The California Tech

VOLUME CVI, NUMBER 7 | PASADENA, CALIFORNIA | NOVEMBER 8, 2004

TACIT's *Misanthrope* Show Amuses Crowd

By JON MALMAUD

"I'm not as interested as you suppose in Celimene's discarded gigolos." This rhyming couplet found in TACIT's production of Moulier's *The Misanthrope* is just one example of the wit which runs throughout the comedy. No play purist, TACIT director Shirley Marneus updates the classic French 18th-century play to include 1930s culture, modern language and yes, lesbian lovers.

The Misanthrope is about Alceste, a man so disillusioned by all the false flattery going on around him at the French court that he vows to never lie again. Trouble arises when the pompous noble Oronte asks Alceste for an honest opinion of his latest sonnet. When Alceste gives Oronte his frank opinion (it stinks), Oronte storms off in a rage. Alceste's philosophic friend Philip tries to convince Alceste of the foolishness in "rag[ing] and rant[ing] against the manners of the age", but Alceste continues on in his stubborn resolution to tell the truth a la Jim Carrey in *Liar, Liar*.

Alceste is ironically in love with Celimene, a coquettish young woman who spends all her time flattering people to their faces and gossiping about them behind their backs. Just as Alceste is condemning her for her flirtatious ways, two rival suitors enter the scene: the baron Andrzej and the marquess Claudia. Alceste scolds them all for their hypocrisy and only stops when a messenger arrives to inform Alceste that Oronte has filed a lawsuit against him in retribution for Alceste's jabs about his poem. Meanwhile, the jealous matriarch Lady Arsinoe shows Alceste a love letter from Celimene to Oronte. Celimene's cousin Mei Liang falls for Alceste and Philip falls for Mei Lang. I don't want to spoil the ending but the play ends with a delightful set of scenes which left the audience rolling with laughter.

Ms. Marneus is not content

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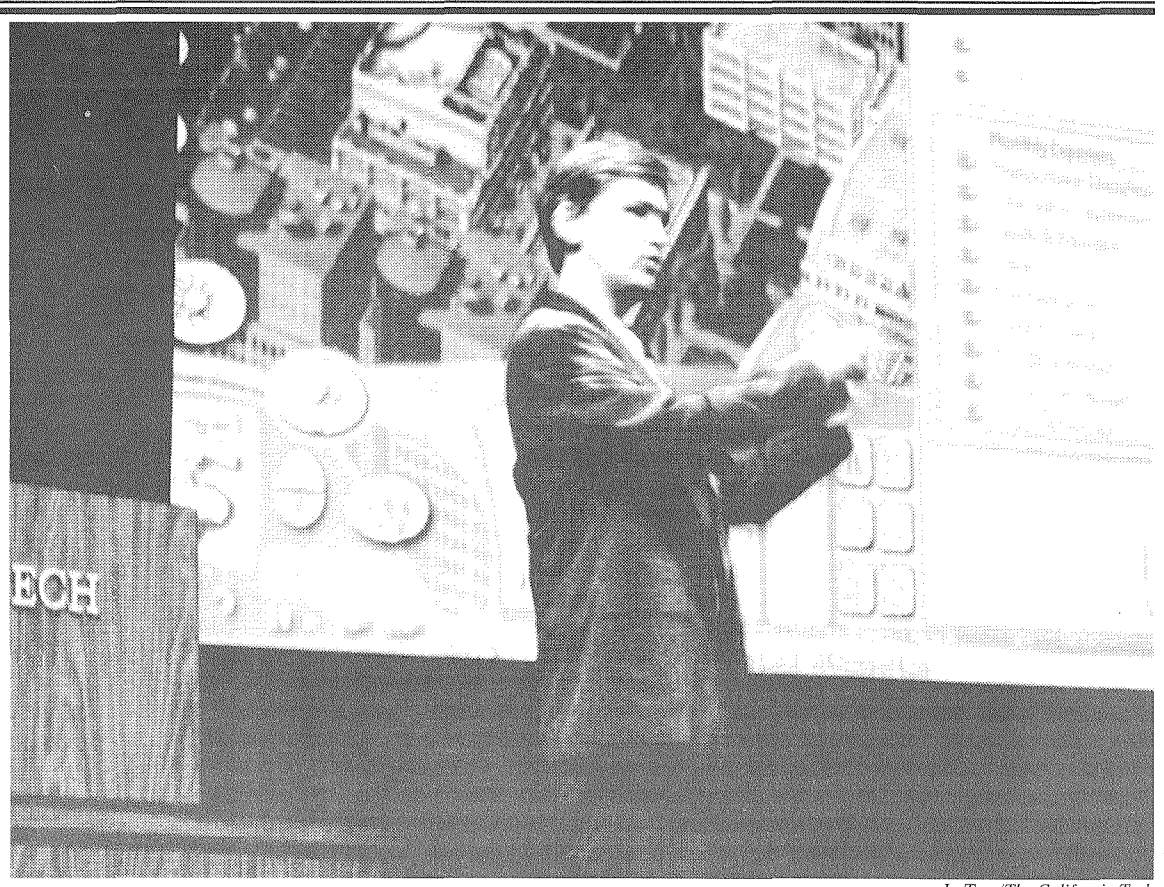

L. Tran/*The California Tech*

Stephen Johnson, author and writer for *Wired* magazine, offers examples of how television shows and computer games such as Sim City have increased in complexity.

Positive Perspective on Modern Culture Offered by *Wired* Writer

By DAVID CHEN

"Everything bad is good for you," was the title of the presentation that Steven Johnson gave November 5th, 2004. Denise Nelson Nash, director of public relations, introduced the premise in Johnson's newest book that popular entertainment, such as television and video games, make us smarter.

Johnson, a contributing writer to *Wired* magazine and other publications, argues that popular entertainment has become more complex over the past 30 years. He terms this progression of increasingly complex entertainment the "sleeper curve."

To illustrate how this name came about, Johnson played a clip from Woody Allen's movie *Sleeper*, in which a man is put into deep sleep and awakened 200 years into the future. The clip shows two scientists in the future discussing how they have proven that food such as chocolate—which were previously considered unhealthy—are actually good for the body. While the movie is clearly a satire, Johnson plays this clip to demonstrate how current thinking may actually be incorrect.

As a counter-example to the hypothesis that popular entertainment decreases our cognitive skills, Johnson presented a hypothetical universe in which video games were made before books. He then read a mock op-ed piece that read, "Reading books chronically under-whelms the senses… Books only require a small portion of the brain and books are tragically isolating. Readers follow a fixed, linear path and simply sit back and take the narrative presented."

While Johnson emphasized that books have value, of course,

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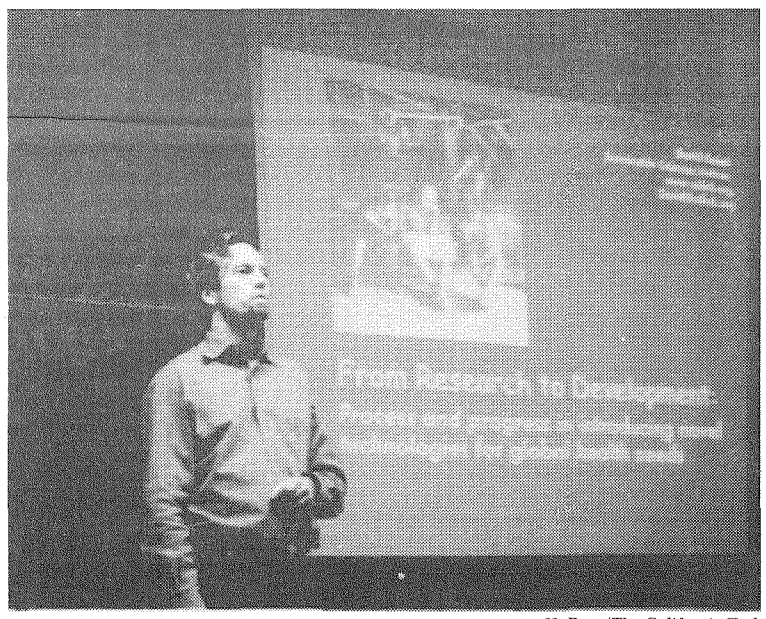

K. Peng/*The California Tech*

David Kaisel, Commercial Development Coordinator for the Sustainable Science Institute, explains the organziation's mission.

SSI Developing Chip For Use In Cheap Medical Diagnostic Tests

By ZHIYUN GUAN

Researching and developing health technologies for developing countries is a process full of complexities and challenges, David Kaisel explained on Thursday in Downs Laboratory. Kaisel reflected on his own experiences as Commercial Development Coordinator for the Sustainable Science Institute, a nonprofit organization focused on public health in the developing world. The lecture was sponsored by Engineers for a Sustainable World @ Caltech as part of a series.

"I've always had a fascination and interest in localizing medical technology for the developing world," Kaisel recounted. His interest led him to his work at SSI, with the goal not only to develop low-cost and efficient technologies but train and enable lab technicians in developing countries to use them.

Infectious diseases account for 43.5% of deaths in these countries, Kaisel pointed out, but only 4.6% of deaths in the developed world. With such a challenge before them, the SSI team needed to make "accurate and effective infectious disease assays and bring them to underserved populations in the developing world," Kaisel said.

The team's current project, ImmunoSensor, is one such diagnostic assay. A "lab on a chip", ImmunoSensor uses paramagnetic beads that can be configured to detect a wide range of molecules in a sample well. The versatility of these beads makes the device more flexible than ELISA (Enzyme-Linked Immunosorbent Assay), a common immunological test. In addition, ImmunoSensor can detect both disease agents and the patient's immune response. With a multiplex assay, the sensor can identify more than one disease at the same time. Currently, the team is working on an even more convenient format for ImmunoSensor's wireless chip.

Although ImmunoSensor has many exciting unique features, Kaisel cautions the audience not to be "dazzled by the technology", since the practical benefits delivered are more important.

Continued on Page 8, Column 1

Water Polo Ranked In NCAA Top 10 Listing

By BRIAN ZHOU

The Caltech men's water polo team lost on Friday, November 5, 2004 to conference rival Occidental 6-14. Despite strong performances from Daniel Oliver with three goals and captain Jason Lee with two goals and two assists, the Beavers could not overcome the same Occidental team that they upset earlier in the season to crack the NCAA Division III top ten. After holding the Occidental offense to a mere one score in the first quarter, Caltech surrendered seven tallies in the second and never regained the deficit.

The water polo team's solid results this year at 3 wins and 14 losses are only outshined by the tremendous success enjoyed in past years. Coming off a near .500 season at 10-14, the team had high expectations to fulfill and big shoes to replace with the graduation of standout seniors, such as team MVP Erik Granstedt, scorer Ben Solecki, second-team all-conference performer Jim Rebesco and defender Kai Sung.

However, a young core of sophomores in Tom Jurczak and Daniel Oliver and senior captain Jason Lee led the team to three early wins, a shocker against Occidental and back-to-back victories against Cal Maritime. The team certainly suffered some tense moments late in games having squeaked out all three victories on single goal margins, including a 14-13 triumph against Cal Maritime in extended time.

The fact that Caltech has enjoyed such success in recent years is astonishing, for its conference, the Southern California Intercollegiate Athletic Conference (SCIAC), boasts a wealth of water polo powerhouses. As of the latest No-

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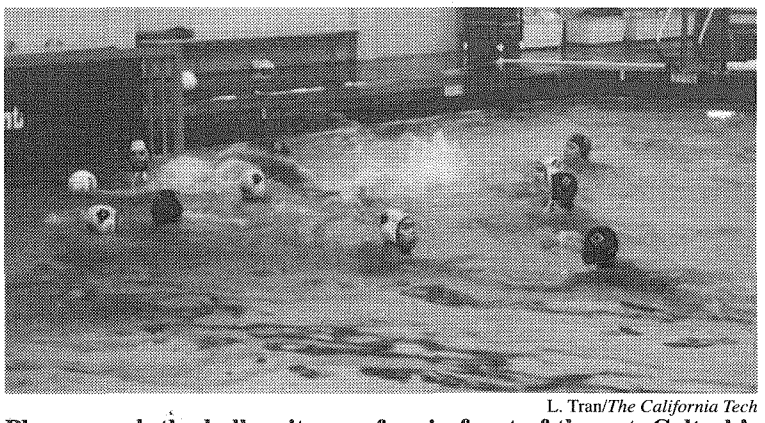


L. Tran/*The California Tech*

Players rush the ball as it pops free in front of the net. Caltech's water polo team has had a disappointing season.

Modern TV, Gaming Teach Thinking Skills

Continued from Page 1, Column 5

he contended that entertainment such as video games also have their own uses, besides the usual off-hand "compliment" that they might improve hand-eye coordination. To introduce these benefits, Johnson emphasized that there are gains from learning the material itself and "collateral learning" benefits.

Johnson explained that video games give the gamers many collateral benefits such as patience and decision-making. As a first example, he mentioned the Grand Theft Auto game series, which involves players exploring vast universes—large enough that someone wrote a walkthrough that is 53,000 words, or about 200 pages, long. With such large amounts of exploring to do, gamers naturally learn to be patient.

Gamers also develop a skill that Johnson calls probing, in which gamers test the system, "and hypothesize what laws are governing the world." Johnson presented a screenshot from SimCity, a game in which the players attempt to create and maintain a city. He emphasized the huge amounts of choices available for the players to try. In addition, he noted that this is the 3rd or 4th best-selling franchise, to show that such games are the norm.

Johnson also presented a screenshot from ESPN baseball, where players act as the general manager and are presented with a list of tasks to do. "We're talking about chores," which children are eager to do in video-game format.

Another skill that Johnson explained is telescopic thinking, when players keep track of numerous levels of objectives. As an example, he presented the goals in Zelda, in which players attempt to defeat Ganon but to do this, the player must first obtain legendary weapons and to obtain this weapon, the player must find the pearl of din, etc. He emphasized the complexity needed to complete each task in a game, requiring players to keep track of nested objectives, including long-term goals and short-term tasks.

While Johnson acknowledged that such an argument may be harder to make in regards to television, he also claims that television shows have become more complex. To illustrate the difference, he noted Postman's Golden Rules for television producers 30 years ago, which required that shows had no perplexity and no prerequisite knowledge from prior episodes.

The primary increase in complexity for television shows has been in the form of multiple plots per episode. For example, an episode from *Dragnet*, a show from the 70s, would involve only one plot per episode. During the early 80s, *Hillstreet Blues* began the trend to include seven or eight plots per episode. In addition, about two of these plots would last through multiple episodes. To further this progression, Johnson showed a plot for an episode of Sopranos. While there are about eight plots still, a single scene can involve multiple plots and plots may require knowledge from more than two episodes ago or even past seasons.

Johnson also explained that the social networks presented in the shows have become more complex. He showed a ten minute clip from episode nine of *Dallas*, a show from the 70s. For today's viewers, the show seemed extremely slow and drawn-out with only one plot introduced during the clip. In contrast, Johnson also showed a five minute clip from *24*, which presents a mind-boggling amount of information in a short period. Each character speaks at rapid-fire speed for about 20 seconds and then the camera quickly moves on. In addition, Johnson emphasized that viewers have to speculate the true natures of the relationships because it is known that an unspecified character is a mole.

Johnson emphasized that our brains have become used to processing so much information this quickly, but this is not information overload. He gave multiple causes for this phenomenon. A big change is that viewers are able to view shows multiple times via television recordings or renting DVDs. In addition, meta-commentary is now easily available through fan sites for television shows and walkthrough for video games.

He explained the myth of the slacker mind, "If people really wanted to be unchallenged, they would have easy games. The opposite is the case. They've gotten harder and harder. We like to get challenged and we like to solve riddles."

Johnson did acknowledge a few clear downsides, however. Popular entertainment has become increasingly violent, although he notes that violent crimes have actually decreased during this period. In addition, these forms of entertainment lack psychological depth and are still not as complex as arguments presented by books.

A new rating system for games based on complexity would be beneficial. Johnson noted that current ratings are only concerned with the sex and violent involved, but the ratings should also note the amount of engagement and problem-solving the games require.

In regards to television, Johnson noted that there are "really terrible shows like *Fear Factor*, which have no redeeming value whatsoever, but shows like *The Apprentice* and *Survivor* have complex relationships."

Johnson quipped that his message was essentially the Atkins diet for pop culture and then he opened the floor to questions.

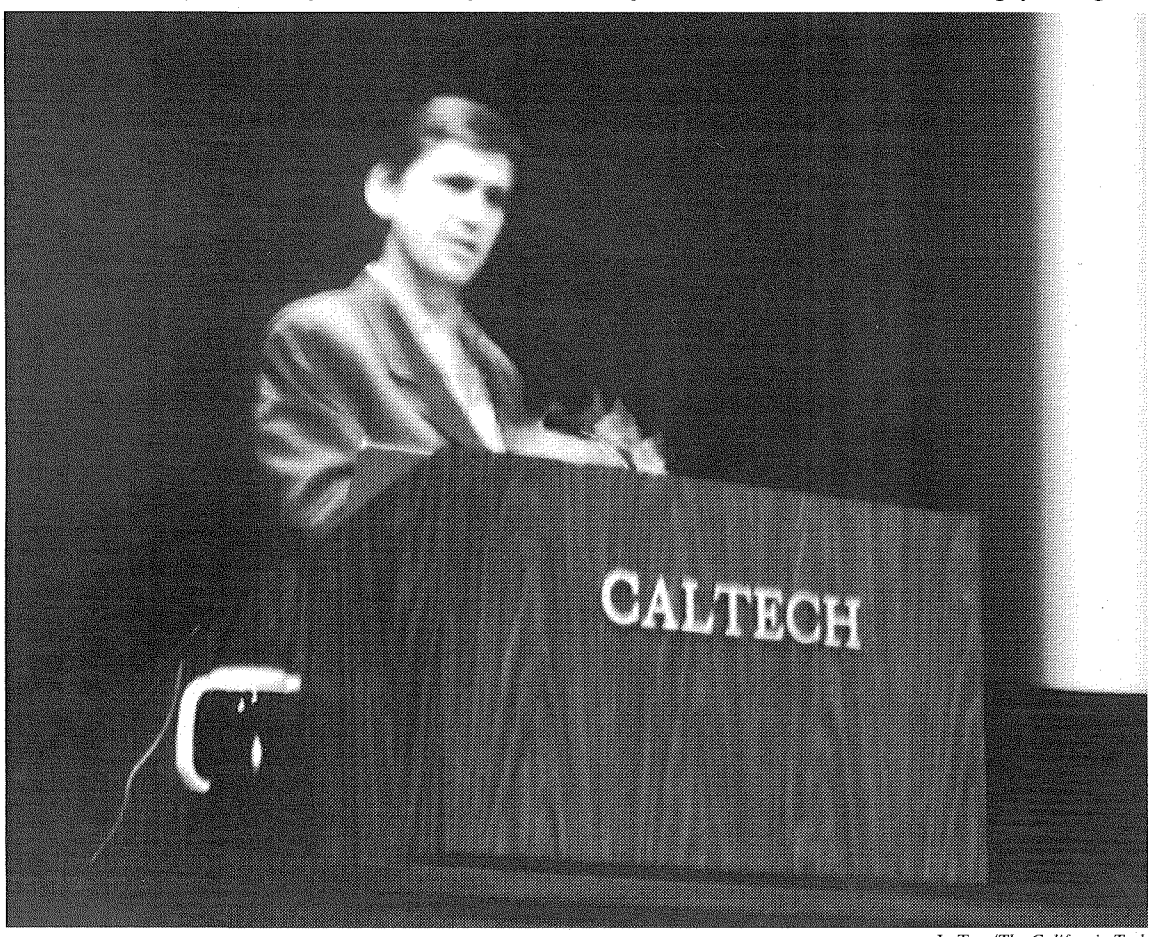
The first question asked if the world's chess champion would have a higher or lower IQ compared to the world's video game champion. Johnson pointed out that the nature of the game mattered. The best doom player would definitely lose, but Johnson contends that the best SimCity player might actually acquire more real-world intellectual ability.

Another audience member, a father of a 13-year-old, presented his grave concern that video gaming causes children to link nervous triggers, such as adrenaline rushes, with scenarios that are impossible in the real world. While Johnson initially deflected this question by noting that his purpose was to present a contrarian argument, he responded that the brain is very sensitive to rewards and games tend to overwhelm these receptors. He noted that while the games can be addicting, games can be beneficial in moderation. "It's an old story… people previously thought television would turn us into idiots."

Another audience member noted that while he found the clip from *24* to be quite complex, a work by Shakespeare would definitely be even more deep. Johnson agreed, noting that entertainment had somehow dumbed down before the 1970s, before becoming complex again.

Johnson was also asked if the value of media, especially music, is diminishing now that users can download and easily share them from de-centralized sources. Johnson noted a *Wired* article by Chris Anderon called "The Long Tail," explaining that the old system allowed a few artists to sell millions, while the other millions of artists sold practically nothing. The new medium allows hobbyists to make a small amount, so while the audience member was concerned by the future, Johnson saw this trend as a positive thing.

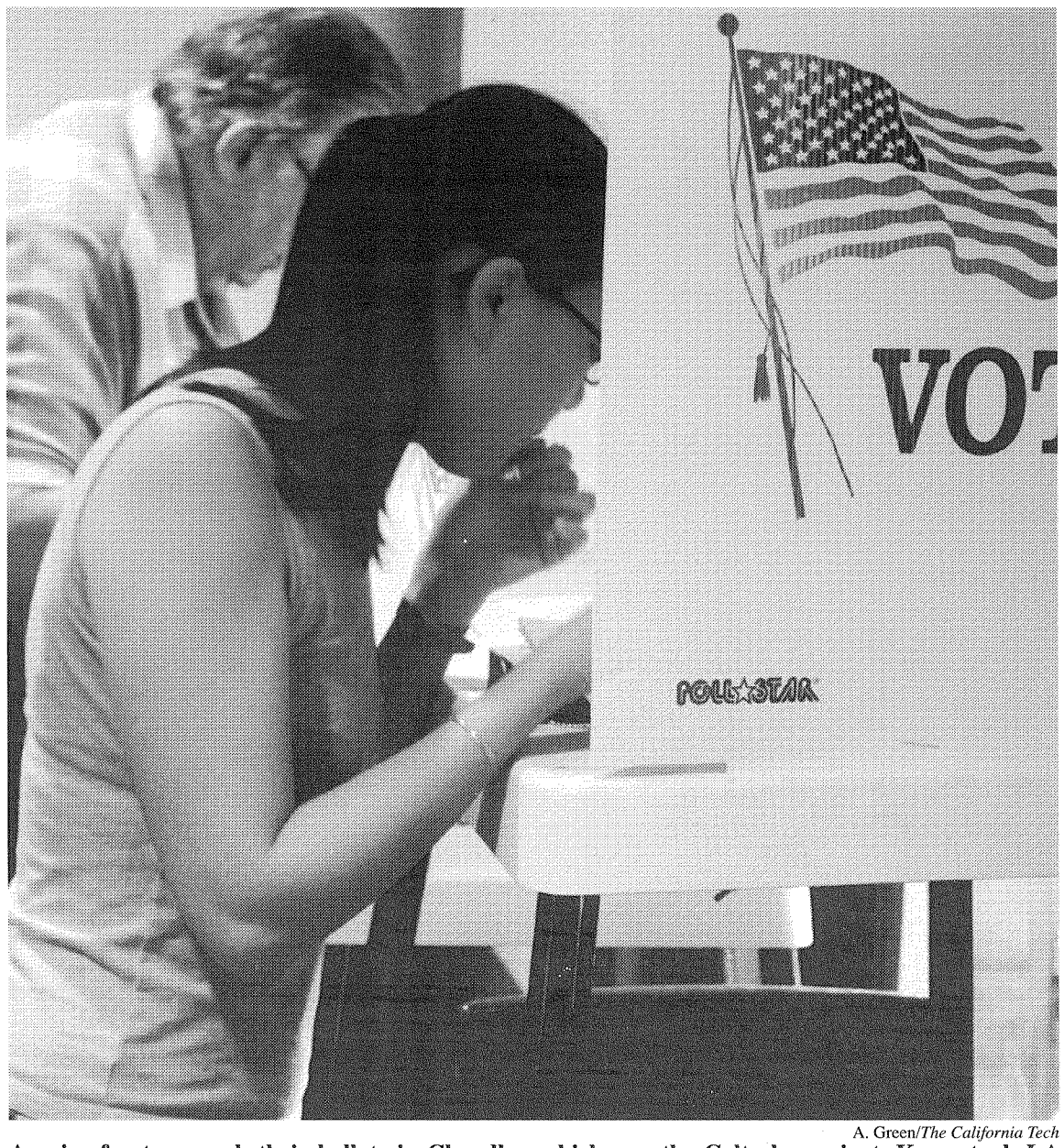
Readers interested in reading more about this topic may visit Johnson's blog. This presentation was the second in the Voices of Vision series for this year.



L. Tran/*The California Tech*

Johnson explains how modern computer games force players to keep track of both short and long term goals. His new book goes into greater detail on this perspective.

Caltech Votes



A. Green/*The California Tech*

A pair of voters mark their ballots in Chandler, which was the Caltech precinct. Kerry took LA County with 63% of the vote.

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Fall Sports Teams Finish Off Seasons, Cross-Country Team Places Third at UCI Invitational

By MIKE RUPP

Caltech Athletics
Weekly Roundup
November 1, 2004

Athlete of the Week: Men's Cross Country's David Rosen

The 5-10 Freshman from Torrance, CA lead the Men's Cross-Country team to a 5th place finish at the SCIAC Championships this past weekend. Rosen's time of 27:10.90 was good for 12th place, and a full minute better than his time from the SCIAC Multi-duals two weeks before. Rosen has been Caltech's top performer all season, leading the team at every meet, and along with fellow Freshman phenom Matt Kiesz has formed a dynamic duo to keep the team competitive for years to come. Congratulations to Rosen and the rest of the team on a great season.

Women's Volleyball Honors Graduating Seniors

The Women's Volleyball team honored its graduating Seniors this past Saturday night at a pre-match ceremony before their home finale against Pomona-Pitzer. Senior Outside Hitter Kristen Zortman, Senior Middle Blocker Delia Davies, and Senior Defensive Specialists Hesper Rego and Vi Tran were each individually recognized by Coach Brent Reger.

Kristen Zortman, a three-sport athlete in her Caltech athletics career, she currently leads the team in total blocks (13) and is second on the team in kills (with 82) and attack-kill percentage. In addition to playing for the Women's Volleyball program the past three seasons, Zortman, has also played for the Men's Baseball team and the Women's Track and Field team.

Delia Davies is currently third on the team in kills (80) and second in blocks (10). A four-year letter-winner for Women's Volleyball, Davies will be featured in next week's senior spotlight.

Vi Tran is another four-year letter-winner for Women's Volleyball. An accomplished setter as well as libero, Tran is second on the team in digs and assists.

Hesper Rego has been a key contributor to the team for the past three seasons. She's currently fourth on the team in digs with 99, and has been a part of the team's top seven lineup all season long.

The team lost to Pomona-Pitzer on Friday and La Verne on Saturday night. The team will wrap up its schedule this week with away matches at Whittier and Redlands.

Cross-County teams finish season at SCIAC Championships places third at UCI Invitational

Lead by Freshman David Rosen's Caltech Athlete of the Week winning performance, the Men's Cross Country team finished fifth at the SCIAC Championships this past weekend. Following Rosen was Freshman Matt Kiesz in 23rd place with a time of 27:54.30, and Junior Gustavo Olm in 36th place, with a time of 28:36.10.

For the Women's team, Junior Ekua Anane-Fenin lead the way in 24th place with a time of 23:07.20. She was followed by Senior Kamalah Chang in 26th place with a time of 23:25.30 and Freshman Krastina Petrova in 39th place who had a time of 24:33.00.

Of special note; for the Men, seven of their top eight runners were Freshmen or Sophomores this season. For the Women, seven of their top nine runners will return next year, and with promising new Freshmen coming in every year, the future of the program is bright.

Congratulations to the whole team on an outstanding season!

Men's Soccer loses to Occidental; Redlands

The Men's Soccer team finished its home schedule with losses to Occidental and Redlands this past week, both by the score of 6-0.

Freshman Goalkeeper Elliott Pallett had identical performances against both opponents from a statistical standpoint. In 180 minutes of playing time this past week, a combined 54 shots were taken by Occidental and Redlands. Pallett responded with 20 saves; ten in each match.

The team will wrap up its regular season this week with an away match at Pomona-Pitzer on Wednesday afternoon. The team will be hosting an Alumni match at the south field Saturday, November 13th at 11:00 AM.

Men's Water Polo loses to La Verne; Whittier

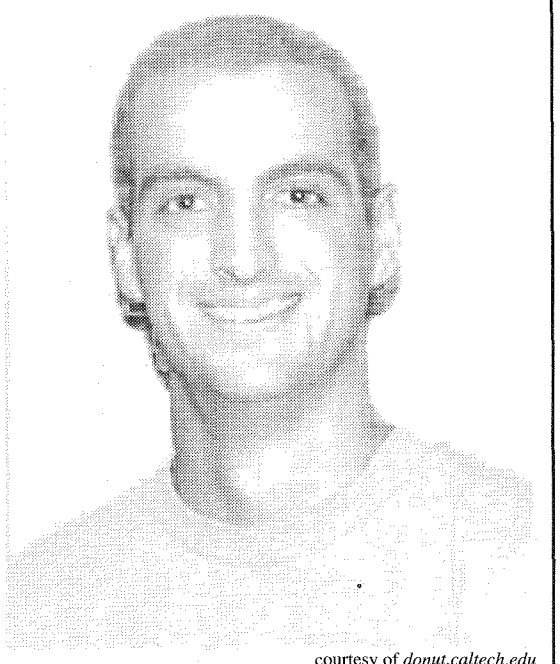
Sophomore Tom Jurczak continued his scoring splurge that earned him Caltech Athlete of the Week honors last week. Jurczak had five goals, three assists, three steals and a block split over the course of two lopsided losses for Caltech, 19-7 against La Verne and 20-7 against Whittier.

Fellow Sophomore Daniel Oliver also had a strong week, with four goals, two assists, eleven errors drawn and one steal.

Sophomore Goalkeeper Kurtis Ras has seen more time in goal as the season has gone on. Ras had six saves in six quarters for the week.

Finally, Senior Jason Lee had three goals for the week.

The team plays its next home match this Saturday against Claremont Mudd-Scripps. The match begins at 11:00 AM.



courtesy of *donut.caltech.edu*

Freshman David Rosen has been a huge asset to the Men's Cross Country team this year, leading them to a 5th place finish at SCIACS.

Nov. 2 Minutes: *litttle T* Happy Hour, Year's Budget Ratified

ASCIT Minutes
November 2, 2004

Present: Ann Bendfeldt, Ryan Farmer, Meng-meng Fu, Shaun Lee, Kelly Lin, Claire Walton, Corinna Zygourakis

Absent: Galen Loram, Kim Popendorf

Guests: Todd Gingrich, Lizz Felnagle

Introduction:
1. Call to Order, 12:10 PM

Money Requests:
2. Todd Gingrich requests $75 to purchase equipment for the Four-Square Club. Vote: 5-0-0 (approved).

Other Business:
3. BoD ratifies the budget decisions made at the previous Saturday's meeting. Vote: 5-0-0 (approved).

4, Editor Lizz Felnagle requests money to host a "*little t* Happy Hour." The event will be held in the Ricketts-Fleming Courtyard from 4-6 pm on this upcoming Friday afternoon and will provide a way for students to mingle and socialize, as well as pick up their *little t*'s! The BoD approves $350 for this event. Vote: 3-1-1 (Shaun against, Ryan abstaining).

5. This term's club checks are out! You should email Kelly Lin (*kyl427@caltech.edu*) with your name, club name, and mailbox code in order to receive your club's check.

Meeting adjourned 12:40 PM.

Respectfully submitted,
Corinna Zygourakis
ASCIT Secretary

Minutes

November at the Women's Center.

Reel Women Series

India: Holy Cow!

Date: Thursday, November 11, Time: 12-1pm; Location: Women's Center located in room 265 of the Center for Student Services.

Adventure Diva, Holly Morris, travels to India encountering women with a strong identity and heritage, including the first woman to reach the top of Mount Everest, a woman who risks her life to help women in a lower caste, a sharp shooting policewoman and that's just to start with! Free pizza and sodas. No RSVP needed. Cosponsored with ISP & OASIS.

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Women's Center Student Programming Board

All undergraduate students are invited to participate in the Women's Center Student Programming Board. The SPB meets regularly to develop and implement programs of interest to the undergraduate women's community. SPB members also participate in outreach and admissions activities throughout the year. If you'd like more information, please contact Jennifer at *jcichock@studaff.caltech.edu*

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Women's Health and Wellness Series

Topic: The Great, the Good and the Ugly: Explore the Key to Healthy Relationships

Date: November 18, Time: 12-1pm

Location: Women's Center located in room 265 of the Center for Student Services. Lita Mercado, from the Los Angeles Commission on Assaults Against Women (LACAAW), will discuss the components of healthy relationships - from value clarification to communication styles. Learn how to spot unhealthy relationships and the skills to do something about it for yourself, a family member, or a friend. Lunch provided.

RSVP required! To sign-up please call ext. 3221 or email:
wcenter@studaff.caltech.edu

Ballroom Dance Club

The beginner international style ballroom class is held Sundays and will continue until November 28th. This class will cover 4 dances and will be taught by CBDC guru Derrick Bass. Instruction is from 4:30 to 6:30 pm in Winnett Lounge and as always no partner or prior dance experience is required! Cost is $50 for the full 8-week series for Caltech students and $80 for the series for non-students.

Our intermediate international style class is taught Thursdays by Caltech's own Tudor Stoenescu and Gwyneth Card. Class begins at 8 pm in Winnett Lounge; the first hour will cover standard and the second will cover latin. The series runs 8 weeks and the cost is $25 for Caltech students, $40 for non-students.

The Ballroom Dance Team will also be offering Team Practice, held each Tuesday in the Braun Gym multipurpose room from 9 to 11 pm. The practice will feature the assistance of a professional coach so that team members can get advice and tips to improve their dancing. Team membership is required and there is a $5 fee to enter the gym if you do not have Caltech/JPL issued ID.

A Merciless Wait Ends for One Cursed Franchise, Another Continues

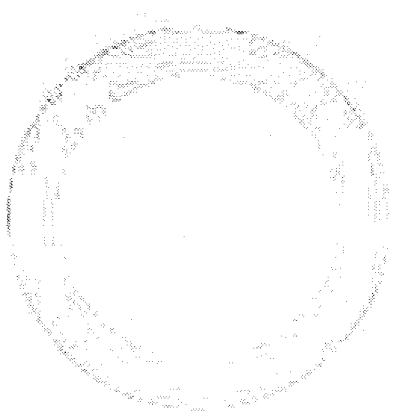
By HARRISON STEIN

In the sports world, 2004 was a year that massive, supposedly never-ending streaks thankfully ended for a number of sports teams and figures. Luckless lefty Phil Mickelson pulled a miraculous comeback in the Masters tournament and broke an ignominious 0-46 streak in major golf tournaments. In June, the Detroit Pistons stunned the Los Angeles Lakers in five mind-boggling games, ending an eight-year stranglehold by the Western Conference over the (L)Eastern Conference. The Cubs had back to back winning seasons for the first time in 31 years (although the season ended very badly). Finally, the Redskins finally ended a bizarre streak that started in 1936 when they first came to Washington. In every election year since, if the Redskins won their last home game before the election, the incumbent president or party would win. Otherwise, the challenger would take the presidency. Alas, even though the Green Bay Packers came into DC and beat the lowly Redskins last Sunday, George W. Bush still won his bid for re-election.

"The playoffs left me with very mixed emotions...We were comforted by the fact that at least one other franchise had as miserable a century as the Cubs."

However, none of these streaks ended in as unlikely a fashion as the most infamous streak in the history of sports. The Boston Red Sox reversed the Curse of the Bambino, won their first World Series in 86 years, and in the process, became the first team in Major League Baseball history to overcome a 3-0 deficit in a seven game series to win. To top it off, they completed this magical quest against the hated New York Yankees, as the Sox beat the Bronx Bombers for the first time ever in a playoff series. Additionally, they finished their season after the Yankees had been eliminated for the first time since 1990.

In the process, the Red Sox gave hope to White Sox, Indians, Browns, Eagles, Flyers, and Knicks fans across the country. Most of all, as a broken Cubs fan, I needed this result to reaffirm my faith in Major League Baseball. To recap: Last year, the Cubs and the Red Sox were each five outs away from reaching what would have been the most exciting and significant World Series ever. The Sox hadn't won the title since 1918 and the Cubs hadn't even been to the World Series since 1945, but if the two played each other, either hell would probably freeze over. Unfortunately, through acts of God (Steve Bartman knocking an out away from Moises Alou) and acts of stupidity (former-Boston manager Grady Little inexplicably leaving Pedro Martinez in one inning too long) we were saddled with Yankees-Marlins, one of the most ho-hum series in recent memory.



courtesy of *http://chicago.cubs.mlb.com*

Both teams recognized how close they were to the pinnacle and began reloading for 2004. The Red Sox added big-game pitcher Curt Schilling, shut-down closer Keith Foulke, and avoided a franchise-killing trade for Alex Rodriguez. The Cubs signed bullpen "ace" LaTroy Hawkins and Hall of Fame pitcher Greg Maddux and traded for Gold Glove, power-hitting first baseman Derrek Lee.

The Cubs and the Red Sox each had promising 2004 seasons that diverged as soon as the two made a blockbuster trade that sent disgruntled superstar shortstop Nomar Garciaparra from the Sox to the Cubs. Karma seemed to switch hands as the Cubs painfully blew seven of their last nine games to lose the Wild Card in the most painful of fashions, to division rival Houston no less. The Red Sox, meanwhile, raced through the regular season and met the Yankees in the American League Championship Series. When the Yankees jumped to a 3-0 advantage, baseball fans across the country were demoralized. America's lovable losers were on the verge of another colossally bitter end, and a brutal series sweep against the Yankees could have set back Red Sox nation another 86 years. Meanwhile, Cubs fans were faced with the prospect of seeing a Yankees-Cardinals World Series, where we could root for only one team: the Umpires.

However, as soon as former Cub Bill Mueller hit the game-tying single off of all-world closer Mariano Rivera, momentum visibly changed hands. David Ortiz finished Game 4 with a blast down left field and Rivera came in and promptly blew Game 5 in a very similar fashion. By the time Ortiz ended that 14-inning thriller with an RBI single, the Yankees were in trouble. The following day, the Bombers faced a desperate situation, down 4-1 in the eighth inning, but instead of finding a way, like all previous Yanks teams had done, this one resorted to cheating. When Alex Rodriguez tapped the ball down the first base line, he averted the pitcher's tag by outstretching his arm and knocking the glove away. The umpires correctly called interference, and the Yankees were done.

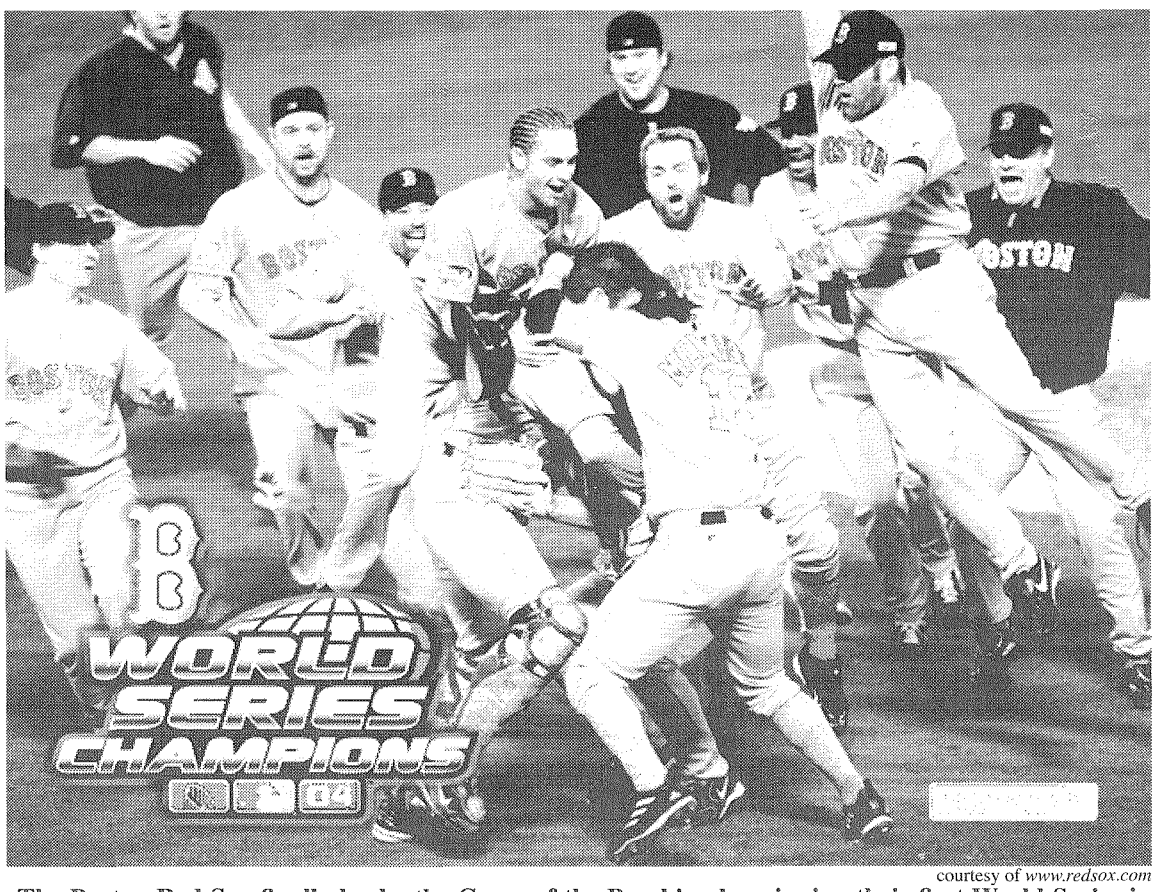
The playoffs left me with very mixed emotions. Sure, the three teams I hate the most in baseball (Astros, Cardinals, Yankees) all made the league championship series and none won the World Series. I got to see the Yankees, a symbol of everything wrong with baseball, lose an insurmountable series lead and become a laughingstock for years to come. I got to see St. Louis, the Cubs' most bitter rival, get humiliated on the grandest stage in one of the least competitive World Series in the last 86 years. Most importantly, I saw there is hope for downtrodden franchises like my Cubs.

On the other hand, Red Sox and Cubs fans endured this painful stretch together. They felt for us when the ball went through Leon Durham's legs and when we lost the Bartman game. We were there for them when the ball went though Bill Buckner's legs and when they lost the Grady Little game. We were comforted by the fact that at least one other franchise had as miserable a century as the Cubs. From now on, we're in this alone. The Red Sox are now just another team with a recent World Series ring.

There's still hope on the horizon

The Cubs will make a run at superstar Carlos Beltran and will undoubtedly get some bullpen help to avoid another collapse like this year. Sammy Sosa is probably gone which is unfortunate because he was the second best player in Cubs history, but at this point, he brings nothing to the table and his bitter and narcissistic attitude detracts from a close-knit team. We still have the best 1-2-3 starting pitchers in the league, as Mark Prior, Carlos Zambrano and Kerry Wood are all Cy Young caliber pitchers and ownership finally seems dedicated to winning.

The Cubs will probably enter 2005 as favorites to win the National League once again, but it remains to be seen whether they can capitalize this time. Regardless, it's still "Wait Til Next Year" on the North Side of Chicago, and for the first time in 86 years, it's "Wait Til This Year" in Boston.



courtesy of *www.redsox.com*

The Boston Red Sox finally broke the Curse of the Bambino by winning their first World Series in 86 years.

The Freshman Rant: On Buildings and Burning Orphans, How Much Are You Willing to Risk to Save One or Both?

By ANDREW KOSITSKY

Would you risk your life to save a building from a bunch of burning orphans?

Over a period of approximately three weeks, over 100 students on campus were asked this provocative question. Most of them responded. Slightly less than half of the students immediately said no, they would let the building burn. In some cases, those asked even wanted to help the building burn. The inquisitive folks got more details on the situation:

You find yourself walking down the street in an unfamiliar town. You look up and notice a nice building on your left. Out of the corner of your eye, something catches your attention. Running down the street, as if they had just fled an orphanage in a great exodus, are approximately 500 burning, filthy little six- and seven-year-olds with napalm on them, obviously beyond hope of survival. In your bewilderment, you run straight into a fire hydrant. As you gather yourself and stand up, you notice that there's a fire hose ready to be used, already spraying water. You also see several boxes of candy and a shotgun. You think that there is approximately a 10 percent chance that you'll lose your life if you try to save the building.

After receiving this information, almost everybody else responded. Half of these individuals said that yes, they would save the building. The other half said no. Two people said that I was a sick, sick man.

What is it about architecture and large structures that would make nearly one-fourth of the Caltech undergraduate population risk their lives to save an inanimate object?

- Thirst for blood: Ricketts. Need I say more?
- Love for architecture and history: when pressured for more information, building turned into a nice building turned into a very nice building, possibly with some historical significance.
- Money: a few people felt that monetary reward or ownership of the building would be enough motivation to risk one's life.
- Nothing better to live for: Mathematicians. Need I say more?
- Lack of hearing: several people, none of them math majors, changed their answer from yes to no after hearing the question the second time. Apparently, they thought they were asked about saving orphans from a burning building.
- Equally interesting, several of the mechanical engineers felt that they would watch the building burn as a means of job security.
- Others, upon hearing that the orphans were unsaveable, reasoned that their lives were worth more than an inanimate object.
- Mmm ... candy ... * drool *

But on a more serious note, the decision to save the building or not may depend on the fundamental assumptions made by those at Caltech. As one student mentioned, there may be sentimental value attached to the building. For example, if the building is an apartment complex, there may be dozens of people whose lives will be shattered if the building is burned. While someone might not risk their life to save a pile of money, the memories and experiences that are associated with a given building might be worth the risk. In the end, there are a number of factors which play into each person's decision to save the building or not. Similar to real life, the information the students received was imperfect; they had to make assumptions about the quality of the tools that were given, the likelihood of death, other possible options, whether it is right to walk away, and the value of their life. The decision has to be intuitive, emotional, and must be made in a split-second, commented another student.

Seventy-five percent of the students at Caltech would rather assume the situation in which they don't need to risk their lives. Twenty-five percent of the students tend to make assumptions that lead toward action rather than inaction. While the situation described concerned saving an inanimate object, the in-the-moment fear and emotions might balance the real world uncertainty of whether or not something is alive within the building. If these statistics are accurate, we have quite a heroic population here at Caltech.

If you have any questions or comments, please e-mail *kositsky@caltech.edu*

A Leader or a President or a Dictator?

By SIMON QUE

George W. Bush supporters cheered and John Kerry supporters lamented after last Tuesday's election. To millions, this election was a big deal, whether it is a victory or a defeat. Both camps seem to believe that if their candidate of choice had been elected president of the United States, everything would be okay for the next four years.

But the attitude that if we just elect one person to the highest office in the land, all of our problems would be solved, is an indication that not everything is okay.

People chatter about who will lead us for the next four years. That "leader" rhetoric betrays a serious lack of understanding of American government. In the United States federal government, power is divided into legislative, executive, and judicial branches. The president is only the head of only one of these branches, the executive branch, and he does not have the power to make laws. That power belongs to Congress, the legislative branch.

In truth, the president of the United States is a "leader" in name only. He can offer advice and ideas to Congress and deliver speeches to the people, but he has few real powers in theory. His veto power (which can still be overruled by Congress) is about as broad as it gets. He is restricted to those powers that the Constitution lays out for the presidency. He can't make laws; he can only approve congressional bills with his signature.

Yet in public discourse, the idea that the president is not a true leader seems to have diminished.

As an example, take the sunset of the so-called "assault weapons" ban on September 13, 2004. Senate leaders did not take the initiative to push for renewal, and Senator John Kerry criticized President Bush for not pushing Congress to renew it. He blamed the hypothetical rise in crime that would follow the sunset of the ban on Bush's failure to tell Congress to renew it.

But wait a minute. Congress isn't a bunch of drones waiting for the President's command. They are autonomous individuals who make their own decisions. The president can present them with ideas that he believes are good and encourage them by saying that he would sign a certain bill if it passed (as was the case with the weapons ban). But if they fail to act, then they are the ones responsible for their own inaction. It's not the president's fault. If the sunset of the ban were really as bad as Kerry made it out to be, then the electorate should vote against their senators and representatives, not against Bush. That's the way it works.

"Yet for all the talk about the Presidency in this election season, there was little mention of the Senate and the House of Representatives races in the public square."

Yet for all the talk about the Presidency in this election season, there was little mention of Senate and House of Representatives races in the public square. Are the people actually paying attention to what their legislators are doing? They are the ones who write and pass laws that would apply to everyone in the U.S. That makes them as significant as the president who signs bills into actual laws. Yet in a poll conducted by the University of New Hampshire Survey Center, 49 percent of likely voters could not name one of their senators, and a whopping 57 percent could not name their representative in the House. Furthermore, according to a study done at George Mason University, only 39 percent of eligible voters voted in the 2002 election, when people voted on senators and congressmen but not on the president. The level of ignorance and apathy about Congress is disturbing.

Americans ought to realize the distinctions between the legislative and executive branches and their importance. The legislative power of Congress prevents a single ruler from writing and enforcing laws without restraint. The veto power of the president makes sure that Congress doesn't get away with writing bad laws. As laid out in the U.S. Constitution, Congress has certain powers, and the president has certain other powers.

Yet Congress has been known to do transfer powers to the presidency. In 2002, Congress voted to grant the president the power to declare war, a power that used to belong exclusively to Congress. This was a dangerous move toward turning the presidency, an office with specifically enumerated powers and roles, into a dictatorship. Take a look at Nazi Germany. In 1933, the Reichstag parliament passed the Enabling Act to give legislative powers to Hitler and his Nazi Cabinet. History books tell us the rest.

The United States is still a long way from a dictatorship. However, it won't remain that way easily. If the people demand a strong leader over a constitutionally limited president, and fail to discern the difference between a president and a leader, keep a close eye on Congress, or understand and appreciate the separation of powers in the federal government, and then there would be little standing in the way of Congress handing legislative powers over to the president, who would then become a president in name only. In reality, he would be a dictator.

Size Does Matter - When It Comes to Reducing Environmental Pollution

By DEBORAH WILLIAMS-HEDGES

PASADENA, Calif.-When it comes to mitigating the harmful impacts of environmental pollution--size does matter . . . or, at least, that's the hypothesis that California Institute of Technology professors Janet Hering and Richard Flagan will be testing.

Hering is professor of environmental science and engineering executive officer for Keck Laboratories. Flagan is executive officer of chemical engineering Irma and Ross McCollum professor of chemical engineering and professor of environmental science and engineering.

In a study funded by the Camille and Henry Dreyfus Foundation, Hering and Flagan will examine whether the effectiveness of iron nanoparticles in pollution remediation is influenced by their size. The $120,000 grant, under the Dreyfus Foundation's 2004 Postdoctoral Program in Environmental Chemistry, will be used to recruit a postdoctoral scientist to conduct research in environmental chemistry.

Specifically, the researchers will utilize this grant to examine effective strategies for reduction and mitigation of environmental pollutants in aquatic ecosystems. Ultimately, the study seeks to help provide viable, cost-effective commercial technologies for the remediation of certain contaminants, including groundwater contaminants, chlorinated solvents, nitrates, pesticides, various chemical by-products, residue created in manufacturing, and other industrial or inorganic contaminants.

The study, "Use of Vapor-Phase Synthesized Iron Nanoparticles to Examine Nanoscale Reactivity," will investigate whether reactivity and effectiveness of iron nanoparticles, in pollution mitigation, are influenced by their size. The study will compare particles in different size classes to determine whether nanoparticles exhibit enhanced reactivity in the reduction of organic substrates based on their size when surface area effects are accounted for.

Elemental iron [Fe(0)], or zero-valent iron, has been demonstrated to be an effective reductant for a wide range of environmental contaminants, including both organic and inorganic contaminants. Upon reaction with Fe(0), some contaminants can be transformed to products that are non-toxic or immobile. Fe(0) can be delivered to the subsurface environment by injection of Fe(0) nanoparticles.

If research results yield a conclusion that the size of Fe(0) nanoparticles does make a difference in their reactivity or effectiveness, then this finding will have a significant effect on the application of Fe(0) materials in environmental remediation and will provide insight into the fundamental chemical properties and behavior of nanoparticles in these applications.

Created in 1946, the Camille and Henry Dreyfus Foundation bears the names of modern chemistry pioneers Drs. Camille Dreyfus and his brother Henry. The foundation's mandate is "to advance the science of chemistry, chemical engineering, and related sciences as a means of improving human relations and circumstances throughout the world." The foundation directs much of its resources to the support of excellence in teaching and research by outstanding chemistry faculty at universities and colleges.

Nominations for 2005 Feynman Teaching Prize Welcome

By PAUL C. JENNINGS

I am pleased to solicit nominations for the Richard P. Feynman Prize for Excellence in Teaching. The Feynman Prize is endowed through the generosity of Ione and Robert E. Paradise, with additional contributions from Mr. and Mrs. William H. Hurt, to annually honor a professor who demonstrates, in the broadest sense, unusual ability, creativity, and innovation in undergraduate and graduate classroom or laboratory teaching.

Nominations for the Feynman Teaching Prize are welcome from faculty, students, postdoctoral scholars, staff, and alumni. Guidelines for the prize are attached. Please submit detailed nomination packages to the Provost's Office by December 30, 2004.

Former Feynman Prize Recipients:

2003-04: George Rossman, Mineralogy

2002-03: Niles Pierce, Applied and Computational Mathematics

2001-02: Joseph Kirschvink, Geobiology

2000-01: David Stevenson, Planetary Science

1999-00: Donald Cohen, Applied Mathematics

1998-99: Emlyn Hughes, Physics

1997-98: Barbara Imperiali, Chemistry

1996-97: R. David Middlebrook, Electrical Engineering

1995-96: Yaser Abu-Mostafa, Electrical Engineering and Computer Science

1994-95: Erik Antonsson, Mechanical Engineering

1993-94: Tom Tombrello, Basic and Applied Physics

RICHARD P. FEYNMAN PRIZE FOR EXCELLENCE IN TEACHING

CRITERIA FOR THE PRIZE:

The Richard P. Feynman Prize in teaching is to be awarded annually to a professor who demonstrates, in the broadest sense, unusual ability, creativity, and innovation in undergraduate and graduate classroom or laboratory teaching.

ORIGIN OF THE PRIZE:

The prize is made possible by a gift of endowment by Ione and Robert E. Paradise, with additional contributions from Mr. and Mrs. William H. Hurt, in appreciation of Richard Feynman's contributions to excellent teaching.

TERMS OF THE PRIZE:

The prize consists of a cash award of $3,500, matched by an equivalent raise in the annual salary of the awardee.

ELIGIBILITY:

All professorial faculty of the Institute are eligible.

NOMINATIONS FOR THE PRIZE:

Nominations for the Feynman Prize may be made by any member of the Caltech community, including faculty, students, postdoctoral scholars, alumni, and staff. A letter of nomination and detailed supporting material (including, but not limited to, a curriculum vitae, course syllabus or description, and supporting recommendation letters) should be directed to the Office of the Provost, Mail Code 206-31, at the California Institute of Technology, Pasadena, California, 91125. The Provost's Office will compile teaching evaluations for all nominees for courses taught during the prior academic year. Nomination packages are due by December 30.

RENOMINATIONS:

Nominees not selected in a given year will be considered part of the nomination pool for each of the following two years. New material is not required for renomination, but will be accepted. Consideration of a nominee after three years will require renomination.

SELECTION:

Selection of the recipient will be made by a committee appointed by the Provost. The committee chair and members will be rotated frequently to reflect all segments of the Institute. The committee shall consist of three professorial faculty, and one representative each from the undergraduate student body and the graduate student body.

PRESENTATION OF THE PRIZE:

The Feynman Prize will be presented at a regular meeting of the Caltech faculty in the second term. In addition, the awardee will be honored at a small celebratory dinner or other suitable event with a few colleagues and members of the administration, and the donors of the prize.

Further information regarding the prize or nomination procedure can be obtained from Stacey Scoville in the Provost's Office (626-395-6320; staceys@caltech.edu).

Scholarships

The Financial Aid Office has applications and/or information on the following as well as additional undergraduate scholarships. All qualified students are encouraged to apply. Our office is located in the Center for Student Services M/C 110-87. Please see our website for more information: *www.finaid.caltech.edu/news.html*.

The Swedish Club of Los Angeles offers two $2,000 Scholarships: "The Glenn T. Seaborg" scholarship in Science, and the "Walter G. Danielson scholarship" in International Relations and Diplomacy. Requirements include: a transcript, letters of recommendation from two professors, a resume, and a statement of goals. Juniors, seniors, and graduate students are eligible. Application information is available in the Financial Aid Office.

The 2005 Olive W. Garvey Fellowships are now available. This fellowship, available to both graduate and undergraduate students, is awarded based on the best essay on the topic: "The great aim of the struggle for liberty has been equality before the law." The deadline is May 1, 2005. For further information visit: *http://www.independent.org/students/garvey*

American Public Power Association "APPA" has DEED Student Research Grants and Internships available. Each year up to ten, $4,000 student research grants and internships are awarded to students conducting research on an energy-related project. Students in energy-related disciplines are eligible. Students must obtain a DEED member sponser for their student research grant or internship. Applications are accepted January 15 and July 15 each year. For more information visit: *http://www.appanet.org/res*

Citizens for Global Solutions is holding a FLASH Movie Contest "Global Solutions for a New Year." The top prize is $1,000. Please visit: *http://advocacy.globalsolutions.org*

The Minerals, Metals & Materials Society "TMS" offers a variety of scholarships. To preview scholarship eligibility and deadline information visit:
www.tms.org/Students/AwardsPrograms/Scholarships.html

The Glamour Magazine's 2005 Top Ten College Women Competition has begun. The competition is open to all full-time female juniors regardless of major or GPA. Applications are available at:
www.us.glamour.com/images/features/04011application.lo.pdf. All entries must be postmarked by February 10, 2005.

The Mensa Education & Research Foundation Scholarship Essay Contest is available to students who will be or are enrolled in any accredited U.S. institution of postsecondary education for the 2005 fall term. Scholarships range from $300 to $4,000. Additional information and the entry form are available via the internet:*www.ocmensa.org*. The deadline to apply is December 31, 2004

The Pauletta and Denzel Washington Family Gifted Scholars Program in Neuroscience is available to one undergraduate and one graduate or medical student. The primary purpose of this award is to mentor and encourage young, potential scientists and physicians to enter the field of neurological research. Additional information regarding the program as well as the application may be viewed by going to *www.cedars-sinai.edu*. The deadline to apply is January 1, 2005

The Society of Plastics Engineers offers 10-12 undergraduate scholarships. Please visit their website for deadlines, scholarship guidelines and applications: *www.4spe.org*

The Excellence in 3D Animation Award is a $1,000 cash gift awarded quarterly by Troy Studios to encourage students to pursue Graphics Ars and Animation. Award winners are chosen based on their entries in a contest. The contest is open to all students of all nations, regardless of field of study. To enter the contest, students should download free software from the *www.animoids.com website*.

Please visit their website for more detailed information. There are four quarterly deadlines each year (Feb 28, May 31, Aug 31, and Nov 30)

The Measurement Science Conference (MSC) has established a scholarship to fund students in an Engineering, Science or Quality Assurance degree program. The scholarship program places emphasis on experience or accomplishments related to the application or advancement of measurement science technology. To be considered for one of five, $1,000 scholarships, individuals must: have completed at least 24 units of upper division courses in an Engineering or Science Degree Program or five courses in a Masters Program in Quality Assurance; have an overall grade point average of 3.2 or greater; be a U.S. citizen; be able to attend the Measurement Science Conference on January 21, 2005 in Anaheim. Submit an application before November 30, 2004. Applications are available in the Financial Aid Office.

Educaid is offering their "DoubleTake" Sweepstakes. Win two $2,500 scholarships - One for you and one for your school. Applications are available in the Financial Aid Office, or on Educaid's website: *https://www.educaid.com/doubletake*

The John Gyles Education Awards of $3000 are available to full Canadian or American citizens who are studying all areas of postsecondary study. A minimum GPA of 2.7 is required. Criteria other than strictly academic ability and financial need are considered in the selective process. Filing dates for mailing applications in 2004 are April 1, June 1 and November 15, 2004.

To receive an application, send only a stamped (US 37¢) self-addressed envelope to:

John Gyles Education Awards
Attn: The Secretary
P.O. Box 4808
712 Riverside Drive
Fredericton, New Brunswick
Canada E3B 5GA

If you are a college student who is interested in becoming a naval officer when you graduate, you could apply for the Baccalaureate Degree Completion Program (BDCP). This program pays future naval officers a monthly salary while they are still attending college. Qualified technical majors can receive a salary of approximately $1,500 per month for up to three years prior to graduation and qualified non-technical majors can receive this salary for up to two years prior to graduation. Additional information is available at: *www.navy.com*.

The National Council of Jewish Women/Los Angeles provides a variety of scholarships year-round for women, regardless of religious belief or ethnic background, who reside in Los Angeles County. The organization focuses on each applicant's dedication to her chosen path and her financial need. Applications are available in the Financial Aid Office. For more information visit: *www.ncjwla.org/*.

The Air Force Reserve Officer Training Corps (AFROTC) offers 2 year to 3.5 year scholarships in all majors. The scholarships are generally capped at $15,000 per academic year towards tuition and fees, with an annual book allowance of $480 and $200/month stipend during the school year. Full-time student status, AFROTC program involvement, and a minimum of 2.5 cumulative GPA is required to be eligible. For more information visit *www.afrotc.com*

Astronomers Classify Type of Cosmic Burst

By ROBERT TINDOL

PASADENA, Calif.-Astronomers have identified a new class of cosmic explosions that are more powerful than supernovae but considerably weaker than most gamma-ray bursts. The discovery strongly suggests a continuum between the two previously-known classes of explosions.

In a past issue of Nature, astronomers from the Space Research Institute of the Russian Academy of Sciences and the California Institute of Technology announce in two related papers the discovery of the explosion, which was first detected on December 3, 2003, by the European-Russian Integral satellite and then observed in detail at ground-based radio and optical observatories. The burst, known by its birthdate, GRB031203, appeared in the constellation Puppis and is about 1.6 billion light-years away.

Although the burst was the closest gamma-ray burst to Earth ever studied (all the others have been several billion light-years away), researchers noticed that the explosion was extremely faint--releasing only about one-thousandth of the gamma rays of a typical gamma-ray burst. However, the burst was also much brighter than supernovae explosions, which led to the conclusion that a new type of explosion had been found.

Both supernovae and the rare but brilliant gamma-ray bursts are cosmic explosions marking the deaths of massive stars. Astronomers have long wondered what causes the seemingly dramatic differences between these events. The question of how stars die is currently a major focus of stellar research and is particularly directed toward the energetic explosions that destroy a star in one cataclysmic event.

Stars are powered by the fusion ("burning") of hydrogen in their interiors. Upon exhaustion of fuel in the interior, the core of massive stars collapse to compact objects--typically a neutron star and occasionally a black hole. The energy released as a result of the collapse explodes the outer layers, the visible manifestation of which is a supernova. In this process, new elements are added to the inventory of matter in the universe.

However, this nuclear energy may be insufficient to power the supernova explosions. One theory is that additional energy is generated from the matter falling onto the newly produced black hole. Many astronomers believe that this is what powers the luminous gamma-ray bursts.

But the connection between such extreme events and the more common supernovae is not yet clear and if they are indeed closely related, then there should be a continuum of cosmic explosions, ranging in energy from that of "ordinary" supernovae to that of gamma-ray bursts.

In 1998, astronomers discovered an extremely faint gamma-ray burst, GRB 980425, coincident with a nearby luminous supernova. The supernova, SN 1998bw, also showed evidence for an underlying engine, albeit a very weak one. The question that arose was whether the event, GRB 980425/SN 1998bw, was a "freak" explosion or whether it was indicative of a larger population of low-powered cosmic explosions with characteristics in between the cosmological gamma-ray bursts and typical supernovae.

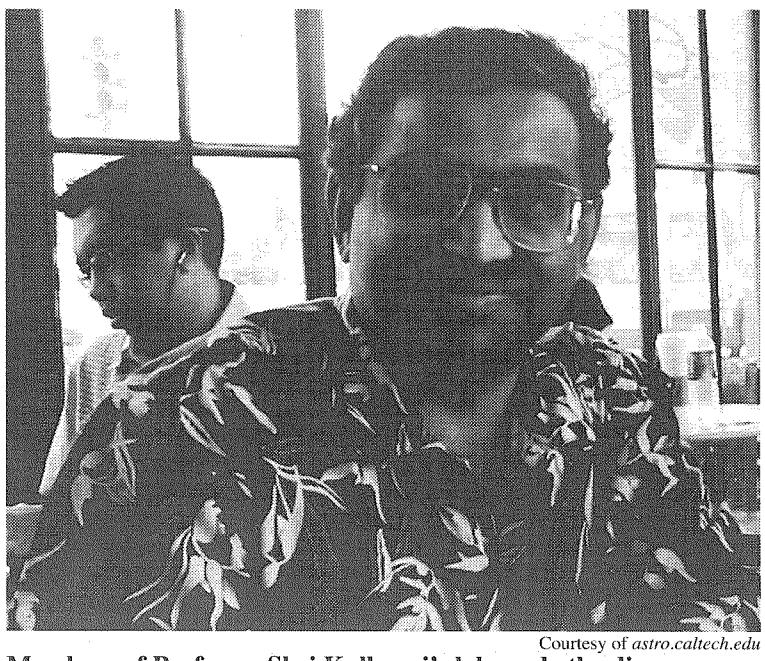
"I knew this was an exciting find because even though this was the nearest gamma-ray burst to date, the gamma-ray energy measured by Integral is one thousand times fainter than typical cosmological gamma-ray bursts," says Sergey Sazonov of the Space Research Institute, the first author of one of the two Nature papers.

The event was studied in further detail by the Chandra X-Ray Observatory and the Very Large Array, a radio telescope facility located in New Mexico.

"I was stunned that my observations from the Very Large Arr ray showed that this event confirmed the existence of a new class of bursts," says graduate student Alicia Soderberg, who is the principal author of the other Nature paper. "It was like hitting the jackpot."

There are several exciting implications of this discovery, including the possible existence of a significant new population of low-luminosity gamma-ray bursts lurking within the nearby universe, said Shrinivas Kulkarni, who is the MacArthur Professor of Astronomy and Planetary Science at Caltech and Soderberg's faculty adviser.

"This is an intriguing discovery," says Kulkarni. "I expect a treasure trove of such events to be identified by NASA's Swift mission scheduled to be launched this fall from Cape Canaveral. I am convinced that further discoveries and studies of this new class of hybrid events will forward our understanding of the death of massive stars."



Courtesy of *astro.caltech.edu*

Members of Professor Shri Kulkarni's lab made the discovery using data found initially by the European-Russian Integral probe.

TACIT Puts Modern Adaptation To Moliere's Centuries Old Satire

Continued from Page 1, Column 2

to merely replay a centuries-old French satire but has updated the play to reflect modern and especially Techer, society. For one thing, the set is definitely not from some French châteaux. "We've set it in the 30s", she says. "It's a fairly sophisticated age laden in manners." The setting is a fictional minor, last-century French kingdom. From the issues of Vanity Fair lying about the set, to the nude male statue on the dining table, to the Art Deco mirrors on the wall, the set gleams with a remarkably coherent 30s feel. Costume design blends in as well--tweed sweaters and plaid suits adorn the main characters while Celimene dawns a provocatively low-cut dress and Andrzej is ripe with medallions and capes.

Marneus also tried to "stress the international nature of our campus." Caucasian, African-American, Asian and Hispanic actors flesh out the society of nobles. While some may point out the questionable logic behind having the blond coquette's cousin being a black-haired Asian, it does remind us that no ethnicity is exempt from Alceste's criticisms of hypocrisy. And who could resist chuckling when Mei Ling walks into the drawing room with her dazzling blue kimono among a room filled with corsets and vests?

To truly replicate modern society, Marneus also substituted the lesbian suitor Claudia to replace what was a male suitor of Celimene in the original. In one evocative scene Claudia begins to stroke the sleeping Celimene's legs. At times it seems to be an overdrawn attempt at being avant-garde but at other times blends with the 'modern society' feel of the play. As Marneus succinctly states, "it fits."

Speaking of casting, the actors do a marvelous job. Alceste is played by David Seal, an MIT graduate who is one of the leads on JPL's Cassini missions to Saturn. The other roles are filled by other Caltech staff members, grad students and undergrads. While an occasional line was flubbed, the cast has been preparing for six arduous weeks and certainly don't have the amateurish quality many of us associate with school plays from high school. Most have performed in TACIT for at least a year. Ms. Marneus has been directing Caltech theater for nearly forty years even since leaving NBC Studios and introduces a professional level of quality. The play is definitely a bargain at just $5 for Caltech students.

The play is largely a Shakespeare-meets-Seinfeld comedy of several plots and hilariously exaggerated characters. You can come for the laughs and leave satisfied but you could also try to take away Moulier's deeper meaning and moral lessons. After all, says Marneus, "people have not really changed [since the 18th century]...We are [still] dedicated to good manners." Alceste is doomed to fail in society since he refuses to compromise at all for the sake of good manners.. Towards the end Celimene turns down Alceste's offer to retreat from society together. "Must you have me and all the world besides?", Alceste glumly responds. Certainly, Moliere suggests, it is ridiculous to believe your loved ones should ignore the rest of the world for you. According to Philip, however, "there's no greater problem...than trying to reform society." "Not that you shouldn't try sometimes", Marneus is quick to add privately.

Anyone can enjoy this play. Its language is modern and understanding the simple verse requires no great cognitive labor. "The play was easily accessible and showed polish", according to Lingfeng Yang, a freshman here. After all, says Marneus, "Caltech students are right up there. They're smart enough to understand just about anything. If you can get them to pay attention." Indeed, this charming play will keep your attention throughout its approximately 2:15 running time.

The Misanthrope will be performed on the 12th, 13th, 19th and 20th of this month at 8 p.m. and on the 7th, 14th and 21st at 2 p.m. in the newly-renovated Dabney Lounge. Tickets are $5.00 for students, $10 for faculty and staff and $15 for general admission. They can be purchased at the box office or at the door. More information can be found on the TACIT website at tacit.caltech.edu.

The TACIT season continues later this year with Shakespeare's *Measure for Measure* in the winter and a student-written play in the spring. Any member of the Caltech community interested in working on or off-stage is encouraged to e-mail tacit@caltech.edu. Marneus warns that TACIT isn't a standard Caltech course. "I'm not standing up lecturing a class. It's called 'let's do it' instead."

'Mini' Brain Signals Significant

By MARK WHEELER

PASADENA, Calif. - The brain is a maddeningly complex organ for scientists to understand. No assumption can remain unchallenged, no given taken as a given.

Take "minis" for example. That is, miniature excitatory synaptic events. The location where neurons communicate with each other is the synapse, the tiny gap between the ends of nerve fibers. That's where one nerve cell signals another by secreting special chemicals called neurotransmitters, which jump the gap. The synapse and its ability to strengthen and wane, is thought to be at the heart of learning and memory. Minis, mere single, tiny packets of neurotransmitters, were always thought to have no biological significance, nothing more than "noise," or background chatter that played no role in the formation of a memory. Minis, it was thought, could be safely ignored.

Maybe not, says Mike Sutton, a postdoctoral scholar in the lab of Erin Schuman, an associate professor of biology at the California Institute of Technology and an associate investigator for the Howard Hughes Medical Institute. Sutton, Schuman and colleagues Nicholas Wall and Girish Aakalu report that on the contrary, minis may play an important role in regulating protein synthesis in the brain. Further, their work suggests the brain is a much more sensitive organ than originally perceived, sensitive to the tiniest of chemical signals. Their report appears in the June 25th issue of the journal Science.

Originally, Sutton et. al. weren't looking at minis at all, but at protein synthesis, the process through which cells assemble amino acids into proteins according to the genetic information contained within that cell's DNA. Proteins are the body's workhorses and are required for the structure, function and regulation of cells, tissues and organs. Every protein has a unique function.

A neuron is composed of tree-like branches that extend from the cell body. Numerous branches called dendrites contain numerous synapses that receive signals, while another single branch called an axon passes the signal on to another cell.

Using several different drugs, Sutton first blocked any so-called action potentials, an electrical signal in the sending cell that causes the release of the neurotransmitter glutamate. Normally, a cell will fire hundreds of times each second. When blocked, it only fires once every few seconds. Next he blocked both the action potential and the release of any minis. "To our surprise, the presence or absence of minis had a very large impact on protein synthesis in dendrites," he says. It turned out that the minis inhibit protein synthesis, which increased when the minis were blocked. Further, says Sutton, "it appears the changes in synaptic activity that are needed to alter protein synthesis in dendrites are extremely small--a single package of glutamate is sufficient."

Sutton notes that it is widely accepted that synaptic transmission involves the release of different numbers of glutamate packets. That is, an individual packet (called a vesicle) represents the elemental unit of synaptic communication. "This is known as the 'quantal' nature of synaptic transmission," he says, "and each packet is referred to as a quantum. The study demonstrates, then, the surprising point that protein synthesis in dendrites is extremely sensitive to changes in synaptic activity even when those changes represent a single neurotransmitter quantum.

"Because it's so sensitive," says Sutton, "there is the possibility that minis provide information about the characteristics of a given synapse (for example, is the signal big or small?) and that the postsynaptic or receiving cell might use this information to change the composition of that synapse. And it does this by changing the complement of proteins that are locally synthesized."

The ability to rapidly make more or fewer proteins at a synaptic site allows for quick changes in synaptic strength. Ultimately, he says, this ability may underlie long-term memory storage.

"It's amazing to us that these signals, long regarded by many as synaptic 'noise,' have such a dramatic impact on protein synthesis," says Schuman. "We're excited by the possibility that minis can change the local synaptic landscape. Figuring out the nature of the intracellular 'sensor' for these tiny events is now the big question."

Water Polo Successes Despite Inexperience

Continued from Page 1, Column 5

vember national poll, five of the top eight Division III water polo teams belong to SCIAC, including top-ranked University of Redlands and second-ranked Whittier College. Indeed, Caltech faces some of the stiffest competition in the country game in, game out and hard-fought losses, such as a 6-10 fall to fifth-ranked Pomona-Pitzer, should not be simply discarded to the loss column.

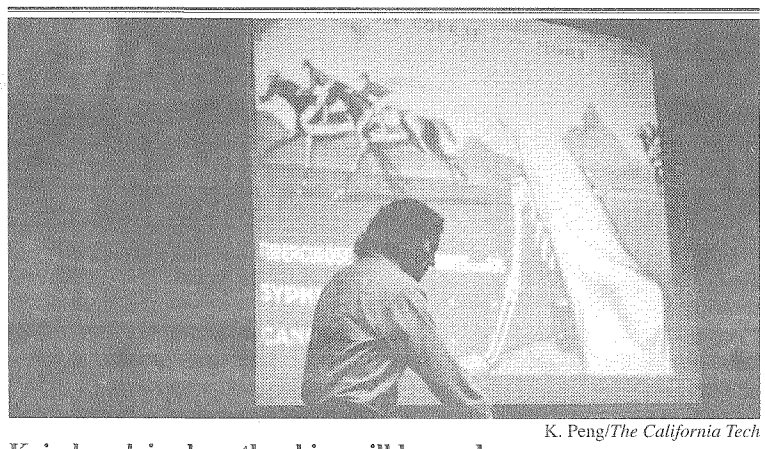
Predictably, the Division I water polo scene is also dominated by California schools, which hold the top nine spots, led by UCLA , Stanford and USC. Oliver explains the popularity and strength of California water polo, "It's the weather. Water sports are a lot more enjoyable if you can play and swim outdoors."

That most Caltech water polo players have little experience in the sport further distinguishes the team's achievements. "It's pretty ridiculous that we can compete [given that] the majority of our team has zero experience and some aren't even the best swimmers," opines Oliver, who himself is an anomaly having played water polo all four years of high school.

One case in point is team sprinter, freshman Tim Curran, described as a "lucky" find by teammate Scott Medling. The sprinter, ideally the team's fastest swimmer, races out at the beginning of each game in attempt to gain possession of the ball placed in the center of the pool.

Curran describes his recruitment by the water polo coaches. "When I got here, they said, 'You're a swimmer so you are a water polo player also.'" He reveals that most freshmen on the team are in a similar situation with their initial intention of swimming at Caltech. To overcome the experience gap, veterans on the team held training sessions early in the season to acclimate the newcomers to the rules of the game and the basic skills of ball handling, shooting and defense.

The water polo team's next matches will come at the SCIAC Championships November 13-14, where no doubt they will aim to topple the giants of Division III water polo.



K. Peng/*The California Tech*

Kaisel explains how the chips will be used.

Cheap Medical Devices

Continued from Page 1, Column 3

"We want something that's portable, low cost, fast, [and] accurate," he said, to meet the needs of public health services in developing countries.

Research and development, however, often have different "objectives, constraints and expected outcomes," Kaisel explained. For a nonprofit organization like SSI, funding is often an important factor in developing a product. "We're not going to deliver the same kind of thing in two years," Kaisel said, as a commercial company with more financial, time and human resources. Therefore, an appropriate business model must be developed to ensure the viability of the project.

The multidisciplinary nature of health technology research is yet another concern. A complex product like ImmunoSensor involves researchers with expertise in electrical engineering, immunochemistry and infectious disease, as well as manufacturers, sponsors and end-users. Ultimately, Kaisel said, the success of ImmunoSensor among its users is the measure of its progress. Researchers must "keep the needs of the people out there [in developing countries] in the lab" and incorporate it into their design, he said.

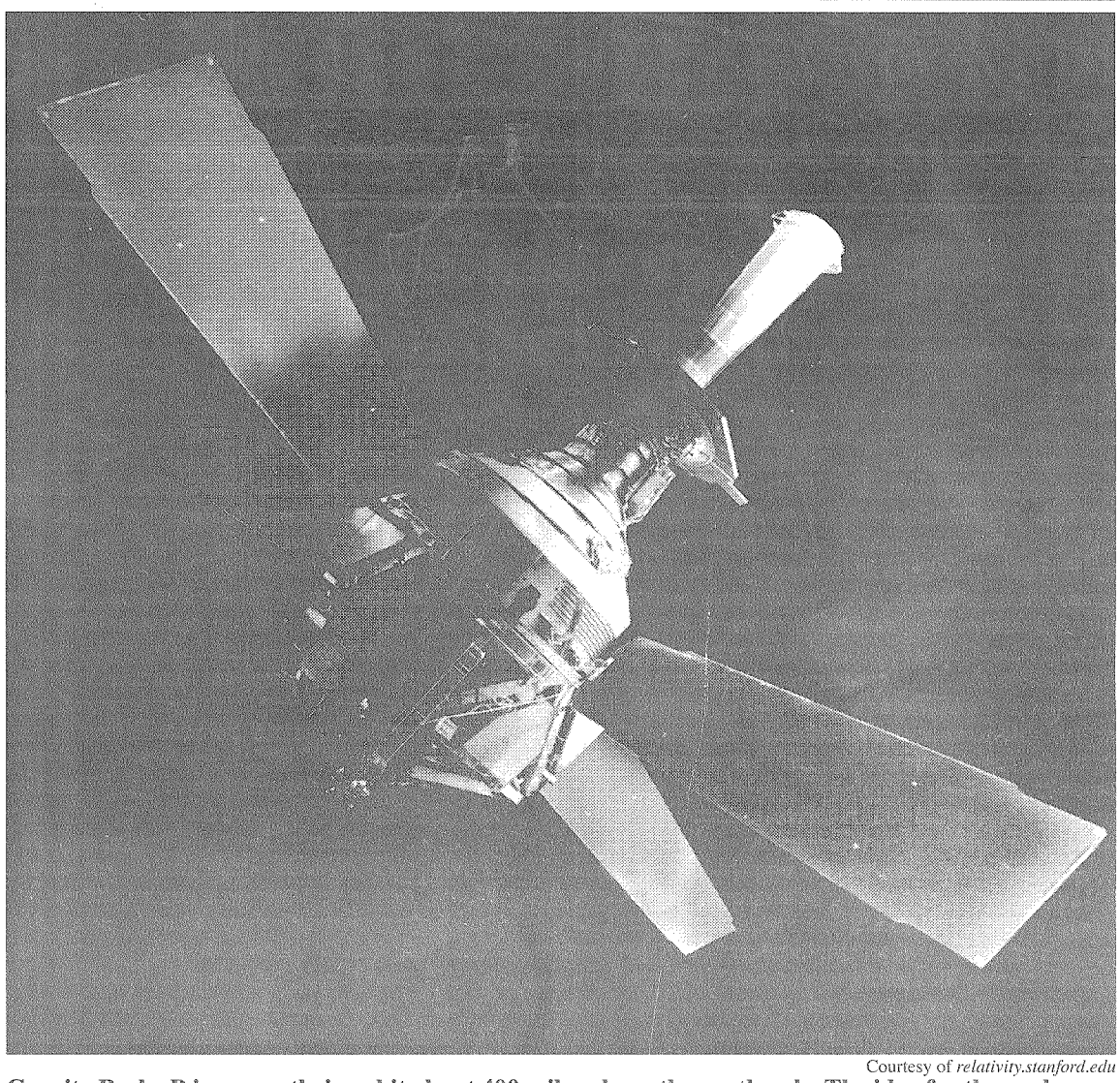
Simplicity and ease of use, for instance, are some important factors to consider. "Just because [the sensor] can do something," Kaisel said, "does not necessarily make it viable at the end of the day." In order to be practical, ImmunoSensor must give the user a yes-or-no answer to the pressing question of infection. Quick results are also essential; "if it takes an hour, it's probably useless," he said.

Furthermore, Kaisel pointed out, the introduction of new health technologies often have unforeseen social impacts. "What does it mean to suddenly bring in the ability to diagnose disease?" he asks the audience to contemplate. Giving an example situation, Kaisel recounted his journey to a tribal village in Brazil, where the rate of Hepatitis B was particularly high. The village was 600 miles from the nearest town and only accessible by boat.

Due to the remoteness of its location, "they're not going to take people out of their communities and send them to a hospital for analysis and treatment, which will probably last the rest of their lives," he said. "From the patient's point of view, you have to question exactly what the benefit" of bringing in diagnostic technology is.

Even in cases where health care is more accessible, Kaisel said, an understanding of the local situation is still critical. SSI must "know what it's like in their clinics and keep it in front of the scientists" developing the technology, he said.

Concluding his slide show presentation with a photograph of children encountered during his work in South America, Kaisel reminded his audience that much is at stake. The challenges of his work may be never-ending, he said, "but that's the excitement of what we do."



Courtesy of *relativity.stanford.edu*

Gravity Probe B is currently in orbit about 400 miles above the north pole. The idea for the probe was first proposed in 1960. Professor Francis Everitt of Stanford has been leading the project since 1962.

Space Probe Seeks Confirmation Of Einstein's Theory of Relativity

By SONIA TIKOO

A group of Caltech physics students, faculty and others gathered in Bridge Thursday to hear C.W. Francis Everitt, research professor at Stanford University and leader of the Gravity Probe B project since 1962, discuss the experimental operations of GP-B as well as its role in the imperative testing of Einstein's general theory of relativity.

In the ongoing battle between the physical theories of general relativity and quantum mechanics, the need to verify or amend Einstein's 1916 theory of gravity, which states that instead of moving in elliptical paths, planets and celestial bodies actually move in straight lines called "geodesics" along curves in space-time.

Gravity Probe B utilizes the idea first proposed by Leonard Schiff in 1960 to use high-precision gyroscopes in outer space orbit in order to observe the space-time processes of geodetic effect and frame-dragging. In the absence of general relativity, a gyroscope set in orbit aligned to a reference star would remain spinning and in its original alignment indefinitely. If Einstein's theory of curved space-time is correct, the perpendicular acting geodetic and frame-dragging effects would gradually foster changes in the gyroscopes position and spin.

Gravity Probe B is the first experiment designed to measure the frame-dragging effect and due to the combined efforts of the team at Stanford University, NASA and private sector corporations such as Boeing and Lockheed Martin, Gravity Probe B was successfully launched into orbit during a one-second launch window on April 20, 2004 to finally assume its position a mere 100 meters from its target of 400 miles directly above the Earth's north pole.

During his lecture, Everitt discussed the technical specifications of the Gravity Probe B structure and the four gyroscopes contained within its complex. The probe's gyroscopes bear a spherical accuracy in shape of $3x10^{-7}$ nanometers, which if scaled to the Earth, would result in a planetoid with the highest mountains being 5 feet tall and the deepest ocean troughs resting at 5 feet deep. 120 decibel AC shielding has been added to cut down interference as well as dampening and filtering processes to distinguish hard astrophysical data from background radiation from Earth-based communications processes.

Everitt also elaborated on the benefits of space-based gyroscopes versus Earth-based ones for astrophysical observations. The Gravity Probe B gyroscope bears an accuracy of measurement of 10^{-12} to 10^{-14} degrees per hour, a gigantic improvement upon conventional Earth gyroscopes with 10^{-1} degrees per hour accuracy. In an encompassing statement, Everitt claimed the GP-B gyroscopes were theoretically 50 million times more accurate and efficient than Earth-based ones.

In terms of benefits to the scientific community in general, Everitt claimed the Gravity Probe B project has helped develop the "near zero" principle in space, as well as using elements of drag trees, pointing and cryogenics, integrated science and operations teams and set a strong example of the great potential of scientific collaboration between university researchers, NASA and industry.

As for the project's results to date, the Gravity Probe B team has determined that their orbiter is in fact pointing at the correct reference star and three out of four of the gyroscopes could theoretically maintain a rotational status quo for approximately 15,000 years. The third project gyroscope is experiencing technical difficulties in the form of depleting rotation at an accelerated rate. The team is currently working to amend this technicality. GP-B analysts are subjecting all incoming data to seven levels of verification and analysis before they will declare their final conclusions to the scientific community. So far, four stages of analysis have been completed. Once the remaining measures of the Gravity Probe B project have been implemented and carried out, we may, as Everitt stated, "finally know whether Einstein was right or not."

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