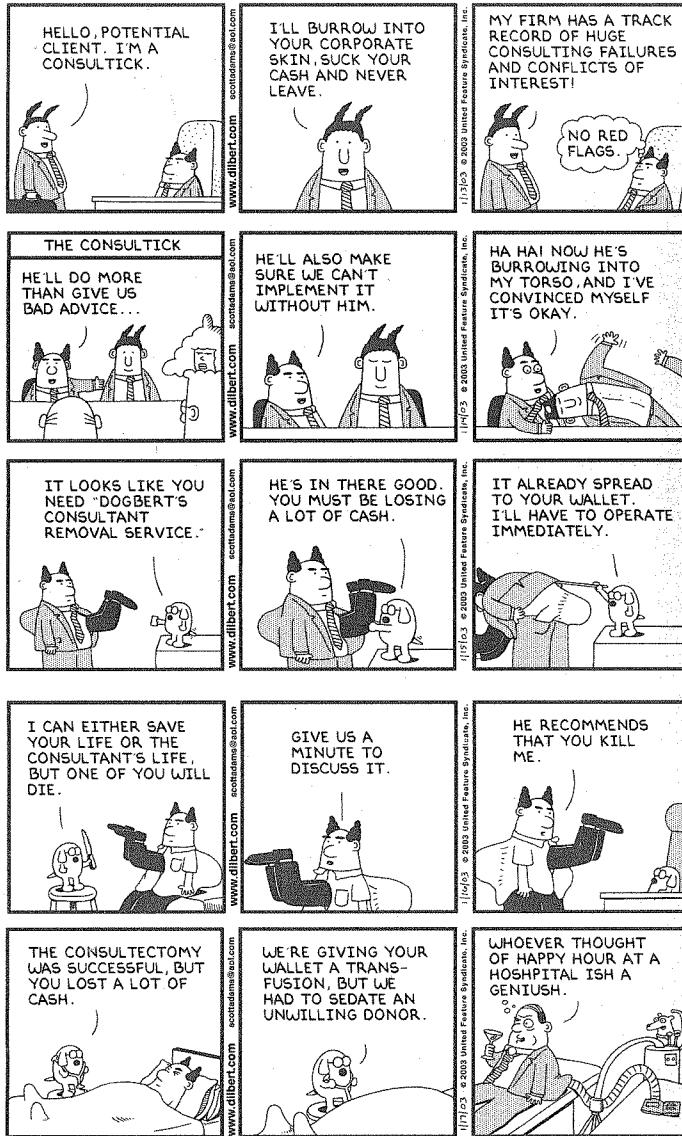
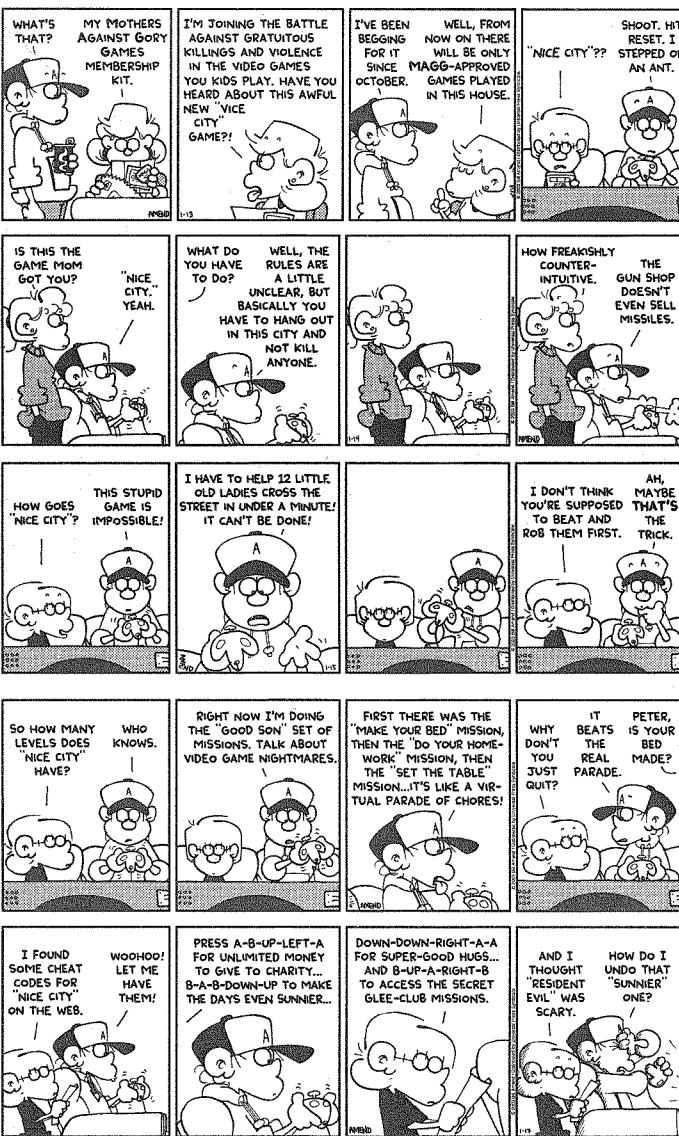
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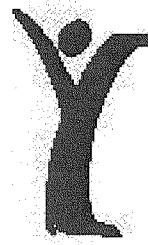
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DILBERT® by Scott Adams**FoxTrot** by Bill Amend**Y-News****Upcoming Events:**

- **ON-CAMPUS TUTORING** (1/14, 1/16, Winnett 4-6 p.m.). Stop by Winnett and tutor a local middle or high school student. No experience is necessary. Everyone is welcome to come as their schedule allows. (Contact y-veep@ugcs if you'd like to join the tutor mailing list.)

- **UNION STATION** (1/18, Caltech Y, 6-9 p.m.). Cook and serve dinner for 40-50 residents at a homeless shelter in Pasadena. Please e-mail ggreg@its.caltech.edu if you'd like to come. Contact Greg (ggreg@its) for additional information about any event.

**Factoid**

The Y has several mailing lists through which it announces activities and projects.

* **y-outdoors:** hikes, camping trips, kayaking

* **y-commser:** community service activities

* **y-interest:** any general Y events (e.g. concerts)

If you'd like to be added or removed from a list, please contact the Vice President (y-veep@ugcs).

Y Not Join Us?

Come to an ExComm meeting! All meetings are open to students, staff and faculty - every Monday at noon in the Caltech Y.

The Y (x6163) is located on the first floor of the Student Services Building, south of the Holliston parking structure. If you are interested in a Y activity or have questions about the Y, please stop by, or send an e-mail to the Vice President (y-veep@ugcs).

Mintz

Nominations for the offices of ASCIT President and ASCIT Vice-President will open at eight a.m. on Wednesday, January 15 in accordance with Article VIII, Section 1 of the ASCIT Bylaws. A sign-up sheet will be placed outside SAC 33 where the names of nominees may be written. The sheet will be taken down at five p.m. on Tuesday, January 21 and no more nominations will be accepted after that time.

The **ASCIT President** is the elected representative of the undergraduate student body. He/she must appear before faculty, administrative, alumni and other outside groups to promote student interests. The ASCIT President is also the chief executive officer of a nonprofit Corporation and is ultimately responsible for all ASCIT employees and operations. Regular duties center around weekly meetings of the ASCIT Board of Directors, where the President is responsible for chairing the meeting and setting the agenda. Other responsibilities vary greatly and the job relies heavily on personal initiative. The time commitment can be heavy and there is very little fame or glory associated with being President, but the opportunities for a student to make a difference are greater in that position than perhaps any other.

The **ASCIT Vice-President** also serves on the Board of Directors and his/her primary responsibility is the continuance of the honor system at Caltech. In this role, the VP serves as the Chairman of the Board of Control and the responsibilities of the job center around that role. The BoC Chair sits on the Routing Committee and helps decide which body handles various disciplinary matters. For cases that are sent to the BoC, the Chair and the BoC Secretary conduct a preliminary investigation, deciding whether or not to hold a full BoC hearing. During those hearings, the BoC Chair presides over the entire process. Being the Chairman of the Board of Control can be one of the most time-consuming jobs in the student government, but it comes with the greatest responsibility, maintaining our most prized tradition.

Interested candidates are encouraged to contact the current ASCIT President, Ted Jou (tjou@caltech.edu) or the current Vice-President, Vikram Mittal (vm@caltech.edu) for more information regarding the positions. Please contact Isaac See (isee@caltech.edu), ASCIT Election Chair, with any additional questions.

CIT Guitar Classes for the Winter quarter are meeting now on Tuesdays in SAC Room 1 as follows: Beginning Guitar Class 4:30 p.m. - 5:30 p.m.; Intermediate Guitar Class 3:00 p.m. - 4:00 p.m.; Advanced Guitar Class 5:30 p.m. - 6:30 p.m.. Classical and flamenco repertoires

are

explored, but techniques transfer to other styles of guitar. The Beginning Class starts from the beginning each quarter and includes a jazz/folk chord system. Classes are free to Caltech students and other members of the Caltech community (space permitting). Undergraduates can receive 3 units of credit. The instructor, Darryl Denning, has an international background in

performance, teaching and recording (two of his CDs are available in the Bookstore). Mr. Denning can be reached at ext. 2923 or (323) 465-0881 or by e-mail at: ddenning@caltech.edu. The Guitar Home Page is: www.music.caltech.edu/denning/index.html.

Job Opportunity! Wanted: undergraduate work study students to participate in gamma-ray astronomy research project at JPL. The job requires data processing and research on gamma sources using data obtained by the BATSE experiment on-board the NASA Compton Gamma-Ray Observatory between 1991 and 2000. Employment would be full time (40 hours/week) during the summer and part-time during the school year under the Caltech Work-Study program. Salary will be between \$14 and \$20/hour depending on the experience of the student. If you are interested in applying for the position, please call Dr. James Ling at (818) 354-2819.

Caltech Library System Presents: The following sessions are approximately one hour of formal instruction. All classes begin at noon and meet in the Sherman Fairchild Library Multimedia Conference Room(Room 328). Walk-ins are welcome.

Monday, Wednesday and Friday, January 13, 15, 17: "Quick Review for Electronic Theses" Are you working on your thesis? Did you know that as of July 1, 2002, both paper and electronic copies of theses must be submitted? Are you aware of the new formatting requirements for theses? You are encouraged to attend a brief overview of techniques useful in the production and publication of Caltech electronic theses. The session will include tips on: format guidance, Intellectual Property considerations, paper to pixels, creating PDFs, submitting a thesis and availability issues (who can see it and when).

View details and register for these and other upcoming classes at: <http://library.caltech.edu/learning/default.htm>. For further information, please contact Kathleen McGregor at x6713 or kathleen@library.caltech.edu.

The Caltech Dance Troupe will have two **dance classes** for the winter term. All classes meet in the Braun multipurpose room. For more information, see our Web site.

Intermediate Jazz; Instructor: Collette Sibal; Tuesdays, 9:30-11 PM. Trial class fee: \$5 Caltech students full term fee: \$20 Non-Caltech students full term fee: \$30. Sponsored by the GSC and ASCIT. **Beginning/Intermediate Ballet;** Saturdays, 1-2:30 PM. FREE! The first hour will be a beginning/intermediate barre while the last half-hour will be an intermediate floor exercise.

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Class: Costs, Benefits

By JIALAN WANG

Why should we go to class? It is a common sight at Caltech that at any given non-mandatory class lecture, only about half of the class shows up and among those who do, several are un- or semi-conscious.

Some students choose which classes to skip and some skip class across the board, but in whatever form, class absenteeism is accepted as a normal part of Caltech life by students and professors alike.

But since the mission of Caltech with regard to its undergraduate students is to educate and the only direct method of educating students is through weekly lectures, this large-scale absenteeism is a clear signal that Caltech is not accomplishing its mission as well as it should.

Why do students skip class in the first place? Boiling this question down to its essentials, it's simply a case of cost-benefit analysis. As Mark Bilinski '03 puts it, "the benefits of going to class are less than the costs."

So what are the costs and benefits? The most obvious and most important cost is time. At Caltech, time is our scarcest and most valuable asset and the key to success here is time management. When

problem sets themselves and related studying take at least nine hours per week per class, that leaves little time for attending lectures.

Since homework and sleep exert the most pressure on our time, time spent in class takes away from either sleep time or homework time. Forgoing rest for class is obviously counterproductive, for sleepy students would most likely not get much out of class anyway and the additional sleep deprivation not only lowers mental ability but also harms overall health. Forgoing homework for lectures exacts the cost of a lower homework grade, or in the least, a lesser understanding of the homework. Thus, the interests of sleep and homework completion effectively compete with lectures for students' time.

Another cost of attending lectures is boredom. Let's face it: even compared to struggling over problem sets, lectures are not very exciting. With the exceptions of humanities classes and a few other classes, lectures consist of a professor simply copying his prepared notes on the board and reciting them aloud in a monotonic voice. Moreover, professors will often try to go over every detail of their class material in

Continued on Page 7, Column 4

Stuck in Past, 2002 Flicks More of Same Blues Brothers 2000 Back to Haunt Us

By JOE ESCALADA

Hollywood distributed endless reels of bad film in 2002, as it has done for decades. What made last year different was the prevalence of its sequels.

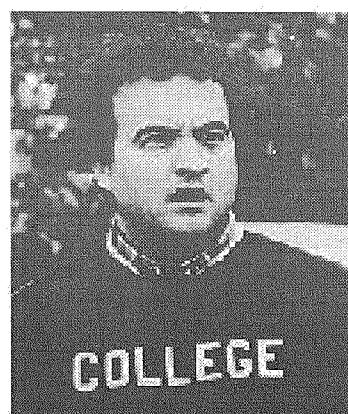
Why so many sequels? Some speculate that more of them are being made because "Hollywood is running out of ideas." Since both original movies and sequels can rip off old ideas, this doesn't really explain the sequel phenomenon. Movies—original or not—are rarely based on fresh ideas. Moreover, the movie industry wouldn't

make sequels if it were concerned with originality.

Like any other industry, it is primarily concerned with its finances. Movie studios favor sequels because they are better investments. Sequels sell tickets based on the reputation of successful original films, making them lower risk investments. Why invest millions in a new concept that might confuse viewers when *Jason X* is guaranteed an audience?

The lure of certain success is so strong that even the death of a

Continued on Page 7, Column 1



Courtesy of J. Escalada

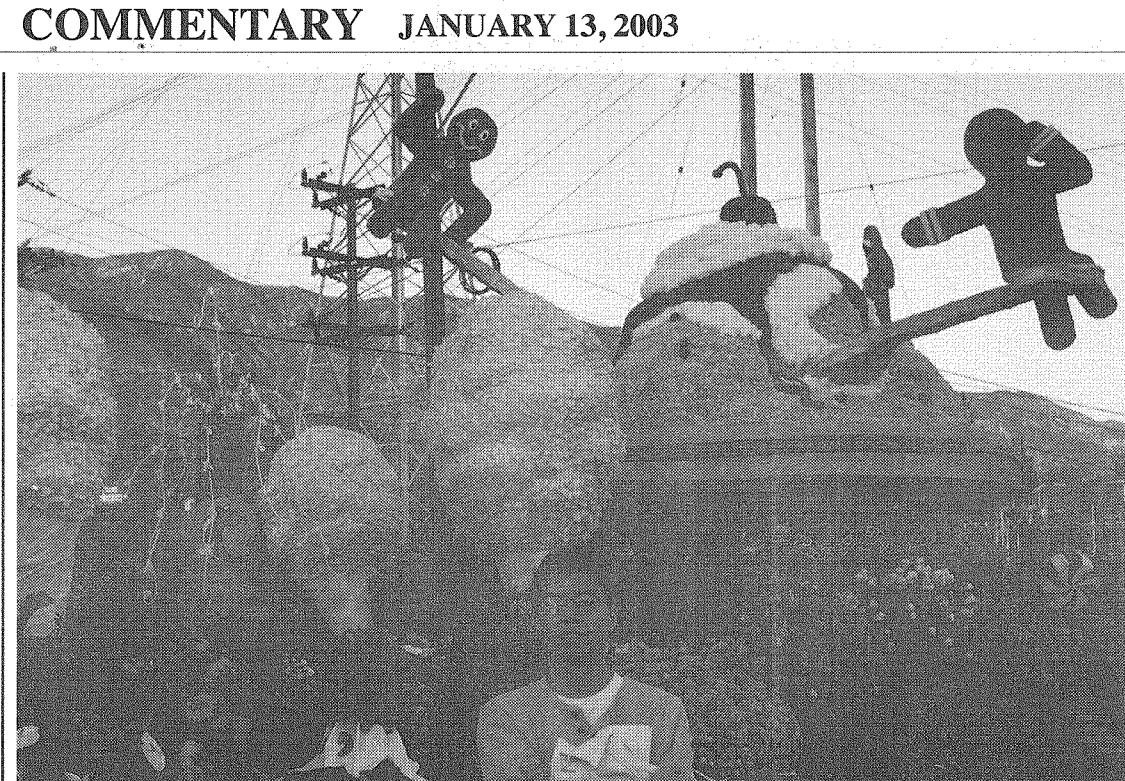
Famed comic John Goodman asserts Joe Escalada '03, would roll over in his grave at 2002's flurry of sequels. The critic gives a rating of two Sad, Dead, Fat Comedians to the less-than-illustrious film year.

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Courtesy of T. Jou

ASCIT President Ted Jou '03 stands in front of the float designed and built by students at Cal. Poly., San Luis Obispo and Pomona for the 2003 parade. Jou attributes Caltech's relative anonymity with the fact that students don't participate in the annual parade that runs through our backyard.

A Charge to Keep: Rose Parade

By TED JOU

A little over a week ago, approximately one million people came to Pasadena for the Tournament of Roses Parade while tens of millions watched from their living rooms.

However, while the nation learned about high school marching bands, city centennials and a lot about roses, there was no mention that Pasadena happens to be the home of one of the top research and educational institutions in the world. Many a Caltech student has wondered why people haven't heard of their school and why when strangers hear "Caltech" they say, "you mean Cal. Poly.?"

The answers may have been in the parade on New Year's Day. The students of Cal. Poly have built a float every year since 1949, while Caltech students have built a float only twice during that period. The Caltech community seems largely ignorant of the Tournament of Roses; I bet you didn't know that three Caltech girls reached the quarterfinals for Rose Queen this year. Maybe we could focus our efforts in that direction, but I think engineers still outnumber girls on this campus.

On the day after New Year's, I visited the Post Parade exhibit at the intersection of Sierra Madre and Washington Boulevards. Seeing the floats up close reinforced my belief that Caltech students would be very capable of building a float on a regular basis. The underlying infrastructure is no more complicated than the average Dabney Drop Day party. The moving parts require no more intricacy than the average ME72 project. Our only weakness may be a shortage of free time; the Tournament of Roses doesn't hand out E's.

If Caltech students wanted to do this, it would take a great deal of planning and organization. In my

eyes, there are three main aspects of a Caltech Rose float project. One aspect will rely on the students. A permanent committee would need to be formed where students are selected each year to be responsible for the float. For this aspect, we can likely learn a lot from Cal. Poly. and a quick drive out to Pomona could start us on that path.

Another major aspect will rely on the Institute and the faculty. For the 1991 float, ME100 gave four units to students working on the float.

At the very least, we would need a place to build the float. Getting faculty members and administrators involved would contribute greatly to the institutional memory and at such a small school, every additional pair of hands will be able to contribute. In the final phase of building a float, flowers need to be affixed by hand and while most of the student body is away for the holidays, involving the staff population on campus and at JPL would be essential.

The last aspect is money. In 1950, Caltech allocated funds to commemorate the opening of the Palomar Observatory. In 1991, Caltech set aside a huge centennial budget. To make a Caltech Rose float a long-term reality, a permanent source of funds would need to be established. It is unlikely a single donor will make a Gordon Moore-like commitment to a Rose float, but students should be able to solicit donations from a variety of corporations and philanthropists for this very public project.

A Caltech Rose float is likely still a few years away and since I'm graduating this year, I am unfortunately not in a prime position to lead this project. However, I think the timing is perfect to start such an initiative. With the campaign just kicking off, I think the additional publicity for Caltech would be extremely valuable.

If there is an underclassman, a professor, an administrator, or a staff member who is reading this and shares my sentiments, please contact me and perhaps we can help make these dreams, wishes and imagination into reality.

BOD CONSIDERS BYLAWS, DVDS, IRS PENALTIES

By JOSEPH JEWELL

President Ted Jou '03, Vice President Vikram Mittal '03, Secretary Joe Jewell '04, Kimberly Hiscox '06, Interhouse Committee Chairman Marcus Williams '03, Academics and Research Committee Chairman Basit Khan '03, Social Director Jialan Wang '04 and Freshman Director-at-Large Andrea Vasconcellos '05. Absent was Upperclass Director-at-Large Neda Afsarmanesh '04. donut.caltech.edu developer Jonathan Dama '03 attended as a guest.

Dama came to inquire about the progress of integrating new ASCIT movies into the DVD Library. Jou and Jewell will look into it.

New bylaw amendments regarding committee appointments regarding committee appointments and other issues are proposed after a lengthy session with the IHC at Tom Mannion's house this week. The bylaws are broken into four parts for the ballot, with the full details online.

Jou reports that an ad-hoc committee to evaluate the size of the institute. The size of the undergraduate student body and faculty are not being considered, but there are more grad students now than ever before and the postdoctoral candidate population has exploded to

Continued on Page 7, Column 5

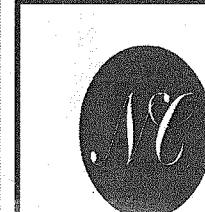
JOB OPPORTUNITY! WANTED: undergraduate work study students to participate in gamma-ray astronomy research project at JPL. The job requires data processing and research on gamma sources using data obtained by the BATSE experiment onboard the NASA Compton Gamma-Ray Observatory between 1991 and 2000. Employment would be full time (40 hours/week) during the summer and part-time during the school year under the Caltech Work-Study program. Salary will be between \$14 and \$20/hour depending on the experience of the student. If you are interested in applying for the position, please call Dr. James Ling at (818) 354-2819.

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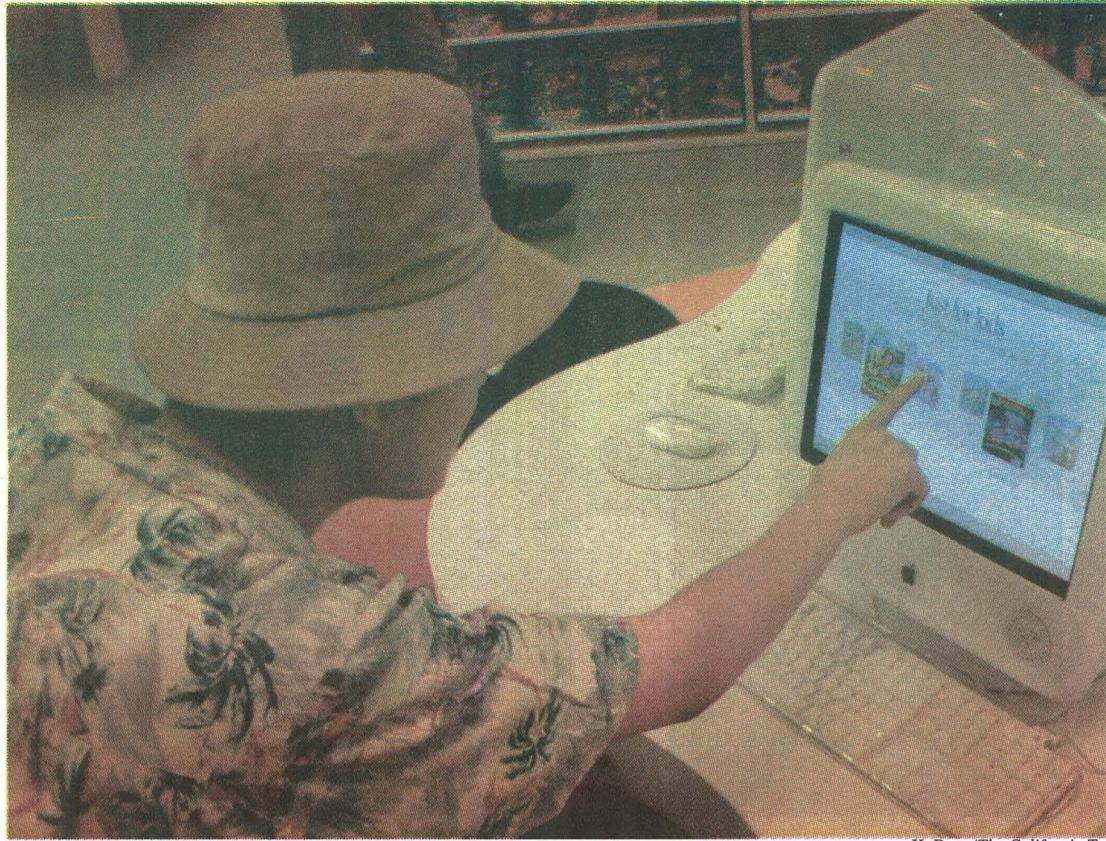


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K. Bartz/The California Tech

Libin Zhang '05 stakes his claim at Apple's 'Just For Kids' Web site at the new Apple Store in Pasadena. His verdict? A kid himself, he just can't wait for Microsoft and two-button mice to take over the world.

My Story: Confessions After Using A Live Mac at the New Apple Store

By LIBIN ZHANG

Being a longtime user of Microsoft products, it was with apprehension and skepticism that I approached the so-called Macintosh computers at the Apple Store. Their "fruity" colors and curvaceous designs awakened the latent homophobe in me and I was greatly concerned that girls would become confused. After using a Mac for a while, I must say that, as some former acquaintances stated so eloquently, "Macs suck."

Over 95% of the computing world uses Microsoft Windows. Popularity is obviously a sign of superior

merit and claims of illegal Microsoft monopoly are shameless liberal attempts to interfere in industry self-regulation. If the government hadn't interfered in the accounting industry's self-regulation, my stock portfolio would be worth so much more money today. I'm also an America On-Line user because the service is the most popular and my music tastes follow the billboard charts, ranging from Britney Spears and Backstreet Boys, to Hanson and N'Sync. Mercedes and BMW have small market shares, so their cars must be crappy; I'll race my souped-up Honda Civic—with an uber-special

'Powered by Rice' sticker—any day.

The one-button mouse is my main complaint about Macs. Of course, upgrading to multi-button mice is possible, but does anyone really upgrade his computer? I'm still using the 64MB RAM chip that came pre-installed in my Windows machine. Upgrading requires opening up the machine and I'll never degrade myself doing manual labor.

The new Mac operating system Mac OS X also allows usage of Xfree86 applications with a simple recompile. However, when I used it, the window manager was tvm—very green and ugly. According to Microsoft, open source software is more expensive and not as customizable as their products, so anyone trying to use an X Window System on a Mac will not experience Microsoft Windows's marvelous user interface. Besides, cool people—JeffK, for example—don't use UNIX.

The computer I used has two 1.25 GHz PowerPC G4 processors, or 2.5 GHz total. The fastest Intel Pentium 4 chips have about 3 GHz processing power. Since gigahertz comparisons are perfectly valid between different chips, apples and oranges, the Pentiums are faster and better in every respect. The Intel chips are even faster than my friend's cell phone; he said it ran at 2.6 GHz.

While using the Mac, I was unable to demonstrate my 133t haXoRing skillz to the charming female Apple employees. All the Internet services are turned off by default and the command line would accept only UNIX, not DOS, commands. I tried using some 31337 scripts, but viruses and, even worse, Microsoft Visual Basic programs, did not work. How can a hard-core hacker be productive with such a machine? I can't even do C#.

So I thought my trip to the Apple Store would improve my opinion of Macs and Mac users, but fortunately that did not happen. Why a mere store opening would be a newsworthy article is beyond me. I'm still waiting for the day when Microsoft purchases or squeezes out all of the world's retail stores so that selection, prices and quality of merchandise will be the same everywhere.

(Minimum Rating: Three Sad, Dead, Fat, Comedians. Maximum Rating: Three Happy, Dead, Fat Comedians.)

Cinema Year 2002 In Recap: More Sequels

Continued from Page 6, Column 2

movie's leading actor can't always deter Hollywood from making a sequel. Remember *Blues Brothers 2000*? I vomited popcorn when I saw this nightmare. This film was a crime against humanity: no plot, no comedy, no Belushi. In hindsight, it is clear that John Belushi's untimely death was a warning from God not to make this movie.

Moviegoers flock to sequels because they are loyal to old favorites and anxious to see what their beloved characters are going to do next. Hard-core fans will see the next *Star Trek* no matter how bad the reviews are.

Normally there is no one to blame but yourself when you see a sequel. You paid \$6.50 for 90 minutes of disappointment. Still, on some masochistic level you enjoy putting yourself through such things, or else you would have transferred to USC.

In 2002, however, there was little choice. With fecal pinatas like *Reign of Fire* splattering theaters, it was often prudent to stay away from new movies and stick with the familiar. At times all the screens in small theaters were showing sequels. If you decided against *The Santa Clause 2* and *Harry Potter and the Chamber of Secrets* on the basis of heterosexuality, your remaining options were *Star Trek: Nemesis* and *James Bond 007: Nightfire*. Sadly these sequels fall short of the expectations set by their predecessors.

Consider *Nightfire*. The new Bond movies rely too much on special effects and gadgets. For example, did the villain really need that ridiculous electronic battle suit? Sadly, personality was the price of this ridiculous, flashy technology. Pierce Brosnan isn't half the womanizing alcoholic that Sean Connery was in *Goldfinger*. Sean Connery saved the world with only his rugged good looks and a hangover. Brosnan isn't that much of a man and so he needs super technology like invisible cars and Viagra. I think that pretty boy might be a double agent.

Other sequels of 2002 follow suit. *Star Trek: Nemesis* is a bland rehash of *Star Trek: The Wrath of Kahn* with better special effects. I guess it isn't plagiarism if you own the rights to the original.

Trekkies weren't the only geeks wronged by Hollywood. Sterile romance and kindergarten dialogue make *Episode II* a visually stunning disgrace to the original *Star Wars Trilogy*.

We've just endured a steaming crapfest of horrible original movies and pathetic sequels. Movies like these are why John Belushi had to die. Therefore, I give the cinema of 2002 two Sad, Dead, Fat Comedians:

(Minimum Rating: Three Sad, Dead, Fat, Comedians. Maximum Rating: Three Happy, Dead, Fat Comedians.)

Ec 11b: The Economic Tradeoffs of Lecture

Continued from Page 6, Column 2

lectures, so the speed at which they progress is too fast for most students to keep up with.

There is a general feeling among students that lectures focus too much on details and proofs that are not only hard to follow, but also give students little idea of the significance of and motivation for the topic.

"[Professors] should always make sure that the students know why they are doing what they are doing before they do it," said Spencer Rarrick '04.

Because professors often fail to give these general motivations, students who go to class are left just to blindly copy notes they think might help them later when they're doing homework. The benefits of going to lecture depend largely on the professor.

For most students, lectures by poor or mediocre professors who don't explain things well or who simply go over what is in the book are practically useless. However, students are fairly willing to attend class if the professor explains the material particularly well or covers material not in the book that helps with the general understanding of the topic.

Said sophomore Ye Li '05, "if a professor were to make things interesting—for example I attended every ACM95a lecture with Niles Pierce, even though I think I could've learned things just as well from reading the book—I would be glad to go to class."

Thus, in a select few classes, students feel that lectures are really helpful. In most cases, however, students perceive very little benefit from going to class. Making matters worse is the fact that classes usually do not help directly with the problem sets. As sophomore Paul Thienphrapha '05 puts it, "it feels pointless to spend precious time in class, then still not be able to do the homework."

Although Caltech students in general are not grade-mongers, we all strive to do well. The main measure of success lies in our homework and test grades, so we are faced with a rather clear choice: spend that hour on homework and get a better grade, or go to class, which can either lead to the abstract gain of a broader understanding of the subject or the loss of time with no benefit at all. Thus, even if a class is reasonably taught, a utility-maximizing student will probably choose to skip class.

But despite the widespread absenteeism among students, many professors seem to feel that lectures are important and students "should" attend them and oftentimes students are punished for not going to class.

Some professors give out pop-quizzes or essential information not available anywhere else in lecture, so even if students consider the lectures a waste of time, they are essentially forced to go.

But forcing students to attend class does not help them learn; in fact it hurts them by depriving them of time that could be spent actually learning the material instead of being slumped over bored in class. At the same time, however, homework is not enough to give students a deep understanding of the topics we learn. Lectures are necessary to provide perspective and personal insight, but currently they are providing neither for many students.

The unique environment and circumstance of Caltech students requires a unique way of teaching. Professors must understand the lifestyle of Caltech students and cater to their needs and interests in lecture. Professors must realize that students will attend class only if they perceive definite benefit from it and should teach in such a way that students willingly attend instead of trying to force them to attend.

If professors fail to respond to students' concerns and poor teaching continues to be the norm here, then it is not just the students who suffer, but the very reputation of Caltech as a distinguished institution.

NEW TAX YEAR FOR ASCIT BOD?

Continued from Page 6, Column 5 around 700.

\$500 is approved by a five-zero vote for the little *t* editors. It was late but high-quality.

The BoC heard 4 cases last term. Two were dismissed in preliminaries, with one conviction, upheld. Nobody was placed on leave.

We consider moving the fiscal year for tax-filing purposes.

We filed our taxes late two years, with alumni Sean McHugh '02 and Ayeh Bandeh-Ahmadi '02 as treasurers. IRS penalties could be reduced due to mitigating circumstances. Hiscox will drum some up and Jou will contact our accountant—another day in the life of the "world's most loosely-run corporation."

The Food Committee will be examining vegan and vegetarian menu options.

Khan reports SFC committees are meeting and the conference has been switched to April 9.

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Embryonic 'Beads' May Affect Valve Formation

Continued from Page 2, Column 3

"Our research shows that the shape of the heart can be changed during the embryonic stage," says Hove. "The results invite us to consider whether this can be related to the roots of heart failure and heart disease."

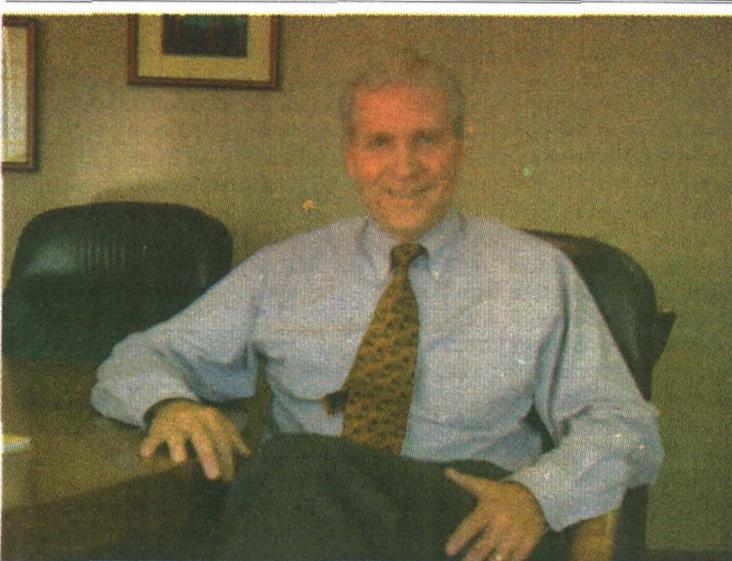
The researchers keyed their efforts on the zebra fish because the one-millimeter eggs and the embryos inside them are nearly transparent. With the addition of a special chemical to further block the formation of pigment, the team was able to perform a non-invasive, *in vivo* "optical dissection." To do this, they used a technique known as confocal microscopy, which allows imaging of a layer of tissue. The images are two-dimensional, but they can be "stacked" for a three-dimensional reconstruction.

Concentrating on two groups of embryos—one group 36 hours after fertilization and the other at about four days—the researchers discovered that their deliberate in-

terference with the blood flow through the use of carefully placed beads had a profound effect on heart development. When the shear force was reduced by 90 percent, the tiny hearts did not form valves properly, nor did they "loop" or form an outflow track properly.

Because the early development of an embryonic heart is thought to proceed through several nearly identical stages for all vertebrates, the researchers say the effect should also hold true for human embryos. In effect, the research demonstrates that the shear force should also be a fundamental influence on the formation of the various structures of the human heart.

The next step for the researchers is to attempt to regulate the restriction of shear force through new techniques to see how slight variations affect structural development and to look at how gene expression is involved in embryonic heart development.



D. Korta/The California Tech
Incoming Alumni Relations Vice President Gary Dicovitsky oversees Caltech's massive fund-raising effort.

\$1.4 Billion to Raise, New VP Dicovitsky Aims to Sell 'Unique Product in Caltech'

By JON FOSTER

Though perhaps not as much of a student household name as that of Caltech's other new vice president, Margo Marshak of Student Affairs, new Vice President of Development and Alumni Relations Gary Dicovitsky will perhaps have just as sweeping an impact on student lives.

Over the next five years, Caltech hopes to raise \$1.4 billion for a broad array of projects and Mr. Dicovitsky is one of the leaders of this effort. With previous major fund-raising experience at Princeton and Pomona, Dicovitsky is working hard to settle into his new position.

He denies having any unique approach towards raising money, but notes that "we have a unique product in Caltech, so perhaps that adds a differentiation that you might not see elsewhere... When it comes to raising considerable dollars for worthy projects the fundamentals are pretty much the same. You have to be out there—you have to first of all understand the culture of Caltech—why the projects that have been identified as priorities for the campaign truly are priorities and why there's an immediacy for those projects."

The fund-raising campaign may help relieve some of the budgetary pressure Caltech finds itself facing, but according to Dicovitsky its main outlook is toward the future.

"At this moment in time, in the competitive business of higher edu-

cation we can't afford at Caltech... to stand still," he maintained. "The institute has always prided itself in having the best faculty and the best students and supporting them to the degree they deserve. Allow them to blossom and wonderful things happen..."

The campaign comes at a difficult time. Economic troubles are making corporations and foundations think twice about being as generous as they once were. With a five-year program, however, a temporary lull in the economy may be offset by later growth and Dicovitsky hopes that if the economy does turn around within the lifetime of the campaign that Caltech will be able to capitalize on that upswing.

In the meantime, Dicovitsky says that the basics of raising money remain the same: get out there to talk to people and "match their interests with the needs of the Institute."

Caltech faces an additional challenge due to its small size. Dicovitsky compared the current campaign to the one he worked on at Princeton. "We're embarking on a \$1.4 billion campaign," he explained. "I worked at Princeton when they were embarking... eight or nine years ago on an \$800 million campaign with an alumni size... maybe three and half times [as large]... and a much wealthier constituency overall and with a history of broad scale alumni support, whereas we're still growing into that maturation process with our alumni."

Offsetting these problems are the



K. Bartz/The California Tech
Apple Computers Vice President of Retail Ron Johnson demonstrates one of the company's notebook computers at last Tuesday's store opening in Pasadena. The Apple Store plans to host "School Night at the Apple Store" and provide student discounts to participants.

Mac Garb, Student-packed Lines Spotlight Apple Store Opening

By ABE FETTERMAN

At first I was hesitant to go to the opening of the new Apple store in Old Town Pasadena. I mean, what kind of person goes to such an event

anyway? Hardcore Emo Apple users? Aging Hipster Mac Addicts? Assorted passersby? Homeless people there for the free shirt? Internet culture icons such as Ellen Feiss? I had no clue what to expect, so it will not surprise you to hear that it was not

as I expected:

Entering the new Apple store invokes mixed feelings: a cross between entering a new Gap store and entering the home of that uncle who forwards those hilarious and wacky e-mails twice a day to you and 200 other lucky relatives/friends/victims. The first can be explained by the fact that both were designed by the same architect and decorator and the second by the fact that nobody will stop talking about their new and exciting Macs.

But why should they? They're certainly something to brag about. Apple stores have the latest and greatest innovations of the Jobs' brain-trust on working display the day they are announced. Not only that, the cheery and knowledgeable staff has already been fully briefed about the products and so do not suffer the lag time that many other computer stores suffer bringing in new technology.

The store is made up of four different areas: the Home and Pro users area, the Genius Bar, the Solutions areas and the Software area. The "Genius Bar" is staffed by an elite—not 3133t, Hackers fans—group of trained customer service and technical support personnel, as well as a large portrait of our good friend Feynman. I was intrigued that the two could be so effectively combined, only to be further flabbergasted to learn that the Apple Store also teaches classes on a weekly basis!

Any topic from photography, on a Mac, to music, on a Mac, to web-page design, also on a Mac, is covered by their coursework.

To further their embrace of education, the Apple Store is putting into practice a new program called

"School Night at the Apple Store." Each week, the Apple Store hosts a school to display the work of students done on a Mac. Participating students then get an additional discount on any Mac they buy and if they use it, Apple also donates some money to their school.

"We've done a lot of work to showcase... achievements on a Mac," said Senior Vice President of Retail Ron Johnson.

This very people-centric view is echoed throughout the store, which is designed with the home in mind. Stereos are set up to blast your music at a moment's touch, each computer is set up with an unrestricted internet connection and there is a pleasant ambiance with music and people chatting.

"The store is really fun for people because they can try [everything] out," Mr. Johnson explained. "From the digital cameras to the monitors to any of the computer programs, you can use everything as if it were yours."

But besides the environment they create, the stores themselves are works of art. The 52 such stores nationwide are within 15 miles of 85 million people—one third the US population. Not bad for a small chain whose first building went up only 20 months ago.

Anyway, despite being only a "switcher-to-be," I could still appreciate the wonders in innovation that went into the Apple Retail Store.

So whether you want to check out their product line, purchase a Mac, check your e-mail or find a safe-haven for the persecuted Mac user, you should check out the new store in Old Town. It is located one block west of the Fair Oaks-Colorado intersection by the theatre.

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