Houses Win Freshmen's Hearts Through Annual Rotation Week

By CHRISTINE CHANG

Name tags, rapid hellos and dinnertime dramatics underlined a week that saw Caltech's newest crop of incoming freshmen roam the seven houses in search of a home, enjoying first tastes of student culture in a fun albeit frenzied annual Rotation ritual designed to match each student with one of the seven on-campus undergraduate houses.

"It was an excellent experience," said Derek Chan '08. "Dinners were pretty awe-inspiring. Furthermore, some freshmen find Rotation a welcome diversion from the rigors of classes and homework.

"I got to meet a lot of cool people. It's also a good stress reliever right after classes," said Helen Lee '08.

Many freshmen agree that Rotation provides them with the opportunity to become acquainted with the houses, but they point out that the houses seem to over-match new students with housemates complementing their personalities, the annual ritual culminated last Sunday as a committee of house leaders issued final membership assignments.

Continued on Page 2, Column 4

P. JENNINGS OPENS TERM AS PROVOST

KOONIN ON LEAVE OF ABSENCE

Returns With Finance Experience to Office He Left in '95

By KLIIMA KLEMENTY

Stepping in for departing Provost Paul Koonin, ex-Provost Paul Jennings is poised to retake the office he last held from 1995 to 1999. Koonin takes a leave of absence from his faculty position at Caltech to work as chief scientist at BP Amoco Chemical Company in London.

Koonin's previous experience with Caltech was key factors in bringing him back. Besides, he said, his life as an economist was fairly busy to begin with -- so no harm in making it a little busier.

Indeed, during the nine-year interim to his provostship, Koonin served as acting vice president for business and finance in 1995 and from 1998 to 1999, as chairman of the California Council on Science and Technology in 1996-2002, as member of CCST's Executive Committee and as chair of Pasadena's City Hall Restoration Oversight Committee. His energy and leadership are widely acknowledged and admired, and most say they will be great assets to his office.

Also to his advantage is Jennings' previous experience with the position of provost. Knowing what to expect and how to deal with different problems that come up is important; "it's all about problem solving," said Jennings of his new job.

And with the ongoing capital

Continued on Page 7, Column 1

CAIB MEMBER

ASSAYS SPACE CATASTROPHE

SAYS FOAM CRASHED COLUMBIA

Explains Bush Move
To Land Men On Moon, Mars

By MARK POLINKOVSKY

February 1, 2003 marked a tragic turn in the US space program. The space shuttle Columbia was destroyed upon re-entry. Last Thursday, Douglas Osheroff of Stanford University gave a Physics Research Conference lecture titled "Understanding the Columbia Shuttle Accident." Dr. Osheroff, a 1996 winner of the Nobel Prize in Physics, served on the Columbia Accident Investigation Board (CAIB). In his lecture, Dr. Osheroff described the findings of the CAIB and offered a detailed analysis of the Columbia accident.

Continued on Page 7, Column 1

An incoming freshman shares in the carefree fun of Student Life Director Tom Mannion's annual pre-term carnival. In its second year, the festival featured games, bouncy castles a dunking booth and its signature fireworks show.

READY, AIM...

By JAAP WEEL

After 30 years as Caltech's Pianist in Residence, and 25 teaching the Projects in Music and Science course, James Boyk has been given the pink slip. The dismissal occurred when Boyk's old appointment to Caltech's undergraduate houses expired on June 30. Although formally Boyk was not given any motivation for his dismissal, Student Affairs has informally cited "inadequate student participation."

"I was startled," said Boyk of the upperclassmen houses. "I learned..." He will stay on as a Lecturer in Music in Electrical Engineering for another year, but lacking a lab he will no longer be able to actually teach.

His students are equally baffled. Jared Updike called it "ironic" that they would fire him after 30 years. Kyle Bradley found it to be his most valuable class, and stresses that projects in Boyk's class have inspired many students' careers. "Projects in Music and Science is exactly the sort of thing Caltech humanities should be like," he says.

Boyk's teaching included the "Alive with Music" public sessions as well as the more in-depth Music Lab courses. He brought to his work a unique multi-disciplinary viewpoint. As a respected concert pianist with a Harvard math degree and a tremendous amount of experience in the fields of recording technology, instrument technology and acoustics, his message to students has always been that "music is unique among the arts in the number and significance of its connections with the sciences."

In Projects in Music and Science, students have investigated the connections between music and the connections between music and the connections between music and..." said Christy Stevens '08, who took Boyk's class last year, was fired last week for attracting "inadequate student participation."

An incoming freshman chats with an upperclassman over a Rotation dinner last Thursday night. Designed to match new students with housemates complementing their personalities, the annual ritual culminated last Sunday as a committee of house leaders issued final membership assignments.

Continued on Page 2, Column 4

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NIH Honors Phillips, Quake DNA Breakthroughs With ‘Pioneer’ Award

By ROBERT TINDOL

The National Institutes of Health (NIH) has announced that California Institute of Technology mechanical engineering and applied physics professor Rob Phillips is one of nine recipients of the first annual Director’s Pioneer Award. Stephen Chu, NHLBI-Director at Stanford University, Phillips has worked recently on DNA injection and packaging that occur during the life cycles of bacterial viruses, as well as on the behavior of cells. He is the author of a book titled “Crystals, Defects and Microstructures”.

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In the short run, this overall view will be the guiding context of a few key case studies, including how viruses manage the physical requirements of packaging and releasing their genomes, now macromolecules compete to decide when genes are turned on and off, and how cells respond to mechanical forces.

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NIH Director Elias A. Zerhouni, M.D. During

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Bush Foreign Policy Is Dishonest, Misguided

Incompetent Leadership Calls for Regime Change in Washington

By SWAROOP MISHRA

Although Caltech students are not known for their activism, we should take the opportunity to speak up at this November's election approaches. For the safety and security of the nation, we should work to bring an end to the Bush Administration's counterproductive activities. Even disregarding the hypocrisy of its environmental policies, the crippling effect of its record budget deficits, the crookedness of its no-bid contracts, and the fact that Bush is the first president since Herbert Hoover (think "Great Depression") whose presidency went to his opponent, the current administration is plainly incompetent. The self-described "war on terrorism" is perhaps the "war on terrorism" that is ill-advised and is already a failure.

Even with Afghanistan in turmoil and Osama bin Laden at large, an invasion of Iraq became central to the Bush strategy. Eighteen months ago, prior to the invasion, I submitted a series of arguments against it to a letter to the California Tech. In response to inaccuracies in Bush's 2003 State of the Union speech and Colin Powell's subsequent presentation to the United Nations, the letter said, "It would appear that in the rush to war, the U.S. government is not placing sufficient importance on the legibility of its evidence or its claims." This statement was substantiated in the invasion's aftermath. If there were no "weapons of mass destruction" found and Bush's own "9/11 Commission" determination that there were no links between Saddam Hussein and al Qaeda, Bush instead of taking responsibility for his false claims, Bush blamed the intelligence community and pushed out the director of the CIA.

As it became clear that Saddam Hussein could not be tied to "weapons of mass destruction" or al Qaeda, Bush began emphasizing the "freedom" that the Iraqi people would enjoy after the invasion. Did Bush recognize that this third justification was no more legitimate or realistic than the first two? The March 2003 letter to the Tech noted that "recent examples demonstrate that the fall of an oppressive regime does not necessarily lead to freedom and democracy, but instead to instability and perhaps further oppression." A simple knowledge of history and politics led me to conclude that "the power vacuum created by Hussein's fall would lead to severe instability in Iraq" and that it would be "comical to assign a great deal of predictability to the eventual outcome of an invasion of Iraq, let alone to believe that Hussein's regime would be replaced by "freedom and democracy." As I was not known for my activism, the puppet government of former exiled Iyad Allawi is propped up by American force and is being steadily undermined by violence, assassinations, and the widespread perception of its illegitimacy. Although the popular religious movements of Ayatollah Ali Sistani and Moqtada al-Sadr pose well-known threats to American control, their cooperation or containment would not guarantee stability to Iraq. It may only be a matter of time before the historically separatist and traditionally well-armed Kurdish population tires of concessions and disturbances in their participation in the government.

Unfortunately, the Bush Administration's greatest failure in this invasion may not be its lies and hypocracies, its usurpation of "war on terrorism" that is ill-advised and is already a failure. As it became clear that Sadham Hussein could not be tied to "weapons of mass destruction" or al Qaeda, Bush began emphasizing the "freedom" that the Iraqi people would enjoy after the invasion. Did Bush recognize that this third justification was no more legitimate or realistic than the first two? The March 2003 letter to the Tech noted that "recent examples demonstrate that the fall of an oppressive regime does not necessarily lead to freedom and democracy, but instead to instability and perhaps further oppression." A simple knowledge of history and politics led me to conclude that "the power vacuum created by Hussein's fall would lead to severe instability in Iraq" and that it would be "comical to assign a great deal of predictability to the eventual outcome of an invasion of Iraq, let alone to believe that Hussein's regime would be replaced by "freedom and democracy." As I was not known for my activism, the puppet government of former exiled Iyad Allawi is propped up by American force and is being steadily undermined by violence, assassinations, and the widespread perception of its illegitimacy. Although the popular religious movements of Ayatollah Ali Sistani and Moqtada al-Sadr pose well-known threats to American control, their cooperation or containment would not guarantee stability to Iraq. It may only be a matter of time before the historically separatist and traditionally well-armed Kurdish population tires of concessions and discommodities in their participation in the government.

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The writer is a graduate student in chemical engineering.
Mainstream Media Ignore Third-Party Candidates

Imbalance in Political Coverage Stifles Serious Voices, Hurts Voters

By SIMON QUE

The number of Thursday, September 30, saw the first official presidential debate of the 2004 election. The participants were, not surprisingly, George Bush and John Kerry. Surprisingly missing from this debate were third-party voices, such as Ralph Nader of Election 2000 fame. People who were not familiar with politics who turned on the TV would have been hit with the suggestion that Bush and Kerry were the only candidates running for President. But why only two candidates? On August 30, there was an "unofficial" presidential debate held in New York City. The organizers sent out invitations to Bush, Kerry, and four other candidates: Ralph Nader (Independent), David Cobb (Green Party), Michael Badnarik (Libertarian Party), and Michael Peroutka (Constitution Party). These are all significant third-party candidates who have made the ballot in a majority of the states. Yet not one of them received an invitation to the Bush-Kerry debate.

One of these candidates, Cobb and Badnarik, took part in the August 30 debate. They held their own debate again on the night of the Bush-Kerry debate. Cobb and Badnarik are ideologically very different from the two major candidates. For instance, both candidates oppose involvement in Iraq and call for the withdrawal of troops. They have both criticized the administration's various violations of civil liberties, such as the provisions of the PATRIOT Act. Nader and Peroutka have voiced similar concerns. But you won't be hearing these views from the big players anytime soon. George Bush wants to continue involvement in Iraq and renew the PATRIOT Act, while the "flip-flop" Kerry seems incapable of giving a straight answer on anything.

Meanwhile, the news media seems to be perfectly complacent to go along with the illusion that there are only two viable candidates. They ignored the Cobb-Badnarik debates, instead covering the concurrent GOP convention and Bush-Kerry debate. While a news channel's camera cannot be in two places at once, it surely wouldn't have been too much trouble to obtain transcripts of both events, and report on them side-by-side on the front page of the next day's paper? In the latest debate, Cobb and Badnarik waited for the Bush-Kerry debate to conclude and then made their comments and rebuttals to the two major candidates. That would have certainly been worthy of airline. But the major news outlets are silent. Even outside of these live debates, third-party candidates don't get much news coverage. As a test, I searched the websites of ABC, CBS, CNN, and FOX News for the keywords "Bush," "Kerry," "Nader," "Badnarik," "David Cobb," and "Peroutka," counting hits from the last three months. Looking at the results, it should not be hard to see the lack of coverage of third-party candidates. None of them gets any front-page coverage at all. Presumably, Nader is mentioned more frequently than the others because he has already become a significant third-party presidential candidate due to his candidacy in 2000. But Nader is not more impressive than the other third-party candidates. For instance, Badnarik is on the ballot in 48 states, more than Nader's 38 states. His party, the Libertarian Party, is the third-largest political party in the U.S. And 66% of respondents in a Rasmussen poll believed that he should be invited to the main presidential debates, while only 20% believed that he should not. Put simply, Badnarik is no lightweight for a third-party candidate. Neither are Cobb and Peroutka; just look at the number of states on which they have made the ballot. Millions of voters would open a ballot on Election Day and see the names of these four candidates. Yet the news media continues to ignore them.

But even if they were very popular, so what? One purpose of reporting news is reveal things that may otherwise be unknown. Granting more news coverage to candidates on the basis of popularity does the exact opposite. A much more reasonable criterion would be to use the degree of ideological difference between candidates. Compared to the aforementioned third-party candidates, Bush and Kerry's views are not that different. Just visit the campaign and party websites of Badnarik, Nader, Cobb, and Peroutka, and see for yourselves. Ideas are far more important than popularity, as politics is theoretically about ideas and not about people. Even if one accepts that third-party candidates are not electable but only force the major parties to adopt their ideas, that is still no reason to ignore them. And popularity ought to serve only as a "sievebreaker" to pick between candidates with similar views - possibly between Nader and Cobb, for example.

G. K. Chesterton once said that "the democracy has the right to answer questions, but it has no right to ask them. It is still the political aristocracy that asks the questions." The political aristocracy in America - i.e. the Republican and Democratic Parties - has a great deal of control over which questions are asked by ignoring alternate voices, such as through restrictive ballot access and campaign finance laws. Voters have little chance of being exposed to these other viewpoints and instead get a two-party duopoly. But more serious is the direction that the major news sources have taken. Their traditional role in society has been to expose corruption and abuse by those in power, including the silencing of third parties' voices. However, the mainstream news media has effectively joined the political aristocracy by ignoring third parties and presenting elections as if the Republican and Democratic Parties - has made the ballot in a majority of the states. Yet not one of them received an invitation to the Bush-Kerry debate. The firm currently has openings in quantitative analysis, software development, information technology, computer architecture, business development, computational chemistry, accounting, finance, and trading. We're looking for creative but pragmatic people: articulate, curious, and driven. Our working environment is intense but surprisingly casual. We provide unusual opportunities for growth. And we compensate extraordinary people extraordinarily well.
Dire Out of Gas Predictions Meet Economic Realities

By SA M DINKIN

In David Goodstein’s Out of Gas: The End of the Age of Oil, a grim picture is painted of civilization as we know it coming to an end. The basic argument is as follows: “In the 1950s, M. King Hubbert predicted that the rate at which oil would be extracted from wells in the United States would peak around 1970 and decline rapidly after that.” The so-called “Hubbert’s peak” in extraction occurs when about half the oil is gone. Hubbert’s prediction for the US was spot on and extrapolates a global Hubbert’s peak that occurs with sometime between now and 2004.

With prices of oil hovering near $40/barel, everyone is suddenly wondering whether the sky is the limit for the price of oil. This might open up opportunities for clean energy exports (Review: Moonrush http://www.thespacereview.com/article/205/l) and solar satellites.

Goodstein worries that there will be no time to emplace an earthbound “array spread over 200,000 square kilometers” of solar cells when only 10 have been produced so far. Solar cells cost about $3.69 per square meter. So the entire 200,000 kilometers conversion of the Earth to solar power could be produced for $87 trillion. That’s a big number, but the world economy is $50 trillion/year. We do not have to convert all in one year. Recall that at Hubbert’s peak, half the usable oil is still unused.

Goodstein worries that there will be trouble ramping up production in time. This may be the $64 trillion question. IDC figures that by 2008 we will have $208 billion in semiconductor sales. At that rate, it would take centuries to build up enough capital stock to go solar. Oops, it looks like I fell into one of the traps that Goodstein says that geologists fall into, that we will “continue at the same rate we are doing now.” Continuing at the 12% growth rate IDC says we will slow to $208 billion in 2008 from $150 billion in 2004, it will only take 30 years to emplace all the solar cells if the entire industry converts over to producing solar cells by 2008.

Remember that we only need about half as much oil in the transition because we will have nearly half as much solar cells half way through the installation. That means we need only about 15 years of consumption left when we get religion and a sufficient industrial base. We could probably get some gains for mass production that would cut out the costs of the rushed semiconductor production conversion and allow us to make the solar conversion quicker if not cheaper.

If Earth-based solar is good, space-based solar could be better. Goodstein says that about one satellite the size of Manhattan in geosynchronous would do the trick. At $1,000 per kilowatt we would only need to spend $15 trillion or so on launch costs to get 15 billion kilograms of solar cells which would only be 1/4 as much as 200,000 square kilometers because there’s about 4 times as much light up there with no clouds and no night. Throw in another $10 trillion for the cells and some more for the microwave ground stations and we have a pretty good case for solar orbital. We should probably exhaust the case for stratospheric lighter than air solar before we invest, but there are other objections.

One trouble with this plan is that oil, coal, natural gas, and oil sands are so cheap that no one will want to switch away from fossil fuels to solar until they are closer to running out. I have been taught since I was a kid (and Goodstein repeats it) that it is better to use our finite reserve of hydrocarbons to make plastic and pharmaceutica instead of burn it. That makes about as much sense as conserving water. If there was a shortage of plastics expected, the manufacturers would bid up the price of plastic. The economy works great to use resources where they are needed most.

Economics also works great to use resources when they are needed most. Economics predicts that because owners have to be made indifferent between extracting now and extracting later that the price of non-renewable resources will rise roughly at the rate of interest. If it rose faster, it would pay to wait to extract later. If it rose slower, they would pay to extract it all now and put the money in the bank. It is not a big leap from there to say that the price of oil now and the interest rate make a very good predictor of the price of oil for next year and the year after: If in 20 years the price of fossil fuels is still less than the price of bottled water, it will take some effort to get people to switch to solar.

So the markets say that Goodstein is wrong when he predicts a major social upheaval in the transition away from oil. Of course it was also predicting in April that the price would be $0.24/liter (0.04 US$) in 2004. If you don’t believe my calm prediction, buy oil stocks or build a bolt hole somewhere depending on your level of disbelief.

The key argument that Goodstein misses is that he should be looking for Hubbert’s peak for global fossil fuel energy usage instead of for oil. In 2004 before the price of oil spiked, Reuters http://64.233.167.104/ search?cache=PRsyED29q44fWw. enm.com/news/2004-04- 13/22838.aspx+global +energy+demand+and+supply reported that world demand for energy would be up 54% in the next 20 years. Oil use peaking in 2010 is a non-event in the global economy if energy use keeps going up. The normal turnover of automotive capital will switch to whatever becomes the most economical whether it is natural gas or something like hydrogen or direct electric (maybe in the roads) both produced by burning coal.

If the price of oil doubled to $0.80/liter People would take mass transit more. They would maybe use an inboard model for food and order it over the internet to be delivered instead of taking a there-and-back trip to the store. Maybe they would telecommute to work more and have more telemeetings instead of plane trips. They would probably drive a hybrid car and use an LED light instead of an incandescent one. That might reduce oil use by 40% which is right around what economists estimate the long term price elasticity of oil is. People would ride trains, minis and bicycles. It would look a lot like The Netherlands where gasoline is already three times what it is in the United States.

The key argument that Goodstein misses is that he should be looking for Hubbert’s peak for global fossil fuel energy usage instead of for oil... Oil use peaking in 2010 is a non-event in the global economy if energy use keeps going up.”
World Markets Can Solve Energy Crisis

Continued from Page 5, Column 5

I agree with Goodstein that if we continue to burn fossil fuels, we face uncertain consequences about rising sea levels and higher atmospheric temperatures. A prudent government strategy would be to impose a carbon tax to encourage decreased consumption and a switch to nuclear, wind, geothermal, tidal and solar. The size of the carbon tax would have to be really big to make a dent. Energy demand might not drop much unless the price of energy doubled. An oil tax to have much bite would have to be about $0.40/liter to cut it 40%. That would raise nearly $2 trillion a year worldwide. I think it would have to be more than twice that if all other forms of fossil fuels were also taxed. That could raise $9 trillion a year in energy taxes including natural gas, hydrides, and coal. If you recall what trouble the $63 billion that the oil for food program generated, you ain’t seen nothing yet. Since that would be 18% of world GDP, I guess I have to agree that civi­

ization as we know it would be at an end. The income and social security taxes should probably be repealed with such a steep energy tax or at least scaled back to the top few percent of earn­
ers. It probably makes sense to cut the sales tax and value added tax and expand the earned in­come tax credit. A big difficulty in the transition would be my spin on Gae’s law that “Soft­

ware expands to use all available memory and processing power”; govern­

ment spending expands to use up all available money. Anyone at NASA for a carbon tax?

I helped pen an Automobile Manufacturers Association rec­

ommendation for a $0.25/tonne tax on CO2 in 1997 working for Charles River Associates, Inc. That would be a little less than a 1% tax on coal and raise about $250M/year and cut coal use by 2%. Coal use would probably be more inelastic for higher tax levels especially if there was a huge tax on oil and natural gas. We might need about a 100% tax to cut consumption in half taking the price of coal up from about $20 to $40/tonne at the mine which would raise maybe $10B/year in taxes in the US. It’s funny how when coal states are so-called “battlefield” states for the presidential election the candidates are falling over them­selves to provide tens of billions of dollars in coal research subvi­

dies instead.

So much as I would like to believe it, the case is not really there for lunar extraction yet (ex­

cept perhaps for the presidential platforms and ADM’s lobbying agenda). Solar satellites may do better than terrestrial solar, but that is not really relevant until the price of oil hits $0.80/liter or the price of space access drops. So it appears that the energy problem will be little different than growing ball pendulum that Goodstein risks in “The Mechanical Universe” http://

www.physics.caltech.edu/~tmu/

the swings across the Caltech lec­

ture hall and back and always comes a few inches from doing any harm.

Sam Dinkin, B.S. Economics, Caltech, ’91, Ph.D. U of AZ, ’96 is a regular columnist at the Space Review. Hubbert’s Central Texas birthplace has disowned him for talking down the price of oil. The jury is out on Caltech. He can be reached at (888) 4­

Dinkin and ad@dinkin.com.

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MEN’S SOCCER EARNS SECOND STUNNING WIN

GOALKEEPER ELLIOT PALLETT NAMED ATHLETE OF THE WEEK

By MIKE RUPP

The Caltech Men’s Soccer team earned their second win of the season with a stunning 1-0 victory over Southwestern College.

Sophomore Forward Sanjeeb Bose scored off an assist by Sophomore Midfielder Meghan Crowley in the 25th minute in a hard-fought match.

It’s the second win for Men’s Soccer this season, who won a 2-0 decision at Berry College on September 9th.

It’s the first time since 1999 the program has had as many as two wins in a season, and the first time in 15 years the team has recorded two shutouts in a season.

The win came just three days after Caltech had an outstanding first half against Cal Lutheran before eventually falling, 0-6.

Freshman Goalkeeper Elliot Pallett was named Caltech’s Ath­

lete of the Week for his tremendous performances in helping his team to a 1-1 week. Against Cal Lutheran on Wednesday, Pallett had 11 saves, leaving Cal Lu scoreless for the first forty minutes of the match. Then on Saturday against Whittier, he had two saves to preserve the 1-0 victory; Caltech’s 2nd of the season.

Just seven matches into his Caltech career, Pallett already has 46 career saves, and has solidified a key position for the program for years to come.

The Men’s Soccer team’s re­

cord is now 2-5. The team plays its next match this Wednesday at home against Claremont Mudd­

Scrips. The match will begin at 4:00 PM.

The Women’s Volleyball team played two SCIAC opponents this past week, losing to each in three straight games. Against La Verne, one of the top teams in the nation, Senior Kristen Zorn­

man and Sophomore Rebecca Streit lead the way with five kills apiece. Against Claremont M-S, Senior Middle Blocker Delta Rosca had 7 kills. The team plays next Tuesday night at Cal Lutheran.

Sophomore Sam Dinkin, B.S. Economics, Caltech, ’91, Ph.D. U of AZ, ’96 is a regular columnist at the Space Review. Hubbert’s Central Texas birthplace has disowned him for talking down the price of oil. The jury is out on Caltech. He can be reached at (888) 4-Dinkin and ad@dinkin.com.

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Sophomore Sanjeeb Bose scored the winning goal that secured a win against Whittier College for Caltech Men’s Soccer.

MEN’S SOCCER EARNS SECOND STUNNING WIN

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The win came just three days after Caltech had an outstanding first half against Cal Lutheran before eventually falling, 0-6.

Freshman Goalkeeper Elliot Pallett was named Caltech’s Ath­

lete of the Week for his tremendous performances in helping his team to a 1-1 week. Against Cal Lutheran on Wednesday, Pallett had 11 saves, leaving Cal Lu scoreless for the first forty minutes of the match. Then on Saturday against Whittier, he had two saves to preserve the 1-0 victory; Caltech’s 2nd of the season.

Just seven matches into his Caltech career, Pallett already has 46 career saves, and has solidified a key position for the program for years to come.

The Men’s Soccer team’s re­

cord is now 2-5. The team plays its next match this Wednesday at home against Claremont Mudd­

Scrips. The match will begin at 4:00 PM.

The Women’s Volleyball team played two SCIAC opponents this past week, losing to each in three straight games. Against La Verne, one of the top teams in the nation, Senior Kristen Zorn­

man and Sophomore Rebecca Streit lead the way with five kills apiece. Against Claremont M-S, Senior Middle Blocker Delta Rosca had 7 kills. The team plays next Tuesday night at Cal Lutheran.

Sophomore Sanjeeb Bose scored the winning goal that secured a win against Whittier College for Caltech Men’s Soccer.

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Earthquake Engineer Jennings Takes Provostship

Continued from Page 1, Column 5

First, he noted the events that led to the catastrophe. On January 16, 2003, during liftoff, a piece of foam insulation fell from the external fuel tank and struck the left wing of the Columbia, ripping a hole in the far end of the leading edge of the shuttle’s wing. While it happened, however, there was immediate evidence of indication that there was damage. Problems only began to surface at the beginning of the shuttle’s reentry into Earth’s atmosphere. At 8:15 a.m. eastern standard time on February 1, 2003 the shuttle began its deceleration over the Indian Ocean, still without any problems.

Half an hour later, at 8:44, Columbia entered the atmosphere at 16,200 mph (780 ft/s), a speed comparable to that of a bullet fired from a rifle.

Ex-provost Paul Jennings is poised to assume the provostship for the second time in his storied Caltech career. He steps in for the departing Steve Koonin, on a leave of absence to work as chief scientist for a U.-Based chemical company.

The CAIB found that there were several indications of problems during the mission. Observations from the ground showed a piece of debris orbiting with the shuttle. Additionally, scientists expressed concern after seeing video of the foam strike. Unfortunately, their requests for more detailed observations of the left wing were overruled. NASA would have been able to believe the damage the orbiter, stated Dr. Osheroff.

He then explained the reason for this belief. The foam was used on the external fuel tanks for isolation. Machines sprayed it on to the tank, a process that left voids in the foam cover. These voids greatly weakened the foam and caused pieces of it to fail. In fact, isolating foam fell during the launch, and this was considered an acceptable phenomenon. Now that falling foam has been shown to be dangerous, NASA will use heaters instead of foam on the external fuel tank.

Dr. Osheroff highlighted another factor in the accident. The CAIB indicated that NASA culture needs to change. NASA, in turn, has acknowledged. Even making an effort to improve its policies and procedures.

Additionally, Dr. Osheroff described the change in policy caused by the Columbia accident. President Busch has indicated that the United States will shift its focus to the Moon and Mars, with the eventual goal of landing astronauts on Mars.

For its part, the NASA response has been more than swift; the Hubble Space Telescope is being repaired, and America will pull out of the International Space Station as soon as NASA meets its obligations. Also, the Space Transportation System of orbiters is to be phased out by 2004, with the eventual goal of landing astronauts on Mars.

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HERC Web Site Aids Academia's Job Seekers

By JILL PERRY

Colleges and universities in Southern California expect to hire more than 50,000 new employees in the next five years, and a new Web site officially launched September 29 at UCLA will make it easier for job seekers to find those jobs.

The Southern California Higher Education Recruitment Consortium (HERC), an association of 23 public and private colleges and universities in California, including the California Institute of Technology, is sponsoring the first higher education employment Web site in the region, at www.socalherc.org.

The site gives job seekers access to centralized information about thousands of faculty and staff positions at HERC colleges and universities. Previously, job seekers had to visit the Web sites of each college and university to search for these opportunities. Currently there are about 1,500 jobs listed on the site.

"HERC is attempting to deliver a significant economic force in Southern California," said UCLA Chancellor Gene Block. "HERC member campuses have a combined overall budget estimated at over $106 billion, and they employ close to 80,000 faculty, staff, administrative, and executive employees.

"In the next five years, HERC member campuses expect to hire more than 50,000 employees to continue to fulfill our shared mission of educating young people, advancing society through scientific and technological innovation, and developing responses to societal problems in a rapidly changing world," Carnesale added. "In the next 10 years, Southern California HERC campuses will hire over 100,000 new employees.

HERC members include University of California and California community college campuses, and private colleges and universities. Participating campuses are in areas south of Monterey County, from Santa Barbara in the north to San Diego in the south, and as far east as Palm Desert.

Dilohr Gonzales, director of the employment office at Caltech, said universities are often over-

PSA

control and proliferation大大提高。 Further, ubiquitin blocked the cell cycle by preventing two proteins from interacting together. Prior to this, it was thought unlikely that a compound with low molecular weight like ubiquitin—or any future drug—would have much impact on the interaction of proteins in the pathway.

While ubiquitin has other properties that preclude it from being a drug candidate, its stoppage of the cell cycle provides an important clue for future drug development, says Deshaies. "We've found a chemical Achilles' heel in this cell pathway, at least from the viewpoint of these small molecules that comprise most therapeutic drugs."

Because the cell cycle is a complex and highly regulated process, researchers usually pick a simple cell cycle as a target. Then they design a drug that fits the target, and then test it. But given that numerous drugs are involved in this process, the question remained—as specifically was the molecule they were testing working? In short, where was the target?

To find out, Deshaies turned to work they had done over the last five years with ubiquitin, which examined how it interacted with various other proteins, including proteasome. Through a process of elimination, says Deshaies, "we figured out that these small molecules called ubiquitins were blocking the recognition of the ubiquitin chain by the proteasome."

Graphic evidence for how this occurs was provided by a picture taken by David Fushman at the University of Maryland with a nuclear magnetic resonance spectrometer.

This step blocked by ubiquitin involves a protein-protein interaction, a surprise to Deshaies. "One interesting thing about our discovery is that it is further evidence that you can affect a protein-protein interaction at a small molecule. The conventional thinking was that if you look at a footprint of a drug binding to a protein, the drugs are small, but the footprint that corresponds to one protein binding to another is big. So most people thought that the idea of trying to block the footprint of protein-protein interaction with a small drug was extremely unlikely. So if I were asked to predict what we would find, I would never have predicted that a drug could prevent the ubiquitin chain from binding to the proteasome, because I was also influenced by this conventional wisdom."