

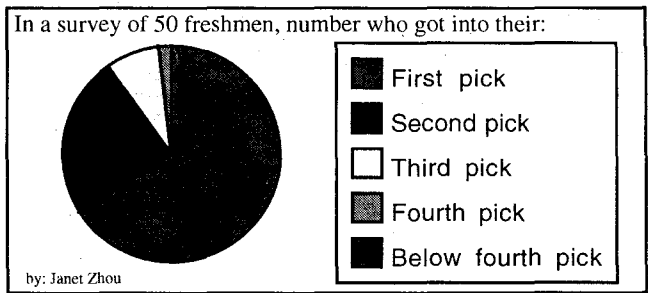
the little t

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Wondering where this strange and elusive creature may be found? It should be in your mailbox by early next week.

???????????



A UNIVERSE OF DARK MATTER

BY SERINA DINIEGA

Signaling the end of the UN First Annual International Space Week on Wednesday, October 11, Marc Kamionkowski, professor of Theoretical Physics and Astrophysics, gave a chalkboard lecture about the dark matter in the universe.

Beginning with a description of the Newtonian mechanics of our solar system, Kamionkowski expanded his argument to include our galaxy. This description then led to the reason scientists hypothesize the existence of dark matter. Put simply, the velocities recorded for objects around our galaxy do not agree with the velocities calculated for them.

The only explanation for this very large discrepancy is the existence of a roughly spherical halo of dark matter around our galaxy. The dark matter local to us should be in rotation around the galaxy with a velocity comparable to that of our sun's orbit around the center of the Milky Way, and should have a density of about 0.4 GeV/cc (for comparison, a cc of liquid water requires approximately 2.6×10^{10} GeV to raise it one degree Celsius).

Kamionkowski then went on to describe the main "guesses" about what this dark matter is made of. The first guess is that it is made of objects found throughout the galaxy: white dwarfs, neutron stars, and black holes. However, he argued against this claim because, when these objects form, they are surrounded with other objects, like ordinary stars and emitted gases. Since we do not find ordinary stars or large clouds of gases surrounding our galaxy, then it is unlikely white dwarfs, neutron stars, or black holes make up the dark matter.

The second guess is that the dark matter is made up of massive neutrinos. However, this is easily argued against as the largest neutrinos accepted by the general scientific community have masses of about 5 eV, as compared to the more than 100 eV neutrinos needed for dark matter.

According to Kamionkowski, the third guess is the most probable: that the dark matter of the

A facelift for the humanities

BY WILLIAM FONG

The beginning of the 2000-2001 school year ushers in a new and improved humanities curriculum as a result of the efforts of the entire humanities department. One of the most noticeable changes for all freshmen are the introductory humanities courses. Beginning this year, the former two-term sequences (for example Hum 1ab) are now one-term courses geared towards giving a general overview in the selected area of study. This change was made to introduce a greater breadth into the freshman humanities curriculum as well as to eliminate the problems that existed with two-term sequences. One conflict worth mentioning is the fact that professors often needed to rehash material taught in the first term for those who joined the class the second term or face the proposition of sacrificing those students for the

progress of the class. The newly-implemented curriculum would eliminate this problem by having separate one-term courses which serve the purpose of giving the students a general understanding of the course topic by covering the classical and/or major works in that area. Although two-term sequences still exist, they are now two individual courses that are only related by a common lineage, not by curriculum.

Another change in the humanities department was the addition of the humanities breadth requirement for the incoming freshmen which states that the two introductory humanities courses that all freshmen must take in their first year must be from two or the following three disciplines: history, literature, and philosophy. Professor Fiona Cowie, an associate professor of philosophy, states that besides exposing the students to a wider breadth of knowledge, this new

requirement "reinforces the educational aim of the school which is to produce well-rounded individuals."

This round of reform in the humanities curriculum has placed an emphasis on the importance of writing as an instrument of communication in all fields. A direct result of this is the writing assessment test which was administered to all incoming students. Professor Jim Woodward, a professor of philosophy and executive officer for the humanities, comments: "The test this year was used to screen out those who needed to take an ESL class as well as those who needed to work on their grammar. This identification is necessary to help students improve their writing skills." In addition to the writing assessment test, every freshmen humanities course is also conducting a writing proficiency test. No formal test is administered in the frosh hums, although

it is true that if a student has serious writing problems, they may be moved out of the frosh hums and placed into a composition course or sent to the writing instructors for personal tutoring. A 4,000 word writing requirement has also been added to the freshman humanities courses to further emphasize the importance of writing.

In conjunction with the humanities department's emphasis on writing, a new writing center has been proposed which would provide writing assistance to all undergraduates and graduates. This new building, the Alexander P. and Adelaide F. Hixon Writing Center, will be completely funded by a \$1.1 million gift from these two members of the Caltech Associates. The writing center will be under the direction of a professional in composition and rhetoric whose main purpose

PLEASE SEE CIRRICULUM ON PAGE 5

Ledyard explains technology in market-structures

BY IRAM BILAL

At 8:00 pm on October 4, 2000, a large crowd of people gathered in Beckman Auditorium to attend the latest in the Watson lecture series on the economics of today's world. This week, it was a lecture on combined value markets by John O. Ledyard (Ph.D), Professor of Economics and Social Sciences chair.

The speaker started by explaining to the audience what auctions



Professor John Ledyard

in the real world are about, and what can go wrong during their operation. In fact, to the audience's amusement, there was a live demonstration of the acclaimed bidding strategies in an auction. By leading the audience in a practical way through

the defects of classical auctions, Ledyard claimed that better conditions can be designed with the help of technological intervention in the market system.

Ledyard highlighted various problems in auctions such as spatial and time agglomeration and exposure and referred to the appropriate responses to them. This led to an explanation of the combined value concept, in which processes like package bidding could be used for counteracting the exposure problem. This would benefit the mutual welfare of both sellers and buyers, Ledyard argued.

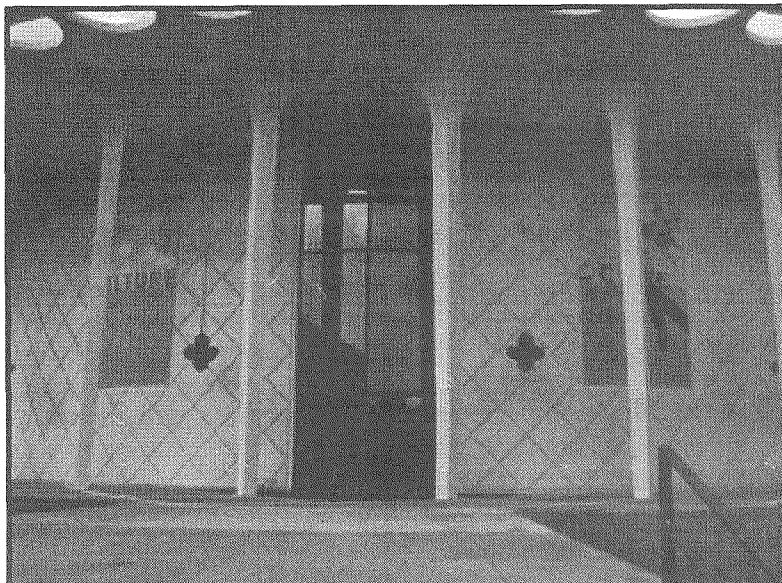
Possible examples of economic considerations where the principle of CV (combined value) can be used include financial portfolios and environmental regulation.

Ledyard also referred to the act of trading through one of the earliest web-based open venues, Market Scape, which was created at Caltech. In addition, he presented an economist's solution to the environmental pollution problem in the West Coast which occurred vastly in the last decade (90s), suggesting that using a CV trading mechanism for pollution permits would have been the best solution.

The intellectual talk ended with an analysis of the causes of market depression and the probable solutions to it. The former was identified as markets

underperforming due to the thinness of the elements they contain (that is, the relative concen-

PLEASE SEE WATSON ON PAGE 5



SwingDance America will be presented on Saturday, October 14, at 8 p.m. in Caltech's Beckman Auditorium. There will be a dance outside following this event.

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PLEASE SEE DARK ON PAGE 5

Letters and Culture

Yoghurt

BY CLARA AND ROBERT

The local music scene seems a bit slow this week. The Pasadena Symphony begins their new series next week and the LA Opera starts a new opera next week. However, this weekend, the LA Phil is performing their second subscription concert of the season. If you missed last weekend's concert then this is your last chance to see Music Director Esa-Pekka Salonen until January when he returns from sabbatical again. Salonen is an extremely enjoyable conductor to watch, not only for his ravishing, yet boyish, good-looks (her opinion), but for his exuberance in conducting. Pay attention to the railing behind him, and you'll notice how often the rail saves him from falling off of his conductor's block during a performance. His energy seems to be transferred to the orchestra, which has wonderful results for the music.

This week, the theme is French. Not French fries or French toast, but French music. The program starts with César Franck's Symphony in D minor followed by The Mother Goose Suite of Maurice Ravel. Catherine Ransom solos in Jacques Ibert's Flute Concerto. The evening ends with a second Ravel piece, La Valse (The Waltz).

César Franck was a composer and a champion of French avant-garde music in the late nineteenth century. Most of the music that he is famous for was written during the enormously productive and creative last twelve years of his life. The Symphony in D minor was composed in 1888 and was influenced by the music of Liszt and Wagner. Franck is known for his pervasive use of chromaticism. The program describes the Symphony in D minor as "a universe of yearning and questing, of searching and seeking." This is a nice way of saying the that piece is very hard to describe, we will leave it at that.

The subtitle to the Mother Goose Suite is literally translated to "Five Infantile Pieces," if you enjoy this piece, Freud could have a field day with you. I enjoy this piece mainly for the harp, which is excellent (his opinion). The textures of the music are used to try to recreate the scenes from such fairy tales as Sleeping Beauty and Beauty and the Beast. Lest you think that Beauty is the theme of the entire work, lesser known works such as L'air des fées, translating to "the little ugly one," are used as well. Overall, this is a beautiful piece that would be much more well-known had

PLEASE SEE YOGHURT ON PAGE 6

LETTERS TO THE EDITOR

Language is not syntax

Professor DeHon's October 6 editorial seems to suffer from the common misconception that language is only syntax. While this might be true in the sterile environment of academic programming, it is certainly not true in professional programming. Each language has its own set of peculiarities and idioms which do not easily translate. His statements about being able to learn a language in a weekend are similar to saying that someone who knows English should be able to learn German in a weekend. After all, the same general grammar rules apply, and it certainly shouldn't take more than a weekend to learn a few new ones. To some extent this is even true. Armed with a good dictionary most reasonably intelligent English speakers could learn to

crudely translate between English and German in a weekend. Certainly they could understand the gist of an article or write something that a German speaker could eventually figure out. Does this mean they can converse in German? Of course not. There is far more to language (computer or human) than just syntax (in fact, using only syntax, one can even end up saying the wrong thing). Not only are there idiomatic differences, but there are also conceptual differences, concepts which appear in one language but not another (e.g. the genitive case in German, which does not have a separate representation in English, or pointers in C, which are not present in Scheme). These new concepts are typically very difficult for people to learn and apply correctly. So stating that a student can easily and quickly move from language to language is only true in a very superficial sense and is a somewhat danger-

ous myth to propagate.

Additionally, Professor DeHon specifically mentions teaching debugging techniques, but these are typically very language dependent (both in typical types of errors and tracking down the errors). It is only in algorithm design (which, unfortunately, most programmers spend very little time doing) that general debugging principles apply. So again, the techniques learned in one language and environment do not necessarily translate well into another language.

Looking at this from a different perspective, Professor DeHon is correct in that the "popular" language changes over time and thus the syntax and idioms one learns today may not be applicable tomorrow. But if the language being used for teaching is immaterial, why not use a language which the students will encounter at least at the start of their careers? It would seem far more logical and efficient to teach both concepts and a useful skill (programming

in a currently popular language) as opposed to just concepts.

In conclusion, one of the biggest problems in the programming industry today is the attitude that once a person knows one language, they can pick up any language in "a weekend." Unfortunately, both programmers and their managers (and apparently the Caltech CS faculty) believe this, yet it is one of the principle causes of the extremely poor quality of modern programs. This is why systems crash and space missions fail - programmers do not really understand the language they are programming in. Whether or not a "useful" language is taught in CS 1 is a decision the professor has to make, but do not delude yourself and the students into believing they now have the skills to be anything more than a poor to mediocre programmer in another language.

Peter Manca, BS '97, MS '98
pmanca@alumni.caltech.edu

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THIS WEEK, OCTOBER 9-13, 2000, is NATIONAL COMING OUT WEEK

National Coming Out Week is celebrated every October. Its purpose is to promote Lesbian, Gay, and Bisexual (LGB) visibility. With this visibility we hope to counter ignorance and fear of Lesbians, Gays, and Bisexuals, and provide inspiration for those who have not yet come out.

"Coming out of the closet" is the act of revealing the truth about one's sexual orientation to others. Coming out is a very personal process and can take many forms. It involves having enough courage and feelings of self worth to reveal this very personal information to others. This can mean taking the risk of being rejected or misunderstood by those around you. However, by being honest about who we are, Gays, Lesbians and Bisexuals can begin to erase the misunderstanding and bigotry.

While we cannot assume that others will understand or care about what it means to be Lesbian, Gay or Bisexual, studies show that non-gay people who know someone who is Lesbian, Gay or Bisexual support equality based on sexual orientation. By coming out to families, friends, and co-workers, the impact we can have on the population is extraordinary.

It is clear that LGB-related issues will not be taken seriously until people know who we are. LGB people are part of every aspect of life — we are parents, friends, children, and co-workers. We are your professors, your TAs, your lab technicians, your Librarians. It is up to us to let the world know.

The people listed below are just a few of the Lesbian, Gay, and Bisexual individuals who are part of the Caltech/JPL community. Our goal is to demonstrate in a direct and dramatic way the size and diversity of the LGB population at Caltech, JPL, and the Caltech-affiliated community at large. In addition, we hope to provide support and inspiration to those among us who have not come out, or who are just beginning the process of coming out.

We invite you to join with us in recognizing National Coming Out Week.

If you're Gay, Lesbian or Bisexual:

Sometime today, come out — to a co-worker, a family member, your doctor or a sales clerk. Do your part to help make a difference.

For members of the non-LGB community:

Today, and all year long, we invite you to make visible your acceptance of Lesbians, Gays and Bisexuals. We urge you to make visible (and audible) your objections to derogatory comments and "jokes" about Lesbians, Gays and Bisexuals.

In light of this, we, your fellow students, alumni/ae, faculty, co-workers, and friends, sign this message:

Chris Adami, Senior Research Fellow / Instructor
Mark Barton, Senior Postdoctoral Scholar, LIGO Project - Physics, Math and Astronomy
Martin L. Basch, Graduate Student, Biology
Bill Bauer, Alumnus (BS in Chemistry, 1961; Ph.D. in Chemistry, 1968)
Richard G. G. Beatty, Alumnus (BS in E&AS, 1977); JPL Program Engineer, Microgravity Fundamental Physics
Eric Bogs, Alumnus (BS in Computer Science, 1999)
Sue Borrego, Associate Dean / Director, Office for Minority Student Affairs
Laura Brogoch, Undergraduate (Senior), Computer Science
Rich Chin, Alumnus (BS in E&AS / Materials Science, 1996)
Rudolf Danner, Ph.D., Alumnus; JPL Origins Outreach Scientist
Rochelle (Shelley) Diamond, Member of the Professional Staff, Biology
Ron Dollete, Alumnus (BS in EE, 2000)
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Jim O'Donnell, Geology Librarian
Craig Peterson, JPL Senior Engineer, Systems Division
Jess Reynolds, Undergraduate (Freshman)
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Derek Shannon, Undergraduate (Junior), Geobiology
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Yinan Song, Graduate Student, Mathematics
Robert Southworth, Alumnus (MS in Computer Science, 2000)
Daniel Taylor, Biology Librarian
Thomas E. Wilhelm, Alumnus (Ph.D. in Chemistry, 1998)
Ted Wyder, Postdoctoral Scholar, Astronomy

_____, this space left blank for those who feel they cannot yet come out due to societal fear and ignorance

There are a number of resources and organizations on campus for the purposes of LGB visibility and activism, support, and meeting other Lesbian, Gay, and Bisexual people:

Caltech LesBiGay Union (CLU)

an organization of gay, lesbian, bisexual (and straight!) faculty, staff, students and alumni at Caltech
<http://www.its.caltech.edu/~clu>

Caltech Students Pride Association (CSPA)

an Alliance of queer and straight students at Caltech
<http://www.ugcs.caltech.edu/~cspa>

Caltech LGB Discussion Group

Meets the first and third Tuesdays of each month, 8:15-10:15 pm, in the Health Center Lounge
 Open to the wider Caltech/JPL community
 Call x8331 for more information, or visit the CLU website above

The Pride-List (aka the CLU-List)

The Caltech e-mail list for LGB-folk and Queer-friendly Allies
 To add your name, send e-mail to pride-list-request@its.caltech.edu

Los Angeles Gay & Lesbian Scientists (LAGLS)

Local group meets at various locations around the Los Angeles area once a month
 Contact Shelley Diamond, (626) 791-7689
 P.O. Box 91803, Pasadena, CA 91109

National Organization of Gay and Lesbian Scientists and Technical Professionals (NOGLSTP)

<http://www.noglstp.org/>
 See LAGLS listing above for more information

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The
Ticket
Stub

by Justin Ho

Dancer in the Dark (A)

Rated R: for violence, the spiritual annihilation of humanity

As a journalist, writing a review of "Dancer in the Dark" would be mind-numbingly excruciating because any level of objectivism would be nullified by the strong emotions that this film elicits. "Dancer" won both the accolades of film virtuosos at the Cannes Film Festival but an equally hostile reception of boos. Therefore, the following account should be taken as the opinion of a critic steeped in subjectivity, and possibly un-deserving of your, the reader's, regard as to whether or not this film is worthy of your attention. My perspective is, after all, a matter of my own prejudices, jadedness, and system of categorizing good or bad taste. If I recommend this movie, it is because I am too ambivalent to tell you one way or another whether \$6 and 2+ hours of your time is well-spent, so decide for yourself if it was worth it. This request, in and of itself, is a quandary in its own right.

"Dancer in the Dark" is at once clumsily absurd yet in spite of the plotline that would make this

story one of pure fiction, it has a visceral taste of realism. An immigrant single mother from Czechoslovakia, Selma, with a genetic disease which is causing her descent into blindness, scrapes enough cash working at a tool-and-die factory to fund an operation which would save her son from an identical fate to black. For a blue-collar worker in rural America during the '60s, life is especially tenuous. She and her son lead a secluded life in a trailer that they rent from a middle-aged couple who is ostensibly better off. Yet, borrowing from "American Beauty's" epithet to "look closer", an ever greater mountain of misery is soon discernible under the façade of grim faces and neighborly love.

There is at first a sense of security as even Selma, growing progressively blind and stalwart to the dangers that such a handicap would introduce, is under the guardianship of an older worker, Kathy; a longing admirer, Jeff; and the protection of her landlord, who is, of all occupations, a police officer. In keeping with most musicals of the era, there is actually little that is amiss, and indeed additional concessions seem to be made to compensate for the onerous handicap of Selma's blindness to make the film more happy. She is able to take the lead role as Maria in a small town production of the "Sound of Music" and even without eyes, she frequently visits the cinema to listen, if not to see,

Hollywood musicals. An especially endearing moment arises when Selma, desperate for a sense of the movements of the dancers in a musical number, has the steps traced or more or less tickled on her hands. Even without a visual signal, music and her imagination fill her mind with such an overpowering sense of beauty that her face lights up with joy.

The sense of sweetness is, however, transient. The beginning of the tragic turn of events acts so much to elevate Selma as a martyr as if to make the film a crock. While receding physically into the darkness, Selma conjures elaborate song and dance numbers, including factory equipment and the people around her. The cinematography assimilates a graininess reminiscent of actual musicals from the 50's and 60's when Technicolor was suddenly novel, and the contrast in textures underlies the difference between Selma's mental states and actual reality. In a symbolic way, the cinematography is a figment of the world, or at least of the contrived world that Selma remembers. As tragedy strikes, Selma recedes into her imagination, her individual universe where repercussions are placated by song and nothing bad ever happens. She is forced to confront her desperate neighbor who steals for her stash of operation money. The struggle over a meager sum of cash is a jolt from the misleading utopian world created in the

PLEASE SEE DANCER ON PAGE 5

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WELLS FARGO

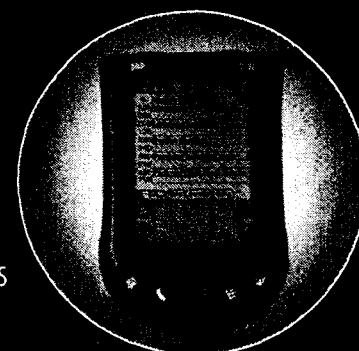
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Continuations

WATSON:

CONTINUED FROM PAGE 1

tration of buyers and sellers) and the latter was, as expected, the intervention of new technologies in market systems.

At Caltech, people were obviously interested in the details of these technologies, some of which Ledyard highlighted being the internet and CV call markets.

The lecture ended with the final encouraging statement that CV markets were quite possible and were already in existence. In fact, to our surprise the speaker closed with: "Caltech is leading development of these markets in theory and experiment."

As usual, the lecture was followed by an excited mass of questions and their equally impressive and informative answers. This one hour lecture on pure economics incorporated in the minds of this engineering-oriented community that technology and business go hand-in-hand and that new techniques can only be applauded when launched in the world community with superior management and business skills.

DARK:

CONTINUED FROM PAGE 1

universe is made up of exotic new particles. Although no particles in the standard model fit the requirements of dark matter, by the supersymmetry theory, there exist particles that, although as of yet unobserved, agree with this dark matter hypothesis. The supersymmetry theory is that for every fermion (basic constituent of nuclear and atomic forces), there is a complementary boson (particles that transmit the fundamental forces of nature between fermions), and visa versa. However, the standard model currently lacks companion fermions for some of the bosons. These unobserved complementary fermions, collectively known as "neutralino" particles, could be the unknown constituent of dark matter. This argument is supported by the fact that if neutralino particles exist, their probable current density is approximately equal to the density of dark matter.

However, the entire question about the ingredients of dark matter is still highly controversial. Many teams around the world are working towards an answer, mostly by trying to detect or disprove the existence of neutralinos. Regardless of which guess, if any of the three, is correct, the search for an answer is an exciting and extensive branch of theoretical physics.

For more information, check out the Center for Particle Astrophysics at <http://cfpa.berkeley.edu/>.

DANCER:

CONTINUED FROM PAGE 4

beginning in which a blind girl can operate life-threatening machinery. It's a horrible, excruciating altercation, exacerbated by the policeman's masochism and Selma's desperation to cling to a single material quantity which would exonerate her from a guilty conscience plagued by bringing into the world a son who would share her same fate. Yet, it serves as a more significant allegory, that being the desperate things that especially innocent people are forced to do. In Selma's inner realm, however, life as an ever-redeeming musical continues.

As Selma's ability to control her destiny diminishes, the sheer boldness of the film emerges. Evidently, few films come face to face with a scathing portrayal of capital punishment and sheer insanity. Selma's mental state

degenerates into such an assortment of different degrees of coherence and consciousness as if to label her mad. Yet, she maintains an uncanny sense of morality, focused on renewing the gift of sight to her son. There is no faltering on this point, even when an escape from her doom emerges—a stance of unequivocalness that is absolutely preposterous. But one can not help but treat the film with the most stringent gravity. There is, in the film's disfavor, no moral dilemma in Selma's mind between her salvation and that of her son's. Her resistance from saving herself is naïve, so defiant, but paradoxically practical. In the confines of a prison, it is not the absence of sight which is her mortal enemy, nor even her mortality, but the absolute deprivation of sensory stimulation, that which could otherwise whet the appetite of her imagination. When Selma confronts reality, one in which has no sight and no sound, the same senses which elaborate

musical had appealed to, she is already figuratively dead.

It may come as a surprise that an allusion to the ending has been made, but certainly the unraveling of the plot is the least of surprises in this topsy-turvy story. The film can be said to bravely go where no film has before, filling the mind with disgustingly bad and immature images and overpowering scenes. The role of Selma could not have possibly been better cast, as Bjork, making her first and last film appearance, introduces a rawness to the screen which is appropriate for a character only beginning to comprehend her actions and her fate. Any accomplished actress would have insulated herself from the sheer misery of the character's life, perhaps, preventing the act of "becoming" which is rarely attained in acting. Yet, Bjork's physiognomy and hyper-activity is bathed in an innocence which is capable of radiating absolute euphoria as in a never-ending musical, or delineating the pure

torture and madness when that innocence is broken. The shattering of her innocence, the injustice that befalls her that results in her utter annihilation of body and soul is so visceral as if to epitomize bad taste and raise the bar of human emoting simultaneously. For the audience, the visual and aural overload of this tragic masterpiece is enough to provoke the question of why we ourselves have not constructed a happier imagination in which to escape from such misery.

CURRICULUM:

CONTINUED FROM PAGE 1

is to supplement the writing instruction found in most of the humanities classes and to provide help to all students in writing papers, reports, and applications. Expected to open up for service next year, it is another step forward in the Caltech community towards improving the writing and communication skills of its students.

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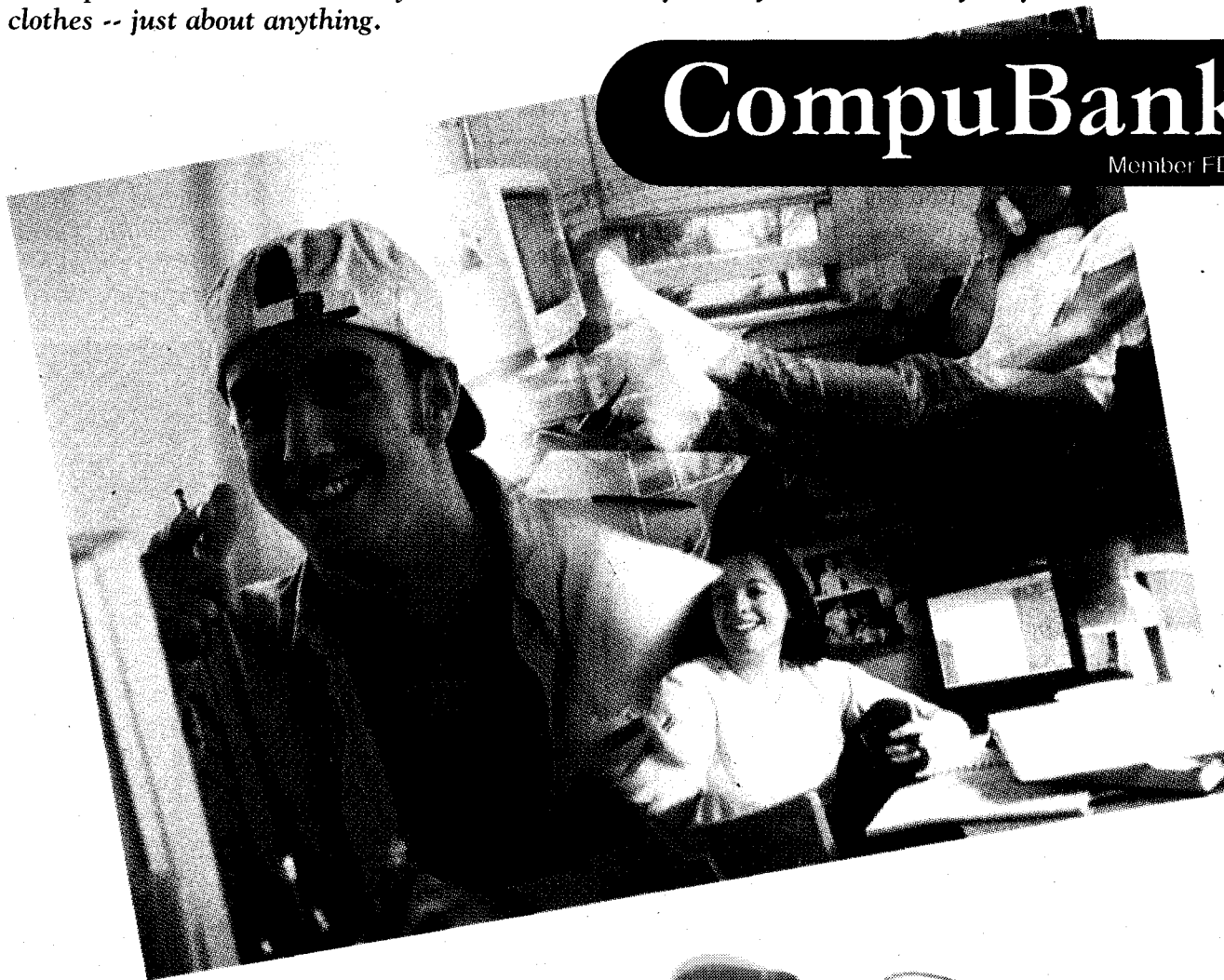
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Yoghurt

CONTINUED FROM PAGE 2

Ravel not written Bolero, which overshadows all of his other works.

The Ibert piece is a complex work whose main purpose is to showcase the talent of the flutist. While it does an excellent job of that there is no real telling characteristics that can be described here. The flute part is excellent, the piece itself is complex even with a reduced orchestra. There is a reason though that Ibert is not a very well known composer: he's not very good. Not to say that the piece is not worthwhile, it is, but Ibert is no Mozart.

The final piece is also from Ravel, composed as a tribute to Johann Strauss, who is one of

the guilty pleasures of classical music. The "Waltz King" is not nearly as intellectual as Richard Strauss, but everything always sounds so nice. Ravel's tribute to Strauss is much more intellectual than any waltz Strauss wrote. Ravel tries to paint the scene of the grand ballroom where such music and dancing would have occurred as a tribute to days gone by. Originally,

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it was to be titled “Vienna” but
as France had just seen Vienna

as the enemy capital in World War I, and this was considered to be a bad idea.

Summary: Go early to the show to catch the lecture beforehand. The pieces are much more enjoyable when you know what's happening inside the pieces as they are played. The notes in the program were written by someone who, like all of us at one time, was using as many adjectives as possible to increase the word count. The Mother Goose Suite is reason enough to go, the Waltz is also very good, the Ibert is nice, but nothing to write home about, and the Franck you will either love or hate. The conductor should be a bit of encouragement as well. Concerts are Friday and Saturday night at 8 pm, with the pre-concert lecture at 7 pm. Student rush tickets go on sale two hours before the perfor-

mance for \$10 at the Dorothy Chandler Pavilion in the LA Music Center.

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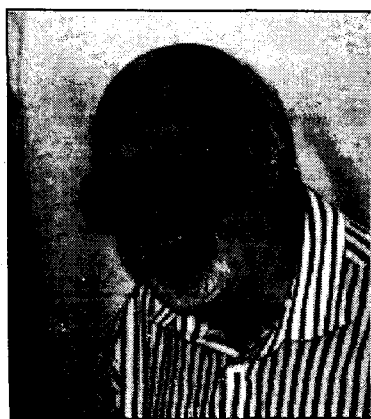
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Dean

Dean's Corner

The Fickle Finger of Fate

by Jean-Paul Revel



That was the name of a weekly "award" handed out on "Laugh In," a show which was wildly, no, widely, popular at the end of the 1960s. And a great show it was, indeed: irreverent, funny, rapidly paced, and with a stellar cast of people like Robin Williams, Goldie Hawn, and many more, besides Henry Gibson, who read his goofy poetry in a flat monotone and dropped nuggets like "Politics make strange vice presidents." It sure does! But that's not the point here. I don't want to talk about the election.

I am talking about Lady Fate's fickle finger, which is pointed at a group of dedicated physicists.

So here is the story: You are aware of course that the "standard model," a description of the way in which we think the universe is built, is pretty much complete. Almost all of the particles required by theory are accounted for. All the quarks, in-

cluding the charm and the strange, the leptons, the force carriers like the Z and W bosons, the photons, and the gluons. One component missing from this menagerie is the Higgs boson, needed to account for the existence of mass. A pretty massive omission, no? Just joking, just joking. To complete the model, search for the Higgs has been a Holy Grail of modern physics. To hunt it down required the energy of the huge accelerator in the countryside near Geneva, Switzerland, the Large Electron Positron collider (LEP). It has worked for 11 years now without providing evidence for the existence of the Higgs boson and is about to be shut down to be replaced with an even larger accelerator, the Large Hadron collider (LHC). In the LHC, two proton beams at higher energies than available in the LEP will be sent on a collision course. The new machine will occupy the same 27 km tunnel as its predecessor. So, in order to

construct the LHC, CERN, the international consortium which runs the facility, needs to shut down the LEP and begin its demolition.

That was supposed to happen early this fall. And then something very strange happened in early September, probably as a consequence of a decision made at the same time as that to pull the plug. It seemed appropriate that, for the last few months of its life, the LEP, which had been run with colliding beams of 100 GeV each, would be run instead at 103 GeV. Using 100GeV beams had been a conservative measure, so as to be sure not to harm the delicate instrument. But now who cared? Might as well see what could happen at higher energies.

What happened of course was stupendous, although not wholly unexpected, because something similar had happened before, with another instrument, at another time. Not only was no harm done by raising the beam energy, but surprise! the detectors registered signals which suggested that Higgs bosons were now being generated. The results are too preliminary to be anything but tan-

talizing. But they are suggestive enough that the machine was granted a reprieve - not a long one, only two months extra, but a reprieve nevertheless. Another two months of observations will not be sufficient to nail evidence for the existence of the boson, but may provide additional support for its existence. And so the researchers have till November 2 to see if the intimations they have now can be turned into something solid enough to be called evidence.

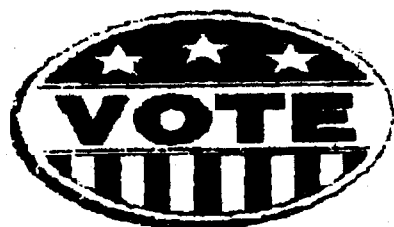
Science is supposed to be a pure search, with human emotions and desires playing no role. But scientists, fortunately, are just people, emotionally involved in what they do. So in some ways, it might be best if no further evidence were obtained. Imagine the disappointment if more data supporting the generation of Higgs bosons were forthcoming. What would the steering committee for CERN do under those circumstances? Delay the shutdown even longer? That seems unlikely, since that would delay construction of the LHC a great deal, probably more than can be tolerated for economic, political and scientific reasons. So chances are that this will indeed be it. The full discovery, the final word, will likely have to wait until the completion of the new collider, five years or so hence. In fact, it

means that, most likely, evidence for the Higgs boson will come first from the Fermi National Accelerator Laboratory, near Chicago. There, a machine (the Tevatron) is being upgraded now (with completion scheduled a year from now). It will be operating at energies higher than those available on the LEP and so is likely to produce the evidence which has been escaping that of the CERN instrument.

So is it the finger of fate? To get so close and yet fail to obtain conclusive proof? But then, the option of raising the operating energy of the collider had been there all along. What was needed was to throw caution to the wind, to go for broke. And of course broke is what could have been, considering the huge investment in time and money that colliders represent. So while one can empathize with those protecting the investment that such a machine represents, it is nevertheless tempting to say (talk is cheap) that fate favors those who dare! (Sometimes!) May you never have to face such a dilemma yourselves, may the path to follow always be clear to you and the rewards forthcoming. May fate not be fickle.

A bientôt,

Jean Paul Revel
Jean-Paul Revel



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On-campus recruiting for software developers to work in Long Beach, CA. All Computer Science/Engineering majors are encouraged to attend.

Mints

ANNOUNCEMENTS

CIT Guitar Classes for the spring quarter will meet on Tuesdays in SAC Room 1, starting on October 3 as follows: Beginning Guitar Class: 4:30 PM - 5:30 PM, Intermediate Guitar Class: 3:00 PM - 4:00 PM, Advanced Guitar Class: 5:30 PM - 6:30 PM. Classical and flamenco repertoires are explored, but techniques transfer to other styles of guitar. The Beginning Class includes a jazz/folk chord system. Classes are free to Caltech students and other members of the Caltech community (space permitting). Undergrads can receive 3 units of credit. The instructor, Darryl Denning, has an international background in performance, teaching and recording (two of his CDs are available in the Bookstore). Mr. Denning can be reached at (323) 465-0881 or by email at: ddenning@caltech.edu. The Guitar Home Page is at: www.cco.caltech.edu/~musicpgm/guitar.html

The **Caltech Ballroom Dance Club** [CBDC] continues its offerings of dance classes and parties for the new term. **Beginning West Coast Swing** - taught by a professional dance instructor, five week series starting Mon 2 Oct'00: \$20/series for undergraduates, \$30/series for others. The lessons will be held from 7:30 to 9:00 pm on Mon in the Winnett Lounge with a 1/2 hr. practice period after each lesson. Refreshments will be provided, and no partner is required. **Beginning Argentine Tango** - "Amateur"-taught, four week series starting Wed 4 Oct'00, free for undergraduates, \$1.00/lesson for others. The lessons will be held from 7:30 to 9:00 pm on Wed in the Winnett Lounge, with refreshments and a 1/2 hr. practice period after each lesson. Refreshments will be provided, and no partner is required.

For last minute changes see its.caltech.edu/~ballroom, or call Don at 626-791-3103

EVENTS

Announcement of the Fall Meeting Caltech Science Education Club, Tuesday, October 17, 2000 5:15 p.m. 287 S. Hill Ave (Building 98 on the campus map) **Pizza provided** Open to all Caltech students, faculty, staff, graduates and Pasadena area community members. Topic: "Make No Small Plans in Science Education." Here is an opportunity

to find out about some creative large scale projects in Science Education. Featured presenters: Dr. David Goodstein, Caltech Vice Provost and Gilloon Distinguished Teaching and Service Professor of Physics and Applied Physics. Dr. Jennifer Yure—Director of Science Instruction (PUSD) and a founder of the S.E.E.D. Project. Dr. Jim Folsom, Director of the Huntington Botanical Gardens, San Marino, California—As Director of the Huntington Botanical Gardens, Dr. Folsom has promoted development of the gardens and research in botany.***Please let us know if you are planning to attend the meeting on October 17th so we can reserve a place for you (and pizza too!). Email Art Hammon at ahammon@caltech.edu or leave a phone message with the CAPSI receptionist at x3222

The **Caltech Ballroom Dance Club** hosts a series of weekly "mini-parties", i.e., no lesson/demonstration or theme as done for the "regular" parties. The parties are free and take place in Winnett Lounge after each pro-taught class [West Coast Swing for the first half of the Fall'00 term and probably the Lindy for the second half] on Mon from 9:00-11:00pm. Refreshments are provided and no partner is required. From 9:00 to 9:30pm music pertaining to the previous class will be played, but after 9:30pm feel free to make requests or bring your own music.

A Milonga [Argentine Dance Party], will be held 8:00-11:59 pm in Dabney Lounge Fri 20 Oct'00. The party is free, refreshments will be provided, and no partner is required. For last minute changes see its.caltech.edu/~ballroom, or call Don at 626-791-3103

Science, Ethics, and Public Policy Lecture Series for Fall Quarter 2000:

Dr. Andrew Scull, Professor of Sociology and Science Studies, The University of California, San Diego, *Combating the Perils of Pus Infection: A Cautionary Tale from the History of Psychiatry*, Wednesday, October 18, 2000 4:00 p.m. Room 25 Baxter Building

Dr. Myles W. Jackson, Assistant Professor of the History of Science, Willamette University, *The Standardization of Aesthetic Qualities: Physics and Music in Nineteenth-Century Germany*, Thursday, November 9, 2000 4:00 p.m. Room 25 Baxter Building

The William and Myrtle Harris Distinguished Lectureship

in Science and Civilization presents Dr. Peter Galison, Professor of the History of Science and of Physics, Harvard University, *Poincaré's Maps and Einstein's Clocks*, Friday, December 1, 2000 4:00 p.m. Beckman Institute Auditorium

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

The **Caltech Amateur Radio Club** will meet on Thursday, October 19, at 7:30 PM in Winnett Center Club Room 1. Come see what the big antennas are all about. We'll eat pizza and talk ham radio. For info, check out our web page under student clubs.

SCHOLARSHIP

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 at 515 S. Wilson, second floor.

* The **Hispanic Scholarship Fund** (formerly the National Hispanic Scholarship Fund) is accepting applications for scholarship awards ranging from \$1,000 to \$3,000. Applicants must be U.S. citizens or permanent residents of Hispanic heritage, full-time undergraduate work with a minimum 2.7 GPA. For further information about HSF, informative links, and tips for applying, visit their web site at www.HSF.net. Applications are available in the Financial Aid Office and Office of Minority Student Affairs. Entries must be submitted to the Hispanic Scholarship Fund (HSF) by October 15, 2000.

* The **Measurement Science Conference** (MSC) has established scholarships to students in an Engineering or Science or Quality Assurance degree pro-

gram. The scholarship program places emphasis on papers or projects that discuss the advancement of measurement science technology. Applicants must be U.S. citizens, have a overall grade point average of 3.2 or higher, completed at 24 units of upper division courses in Engineering or Science degree or five courses in a Masters Degree Program in Quality Assurance. Current members of the Measurement Science Conference Committee are ineligible for this scholarship award. Also, applicants must be able to attend the Measurement Science Conference luncheon held on January 18, 2001, at the Disneyland Convention Center in Anaheim, California. Applications are available in the Financial Aid Office. For further information regarding MSC Scholarships, you may contact: Rick Careyette, MSC Scholarships Chairperson, Teledyne Electronics Technologies, Marina del Rey Facility, 12964 Panama Street, Los Angeles, CA 90066-6534. Entries must be submitted to Teledyne Electronics Technologies by December 1, 2000.

* The **AFCEA Copernicus Foundation** is offering a \$2,000 scholarship to eligible students working towards an undergraduate technology degree in the fields of computer engineering technology, computer information systems, and electronics engineering technology. Applicants must be enrolled full-time in a technology related curriculum at any four-year institution in the U.S., be a U.S. citizen, and be a sophomore or junior at the time of application. Special consideration will be given to military enlisted candidates. For further information regarding the AFCEA Copernicus Foundation Scholarship, you may contact: Norma Corrales at (703) 631-6149, e-mail scholarship@afcea.org, or visit their web site at www.afcea.org. Entries must be submitted to AFCEA Educational Foundation by November 1, 2000.

* The **National Academy for Nuclear Training** is offering \$2,500 scholarships to eligible students majoring in nuclear engineering, power generation health physics, electrical or me-

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

* **Green Hills Software** annually awards merit-based scholarships and fellowships to Caltech undergraduates who have demonstrated ability and special aptitude in computer science. The award for the junior year consists of a \$2,500 scholarship. The award for the senior year may consist of either a \$2,500 or \$5,000 scholarship. In addition, one or two applicants are invited to become Green Hills Fellows. Applicants should be second term sophomores with a GPA of 3.2 or higher. The selection criteria include programming ability, academic performance, and faculty and peer recommendations. To apply, applicants must submit an application form, current academic transcript, and three letters of recommendation, preferably from faculty or employers familiar with the student's work. Applications are available in the Financial Aid Office. Entries must be submitted to the Financial Aid Office by October 20, 2000.

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

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