



Barton group develops theory on DNA repair

KIMM FESENMAIER
Science Writer

Our genetic information is under constant attack—not only from outside sources such as UV radiation and environmental toxins, but also from oxidative stress, the production of highly reactive forms of oxygen, within our bodies. Luckily, repair proteins are typically hard at work, locating and fixing damaged DNA. Over the past decade, Caltech chemist Jacqueline Barton has been exploring a model that describes how repair proteins might work together in this scouting mission to efficiently home in on lesions or mismatches within the DNA.

Essentially, the model suggests that two DNA-bound repair proteins can use DNA like a wire to shuttle electrons between themselves—a process called charge transport. When one protein receives an electron from the other, its affinity for the DNA to which it clings decreases, causing the protein to fall off that strand. If instead, a lesion—a structural defect in the DNA—prevents that electron from being transferred between the proteins, both members of the pair remain bound to the DNA and begin inching toward the problem area. Since this signaling can be achieved over long molecular distances, the model could explain how it is that the relatively few repair proteins in our cells are able to scour so much

genetic information to efficiently locate problems.

Providing support for that model, Barton's team has recently shown that two different repair proteins preferentially reposition themselves onto damaged strands of DNA. Publishing in the journal *Proceedings of the National Academy of Sciences (PNAS)*, the group recently reported that repair proteins relocate in this way only if they have the capability to participate in charge transport. In the study, proteins with mutations that destroy their charge-transport capabilities could not zero in on DNA lesions. Versions of those mutated proteins found in humans are associated with diseases such as colorectal cancer, Cockayne syndrome, and xeroderma pigmentosum, suggesting that charge transport may indeed be a necessary part of genome maintenance.

"These findings are consistent with and provide data to support the model of facilitated search for lesions through DNA-mediated signaling between proteins," says Barton chair of the Division of Chemistry and Chemical Engineering at Caltech. "This provides another piece of the puzzle." In their study, the researchers investigated XPD, a protein involved in both DNA repair and replication. First, the scientists attached very short strands of DNA to a gold electrode, added the XPD, and used the

electrode to measure the protein's electrical potential, or its ability to send or receive electrons. Separately, the chemists made a solution of the protein along with both regularly matched strands of DNA

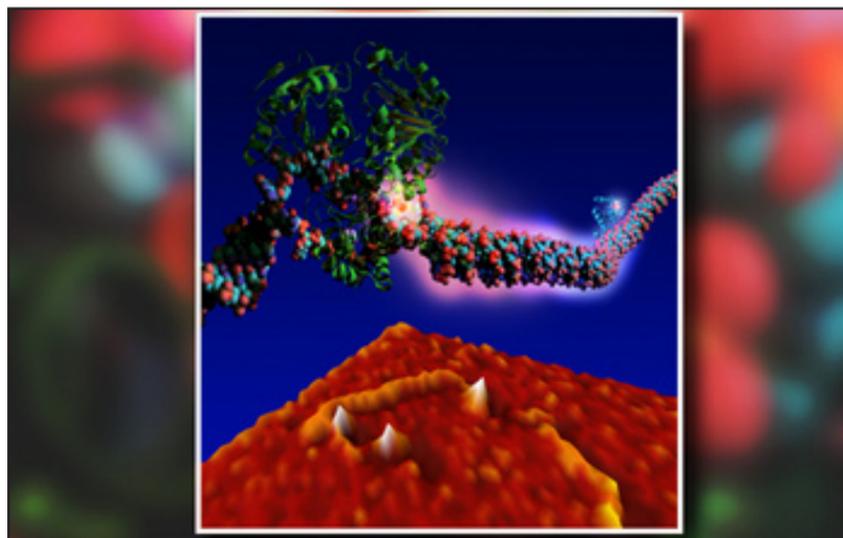
Sontz, lead author on the study and a graduate student at Caltech. In a previous study, the Barton lab had conducted similar experiments with Endonuclease III (EndoIII), a repair protein that removes

pathways and from totally separate organisms, which is really neat. That's what's really opening the door for a lot of future studies. If EndoIII and XPD can do this, there are probably many other proteins from a variety of organisms that are also able to send or receive charge through DNA."

Coauthor and graduate student Tim Mui adds that this kind of cooperation between tested proteins that are normally completely isolated from one another could indicate that the mechanism has been conserved by organisms across evolutionary history. The key to this coordination seems to be that the two types of proteins have comparable electrical potentials when bound to DNA, meaning that they are similar in their likelihood to gain or lose electrons. "We're finding that one of the requirements for a protein to potentially participate in this process is that as it binds to DNA, it has to have a similar potential to other proteins, so that it can release an electron that can shuttle through the DNA to another protein," Sontz says.

The proteins have this ability to send and receive electrons because they contain what are called redox-active iron-sulfur clusters. Both XPD and EndoIII contain four-iron, four-sulfur clusters that play no clear structural role in the proteins but contain metals that can easily gain or lose an electron as they bind DNA.

"It's really difficult for the cell to build these clusters," Mui says. "So there is a thought that they must play a significant role in something else, which could be this mechanism to locate lesions within the DNA."



Two repair proteins, XPD and EndoIII, are shown at the top of the image, bound to DNA and using DNA-mediated charge transport to locate genetic damage. Pictured below the DNA is an atomic force microscopy image of XPD bound to DNA strands on a mica surface.

- Eric Olmon and Pamela Sontz

and longer strands that included a mismatched pair of nucleotides, which are the individual chemical units that make up DNA. Then they used microscopy to visualize and count the number of proteins that bound themselves to the different types of DNA.

They found that only the proteins that were able to send and receive electrons through the DNA repositioned themselves in the vicinity of the mismatched nucleotides. "We believe that the redistribution comes from two proteins using charge transport to communicate with one another, and falling off of the strands that don't have a lesion and attaching to the strands that do," says Pam

damaged bases. They found that like XPD, EndoIII redistributes itself so that it can home in on mismatches in DNA, and that mutant forms of EndoIII that cannot participate in charge transfer do not relocalize.

In the new study, the researchers were also able to show that mixtures of EndoIII and XPD were able to coordinate in order to relocate onto the mismatched strands of DNA. The team was working with EndoIII from the bacteria *Escherichia coli* and XPD from a microorganism called *Sulfolobus acidocaldarius*. "Our findings suggest that these two proteins are able to signal one another in order to zero in on a lesion," Sontz says. "They're from different DNA-repair

In this issue

NEWS

The link between IQ and social group **3**

OPINION

A response to Scheff's open letter **4**

FEATURE

Warren Brown nominated as Prof of the Month **5**

SPORTS

Caltech fencers qualify for NCAA Western Regionals **7**

News briefs from around the globe

Helping readers burst out of the Caltech bubble

Need to know

< **100** words about the world this week – topics sorted from good to bad

by Sam Barnett – links to full stories available at barnett.caltech.edu/news

Strong employment data	243,000 new jobs last month – DJIA stocks highest since May 2008 [AFP]
Federal Reserve efforts	2% annual inflation target – predicts 2012 GDP rise of 2.2% to 2.7% [CNN]
Case against Swiss bank	\$ 1.2 billion allegedly hidden from the IRS with the bank's help [WSJ]
Egyptian investigation	19 Americans face criminal trials regarding nonprofit financing [NYTIMES]
Floods in Australia	4,000 ordered to evacuate – 300 buildings have been flooded [CNN]
Escalation in Syria	43 people killed by Syrian forces – China, Russia veto UN resolution [CNN]
Rise in malaria deaths	1.24 million (Lancet estimate for 2010) – twice WHO's estimate [BBC]

Food with Mannion!

Do you like eating food?

How about free food at nice restaurants?

Ever want to tell the world exactly what you think of said food?

The Tech will be beginning a new column to chronicle the foodie experiences of new writers every other week... The Catch: They'll be going head-to-head with Tom Mannion who will be reviewing the same restaurant. If you have ever thought you were more of a gourmand than our resident master chef, now's your chance to prove it!

Email us for a spot on the list at tech@caltech.edu

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ASCIT Minutes

1/29/2012

Officer's present: Chris Hallacy, Margaret Chiu, Laura Conwill, Diego Caporale, Mario Zubia, Michelle Tang, Laura Santoso

Guests: Kathy Garcia

President's Report

1. PFW: Probably won't do midnight donuts again because the mob scares pre-frosh. Thinking of new ideas for the carnival.
2. Big I: May bring it back next year if there's enough interest.
3. Basketball buses: Mannion providing buses for games.
4. Athletics: Betsy Mitchell will be meeting with the athletics faculty board. Wondering what the Student Athletic Advising Committee (SAAC) is doing.

Officer's Reports

1. ARC (Margaret)
 - a. Option requirements: Option heads are meeting with Melanie Hunt to discuss changes they might make to their major requirements in response to a change in core.
 - b. Couse feedback: working on Ombuds, trying to get qualitative input by midterms.
 - c. Option fair: Working on getting professors and students to hold booths.
 - d. Prof of the month: Warren Brown (humanities) is the January prof of the month.
 - e. SFL: Will be
2. IHC (LC)
 - a. New Fleming President: Is now Alan Menezes.
 - b. Admissions: Trying to get more house information available to people who are admitted, both about the housing system and housing personalities.
 - c. Bechtel Committee: student appointments are being made, up in the air right now.
 - d. Alcohol Cabinets: Are officially going to be made for each of the houses, though no deadlines for building have been set yet.
3. Director of Operations (Diego)
 - a. Paintballs in SAC 15: has started moving them to a better location. They are now on rolling chairs.
4. Treasurer (Mario)
 - a. Club funding: If clubs run out of money before the end of this year, they can come to ASCIT with proposals for more.
5. Social Representative (Michelle)
 - a. Ice event: Went well! Though music stopped early because of too many noise complaints.
 - b. Pong marathon?: Thinking about doing a massive water pong and ping pong tournament
6. Secretary (Laura)
 - a. Big T Editor: New editors in chief are Nikita Sinha and Melissa Xu.
 - b. SFC committees: Scheduling meetings with them.

Caltech scientists find status within group affects IQ

KIMM FESENMAIER
Science Writer

Our cognitive abilities and decision-making skills can be dramatically hindered in social settings where we feel that we are being ranked or assigned a status level, such as classrooms and work environments, according to new findings from a team of researchers from Caltech and four other institutions. The finding flies in the face of long-held ideas about intelligence and cognition that regard IQ as a stable, predictive measure of mental horsepower.

“This study tells us the idea that IQ is something we can reliably measure in isolation without considering how it interacts with social context is essentially flawed,” says Steven Quartz, professor of philosophy at Caltech and one of the authors of the new study, which appears in the current issue of *Philosophical Transactions of The Royal Society B*. “Furthermore, this suggests that the idea of a division between social and cognitive processing in the brain is really pretty artificial. The two deeply interact with each other.”

“You may joke about how committee meetings make you feel brain-dead, but our findings suggest that they may make you act brain-dead as well,” says Read Montague, director of the Human Neuroimaging Laboratory and Computational Psychiatry Unit at the Virginia Tech Carilion Research Institute and corresponding author on the paper.

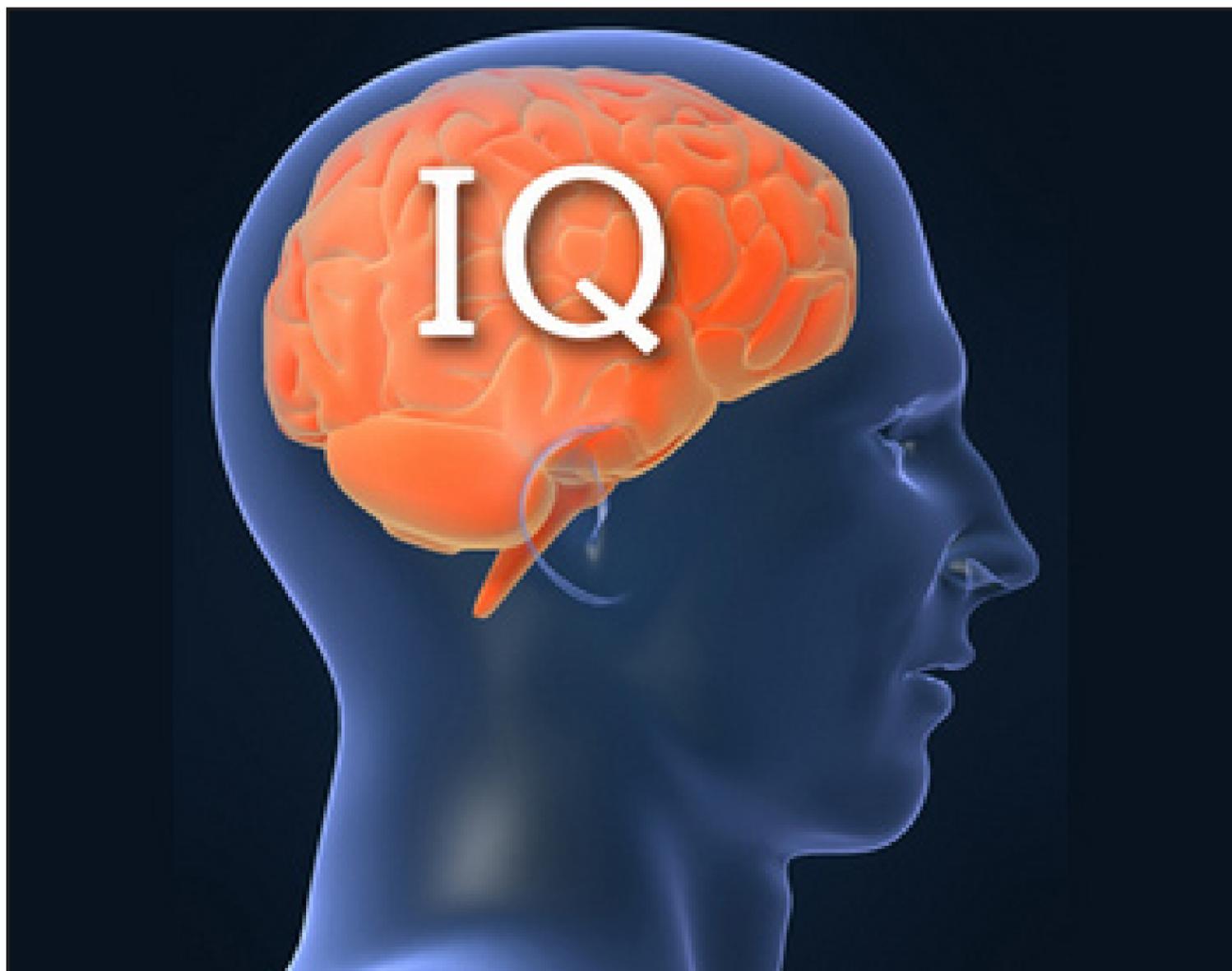
To investigate the impact of social context on IQ, the researchers divided a pool of 70 subjects into groups of five and gave each individual a computer-based IQ test. After each question, an on-screen ranking showed the subjects how well they were performing relative to others in their group and how well one other person in the group was faring. All of the subjects had previously taken a paper-and-pencil IQ test, and were matched with the rest of the group so that they would each be expected to perform similarly on an IQ test.

others, called Low Performers, continued to perform below their expected level. By the end of the computer-based test, the scores of the Low Performers dropped an average of 17.4 points compared to their performance on the paper-and-pencil test.

functional Magnetic Resonance Imaging (fMRI). This type of imaging allows scientists to track increases in oxygenated blood flow, indicating heightened activity, in the brain. At the start of the test, researchers observed increased activity in all the participants

important to people,” Quartz says. “When they saw their rank go up, that was a reward.” The idea for the new study came, in part, from a study published in 1999 in which researchers from Emory University examined social rank—a strong and extremely motivating signal

the things that we’re learning more and more in social neuroscience is the role of our social contexts and the social adaptation of the brain.” Understanding the role social context plays and its differential impact on the brain may ultimately help educators and others to



media.caltech.edu

“What we found was that sensitivity to the social feedback of the rankings profoundly altered some people’s ability to express their cognitive capacity,” Quartz says. “So we get this really quite dramatic downward spiraling of one group purely because of their sensitivity to this social feedback.” Since so much of our learning—from the classroom to the work team—is socially situated, this study suggests that individual

in a brain region called the amygdala, which is associated with fear and emotional arousal. Among High Performers, that activation decreased over time, while it remained steady in Low Performers. “What is causing the Low Performers to be hindered by the social context is something for follow-up studies, but certainly the suspicion is that it’s a dimension of personality that is driving the difference,” Quartz says. That dimension could be neuroticism, the tendency to worry or to ruminate about social information. “The pattern of activity that we see originally in both groups, but especially in the low-performing group, is quite similar to the pattern of activity you see in studies looking at the neuroscience of neuroticism.”

The researchers also tracked activity in the nucleus accumbens, a part of the brain involved in the processing of rewards. They observed elevated activity in the nucleus accumbens when a subject’s rank within the group increased. “That shows that the task was motivationally

among primates. It has long been known that even monkeys that have never met before can quickly sort themselves based on social standing within the group. The Emory researchers isolated low-ranking rhesus monkeys and taught them a learning task. They found that in the presence of high-ranking group members, the monkeys who had learned the task acted as though they were not familiar with it. “Social rank isn’t as well understood in humans,” Quartz says. “So we wanted to see what would happen when social rank becomes salient in a group of humans, as it does in most real-world learning environments. We wanted to see if this has an effect on the expression of IQ.” Throughout the 20th century, IQ was used in different arenas as a way of sorting or classifying people into niches. Because people believed it to be a more abstract notion of cognitive ability, it was thought to have strong predictive validity of mental capabilities even from age six. But IQ was always measured in social isolation. “That reflects a long tradition of intellectual history, of considering rationality and cognition to be this isolated process,” Quartz says. “But one of

design more effective learning environments. The present study found some unexpected trends, including the tendency for female subjects to be more affected than males by the implicit signaling of social status during the test. Although all of the subjects scored similarly on the paper-and-pencil IQ test, 11 of the 14 Low Performers on the ranked group IQ task were female, while 10 of the 13 High Performers were male. Due to sample size limitations, additional studies are needed to validate the finding and to investigate possible causes. In addition to Quartz and Montague, additional authors on the paper, “Implicit signals in small group settings and their impact on the expression of cognitive capacity and associated brain responses,” are Kenneth Kishida of Virginia Tech Carilion Research Institute, Dongni Yang of the Baylor College of Medicine, and Karen Hunter Quartz of the University of California, Los Angeles. Montague is also affiliated with the Wellcome Trust Centre for Neuroimaging in London. The work was funded by the Wellcome Trust Principal Research Fellowship, the Kane Family Foundation, and the National Institutes of Health.

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You may joke about how committee meetings make you feel brain-dead, but our findings suggest that they may make you act brain-dead as well.

- Read Montague

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At the outset, all of the subjects did worse than expected on this “ranked group IQ task.” But some of the subjects, dubbed High Performers, were able to improve over the course of the test while

differences in social sensitivity may play an important role in shaping human intelligence over time.

During the computer-based test, about a third of the subjects underwent brain scans, using

Caltech Couture: Weather wear

ALEX LANGERFIELD
Columnist

Here's something to consider. It's now February, the Houses just finished their annual ski trips, and 80-degree weather has been a pretty normal phenomenon lately. What's going on? We're in California!

California is truly a state of contrasts. In one day you can go skiing in Squaw Valley in record snow conditions (home of the 1960 Winter Olympics), pass Donner Lake on the I-80 (where the Donner Party partially committed to cannibalism when it got trapped in over six feet of snow for the winter), then drive through the desert Great Central Valley and finally enjoy the afternoon basking in the setting West-coast sun, sipping a Napa Valley wine, savoring a Ghirardelli chocolate dessert, and admiring the blooming roses.

Does paradise actually exist? I'd say yes.

I came back to Pasadena from winter break and my first reaction was to go to the beach, or at the very least, the pool. Now here's a

problem. Before leaving for break, I packed away all my summer clothes and put out my winter clothes. Now I'm pulling out summer pieces one by one as the weather doesn't seem to break much.

I admit that I love the sunshine, but it still feels funny wearing shorts and getting deep tan lines in February.

We're not in Australia, where it is actually summer, and we have even had a couple of rainy days. I spotted a few Christmas trees still

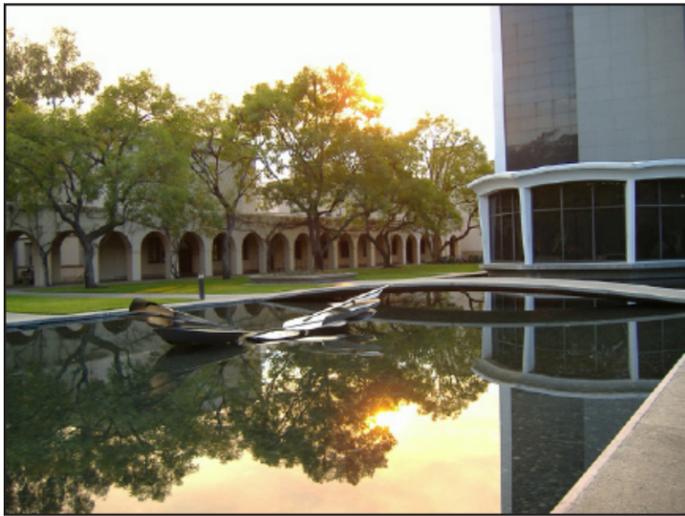
blizzards, etc. Do you miss winter? Or are you taking this Pasadena weather as a blessing?

Perhaps the best general answer is that everyone has his or her own preference. But that still doesn't resolve the clothing issue. On campus, I see one person wearing one light layer and two feet away I see another person a sweater, scarf and boots. Which outfit is more appropriate?

On the practical side, it's more appropriate to wear what fits the weather. On the conventional side, it's more appropriate to mimic the season. However, the season here is a Southern Californian winter which might as well call for bathing suits!

It's most convenient to dress according to the weather. However, this means that we would barely ever wear cozy sweaters and earmuffs, but those are just too

much fun to wear! So, if we must get it out of our systems, we should pull out the winter clothes now while it's formally winter unless we want to have a Christmas in July. I guess having suntan lotion (alright, or sunblock) and a fuzzy scarf with you is just another proof that you are in blessed California!



climatescience.jpl.nasa.gov/

lying on the sidewalks just a few days ago! Is it fair for us to don our daisy dukes when just a few hours' drive away people are skiing and sipping hot chocolate?

My hometown boasts a rather mild climate too, so I can't say that I miss winter because I'm not used to having one. However, others here just got back from snowstorms,

In response to Isaac Sheff's open letter

TRAVIS SCHOLTEN
Contributing Writer

I am writing this letter in response to Isaac's letter last week regarding hazing.

In it Isaac makes a great effort at explaining and contrasting how rites of initiation from earlier in Caltech's history were far worse than those performed today, by any "reasonable" definition of worse.

To bolster his claims, Isaac found a photo of a young man with a blanket of sorts over his head and a belt around his neck in the style of a leash.

This was supposed to be characteristic of the kinds of behavior any reasonable person would find deplorable.

I laughed when I saw that photo. I say that in complete sincerity. Does that mean I am not a reasonable person? As I find something oddly amusing about that situation, should my viewpoint be dismissed as "not reasonable"?

I bring this up because any rule or policy which is only enforced when a "victim" feels victimized by a "perpetrator" creates the unmanageable situation when the subjective interpretation of the "perpetrator" must necessarily be subjugated to the interpretation of the "victim".

What's more, it also follows that any person who does not agree

with the victim must themselves be as guilty - at least in spirit - as the perpetrator. (Recall the outpouring of anger at men who refused to condemn DSK.

How many of you remember the Duke lacrosse players?)

For all intents and purposes, the "perpetrator" has no defense. How can one argue with a "victim's" claims that they have been hazed/harassed/etc.? The simple answer: there is no argument. The dangerous conclusion: under such rules, a concept of justice cannot exist.

Like Isaac, I too am leery of a hazing policy which is exceptionally vague.

However, I am more concerned with the notion of a hazing policy which defines hazing in the eyes of the beholder.

Our Honor Code works because we know violations of the Honor Code represent serious transgressions of proper behavior in the Caltech community.

The new hazing policy cheapens the value of the Honor Code by suggesting that in addition, there are petty transgressions which, by their "offensive" nature, must be dealt with as seriously as other violations.

In other words, just because I laughed at that photo, does that mean I am actually as deplorable as you may want me to be?

"Love Sucks" a cappella concert comes to Caltech

Romantic entanglements got you down? Well look no further! We have the solution for you!

With Valentine's Day fast approaching, it is once again time for the annual "Love Sucks" a cappella concert hosted by Caltech's Fluid Dynamics and Out of Context. Every year collegiate a cappella groups from all over this chunk of the state gather to show off their talents and collectively lament at how unfortunate it is to be in love. Got a romantic chip on your shoulder? Then come to the concert!

This year's lineup includes a total of eight different groups from as far away as UCSD, and as close by as Cal-State Northridge. Awesome groups like Awakening, whose former members include Sara Bareilles, and the rival all-female groups from USC and UCLA are all making an appearance to show off their triads and trills. If you like music, here's one concert you won't want to miss.

The concert will be held in Dabney Hall at 3:30 pm Sunday, February 12. Admission is free to all and all are welcome. Come support your fellow students and see some great talent from all over SoCal!

Prof of the Month: Professor Warren Brown

SANDHYA CHANDRASEKARAN
News Editor

Professor Warren Brown has been an HSS faculty member for nearly fifteen years. But before making his way to Caltech as a history professor, he obtained both an undergraduate physics and music degree in a dual program with Tufts University and the New England Conservatory.

However, his undying curiosity for history convinced him to pursue his passion. Brown's unique background and enthusiasm translate into his impressive and universally appreciated method of teaching.

Brown teaches a wide array of courses that he tailors to best address the interests of his students. In his freshman humanities courses, of which he teaches one every year, he tries to show his students how historians do their work, as opposed to flooding them with advanced historical names and places.

He continues, "I take big works of history or works of literature, like Virgil's Aeneid or Dante's Inferno, and treat them as historical primary sources. I work through them with students, not necessarily to come up with "the right answer", but rather to ask questions, figure out how to draw conclusions, and argue with each other."

Brown is a medieval historian, so his numerous classes on the Middle Ages are no surprise. He teaches a survey course every other year, the first half of which spans 500 to 1000 A.D., while the other covers 1000 A.D. up until the Reformation.

Additionally, Brown creates specialized courses that he "uses as a hook to draw students in to teach them about social, political, and economic history while they are not looking."

He elaborates, "The students make their interests very clear... and over the years, I have paid attention to what the students want. We have a lot of testosterone-driven males at this school who are really interested in military history, so I teach a class on knighthood... Religion is also a big flashpoint... Regardless of their background, the pope, for example, is a burr in their saddle.

"So, in my church history class, I talk about where the pope came from and how the pope developed. In my survey class, my students keep asking me about the Crusades, and since I am only able to dedicate a week in that class, I developed an entire course on it [which I am currently teaching]. Vikings perennially fascinate students, and they have these persistent beliefs that, for example, Vikings had horned helmets, which is a

complete myth. So I teach a class on the Vikings in the spring.

"I even have this fantasy of teaching a course on J.R.R. Tolkien. Everybody here has read Lord of the Rings. So have I - ten times in English, and five in German. So that is a common interest that we have. Tolkien was a medieval historian, and LOTR came from all of his research, particularly in Nordic

similar to how I would teach a graduate seminar... I was a TA at UCLA when I was doing my doctoral work, where lectures are attended by up to 200 people; there is no way a professor can engage them in any kind of process. I count myself extremely fortunate; I have had moments in conferences where I talked to colleagues about what teaching is like here, and I can tell they

But, [at the end of the day], I am very happy if people leave with more questions than answers... I very rarely find that my courses go stale because each time the pack of students is different. I never walk into a class at the beginning of the term knowing exactly how it is going to turn out, what the personality of the class is going to be. The questions are always different. So no matter if I have taught a course five times, I feel like it is a fresh course every time I do it."

As knowledgeable and well versed as he is in medieval history, Brown is continually challenged by his students.

He explains, "Caltech students are really smart, and sometimes, they can push me... Sometimes, I have to hide the fact that I am nervous when I enter the room because the students are so smart and their questions are so pointed." SURF students have come in with very original questions and I have learned from them; they push me out of my envelope and tackle things that I don't teach...

That isn't to say that Brown is unprepared in the least. He reveals, "I spend a good half of my day preparing, even if it's a course I have taught before, because the questions I will get are unpredictable. I have to be ready to do my job, which is to answer questions, to give information and at least show students where to look for answers. So the preparation - feeling like I have done my work when I walk into the classroom - it takes time... I have to make sure I am on top of my game every time I walk into class because I feel like the students expect it."

The spontaneous dynamic of

To go in with a basic framework, basic idea, and then just turn loose, and improvise in response to what is going on."

The reason Brown is able to flourish in this type of course environment is his keen intuition for the needs of his students.

He advises, "Treat the students as people. Care about them, and care about whether they learn something. I really try to engage them personally, I try to get to know them and to be available for questions. I think students really respond well to feeling like they are cared about and that the professor cares about what they learn rather than putting the information on the board and leaving it up to the students to decipher it. Actually assigning work and being a stickler about attendance give the students the sense that I do care, that it matters to me."

Brown's care for his students extends beyond the meticulousness with which he organizes his courses.

He was an active faculty member of the CORE Curriculum Task Force, which dedicated a considerable amount of time to restructuring the CORE curriculum to suit the needs of Caltech students.

Although the number of HSS courses on the current agenda might be reduced from the present requirement of twelve courses down to eleven, Brown is far from discouraged. "Caltech sends a powerful message to the world by requiring students to essentially take one HSS course every term. Caltech takes the humanities seriously. And it is a real morale boost to see, for example, on the faculty board or various committees, that there are people who are reluctant to cut the humanities requirements."

But it is ultimately up to the students to make the most of the opportunities given them.

He urges, "Take the humanities classes seriously... You are moving out into a world that does not understand what you do all the time. That will often try to manipulate what you do for political or economic ends... I can't think of a better way to teach students to [handle this] than to use past sources

to see what people have done to precisely tackle the kind of things they are going to meet out in the world."

There will be a reception recognizing Professor Brown in early March, along with the Professor of the Month for February.

Be on the lookout for announcements, and spend time getting to know these amazing individuals.



<http://www.its.caltech.edu/>

Scandinavian history. To design a course where we look at Tolkien as a historian and see where the roots of LOTR came from would be a very cool and luring topic."

While Brown finds that he has little trouble incentivizing

students to engage and participate, he does require attendance in his freshman humanities courses - "if they miss two classes, they fail." However, he notes that no one has pushed him on that policy.

Brown feels like, aside from mandating regular attendance, there is little need to seduce students into taking his

courses. "Students are there because they are willing to go through the work in exchange for the payoff in learning. They come into these classes because they want to get out of the lab and problem sets, so they are really engaged."

Brown thrives in the Caltech atmosphere as much as his students do. "I do not know of another place, besides small liberal arts colleges, where we can teach undergraduate courses

feel pretty jealous... I am not sure I would want to teach anywhere else."

Over the years, the basic approach that Brown implements in his courses has remained the same.

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Everybody here has read Lord of the Rings. So have I - ten times in English, and five in German. So that is a common interest we have.

- Prof. Brown

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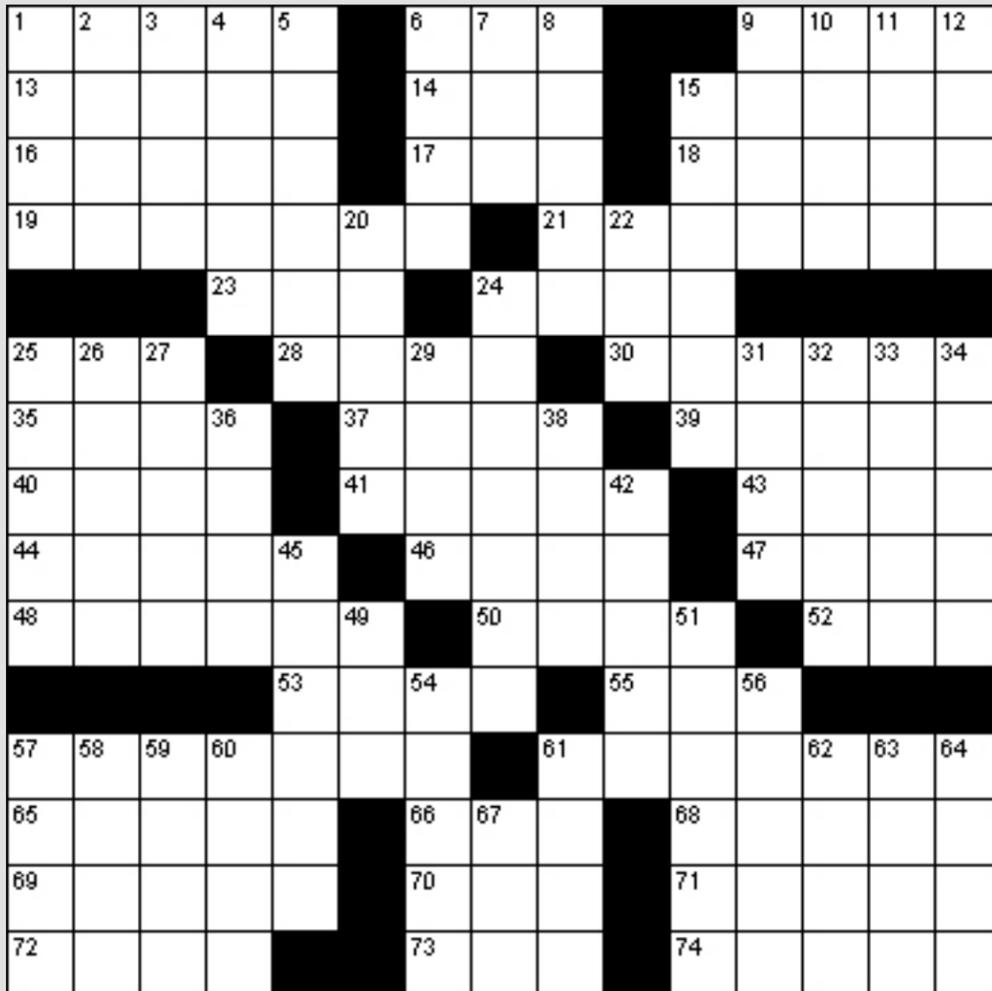
Brown shies away from using secondary reading, and does not assign textbooks because "they tend to give prepackaged interpretations".

Instead, "I exclusively give primary sources texts from the period and I give background lectures to provide a framework. But it really is getting our hands dirty with discussing the primary sources. I have a few goals each time that I want them to reach, some things I want them to see.

his courses prompts Brown to compare his teaching style to jazz improvisations.

"Jazz improv takes a basic structure, like one of the songs from the American Songbook. There is a basic harmonic and melodic structure. That's it -- a very loose framework. And then the rest is improvising around it, on the spur of the moment. A good jazz player has no idea what is going to happen. And that, I think, is my teaching style.

Today's Puzzle: Crossword



Across

1. Incline
6. Spoil
9. Particle
13. Person
14. Mature
15. Phase
16. Skilful
17. Offspring
18. Coconut meat
19. Sovereign
21. Went by, in time
23. Meadow
24. Pitcher
25. Expert
28. Jealousy
30. Kilt fabric
35. Nobleman
37. Swarm
39. Carried
40. Land measure
41. Beginning
43. Solitary
44. Hen shelter
46. Completed
47. Noisy
48. Retailer's margin
50. Part of a ladder
52. Travel a route regularly
53. Scottish hill
55. Single

Down

1. Something other than it appears
2. Board game
3. Portent
4. Apostolic
5. Main course
6. Crush
7. Before
8. Regenerate
9. At the peak
10. Bugle call
11. Fiend
12. Fermented honey and water
15. Type of beetle
20. Voice part in choral music
22. Allow
24. Ugly sight
25. Warning
26. Criollo
27. Mistake
29. Sell
31. Roster
32. Group of soldiers
33. Invalidate
34. Indigent
36. Writing table
38. Bill of fare
42. Male singing voice
45. Piping
49. On the affirmative side
51. Rock similar to granite
54. Part of a church
56. Number
57. Immense
58. Small island
59. Therefore
60. Letting return
61. Verified piece of information
62. Hilarity
63. Unit of play in golf
64. Recounted
67. Epoch

[<http://www.puzzlechoice.com/>]

Yann Tiersen's Skyline is fitting sequel to Dust Lane

CLEMENT LACROUTE
Staff Writer

Disclaimer: I am a French citizen reviewing a French artist; please do not take anything that is written below as neutral ground. This is a highly biased article, targeted at making you buy albums and concert tickets that will help France get its triple A back. Now on with the music.

Skyline is Yann Tiersen's new album, released in Europe in October 2011, exactly a year after its predecessor, Dust Lane. Part of it was already written at the time Dust Lane was recorded, and the rest was written and recorded during and right after the worldwide tour supporting Dust Lane.

Skyline is in that sense a true sequel, which is why I will go ahead and review both albums for you (my pleasure!).

Yann Tiersen is one of the most famous French musicians abroad, mostly for his work on the soundtrack for the Jean-Pierre Jeunet movie "Amélie".

That success was both a blessing and curse: it helped Tiersen reach a much wider audience than he could ever have dreamed of, but it also gave him a label that he did not want. In the eyes of the public, it trapped him in a genre that was not exactly his.

Dust Lane is, then, a major album in Tiersen's discography. It acts both as an album freeing

him from his "Amélie" label and as a major achievement as a composer. Dust Lane is musically a rupture from any of his previous recordings, except perhaps the live album "On Tour" released in 2006.

It is, of course, reminiscent of his previous works, but in a form that is closer to rock. In addition to Tiersen's usual repertoire of strings and pianos, he adds electric guitars and synthesizers and includes plenty of collaborators such as Syd Matters and Matt Elliott.

Dust Lane is also more ambitious work, with tracks running up to 8 minutes, developing into complex pieces that go beyond being mere songs—the amazing piece "Till the End" by itself justifies the album's purchase.

Dust Lane also contains elements that reflect a rupture in Tiersen's life, following his mother's death. Pieces are imprinted with a rather dark tone (see the tune "dark stuff"), even though hope is not absent.



yanntiersen.com

It is also the first record where Tiersen was able to merge all of his skills into one consistent work: he is a talented musician and composer, a craftsman of sound, a punk, and an energetic performer.

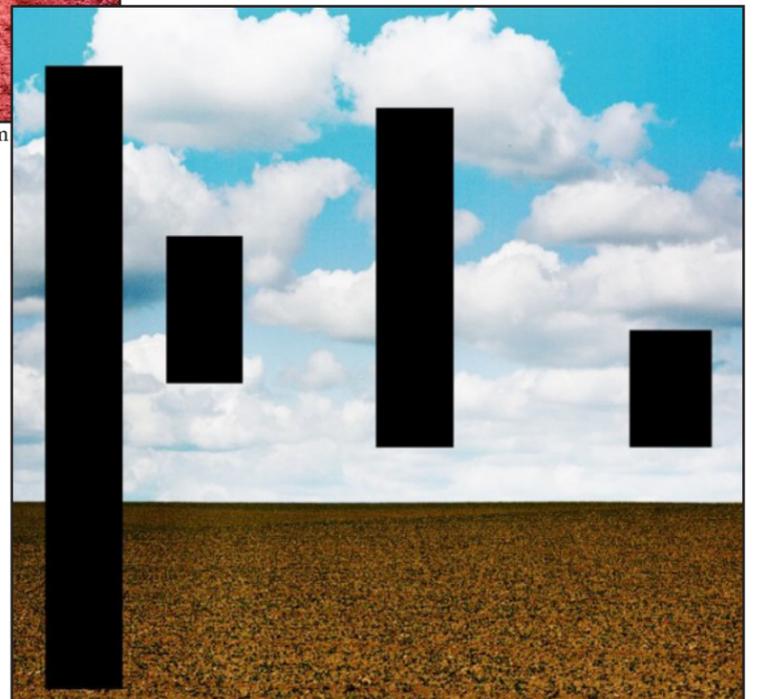
If Skyline doesn't strike as strongly as Dust Lane at first, it is at the very least a fine counterpoint to it. It is no wonder that the album titles take you from ground to ether. Skyline follows the musical track set by Dust Lane, but in a lighter manner, leaning more towards pop this time. It is also less ambitious in its production, with less in the way of strings, pianos, or choirs. The line-up stays the same, and

the work on the vocal arrangements is beautiful on tracks such as "I'm gonna live anyhow", "Gutter", and "The Trial", which allows me to forgive the sometimes plain lyrics (that you might well find yourself reciting after a few listens). To sum things up, Dust Lane is a must-have album, proving Yann Tiersen's talent once

again. If you were to listen to only one of the pair, then it has to be this one. Still, Skyline is a great answer to some of the questions that Dust Lane asks, which ties these two CDs to one another. You'll probably end up loving them both.

If by any chance this review convinced you that these albums are worth listening to, you should also know that it's even better to see them performed live. And you are in luck, since Yann Tiersen will be in Los Angeles at the Music Box on May 12, 2012.

Skyline will be released in America on April 17, 2012.



Caltech fencers qualify for post-season championship and a chance at NCAA finals

MACKENZIE DAY
Contributing Writer

Caltech's Fencing Team brought their foils, epees, and sabers to bear in the tournament hosted at Northwestern University on February 4th and 5th. Two solid days of competition saw the team through successive victories throughout the day, and culminated in seven fencers qualifying for the NCAA regional championships. In these championships, slated to be held in March at Stanford University, the fencers have the chance to continue on to NCAA Finals.

Beyond seven regional qualifiers, the tournament was host to several other exciting turns of events. Of the seven qualifying fencers, four of them are among the team's freshmen.

Harrison Miller and Ingrid Fiedler, who joined the team only this January, managed to pull out enough wins to qualify in their first ever NCAA tournament. John Christian, a freshmen epee fencer, qualified in his weapon, and then went on to win the team bouts in a completely different style of swordplay. Christian brought in several saber wins for the team, adding to the earlier men's saber victory against University of Detroit Mercy.

By far the most impressive of the freshmen qualifiers is women's foil fencer Katherine Fisher. A long time foil fencer, Katie qualified in foil with six wins. She then switched weapons to help the women's epee team defeat Cleveland State University, University of Detroit Mercy, and Lawrence University. By the end of the day, Katie had qualified for the post-season championships not only in foil, her primary weapon, but in epee as well.

Upperclassmen Eugene Vinitzky, Stanford Schor, and Jonathan Schor all pulled similar stunts after qualifying in their primary weapons. These gentlemen changed from their primary weapon to a secondary to help their teammates battle against some of the most highly rated fencers in the country. These gentlemen showed the utmost skill and versatility in their

ability to move between weapon events, and impressed the referees with how well they held their own.

One referee was particularly stunned when, after telling Stanford Schor that he had the wrong equipment to fence left-handed, Stan's response was simply to flip the sword to his right (non-dominant) hand and complete the match this way. In a conversation after the bout, the referee admitted that he could not believe that Stan had never done this before.

All in all, Caltech held its own against some very fierce competition. Apart from the reputation and training of such division I schools as Northwestern and Princeton, in attendance at this tournament were several Olympic medalists. On the first day of the tournament, Caltech's women's saber team faced off against a two time Olympic bronze medalist. It was fun, and she was quite good.

To compensate for their lack of experience relative to the fierce competition, Caltech's fencers defer to other methods at their disposal. Using their smarts, their speed, and even their sick dance moves our fencers showed the competition how to always be on their toes. In one epic bout, whirling wielder Emmett Goodman spun 360 degrees to avoid the point of his opponent's foil. He then spun back and attempted to hit his opponent with a classy-looking around the back attack. Though this series of maneuvers is highly illegal, the referee was so amused with this freshmen's attempt to get the touch that he did not penalize him with a yellow card. Like the referee, we applaud Emmett's ingenuity and fighting spirit.

Two days, countless bruises, and a few snapped blades later, the team returned to Caltech victorious. Every member of the predominantly underclassmen team won bouts during the tournament, and Caltech as a team even came away with a few collegiate wins. With seven fencers moving on to compete in the championships, Caltech's Fencing Team has once again shown teams from across the nation that we are a force to be reckoned with. Stay tuned for more news on these qualifiers. Go Beavers!



Jonathan Schor straight up beheads a dude in front of horrified fans. Fencing is way more intense than I previously thought. I will never question the editors-in-chief of the Tech again.

- Rachel Degooey



Sometimes, you have to destroy the things you love most.

- Amol Kamat

Caltech men's tennis team loses season opener

AMOL KAMAT
Sports Editor

On Saturday afternoon, the Caltech men's tennis team took on the Chapman University Panthers in their first match of the season, losing 9-0. Chapman, located in the city of Orange in the county of Orange ("the OC" if you will), will soon be joining the SCIAC, so the match promised to be competitive and entertaining. In reality, it was...not. Although, I once saw a bird play with a ping-pong ball and then miss and fall off his perch, which was pretty similar to this match and fairly entertaining, so there you go.

The match started with the Beavers looking poised and energized. Their cheer of "CALTECH!" certainly struck fear into the hearts of the Panthers,

whose only response was to win all of the matches in straight sets.

Indeed, the Beavers' day went downhill after player introductions. All three doubles teams fell quickly. Caltech's #1 doubles team (Devashish Joshi and Luka Mernic) were able to take 3 games from the visitors and #3 doubles (Chi Chi An and Amol Kamat) were able to take 1 game (and look damn good doing it), but they still failed to make a significant impact on the powerful panthers players of the OC.

The Caltech Single players also failed to impress, with all six Beavers losing in straight sets. In fact, only one player, John Chen, was able to win more than one game (he won two).

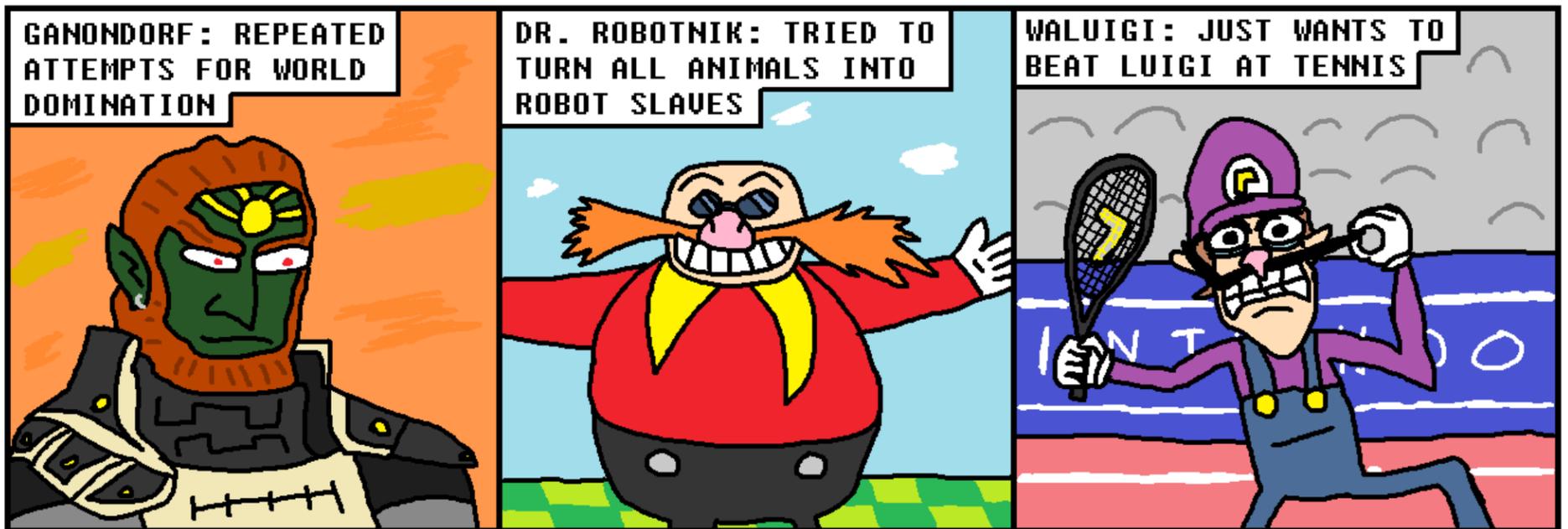
Highlights from the game included freshman Ryan Batterman making his NCAA

debut and junior Amol Kamat looking great in singles. I mean, he didn't actually play great tennis, but he's just really, ridiculously good looking. Batterman played #6 singles and managed to stay out on the court longer than any other Beaver, despite losing 6-0, 6-0. That's pretty impressive. You might say Chapman's strategy against Ryan was: "We double bagel the Batterman." With four years left to practice and learn, Batterman will certainly soon be the hero Caltech deserves, even if he isn't the one they need right now. Yup, that's right.

Caltech takes on Biola University this Friday at 3 pm. From what I understand, they will be getting all orange warm up suits, so you have that to look forward to. With all that orange, we'll look like the OC, huh? Am I right? Yeah, I'm right.

VIDCON VILLAINRY

BY GENE CLINT SITTA



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To apply, email Adam Jacobo (ajacobo@caltech.edu) or call (626)395-5907.

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