



Get to know the corrosion fighters

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



ANNESHA DAS

Winner of **Best poster presentation of the Eurocorr 2023 Nuclear Corrosion Session**

Could you give us a little presentation of yours?

I am a post-doctoral researcher working at the Paul Scherrer Institut, Switzerland. I have my basic degrees in Chemical Engineering, with a Ph.D. in corrosion science and engineering. Broadly speaking, I work on the fields of surface modification of metals and alloys to combat corrosion, stress corrosion cracking (SCC, growth and initiation), high-temperature oxidation, and characterisation of materials using advanced techniques and electrochemistry.



What do your studies consist of?

My studies involve critical experiments in high-temperature high-pressure environments and subsequent characterisation using high-end microscopic, spectroscopic and electrochemical techniques.

What is its relation with nuclear corrosion?

The systems I typically work with simulate reactor operating conditions, and the materials under investigation are those classically used as structural components viz. different grades of stainless steel and nickel-based alloys.

What do you like the most about your nuclear corrosion?

In the current global socio-political landscape, nuclear energy stands as a pivotal solution, offering a technologically advanced means to diversify energy portfolios while significantly reducing carbon emissions, thereby mitigating climate change effects. My work on nuclear corrosion is not only instrumental in improving the safe and reliable operation of existing nuclear power plants, thereby extending their life, but also provides insight for design of new generation power plants with formulation of improved predictive models.

Is there something you don't like?

Professionally, working on nuclear corrosion can sometimes be very challenging due to inherent intricacies of the testing equipment and the meticulous attention to detail required during sample processing. On a personal level, one grapples with the slow-paced nature of the work while on deadlines, stringent safety protocols, and heightened bureaucratic red tapes while travelling for conferences and seminars abroad.

How did you get here? How did you discover this world?

The credit goes to a professor in my master's programme who suddenly revealed this world of hitherto unknown complex systems that encompassed a little bit of material science, chemistry, electrochemistry and lot of characterisation. The diversity of fields coming together was shocking to me, and the possibilities it opened up seemed endless. I eventually did my Ph.D. on corrosion of stainless steel in high-temperature water simulating reactor operating conditions because it seamlessly merged my interest in a sustainable energy solution and gave me almost infinite scope of learning and working hands on with high-end characterisation techniques.

Something curious that has happened to you within your career and that you remember with a smile?

I have had a pedestrian life so far!

If you didn't dedicate yourself to this field, what would you have liked to do?

I have an interest in literature, but in the age of social media and AI, literature as I have known it in my life is rapidly changing beyond recognition. I would probably have explored digital humanities – form, visualization, ethics, etc. as a means to understand this tectonic shift.

Where do you see yourself in the future?

I would want to work as a scientist in a laboratory of international repute.

Do you think networking will be important to get there?

Yes, I do. I think it is important to pop social and professional bubbles if we are to contribute meaningfully to science. A global awareness and cultural exchange exposes the mind to different ideas and working methodologies, which ultimately results in symbiotic relationships between different fields which would have otherwise been less likely to happen. Also, the flow of information is facilitated by networking, and we are made aware of new opportunities and prospects for career developments.

Do you think the nuclear corrosion field needs more visibility?

I think so, yes. If I say to the general public that I work in the nuclear field without more elaboration, I am usually asked about nuclear fission and fusion. Or in some rare cases, about nuclear waste management. I get the impression that nuclear corrosion does not feature as a critical area of research in the public eye, whereas it is instrumental to safe and reliable long-term operation of the reactors! Look at the French reactors for example. They were shut down for about a year due to corrosion related issues last year!

In your opinion, what is the single most valuable attribute is researcher should have?

Integrity. Everything else stems from there.

What advice would you give to students in an early stage of their careers?

Read and reach out! Talk to your alumni, pick the brains of the professors you don't take classes with, enrich yourself with the knowledge of what is possible!

Could you say how you see the future of engineers/corrosion scientists?

I think corrosion problems are here to stay, unless some magic material is discovered that is perfectly strong and stable under all application conditions. That implies that the future of corrosion scientists may involve newer challenges as different material applications come up, and newer characterisation techniques are developed to tackle those challenges, but the fundamental nature of the problems will probably remain the same.

Corrosionist... is it born or made?

I was definitely made by my professor who changed my career curve from true blue chemical engineering to now a corrosion engineer!