doi: 10.1255/nirn.1524

José Miguel Hernandez Hierro

Interviewed by Gerry Downey

The young scientist subject of this interview is Dr José Miguel Hernandez Hierro, currently working at the University of Seville, Spain. I got to know José Miguel when he came to my laboratory to work for three months on the measurement of proactive compounds in broccoli. As an emerging young NIR scientist, I thought he would make an excellent interviewee.—Ed.

Tell me a little about your background—place of birth, family, schooling maybe and current family details

I feel it might be a little too early to make a bio... but well, here goes. I was born in Salamanca, a beautiful, historical city in the north-west of Spain, in 1980. I am an only child and I grew up in the countryside in a little village called Tordillos (just 400 inhabitants!!!). My parents had a small bakery there and this is also where we lived. My father still lives in this village and my mother has just passed away (I would like to pay tribute to her memory through these lines). My childhood friends also live there and to visit them is a great pleasure for me. I currently live in Seville, which is also a beautiful, historical (but extremely hot!!!) city in the south of Spain. I enjoy my adopted city and its lifestyle (awesome breakfasts!!!) but I have to say that it was quite difficult to get used to the climate at the beginning…

Were you always interested in science—how did you choose science as a career path?

There was nothing in my childhood surroundings that pointed towards a career in science. I was not too keen on following an academic choice of career, but my family (especially my aunts Maria and Amelia and my uncle Miguel) encouraged me to do it. I was a good student but I always wanted to be a baker (like my father, and my grandfather… and so on). However, during one long hot summer I formed the opinion that the life of a baker was going to be too hard and I followed my family's advice (thanks to all of them!!!).

My parents (inset: my mother when she was young).

Where have you worked since your primary degree?

I graduated from the local high school and entered into the Faculty of Chemistry at Salamanca University (USAL). After graduating, I started my master's thesis and after that my PhD thesis under the supervision of Inmaculada González-Martín without any financial support. At the same time, I was also employed at the same University to carry out water analysis under the supervision of Rafael Garcia-Villanova (just a lucky strike!!). There was a lot of lab work, but I was able to combine it thanks to their patience!!!!. My postdoctoral career started in the Polyphenols Research Group, University of Salamanca (USAL). Currently, I work at the Food Colour & Quality Laboratory, University of Seville (US), as a postdoctoral fellow.

What figures have influenced the direction of your work?

I guess there have been a few mentors that have had an influence on my career. I have been very lucky to meet, learn from and discuss science with them. But, undoubtedly, some of them are very special to me. Inmaculada González Martín (USAL) introduced me to the world of NIR and directed my master's thesis. Her vision on how to implement NIR to solve food and agricultural problems and her energy encouraged me to continue learning beyond my undergraduate studies. Julián Rivas Gonzalo and M. Teresa Escribano-Bailón (USAL) were my other major mentors. They gave me the opportunity to join their group and

Former labmates at the Polyphenols Research Group (USAL).

Part of my current research team [Food Colour & Quality Laboratory (US)].

sponsored my first postdoctoral position, providing the resources and motivation (not only scientific but also personal) I needed for my development. They always made themselves available to discuss the progression and results of the grape and wine experiments but also to have a cup of coffee for hours just having a good chat. Last but not the least, Francisco J. Heredia (US), who introduced me into the world of colour. By questioning and challenging my ideas, he also drove me to mature as a scientist.

As you know, Gerry, you are also one of them; you pushed me into the NIR world during my short study period at Teagasc (Dublin, Ireland) and taught me always to think simple and strive to make difficult things easy for others.

What is the major focus of your current work, what do you believe to be the greatest challenges yet to be faced?

I have inherited a deep interest in the spectroscopy of agricultural products, grape and wine chemistry and colour from my academic mentors. Winemakers are continuously looking for high quality wines and the major factors impacting on wine quality are related to the winemaking process and cultivar features. In the wine sector, it is really important to know critical parameters and attributes of grapes, and is necessary to do it quickly and precisely. There are several applications in grape skin and seed where hyperspectral imaging can be applied. Accordingly, hyperspectral imaging could be applied to the screening of several parameters in grape skin such as total flavanol content, total and extractable flavonol content, total and extractable resveratrol content or aromatic potential. Other parameters of interest present in grape seed, such as fat, could also be the target of this new and green analytical methodology. Cell wall structure of the aforesaid matrices and their spectral signature might be also important in order to better understand the release of compounds from tissues to the must or wine and therefore a deep spectral and chemical study should be carried out to achieve this goal. Moreover, discrimination tools could be increased in order to discriminate between other grape varieties, detect grape diseases or heterogeneity of samples prior to further analysis. The use of hyperspectral imaging in other matrices such as oenological by-products and the chemical imaging of compounds which present an important or useful role are also two important targets. Furthermore, pilot plant and industrial studies should be developed in order to improve the hyperspectral software and automate these measurements.

Current labmates during my 34rd birthday.

Currently on the Food Colour & Quality Laboratory research team (www.color.us.es) there are several people involved trying to achieve these milestones, such as Francisco J. Heredia (Head), M. Lourdes González-Miret, Francisco J. Rodríguez-Pulido and, last but not the least, my PhD students and inseparable coffee (and also beer) partners Berta Baca-Bocanegra and Julio Nogales-Bueno.

You must have been involved in the organisation of a number of national or international NIR events. How valuable an experience do you think that was? Any particularly interesting memories?

I consider conferences a great opportunity to maintain relationships, learn new techniques and tricks. They also have enabled me to travel to many parts of the world. I suppose that organising a meeting, even a small one, is a lot of very hard work. I have not organised a proper conference yet, but I would be honoured to do so.

I have attended a number of national or international conferences and I have very good memories of all of them. Euroanalysis (my first one, Antwerp, Belgium), RNE-CIE and In vino Analytica Scientia bring back so many pleasant memories and crazy anecdotes. Nowadays, I am involved in the International Year of Light and Light-based Technologies (IYL 2015) event, which aims to promote improved public and political understanding of the central role of light in the modern world.

When you are not working, how do you relax?

I relax by going to the pool and swimming, running or maybe cycling. I like all types of sports, but I have to say that I am not good at all of them. I also very much enjoy going out, trekking and outdoors activities (and Seville is a good place to do it!!!). I try to find time to mix music and from time to time I also try to entertain myself with a new hobby, a new trumpet (a very difficult task, especially for my neighbours…).

Thank you José Miguel.