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Nanoscale Horizons Emerging Investigator Series: Dr Ahu Gümrah Dumanli-Parry, University of Manchester, UK

Our Emerging Investigator Series features exceptional work by early-career nanoscience and nanotechnology researchers. Read Ahu Gümrah Dumanli-Parry's Emerging Investigator Series article 'Edible cellulose-based colorimetric timer' (https://doi.org/10.1039/D3NH00006K) and read more about her in the interview below.

Dr Ahu Gümrah Dumanlı-Parry is a Materials Chemist and the first recipient of the bp-ICAM Kathleen Lonsdale Research Fellowship, received in 2019 for her work on bio-inspired advanced materials. Dr Dumanli-Parry's research group focuses on the understanding of self-assembly processes in nature and mimicking them to produce structurally ordered materials. With her research group, Dr Dumanli-Parry investigates the complex relationship between the intrinsic properties of colloidal building blocks and the physical effects that modulate the self-assembly process, to build active matter for sensing technologies and shape morphing systems as well as light harvesting applications. She obtained her PhD from Sabanci University, Istanbul and was a postdoctoral fellow at the University of Cambridge and Adolphe Merkle Institute in Switzerland.

Read Ahu Gümrah Dumanli-Parry's Emerging Investigator Series article 'Edible cellulose-based colorimetric timer' (https://doi.org/10.1039/D3NH00006K) and read more about her in the interview below:

NH: Your recent Nanoscale Horizons Communication reports an edible colorimetric timer made using liquid crystal phases of hydroxypropyl cellulose encapsulated in water permeable membranes. How has your research evolved from your first article to this most recent article and where do you see your research going in future?

AGDP: Over the years, my research has evolved significantly; I've transformed my research focus from pure materials chemistry into more complex and interdisciplinary areas concerning biomaterials and developing bio-inspired functional materials through self-assembly. My collaborations span from working with evolutionary biologists to textile artists, which I find truly inspiring.

The research presented in this manuscript not only builds upon the work I started with for my first publication on cellulose photonics, but it also has clear indications of real-life applications. In my view, photonic devices from biomaterials will be the answer to the growing demand for optical materials and sensors for a sustainable future. I am very happy to be at the forefront of this research field.

NH: How do you feel about Nanoscale Horizons as a place to publish research on this topic?

AGDP: For this work on an edible colorimetric timer made using liquid crystal phases of hydroxypropyl cellulose, I believe *Nanoscale Horizons* was the best choice, as the journal welcomes communications on interdisciplinary, innovative, and cutting-edge research. In its essence we showed for the first time the possibility to produce an edible colorimetric timer, a highly risky but rewarding idea that we started working on a few years ago. The very possibility to couple the timer/colour to changes in environmental humidity and temperature makes it a perfect simple colorimetric sensor. I believe *Nanoscale Horizons* will provide an excellent platform for this work to gain recognition and reach the right audience – both in the academic and industrial research community.

NH: What aspect of your work are you most excited about at the moment?

AGDP: I am currently most excited about my work in biomimicry and developing the area of biopolymer-based photonics. In my opinion this research area holds tremendous potential for innovation and real-life applications. At the same time, producing advanced technologies using nature's most abundant resources directly addresses the most

pressing challenges we face today regarding material end-life and sustainable futures.

NH: In your opinion, what are the most important questions to be asked/answered in this field of research?

AGDP: We are leading the field of bio-inspired functional material development. We are following the footsteps of the natural world and the knowledge of the interplay between the morphology and optical appearance of biological photonic systems continues to provide inspiration for creating sustainable photonic material systems and devices. However, the mechanisms behind the biological production of such structures in plant and animal cells and their evolutionary connections remain unresolved. Our next steps will be tackling this exact field to understand what creates structural diversity and how such natural processes can be translated to *in vitro* systems.

NH: What do you find most challenging about your research?

AGDP: What is fascinating about my research field is the complexity of structural development in nature, which poses great, yet intriguing, challenges. The fundamental questions we are trying to answer require interdisciplinary work combining materials chemistry, high-resolution imaging, development of new characterisation methods, soft-matter physics, evolutionary biology, and computational modelling. Therefore, we need organic, fruitful collaborations to tackle these research questions.

NH: In which upcoming conferences or events may our readers meet you?

AGDP: As I am writing this interview, I am actually in Hiroshima attending the 5th International Cellulose Conference (ICC2022+1). This year has been the year of great results and I am excited to share our work in two more meetings, as I am planning to attend SPIE Photonex in Glasgow and the 2023 MRS Fall meeting in Boston.

NH: How do you spend your spare time?

AGDP: I am quite passionate about science outreach, so I dedicate some of my ''off time'' to develop outreach projects. I especially enjoy this little project where I have a chance to test my outreach ideas with my son (Léon) who is 8 years old and loves these activities. I am writing a school play to teach scientific concepts to primary school students. I also love playing music and play drums with a Manchester-based Maracatu band.

NH: Can you share one piece of career-related advice or wisdom with other early career scientists?

AGDP: To the ECRs, I would say work on projects that you're really passionate about; the research journey can be long and maintaining good motivation levels is essential, yet can be challenging. By dedicating yourself to the areas that genuinely fascinate you, you'll find the energy and enthusiasm to face the challenges along the way.

Also embrace collaboration with scientists from diverse fields. Interdisciplinary partnerships will not only give you inspiration but also such interventions may lead to unexpected research breakthroughs and help push the boundaries of your research in ways you couldn't have anticipated.