

## WCSB8 Conference Report

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On 9–11 May 2017, 206 delegates from around the world gathered in Perth for the 8<sup>th</sup> World Conference on Sampling and Blending (WCSB8), which on all accounts was a great success. The conference was the latest in the very successful conference series which commenced in Denmark in 2003 (WCSB1), followed by Australia in 2005 (WCSB2), Brazil in 2007 (WCSB3), South Africa in 2009 (WCSB4), Chile in 2011 (WCSB5), Peru in 2013 (WCSB6) and France in 2015 (WCSB7).

The conference was jointly hosted by The Australasian Institute of Mining and Metallurgy (The AusIMM) and the Australian Commonwealth Scientific and Industrial Research Organisation (CSIRO), with FLSmidth as a Platinum Sponsor, Thermo Fisher Scientific as a Gold Sponsor, IMP Innovative Solutions and Multotec as Silver Sponsors, and Herzog as the Sponsor of the Conference Proceedings. Additional support was provided by BHP Billiton (Technical Session), Process IQ (Name Tags) and Scantech (Note Pads and Pens).

The conference brought together most of all those globally involved in sampling and blending in the mineral, pharmaceutical, food, feed, agricultural, biomass, recycling and environmental monitoring sectors and industries. Delegates came from Australia, Belgium, Brazil, Canada, Chile, China, CIS, Czech Republic, Denmark, Finland, France, Germany, Italy, Mongolia, Netherlands, Norway, Papua New Guinea, Russia, South Africa, Turkey, UK and USA. Pierre Gy, founder of the Theory of Sampling (TOS) passed away in Bordeaux, France, in November 2015, so WCSB8 was dedicated to his memory and lifetime achievements in sampling commodities.

Despite the wealth of knowledge available on correct sampling principles and practice, it is surprising how little attention and resources are sometimes devoted to extracting representative samples. Quite often everyone appears satisfied as long as *some* material is collected and delivered to the laboratory for analysis. Yet, unless the samples are representative, the whole



**Figure 1.** Professor Richard Minnitt with his freshly awarded Pierre Gy Sampling Gold Medal together with previous recipients (from left to right: Pentti Minkinen, Francis Pitard, Kim H. Esbensen, Dominique François-Bongarçon, Ralph Holmes).



**Figure 2.** Pierre Gy Sampling Gold Medal.

measurement process is flawed at the outset and no amount of re-analysis can fix the fact that representativity is lost completely.

As a direct result, companies often stand to lose millions of dollars in terms of poor investment decisions, wasted resources,



**Figure 3.** WCSB8 Organising Committee (from left to right: Simon Dominy, Andre Balt, Boyne Hohenstein, Antonia Riley, James Docherty, Claudia Paoletti, Darryl Stevens, Eliza Sanneman, Oscar Dominguez, Kim Esbensen, Ralph Holmes and Rodolfo Romañach).



**Figure 4.** Conference exhibition—visited by some of the absolute *illuminati* of sampling.

attention it deserves by ensuring that the samples extracted are representative and that meaningful decisions can be made based on their analyses.

A key objective of the conference series is to bring to centre stage the importance of collecting representative samples at the outset (“Get your sampling right from the start”), and this objective was further reinforced by WCSB8. After a “Welcome to Country” by the Reverend Sealin Garlett on behalf of the traditional owners of the land on which the conference was being held, the conference was officially opened by Pamela Naidoo-Ameglio, a Director of The AusIMM. This was followed by the first of the seven Keynote presentations by a selection of highly regarded international sampling experts who shared their expertise and views on various aspects of sampling and blending over the three-day conference as follows:

**Dr Francis Pitard:** Integration of Visman and Ingamells’ works into the Theory of Sampling—a necessity to expand possibilities in sampling practices

**Dr Isobel Clark:** Underground bulk sampling, uniform conditioning and conditional simulation—unrealistic expectations?

**Dr Rodolfo Romañach:** Theory of Sampling—from missing link to key enabler for process analytical technology

**Dr Anita Parbhakar-Fox:** Sampling and blending in environmental campaigns—current practice and future opportunities

**Kathy Ehrig:** Sampling the supergiant Olympic Dam iron-oxide Cu-U-Au-Ag deposit, South Australia

**Dr Claudia Paoletti:** Assessing and monitoring food and feed safety—a 15 year quest for proper sampling

**Dr Kim Esbensen:** Theory of Sampling—what’s next?

The balance of the conference technical programme comprised more than 40 contributed papers covering a broad range of important and fascinating areas, including sampling theory, geostatistics, drill and blasthole sampling, quality control, metallurgical accounting, environmental sampling and monitoring, sampling of agricultural and biomass products, process analytical technology, and new developments and equipment.

There was also a discussion forum on the second day to provide delegates with the opportunity to seek answers to difficult sampling problems from a panel of international sampling experts. This forum

poor plant performance, poor product quality and sales income. Likewise, society often faces more than equivalent monetary losses, for the same technical reasons and also here resulting in poor decisions, but in addition serious, sometimes even fatal, inadequacy and irresponsibility regarding

public health risks, food/feed quality deterioration, environmental pollution and resource over-consumption. Even though such consequences of inferior sampling are often hidden from direct observation, in sum they are of even greater economic significance. Sampling, therefore, needs to be given the

was also used by the WCSB8 Chair, Dr Ralph Holmes, to preside over the launch of the International Pierre Gy Sampling Association (IPGSA), the purpose of which is to oversee various formal activities of the international sampling community and represent the views of this community as appropriate from time to time, including awarding a country the right to host a World Conference on Sampling and Blending. The proposed Constitution of IPGSA was published in *TOS Forum* Issue 7.

Nominations for IPGSA positions were called and the inaugural appointments were agreed to in forum (Table 1).

A highlight of the conference was the announcement, at the official conference dinner, of the winner of the 2017 Pierre Gy Sampling Gold Medal, which was awarded to Professor Richard Minnitt, WITS University in Johannesburg, South Africa, for “Excellence in Teaching and Application of the Theory of Sampling”. Richard worked for Anglo American and JCI before joining WITS University to teach technical valuation and mineral economics, where he currently holds the JCI Chair of Mineral Resources and Reserves. Dick was considered an impressive recipient of the Gold Medal by all present. The following morning, Professor Minnitt presented the inaugural Pierre Gy Gold Medal Oration at the conference morning opening, where he presented a scholarly exposé of the background and historical development of Pierre Gy’s Theory of Sampling (see elsewhere in this issue).

A number of additional awards were also presented at the official conference dinner, on this occasion for the best overall paper, the best paper by a young author (as the prime author) and the best oral presentation. The overall quality of the papers and presentations at the conference was excellent, so deciding on the winners was a difficult task for the selection committee, the final winners being as follows:

**Best overall paper:** “The sampling characteristics of grains contaminated by mycotoxins”, by G.J. Lyman and S.A. Tittlemier.

**Best paper by a young author:** “Blasthole sampling (replicate and variographic experiments) in LKAB open pit iron ore mines—fit for purpose representativity?”, by K. Engström and K.H. Esbensen.

**Best presentation:** “Theory of Sampling—from missing link to key enabler for process analytical technology”, by R. Romañach.

The associated exhibition was quite large for a sampling and blending conference, and

**Table 1.** The inaugural positions in the IPGSA.

<b>Chair</b>	Ralph Holmes	
<b>Vice-Chair</b>	Simon Dominy	
<b>TOS Forum Editor</b>	Kim H. Esbensen	
<b>Members</b>	Ana Chierigati	Karin Engstrom
	Claudia Paoletti	Rodolfo Romanach
	Oscar Dominquez	Philippe Davin
	Elke Thisted	Trevor Bruce
	<b>Advisory Committee</b>	Francis Pitard
	Dick Minnitt	Pentti Minkkinen
	Geoff Lyman	



**Figure 5.** Conference exhibition—getting up to speed at an early moment.

attracted 21 exhibitors, including Scantech International, Foraco Australia, Consep Pty Ltd, Bureau Veritas, Pilbara Standards Pty Ltd, Metzke, Rocklabs, Intertek, Bruker, IMP Group, Real Time Instruments, Multotec Process Equipment (Pty) Ltd, Process IQ, Iteca Socadei, FLSmidth Pty Limited, Autorun Technologies, Expedio, Thermo Scientific, PANalytical, Sodern and SMC Pneumatics. The coffee breaks and lunch were held in the exhibition area, so attention opportunities were maximised and there were great opportunities for networking.

A number of pre- and post-conference workshops were also held in association with WCSB8, which complemented the main technical programme and exhibition. These workshops were:

“**Sampling Theory, Sampling Practices and their Economic Impact**”, by Dr Francis Pitard and Dr Dominique François-Bongarçon.

“**A Practical Guide to Designing and Running Effective Sampling Programs**”, by John Graindorge (Snowden).

“**Grade Control in Underground Gold Operations**”, by Dr Simon Dominy.

A post-conference tour of sampling equipment manufacture and laboratories in the Perth area was organised on the Friday following the conference. Delegates had the opportunity to visit and inspect FLSmidth’s excellent facilities for manufacturing sampling equipment and the first class sample preparation and analysis laboratories of MinAnalytical and SGS.



Figure 6. WCSB8 Chair with WCSB9 bidding team from China (from left to right: Huachang Li, General Manager, BGRIMM MTC Technology, Shufang Tang, BGRIMM MTC Technology, Ralph Holmes, WCSB8 Chair, and Roy Xu, General Manager, Unismart Events Limited).



Figure 7. Post-conference sampling and laboratory tour.

In conclusion, thanks are due to the Organising Committee, The AusIMM Events and Publications Departments, authors, paper referees, sessions chairs, and all the Sponsors and Exhibitors, particularly FLSmidth as the Platinum Sponsor of the conference and Herzog as the Sponsor of the Conference Proceedings, for making WCSB8 such a success. Bids

for hosting WCSB9 in 2019 were presented by South Africa and China during the forum session on Day 2. Both bids were attractive and were carefully considered by the newly established IPGSA, which by majority vote decided to award WCSB9 to China. Hence, we look forward to meeting again in 2019 in Beijing, China.