

# PAUL D. EWART

## Education:

NZ Certificate of Mechanical Engineering, Waikato Polytechnic, New Zealand 1999.

MSc of Materials Technology, University of Waikato, New Zealand 2007.

PhD of Materials and Process Engineering, University of Waikato, New Zealand 2015.

## Why did you study powder metallurgy/particulate materials?

My introduction to powder metallurgy (PM) was during my time at Waikato Polytechnic, the sum content being an hour-long lecture on the use of press-and-sinter to produce machine tool cermets.

Later, as a technician at the local university, I took masters level papers on the properties and processing of materials to help support graduate research in the metallurgy labs. As I became more familiar with materials processing, I also increased my involvement in the graduate and postgraduate programs.

In 2010 a \$10M grant awarded to the titanium research group led by Professor Deliang Zhang pushed his fundamental research to a pre-commercial focus. One of the targeted processes for investigation was powder injection molding (PIM), and a scholarship opportunity was offered to potential masters and doctoral candidates. Since I had completed my masters degree and had wanted my own research project to lead I applied for the project. (How I would manage financially with a wife and two children on a scholarship offering about 1/3 of my then salary I had yet to determine.)

After writing what turned out to be an excellent project proposal and research plan I was accepted into the University of Waikato doctoral program. Fortunately, moral support from the titanium group and a breakthrough early in the research enabled me to gain two further scholarships (one a Fulbright fellowship) and a government grant.

In summary, I studied PM to support graduate

research. I continued to study due to good fortune with funding and the help of my advisors, and I will continue to study PM to support the commercial interests I hold and the students I now supervise.

## When did your interest in engineering/science begin?

I made many contraptions as a boy and spent hours with the family Meccano® set. Later, I built many trolleys (soapbox racers?) and other structures, to my own designs—never traditional models. Engineering, technology, and physics were my fall-backs at school and helped me to understand math, while biology and social studies seemed hopeless.

## What was your first job in PM? What did you do?

I was employed at the local university to oversee day-to-day operations of a new, large-scale laboratory facility being built. The facility consisted of four research areas covering fluids and energy technology, food processing technologies, bio-technologies, polymer and composite materials, and metallurgy

and particulate materials. The intention of this facility was to bridge the gap between laboratory research and commercial activity. Each of the six laboratories was about 30-m length x 9-m across x 7-m height to enable pilot scale plant to be used in the research.

My role was to oversee the facility, advise on equipment purchase and maintenance, facilitate teaching labs for undergraduate classes, supervise technical aspects of the graduate research, manage external testing and small contract investigations, and support internally and externally funded research.

The metallurgy and particulate materials lab had a range of equipment that was totally foreign to me. There was a pilot scale powder atomizer, ball mills, roller mills, disc mills, grinders, polishers, sample prep kit, gloveboxes, special powder handling rooms, many furnaces, and an array of instruments for characteriza-



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tion and testing.

A truly wonderful place to be introduced to PM; especially with the expert academic and technical support of colleagues and the unbridled passion of the students who studied and did research there.

**Describe your career path, companies worked for, and responsibilities.**

I had a few jobs after school and on weekends, and of course the obligatory holiday work. After my first year of study, I left New Zealand to travel for a few months before I got some contract work for the Commonwealth Scientific and Industrial Research Organization (CSIRO) in Australia doing maintenance and modification of research equipment.

After returning to New Zealand, I got a job with TRT Limited a heavy-transport manufacturing company. They took me on as a cadet, which meant I worked for them while completing my mechanical engineering at Waikato Polytechnic. As a cadet I rotated throughout every department in the company. I did sales in the parts department, marketing for the hydraulics branch, and there was welding, machining, and assembly in the workshop. I worked on access equipment, mobile cranes, and special vehicles. Most enjoyable was my time in the engineering office where I got involved with clients and the design process as well as quotations and project management.

From here I went to the University of Waikato to oversee day-to-day operations of the (then) new, large-scale laboratory facility.

In the final stages of my PhD research I co-founded AME Powder Technology—a company to commercialise the use of PM processes, especially the PIM process and titanium metals. This was a top-down endeavor—especially with no established PM companies in the country and so, no expertise outside of the research environment. Taking the role of chief technical officer, I was responsible for setting up the factory and initiating the development methodology to be used to cater to the clients we were yet to have. The other shareholders were responsible for sales, business management, and production. The factory is producing batches of components for the marine industry and is developing more products; however, it is still very much in a pre-production phase.

I have also stepped back into academia and hold a teaching and research position at the Waikato Institute

of Technology. In this role I lecture to students studying for a mechanical engineering diploma and degree qualifications. My courses include mechanics, technical literacy, manufacturing, materials, and computer-aided engineering. I also supervise projects for final-year degree students. I am research active and provide academic support and even funding to companies interested in researching, prototyping, and product development using PIM. I also collaborate with other institutions and welcome all exchange opportunities.

**What gives you the most satisfaction in your career?**

The connections and networks I have been able to form throughout my career give me the most satisfaction. I enjoy the challenge of being able to provide solutions to technological problems where none exists. I particularly want to show young engineers the many opportunities that exist in the world of sustainable material processes such as with PM.

**List your MPIF/APMI activities.**

I first joined the APMI membership as a student member in 2009. Since I'm on the far side of the world, I am not involved in the workshops and events that are held in North America. Nevertheless, as an avid reader of the *Journal*, I do get to catch up on the news and have previously attended a couple of conferences. I am planning to attend more conferences and to write an article for the *Journal* in the near future; so watch out for that.

**What major changes/trend(s) in the PM industry have you seen?**

I guess the major change I have seen is the rapid growth of the additive manufacturing sector. I do not see it as disruptive as some might, due to the many referrals I have seen coming from companies who have tried it only to be put off by negative aspects such as surface finish and volume cost.

**What are your current interests, hobbies, and activities outside of work?**

Outside of work I value time with friends and family. I enjoy physical activity and often commute by bicycle. As an instructor of both civil and martial arts, I help run the local tai chi and kung fu club. I enjoy hiking and long-distance trail running, as well as kayaking and camping. 