

## Rohit Repala

Honors College Biochemistry major, Class of '08;  
SBU Beckman Scholars Program 06-07

Research Mentors: Dr. Iwao Ojima, Department of Chemistry;  
Dr. Francis Johnson, Departments of Chemistry, Pharmacological Sciences

## Researcher of the Month - July 2007

### About Rohit

Ten years after getting recognized by the National Science Foundation (NSF) with the RAIRE grant (1997) for its exceptional record of integrating research and education, [Stony Brook University](#) continues to be the locus for synthesizing what you learn in the classroom with what you learn in the lab. Just ask Rohit Repala, an [Honors College](#) biochemistry major who articulates how potent the combination can be: "Prior to taking organic chem, I had no knowledge. I was basically a chef in the lab, where they were telling me to put this this and this and I would do exactly that and not understand the mechanisms involved. . . But taking organic chem and doing the reaction mechanisms and understanding the concepts, and then going to lab and doing the same stuff that I just learned. . . *that* was really cool to integrate both of them. I was learning about deprotection in class and then the following day I would do deprotection of my compound to get my final product. So integrating that — learning it and doing it in lab — was something that was I thought that was really unique and valuable. . . When I'm doing something in lab, I understand *why* I'm doing it. "



Being exceptional at *both* research and classroom learning has been Rohit's MO from the get-go. While maintaining a near perfect GPA in his three years to date, Rohit is the recipient of the premier undergraduate research honor at Stony Brook, the [Beckman Scholar s Program](#) award (2006-2007) which totals over \$19,000 in support; and has also earned [Honorable Mention](#) (2007) status for the national [Barry M. Goldwater Scholarship](#). The support from the Arnold & Mabel Beckman Foundation funds his ongoing work in the lab of Distinguished Professor [Ojima](#) in the [Department of Chemistry](#) and the [Institute of Chemical Biology and Drug Discovery](#) where Rohit is engaged in a project on "Design, Synthesis and Mechanism Study of Taxane Based Tumor-targeting Anticancer Agents." At the end of this month, Rohit looks forward to attending the Beckman Symposium in Irvine, California — together with his fellow SBU Beckman Scholars, Avinash Khanna ([Tonge lab](#)), Eugene Tan ([Haltiwanger lab](#)) and [Alexsandr Treyer](#) ([Bogenhagen lab](#)); and is preparing a poster together for the symposium. Quite recently, Rohit presented a poster at the on-campus URECA [Celebration](#) (April 2007) where he enjoyed the chance to talk about his research to friends, faculty and the university community.

The [Ojima lab](#), well known for its success at mentoring high school students, was one catalyst sparking Rohit's passion for research: while he was a high school junior from Comsewogue H.S., Rohit participated in the the [Simons Summer Research Program](#) (2003) where he worked on "[Design & Synthesis of New Taxane as Anti-Tubercular Agents](#)," an experience that guided many other subsequent decisions— making research a priority in his life, convincing Rohit that Stony Brook University was the best choice for his undergraduate education, and even influencing his plans to pursue a M.D./Ph.D. following graduation from Stony Brook. Like many [Honors College](#) classmates, Rohit did not wait until senior year to get involved in faculty-mentored research but augmented his academic undergraduates experiences early on by gaining more and more research experience. During 2004-2005, his freshman and sophomore years, Rohit worked at [Chem-Master International Inc.](#), a pharmaceutical company run by [Dr. Francis Johnson](#), Professor of Chemistry and Pharmacological Sciences; starting in spring 2006, Rohit returned to work in the Ojima lab full time with the support of the Beckman Scholars program.

Rohit remembers when he was only 3 years old being introduced to a lab environment and playing with TLC capillaries spotting water, "working" alongside his mother who was then earning her Ph.D. in organic chemistry. He credits his mom for being "the biggest influence in my life, towards what I'm going to do and where I'll be in the future." In addition to his passion for science, Rohit is active in Thillana (a student club / South Asian Dance Troupe), enjoys the outdoors, and loves playing basketball, tennis and cricket. He is also serving as a Stony Brook Student [Ambassador](#) for 2007-2008. Below are some excerpts of his interview with Karen Kernan, [URECA](#) Director .

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## The Interview

### **Karen: Tell me how you first got involved in lab work. .**

*Rohit:* I started actually going into research in the summer of 11th grade. I got into the Simons Research Fellowship Program which I found through the Stony Brook website. I applied to it and luckily I was accepted. During that time I worked with Prof. Iwao Ojima in the Department of Chemistry. At the lab I do mostly organic synthesis involving reactions, purifications and then columns and then characterization of the compounds that I make. And my research is focused towards tumor targeting anticancerous agents which Prof. Ojima is known for, especially taxol modifications. . . . That was the first dose of research that I was exposed to and that's something that kept me motivated with research. I would definitely say the Simons fellowship was the biggest turning point where I decided that I was going to make research a big part of my undergraduate career. In the lab, I've been fortunate to have grad students who were very caring and understanding during those early stages of growth. At the beginning I really didn't know much. Now I can actually help guide someone else: last week I was helping a high school student set up a column to do purifications. Prof. Ojima always takes 4 or 5 high school students. His lab is very welcoming and receptive to new students.

### **What is that you like about the lab environment?**

The thing about chemistry is that it can get monotonous at times but the most important thing is once you see the end result, once you see the compound itself. . . when you finally make it. . . even though it might be 6 mg and you can just blow it from your hand. . . it's the fact that you've been with it since the beginning and carried it along through 10 steps of synthesis to get your final product and then you give it for testing. Seeing the results at the end where they do the biological testing to see if the drug is effective or not is really what the excitement is about. Just a couple of weeks ago, we were testing our drug on cells and we got really cool pictures, seeing the drug being uptaken into the cell. It lights up the cell so that you can see where your drug exactly is. The proposed mechanism that we were thinking about is actually true. . . it was very exciting.

### **What would you say is your least favorite experience?**

This past semester, I was working in the lab. I had done a column of preparation almost 300 times prior to this. I loaded the column, loaded my compound and then I was putting pressure on it to let the column run. And all of a sudden the column burst and my compound was gone. And I'd been working on this compound for almost 3 months, this entire past semester. In just fractions of seconds, the column just broke, and there was no more compound left. . . Putting so much effort for almost 3 months and seeing it disappear in 3 or 4 seconds was really heartbreaking. My grad student, my parents, and Prof. Ojima were all very helpful in the process of getting back on track, and starting again. I would say that was my lowest point of research.

### **Are there particular qualities that you've learned from your involvement in research?**

The biggest thing that I learned or that I'm trying to improve is really patience. If something doesn't work, I take it to heart. Being patient is something that you have to develop. You have to be patient with the reaction. And you have to be patient if any obstacles come through in your reaction scheme, or experimental scheme. One of your reactions may give you low yield and you need that product to continue to do the next 5 steps. So then you need to be patient and go back to the starting material and resynthesize it. It can take months. But once you get to the end product, you'll finally be glad of all the work you put in. Chemistry is unpredictable sometimes. There are days where I can be done in an hour or two hours setting up an overnight reaction. There are other days where I've been in the lab 10, 11, 12 hours straight. You never know when you go in when you'll come out. You have to be patient.

I also learned from the experience of working in two very different labs. Prof. Johnson's lab is where I got away from the academic side and focused more on the pharmaceutical side. It's a completely different perspective. The biggest difference is the scale we work with. In Prof. Ojima's lab we work in milligram scales. And in Prof. Johnson's lab we work in kilogram scales. Where you lose 10 mg or 20 mg in Prof. Johnson's lab it's no big deal because you're working in kg scales. But 10 mg is all you have as your final product in Prof. Ojima's lab. Another huge consideration in the pharmaceutical side is you don't have options to try many experiments because materials cost a lot. There's a whole cost infrastructure involved in it. You're working on finding the best effective plan, giving the best amount of yield and finding the best people to do the job. Working with Prof. Johnson, I had the opportunity to see the business aspect of the chemical industry; and it's actually very exciting. . . something I look forward to getting more involved in the future, perhaps.

### **What are your future plans?**

I'm taking MCAT's this July 15th, so that's a big day. After that I'll decide, depending on my score, what places I'll apply to. I plan to pursue a MD/PhD eventually. . . I've always been surrounded in family and friends by scientists and doctors. And I've always looked up to these people that have been in my life. Medicine is something that I really do have a passion for and I can see myself being happy doing it. Having research also be such a big part of my life for the majority of the past few years, I can't see myself leaving research and doing completely medicine or leaving medicine and completely doing research. An PhD/MD program is something that caters to both my areas of interest.

**How do you balance your time-studying with a commitment to research with classes?**

It's a balancing act. You do the best you can. As long as you enjoy what you're doing, it doesn't feel like you're being forced to go to lab. Some days I enjoy going to lab because I have a cool reaction to do. Prior to taking organic chemistry, I realized that I was basically a chef in the lab, where they were telling me to put this and this and I would do exactly that and not understand the mechanisms involved. They'd explain it to me but I had no firm chemistry background at that point. But taking organic chem and doing the reaction mechanisms and understanding the concepts, and then going to lab and doing the same stuff that I just learned. . . that was really cool to integrate both of them. I was learning about deprotection in class and then the following day I would do deprotection of my compound to get my final product. So integrating that—learning it and doing it in lab—was something that was really unique and valuable. And as long as you enjoy what you're doing, it's not that much of a burden. Research doesn't get in the way of your academic career, it only enhances it. It works both ways too. Understanding the materials from my classes has helped me in the lab. When I'm doing something in lab, I understand why I'm doing it.

**It seems you have had a lot of positive experiences concerning research.**

Also, luckily, in the Honors College. . . seeing so many talented kids around you just makes you be more motivated and driven. I've been so fortunate with the people that I've met, and the friends I've made. We have a study group too. It's so effective to see so many other students who excel at everything and are willing to share that knowledge with you. There are some subjects that I get, some that my friends get. And we help each other get through these difficult topics; it's something that I'd never seen or experienced before.

**Do you have any general advice for, say, a new student just coming to the university?**

I've applied to so many fellowships that I can't even count. And I've been rejected to more fellowships than I can even count! You just have to put your name out there and get adapted to applying to so many programs. I've applied to the Beckman and been fortunate to get it. But I've applied to other REU programs and not gotten some of those. That hasn't deterred me from applying, or looking for opportunities. At Stony Brook too, I can see how the majority of labs are filled with undergraduate students and high school students too. In the Dept of Chemistry, there are almost 50 students working in labs. So you can't say there are no opportunities! You just have to keep looking for opportunities, whether through fellowships where you're paid or whether you contact a professor yourself and volunteer first.

**What kind of presentation experiences have you had?**

The first poster I presented was at URECA this spring. And that was my first experience of actually putting a poster together. But when I was in high school, I'd worked with my mentor and grad students when they were preparing for the ACS conference. . . URECA was really cool. It was the first time I was able to explain my poster to my friends and to see all of the other professors that I've taken classes with come ask questions about what I do in the lab. You feel a little important. That was also the first time for me to see what my friends are doing, and to explain your work to your professors. Trying to explain a reaction to Prof. Kerber, who I'm sure knows it all, was pretty interesting! At the poster presentation, you're talking about what you did, what conditions there were in the lab, why you got a 75% yield. . . You get to talk, ask questions about how things might work better (if you used a different solvent or different catalyst?). I had a lively conversation about synthesis with Prof. Koch. And that was really cool to see the faculty come to URECA and ask you about your work.

**How helpful has the Beckman Scholars Program award been for you?**

Words can't even describe how much the Beckman Fellowship has meant! The commitment that they have, the way they treat you when you come off the plane to California, the way they treat during the entire year is amazing. It's not a short term summer thing. They actually fund and keep in contact with you and are committed to you for years. Plus, they're very receptive. Meeting new people at the Beckman Foundation, seeing the facilities at the Beckman Foundation, and just interacting with the entire team of the Beckman, everything is so great about it. I was very fortunate to hear about the Beckman opportunity. I felt lucky to have been one of the students awarded. And I'm looking forward to the Symposium at the end of July. Last year, we had an amazing panel on stem cell research. The presentations were phenomenal and captured my interest and motivated me to continue pursuing research. We also got to learn more about the man behind all of this, Arnold Beckman. He had a lot of passion for science and through his foundation he kept that tradition alive by supporting and encouraging the next generation to carry on. . . All in all, I took away a lot from the symposium. I hope to have the same, if not better, experience this year.