

From Potential to Promise

Developing Scholars, one Eureka moment at a time

Rajiv Gandhi

Department of Computer Science
Rutgers University – Camden

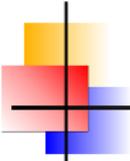
March 12, 2018

This work is supported by the National Science Foundation.



Rutgers-Camden (RU-C) Background

- ▶ mainly a 4-year, liberal arts college
- ▶ most students hold jobs
 - ▶ studying is a “part-time activity”
- ▶ majority of students transfer from Community Colleges
 - ▶ very small time window to have an impact
- ▶ hardly any student went to graduate school
 - ▶ one student from CS in 14 years had gone to graduate school



Example

In high school, I did not care for education and felt it didn't care for me. Senior year in high school, I did not know what was going to happen. I had only applied to one college, RU--C, the school closest to my home, and had plans on joining the armed forces like three of my siblings, if I was not accepted. I only applied because, in our country, college is what everyone does after high school, since almost any job now requires a college education. I got admitted to RU--C, but I had no idea what I was doing there, and barely coasted through courses. I felt like I had no future.

- ▶ students lacked confidence in themselves
- ▶ faculty lacked confidence in students' abilities
 - ▶ reflected in courses
- ▶ some very bright students in my classes
- ▶ unsuccessful in convincing my colleagues of the same
- ▶ my advice to students: go somewhere else!
 - ▶ students transferred to U. Michigan, U. Penn, Rutgers



- ▶ met Brad Greening
 - ▶ student in Math Foundations course
 - ▶ moving to another university not an option
 - ▶ \$35,000 per year job
- ▶ Summer 2007 research - failure!
- ▶ Fall 2007: read the book –
Proofs that Really Count: The Art of Combinatorial Proof

- ▶ outstanding presentations in the dept colloquium and at the U. Maryland seminar series

You know, I had him in my class a few years ago and, based on that, I would never have guessed that he'd be capable of the seminar talk he gave a few weeks back. You've obviously been very good for him... :-)

- ▶ quit his job at Comcast in Jan 2008 (last minute decision!)
- ▶ REU with Prof. Nina Fefferman



Brad Greening - the Decision

Date: Wed, 23 Jan 2008 00:14:57 -0500
From: Brad Greening <bgreening01@gmail.com>
To: Rajiv Gandhi <rajivg@camden.rutgers.edu>
Subject: Decision

Dear Rajiv,

I would like to try to go for it. As per our discussion, I figure even if things do not work out, with the work we will have done plus the plan to do the data structures work, I will be well able to get another (very possibly better) job should the worst case happen. By my figures, a lower bound of \$550 per month would allow me to pay my parents their money, plus pay my car insurance, gas, and phone. If tutoring cannot fill this, i may need to supplement from somewhere else, however, this should be

- ▶ got NSF funding
- ▶ increased the workload significantly in Math Foundations course
- ▶ students like Tom and James postpone their graduation
- ▶ introduced a course in which students would be required to read and present research papers.
- ▶ all presentations in dept colloquium given by students
- ▶ Brad gets admitted into the PhD program at Rutgers
- ▶ several students went to REU/internships and did well

Josh was fabulous. We got a poster & oral presentation into the WABI workshop based on his work and are now working on a journal paper. I've tried to get him to apply to Maryland for grad school but he's got some family issues that will probably keep him out of school for a few years. I'll try to keep in touch with him and hopefully lure him here.



Summer Feedback

Hi Tom,

I have enjoyed working with you on this project. Kathy mentioned you are submitting applications for graduate school.

I hope you will consider applying to UW, we are a well-funded program, highly ranked and have many opportunities for research. Please let me know if you have any questions about our program and if you are interested in visiting.

Tom:

You may recall that we met during your summer research project at VT. I heard that you are applying for grad admission here.

I wanted to encourage you to apply and also to share with you sometime more information about the work of our group. ...

If you are applying let me know when you do so. I can look for your application in our department's on-line grad admission system.

- ▶ James gave very nice presentations at U. Maryland and UPenn.

Thanks Rajiv, it was good to see both you and your maturing student James - it is really nice that these guys can understand such key research papers.

- ▶ four more students get accepted to graduate programs - Cornell, Dartmouth, Princeton, Virginia Tech

- ▶ more students want to pursue academics

Professor,

I quit my job and am ready for any challenge you
have to offer.

Sincerely,

Elaine



- ▶ James Davis
 - ▶ high school GPA so low that RU-C would not admit him
 - ▶ planned to work at ShopRite, his employer after high school
 - ▶ quits job in early 2009
 - ▶ starts graduate studies at Cornell in Fall 2010
 - ▶ recipient of the NSF Graduate Research Fellowship
 - ▶ finishes his PhD in 2015
 - ▶ **Assistant Professor at the Univ. Illinois.**
- ▶ Brad Greening
 - ▶ finished his PhD in 2014
 - ▶ **post-doctoral fellow at CDC**
- ▶ Robert MacDavid
 - ▶ **graduate student at Princeton University.**



Students

Dan Allen, Brian Brubach, James Davis, Tom DeHart, Brian Goodchild, Brad Greening, Thomas Greening, Christopher Hodsdon, Hitaxi Kalaria, Vijay Kothari, Clare Li, Mark Lippincott, Sean Lowen, Robert MacDavid, Hoon Oh, Joshua Wetzel, Chris Riesz, Alexandra Rumyantseva, Katherine Scola, Yuping Tang, Carl Trimbach, Joe Vessella, Elaine Zamora.

Chris must've told you about his Sensys paper.

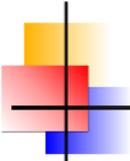
Please encourage him to apply to grad school ; I've also been doing this.

He comes regularly, pays attention and aced the exam . I hope he's finding the class interesting and not too easy.



“Approximately 50% of domestic Ph.D. students come from 54 institutions of baccalaureate origin and the other 50% come from over 747 institutions.” ¹

¹Hambrusch et al., “Exploring the Baccalaureate Origin of Domestic Ph.D. Students in Computing Fields”, Computing Research News, Jan’13



RU-C students in grad schools (2009-)

- ▶ Brown (2)
- ▶ Columbia (1)
- ▶ Cornell (1)
- ▶ CMU (2)
- ▶ Dartmouth (2)
- ▶ Princeton (3)
- ▶ Rutgers-New Brunswick (2)
- ▶ U. Maryland (2)
- ▶ UPenn (2)
- ▶ Virginia Tech (1)
- ▶ Northeastern (1)

- ▶ NSF Graduate Research Fellowships(2)
- ▶ CRA Undergrad. Research Award – Winner(1), Honorable Mention(2)



High School Students – Summer Program

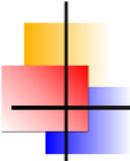
- ▶ Summer 2010
 - ▶ 9 weeks, 12 students, 6-7 hours each weekday
 - ▶ Algorithms, NP-completeness (upper-level college topics)
- ▶ Fall 2010
 - ▶ students learn grad level topics in Combinatorial Optimization
- ▶ Summer 2017
 - ▶ number of applicants tripled in the last two years.
 - ▶ 100 participants
 - ▶ 35% of participants were female

Dear Rajiv,

Today was Luigi's last day working with me and

I want to thank you most sincerely for recommending him to me and supporting him. He is amazing! He's incredibly smart, well-prepared, and tenacious about working on hard problems without giving up . He's also very nice. As you'll hear when he visits you next week, he contributed significantly to a number of very nice results and has some very impressive results that he came up with entirely independently .

I'm happy to take any student that you recommend in the future.



High School Students

Rajiv,

This is a quick note of thanks – sent with Sheil's permission – for introducing us and encouraging me to find a way to let him take my majors-only programming languages course this Fall. Being a large institution with unmeetable demand for our courses, we rarely allow such exceptions, but I took the chance for Sheil and, as it turns out, one other first-term freshman as well.

Sheil ended up with the highest grade in the course, basically tied with two other students in a class of 75 students. He received a 100% on the final exam, which no other student did. And, of course, he was a delight to have participate.

Sheil is surely special, but it's also great evidence that those of us trying to manage large organizations and enterprises do need to be mindful of the value of making exceptions.

- ▶ Fulbright Fellow (Jan-June 2011)
 - ▶ wanted to teach at “non-elite” institution
 - ▶ a very satisfying experience
 - ▶ taught 2-3 hour lectures, 3 days a week
- ▶ hardly any students in CS do PhD
- ▶ Manish Purohit started PhD at U. Maryland in 2011
Manish is turning out to be a very good student.
- ▶ initially on their “reject list”
- ▶ about 20 students now in PhD programs
We have been very happy to have Amey here, he is a very valuable addition to our department.

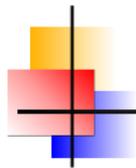
- ▶ Resource Augmentation
 - ▶ advisors, faculty at other universities
 - ▶ funding
 - ▶ family, friends
- ▶ Depth-First vs. Breadth-First approach
 - ▶ students at RU-C have only two years before they graduate
 - ▶ helps instill an interest in academics
- ▶ Role Models
 - ▶ past students are having a huge impact on future students
- ▶ Strong work-ethic
 - ▶ through the Math Foundations course
- ▶ Give them a chance!



Conclusion

“Ordinary” people, when given a chance, can perform extraordinary tasks.

– Julian Sit
(high school junior)



Thank you!