



Australian Government
Chief Scientist

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International Microscopy Congress 2018

Opening Address

Progress in view

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**International Convention Centre
SYDNEY**

If you type “scientist” into Google and look at the images, you’ll find two things:

- 1) People filling beakers with coloured solutions.
- 2) People staring down microscopes.

To the public, *this is the very essence of science.*

And at least when it comes to microscopes, they’re spot on.

Without microscopy there is no modern science. End of story.

I think of my own field, neuroscience.

The father of neuroscience is Ramón y Cajal.

He was a strange and difficult child who could be mesmerised for hours by a stain on the ceiling or a crack in the wall.

He was training his brain to see detail. And when he looked down a microscope he knew: he’d come home.

In his memoirs, this is how Cajal described that profound moment of realisation that what he wanted to do, for the rest of his life... was to stare down a microscope.

“I knew I should feel myself happy in contemplating the captivating spectacle and listening, entranced, from the ocular of the microscope, to the hum of the restless beehive which we all have within us.”

And the most captivating spectacle of all to this young scientist was the brain: thin slices of neural tissue, stained with silver nitrate, and mounted with painstaking care onto glass slides.

Other scientists who tried it saw only a jumble: an eye-watering mess.

Cajal, with his infinite patience, and his eye for detail, saw pattern, and order, and an intricate kind of beauty.

And he captured that pattern in meticulous free-hand drawings.

He was the first person to see a neuron – *really* to see it, and understand it as a form with a function.

Now Cajal was hard-core, even for a microbiologist. He went at it like an ultra-marathon runner: twenty hours a day, seven days a week, weeks at a stretch.

He was approaching forty, and he'd barely left his home country, Spain.

Then he received an invitation to an academic congress, an international gathering, albeit on a much smaller scale than this one, in Berlin.

And he packed his bags with his microscope, his drawings, and his slides.

What the world saw in Berlin put Cajal on the path to one of the very first Nobel Prizes ever awarded.

And it set the science world ablaze.

Cellular neuroscience was born.

By a scientist, yes, staring down a microscope... just as Google says.

One hundred years later, the optical resolution we can achieve is truly remarkable.

In my lifetime, we've gone from half a wavelength down to ten nanometres.

But neuroscience is just one of many fields that owes its very existence to people like you.

How many technologies progress almost in lockstep with progress in microscopy?

Synthetic biology. Electronics. Materials science. Minerology

The breadth of the speakers at this Congress in Sydney is some reflection.

So when our Congress Chair Simon Ringer reached out to me in April to offer me this slot in the program, I sent back my acceptance that same day.

I am delighted that the Australian microscopy community was awarded the honour of hosting this prestigious international gathering.

Visitors, you will find in Australia a field in excellent health: supported by a national network that ensures our researchers can access the best possible tools.

You will all understand from experience that persuading a politician to put money into something like a Thermo Scientific Titan Krios 300 kilovolt transmission cryo-electron microscope can be very hard.

But when politicians see the outcomes from our labs – here in Sydney, and in Melbourne and Adelaide and Brisbane and Perth and Hobart – then suddenly... the conversation shifts.

Now they can see that an investment in this field is an investment in nanoparticles that target a drug directly to the malignant cells.

3D printed lattices that act like tiny factories for T-cells, vital in the new generation of cancer immunotherapies.

Techniques for the rapid identification of new viruses that could otherwise jump from wild birds to humans.

Metal–ceramic composites for lighter, faster, stronger aeroplanes.

Everything we achieve in Australia relies on our constant engagement with the wider world.

You are our valued colleagues, guests and friends.

So in opening this event, I encourage you to make the most of this opportunity to lift up your eyes from the microscope - and enjoy your time in Australia.

Welcome. To Australia, and to the 19th International Microscopy Congress.

THANK YOU