



Special Issue dedicated to Stefano De Marchi on the occasion of his 60th birthday

L. Bos^a · F. Dell’Accio^e · G. Elefante^b · W. Erb^b · F. Marchetti^b · E. Perracchione^c · D. Poggiali^d · G. Santin^e · A. Sommariva^b

Abstract

As colleagues and friends we dedicate this issue to Stefano De Marchi on the occasion of his 60th birthday, publishing works of some of his collaborators. Stefano has made many important contributions to approximation theory and beyond and is one of the “founding fathers” of this journal. Here we briefly reminisce and recount some of our experiences with Stefano in the spirit of the occasion.

1 The early years in Padova

Davide Poggiali and Gabriele Santin

We first met Stefano in 2010 as students of the first edition of his course “Approximation Theory and Applications”, or “Teoria dell’approssimazione e applicazioni” in Italian - TAA in short.

Stefano had recently moved from Verona to Padova, where we were enrolled as master students in Mathematics. The program was at the time (and still is) very attractive for the large spectrum of specializations that it offered, and many students moved to Padova after completing their Bachelor elsewhere. TAA was the first course on Numerical Analysis in the master, and the first meeting point for the numerical-oriented students. A small community built around that course, and it was both very stimulating academically and a source of some friendships that still last after many years.

The course all revolved around kernel methods - a love at first sight for many of us, who later went on to write theses on the topic under the supervision of Stefano. At some point in these years, up to ten students (out of around twenty taking the course) were active under his supervision in Padova. Apart from the theses that he supervised directly, he was very open and keen to provide students with opportunities to move outside of the department: many wrote theses on applied projects developed during company internships or in collaboration with researchers from completely different fields. Even more of his students went abroad to work with one of the many of Stefano’s international collaborators. He was very active in personally contacting many interested companies, and had a central role in opening Erasmus agreements to let his students collaborate with several foreign universities.

A group seminar was also started those years, to present current projects by the students. Quite often, some of Stefano’s collaborators visited Padova in person, and took part in those seminars. First-hand contact with the current research included participation in the research weeks at Alba di Canazei, to which many students had access even during their master studies. It was a great opportunity for us to get in touch for the first time with a whole world of national and international research groups. The occasions of research weeks planted a seed that later would have grown into RITA, the Italian Approximation Theory Research network.

Being it in Padova or in Canazei, wine tastings organized by Stefano have always been a valuable occasion for socializing, discussing our work and getting to know the world of Northern Italy’s fine wines. A thing that mathematicians and sommeliers have in common is having a great knowledge of non-perceptible subjects and the strong will to communicate it to people without the same experience. At least, he had more success in introducing us to wine, than in his other passion of marathon running. Some of us (not everyone of course) were actually less in shape than him, despite the age gap.

Working in that research-filled environment was a turning point for many students, who went on to spend several years working in the field - or was it the wine?

^aDepartment of Computer Science, University of Verona, Italy

^dDepartment of Mathematics and Computer Science, University of Calabria, Rende, CS (Italy)

^bDepartment of Mathematics “Tullio Levi-Civita”, Università degli Studi di Padova (Italy)

^cDepartment of Mathematical Sciences “Giuseppe Luigi Lagrange”, Politecnico di Torino (Italy)

^dFAR Networks S.r.l., Cernusco S.N., Milano (Italy)

^dDigital Society Center (DIGIS), Fondazione Bruno Kessler, Trento (Italy)



Figure 1: A picture from 1992 (Oxford), with G. Rodriguez, M. Rossini and J.-P. Berrut (photo courtesy of M. Rossini).

2 Erasmus, theses and more

Francesco Marchetti and Giacomo Elefante

In 2014, we were looking for a nice destination to spend our Erasmus in, and we thought that Warsaw was a nice idea. It was when we needed more information about this destination that we first met Stefano, as he was coordinator. It is somehow funny and significant at the same time that this was the reason behind our first meeting. Indeed, when we became his students later, he has been always motivating and encouraging us in having international experiences by attending meetings and conferences (... and by doing a PhD, Giacomo says!).

After that first meeting, in the next months, we were both interested in writing our thesis (bachelor for Francesco, master for Giacomo) including some numerical flavor, so why not asking Stefano? During our work of thesis, and also thanks to the TAA course (refer to Section 1 for an introduction on TA... Ok stop no serious stuffs here) he introduced us to many intriguing topics in the field of numerical analysis and particularly approximation theory: multivariate polynomial approximation, rational interpolation, kernel-based methods... We are still happily working together on interesting new topics after almost eight years.

A very nice quality of Stefano as a supervisor is that he avoids impositions or strict recommendations on your research flow: as a student you are free, and encouraged, to explore different research lines. He always emphasizes the importance of establishing collaborations with other researchers, as it is the best fertile ground for the growth of new ideas.

Last but not least, Stefano also introduced us to “wine theory”! Happy 60th birthday Stefano!



Figure 2: From left to right, Stefano at the conference *Meshless Methods and Applications in Finance* and at the *4th Dolomites Workshop on Constructive Approximation and Applications*, Alba di Canazei, 2016 (photo courtesy of J.-P. Berrut).

3 A mathematical view of matching Stefano and wine

Emma Perracchione and Wolfgang Erb

A much noted work of Stefano deals with the mathematical description of matching food with wine. In the occasion of his sixtieth birthday we thought it might be a good idea to apply the methods developed by Stefano to find the wine that optimally matches his character and personality. The personality of Stefano is however much too rich and complex for the simple methods developed

in his work for food and wine pairing, so we had to come up with a different solution. To get the optimal pairing, we took a huge artificial neural network and started to train it with the following components: all wine guides of the Italian Sommeliers Association, all papers and lecture notes of Stefano, some documentation of his scientific activity in Iran (see Figure 3), all articles of his collaborators (which are a lot), a book on the history of Candiana, and a book on the best vie ferrate in the dolomites. As you can imagine this is way too much material to get a result in a reasonable time. To reduce the dimensionality of the problem we therefore also applied some of the approximation techniques studied by Stefano, in particular, stable RBF interpolation methods, weak polynomial meshes, Fekete points, variable scaled kernels, Chebyshev and Leja polynomial approximations, and, of course, polynomial interpolation on the Padua points. Unfortunately, also with this considerable reduction strategy, the first results will only be available in approximately ten years^(*), so we have to wait for the next big anniversary of Stefano to get the optimal pairing. However we can state already now that, like a fine wine, Stefano will only get better with age and hopefully so our computational approaches. In the mean time, we wish Stefano all the best for his sixtieth birthday!

(*) actually the calculations would be much faster if the Padua points in 3D were known.



Figure 3: Memories from Iran: Stefano held some tutorials in Teheran.

4 On workshops at Canazei and their organization

Alvise Sommariva

For many of us, Stefano has been, as well as some colleagues working undercover, one of the organizers of the workshops at Canazei. In view of his communication skills, he has been our frontman, introducing the conferences and giving the final talks. I have been part of that troop for many years. Though we managed it for many editions, the beginning of each conference has always been a thrill, running against time, from the preparation of the rooms to the phone calls to the coffee shop. Our common work was simplified by the fact that Stefano went to Canazei many times before the workshops, just to check that everything was fine with our local partners, from finding the support of Canazei municipality to determine an agreement with the local restaurant in which the participants could have lunch at a lower price.

In spite of this, in some occasions things became a little wild. Once, at 9 P.M., after a long day at our Canazei location, the chief organizers decided to check the conference money balance, immediately realizing that it was wrong. We counted our havings many times and the entries were less than expected. Who made the mistake? At 10.30 P.M., when the situation was hotter than ever, we realized that we were wrong of just some cents. I am pretty sure that Stefano still remembers the swear words thundering in the room, with a large smile.

Many of us have also well in mind the first wine tasting open to the workshop participants, with the special contribution of a famous italian producer. Stefano did his best to find this prestigious agreement with that local company. They sent us a skilled sommelier to teach all the qualities of wine, that special cherry taste or that bread crust savour. Unfortunately, he kept talking and talking, with people ranging from sleepy to furious, close to plan an insurrection, as in a famous scene of the italian film character Fantozzi. We wanted to drink wine! In a little the situation was out of control, with paper airplanes flying like in the most boring high-school lessons. I still remember the disgusted face of the sommelier. And when we sipped the wine, a famous professor said aloud *It does not have a cherry taste, in my opinion the wine is corked!* After this experience, things were organized differently and every participant was happy to have wine lessons with few theory and a lot of *practice!*

And from the very beginning there were the hikes. A brilliant idea to give the conference a special flavour, having in mind that participants could know better one each other, and share ideas while walking. In this case it was crucial to subdivide them in different groups, from newbies to experts, also proposing different tours. The bad thing was that we had to believe to those saying that they did this and that, classifying wrongly themselves as skilled hikers. Stefano surely remembers those *experts* wearing gym shoes on the flat *Viel del Pan*, arguing that it was a challenging trip. And what about those wearing flip flops instead of boots?

All these words to say how brave were those bunch of pioneers who created this machinery. No ideas of all these potential troubles, believing that everything could only go well.

I hope that all these common views will keep us united also in the future. Happy 60th birthday, dear Stefano. We all know

you are already thinking what wine is suitable to open our forthcoming conference in the new mountain location. But please, no more dumb sommeliers!



Figure 4: Stefano at Canazei: as anchorman and at a wine tasting.

5 Reminiscences

Len Bos

I first met Stefano at the CAGD conference held in Chamonix, France in the summer of 1996. After visiting Italy some years before, I had become (as have many others!) quite interested in things Italian and was very pleased when the Italian conference participants kindly accepted me into their social circle. Stefano in particular was very sociable and welcoming. I remember he was very proud of his family, showing me pictures of his lovely wife Cristina and then baby daughter Silvia (now a PhD student in New York; how time flies!). However, it was almost the case that our friendship was nipped in the bud, so to speak! As we all know Stefano has a passion for the mountains, and he could not resist the siren call of Monte Bianco, towering above the Chamonix valley. Anyways, one morning when I arrived at the conference centre, there was no Stefano. He had disappeared! Lost on Monte Bianco. But fortunately, in the end, only temporarily! Evidently he and a friend missed the last cable car down and spent a cold night in a hut somewhere on the mountain.

Despite this near setback, we became fast friends and frequent collaborators. I visited him many times and I learned many things from him, including the difference between Friularo and Raboso wines!

On the occasion of his 60th birthday and 26th anniversary of our friendship I would like to wish Stefano many happy returns, and many more years of the joys of Mathematics, Mountains, Wine and Family (but not necessarily in that order!).



Figure 5: Stefano with his wife Cristina and his daughter Silvia.

6 Last but not least

Francesco Dell'Accio

I think I became Stefano's friend already at our first meeting, which took place on the occasion of the conference *Approximation of Curves and Surfaces* held in Florence, on June 8-9, 2000. I had just returned to Italy after having finished my PhD studies at Steklov Institute in Moscow and I was beginning my research in Approximation Theory after having worked for years on the Jacobian conjecture with Vitushkin. I hardly knew anybody in Florence and Stefano, one of the organizers of the special session of the conference, welcomed me with a smile as if he had always known me, asking for news about the colleagues in Cosenza. I also

met Len for the first time on that day, who was introduced to me with great enthusiasm by Stefano. That little seed of friendship, planted on that day, has produced over the years a plant with a robust stem, which has embraced our families with its roots. Among the beautiful things to be kept with care in the drawer of memories, there certainly finds a place the days spent together on the occasion of the *I Jaen Conference on Approximation Theory* held in Ubeda from 4 to 9 July 2010 with an impromptu trip to Granada, during which I had the opportunity to meet Cristina and Silvia, as well as the Easter holidays of 2013 spent with our families down in Calabria, between good meals and trips out of town to Reggio, Scilla, Pizzo and ... Sersale (a charming town in the Catanzaro area, famous for its Valli Cupe), the conferences and study weeks in the gorgeous setting of Canazei, together with Alvise, Marco and other friends ... Time has passed and now we find ourselves with a few more wrinkles and responsibilities such as the board of the UMI working group in Approximation Theory and Applications, whose logo was masterfully designed by Stefano himself. Stefano also acts as head of this group, after having coordinated the Research Italian Network of Approximation (RITA), founded in Palermo in 2017 largely due to his inspiration and organizational impetus.

My dear friend, I can write nothing more but "All the best!"



Figure 6: Len, Stefano and Francesco with many colleagues, at the meeting ATMA2017 in Palermo in which RITA was founded (December 9, 2017).



Figure 7: Len, Stefano and Francesco with many colleagues, at ATMA2019 in Naples (2019).