

Justy Alicia

Biology major, Class of '08;
recipient of [URECA travel grant](#)

Research Mentor: Dr. David Krause,
Anatomical Sciences

Researcher of the Month - December 2007

About Justy

A child's fascination with dinosaurs, an artist's captivation with rendering creatures fantastic and mythologic—these surely, are part of this undergraduate's unfolding story. But for Justy Alicia, about to graduate from Stony Brook with a B.S. in biology (advanced track in ecology & evolution) next May, such early passions was not shelved at an early age, along with the prehistoric primers on [Archaeopteryx](#) to [Zuniceratops](#).

As a newly arrived transfer student, Justy Alicia's exceptional initiative and interest in paleontology were not lost on evolution class professor [Douglas Futuyma](#). Prof. Futuyma encouraged Justy to think seriously about getting involved in undergraduate research, suggesting possible leads for him to follow. But it was ultimately attending a December 2006 [Living World Lecture](#) by [David Krause](#), Professor of [Anatomical Sciences](#), and pursuing his life-long curiosity about dinosaurs, that would jump start his professional career. After the lecture, Justy talked with the Distinguished Service Professor who is world renowned for his [humanitarian work](#) as well as his science and fossil discoveries (including "[Stony Bones](#)"!), and subsequently got an amazing offer: the chance to work with Prof. Krause and graduate student [Andrew Farke](#) on a 4-credit Bio 489 research project. After dedicating approximately 15-20 hours a week in spring 2007 to this research project involving millions of measurements on femora of bird species and non avian dinosaurs, including *Masiakasaurus*, followed by a summer of full time fossil prep work under the expert guidance of Joseph Groenke, Justy Alicia was delighted to learn that his abstract, "Can cross-sectional properties of the femur be used to infer posture in non-avian dinosaurs and terrestrial birds?" had been accepted for presentation at the 2007 [Society of Vertebrate Paleontology](#) (SVP) meeting. With funding support from a [URECA travel grant](#), Justy presented a poster at the SVP meeting in Austin, Texas this past October, and plans to present this ongoing work at the upcoming university-wide [URECA Celebration](#) of Undergraduate Research & Creativity (sponsored by [LIGASE/CESAME](#) and the Howard Hughes Medical Institute) on April 30th, 2008.



Justy Alicia is happily continuing to work with Dr. Krause and Andrew Farke on preparing and submitting a publication on this research—and can now, in hindsight, look back on that extra year it took to raise his GPA in order to gain admission to Stony Brook University as well worth the time, effort and perseverance! Born in Ponce, Puerto Rico, Justy Alicia attended [Frederick Douglass Academy](#) in NYC and developed an extensive interest (and ability!) in the art of illustration, even going so far as to start an entrepreneurial airbrushing business, called Gryphon's Lair. He is also interested in drumming, skateboarding, biking and acting; and is a member of the Lambda Sigma Upsilon Latino Fraternity. Below are some excerpts shared from his interview with Karen Kernan, [URECA](#) Director

The Interview

Karen: Tell me about your research area and what you do.

Justy: I'm researching posture in dinosaurs. I'm using CT scans to look at the cross-sectional properties of limb bones to see if they can tell us anything about the posture of these extinct dinosaurs. We're focusing on the femur. The results basically came out that either the properties that we used — engineering principles related to torsion and bending of a beam — do not give us a good enough account as to what the posture is; or that dinosaurs held their femur in a more birdlike posture, which goes contrary to what paleontologists currently believe.

What dinosaurs in particular were you studying?

I was working with *Masiakasaurus*. A few specimens have been found in Madagascar by the faculty here. *Masiakasaurus* is a small theropod dinosaur (a lot smaller than the [one on display in Admin](#)), with a very strange morphology of the skull. It has its teeth pointed forward which might have been used for efficient insect feeding.

When did you first get interested in this field?

I was fascinated by dinosaurs since I was a little kid. I just never grew out of it! Anyone in my family will tell you that since I was 5 or 6, as soon as I knew what a paleontologist was, that's what I wanted to be! Everything has been driven towards that. All my decisions as far as colleges & high school was influenced by my desire to become a paleontologist. I still have the first books I read about dinosaurs at home. There was a series starting with *Archaeopteryx*, books with a one-page picture and a one-page fact sheet. I also spent a lot of my time when I was young watching PBS's [Nature](#) together with my mom.

So you came to Stony Brook with a specific interest in pursuing the field of paleontology?

I transferred from Long Island University. I had taken a year off and worked, and through that year, I had time to think. I knew I wanted to finish a biology degree so that I could get into paleontology in grad school. I transferred in as a bio major after taking another year at another school to get my grades up so I could come here. The first time I applied they didn't accept me because I was .05 of a grade point average below what they required for me to transfer in. But when I came in, I dove straight into bio and have been taking classes ever since. I'm almost done now.

But how did you get involved in undergrad research? Let's backtrack.

The second semester I was here, I took an evolution class with Prof. Douglas Futuyma. It really re-sparked my interest in the field. When I took that class, I was there every day after class speaking to Prof. Futuyma about his lectures. I couldn't stop being interested. I spoke to him a lot after class. One day, he pulled me aside and asked me what I wanted to do with my future. And I told him I wanted to go into paleontology. He gave me a few suggestions as to whom I should speak to. In the interim, I had attended a talk by Dr. Dave Krause on his Madagascar finds. I went to his talk at the Wang Center and was fascinated by what he had to say. He's awesome! I spoke to him after the lecture and set up a meeting. I wanted to get his advice as to what I should do to pursue my interest in paleontology. Everything else took off from there. Prof. Futuyma also followed up with Prof. Krause, who ended up offering me an opportunity to do research, to take undergrad research for credit. It all worked out. I worked between 15-20 hours a week last spring with Prof. Krause's research group. I spent a lot of time in the lab, worked on modeling — all these things I used for the poster presentation I gave just recently at the SVP meeting. And after the semester's research was over, I expressed interest to Dr. Krause in working with the fossils, in how they go from blocks of clay and sandstone to being prepared and mounted. He put me in contact with Joe Groenke, one of the preparators. That was towards the end of the spring semester, the last week or two of classes. We sat down and talked, and I expressed to Joe Groenke my interest in learning how to prep. From there I started work on my first fossil from then to the end of the summer. It was a pretty big piece. A big, 68 million year old crocodile jaw. It was pretty neat!

Did you continue your research on CT scans and femoral posture at the same time?

Not really. That took a back seat until this semester started when we found that our abstract was accepted by SVP. Once we found that out, we jumped back into it, putting the presentation together.

SVP stands for the Society of Vertebrate Paleontology. . . So that's the meeting you recently attended in Austin, Texas, with funding support from URECA?

Yes. It was my first poster, my first presentation, my first conference. Lots of firsts! I didn't know what to expect and I was pretty nervous. A lot of famous people whose work and research I've read were there— it was pretty intense! We'd sent in the abstract at the beginning of the summer. At the end of the summer we received confirmation that our abstract was accepted. From there, we started working on all the information that we had gathered, trying to figure out what we wanted to add, what we wanted to leave out. We couldn't include everything that we did.

So what was it like, your first big conference?

It was awesome! My biggest concern was to see how receptive the community was to newcomers to the field. And they were above and beyond my expectations. At SVP, the people were really nice, really welcoming— and genuinely curious about the work I had done, even though I was only an undergrad and have practically no physical experience in the field. It was cool, it was definitely cool!

It was interesting too because at the meeting, when I gave my presentation, one of the main questions I kept getting asked was: are we going to publish? I hadn't spoken about that with Andy. But Andy jumped in and said, "Yeah, we're going to publish!" So now, we'll definitely need to keep working on the project to add to it, and put it all together for the publication. I'm looking forward it.

How has research enhanced your overall education?

It's been great, and definitely enhanced my experience here at Stony Brook. I feel like I've finally gotten a chance to do what I've wanted to do since I was a kid. It wasn't going to happen anywhere else. If I had gone to college someplace else, I wouldn't be as close to attaining that. It's been a great ride so far and I just want to keep the momentum going.

Sounds as if you've been fortunate, in having great mentors along the way too!

They've taken a genuine interest and invested a lot of time into me and my aspirations. It's been great to have that kind of support. At other schools, I was pretty much going about it alone, focusing on getting through college so I could go to grad school and then be able to do something. But these professors took me in and said, "You can do it now. Why wait?" If it wasn't for that, then I don't know what I'd be doing right now. It's great to say I've finally done something in what I wanted to do, as opposed to saying, I'm working towards something. Now I'm practically at the front door rather than down the block. I'm very happy about that.

I actually spent so much time before immersed in thinking about undergraduate studies (and how to get done & graduate!) that I never really stopped to think about graduate school. So being around Andy and the other grad students that work in the department was a great help. They kept asking me about my future plans, what I plan on doing. Andy's been really great about giving me a graduate student's perspective on graduate school. That's invaluable. He's talked to me, given me advice, tried to help me figure the best way to go about looking at graduate programs. And the Department in general — there are so many really good people. Everyone at that department has been really helpful, really nice.

How difficult is it to balance your schedule — the research with the academics?

I had two jobs until a week or two ago. So it is really difficult at times. I've had to draw on a lot of different areas in order to get to this point. I live off campus so I have to pay rent. I have to have a job. Nobody is supporting me. I have to do it on my own. I have to get through school. I have to do it myself. I've been pushing myself to do these things. So it has been a real struggle as far as trying to get to where I need to be. But I feel like it's making me stronger. You know, there's 50 million other things that would be a lot easier on me. But this is what I want to do.

Research has definitely strengthened my goals too, and helped made things make a lot more sense. It's one thing to learn things in class, looking at it from the outside. But then to be able to actually apply these things and see why we use the things that we use, *why* I'm learning what I'm learning in class, is really beneficial. I'm taking statistics right now, and I've actually incorporated some of those statistics in my research last semester. Now I understand where these statistical analyses come from and why we use them the way that we use them.

Does your work also involve biophysics/biomechanics?

Those are areas I've learned about primarily through the research, not from classwork. When you don't know something in research, you have to find out yourself. You can't rely on a class to teach you. It's been one of those things that has pushed me to go ahead and learn outside of class, to apply those things that I don't know into my research . . . which is why you do research from the beginning: to find out about things you don't know about.

What was the best day of your research experiences so far?

The best day was towards the end of last semester when we actually graphed all the data that we had compiled and were able to say something about it. I had spent the whole semester gathering information. And up until then, it was just numbers — recording numbers, measurements. It was pretty secretarial work, doing this, putting a model up and finding out what the measurements were, looking at a whole bunch of numbers. But at the end, when we were able to plot the graphs, femur length vs cortical area, and all these other things, and we saw correlations . . . we were able to figure out what the data was telling us, to put it together and see the big picture clearly. Finally, we could understand what was in front of us. That was a couple of weeks before we submitted the abstract. It might not have come out exactly the way we thought it was going to or the way we would have predicted. But seeing it come together was awesome! There was actual information we could get out of all that work: we could finally say something! That was cool!

And your most frustrating experience?

Working on some of the more delicate fossils is incredibly frustrating. You have to be so careful. One wrong move and it basically crumbles in your hands. You expect some degree of this in this type of work: when it happens, you end up putting it back together, which is part of what fossil preparation is all about. If you're good with 3D puzzles, you'll do fine in prep work. It's a lot of attention to detail. I think my artistic background helps out in that regard.

Tell me more about your artistic background and talents.

Gryphon's Lair is a side company or endeavor I've had since I was a senior in high school. I basically air brush articles of clothing, customize pants, shirts, posters, even murals. It's something I've been doing for a few years. I've done characters, I've done some dinosaurs, some air brush pieces. I grew up doing illustration, doing a lot of comic book work. I used to draw my own comics with friends. A lot of my upbringing was in comic books and fantasy type work. At Frederick Douglass Academy, I was fortunate to meet a few people that had the same interest in art. These were the people I grew up with, drawing all the time. So basically, having a visual arts background helps with regards to preparation work, as far as putting things together. Having a sense of anatomical aspect, knowing positions of different bones, what to expect as far as bone shape, even in mounting and casting a molding which you have to do for a lot of specimens. . . it definitely helps having an artistic background! I did a little bit of artwork for the poster presentation that I recently gave at SVP. I drew some limb bones to show position differences in femoral posture.

What advice do you have for fellow students?

Speak to your professors, get to know your professors! If you're genuinely interested, that professor more than likely knows people who are working in the field. That right there is a starting point. Once you get through, then everything else starts falling into place. I'm really happy I came to Stony Brook. This is the first school that I've been to that I actually like being at. That says a lot. It's a combination of everything: the people, how much I learn, how much I spend, and "is it worth it?" . . . It's all related. It all comes together to make your experience.

Do you enjoy presenting, and getting the chance to explain your work to others?

It's funny you should mention that. I get really irritated by scientific lingo/jargon. So I like to explain things in simple, human terms. I like doing that. At the recent meeting, there were a few high school students there. So I got the chance to explain my presentation to students who didn't really have that much background knowledge about my project or about paleontology. But I felt that the students I talked to understood my project. . . .and that was great. That works for me!