

## Swanky Stamps to Show Solitary Scientist's Snowflake Snapshot

By ROBERT TINDOL

Postage rates may keep going up, but when it comes to natural beauty and scientific wonder, one particular issue of stamps is going to be hard to lick.

Beginning next October, the U.S. Postal Service will issue a set of four commemorative stamps featuring images of snowflakes furnished by that hotbed of snowflake research, the California Institute of Technology. The holiday snowflakes stamp set will display photographs taken by Caltech physics professor Kenneth Libbrecht.

For several years Libbrecht has been investigating the basic physics of how patterns are created during crystal growth and other simple physical processes. He has delved particularly deeply into a case study of the formation of snowflakes. His research is aimed at better understanding how structures arise in material systems, but it is also visually compelling and, from the start, has been a hit with the public.

"My snowflake website, [www.snowcrystals.com](http://www.snowcrystals.com), is getting about two million hits a year," says Libbrecht, "of

course, with a big peak during the winter months."

Libbrecht attributes the site's popularity to its discussion of some very accessible science. "Snowflake patterns are well known, the snowflakes fall right out of the sky, and you don't necessarily need a science background to appreciate the science behind how these ice structures form. It's an especially good introduction to science for younger kids," he says.

Libbrecht began his research by growing synthetic snowflakes in his lab, where they can be created and studied under well-controlled conditions. Precision micro-photography was necessary for this work, and over several years Libbrecht developed some specialized techniques for capturing images of snow crystals. Starting in 2001, he expanded his range to photographing natural snowflakes as well. "A few years ago I mounted my microscope in a suitcase, so I now can take it out into the field," says Libbrecht. "Sometimes I arrange trips to visit colleagues in the frozen north, and other times I arrange extended ski

Continued on Page 8, Column 1



Photo courtesy of [www.usps.com](http://www.usps.com)

## Caltech Transit Guide Takes Trips Online

By AMEERA NAZ CHOWDHURY

The Caltech Transit Guide, a new website designed to help the Caltech community use public transportation, is now online at [transitguide.caltech.edu](http://transitguide.caltech.edu).

Unlike other transit resources, this site contains Caltech-specific information on everything from bus routes to subsidized fares. Ameerah Chowdhury ('04), a former Techer, compiled the website's extensive contents.

Whether you are a faculty or staff member, who commutes to Caltech, or a student, who wants to take a jaunt into L.A., this site will show you how to make your trip fast and cheap via bus, rail, or bike.

For those of you who are new to Caltech, the site first begins with a quick overview of L.A.'s Metro system and other transit providers in the area.

The website then shows you how to plan your trip on public transportation using automated trip planners and maps. Some trip planners, such as

ExperienceLA, work better for tourist destinations while others, like BikeMetro, are geared for bicyclists. The Caltech Transit Guide can help

you determine which online trip planner is best for you, and then connect you to it with the click of a button.

Now that you've planned your trip, how much is it going to cost? The Caltech Transit Guide shows you how to make your

trip a bargain, depending on how often you use public transportation.

Caltech offers a \$25 transit subsidy to any Caltech member, who buys a Metro monthly pass. With parking fees and gas prices on the rise, this is an added incentive to ride public transportation frequently, especially for commuting to Caltech. You can purchase a subsidized Metro monthly pass from the Caltech bookstore for \$27.

Students can do even better by scoring a Metro student monthly pass for only \$5. That's cheaper than the cost of two Metro Day Passes! For more

information on this bargain and other transit subsidies, see the section "What's FARE for Me?" on the Caltech Transit Guide site.

In addition, the website covers how to get to the Metro Gold Line from Caltech, how to bring your bike on public transit, and how to stay safe while riding.

The Caltech Transit Guide is also available in PDF form for convenient printing. If you print the guide two to a page, front and back, you can make a booklet that fits easily in a purse or backpack.

We hope that the Caltech Transit Guide helps you use public transportation to explore Pasadena and the L.A. area. Visit our new website at [transitguide.caltech.edu](http://transitguide.caltech.edu).

## Cindy Ko Interviews Jimmy Eat World (Story on Page 4)



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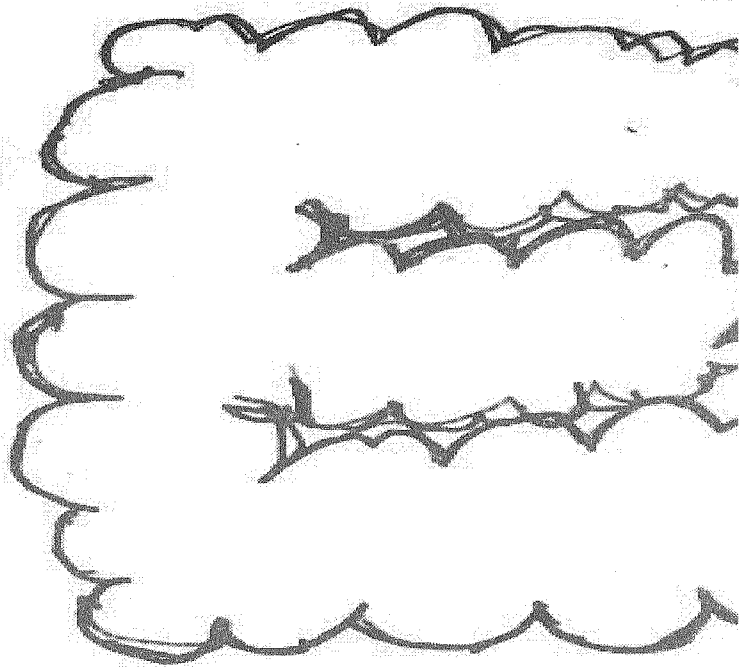
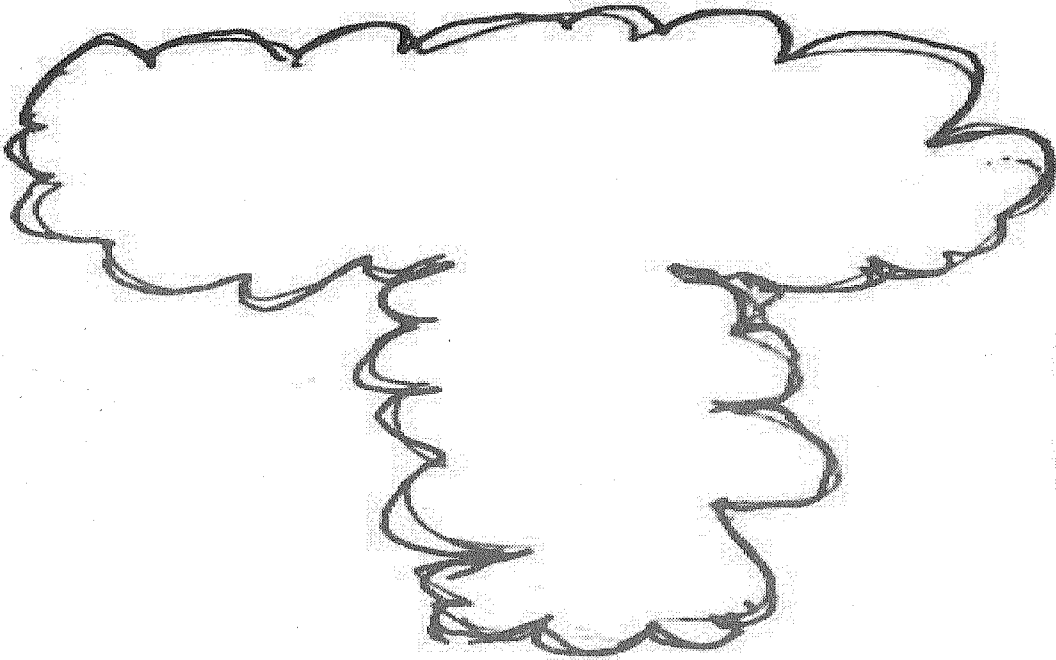
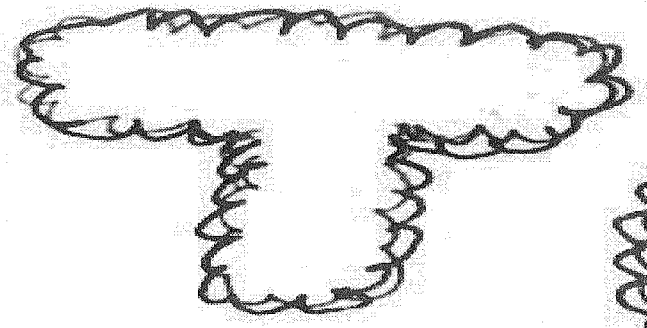
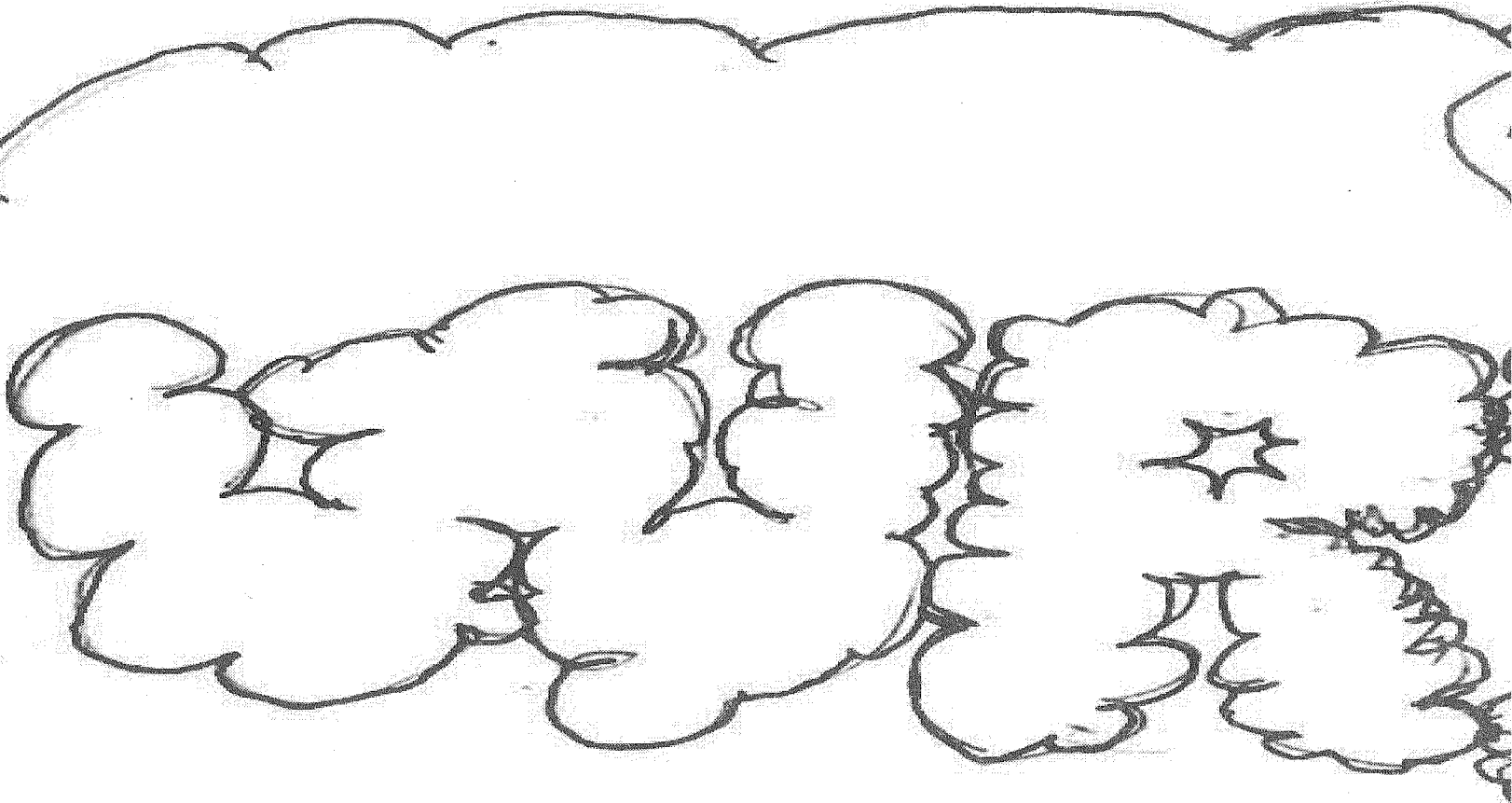
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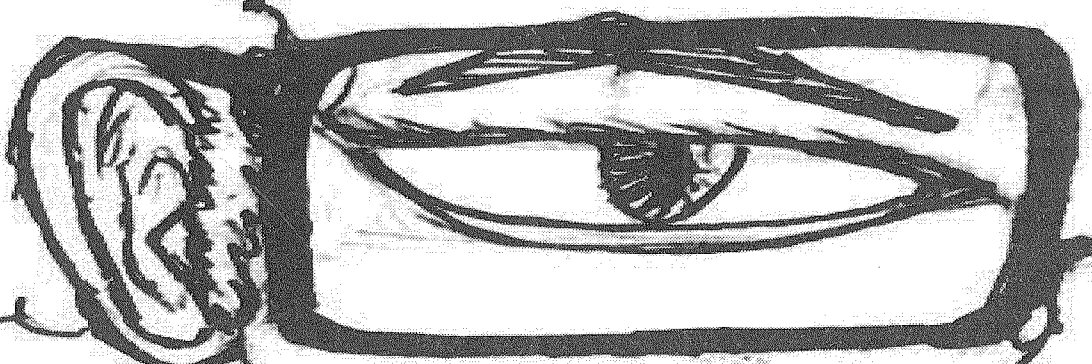
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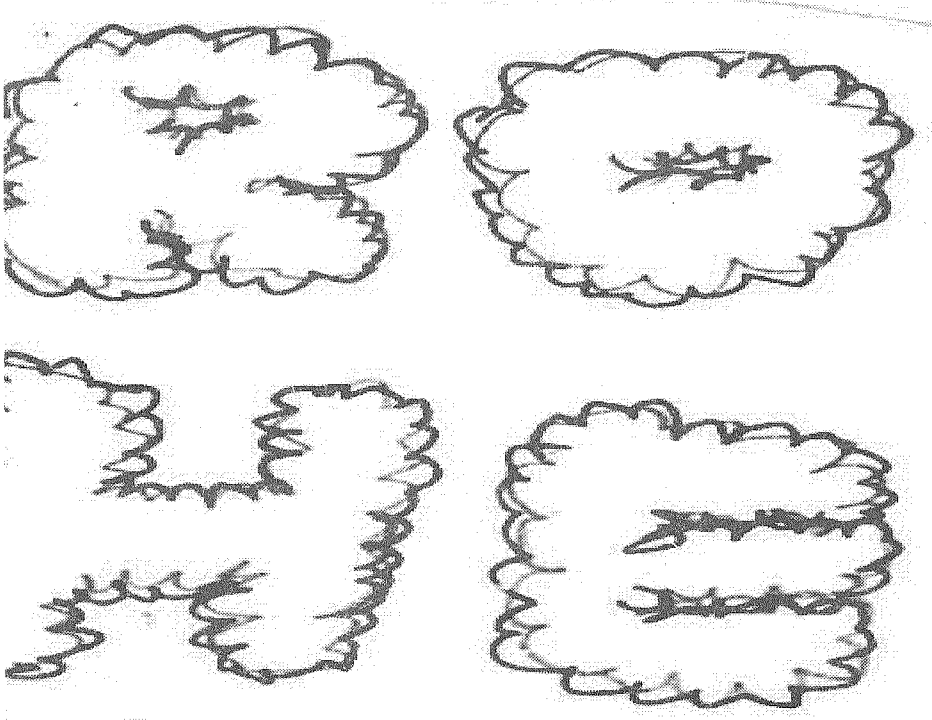
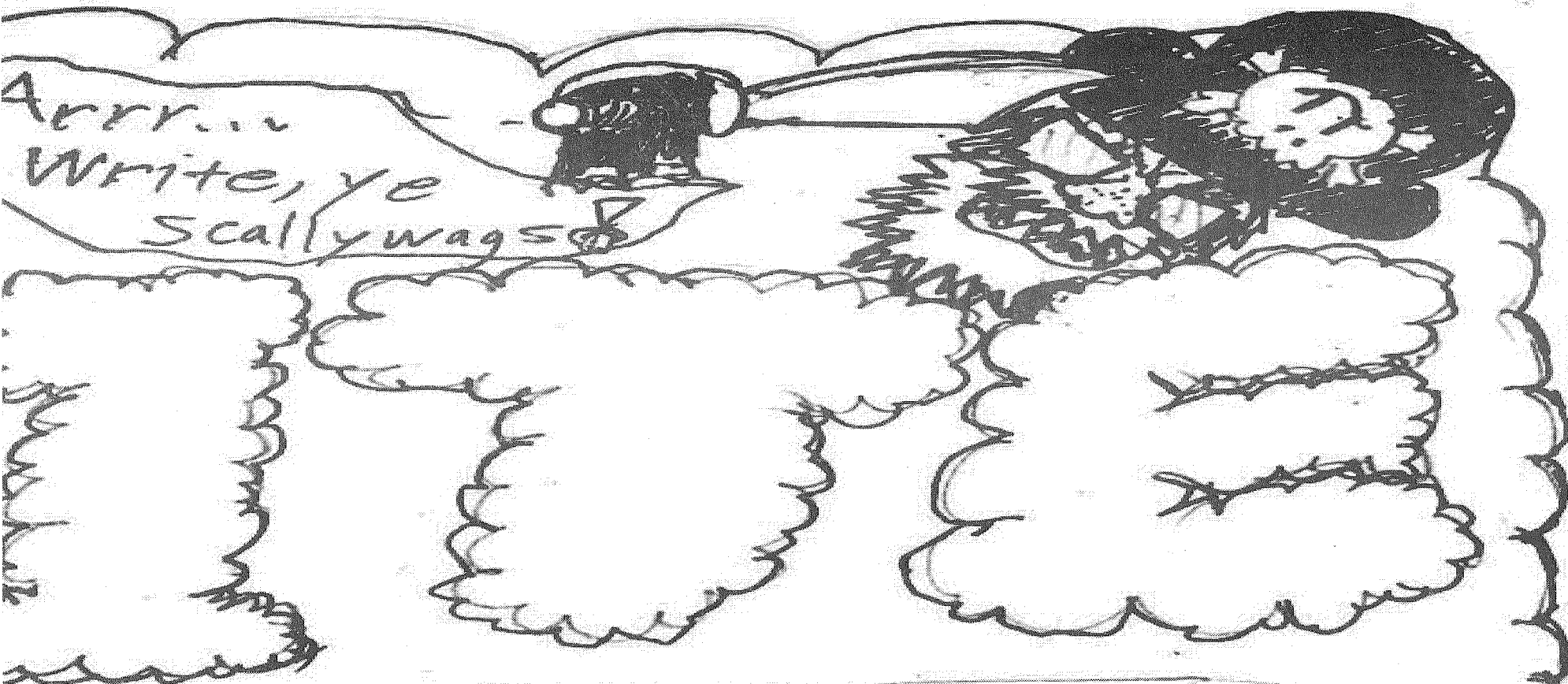


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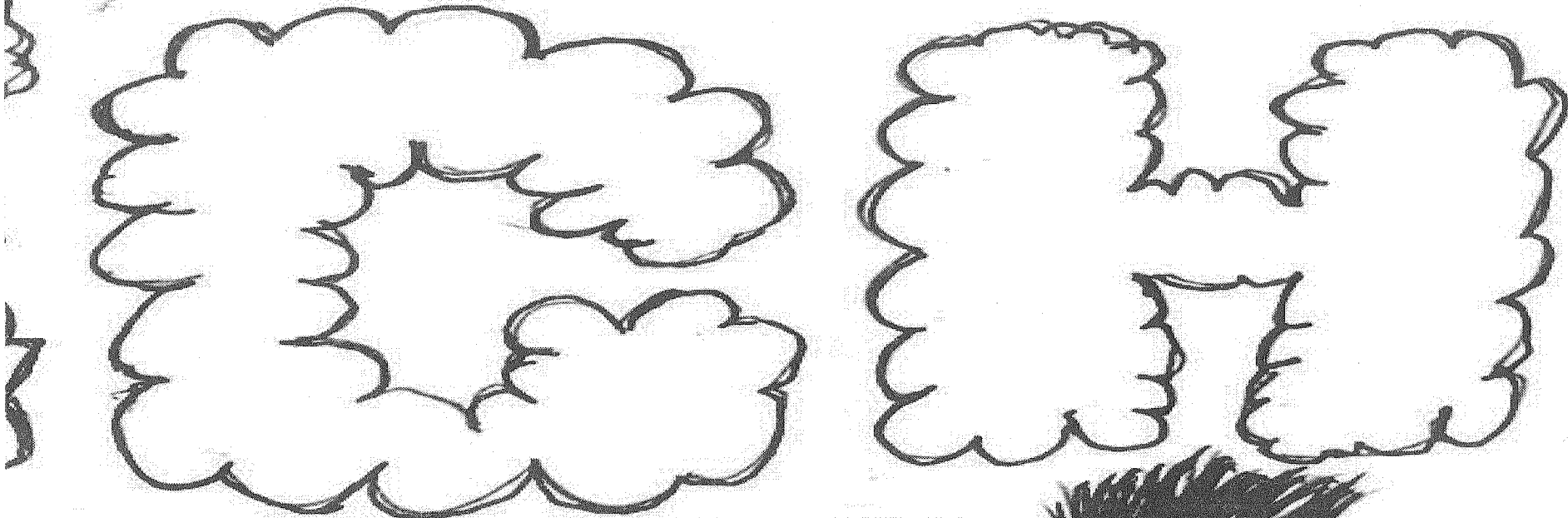
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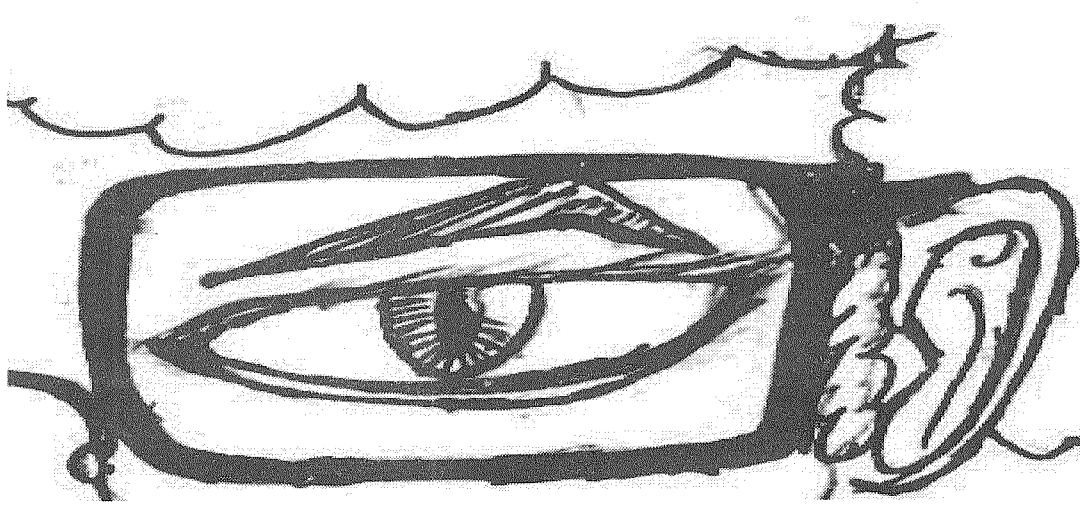
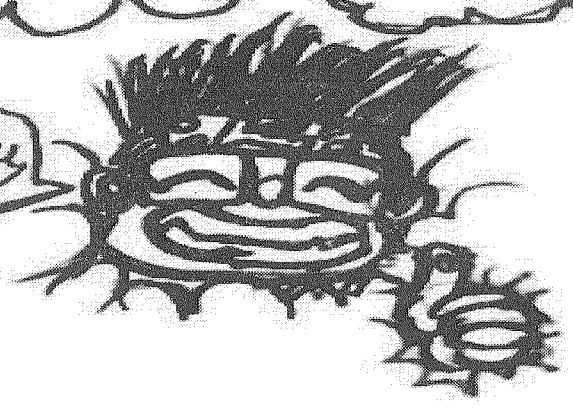




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# Everything You Always Jimmy Eat World but Secu

By CI

## Jimmy Eat World at Caltech – This Ain't No Karaoke Contest

It is beyond me how we got Jimmy Eat World to play here. "What is a hot band like them doing at a school like ours?" is just one of the many questions answered in this interview. I can't believe I got the chance to meet and interview one of my favorite bands of all time: Dreamy!

In the hours before their concert, a bunch of students, myself included, were treated to a 15-minute meet-and-greet with Jim, Rick, Tom, and Zach in Winnett Lounge, all possible thanks to Dima. They were all super nice, even when I was all star struck and stuff. I had compiled a lot of questions over the previous two weeks, and I couldn't decide whether I wanted an interview centered on music, or funny stuff, or stuff that gauged how nerdy and Techer-like they were, so I put in a few of the best. I got a lot of good responses, including the shocking story that explains the title of this article. Please enjoy.

We couldn't get an official interview where I sat down and talked to them all at once, so I had to ask each of them separately.

Encounters with Zach Lind (drums)

CK: So you guys play videogames? I heard you play a lot of *Battlefield 1942*.

ZL: We do, yeah we play that. We play a lot of videogames.

CK: How many hours do you guys spend playing?

ZL: Well, we probably don't play as much as the average geek in college, but like we probably play a lot for how old we are, you know.

CK: *Laughs*. Oh, I don't think it's age related...

ZL: Yeah, I don't know.

CK: Uhhh so... *Interview gets sort of awkward here*. What's your eyesight?

ZL: I have really good eyesight, whatever that is.

CK: Hey, that's good. So you're a straight A student, right?

ZL: No, I was never a straight A student...

CK: Whatever, it's cool; none of us are, either. *Time to ask new questions...* So you're playing in Australia after a few more shows in

the states. How many times have you guys toured there?

ZL: This is our 3<sup>rd</sup> time going to Australia. It's really cool.

CK: I know you guys had fun touring in Japan, because the crowds get pretty crazy, but how does Australia compare?

ZL: Uhh, it's a lot like the States I guess. Japan and Australia are really different though; you can't compare those two.

CK: Cool, well good luck with tonight's show and good luck with your tour in Australia.

ZL: Thanks.

Conversations with Jim Adkins (lead guitar/ lead vox)

CK: So what's the last techno gadget you bought for yourself?

JA: Uhhh... hmmm... latest techno gadget... *Thinks*.

CK: I'm just trying to measure your nerdiness in comparison with the stereotypical Tech student. Like uhh... you know, 'how many hours of video games do you play a day?', 'what's your eyesight?', blah blah.

JA: Uhhmm... latest techno gadget I bought was... a tube distortion pedal by a company called Metasonics.

CK: *Yeah, I don't have any idea about what he's talking about...* Okay, sounds cool.

JA: Yeah?

CK: Yeah...

JA: It's kind cool, like they make stuff out of tubes that were never designed for audio... stuff.

CK: Sound engineering, that's awesome. How's it different from the other distortion pedals that you have already?

JA: It's... uhh it's got a really high output, so you gotta be careful, 'cause you could actually break stuff that you use it with.

CK: Wow, that's cool! *Wow, I sound stupid...* oh, I think I'll have to ask you more questions later, 'cause I'm sort of holding the line up. Is it okay if I come back later?

JA: Yeah sure.

--*To be continued. (Not really.)*--

Adventures with Tom Linton (guitar/ backup vox)

CK: So I'm trying to compare you with the ste-

reotypical geek at Caltech, and I just wanted to know what your favorite science in school was.

TL: Uhhh... probably biology.

CK: Oh really? That's cool, I just changed majors from Bio to Mech E—uhh mechanical engineering.

TL: Cool.

CK: I also have some other questions, this is unrelated, but what's the worst you've ever screwed someone over?

----- *Insert awkwardness* -----

TL: Uhhh, What's the worse I've ever screwed someone? Uhh...

CK: *I'm realizing that this was probably a mistake to ask*. You don't have to answer that if you don't want to.

TL: Uhhh... I'm trying to think. *Thinks for a while...*

CK: That means you're a good person, really.

TL: Yeah, I don't think I've ever really done that. *Laughs*.

CK: That's really good. I'm glad you can't answer that question.

TL: Yeah, I've never screwed anyone over.

CK: Hey, that's good; it's a loaded question, really. Umm what about, what invention did you wish you had thought of?

TL: The wheel.

CK: The wheel? That's a cop-out answer.

TL: What? *Laughing*. That's a good invention...

CK: Alright, alright, it's a good invention. So I heard you guys are like huge Bon Jovi fans,

and you go to karaoke and sing, so what's your favorite karaoke song to sing?

TL: Yeah, it was Jim's birthday a month ago, and we went to a karaoke bar in Chicago. And uhhh, well, we've gone to karaoke bars before, and when we get there no one really wants to go up and sing. So what I did was that I went up and picked all these random and really bad songs, like Ugly Kid Joe, and I don't know, whatever songs... —

CK: -- like the "Cat's Cradle" cover?

TL: Yeah, yeah, just so that people have to go up there and Zach went up — Zach's the Bon Jovi fan—and he did, "Dead or Alive."

CK: Nice, nice. Hey wait, so like, you guys go out to karaoke, but no one wants to sing? That's kind of weird.

TL: Yeah, well people get

nervous, you know?

CK: Yeah, but why do you get nervous though? You guys are on stage a whole bunch. But in front of each other, is it like, 'oooh shy'?

TL: Haha, you know what? Actually, about the time we were recording *Futures*, Jim went over to a karaoke bar that was right across the street from our hotel. And I guess they had, "The Middle" on the karaoke menu. There was also a contest that night, and Jim sang [his song] "The Middle"—but he lost! *Laughs*.

CK: Oh nooooo... that's terrible. That soo... weird.

TL: True story, but kinda funny.

CK: That's a good story. Hey so, I heard you like playing videogames, yeah?

TL: Yes, I just got the X-box Live.

CK: So how do you like

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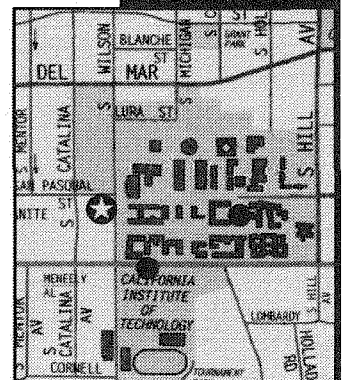
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# Wanted to Know About rity Wouldn't Let You Ask

7 KO

that? What's your favorite game?

TL: I like *Gun*; I also like *Red Dead Revolver*. On Xbox Live, I like *Call of Duty 2* and I like *Madden*. We're solid, big videogame guys.

CK: I know you spend a lot of time making your *Adventures*, and I just want to know how many hours you spend on it. They're really well done, I have to say. Especially that French one... that has no English... I like that one quite a bit. (Tom, his bandmates, and his buddies like to film short movies about funny stuff, and title them *A World of Adventure*. The shorts are posted for fans to download off of their website on the Audio-Video page.)

TL: *Laughs*. You know what? As far as the acting goes, it's pretty much done all in one take. But the guy

who directs and edits it, Marty Flickman, he's the one who spends all the work and time. We don't really spend that much time on the acting, or like our 'trying' to act... it's still fun though.

CK: Yeah, it's cool.

-- Enter band manager.--

CK: Hey, I'm from the school newspaper, is it alright if I just get three more minutes?

Manager: No, we gotta get ready.

CK: *Yeah right, you have an opening band first. C'mon, you have three minutes, gimme some slack...*

-- Manager proceeds to shoo me toward the door. --

I had never really got back to Jim, but I did manage to make a fool out of myself in front of him before I left. As everyone was being shooed out, I insisted on finishing

up the interview, but their manager was like, 'Haha, no way.' So instead, I decided to thank the band by blurting out to Jim, "Thanks for coming to play here, it's so so so... *great!* Thank you!!!" I had originally meant it to sound less corny or retarded but whatever. Jim smiled politely and their manager, who was being a jerk, practically pushed me out the door.

So, even though their manager could have been a little more generous, I still got an interview of sorts. Although, I had forgotten to ask them one key question, "Why did they choose to play at Caltech?" I should have started the interview with that question, but my apologies: I'm an amateur. You may also notice that I didn't ask Rick Burch (bass) any questions, but I will

remedy that later.

Soon after the meet and greet ended, their opening band from San Diego, The Jade Shader, took stage. They were well received by the crowd, with their songs about pirates and Emergen-C antics. The Jade Shader had been on tour with them in the past, but they weren't slated to follow JEW on the next leg of the tour to Australia with Green Day and My Chemical Romance. With the end of The Jade Shader's set, the crowd was warmed up for when Jimmy Eat World took stage.

Having seen them play live a total of three times, twice in high school and once here at Tech, the concert five last Saturdays ago was worlds better than the other times. This time, I got to interview them too, but still the judgment stands. I'd say that the concert venue makes a huge difference; the first two times I saw them play in a sports arena setting, and I had sucky nosebleed lawn seats. I felt like I was at a lame sporting event that costed me too much to sit too far away. A nice intimate concert on the lawn was easily the best to which I've been. They played all their singles off of *Bleed American* and *Futures* and a few of the lesser-known songs, including one they only typically play in concert. The set included an encore as well, which was nice.

At the end of the concert, I was still bummed about not getting to complete my interview, especially because I didn't ask them that last question. I practically begged everyone who I thought could help me get backstage again with very little success. However, I did get lucky when I asked a

member of the ASCIT social team, Rocky Velez, for help. With a little persistence, she got the chance to ask Rick Burch (bass) the final question right before the band left.

RV: Thanks so much for the concert. Here's your dinner. By the way, the reporter forgot to ask you a very important question.

Manager: Sorry, no way. It's too late.

RV: But it's only one question.

RB: Where is she?

RV: Oh well, I was just going to ask you for her.

RB: Okay, what's the question?

Manager: No way, you can't ask them. It's already over.

RB: But what's the question?

RV: Why did you choose to play at Caltech? Why did you agree to play here?

RB: Ooh, that's a hard question... Well, it sounded like it could be a fun concert.

RV: Did you have fun?

RB: Yeah, it was awesome!

(Thank you, Rocky-- you saved the interview!)

Overall, I'm pretty happy that Caltech gave this private concert and I hope that they can do more in the future. Thank you to Jimmy Eat World for giving us an awesome concert, and thank you to ASCIT and everyone involved for the wonderful job they did. I had a great time, and I'm sure that this opinion is shared among most all of the students who attended.

--Cindy Ko

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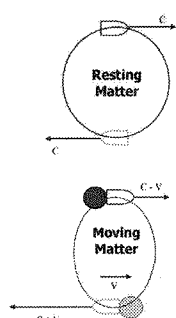
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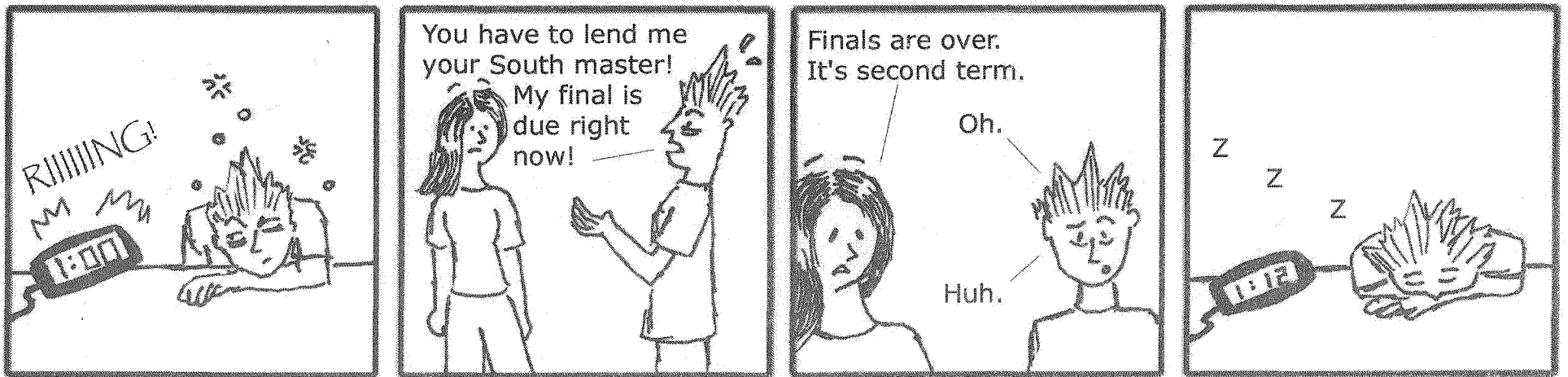


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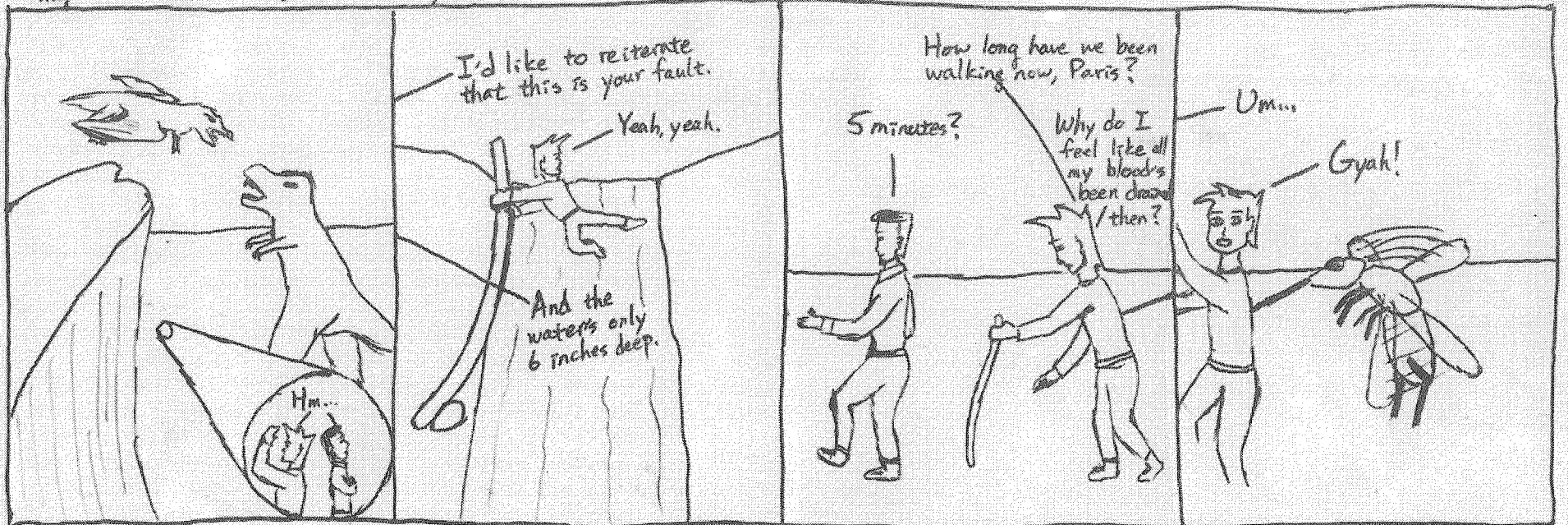
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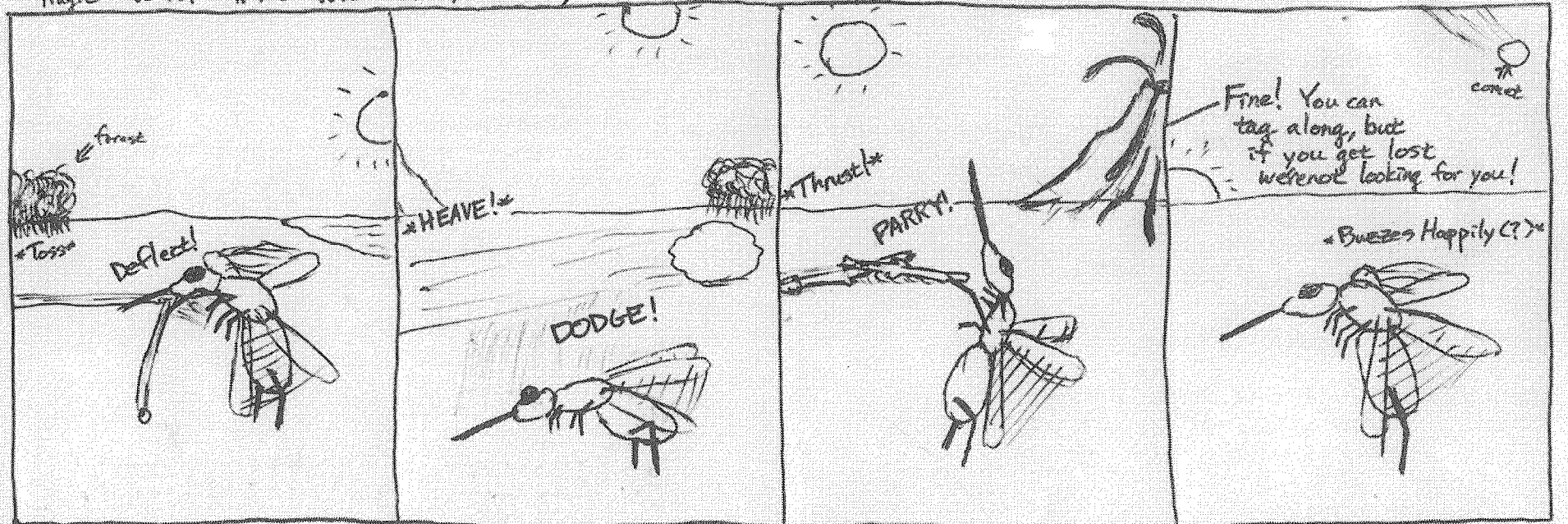


Tragic Relief #11: Are we there yet?



by: Dave Zhang

Tragic Relief #12: What do you mean, "The artist is lazy"!?



by: Dave Zhang



# Bitches is Hoes Papers Part 2: Bitches is Bitches: The reflexive axiom

By JOSHUA GUTMAN

If you've ever been inside a house besides Fleming or Avery, you've noticed the murals on the walls. Starting last year, the administration started a group called Housing and Administration for a Tolerable Environment, or HATE, to remove murals around campus that could be considered offensive. Since this formation, the administration has been using HATE to combat objectionable material and, as they put it, "prevent harassment." Often the removal takes place with little or no notice to the house involved. In a recent case Ricketts house had a pentagram on a wall in the trailers similar to the one they had in the south houses for many years. The mural in the trailer was removed and the house was informed they would not be able to keep the pentagram when they moved back into the south houses. The reason for this removal: Some individuals interpreted the pentagram as a symbol of Satan and hence an attack on Christianity.

To intelligently discuss this issue though, we need to consider what a person may take offense to. My answer:

anything. You are allowed to take offense to absolutely anything. However, realizing that sometimes the view you hold differs from the views of others, it is unreasonable to expect to create an environment to which nobody could take offense. You do have the right to find material objectionable, but you do not have the right never to encounter such material. However, this has not stopped HATE; in fact, it seems that nothing can stop HATE. All of this is pretty ironic considering the symbol was once commonly used to represent the five wounds of Jesus. So clearly the Caltech administration has taken it upon themselves to create their own definition of what we should and should not find offensive. It seems that from this example at least any symbols that can be interpreted as an attack on any group associated by race, religion, etc. are not allowed. Alright Caltech, I'll play by your rules:

Since Caltech has no problem limiting worship of a figure, in this case Satan, I hereby request that HATE remove all crosses and bibles from public display and that

individuals not be allowed to wear crosses around their necks. I find all of these things offensive and threatening. As a Jew, it is not surprising for me to find offensive a constant reminder that there are around half a billion people on this planet who wear reminders and celebrate the torture and murder of a Jewish man. I find it threatening in that the cross signifies the death of one Jewish man and the potential that I might be next. Therefore, unless Caltech is ready to file as a religious university, it would seem quite prejudicial to proscribe one religious symbol because it is offensive and not prohibit other religious symbols.

Some of you out there disagree with my view; some look in the mirror and do not see an anti-Semite. So HATE, I challenge you to come on my show and defend your honor. If you don't, you're a coward. Feel free to e-mail the time you would like to come on my show to [jegutman@its.caltech.edu](mailto:jegutman@its.caltech.edu) or any other hate mail anybody else might have.

In Conclusion: Bitches is bitches.

Bitches is Hoes is a collection of rants about the changes that are happening around Caltech. Many people complain that these changes cause this place to become less Caltechy. We have no idea what that means and we do not have any idea what those people are talking about. We are here to point fingers. We are identifying the obvious examples of idiocy that plague our community. These are the cowardly acts committed by the administration because they are afraid to get sued. These are the failings of different so-called campus services because they are afraid of budget cuts. These are the students who sycophantically adhere to the administration's weak excuses. And so we label them as "bitches." They are as effective as a blind, spayed dog with its teeth knocked out and a giant tumor coming out of its nose. They have sold out by sacrificing the efficiency and quality of the Caltech experience for an illusion of politically correctness and safety. Hence, bitches is hoes.

On another note, don't try to stick us with libel. Everything in these articles is true.

[Editor's Note: Furthermore, in this case, the main accusation made is of hypocrisy, and, if that were illegal, no one would remain to serve jury duty, let alone judge, prosecute, or defend.]

We pull no punches when we comment on the shortcomings of this place. If you think we have punched below the belt, do not hesitate to contact the author of the article so we can make fun of you.

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# Parade-Goers Persevere Against Perilous Pluvian Pelting

By THE CALTECH PR DEPARTMENT

Every year, a sizeable group of Caltech alumni sign on to watch the Tournament of Roses Parade with the Alumni Association, a reservation that guarantees them prime seating at the corner of Hill and Colorado and a convivial post-parade lunch at the Athenaeum. More than 220 people booked spots for the 2006 parade, and nearly all of them braved the elements on January 2, according to Association

assistant director for events and programs Jennifer Schmidt, who accompanied the group. "Everyone showed up in their rain gear, cracking jokes about the weather, and in high spirits overall," says Schmidt. "By lunchtime the mood was a little more subdued and the people a little more soggy, but some good food, hot soup, and coffee seemed to restore their humor, and everyone started comparing stories." Somewhat

surprisingly, no one brought a precipitation gauge, but Schmidt reports that she did overhear "two men trying to calculate the exact percentage of the surface area of their bodies that was wet to determine who was more soaked." Alas, no photos exist to commemorate the camaraderie of the inclemently inclined Caltechers. Schmidt says that she wasn't sure that her digital camera would survive the monsoon.



Photograph by Robert Paz

## There's Snow Reason to Avoid Bad Puns

Continued from Page 1

vacations with my family. The most difficult part these days is getting this complex-looking instrument through airport security."

Libbrecht's camera rig is essentially a microscope with a camera attached. The entire apparatus was built on campus and designed specifically for snowflake photography. "Snowflakes are made of ice, which is mostly completely clear, so lighting is an important consideration in this whole business," he says. "I use different types of colored lights shining through the crystals, so the ice structures act like complex lenses to refract the light in different ways. The better the lighting, the more interesting is the final photograph." The structures of snowflakes are ephemeral, so speed is needed to get good photographs. Within minutes after falling, a snowflake will begin to degrade as its sharper features evaporate away. The complex structures are created as the crystals grow, and when they stop growing, the crystals soon become rounded and more blocky in appearance. "When photographing in the field, I first let the crystals fall onto a piece of cardboard," says Libbrecht. "Then I find one I like, pick it up using a small paintbrush, and place it on a microscope slide. I then put it under the microscope, adjust the focus and lighting, and take the shot. You need to search through a lot of snowflakes to find the most beautiful specimens." Libbrecht finds that observing natural snowflakes in the field is an important part of his research, and nicely complements his laboratory work. "I've learned a great deal about crystal growth by studying ice, and have gotten many insights from looking at natural crystals. Nature provides a wonderful variety of snow crystal types to look at, and the crystals that fall

great distances are larger than what we can easily grow in the lab." So where does one find really nice snowflakes? Certainly not in Pasadena, where Caltech is located, but Libbrecht says that certain snowy places are better than others. The snowflakes chosen for the stamps were photographed in Fairbanks, Alaska, in the Upper Peninsula of Michigan, and in Libbrecht's favorite spot-Cochrane, Northern Ontario. "Northern Ontario provides some really excellent specimens to photograph," says Libbrecht. "The temperature is cold, but not too cold, and the weather brings light snow frequently.

"Fairbanks sometimes offers some unusual crystal types, because it's so cold. Warmer climates, for example, in New York State and the vicinity, tend to produce less spectacular crystals." As for the nitty-gritty of snowflake research, probably the question Libbrecht is asked the most is whether the old story about no two snowflakes being exactly alike is really true.

"The answer is basically yes, because there is such an incredibly large number of possible ways to make a complex snowflake," he says. "In many cases, there are very clear differences between snow crystals, but of course there are many similar crystals as well. In the lab we often produce very simple, hexagonal crystals, and these all look very similar."

Libbrecht can grow many different snowflake forms at will in his lab, but says there are still many subtle mysteries in crystal growth that are of interest to physicists who are trying to understand and control the formation of various materials. A real-world application of research on crystals is the growth of semiconductors for our electronic gadgets. These semiconductors

are made possible in part by painstakingly controlling how certain substances condense into solid structures.

Lest anyone thinks that Libbrecht limits his life as a physicist to snowflakes, he is also involved in the Laser Interferometer Gravitational-Wave Observatory (LIGO), an NSF-funded project that seeks to confirm the existence of gravitational waves from exotic cosmic sources such as colliding black holes.

In LIGO, Libbrecht has lots of professional company; in fact, the field was essentially founded by Albert Einstein, who first predicted the existence of gravitational waves as a consequence of general relativity. Kip Thorne and Ron Drever at Caltech, along with Rai Weiss at MIT, were instrumental in initiating the LIGO project in the 1980s.

But in snowflake research, Libbrecht is pretty much a one-man show. And he says there's something about the exclusivity that he likes.

"It suits some of my hermit-like tendencies," comments Libbrecht. "As Daniel Boone once said, if you can smell the smoke of another person's fire, then it's time to move on. My research on snow crystal growth is the one thing I do that simply wouldn't get done otherwise."

## Last Call for Caltech Presidents

By ADAM CRAIG

January 10, 2006 is the last day to tell the faculty search committee and trustee selection committee what kind of president you want Caltech to have.

Whether you want Baltimore II or Bizarro Baltimore, the unliving duplicate who does the opposite of whatever Baltimore would do, this is your last chance to weigh in on the topic at

<http://presidentalsearch.caltech.edu/>.

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