Microbiologist discovers antibacterial properties of insect wings

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When Elena Ivanova travelled from Russia to Australia in January 2001, she brought with her an international reputation, an impressive publishing record and her unique collection of marine bacteria, amassed over almost two decades.

"The collection is priceless to me," she told a Melbourne newspaper at the time. "Naturally it was never destined for the luggage hold and travelled business class with me in a specially designed container as part of my hand luggage."

The arrival of Professor Ivanova, a Russian-born and educated microbiologist who had worked in the US and Japan, was a coup for Swinburne.

Professor Ivanova, who was based in Vladivostok, had, among other important discoveries, identified ways in which marine bacteria behaved differently depending on the kinds of surfaces to which they were attached. She saw potential for applications in areas as diverse as medicine, manufacturing and shipping – if she could work further with people who had the right knowledge and skills.

When she was offered a permanent position at Swinburne's then Industrial Research Institute, where she could continue her work in biodiversity and marine microbiology, she knew she would be able to branch out into the fascinating and rapidly developing field of nanotechnology, the study and application of things smaller than an

individual cell.

It was in some ways an unexpected shift across the globe, but the move into an interdisciplinary environment has produced many breakthroughs and successes. For Professor Ivanova, the most significant has been the discovery in 2013 of nanostructured surfaces capable of killing bacteria. That development came out of her team's study of the antibacterial properties of insect wings.

The research, by the team in Swinburne's Faculty of Science, Engineering and Technology, has implications for antibiotic-free medical treatments and can be used in materials including silicon, glass, metals and ceramics.

"With colleagues, we are looking forward to commercialisation of our antibacterial surfaces to allow an antimicrobial nanosurface to be engineered onto existing medical devices, including implants," Professor Ivanova says.

The team she leads is also working with steel producer BlueScope to improve the performance of its well-known Colorbond product range.

Professor Ivanova has remained a lifelong student. In 2008 she added a Juris Doctor from the University of Melbourne to her already long list of degrees, honours and awards; her CV includes a Bachelor of Science from Vladivostok State University, a PhD from the Institute of Microbiology and Virology in Ukraine and further postgraduate qualifications from Belgium and Russia.

Although research remains her focus, she continues to teach, and says this attitude to giving back and sharing knowledge is a key part of Swinburne's success.

"I think what is Swinburne's great strength is that we make time to dedicate to our students," she says. "I am now more involved with postgraduate students, but we see that at all levels. We attract students because we can provide that level of attention."

Provided by Swinburne University of Technology