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### Bitten by the Science Bug (NYCSeF 2011)

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*CUNY City College*

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**Final Round (March 29, 2011)**

American Museum of Natural History,  
New York City, NY

***Bitten by the Science Bug***

Invited Speaker: Dr. Maribel Vazquez (Professor of CCNY Biomedical Engineering)

Congratulations on making it to the Final Round!! Your parents, your teachers, your colleagues and even your younger siblings (believe it or not!) are so proud of you and rooting for you to win it all! I'd like to take a few minutes today to tell you about who I am and what I do, why I love STEM (Science, Technology, Engineering and Math) and why I am so honored to be here with you today. I think the best way to do that is to start by telling you where I come from. I am a New York City native, born and raised in Washington Heights in Upper Manhattan. And like you, I am a proud product of the NYC public schools! I grew up in the 1970s, and went to HS in the 1980s, and although many things have changed since then, some things remain the same....NYC schools continue to have dwindling funding for STEM.

Like perhaps some of you, I didn't grow up speaking English at home and I still only rarely speak English at home. English as a Second Language (ESL) programs began with my generation, and I remember being pulled out of my first grade class midyear and put into another class where we all spoke only Spanish all day. Today it is ironic that many parents want to enroll their children in (often expensive!) bilingual or multicultural schools, because the original bilingual program of my generation was reserved for '*slow learners*'. Whether it was right or wrong, few bilingual teachers back then spoke English. Kids in the bilingual program spent hours learning to read and write in Spanish, having only one hour a week where a different teacher would come to read us a book in English. Naturally all little kids misbehaved with these teachers, especially since they were often newbies! Despite the lack of English instruction, the administration held that if ESL kids didn't learn English quickly, we were doomed to be slow learners and not worthy of the precious little resources the school had. And so it became that ESL classes were thought of as the stupid kids, who were never assigned math homework or engaged in any trips to the museum, especially not to my favorite one, this AMNH where we are meeting today.

And so it came that my love of math and science changed my life. The teachers tried to move me into the English-only classes a few times, but I was not engaged because I had a hard time understanding when the teachers were calling my name in English (and I still don't get why the phonic stress has to be so wrong!). But then the NY state tests came around, and by the grace of God somehow I consistently scored the highest on all of the state math tests. This posed a bit of a conundrum for my teachers, because the bilingual ones didn't want to see me go (I was a good student and I loved being the teacher's helper), and the English-only ones didn't know me. However, when the newly-formed Board of Education (1980) inquired why the school was denying math instruction to 'gifted' children, I was moved into the English-only math class rather abruptly! I remember my 3rd grade teacher told me plainly, *'Don't worry so much about how people pronounce your name today, because when you are older you will get to decide HOW people address you....and it may be Madame President!'* Best. Teacher. Ever.

So I stayed in her class and years later graduated to the (now non-existent) Special Program in NYC Public Junior High Schools. Here, kids were allowed to do 2 years of math and science in one in order to skip a grade. All was going well...and then came High School. See, TODAY you guys have HS fairs and you get to visit schools and principals want to talk to your parents, etc. Not so for me. There was only one road: If your parents were in the know they made you take the Specialized High School Admissions Test (SHSAT), else you just went to your locally zoned HS. Unfortunately, my local HS was violent and awful, so I joined the whole city lottery and got accepted into a different high school in the Bronx. But back then, as probably so now, the schools did not talk to one another, especially across boroughs. So, since I was coming from Manhattan, nobody in the Bronx knew about the special program I had been part of, and I was simply put into a randomly assigned course schedule that included: Intro to Biology, Typing, American History, and English. I remember that a few weeks into the first semester my biology teacher asked me what I was doing in that class. I was very confused by the question and answered, *'Well it's second period and this is where my program card says I should be.'* He laughed and told me that I should be in the science honors program, and that I should have math. He got me there because I lit up and said, *'Oh yes please! Can I have math again?'* He looked at me like I was crazy. But sure enough, by the end of the term he had re-arranged my program and told me that I was going

into a special Science Honors program where I would do more math and science, plus a new course in research. I was all for it until I saw my program card. Whereas I had a light schedule from 9:00AM-1:30PM before, my new program card was completely filled from 8AM-3PM and even had research listed during the lunch period. I was outraged! To my surprise, along the way I began to really look forward to my research lunch period. I am today an experimentalist, so I LOVED my first introduction to experiments of my own design. And I will be honest, I loved being able to break things HA! But being forced to put them back together really helped me learn how equipment worked too.

To this day, I still remember my first research experiment. I wanted to know if excess Monosodium Glutamate (MSG) would accelerate the contractile vacuole of a paramecium (used to breathe). I remember this so well not because I entered a science competition as you bright students are doing here, but because it was so darn HARD to get that paramecium to stay still long enough to study it under the microscope! I tried everything, and in the end those little guys were swimming in gel so thick I couldn't even mix more of it....and that is when it happened. My teacher spoke words to me that I now know all great scientists have said at one time or another: *'Sometimes an experiment is well-planned, will provide valuable information, but we just don't have the equipment needed to get it to work.'* He continued more pragmatically to say, *'By the way, you will need to switch projects to complete a final report. Keep your eye on the prize, college applications are due!'*

I remember that interchange well for so many reasons, but I will conclude with the most relevant. If I could go back in time and relive that moment, I know now exactly what I should have said: *'We don't have the equipment needed to get it to work? That's what ENGINEERS are FOR!!'* I say this because I wholeheartedly believe that is the key distinction of engineers. Today I run a CUNY lab that develops biomedical engineering technologies so that generations of innovative researchers CAN do the STEM experiments needed to bring about knowledge, progress and change. Those researches are YOU! Congratulations and best of luck today!