



Dr LUIGI PETRONE

**Associate -
Consulting Scientist**

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21 July 1978
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Dr Luigi Petrone, an Italian-born Scientist, joined Brookes Bell in 2015 after obtaining his PhD in Chemistry and five years' post-doctoral experience between New Zealand, Sweden, the United Kingdom and Singapore. His areas of expertise lie in the field of marine coatings as well as the carriage of chemical and agricultural cargoes at sea.

As a coating expert, he has been extensively involved with incidences of hull fouling and coatings damage/failure to ship's hull, cargo holds, cargo and ballast tanks. In addition, he has conducted major investigations overseas into coating damage caused by the carriage of aggressive cargoes to cargo holds in dry bulk carriers and cargo tanks on tankers. His expertise encompasses the evaluation of coatings, modes and mechanisms of failure, cause and extent of coating breakdown and recommendations for remedial treatments.

As a cargo expert, his main area of expertise lies in the field of chemicals and agricultural commodities. He has provided extensive advice to members in the marine shipping community on the safe carriage of chemical and agricultural commodities. Furthermore, he has been extensively involved with liquefaction issues and has conducted major investigations overseas into incidences of cargo damage arising from transportation and from inherent vice. His interests are concerned with the carriage of cargoes, such as grains, oilseeds, seed cake, vegetable oils, fruits and vegetables, fertilisers, minerals, metal ores, liquid and gas chemicals. He also has a keen interest in fire investigations relating to chemicals as well as various other self-heating and combustible cargoes.

Prior to joining Brookes Bell, he carried out academic research as a Senior Research Fellow for 10 years within international multidisciplinary projects at the interface between marine science, chemistry, biology and materials science. Luigi liaised with industrial partners on R&D aspects of the formulation and testing of novel anti-fouling paint as well as adhesive technologies. His research focused on the formulation of coatings for marine anti-fouling applications and on the analysis of coatings with a wide range of analytical techniques.

He has vast experience on the biology of major marine fouling organisms, which settle on ship's hull and other submerged man-made structures, causing vast economic and environmental issues. Luigi has presented at several international conferences, acts as a referee for a series of scientific journals, and published 20 peer-reviewed articles in top scientific journals, including some of the world's top scientific journals, such as *Science*, *Advanced Functional Materials*, *Nature Communications* and *Advances in Colloids and Interface Science*.

As a cargo expert, Luigi has published bulletins and loss prevention articles for P&I Club and articles for magazines of the dry bulk industry, such as *Dry Cargo International* on the carriage of soybeans and related claims.

Luigi is a certified paint inspector (ICorr Level 2) with expertise and qualification in marine and offshore coatings, and holds a Diploma in Coatings for Corrosion Control (DipCorr). He is also a Chartered Scientist and Chartered Marine Scientist, Member of the Institute of Marine Engineering, Science and Technology (MIMarEST), Member of the Institute of Corrosion (MICorr), Member of the Royal Society of Chemistry (MRSC), and Member of the Royal Society of Biology (MRSB).

Previous Professional Experiences

Senior Research Fellow Maritime Institute and School of Materials Science and Engineering, Nanyang Technological University, Singapore	Jan 2014-Sep 2015
Postdoctoral Research Fellow Division of Molecular Physics, Linköping University, Sweden	Oct 2012-Jan 2014
Scientist IMRE – Institute of Materials Research and Engineering, A*STAR, Singapore	Sep 2011-Sep 2012
Marie-Curie Postdoctoral Research Fellow Division of Molecular Physics, Linköping University, Sweden	Feb 2010-Sep 2011

Membership of Professional Bodies

Chartered Scientist (CSci) and Chartered Marine Scientist (CMarSci)
 Member of the Institute of Marine Engineering, Science and Technology (MIMarEST)
 Member of the Royal Society of Chemistry (MRSC)
 Member of the Royal Society of Biology (MRSB)
 Member of the Institute of Corrosion (MICorr)

Education

Diploma in Coatings for Corrosion Control	2018
ICorr Level 2 Paint Inspector	2018
Marine and Offshore Paint Inspector (ICorr/MPI Group)	2018
PhD in Chemistry University of Otago, New Zealand	2006-2009
BSc & MSc in Chemistry University of Bari, Italy	2000-2005

Small selection of jobs done since joining Brookes Bell

Damage to cargo of soybeans (about 100 cases worldwide)
 Water damage to cargoes of soybeans, maize and rice (various locations worldwide)
 Mould damage to rice (Japan and Vietnam)
 Fire in palm kernel expellers and palm kernel shells (Malaysia and Indonesia)
 Water damage to cargo of vegetable oil (UK, Singapore)
 Coal self-heating, fire and water damage (India, Indonesia, USA)
 Rust scale contamination of premium wheat (New Zealand)
 Insect infestation to cargo of maize (Indonesia)
 Heat damage to maize (Vietnam, Ukraine)
 Fumigant explosion in cargo holds (South Korea, Philippines)
 Fire in maize (Ukraine)
 Liquefaction of nickel ore (Indonesia, Singapore, Hong Kong, Papua New Guinea, Philippines)
 Liquefaction of Iron Ore Fines (Singapore, Brazil)
 Contamination of liquid cargoes, such hexane, ULSD, gasoline, styrene monomer, naphtha

Contamination of gas cargoes, such propane and butane

Managing risk of explosion of liquid styrene monomer and methyl methacrylate cargoes

International investigations in quality issues of tin concentrate (Rwanda, Malaysia) and copper ingots (Hong Kong)

Investigation into the cause of explosion of a waste treatment plant (Singapore)

Loss Prevention Articles, Bulletins, Magazines

1. The importance of cargo sampling. The Japan Ship Owners' Mutual Protection & Indemnity Association. January 2019
2. Safeguarding against heat damage to soybeans in China. Dry Cargo International. January 2018
3. Loss Prevention for Soya Bean's Self-Heating Damage in China. The Japan Ship Owners' Mutual Protection & Indemnity Association. 13 November 2017
4. China: Distillers Dried Grains and Solubles (DDGS) - discoloration of cargo. Skuld. 11 January 2016

Invited Presentations

1. The Ballast Water Management Convention. UK Defence Club, Singapore. 27 Sep 2018
2. Recent Bulk Cargoes Issues. The Institute of Chartered Shipbrokers (ICS), Hong Kong. 29 March 2017
3. Soya Bean Cargoes. West of England and COSCO, Hong Kong. 20 October 2016

Selected Peer-Reviewed Academic Articles

1. **Petrone L, et al.** Preventing mussel adhesion using lubricant-infused materials. *Science* 18, 357:668-673.
2. **Petrone L, Sutanto CN, Zappone B, Miserez A.** Wet adhesion of mussel foot proteins is dictated by molecular conformation and time-regulated secretion. *Nature Communications* 6, 8737, 2015.
3. **Petrone L,** Molecular surface chemistry in marine bioadhesion. *Advances in Colloids and Interface Science* 195-196:1-182, 2013.
4. **Petrone L, Easingwood R, Barker MF, McQuillan AJ.** *In situ* ATR-IR spectroscopic and electron microscopic analyses of settlement secretions of *Undaria pinnatifida* kelp spores. *Journal of the Royal Society Interface* 8:410-422, 2011.
5. **Petrone L, Aldred N, Emami K, Enander K, Ederth T, Clare AS.** Chemistry-specific surface adsorption of the barnacle settlement-inducing protein complex. *Interface Focus* 5: 20140047, 2014.