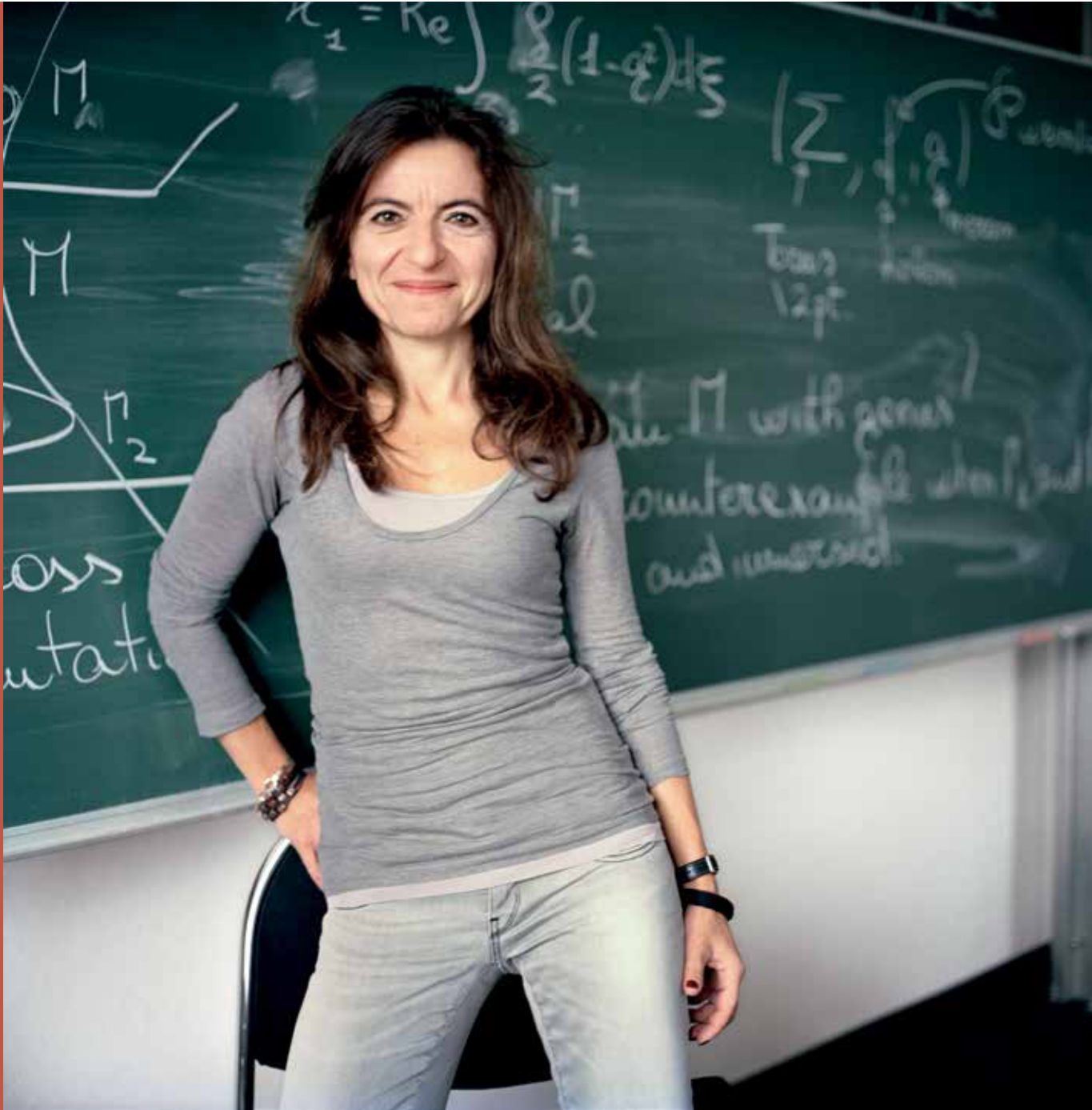


Barbara Nelli

$$\operatorname{div} \left(\frac{\nabla u}{\sqrt{1 + |\nabla u|^2}} \right) = nH$$

Barbara Nelli obtained her PhD in Mathematics at the University of Pisa and at the University of Paris 7 under the supervision of Harold Rosenberg. She was a postdoc in Paris, and a Humboldt fellow at the Technische Universität Berlin. In 1997 she became Ricercatore at the University of L'Aquila and in 2005 she was appointed Professor at the same University. She is a member of the Scientific Committee of the Unione Matematica Italiana. She is a regularly invited professor at the University PUC and UFRJ of Rio de Janeiro, at the Universities of Paris VII, Tours and Granada.

- Research topics:
- Geometric analysis
 - Minimal surfaces
 - Dirichlet problem
 - Geometric maximum principle



Golm, Germany, 2019



How and when did you choose to do mathematics?

At school, I had always been “good at maths” and liked this subject, even though I also enjoyed other subjects, such as history. Because I liked doing mathematics, I then chose to study mathematics at university. Another subject I found tempting was law, and I also considered studying physics. I thought law would appeal to me because of its internal logic, but soon found out this was not the case. Also, I realised I understood mathematics better than physics, so I decided on mathematics. I knew that mathematics could be useful to find a job, maybe in a private company. I never thought I would do research though; it was the Master’s thesis (a thesis work you do in Italy after 4 years’ studying) that triggered my decision to opt for research. So I applied for a PhD fellowship, and simultaneously went through the hiring procedure for a position at IBM, which I eventually got. At that time, you would receive many offers from private companies when you had a mathematics degree. The application for the PhD fellowship meant taking a competitive exam, which I found much more challenging than the hiring procedure at IBM; I liked the challenge and declined the IBM offer.



Were you then encouraged by your family, friends or other people around you?

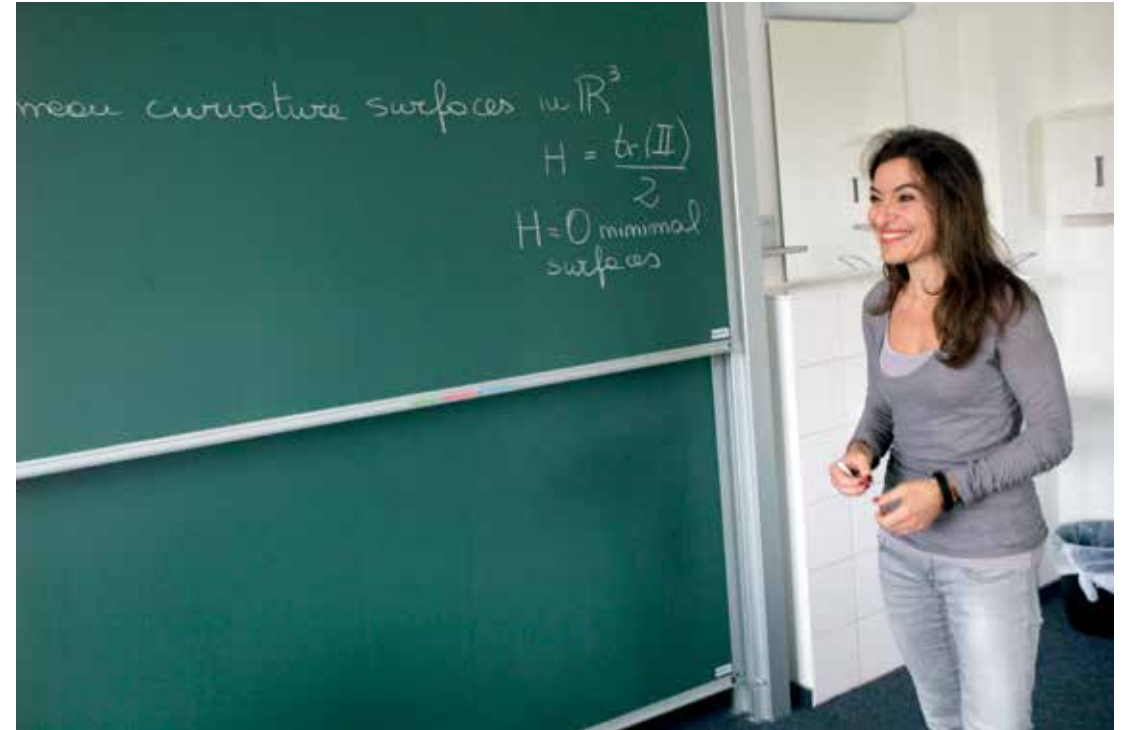
I was left free by my family to choose to study whatever I liked. The encouragements I got came from my mother, who held one’s financial autonomy and independence to be the most important thing. I was confident and had no doubts about getting a job as a mathematician, which at the time was objectively feasible. A very good mathematics and physics teacher I had in high school might have had some influence on my choices.

Did you come across obstacles in pursuing your career as a mathematician?

I started my PhD in Pisa and, in agreement with my PhD adviser there, applied for an Erasmus grant to study in Paris. There I worked under the supervision of Harold Rosenberg, at the University of Paris VII. After that I applied for jobs in France, but at that time being Italian made it harder to find a job in France, more so considering that my PhD adviser was American and not French. When I came back to Italy, I easily found a job as a “Ricercatore” in L’Aquila in 1997 – where I am still working now – on the grounds of the quality of my CV. Then I was confronted with the problem of getting a promotion. The fact



that I wrote my PhD in France and not in Italy has influenced my career, both positively and negatively. Positively, because I work on a rather unusual topic in Italy, which gives me some independence, which I value very much. Negatively, because this very fact might have been one of the reasons why it took a long time for me to get an assistant professorship. I passed the “Idoneità” (a competitive exam which enables you to apply for such a position) in 2003 and was actually promoted in 2005. I am still not a full professor although I was selected for “Abilitazione” (habilitation) in 2013. This is a selective procedure, unrelated to a position. Actually, due to the lack of full professor positions in Italy, particularly in geometry, among the fifty odd people who were selected for the “Abilitazione” at the same time as I was, only five were appointed professors and two of them are women. The statistics show that fewer women than expected apply to get the “Abilitazione”, in spite of their merits, which speaks to the fact that women censure themselves, a widespread phenomenon among women due to cultural reasons.



In retrospect, are you happy to have chosen mathematics or do you have some regrets?

For you, what are the joys of mathematics?

What are the hardships?

I have no regrets, none at all. Mathematics gave me the opportunity to discover the university world, which was completely new to me. Mathematics is very creative; as a mathematician, you are very independent and can organise yourself as you wish. You are free to think

about what you like, to choose a problem and the way to solve it. I see mathematics as a creative job, rather than a useful job. Mathematics is made of layers, the upper layer cannot exist without the lower one. But when you reach the top layer, you do not see what the bottom layer looks like. Mathematics is a very difficult subject, not easy at all! The difficulty comes from having to find a reasonable problem and an appropriate way of solving it. When you have found a way

to approach the problem, you usually still have a long way to go before actually solving it. It is often much longer than you might have anticipated! I went through times of discouragement; a few years after my PhD, I was then already working at l'Aquila, I felt I had reached a dead end, I did not know what to aim for in terms of my research and how to go on. I thought of quitting and working for a private company and actually enquired at an insurance company. The little I saw of their

way of functioning put me off and convinced me that my place was at university. I then found a new impulse to work on new directions of research.

Working with other people I enjoy a lot, because sharing an idea is the best part of having an idea. I share with someone who in turn shares with me. Working with young people is also very nice; as a senior mathematician, you have many things to tell them and in the best of cases, you get unexpected feed-back from them; you give them something and get a lot back from them.

For a long time, I did not see myself as a woman working in mathematics, but simply as a mathematician. Only relatively recently did I realise, at a conference in Bonn, that there were only men in the room. It is difficult to tell whether I never experienced any discrimination in being a woman, or whether I just did not see it as a discrimination. I do not think I experienced any discrimination as a woman in mathematics, although there are hardly any women working in my area of research. However, interestingly, in Italy there is a higher proportion of women in mathematics than there is on average in Europe, even if not at the top positions. I believe that this is due to the fact that to be a professor at university, especially in mathematics (viewed

as very abstract and not useful, no money involved) is not a highly valued job in Italy. So, it is easily left to women.

What would you recommend to a young woman in your country wanting to start a career in mathematics?

A student in Italy who has a degree in mathematics, I would encourage to go abroad, helping out by suggesting places. This for two reasons, because I believe that living and working abroad is very useful both mathematically and on a human level, and also because there are hardly any prospects for him or her in Italy. I would encourage a woman or a man in the same way, for I believe that the difficulties one encounters as a woman in mathematics are the same as in any job, and not specific to mathematics. My job is not to tell a young woman mathematician about the difficulties she is to expect, it is rather to make her path as a mathematician easier. It might be better for a young woman mathematician not to be aware of the many obstacles she might encounter; she could not do much about it anyway.

Could you describe your research field to a lay person?

I study soap bubbles, from a mathematical point of view; they are constant mean curvature surfaces. The mean curvature you can imagine as the pressure and a soap bubble with constant mean curvature is like one at rest. I have to confess that I am not interested in applications, so not in the soap bubble itself but rather in the mathematics inside it.

Can you describe your favourite personal achievement in mathematics?

A personal achievement I vividly recall, despite the fact that it is very simple, is something that happened while I was in France for my PhD. I had come to work with Harold Rosenberg, and had told him so when I first met him. During one of the classes I took with him, he asked me to solve the following problem: "Show that the solution of a positive Gauss curvature equation on a punctured disc extends continuously to the disc", which I indeed solved. This, I think, was what triggered his decision to supervise my PhD thesis. Long after my PhD he told me I had been the first female PhD student he had had.

