

# MEET THE RESEARCHER

## HATCHING A PLAN TO HELP NORFOLK POULTRY FARMERS

Bushra Abu-Helil is a PhD research student in zoology at the Quadram Institute on Norwich Research Park. Find out how her work studying the microbiome of chickens is helping to address animal welfare, food sustainability and zoonotic diseases like bird flu.

### What does your research entail?

I'm trying to identify novel biomarkers for poultry health and welfare. A biomarker is a naturally occurring molecule, gene or characteristic which we use to identify disease or stress. I use next-generation DNA sequencing, which determines which genes are present in an environment, and nuclear magnetic resonance (NMR) spectroscopy, which allows us to observe magnetic fields around an atom, to analyse the bacterial and metabolite composition of chicken faeces. This will allow us to learn more about the intestinal microbiome.

DNA sequences reveal communities of bacteria, fungi, yeast and virus-like particles such as bacteriophages interacting with each other. It's important that humans have a balance for healthy development and a strong immune system - and this is true for animals too. If we see an imbalance - or dysbacteriosis -

within a chicken's intestine, it indicates that it is unhealthy or needs support.

There is an important link between the welfare and the health of an animal. Stressed chickens can get a 'leaky gut', whereby compounds and bacteria leak through the intestinal lining and circulate around the body.

### Why is microbiome research important?

People say you are what you eat - it's true! Our diet can have a significant impact on our physical and mental health. Age, sex, genetics and environmental factors all have an effect on the microbiome. That's why it's important to find a biomarker robust enough to confidently detect stress or disease under different conditions.

My work is important because it plays into the World Health Organisation's 'One Health Initiative', which seeks to combine human, veterinary and

environmental health into one science. We shouldn't just be focusing on chicken health though and we shouldn't just be focusing on chicken meat from a human perspective. Also, we shouldn't just be focusing on commercial farming and sustainability. All of these are linked and should be studied together.

### What global issues will finding a biomarker solve?

As well as providing a good indication for animal welfare, biomarkers can detect outbreaks of pathogens or zoonotic diseases, which pass between humans and animals. The UK is currently experiencing a significant bird flu outbreak whereby entire flocks are having to be culled, which means meat can't reach the consumer.

As well as thinking of the animals, we must think of the farmers. This is their livelihood - and their margins are small. We want to ensure the chickens are living a good life to keep the birds as healthy as possible, so that the farmers can make a living and people can eat the products.

In research, there's usually a 15-year translation period from lab to real-life action. But farmers need solutions now. One of the reasons I want to do this at the Quadram Institute is to provide a direct benefit to the poultry farmers of Norfolk.

### Why did you decide to pursue a career in science?

My first pet was a chicken called Princess Zara Fidget that lived at my auntie's aviary in Essex. My mum saw my passion for animals and asked me what I wanted to be when I grew up. I told her I didn't want to be a vet. My mum said: "You can be a zoologist." As a seven-year-old, this was the biggest word I'd ever heard. It sounded fantastic.

I did my degree in zoology at Anglia Ruskin University in Cambridge but I struggled with exams and coursework. Afterwards, I worked for the Wellcome Trust Sanger Institute and Cancer Research UK, where I realised that it doesn't matter that I can't write a perfect essay. What matters is that I am passionate, interested and enthusiastic.

### What is your role with the Racial and Ethnic Equality and Diversity (REED) Ecological Network?

I am vice chair of the REED Ecological Network, a special interest group set up in 2020

by the British Ecological Society, inspired by the Black Lives Matters movement, to provide support and mentoring to persons of colour in ecology and academia.

The agricultural industry is the least diverse sector in the UK, followed by the environmental sector. I am working with the likes of the Vincent Wildlife Trust, the RSPB and the Natural History Consortium to improve equality and diversity and instigate real change within the sectors.

### What's the best thing about working at Norwich Research Park?

The Quadram Institute has advanced technologies for human science which I'm able to apply to my poultry research. It really puts me ahead of the game. We're able to collaborate with other institutes like the John Innes Centre, Earlham Institute and UEA, as well as external partners like Oxford University. Your research is never limited here, especially when it comes to things like facilities or expertise.

The Quadram Institute was formerly the Institute of Food Research, where Dr Ella May Barnes OBE pioneered research into the microbiome of poultry. It definitely feels like I'm standing on the shoulders of a giant.

### What do you get up to when you're not working?

Canoeing is my favourite thing to do. I live in Welney in West Norfolk, which is in the Fenlands. When I'm out in my canoe, I survey populations of otters and eels as a volunteer with the March Level Commissioner's Office, monitoring protected species.

I also host my own radio show called Nature+Nonsense every Sunday on More Muzic Radio. I keep my listeners up to date with the latest wildlife and environmental news from around the world.

### And finally, which came first: the chicken or the egg?

We actually do know this now. The egg definitely came first!

Bushra Abu-Helil is a PhD researcher in zoology at the Quadram Institute on Norwich Research Park. You can follow her on Twitter and Instagram @Bushyb94. You can also hear her being interviewed on Radio 4's Farming Today programme on Monday, May 2.

**BELOW:**  
Bushra hosts her own radio show called Nature+Nonsense every Sunday on More Muzic Radio

Picture: BUSHRA ABU-HELIL

