Get to know the corrosion fighters

They have told us their story, how will yours be?

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Give us a little presentation of yours. What did you study?

I am Graduate in Chemical Sciences by the Universidad Complutense Madrid (1980), with a diploma thesis in the field of Metallurgy. I joined at the Corrosion and Protection Department of the National Centre for Metallurgical Research (CENIM-CSIC) in 1982 where I did my PhD in Chemistry, studying the mechanism of organic corrosion inhibitors in pickling solutions. I also have a BSc in Welding. I am currently Chairman of the Spanish Society of Materials (SOCIEMAT) and I was Executive Officer of The Federation of European Materials Societies (FEMS). Of course, I am with the EFC!

The research lines developed throughout my career have focused on Surface Engineering and more specifically on the use of surface modification techniques to obtain new materials with improved corrosion and wear resistance.

What is your job title? What does it consist of?

At present, I am Research Professor at the Corrosion and Protection Group (COPROMAT) of the National Centre for Metallurgical Research (CENIM-CSIC). Our activity is aimed at basic and applied research, to better understand the causes, treatment and prevention of corrosion phenomena. Today, corrosion demands an in-depth knowledge of the thermodynamic and kinetic aspects of the surface/environment interface to understand the elementary processes involved in chemical or the electrochemical reactions occurred in that interface. With these bases, it is possible to give and adequate answer to the problems facing the industry, resulting for the extreme working conditions (pH, Temperature, pression, environments...).

How did you get here?

I followed the traditional way to achieve it. After finishing my degree studies, I did a Master Thesis on corrosion and developed a strong taste for spend many hours at lab. After that, I had the opportunity to get a contract to continue and, finally, I read my PhD Thesis. After it, I spend a time at Imperial Collage London as a Post-Doc working with Prof. David West on laser surface treatment.

It's not easy to get a permanent position. This is a great problem in the R&D system in Spain that had been forced too many young researchers to leave their labs and look for another jobs. To become a scientist, the way is very long, meaning that many good and promising young researchers can often get lost on the journey towards this stable position. This is particularly important for young women cases.

Who has helped? Was networking important?
Research is a long-distance race. Sometimes you are going to bump into many obstacles to reach the target (lack of contracts, discontinuity of research lines, changes in the research teams...). All these circumstances make it necessary to have a friendly environment at the lab. Supervisors that encourage to follow and support; family and friends who understand and support you. All the "science ecosystem" has to help! I was fortunate to work with Professor Alfonso Vazquez for several years. He was an expert on galvanized steel and he generously shared his experience and his passion for science with me.

What do you like most about your profession?... Is there something you don't like?
This profession is exciting, creative, interesting, motivating... There are insufficient adjectives to define the passionate adventure of teaching and research. Every day is a new challenge. The B-side of this work (what nobody likes) is all the bureaucracy involved in any proposal. You have to spend a lot of your time filling forms! However, in spite of everything, all this effort worthwhile

If you didn't dedicate yourself to this field, what would you have liked to be?
A musician, without any doubt!

Do you think this field needs more visibility?
I've just commented that corrosion is still unknown despite enormous human, social and economic impact. The Industry of the Future will need new materials for working in extreme conditions. Research in materials cut across many sectors from nanotechnology to advanced manufacturing, from the deep seas to the Space, from factory to human body. A matter of common concern of all developments is the behaviour of these new developments in aggressive environments. This scenario makes the study of corrosion an important aspect in any technological development, since all industrial progress relies on the ability of materials to withstand ever more demanding service conditions. For all this, national and European societies, (as the Spanish Society of Materials or the European Federation of Corrosion) are absolutely necessary. I highly encourage to celebrate the Corrosion Awareness Day every April to show our fellow citizens what we are doing in our labs.

What do you think about the incorporation of new Technologies for corrosion detection? Are they necessary or could we live without them?
The EUROCORR we celebrated in Spain (Sevilla) in 2019 had the theme "New times, new materials, new corrosion challenges". It was a declaration of intentions. We are living in a changing world, faster than ever before in human history.

This means the development of new technologies and equipment allowing a deeper insight into corrosion phenomena. In this sense, the “materials genomic”, i.e. the computational materials science, the artificial intelligence and the big data are tools which will be added in a very next future. This is what Scully named “The Next “Leap Ahead” in Corrosion Control May Be Enabled by Data Analytics and Artificial Intelligence”. The Future is promising and young EFC researchers have the key on their hands.

How do you think a good corrosion professional should be?
At the beginning of the 50’s and later on in 1985, LaQue wrote a paper entitled “What can management expect from a corrosion engineer?” explaining what it takes to be a good corrosionist. Together, this paper constitutes a comprehensive knowledge guide must have for corrosion professionals: from Materials Science to Economy passing through a large number of disciplines such as Processing or management of human teams and -last but no least- common sense! All this is certainly what Industry is looking for.

What is the single most valuable attribute of a researcher in your lab?
Courageously and persistently work as well as appetite for learning. If you lose it you lose everything.

What do you mainly check in the CVs you receive?
Firstly, the background studies (the University degree, preferable in Chemistry, Phisics or Materials Engineering but open to other related degrees). I do not place specific emphasis on the grades but rather to an open, dynamic and proactive attitude throughout the years when you studied.

What is lacking in these applicants' CVs?
When you are a recent college graduate, it has no sense to require specific experience. However, this does not mean that during the University years, the student has assisted or received complementary training, seminars, workshops and conferencia on Science in general. To my mind, this demonstrates an interest in research.

Could you say what it is and how you see the future of engineers/corrosion scientists? Any advice?
Corrosion is always going to be there. Thus, the corrosion experts will be needed. But, as we said before, you have to be patient. You have to climb step by step, from research student to become a good corrosion professional and that curiosity, motivation, and study (a lot!) are key to success.

Corrosionist... is it born or made?
Made.

TO END... COULD YOU TELL US...

- **A color:** Blue
- **A number:** 22
- **A song:** Any of The Beatles (Norwegian Wood, for instance)
- **A hobby:** Mountain bike
- **A city**: Bilbao and Madrid