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The California Tech

VOLUME CII, NUMBER 11

PASADENA, CALIFORNIA

JANUARY 5, 2001

LOOKING AT THE EINSTEIN PAPERS PROJECT

BY DANA SADAVA

Caltech has recently become the new home for the Einstein Papers Project, a long-running endeavor to publish Einstein's complete works: not just his scientific theories, but all of his notes, drawings and correspondence still in existence.

Diana L. Barkan, Associate Professor of History at Caltech, is heading the team that will eventually publish approximately thirty volumes, each several hundred pages, of Einstein's writings. Eight volumes have been published so far.

Barkan's team has complete copies of everything Einstein ever wrote (and kept). Upon his death, his entire estate was left to Hebrew University in Israel. That institution, along with Princeton University, first began the project in the eighties. Boston University continued it until Caltech picked it up this year.

Geneticists decode plant genome

BY JOHN OH

Following on the heels of *Homo sapiens*, *Arabidopsis thaliana*, commonly known as the thale cress, joins the elite club of organisms whose genomes have been sequenced. A team of international scientists announced in the December 14th issue of the journal *Nature* the completion of sequencing of *Arabidopsis*.

While scientists have already sequenced a few animals, such as the nematode worm and the fruit fly, *Arabidopsis* is the first multicellular plant to be sequenced. The first cloning and sequencing of the plant took place here at Caltech, in the lab of Geneticist Dr. Elliot Meyerowitz. Meyerowitz, who is the division chair for the biology department, concentrates his work in three areas: the origin of developmental patterns in flowers, the control of cell divi-

PLEASE SEE GENOME ON PAGE 3

Hydrogen study gives answers

BY JONATHAN FOSTER

The history of planet formation has a new chapter.

A study published in the January 4 issue of *Nature* finds that massive amounts of hydrogen remain in planetary disks for much longer than had been thought—a result which lends some hope to the old standard model of planetary formation which had recently been severely undermined by the unexpected discovery of large gas giants in close orbits around nearby stars.

The majority of the work was done by Ewine van Dishoeck and Win-Fai Thi of Leiden University in the Netherlands, but two Caltech professors contributed: Geoffery Blake, one of the leading authors and professor of cosmochemistry, and Anneila Sargent, professor of astronomy.

"Theorists have a difficult time getting Jupiters," said Blake. The difficulty arises from the amount of mass necessary to trap hydrogen.

"If you drill down on Earth and find natural gas you'll release some hydrogen, but it will just escape through the atmosphere, you need more mass to hold it," Blake explained.

The standard model, in which planets formed slowly as dust grains collided and gradually formed a proto-planet large enough to trap hydrogen, required hydrogen to survive in planetary disks for longer than evidence seemed to support.

Evidence for a short lived planetary disk derived mainly from observations of carbonyl monoxide, which has easily detectable emission lines and is often used as a tracer of entire gas clouds.

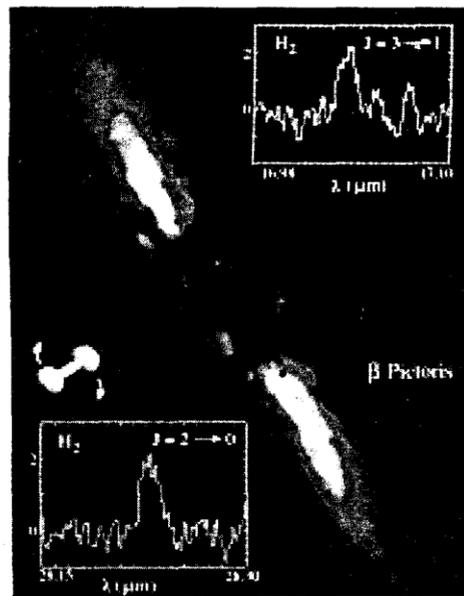
In this case, however, this method proved to be faulty. By getting above the atmosphere via the European Space Agency's Infrared Space Observatory, the authors of this study were able to directly search for hydrogen around three nearby, relatively old stars (all 10 to 20 million years old). They found

molecular hydrogen, and plenty of it, from one fifth of Jupiter's mass to nearly six times the mass of Jupiter around a star called HD135344.

This is surprising because dust and CO are known to dissipate in about 1-3 million years, and it was assumed that the same was also true for molecular hydrogen.

"You can't regenerate enough hydrogen to explain this," asserted Blake, referring to the fact that small amounts of dust and gas can be produced by collisions. "The hydrogen must be left over".

The implications of the study are not yet fully known. The three stars looked at in the study were all relatively similar, and future experiments hope to determine if this amount of hydrogen is found



These disks of hydrogen around Beta Pictoris contain at least 20% of the mass of Jupiter

around all young stars.

If it is, as this study would seem to suggest, then gas giants are likely to be extremely common, much more common than we currently know, since nearby gas giants have only been detected around approximately 2%

PLEASE SEE HYDROGEN ON PAGE 2

Eric Tuttle '01 receives Marshall Scholarship

BY LAUREN STOLPER

British Ambassador Sir Christopher Meyer announced today the list of 40 American students who have been chosen to receive Marshall scholarships. Over 1200 students apply for the Marshall each year.

Sir Christopher said, "Once again we have selected an exceptional group of American students to study as Marshall scholars at universities across the United Kingdom. I wish them all the best. I am sure that they will enjoy their time in the UK and, as they rise to leadership positions in their chosen fields, go on to enhance relations between our two countries."

Eric Tuttle, born in Long Beach, CA, is currently studying Applied Physics at Caltech. He plans to study Computational Neuroscience at the University of London, England.

This year's recipients of the scholarship, worth approximately \$50,000 over two years, come from a wide range of back-



Tuttle in London

grounds and an equally wide range of states and universities. Disciplines include neuroscience, international development, bioengineering, aerospace engineering, and the classics.

The Marshall Scholarships were established in 1953 as a British gesture of thanks to the people of the United States for the assistance received after the Second World War under the Marshall Plan.

The scholarships, financed by the British Government, provide an opportunity for American stu-

PLEASE SEE TUTTLE ON PAGE 2

Battling Beavers invade gym as CIT faces MIT

BY DANA SADAVA

It's the battle of the beavers. Tonight at 5:30pm in Braun gym, women's basketball teams from Caltech and MIT will engage in athletic competition for the first time.

"Caltech actually matches up pretty well with a lot of schools on the East coast," said Coach Rachel Madsen, who arranged the game with MIT's coach through a mutual friend.

"We compare ourselves with MIT in every other respect, so it's interesting to see how we compare athletically," she said.

Even though the two schools are long-time institutional rivals,

the coaches frequently discuss recruiting techniques as it is difficult to build competitive athletic teams in schools that so strongly emphasize the sciences.

Madsen has arranged that women's basketball teams will compete against each other annually, taking turns travelling. MIT played Whittier College earlier in the week.

Co-captains Laurie Gagne and Sarah Hunyadi led the team this year.

"We're really looking forward to it, especially because we will be playing against girls who share the same academic goals and career objectives as we do," said Hunyadi.

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Caltech and the Outside

LETTERS TO THE EDITOR

Community Service at Caltech

We all have the desire to make a difference in the world we live in. Some may have more difficult times effecting positive change than others, but everyone has it within his power to do so, in ways however small - if he makes it a high enough priority in his life. There are many ways for one to make an impact while serving time as a student at Caltech, and I would like to throw out the idea of community service as a way to enrich the lives of not only the people you are helping, but yourself as well.

I was an undergrad once upon a time, and though the idea of volunteering popped into my mind from time to time, there seemed to be so many reasons I could manufacture about why I could not participate in community service projects. First, I thought I didn't have the time for them, especially considering I felt I needed to do better academically (and I think just about everyone at Caltech may feel that they can do better academically). Looking back at those years, however, I realize that even though there was definitely room for personal academic improvement, I ended up spending

a lot of time stressing out on my own without getting much more academic work done, a pattern that I have observed in many other fellow undergrads.

Given my experience in volunteering my time once a week for the past year, I feel I am definitely as productive, if not more, as a result of contributing to a worthwhile cause. I will come back to my personal experiences as a volunteer for the past year later. For now, I just want to throw out the idea that everyone at Caltech has the time to contribute to at least one worthwhile community project during one's tenure at Caltech. Spending two hours a week every week may seem a lot of time for some, but I am sure everyone has at least two hours a week to do something worthwhile. Besides, two hours a week is but a drop in the ocean of a lifetime, and your service can do a lifetime of good for someone else.

I wanted to do something on a weekly basis, but I thought doing so wouldn't be financially viable. However, this is now a moot point for those who have federal work-study money because the per hour rate for community service projects organized or supervised through the Caltech Y pays \$15 an hour. The rate is definitely competitive

with most other jobs one can find on campus. Ideally, one shouldn't do community service project solely for the money, but at least people are no longer penalized financially for choosing to work in the area of community service. If one doesn't have federal work-study, and money is still an issue, than I would like to point out that a few hours a week may be infeasible for some, but everyone has at least a few hours a term.

Let's assume for now that I have convinced you that you do have the time if you think it is important enough to participate in a worthwhile community service project. There are still many outstanding issues. How would one go about identifying the community service projects that are around the Pasadena region? How does one get to the place that one wants to volunteer at if one doesn't have a car? The person to go to for answers is Kristin Abbott, the Community Service Programs Coordinator at the Caltech Y. Her e-mail address is kabbott@caltech.edu and her extension is x3180. Not only can she provide you with a list of agencies that the Caltech Y has active connections with, she can also point you in the right direction if the Caltech Y doesn't have relationships with the

projects or agencies that you want to work with. She can also facilitate the process of finding transportation for you.

I have been volunteering about once a week for two hours in the past year at a group home in the Altadena region as an academic tutor. Working with disadvantaged and at-risk youth has always been something that I found important personally, thus the decision to work at the group home was fairly obvious. In the beginning, I had my own expect-

tations about the role that I would play, and I am somewhat embarrassed to say that I thought I was going to be like Jaime Escalante - the math teacher that was played by Edward James Olmos in the movie "Stand and Deliver" - teaching kids about calculus and the wonders of science. It didn't take me long to realize that what I was most needed for wasn't my brain, but rather my heart.

There are definitely days that I just feel so tired and exhausted after the tutoring session, but even so, I always leave with a sense of peace about my own life in part because I felt good about having helped people that I cared about. In addition, the tutoring sessions also gave me a different perspective on my own life. Tutoring kids once a

week may not be your thing, and that is fine, but there are plenty of worthwhile things to do out in the world. I do believe that regardless of the cause that you work for, you will find the experience rewarding if it is something you care about.

The undergraduate life at Caltech can be hard for many people, for an entire spectrum of reasons. Life here can be difficult, and it is easy to get caught in a cycle of complaint and disappointment. But rather than lament your "suffering" at the hands of the impersonal (and somewhat artificial) academic world, I suggest you recognize and exult in your immense personal power to improve the lives of others in the world at large. As a scientist, you are at heart a public servant anyway. Participating in community service, and helping others in general, ultimately, is a way for us to transform our own sufferings into something positive and to share our joys with others.

-John Lin

TUTTLE:

CONTINUED FROM PAGE 1

dents who have demonstrated academic excellence and leadership potential to continue their studies for two years at any British university.

Long regarded as one of the highest undergraduate accolades, the Marshall Scholarships cover the scholar's tuition costs, books, travel and living expenses while in the United Kingdom.

Prominent former Marshall scholars include US Supreme Court Justice Stephen Breyer, US Secretary of the Interior Bruce Babbitt, New York Times foreign affairs columnist Tom Riedman, Dean of Stanford Law School Dr. Kathleen Sullivan, Ray Dolby, and President of Duke University and member of the National Women's Hall of Fame, Dr. Nan Keohane. Caltech faculty members who were Marshall Scholars include Professors Jonas Peters (Chemistry), Steryl Phinney (Astrophysics), Edward Stolper (Geology & Planetary Sciences), and Stephen Quake (Applied Physics).

Former Caltech president Tom Everhart was also a Marshall Scholar.

Caltech students interested in the Marshall or other post B.S.

opportunities for study and travel abroad should contact Lauren Stolper, Director of Fellowships Advising & Study Abroad.

More information on the Marshall and this year's winners can be found at <http://www.britainusa.com>.

HYDROGEN:

CONTINUED FROM PAGE 1

of stars observed.

Gas giants also mean that life-bearing terrestrial planets could be more easily formed, since they are sheltered from comets and asteroids by the giant's gravity.

Future space- and air-based telescopes will shed light on these questions.

The Space Infrared Telescope Facility (SIRTF) and the Stratospheric Observatory for Infrared Astronomy (SOFIA) will be launched in 2002 and could, according to Blake, provide data on "hundreds of stars, real statistics, not just qualitative data".

At the end of the decade, the Next Generation Space Telescope (NGST), Hubble's replacement, could provide enough resolution to actually look at the dynamics of the hydrogen in the disks, a level of detail unobtainable by current instruments.

The Outside World

by Erik Dill

Washington, D.C. - The Federal Reserve lowered the Federal Funds Target rate by half a percent. This key interest rate was changed from 6.5 to 6 percent to curb a feared economic slowdown.

Rome, Italy - The Italian government asked NATO to investigate the deaths of six soldiers who had served in the Balkans. Italy believes that the deaths were caused by exposure to depleted uranium, found in anti-tank weapons and other munitions.

Atlanta, Georgia - Judge John H. West found that the Smithfield Packing Company, the world's largest pork processing plant, had violated labor laws by systematically thwarting unionization attempts by its workers.

Bangkok, Cambodia - The National Assembly voted to create a tribunal to hear Khmer Rouge war-crimes cases. Over a million people died during the 1975-79 rule of the Khmer Rouge.

Cianjur, Indonesia - An increase in the number of witch-killings was tied to a syndicate which, for \$100, engineers murders under the pretense of witchcraft. Witchcraft is legal in Indonesia and about 100 accused witches are typically killed in rural villages.

Fargo, North Dakota - A legally blind graduate student was issued a concealed weapons permit. Carey McWilliams, who can distinguish degrees of brightness, passed his shooting test on the second attempt.



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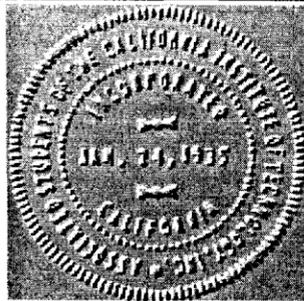
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ASCIT & QotW



ASCIT President and Vice-President/BoC Chair election announcement

Nominations for the ASCIT offices of President and Vice-President / BoC Chair open at 8 a.m. this Wednesday, January 10th and close at 5 p.m. the following Tuesday, January 16th. A sheet will be posted on the door of SAC 33 during this time. Please sign up if you are interested. A brief description of these offices can be found below, and the ASCIT Bylaws provide the technical requirements in Article IV (for the complete text see your little t). Note that you must currently be a registered student, an ASCIT member, and on-track to be a Junior, or Senior next fall in order to be eligible for office. Please contact Eric Tuttle (tuttle@its.caltech.edu) if you would like more information.

There is a vacancy in the office of Director for Social Activities:

This office must be filled temporarily until the newly-elected students take office in mid-February. As per the bylaws, the ASCIT Executive Committee will appoint someone to fulfill the duties of the Social Director during this time. The appointed student will sit on the Board of Directors, but will have no vote. The major tasks to be completed by the social director prior to the transition are to organize the transition dinner, prepare a final financial statement for the social budget (in working with the Treasurer), and finalize a check-out system for the ASCIT party lights. This would be an excel-

lent opportunity to gain experience on the Board before running for an ASCIT office next month. Nominations will open at 12:00 a.m. Friday, January 5th and close at 11:59 p.m. Thursday, January 11. A sign-up sheet will be posted on the door of SAC 33 during that time. Please sign up if you are interested. Interviews will follow. Please contact Eric Tuttle (tuttle@its.caltech.edu) if you would like more information.

Office of the President:

Article IV: SECTION 3. Office of the President: The President shall be the official representative of the Corporation, and he shall preside at its meetings. He shall be chairman, without vote unless a tie occurs, of the Board of Directors and a member of the Executive Committee. He shall have ultimate responsibility for proper observance of all responsibilities delegated to members of the Board of Directors. He must be either a junior or senior in the fall term immediately following his election.

Here are some things you should know if you're thinking of running for president:

This is a serious time commitment – probably 10 - 15 hours per week if you're doing it right. A lot of it is fun and interesting. Some of it is driving to Far Foster's at 7 am (you should have a car, by the way).

Your main job is to be ultimately responsible for every-

thing that goes on in ASCIT. So you should be someone with an ability and desire to keep track of / juggle many things at once. You should hopefully have some sort of vision. It takes a lot of work and enthusiasm to always be on top of everything.

You have to be able to run meetings and manage projects. You also need to know how to delegate and motivate. Just like Dilbert's boss.

You'll have to work with a wide variety of people: students, administrators, professors, alumni, etc. You should have good people-skills and be able to maintain a good relationship with them all (things go a lot smoother that way). But, of course, you need to be able to negotiate, argue professionally, etc. when necessary. It isn't all ass-kissing. As far as students go, you should feel like you could walk into any house and be comfortable having dinner there (except maybe Page; who'd want to eat there?). ASCIT is one of the few places where students try to stay above house divisions.

Is it worth it? I think so. You won't exactly get the esteem and respect of your fellow students, but you will get to be a part of the inner-workings of campus. When the administration needs student input (or when you think they need input), you'll be there to give it to them. You'll know what's going on, from the faculty board, to the alumni board, to the Taiwanese Student Association. And much of what

you'll be doing is interesting, if you like this sort of stuff. It feels a lot more real-world than all those stupid classes you'll be taking. It's a great feeling to be able to get so much stuff done. Plus, I'm working to get you a parking space.

Best of luck in the election!
-Eric

Office of the Vice-President and Board of Control Chairman:

Article IV: SECTION 4. Office of the Vice President: The Vice President shall, during absences of the President, assume the duties of that office. He shall act as chairman of the Board of Control. He shall assist the President in coordinating the policies and activities of the Associated Students. His primary responsibility shall be to insure the continuance of the Honor System among the students. He must be either a junior or a senior in the fall term immediately following his election.

Basically, the ASCIT VP/BoC Chair runs the BoC. This involves working with the secretary to investigate possible honor system violations, and also running full board hearings. This involves working with both faculty and other students. The BoC Chair also sits on the Routing Group and thus helps decide how to deal with a wide variety of disciplinary issues on campus.

-Laura Brogoch

GENOME:

CONTINUED FROM PAGE 1

sion in meristems, and the mechanisms of plant hormone action, all done using Arabidopsis as a model.

Arabidopsis has been one of the primary model organisms upon which a large part of genetic research has been based. The plant itself is a weed of the mustard family. Although it has no commercial use at all, it is simple to grow and maintain, and produces up to eight generations in a year, making it ideal for genetic research, not to mention that it has a relatively small genome (its DNA of 125 million base pairs is twenty times smaller than the human genome). The Arabidopsis genome consists of five chromosomes of about 25,000 genes, roughly twice the number of genes in the fruit fly.

The sequencing was a combined effort of hundreds of scientists from the United States, Europe, and Japan and cost about \$60 million. Work began in 1994 and was expected to take 10 years. Two of the chromosomes were sequenced in 1999, and the sequences for the remaining three were announced on the 14th. Scientists hope to identify the biological role of all 25,000 genes within the next 10 years. Scientists hope for many benefits to come from sequencing Arabidopsis, such as making crops more resistant to diseases and pests, and better understanding the biochemical mechanisms of plants, from which a quarter of all medicines are originally derived. Already, research on Arabidopsis has resulted in boosted yields of staple crops such as wheat, tomatoes, and rice.

Question of the Week

by Janet Zhou

Question of the Week: Describe your most interesting Christmas or New Year's experience.

"It all started out innocently when a friend and I went driving down Colorado Blvd. looking for dinner

New Year's Eve, not knowing of course the tradition for people on the parade route, who were either bored or drunk, to use passing cars as target practice. We were outside the McDonalds when we were suddenly ambushed by marshmallows. I thought they were rocks at first. When we found out they were being deliberately thrown by little kids along the parade route, we decided that we needed to layeth the smacketh down! In a fit of anger, I drove back to Caltech to get a larger group and some ammunition (mostly grapes and silly string). This time as we drove down Colorado, we were really asking for it. They totally trashed my car, throwing anything they could get their hands on, including, most ingeniously,

tortillas topped with shaving cream. Since my car is a lease, I didn't care about it. We took our time pissing them off, opening our windows to entice them, and of course throwing our own fair share of crap back at them. We've decided to make this our little tradition. Then I wept for the future of America's youth."

-- Kevin Tse

"Two Christmas' ago. I got engaged. I bought her a ring and I had a star named after her. I took her out stargazing on Casper Mountain, Wyoming, pointed out the star, and proposed to her. She was shocked beyond words and flabberghasted, but she said yes."

-- BJ Horn

"For New Year's this year,

about fifteen of my friends and I rented this cabin an hour away from Memphis, and we were going to have a party there. This place was in really rural Tennessee, what we would call the "Boon-dox" (for the Yankees unfamiliar with the term), and we figured it would be a pretty cool place for a party. But what happens? Memphis gets covered in snow that day. Memphis, which NEVER gets snow! On this one night, we got four inches (which may not seem like a lot, but down south, it's considered a blizzard). Anyway, none of us felt like risking our lives to get out there (we also didn't quite have good directions), so we ended up going to a friend's house, playing pool, and drinking in the snow."

-- Sina Yeganeh

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Ticket Stub



The Ticket Stub

by Justin Ho

Hollywood movie-fare didn't prove nearly the powerhouse this holiday season that it has been previously. While in past years, larger blockbuster films may have overshadowed independent, art-house flicks both in box office revenue and quality,

the accolades for small films and a few foreign films have recently been deservedly more magnanimous. Enclosed are a sampling of films you may wish to entertain yourselves with in the early idleness of second term.

You Can Count on Me (A+)

In *You Can Count on Me*, a brother and sister orphaned as children reunite as adults. She is a controlling single mother of an 8-year-old, and he is an uncommitted drifter. Despite their tragic origins, the film never stoops to mawkish reminiscences. Rather, the emotional scars are latent and understated. As children thrust into a world of strangers and bereft of security, the siblings developed their own separate personal identities, which accounts for their polar attitudes about remaining attached to their birthplace. Sammy, the older sister, remains in the



You Can Count on Me

Rated R

Paramount Classics

homely upstate New York hamlet of their childhood, and de-

spite the limitations of leading such a provincial existence she is, as ever, guardian of their old home. In contrast, Terry, the younger brother, is an aimless wanderer, without responsibilities after being incarcerated briefly as a result of a temper tantrum in a bar. Having developed such contrasting personalities, it is little surprise that the siblings' initial encounter is pregnant with tension. But the film

draws its strength from the intimate conversations between the two principal characters, in which they not only rediscover each other as siblings but also as best friends.

The film presents itself as an anti-American Beauty. While *Beauty's* protagonist relinquished the burden of responsibilities, especially in the upbringing of his daughter, it is the reunion that heightens Sammy's and Terry's sense of immediacy in Sammy's son's upbringing. Also, while *American Beauty* was filled with visual intricacies, such distractions are absent in *You Can Count on Me*. This focuses scrutiny on the interplay between the characters. Kevin Spacey may have won a best actor Oscar, but family dysfunction limited skirmishes to a few lines and rejoinders. More frequently prose was expressed in monologues, and emotion through facial expression and gesture. Line delivery was rarely a forte. *You Can Count on Me*, on the other hand, concentrates on language and speech, and the moments of joy or setbacks that words can induce. I do not intend to slander Terry's or Sammy's ability to convey feeling through facial expression, but arguments or warm and fuzzy moments are explored more deftly over the course of witty and often lengthy dialogue, something lacking in *American Beauty*. Like a bottle of wine that ripens with age, so does the quality and intensity of conversation in *You Can Count on Me*.

It is perhaps an understatement that failed efforts by writers or actors to make characters communicate with each other in a scintillating fashion has only exacerbated the state of attention deficit. But truly, Kenneth Lonergan's experience as a playwright and stage director allows this film to dangle boldly in the realm of potential boredom without actually falling in. The characters embrace their lines with genuineness and fluidity, so much so that dysfunction, if such humanity should emerge from it, seems a blessing.

Harmony, as evanescent as it may be, is easily crafted here.

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More Movie Review

MOVIES:

CONTINUED FROM PAGE 4

The muted joy of keeping a secret, the subtle embarrassment of being mastered by the id, are resplendent examples of moments that bathe the audience in pathos. However, strong dramas necessitate conflict, which is easily engendered between characters with such contrasting perspectives. Above all, the film delineates the frequent missteps that good people often make. With only the best intentions in mind, Rudy, Sammy's 8-year-old son, is nurtured by ambivalent parental influences: Sammy's penchant for preserving his innocence and naiveté, and Terry's loathing for sheltering children, at the cost of bursting Rudy's bubble of happy thoughts. While Sammy appreciates Terry's efforts in easing her single-parent burden, her diminished place leaves her feeling threatened. It is an appropriate sentiment considering Terry's pursuits: aimlessness in the guise of seeing the world. In desperation, Sammy precipitates one of the most dramatic and solemn closures in recent cinematic memory.

Hidden Tiger, Crouching Dragon (A-)

Asian martial arts films that have opened in the U.S. recently have typically been packaged as

comedies. This is a product of the stars' limited Western pop culture savvy and lack of English proficiency, a formula that has proved effective for stars like Jackie Chan and Jet Li. It feels appropriate to exploit naiveté, throw in a sidekick, and provide comic relief. But along came a little film called Hidden Tiger, Crouching Dragon, which provides a genre-bending alternative to the martial-comic arts cliché, and dares to subvert the Eastern-culture-meets-Western-liberty formula.

Although characters in Hidden Tiger celebrate freedoms that would be anachronistic for such an ancient period, it is more apt to use kick-ass feminism rather than a ploy by the filmmakers to trickle Western influence and its merits on a culture which traditionally undervalues the female gender. The inclusion of girl power, physical and psychological, gives the film wide appeal, not unlike women's professional tennis. The primacy of power in the men's game has reduced points to a few returns back and forth, but the women's game retains the element of finesse and endurance. Anyone who has indulged in martial arts movies has noticed a trend in which the hero's abilities far surpass those of the foes, so that a whopping transpires in a matter of seconds. Even when more opponents are added, the extras serve no purpose but to stand as props to the slaughter, offed in some clever way so as to main-

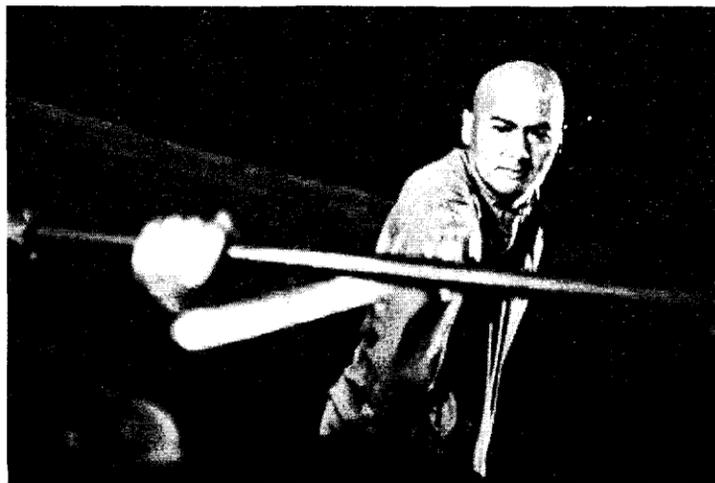
tain viewer interest. What is so unique about this film is that it pits two leading ladies of superb and roughly equivalent abilities against each other in dazzling fight sequences that never abate over the course of five or even ten minutes. And using traditional Chinese weapons (now resurrected in the contemporary sport known as wushu) it provides a true picture of the art of war. Still, the Attorney General says that is an overabundance of senseless violence in the media. So I will add that the film teaches us that force is used out of necessity or ignorance.

The film commences by introducing two seasoned warriors, Li Mu Bai (Chow-Yun Fat) and Yu Shu Lien (Michelle Yeoh), punctuated by wisdom and contrition. Seeking to end his harsh career as a just vigilante of sorts, Mu Bai abdicates his legendary sword, asking Shu Lien to present the weapon as a gift to a mutual friend in the capital city. The recipient has been the host to a powerful aristocratic family, so the residential compound is guarded by foot soldiers. But on the night Shu Lien arrives with the sacred sword, a dainty

thief penetrates the quarters and steals it. With celerity and grace, the masked bandit bounds up vertical walls and floats from roof to roof, defying laws of

Zhang Zi Yi), that pits her against Shu Lien and Mu Bai, who try to contain the wild child. Jen is the quintessential spoiled, wealthy brat, but it is a nuanced role. Fortune and luxury, rather than allowing her to indulge in her desires, are anathema. Her family's power constrains her to certain civic duties and places a ceiling on her personal freedoms. It is not the life she would like to lead, and she aspires rather to be a vigilante.

However, she mistakes nobility and warfare for complacency and personal triumph. Reckless and comfortable, having found a weapon which can compensate for her shortcomings, she voices challenges to friends, foes, and strangers alike. She displays a ruthlessness unbecoming of her youth and beauty. Only after tragedy strikes with its heavy hand does she learn that actions have consequences, but at that point she has forsaken love and family and ostracized herself from the community safety net. It's an interesting character study for anyone wishing to pursue the film on yet another level, beyond the spectacle of hand to hand, weapon to weapon, revolutionary to revolutionary combat.



*Hidden Tiger,
Crouching Dragon*

Rated PG-13

Sony Pictures Classics

physics in what becomes the first glimpse of visual fantasy. But the thief is careless, even as her grace and gravity-defying maneuvers intimate something fantastically super-human. Her scampering on the rooftops attracts the attention of Shu Lien, who shrewdly surmises the thief's identity and the origins of her skill after a tense but dazzling battle.

The theft is simply the first in a string of mounting misdeeds committed by the aristocrat's daughter, Jen (porcelain lovely

I'm afraid I can't do that Dave...



Don't be that guy. Work for the Tech.

Comics

DILBERT® by Scott Adams

Panel 1: Boss: "DILBERT, MEET TOPPER. HE'S AMAZING."
Dilbert: "NO MATTER WHAT YOU SAY ABOUT YOURSELF, HE'LL TOP IT."
Topper: "HOW ARE YOU?"
Dilbert: "I CAN'T GO FIRST. IT RUINS MY SYSTEM."

Panel 2: Dilbert: "I'M GETTING A MOUSE CRAMP."
Boss: "I SPENT SEVEN YEARS CHAINED UPSIDE DOWN TO AN ELBONIAN PRISON WALL."
Dilbert: "AT THE RISK OF SOUNDING TOO COMPETITIVE, I BELIEVE I'M WINNING THIS CONVERSATION."

Panel 3: Dilbert: "MY PROJECT WILL SAVE THE COMPANY A MILLION DOLLARS."
Boss: "MINE SAVES TWENTY MILLION."
Dilbert: "MY PROJECT WILL TAKE A YEAR TO COMPLETE."
Boss: "MINE TAKES A WEEK."
Dilbert: "TOPPER, I HAVE HALF A MIND..."
Boss: "I HAVE ONE PERCENT OF A MIND."

Panel 4: Dilbert: "MY HEADACHE IS A DOOZY."
Boss: "HA! THAT'S NOTHING."
Dilbert: "BAM! BAM! BAM!"
Boss: "UM... YOU WIN."
Dilbert: "I'M JUST GETTING STARTED!"

Panel 5: Dilbert: "I CREATED SOFTWARE THAT MAKES ALL COPYRIGHTED WORK ON THE NET AVAILABLE FOR FREE!"
Boss: "WOULDN'T THAT DESTROY ALL FORMS OF CREATIVITY AND PLUNGE US INTO A DEPRESSION?"
Dilbert: "YES... BUT IT IS VERY NEAT."

Panel 6: Dilbert: "MY PLAN IS TO GIVE AWAY OUR PRODUCT FOR FREE."
Boss: "WE'LL ONLY BILL CUSTOMERS WHO ASK US TO DEINSTALL IT."
Dilbert: "FOR ONCE, THOSE REPORTS OF CONSUMER DECAPITATIONS WILL WORK IN OUR FAVOR."

FoxTrot by Bill Amend

Panel 1: Mom: "I'VE RESOLVED TO NOT LET JASON ANNOY ME THIS YEAR."
Dad: "I'VE RESOLVED TO ANNOY PAIGE MORE THAN EVER THIS YEAR."
Paige: "THIS COULD BE QUITE A TEST OF WILLS."
Jason: "OR PILLS. LET'S SEE... ASPIRIN OR TYLENOL?"

Panel 2: Jason: "DON'T GET HIM A SUPER SOAKER FOR CHRISTMAS," I SAID. "BUT HE REALLY WANTS ONE," YOU SAID...

Panel 3: Jason: "QUINCY REALLY LIKES YOUR NEW CHESS SET, DAD."
Dad: "HE HAS GOOD TASTE."
Jason: "THESE ARE AUTHENTIC HOUSE OF STAUNTON HAND-CARVED PIECES. SANTA REALLY CAME THROUGH."
Dad: "FUNNY THAT YOU SHOULD USE THE WORD 'TASTE'..."
Jason: "WHY ARE HALF THE PAWNS MISSING?"

Panel 4: Jason: "YOU SPECIFICALLY SAID, 'WIPE YOUR FEET ON THIS MAT WHEN YOU COME IN.'"
Mom: "...THE FRONT DOOR!"

Panel 5: Jason: "MOM, THE COMPUTER'S FROZEN UP AGAIN."
Mom: "DID YOU TRY RESTARTING IT?"
Jason: "YES."
Mom: "DID YOU TRY DISABLING THE EXTENSIONS?"
Jason: "YES, YES, YES."
Mom: "DID YOU TRY REINSTALLING THE SYSTEM FILES?"
Jason: "YES, YES, YES."
Mom: "ALL RIGHT, I'LL RAISE THE THERMOSTAT A LITTLE."
Jason: "FINALLY."

Panel 6: Jason: "AND YET YOU CAN'T HIT A CATCHER'S MITT TO SAVE YOUR SOUL."
Dad: "GO FIGURE."

DEAN:

CONTINUED FROM PAGE 7

programs are getting pretty good. (The first draft of this column was written using one). The space architecture envisaged by the film makers wildly surpasses reality. We don't yet have as breathlessly beautiful meeting rooms as are pictured in the movie. Could anyone really work in the enticing environment of the wheel-shaped space craft, with huge picture windows facing the velvety brightness of the heavens? I imagine that I would be gazing out dreamingly. Maybe it is lucky that neither Space Shuttle, nor Mir, nor the Multi-national Space Station provides an environment as con-

ducive to contemplation as that imagined by Kubrick.

There are rumors, of course, that this might change. The Hilton chain is said to be thinking about a space hotel built of shuttle fuel tanks. BBC commentators assured their listeners in 1999 that there were no technical reasons why this could not be done at a fraction of the cost of the international space station. There was the little problem of getting the guests to the hotel, but surely NASA would oblige by building a second generation space shuttle which would carry 100 or so passengers. And if NASA declined, I read in the LA Times on Dec 29, 2000 (p.A5) that a German firm "has purchased exclusive rights to commercial

'taxi rides' for civilians aboard Soyuz rockets." Enjoying the space hotel should be easier than ever, now that the zero gravity toilets, which seemed such a hassle in '68, have been more or less conquered. (See instructions for use of the original, posted at www.ee.ryerson.ca:8080/~elf/aso/zeroGtoilet.html) May you all live long enough to enjoy heavenly room service, and may all your grades be A's...

A bientot

Jean Paul Revel

Jean-Paul Revel
Dean of Students

THE TECH: HOW 'BOUT IT?

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SHADOW OF THE VAMPIRE (R)
Fri. - Thu. [11:30] 1:35 3:40 5:45 7:50 10:00

QUILLS (R)
Fri. - Thu. [1:00] 4:00 7:00 9:45

THE HOUSE OF MIRTH (PG)
Fri. - Thu. [11:30] 2:35 5:40 8:45

O BROTHER, WHERE ART THOU? (PG-13)
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Methuselah

Dean's Corner

Of mice, flies, and men

by Jean-Paul Revel

There was much excitement when, a couple of years ago, a mutation was discovered by Seymour Benzer at Caltech, which he named Methuselah. The life of these mutant Caltech flies was lengthened by some 35 percent. But just last week there was even more astounding news. A paper by researchers at the University of Connecticut (Rogina et al. *Science* 290, pp. 2137-2140, 2000) reported the discovery of another family of mutations in fruit flies, this one actually doubling the life span of the little critters. This mutation has been nicknamed Indy, short for "I'm not dead yet." The mutation was found to interfere with the uptake of key molecules, making the flies' metabolism less efficient. Now, in mammals, the one way to extend

lifespan experimentally is caloric restriction. For example, mice allowed to feed only every other day live longer than controls which can feed at will. Indy mutations might be a genetic way of achieving the same thing. Don't rush to try fasting alternate days. What works on mice and flies may not be that great for people. In fact, stricter metabolic restrictions, in flies anyway, decrease their life span. We just don't know enough right now. But it is fascinating to imagine that, within the next 20 or 30 years, there might well become available "magic" pills which will prolong your lives further into the millennium. But all of that is for tomorrow.

Of course, yesterday's tomorrow is today! And for my purposes yesterday will now be defined as 1968, when "2001," the movie, was released. The year 2001 seemed so far in the future

that writer Arthur C. Clarke and director Stan Kubrick could let their imaginations roam freely. They predicted that spaceships would be plying the heavens to Jupiter and that humans would routinely visit the moon. Reality has gone beyond fancy with JPL sending orbiters and rovers to Mars, where in just a few years we've proceeded from discovering that there are craters on that planet too, to arguing about the presence of water (sometime in the past, if not now). What with discovering planets around other stars and getting tantalizing suggestions of traces of life in meteorites, we slowly have to become more comfortable with the idea that there might be other living things in the universe.

Kubrick and Clarke implicitly assumed that there would be other creatures. Their heroes went in search of who was responsible for mysterious radio signals from Jupiter. Of course, today we would think the who was a what, like the jovian thunderstorms studied by Professor of Planetary Science, Andy

Ingersoll. But something (someone) must have devised the ominous slab of shiny black stuff unmooned in the movie. If our men on the moon have discovered an equally mysterious monument, it has been kept a very dark secret. Of course, the discovery of the slab in the movie was also kept secret, so nothing would be new under the sun.

I don't know if you have seen the movie. The visual effects are fantastic, even if the plot gets to be more than a little incomprehensible. The limited conversation takes place mostly between Dave, one of the astronauts, and HAL, the sensitive, soft-spoken and murderous computer (you can eavesdrop on them at www.palantir.net/2001/sounds.html). Although today's software allows off-the-shelf computers to speak (more or less) clearly, they are no match for HAL. And while you can't buy RoboPens, which in the movie write out dictation on their own, voice recognition

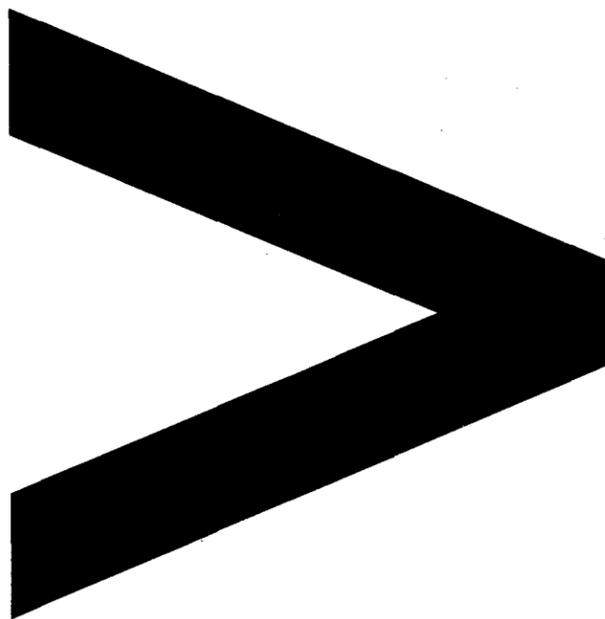
PLEASE SEE DEAN ON PAGE 6



Happy 2001! Happy 2001! I know, it is already the 5th of January, but humor me anyway and let me join the crowd of your enthusiastic well-wishers. So, a most productive, peaceful and enjoyable time to all of you for 2001, no, for the rest of the millennium!

Now you might be wondering, "What did he do over the holiday, he is crazier than ever, really." Well, it's not my fuzzy math, I am embellishing things only a little (after all, if it is OK for politicians, it should be OK for deans). I am not totally crazy. What leads me to speak like that is progress in our understanding of some of the factors which contribute to aging.

Not too surprisingly, some of these factors are genetic.



DUH.

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Mints

ANNOUNCEMENTS

H&SS Division offers the following Selected Topic and New Course for winter term 2000.

Law 133 Business Law and Economics This course provides an introduction to modern business organizations, from both the legal and social-scientific points of view. First we will examine the basic principal-agent relationship at the core of all organizations, from both a legal and economic stand point. We will then explore the governance of modern organizations, both public and closely held.

Topics covered will include corporate liability for employees' wrongdoing, managers' fiduciary duties, corporate opportunity, shareholder voting, shareholder suits, proxy contests, mergers and acquisitions, and a brief introduction to securities fraud.

The course may be taken more than once if the topics differ. Instructor: Arlen TTh 1:30-3pm BLH

SES/PI 133 Philosophy of Physics In this course, we will examine conceptual issues that arise within classical (i.e. non-relativistic) quantum mechanics. The mathematical formalism of quantum mechanics is well understood, and its predictions well-confirmed. There remains, however, the beguiling question of how the world could possibly be that way. In particular, we will examine two problems. 1) The standard formalism for quantum mechanics includes two different rules for the evolution of a physical system. One rule applies when the system is not being measured, the other when the system is being measured. This raises two fundamental questions: what is measurement, and why should a system behave differently when it is being measured? 2) In certain types of physical system, distant particles can coordinate with each other across a great distance -- so great that any signal sent from one to the other would have to travel faster than the speed of light. How is this coordination possible? A number of incautious thinkers have drawn outrageous conclusions from these features of quantum mechanics: quantum mechanics proves that we have free will, or that all things in the universe are interconnected, or that ESP is possible. We will not be discussing any of these claims explicitly, but students who take this course will acquire the resources to examine these claims critically.

This course presupposes no prior knowledge of quantum mechanics: all of the central problems can be raised using very simple exams. It will be assumed that all students have a solid grounding in basic mechanics (such as ought to be provided by a good high school education). The course will make use of some tools from elementary linear algebra: vectors and vector spaces, matrices and linear operators. Students who have not yet completed Math 2a may wish to consult with

the instructor before enrolling. Students must also have completed their freshman humanities requirements before enrolling in this course. Instructor: Hitchcock - W 7pm 127 Bax

*Copies of HSS course schedules are available in 228 Baxter. All other selected topic course descriptions are posted in Baxter.

Gay/Lesbian/Bisexual Discussion Group: Looking for a safe and supportive place to discuss issue such as coming out, being out, dealing with family, coping with a homophobic culture, and being GLB at Caltech? Want somewhere just to make new friends? We invite you to the Gay/Lesbian/Bisexual Discussion Group, which meets on the first and third Tuesdays of each month from 8:15 until 10:15pm in the Health Center Lounge. This is a confidential meeting and does not imply anything about a person's sexual orientation - only that s/he is willing to be supportive in this setting. The group usually discusses a particular relevant topic and then moves on to the general discussion. Refreshments are served. If you would like more information, please call ext. 8331

Community Service Opportunities Abound! The Caltech Y offers students and staff a variety of ways to participate in community service. Opportunities include working with Habitat for Humanity, Union Station Homeless Shelter, math tutoring (on or off campus), reading tutoring, and working at local hospitals. One-time community service events are planned each term and opportunities for service on a regular basis exist. Undergraduates with federal work-study can receive \$15/hr for their community service work. To be added to the community service interest email list, or for more information about the Community Service Program, please contact Kristin Abbott at kabbott@caltech.edu or call 626/395-3180. Or, stop by the Caltech Y in the Center for Student Services (formerly Keck House) for a complete listing of opportunities.

Paid Summer Internship in Silicon Valley Free room and board, \$1000 spending money for 8 weeks, paid for weekend trips, up to \$5000 for eight weeks of experience with a Silicon Valley startup. Check out www.uofdreams.com and if you have any other questions email melly@its.caltech.edu.

The Caltech Alumni Association has funding available for student organizations. We give preference to organizations that encourage interaction between students and alumni. To be considered for funding, an application form must be completed and returned to the Association ASAP. The form can be found on the web at http://www.its.caltech.edu/~alumni/sfar_funding.html If you wish to receive an application in hardcopy form, please contact Kim Goodfriend at extension 6852 or by email at kimberly@alumni.caltech.edu.

EVENTS

Science, Ethics, and Public Policy LECTURE SERIES Winter Quarter 2000:

The William and Myrtle Harris Distinguished Lectureship in Science and Civilization presents the following lectures.

Dr. Dorothy Nelkin, University Professor, Department of Sociology and School of Law New York University will discuss *The Body as Product in the Biotechnology Age*. Thursday, January 11, 2001 4:00 p.m. Beckman Institute Auditorium

Dr. Ute Deichmann, Genetics Institute, University of Cologne will discuss *The Slow Start of Molecular Biology in Post World War II Germany: The Impact of the National Socialist Science Policy*. Thursday, February 1, 2001 4:00 p.m. Room 25 Baxter Building

Dr. David Rowe, Professor of History of Science and Mathematics, Mainz University, Senior Fellow, Dibner Institute will discuss *Einstein's Enemies: German Antirelativists, 1914-1920*. Thursday, February 15, 2001 4:00 p.m. Room 25 Baxter Building

Dr. John D. Norton, Professor of History and Philosophy of Science, University of Pittsburgh will discuss *Einstein and the Canon of Mathematical Simplicity*. Thursday, March 8, 2001 4:00 p.m. Room 25 Baxter Building

Refreshments will be served. Seminars are on the Caltech campus and are open to the community at no charge. For information, contact Michelle Reinschmidt at (626) 395-4087 or michelle@hss.caltech.edu. For a complete list of SEPP Seminars and Harris Lectures scheduled for this academic year, visit our web site: <http://www.hss.caltech.edu/sep/html>

The Biomedical Engineering Seminar Series will be held during the Winter Term on Friday afternoons at 4:00 p.m. in Baxter Lecture Hall. Medical research and its applications today require tools and

methodologies from a variety of disciplines that extend far beyond what is normally available in medical curricula and hospital settings. It is no longer enough to know only molecular biology and genetics or even their relation to complex physiologic systems. Scientists on the cutting edge of medical research are integrating modern biology with advances in computer modeling, materials science, imaging, micro machining, and telemetry. Not surprisingly, Caltech is an ideal environment to foster these kinds of integration, which can lead to innovative and dif-

ferent approaches to analyzing and solving fundamental problems in medicine. This series will highlight new research in engineering, computational science, chemistry, physics, and biology being accomplished by Caltech and JPL investigators, often in collaboration with clinical partners. Scientists and clinicians from elsewhere are also invited. The focus will be on the translation of fundamental science/engineering into clinical/medical devices, approaches, and cures. The presentations are geared for a generally literate scientific audience and not for the specialist. Seminars are open to the public. For information, contact Stacey Scoville at staceys@caltech.edu or (626) 395-6320. A complete list of lecture and abstracts is available at <http://www.cco.caltech.edu/~koonin/biomed.html>

GUITAR CLASSES AT CIT CIT Guitar Classes for the winter quarter will meet on Tuesdays in SAC Room 1, starting on January 9 as follows: Beginning Guitar Class 4:30 PM - 5:30 PM Intermediate Guitar Class 3:00 PM - 4:00 PM Advanced Guitar Class 5:30 PM - 6:30 PM. Classical and flamenco repertoires are explored, but techniques transfer to other styles of guitar. The Beginning Class includes a jazz/folk chord system. Classes are free to Caltech students and other members of the Caltech community (space permitting). Undergrads 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 (323) 465-0881 or by email at: ddenning@caltech.edu. The Guitar Home Page is at: www.cco.caltech.edu/~musicpgm/guitar.html

Stressed??? Sign up for the Stress Management Workshop offered by the Student Counseling Center. This workshop will include a mixture of informal lecture and experiential exercises focusing primarily on basic relaxation techniques and stress management skills. The 4-session workshop will meet on consecutive Tuesdays (January 16, 23, 30, February 6) from 12:00-1:00 p.m. in the Health Center Lounge. Space is limited, so please call x8331 to reserve your place in the group.

SCHOLARSHIPS

The Financial Aid Office has applications and/or information on the following as well as additional undergraduate scholarships. All qualified students are

***The American Electroplaters and Surface Finishers Society (AESF)** is offering scholarships to upper class undergraduate and graduate students who are interested in careers in the surface finishing field. Applicants must be full-time and majoring in chemistry, chemical engineering, environmental engineering, materials engineering, materials science, metallurgy, or metallurgical engineering. To apply, applicants must submit an application form, statement describing career objectives, list of educational achievements, official transcripts, and three letters of recommendation from teachers, employers or professors. Applications are available in the Financial Aid Office. Please send completed application materials to: AESF Scholarship Committee American Electroplaters and Surface Finishers Society, Central Florida Research Park, 12644 Research Parkway Orlando FL 32826-3298. Entries must be submitted to the AESF Scholarship Committee by April 15, 2001.

***The National Academy for Nuclear Training** is offering \$2,500 scholarships to eligible students majoring in nuclear engineering, power generation health physics, electrical or mechanical engineering, or chemical engineering with nuclear or power option. Applicants must be U.S. Citizens, enrolled full-time in a four-year accredited institution, minimum GPA of 3.0 or higher, and interested in nuclear power careers. Additionally, scholarships will be renewed for current Academy scholars who maintain their eligibility. For further information on the National Academy Educational Assistance programs, please visit www.nei.org. Applications are available in the Financial Aid Office. Please send completed application materials to: National Academy for Nuclear Training, Scholarship Review Committee, P.O. Box 6302, Princeton, NJ 08541-6302. Entries must be submitted to the National Academy for Nuclear Training by February 1, 2001.

***THE GLAMOUR MAGAZINE'S 2000 TOP TEN COLLEGE WOMEN COMPETITION** has begun. The competition is open to all full-time juniors regardless of major or GPA. All entries must be postmarked by January 31, 2001. Contact the Dean of Student Office, 110 Parsons-Gates, for the applications.

To submit an event for the Mints, contact mints@ugcs.caltech.edu or mail your announcement to Caltech 40-58 Attn: Mints. Submission should be brief and concise. Email is preferred. The editor reserves the right to edit and abridge all material. Deadline: noon Wednesday. Unless specified, all mints will run for two weeks.

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