

Literature and the laboratory

Where art and science meet

Professor Jennifer Rohn is a cell biologist, microbiologist, and head of the Centre for Urological Biology at University College London. When she isn't in the lab undertaking vital research into urinary tract infections, she is tirelessly working to communicate the nuances of scientific research and culture through a variety of creative media. She is a novelist, a public speaker, a journalist, as well as being the founder and editor of LabLit.com – a website dedicated to the rich but understudied intersections between laboratory research and literature. Research Features spoke to Jennifer about her research, her creative writing, and the fascinating connections that bind the two.

Historically, the interrelations between science and literature have been various, complex, and widely recognised. From the remarkable scientific accuracy of Shakespeare's plays to the voracious novel-reading of Charles Darwin, science and literature were understood as deeply connected and mutually enriching. Modern science and literature, however, are commonly framed as unbridgeable fields, representing two cultures which are seen as fundamentally unrelated, perhaps even the antitheses of one another.

Professor Jennifer Rohn's work seeks to bridge this artificial chasm, by bringing the modern laboratory into the terrain of the novel. Through her own novels – among them, *The Honest Look* (2010) and *Cat Zero* (2018) – and her wider promotion of the genre of 'lab lit', she is working to ensure the broad culture of scientific research is accurately and creatively represented within literary works. *Research Features* were privileged to speak with her about this important interdisciplinary work.

Could you give us an introduction to the research you are undertaking in the neglected field of urinary tract infections?

Our bodies are covered with bacteria, including certain places inside the body. Urinary tract infection (UTI) happens when the wrong sort of bacterium (or in some cases, fungus) travel up into the bladder, swamping out any friendly resident microbes and causing inflammation and various distressing symptoms. In some cases the bacteria keep travelling and end up in the kidney or bloodstream, which is a more serious problem that can be life-threatening. On the face of it, it doesn't seem so serious compared with other diseases, and this is probably why relatively little research is being conducted in the area. The fact that it primarily affects women and the elderly may be another reason it's neglected.

But this seemingly modest illness causes an enormous strain on our healthcare system and untold misery for more than 150 million people annually – especially in the one in four patients who experience

repeated infections. Another serious issue is the sheer number of antibiotic prescriptions that need to be dispensed, meaning that UTI is a key driver of the global antibiotic resistance (AMR) crisis, in which slowly but surely, we are running out of drugs that still work against infections of all types. If we don't slow the pace of AMR, we might find ourselves back in the dark ages when surgery becomes unsafe and people die from simple cuts and scrapes.

In my laboratory at University College London, the team are trying to tackle UTI on several fronts. Some of us work with clinicians and their patients, sampling bacteria from recurrent infections and trying to work out what aspects of their DNA make them invasive and resistant to treatment. These patient-derived bacteria are then used in experiments within our human bladder 'organoid', a lab model we use to mimic the body and one which we are continually improving with the latest tissue engineering techniques. These experiments are really exciting: we try to understand,

in this carefully controlled setting, precisely how the bacteria interact with the human cells at the molecular level. But bacteria have a variety of tricks to get around our defences, including hiding inside our cells, so it's a complex problem to unravel.

the bacteria hiding within. It's been a long journey of a lot of hard lab work to get where we are with CapFuran, and to see this go over the finish line will be such a thrill. Patients have been ignored and underserved for decades and they really deserve new treatments.

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Finally, we have been collaborating for many years with the engineering labs of Prof Mohan Edirisinghe at UCL and Prof Eleanor Stride at Oxford to devise novel therapies for UTI, and commercializing them through the UCL spinout company AtoCap. I'm currently the Chief Scientific Officer of the company, and we are very close to our first-in-human trial of CapFuran, a therapy designed to penetrate the bladder wall and eradicate

Alongside your medical research, you are a successful novelist and writer of short fiction. For you, how do these distinct disciplines inform and interact with one another?

I won't say that my writing would be impossible without my research experience, but the writing that I enjoy most centres squarely around science – not the facts and figures, but the culture of the profession and how it

intersects with daily life. This is why I blog mostly about my life in science, and my fiction contains scientist protagonists. It's been my observation that your average person is not familiar with the process of science – how it is done, the uncertainty, the disagreements, the grey areas. I've likened science to a rugby scrum, moving generally forward down the pitch, but at any given moment, it might be going backwards. You have to take the long view – today's breathless headline about a miracle cure might not stand the test of future experimentation. Scientists work incredibly hard and sometimes passionately disagree – it's a collective endeavour to carve 'truth' out of a messy series of millions of individual experiments, filtered through a lens of human bias. So I am deeply interested

in exploring, through my writing, how scientists do their thing, and how the wider world regards us. Along the way, I hope that my writing sheds some light on this process for people who wouldn't otherwise be exposed to it – in an entertaining way.

As far as the other way around, fiction has become my career 'what if' escapism. In my second novel, *The Honest Look*,



As well as researching and writing novels, Professor Rohn is a public speaker and journalist.

a new researcher in a biotech company discovers that the company's key idea is fatally flawed. At the time, I was myself working in a Dutch biotech company whose premise seemed too good to be true. It did turn out to be true, but I really enjoyed pretending it wasn't, and imaging the slow-motion fallout. In my third novel *Cat Zero*, my protagonist is a successful professor. When I started writing the novel, I'd left science and didn't know if I'd ever make it back, so the story made me somewhat wistful in a *what-if* sort of way. But I found my way back to science and, nearly two decades later, I've just been promoted to professor, so that dream did come true in the end!

Do you have any favourite examples of writers who successfully synthesise the scientific and the literary?

Barbara Kingsolver's novel *Flight Behaviour* is an almost perfect example of what happens when a highly skilled literary author chooses to deal with science (which is sadly rare). The beauty of this story is that it is told from the point of view of someone who, although curious and smart, is uneducated and knows nothing about science. When scientists invade her world – field researchers studying the butterflies in a nearby woods – the character allows us, the reader, to witness the scientists and their work through the eyes of a complete outsider, and we see first-hand how each affects the other. In contrast, Weike Wong's *Chemistry* is a fly-on-the-wall account of science told from the scientist's point of view. You are in the lab with her, claustrophobically so, experiencing the hard work, the challenges and the way the profession can

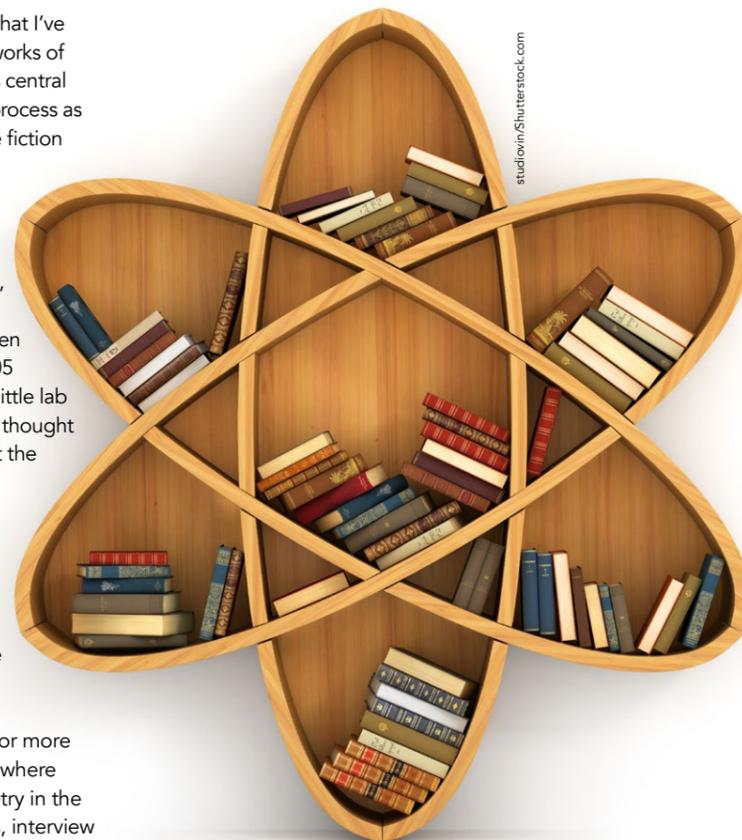
adversely affect mental health. Although it's very sad, it's also laugh-out-loud funny and brutally insightful. Science does have a dark underbelly, in the way that it tends to gobble up trainees and spit them out as a low-paid, disposable commodity. I think it's important for people to understand what the profession is like, warts and all.

You are the editor of lablit.com. Could you tell us a little about this webzine, and what you mean by 'Lab lit' more generally?

'Lab lit', the genre, is exactly what I've been talking about – realistic works of fiction that feature scientists as central characters, with the scientific process as part of the plot. It's not science fiction – which deals with speculative or future scenarios and which often does not contain any scientists. It's actually a play on words – "laboratory literature", of course, but also the "lit" lab – the illumination of a hidden world. I coined the term in 2005 because I'd realized how very little lab lit was actually out there, and I thought a fresh name, and pointing out the strange absence of examples, might galvanise writers into action. (At that point it had been known as 'hard science fiction' or 'science-in-fiction', but I felt those terms weren't that helpful because they were too similar to 'science fiction'.)

The website has been going for more than 15 years, and it's a place where we feature new writing or poetry in the genre and highlight examples, interview

authors, and even feature scientists talking about their lives. But the most popular component is "the List" – a curated and ever-growing database of works in the genre. Science is central to our lives and according to UNESCO, there are about 8 million active scientists on this planet, but there are only about 300 lab lit novels ever written. This still blows my mind. No wonder scientists and science are misunderstood; it's an invisible profession.



You have experience in scientific communication across a broad range of media. What have been some of the thrills and challenges of engaging with audiences through a variety of channels?

There are two barriers when it comes to talking about science. First is the perception, drilled into everyone at a young age, that science is "difficult", or "scary", or "boring". Unfortunately, you might never get that sort of person into the room to work on. This is why I think the lab lit approach is magical: people who wouldn't be caught dead in a science museum might happily go along to a blockbuster film with well-portrayed scientists in them, such as *Gravity* or *The Martian* or *Jurassic Park*. The second is that scientific information is often very complex, and it takes practice and trial-and-error to know the best way to get things across.

My most thrilling and terrifying moment was when I was roped into doing stand-up comedy in a real comedy club. I prepped for three months to do that 8-minute spot, and though people were falling over themselves laughing about life as a UTI researcher, I have never been so happy to have anything over in my life.

You have made important public contributions throughout the COVID-19 pandemic. Do you feel the pandemic has necessitated changes in public medical communication?

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Before COVID, I did occasionally appear on TV as a media expert, but the pandemic really blew that out of the water. At the very beginning, no one else at my university seemed to want to comment, so since I had a PhD in Virology and was keeping up with the latest science, the press office worked me hard and I found myself giving dozens of interviews a week, pounding the pavements or taking taxis between spots, sometimes not even having time to eat. It was exhausting and exhilarating all at the same time. It's calmed a bit



Lab lit brings to light the often invisible daily workings of scientists.

since but the story is still running, so I'm still giving interviews.

Media spots are particularly challenging. The presenters don't always ask what you expect and there's very little time, so you need to think quickly to get across the important messages, accurately and in as few seconds as possible. COVID has shown the importance of science communication – what people take away from it can literally be the difference between life and death. The preprint revolution has been a great thing – we are getting scientific results in days, not

one; it takes time to build up an audience. Twitter is particularly good for science, but tomorrow it might be something else. If writing is your thing, start a blog to practice and to use as a portfolio when you start pitching to venues. If you're more into live stuff, take part in an initiative like 'Soapbox Science', 'Fame Lab' or 'Pint of Science', or find out if your university has any engagement work you can help with. If you're good and persistent, people will start noticing.

Do you have any new writing projects in the pipeline?

At the moment, it's a struggle just to stay afloat between research, media work, teaching and spending time with my family and raising my young son. The pandemic seems to have sucked away some of my inspiration, either because of the changeless aspect of working from home, or just the backdrop of human suffering. I have started a sequel to my third novel, but I am not sure when the story will catch fire and start writing itself. My writing drive has ebbed and flowed in the past, so I'm used to these cycles and look forward to the next 'up' phase. In the meantime, I am putting a lot of passion and love into my garden. You should see my dahlias!

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Do you have any advice for scientific researchers who may be looking to communicate their work to new audiences?

Think about starting small. Make a social media presence if you don't already have