



Biophysicist in Profile

Frances Separovic

Frances Separovic followed an atypical path to become a biophysical chemist and professor in the chemistry department at the University of Melbourne. “I did not choose a career in science; I stumbled onto it,” she admits.

After one term at the University of Sydney, Separovic left school to work as a junior technical assistant in a microbiology lab at CSIRO Food Research, a government research organization. Following the birth of her son, Kane, she decided to advance herself to better provide for him. After getting a biological technician’s certificate in night school, and finding that she enjoyed physics and math, she pursued a math-physics double major at Macquarie University. Her degree program, which she pursued part-time, complemented her work at CSIRO, particularly when she switched to a physics lab.



Separovic with her young son, Kane.

Separovic opted to pursue a PhD part-time, “so I could continue to have fun and do even more research,” she says. By the time she finished her PhD, her son had graduated from high school.

She took leave from CSIRO to do a post-doc in the United States, with *Klaus Gawrisch* at National Institutes of Health, who inspired her to a change in career. She returned to Australia and joined the University of Melbourne as an associate professor of chemistry after having worked at CSIRO for 23 years.

Separovic may have stumbled onto science, but she had always had the inquisitive, analytical mind of a scientist. Her family immigrated to Australia from Croatia when she was a young child. After mastering English, she set out to figure out “how Australians worked,” reading every book in her small school library. This began a lifetime dedicated to discovering how things work, a driving force behind her scientific pursuits. Separovic notes that science not only provided a means to earn a living and help raise her son, but “it also became a hobby which I enjoy very much.”

Separovic specializes in nuclear magnetic resonance (NMR) spectroscopy and membrane biophysics. She developed solid-state NMR to determine the structure and dynamics of membrane components in situ. Her lab focuses on how antimicrobial and amyloid peptides get into phospholipid membranes, with the hope of finding applications for antibiotics and Alzheimer’s disease.

Separovic appreciates starting in a small lab where she learned things in depth, participated in the entire process, and helped analyze the problem and brainstorm solutions. She regrets that the current trend toward large labs and big-number measures of success will limit small-lab opportunities for students and may sometimes risk the integrity of scientific process and outcome. “Big science that measures success in terms of metrics—research income, number of papers, citations, impact factors—sometimes confuses good science with measures of success,” she contends. Though she turns out impressive numbers in terms of grants received, papers published, and conferences organized, Separovic prefers to be known for scientific integrity and the achievement of good science—not for those numbers.

With the addition of roles such as Associate Dean (and for a time, Acting Head of School), Separovic spends more time on administrative matters. She regrets the loss of lab time but sees

her role as “helping others do good scientific work, which is also rewarding,” she says.

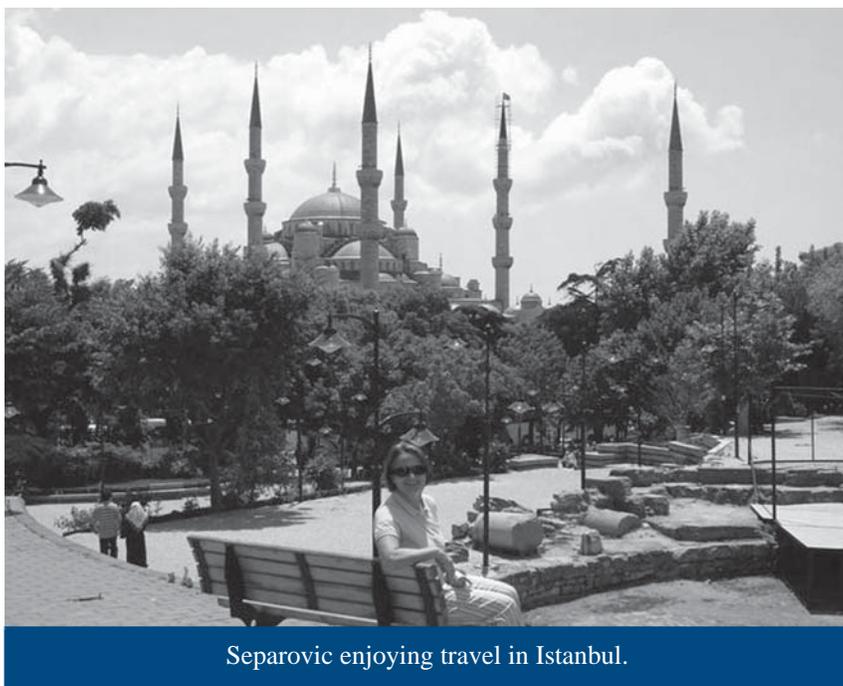
This and Separovic’s scientific integrity generate a broad ripple effect quickly acknowledged by her students and collaborators. A former postdoc in Separovic’s lab, *Maurits de Planque*—now Life Sciences Interface Lecturer at the University of Southampton in the UK—says that what he appreciated most was Separovic’s mentorship. She made de Planque feel at home in Melbourne and in the lab, gave him career advice and encouraged him. “I try to motivate my students in the same way ... by striving to be an excellent supervisor and inspiring mentor.”

Former PhD student *Crystal Tong-Lay Lau*—postdoc research fellow at Keck School of Medicine at the University of Southern California—echoes the desire to pass on what she gained from Separovic, who explained NMR theory “in the most simplified way, allowing a beginner to understand something complicated almost effortlessly.” Separovic promoted manuscript writing skills and attendance at local and international science meetings. (Separovic credits such networking with making her aware of the opportunity for her current position.) “Being in her group was like being in one big family—where even after graduation, the link and support from the group continues,” Lau notes.

Collaborator *Mibel Aguilar*, Professor of Biochemistry and Molecular Biology at Monash University, highlights two outstanding research and academic assets of Separovic. “She reads and processes documents and ideas at an alarming rate,” benefitting collaborators’ publication output and her department’s research status and the “escalation in the quality and quantity of its administrative dealings” says Aguilar. “She also tirelessly promotes women in science.....often surprising conference organizing committees with the depth and breadth of both Australian and international female scientists.”

“Frances knows how to push a person’s limits” to maximize their potential, asserts *Isabelle Marcotte*, Assistant Professor in the Department of Chemistry at the Université du Québec à Montréal. Separovic pressed the shy student to present her PhD work on several occasions, helping Marcotte gain more confidence. Marcotte also gained a friend and collaborator in Separovic, “one of the most brilliant persons I know and a pioneer in the field of biological solid-state NMR.”

Separovic’s students and colleagues are quick to remark about her great sense of humor, “unstoppable” energy, patience and kindness.



Separovic enjoying travel in Istanbul.

They say she’s not only inspiring but also fun to be around. Separovic enjoys her time with her family, especially her son and her nieces and nephews. She relaxes with Scrabble or Sudoku, travel, cinema, sharing a glass of wine with friends – or (according to Marcotte) has been known to listen to heavy metal or rock music, while driving her sports car. That may not be considered to be typical for a scientist—but Frances Separovic does not aspire to be typical.