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## Biophysicist in Profile

### MIGUEL CASTANHO

To Miguel Castanho, professor of biochemistry in the School of Medicine at the University of Lisbon and researcher at the Institute of Molecular Medicine, the glass is always half-full. “He used to say all the time that I should always focus on the solution and never on the problem,” says *Ana Salome Veiga*, formerly one of Castanho’s graduate students, now a Visiting Fellow in the Chemical Biology Laboratory at the National Cancer Institute, National Institutes of Health.

Indeed, such focus on finding solutions sparked Castanho’s interest in biophysics in the first place. As an undergraduate student, Castanho relished physics and math classes as part of his biochemistry major. “I loved quantitative areas of biochemistry while feeling much less interested in qualitative disciplines where analytical reasoning is almost absent,” he says. He discovered the field of molecular biophysics, and found a home there. “Biophysics is a crossing of different disciplines founded on quantitative analysis, rather than mere observation and description,” he says. This outlook carried him to the lab of *Manuel Prieto*, in the Chemical Engineering Department at the Technical University in Lisbon, where Castanho completed his PhD in 1993. His timing joining the group was perfect. “Miguel was an excellent student,” Prieto says. “He

was extremely talented, going into totally new methodologies—time-resolved fluorescence and dynamic light scattering—and he was enjoying it so much.” Castanho’s satisfaction with his work showed. “I felt very comfortable

“Public awareness and understanding is vital for the future of science.”

—MIGUEL CASTANHO

during my PhD amongst spectroscopists because I could devise methodologies that were tailor-made to address the specific problems I had to solve,” he says.

Another problem that Castanho believes needs to be solved is the public perception of science. “Public awareness and understanding is vital for the future of science,” he says. “Nuclear physics and industrial chemistry, for instance, were once very affected by misperceptions in society. We do not want the same to happen to biosciences, so we should actively make an effort so that our scientific work is well and realistically perceived.” Castanho’s colleague *Nuno Santos*, who has seen Castanho’s sundry public outreach activities in action, chalks it up to a belief in the inherent responsibility bestowed on any investigator funded by the European Commission “to let the general public know what he or she is doing,” says Santos, “by fostering contacts with journalists and participating in open sessions for non-scientific audiences, from high school science fairs or seminars to specially planned experiments for elementary school children.” Castanho’s sense of duty extends beyond his home country, including a



**Miguel Castanho with his daughters, Catarina (left) and Sofia (right).**

recent trip with Prieto to the Amazon Rainforest to disseminate science among teachers working there. Castanho credits his upbringing as instrumental in forming his broader scientific outlook. “I was raised in a cultural rainbow,” he says, citing his father, a sociologist; his mother, an art instructor; and his sister, who has a degree in food engineering, as major influences. “I guess this helps me now in understanding the societal and cultural value of science.”

Castanho also keeps the biosciences translucent through his current work, for which the industry sector furnishes many of his collaborators. He lends his expertise to multidisciplinary teams to find solutions applicable in the clinic. “I work in problems of proven biomedical interest,” he says. His current projects focus on drug discovery and development for pain relief, from a nationally funded project studying the blood-brain barrier transposition of a painkiller molecule to correlating the action of antimicrobial peptides in the membranes of bacteria while observing lipid vesicles. Yet another project involves studying the HIV and Dengue virus fusion and assembly and looking at what inhibits these actions. “We have been demonstrating that interaction with lipids is an important part in the mode of action of HIV fusion inhibitors,” Castanho says.

These projects are paving the way to Castanho’s vision of his place in the field in the years to come. “I plan to continue to progress deeper into biomedicine and get more involved in translational work,” he says. His lab members are eager to help him reach his goals. “Miguel is extremely diplomatic, extremely polite, and extremely sensitive,” says *Henri Franquelim*, a PhD student in Castanho’s lab. “When there are tensions and problems to solve, he manages everything without losing his composure.” Castanho’s open, relaxed attitude encourages autonomous thought and a friendly atmosphere in his lab. “He is an incredible mentor,” says *Marta Batista Ribeiro*, also a PhD student. “His guidance is always present but at the same time he gives us total freedom to develop our projects in our own way... The trust level is high and

he creates a very good working environment.”

His contemporaries agree. *Claudio Soares* is a board member of the Portuguese Biophysical Society, which Castanho helped Prieto start in the mid-1990s. “Miguel Castanho is a well-known communicator, very appreciated by his peers, collaborators, and students,” Soares says, adding that Castanho’s sense of humor and his sense of knowing when to listen and when to speak are key aspects of his renowned communication skills. “He develops very close relationships with his students and collaborators, creating a very nice atmosphere in which to work.”

Castanho is active in the Biophysical Society, too. For him, the BPS doesn’t feel a world away. “Probably the most striking characteristic of BPS meetings is that they are truly international to a world level,” he says. He himself received a travel grant to come to the BPS Annual Meeting in 1990, an experience that stuck with him. “I discussed my work with people I only knew the names of from papers and books, people with highly regarded work,” he says. “This caused a very positive impression and was very encouraging.”

When he’s not attending international meetings, in the lab, or volunteering, Castanho’s two young daughters keep him just as busy. Castanho still finds time to read poetry, though, a literary form he finds intriguing. If a scientific vocation hadn’t called to him, Portugal would have found his name printed on the title page of a book of poetry or rolling in the credits of a film. “For sure, I would be doing work related to innovation and creativity,” he says.

Though his life’s work is in science and not in the arts, creativity still plays a major role in his approach. “Pay attention to the results you cannot explain,” he says. “They may not be a problem; maybe they are a challenge you can transform into an asset. Focus on a solution and think, ‘Why not?’”

