



## Nichi, my mentor

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**Abstract.** I have known Nichi my whole academic life. He has been my undergraduate and PhD thesis supervisor, and, later, my Director and my President. I would not be a pulsar astronomer if I had not met him. In this contribution I will give a short (hopefully not too random) account of some of my earlier memories of him, as a brilliant and kind mentor and as a friend.

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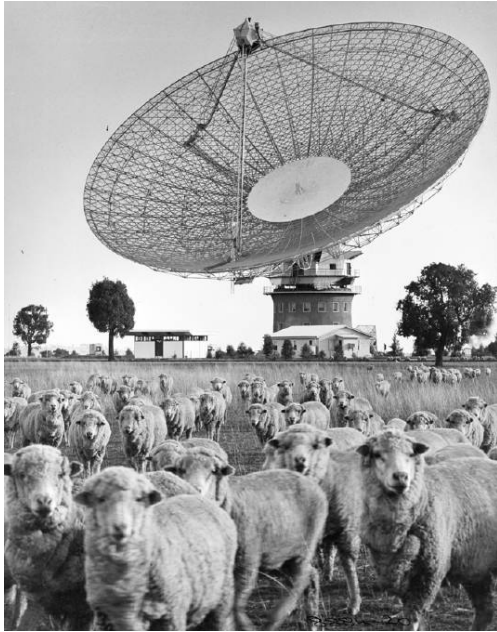
If it weren't for Nichi I probably would not be a pulsar astronomer.

I didn't particularly like pulsars when I first studied them at the university in Bologna: pulsar electrodynamics, as a matter of fact, was one of my least favourite topics of the (otherwise awesome) radio astronomy course of professor Fanti.

One day, though, during my last year as an undergraduate student, I was wandering through the underground level of the astronomy department when I saw, on the door of the conference room, a little flyer with the picture of a big radio telescope sitting on top of a round tower in a sheep paddock. The flyer advertised a talk just about to start. I decided to stay (that telescope looked quite cool!) despite the fact that the topic was, I thought, "some boring pulsar survey". That was the first time I saw Nichi D'Amico, whose clear and insightful talk made me realize that pulsars were so much more interesting than their obscure emission mechanism.

A few months later, while searching for a topic to work on for my Laurea thesis, I remembered that great talk and that brilliant professor. I sent him an email, to see if he would accept a student to work on pulsars (the formerly dreadful pulsars!). It turned out he was working in Australia, just at the radio telescope I saw on that little flyer, at the time. He did have a few projects suitable for a thesis, anyway, so he sent me to pick one from his former student, Andrea Possenti. Andrea reinforced in me the idea that pulsars were actually *really* cool, and I ended up working with him and Nichi ever since.

Of the nine or so months of my laurea thesis, whose topic was the search for millisecond radio pulsations in X-ray transients, I particularly remember the weekly meetings of the small Bologna pulsar group (Nichi, Andrea, myself and a couple more undergrads). Nichi, to my student's eyes, was a reassuringly authoritative and quiet presence. He never talked much during those meetings, but when he did, he always gave the clearest, most effective explanations. I sometimes still find myself trying



**Fig. 1.** The Parkes radio telescope, in Australia, sitting in the middle of a sheep paddock since 1961 (not the picture of that little flyer, but a similar one).

to give my students the answers and the advices I got from him 20 years ago.

I often talked about Nichi and Andrea to my friends (as for any undergraduate, my thesis was basically the centre of my life), referring to either of them as “my boss”. To distinguish among them, one of my friends suggested to name Nichi “Capone” (Big Boss) and Andrea, “Capino” (Little Boss). Of course, this had to do with academic seniority, not size, given that Andrea is some 1.90 meters tall! The names stuck; Andrea knows, I wonder if Nichi ever did.

I discussed my Laurea thesis in December 2000 and I remember that the last question I was asked, by professor Fusi Pecci, was: “Do you think that the Sardinia Radio Telescope will be useful to continue your research on pulsars?”. I had no idea what this Sardinia thingy was, but, “of course!”, I promptly answered (sorry Flavio). Little I knew that Sardinia and the SRT would become such a big part of my future and of my work with Nichi.

(By the way, we did not find any pulsars in the data taken for my Laurea thesis (Burgay et al. 2003), but the idea to search for periodic radio signals in neutron star X-ray transient was right, as we showed several years later, with the discovery of transitional millisecond pulsars (Papitto et al. 2013)).

A few months later I started my PhD thesis, again under the supervision of “Capone” and “Capino”, working on a new survey for pulsars with the Parkes radio telescope (the one on that little flyer). As a doctoral student, I was upgraded from working in the big student’s room at the underground level of the astronomy department, to work on a real office with actual windows. In the old room my desk faced the wall and, when Nichi came in to talk to me, he entered so quietly that I jumped on my chair every single time. After a while he must have noticed, because he started whistling, or clearing his throat, from afar, to make his presence known in advance and spare me the scare. Later I ended up sharing his office, solving the jumping on the chair issue for good.



**Fig. 2.** “Capino” (Andrea Possenti, on the left), “Capone” (Nichi, on the right) and I, in December 2003, at the end of our first ‘tandem talk’ on the *Double pulsar* at the Physics Department of the University of Cagliari.



**Fig. 3.** Nichi, Andrea and I (right to left), celebrating the detection of gravitational waves from a neutron star - neutron star merger, as predicted in our Nature paper on the *Double pulsar* in 2003.

We didn't actually see each other too often in those years, anyway: either he or I were away for weeks at a time, mainly to carry out observations at Parkes (how many anecdotes we shared of that great place!), and then he moved to Sardinia to become director of the Cagliari Observatory. Despite this, he was always available to answer my questions on pulsars, on telescopes and backends, on vacation spots in Australia... and I have many memories of him, of his intelligence, his humour and his kindness as a mentor, a colleague and a friend.

I remember, for instance, his infectious enthusiasm when we discovered, in the data of my thesis' survey (Burgay et al. 2006), what later became apparent as the first (and still only) double pulsar. I had brought a few confirmation observations from Australia to Cagliari, where I was visiting for a short period of time. I was slowly analysing the  $\sim 20$  hours of data in 5-minute chunks, to beat the effects of the quickly changing apparent period of the pulsar in its tight orbit, in search for the signs of relativistic effects. My discovery plot, indeed, already showed some intriguing signature, and we were confident that this would be an interesting source (but to what extent, we could not

imagine then!). At every chunk I analysed, the graph we were tracing became more and more appealing and Nichi started to pop-up in my office more and more often to inquire about the results of the next chunk, with a larger and larger (relatively speaking, of course) smile under his moustache. With just those first three observations, taken in less than a week, we were able to detect the advance of periastron of our new pulsar. And it was the biggest ever measured. From then on, our new pet star gave us a lot of satisfactions and a lot of visibility. We published in Nature and in Science (Burgay et al. 2003; Lyne et al. 2004; Kramer et al. 2006), we were invited to many conferences and to visit many research institutes. The double pulsar system was so rich (two pulsars in one single system, the most relativistic and most constraining of all, with strangely modulated eclipses and intriguing implications on the detectability of gravitational waves) that we usually ended up giving long talks in tandem, with Nichi and Andrea. It always was a great pleasure and an amazing learning experience for me, to share the stage, either in scientific or outreach events, with them.

I remember that, in a couple of occasions, just to highlight to the general public how unique the discovery was, Nichi said that the double pulsar was potentially Nobel prize material (if only it started disproving Einstein's theory, rather than confirming it to better and better precision). There must have been some peculiar person in the audience: for the following three or four years, as soon as the Nobel Prize in physics was announced, Nichi, Andrea and I received an anonymous email saying something along the lines "You did not get the prize this time either, and you never will! Stop trying." We were kind of sad when, after a few years the emails stopped. We were counting on them for our annual Nobel prize laugh.

I have many more fond memories of Nichi from the most recent years, spent in Cagliari working to make the Sardinia Radio Telescope a performing pulsar instrument. The work is always going on, with the continuous upgrades of this great instrument, to the success of which Nichi has devoted so much time and energy.

I learnt so much about the amazing world of pulsars and of radio telescopes working with Nichi, and I hope I have become a better sci-

entist thanks to his example. One thing I did *not* manage to learn, however, despite Nichi's best efforts and despite trying many times, is how to shell a shrimp with knife and fork, one of the many non astronomical skills he had and shared.

## References

- Burgay, M., Burderi, L., Possenti, A., et al. 2003, *ApJ*, 589, 902. doi:10.1086/374690
- Papitto, A., Ferrigno, C., Bozzo, E., et al. 2013, *Nature*, 501, 517. doi:10.1038/nature12470
- Burgay, M., Joshi, B. C., D'Amico, N., et al. 2006, *MNRAS*, 368, 283. doi:10.1111/j.1365-2966.2006.10100.x
- Burgay, M., D'Amico, N., Possenti, A., et al. 2003, *Nature*, 426, 531. doi:10.1038/nature02124
- Lyne, A. G., Burgay, M., Kramer, M., et al. 2004, *Science*, 303, 1153. doi:10.1126/science.1094645
- Kramer, M., Stairs, I. H., Manchester, R. N., et al. 2006, *Science*, 314, 97. doi:10.1126/science.1132305