

# WMB Woman in Technology 2013 – Professor Valeria Nicolosi – Trinity College Dublin

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Valeri Nicolosi

"In academia, either you publish or you perish," warns Professor Valeria Nicolosi, this year's WMB Woman In Technology Award winner. Perish, Valeria will not as the Italian native has an impressive portfolio of over 90 papers, cited over 3,900 times.

Professor Nicolosi is a European Research Council Professor at the School of Physics and the School of Chemistry, Trinity College Dublin (TCD). Not to mention a Principal Investigator at CRANN (the Centre for Research on Adaptive Nanostructures and Nanodevices) based in Trinity also.

Internationally regarded as a leading expert in the field of processing of low-dimensional nanostructures and electron microscopy, Professor Nicolosi researches novel materials such as graphene and other one atom materials whose properties make them super strong, lightweight and electrically conductive and form the basis for new technologies which will enable next generation semiconductor and energy storage devices. Her research has the capacity to impact the development of faster, smaller and lighter mobile electronics devices such as smartphones, tablets and computers.

Valeria simplifies: "As a nanoscientist I always describe what I do in the same way I explain it to my six year old nephew – playing with lego! Tiny materials. Each building block I work with would be 100,000 times smaller than the width of a human hair and only one atom thick. It is the flattest material known to man. This material has wonderful properties so you start stacking and building with them. The overall aim is to make something that is usable, something you can play with and touch."

Applications are huge and vast as Valeria lists off everything from increasing the life of a battery to making computers faster, airplane wings stronger or creating sensors for detecting gas leakages.

Academia was always going to be the career route Valeria embarked upon. "I did my PhD about ten years ago and even if I think about going back in time I still think I'm doing the only job I could picture myself in. The first degree I have is in Chemistry and then I did my PhD in physics to expand the horizon in front of me and see things from a different perspective."

Studying in Sicily, Valeria notes that there were very few females. In 2011 she was awarded a highly competitive starting grant worth €1.5m from the European Research Council (ERC) to expand her work in processing and characterisation of two-dimensional nanomaterials for energy storage applications. The ERC Starting Grant scheme aims to "fast-track the career development of the very best research talent from across the globe working in pioneering frontier research in any field of science". Today, she is leading approximately €3m worth of individual funding to expand her work in processing and advanced characterisation of nanomaterials devoted to the development of novel energy storage devices. In addition, she has been awarded €7m funding from SFI for the establishment of a National Centre for Aberration-Corrected Electron Microscopy and is one of 10 PIs who secured funding for the newly SFI funded Advanced Materials and Bioengineering Research Centre (AMBER).

Since winning her WMB Award Valeria's team at TCD has expanded further. "Now I have 26 people on my team, it was 18 before. So I have a couple of grants come in, large grants – one was the President of Ireland Young Researcher Award for 1.5 million and another one from the European Research Council."

Regarding herself as an entrepreneur as much as anyone who has set up a company, Valeria

explains: "It's certainly an entrepreneurial job. If you see what I've done in the last few years – you need to handle money, you need to run your group as if you were running a company and to do that you need resources. You can't live out of the resources that come to you, you need to be able to write proposals, come up with new ideas and push new boundaries. When your team expands like mine has, you suddenly realise that you are managing a microcosm, a small company."

Although the grant scene has changed since the downturn, Valeria is confident in the ability of good research to penetrate through: "Good ideas haven't been experiencing the recession as such in my own group. If you are productive you are invested upon – that's what I've seen anyway. Also the more you produce the more companies that will come to you, to work with you. If you publish, if you're successful, if you attract funding, you will leverage even more, you will raise your profile and that will make you a key player."

Although Valeria describes herself as having once been a "lab rat" the more senior you progress the less time you get to spend in a laboratory, she explains. "I don't spend any more time in the actual lab doing experiments anymore. There's no time for doing that. My week is all scattered between research driven meetings, teaching and board or executive meetings. It has to be done, it's all part of the job and it's important that you give your input."

On whether she misses the white coat, she passionately exclaims: "I would love to be back in the lab! That's the passion of a scientist. Now unfortunately I don't get to do it anymore. I get to set the job and drive it from behind my desk. Somehow science and academia has this way of promoting people by saying 'Oh you're a great scientist and you're doing so well. We'll give you a promotion and you'll do less of that,'" she laughs.

“But it’s a different beauty now. It’s still engaging and of course when you write a proposal, which a lot of my job is about, writing and managing proposals, putting down ideas and creating something in your mind, some kind of technology that doesn’t exist yet. Then in a year or two seeing that technology happening is the most fulfilling feeling. That’s my drive,” Valeria beams.

The Science, Engineering and Technology sector is one that is notorious for a lack of female representation in the top tiers. In her own experiences Valeria said the fact that there are very few females in the industry is a recurring theme always. “There are quite a few PhD female students but somehow it is harder to find them at higher levels. I remember the very first conference I attended when I started my PhD, it was a very physics focused conference and I think there was a total of 150 participants with only a handful of women.

The problem is twofold says Valeria: “If I look at my students, mostly in chemistry and physics, there are females with PhDs, so the positions that they embrace are the very first steps as an academic. However when it comes to beginning a family they feel as if academia isn’t worth pursuing as it appears too demanding. It’s true but I would say it is only as demanding as any other job to be honest. The good thing about being an academic is you can somehow manage your own time. If you need to go home early then you just start earlier in the morning or you catch up on work at the weekend.”

Of course there are a lot of sacrifices, says Valeria, elaborating that you need to learn to say no just as much as you say yes. “In Chemistry our head of school is a woman. There’s very few. I myself am the only full Principal Investigator in Crann. In Physics there are only couple of female professors. We’re not wonder women, we just managed to find a balance. This career is demanding and it’s extremely competitive so you learn to make choices.”

When confronted with mostly male peers Valeria says all you need to do is ensure you stand strong. “If you have character and your character comes across then they start to respect you professionally.” A strong character she is indeed, which makes for a gifted and energetic public speaker. Valeria most recently spoke at The Annual Meeting of the New Champions – a global business gathering in Asia. “One key point of my job is dissemination and interaction with other scientists – collaborative trips. The one in China was a very particular as I was awarded with the Young Scientist 2013 Award and I was sent there to represent the European Research Council. So out of the 3,000 awardees that the European Research Council has had so far

since 2003, they selected four of us to go to present our work. It was a very different platform. It was politicians, young leaders, young global shapers, young scientists and we were there literally to discuss grant challenges in workshops.”

So how do we resolve grant challenges? “By tackling the problems in different ways; for example we were told the population of the world is growing by 2 billion more within 50 years, so we’re going to have issues with water resources and with energy resources. So of course I was there to discuss my technology, my scientific approach, my scientific solutions... politicians would have seen this from one perspective, entrepreneurs would have discussed that from another, CEOs of large companies would look at the same from a different perspective again. Only by discussing things at a wider angle can you really think about how to solve or how to approach the huge issues that we’re facing.”

Concluding the interview, Valeria looks to future goals: “I’ve always had drive. If you want to be successful, whatever the job you’re considering – businesswoman, nanotechnologist, academic – you need to push for things. Look beyond the limits that you see in the moment. But if I look back ten years ago although I was very ambitious I could never have expected to be in the position I am today. Now of course I have a lot of future plans but my next goal is to see my technology being commercialised. I will push for technologies that I know we can use in everyday life. This is the next step.”



L-R: Rosemary Delaney, WMB; Prof. Valeria Nicolosi, TCD and Emer Costello, DHDA and WMB Awards Chair.