

POLITECNICO DI MILANO



Curriculum vitae of Maurizio Vedani

Personal information

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Education and professional activities

Maurizio Vedani graduated in Mechanical Engineering in 1988 and earned a PhD in Metallurgical Engineering in 1994 with a thesis on aluminium matrix composites. In 1994 he became researcher at Mechanical Department of Politecnico di Milano, in 1998 associate professor and since 2002 he is full professor of Metallurgy. From 2013 to 2017, he was also aggregate professor at Laval University (Quebec City, Canada), Department of mining, Metallurgical and Materials Engineering.

During the current academic year (2022/23) he is holding the courses of Applied Metallurgy (6 credits, Master degree in Mechanical Engineering, taught in English) and of Failure and control of metals (5 credits, Master degree in Materials Engineering and Nanotechnology, taught in English).

The main subjects of his scientific activity concern research on microstructure and mechanical behaviour during manufacturing and service of several metals and metallic alloys, ranging from structural steels (microalloyed steels, spring steels, stainless steels) to non-ferrous alloys such as aluminium alloys, metal matrix composites, titanium and magnesium alloys.

Steels have been thoroughly investigated over years in their microstructural aspects, especially considering endogenous inclusion formation during steelmaking operations and precipitate stability during thermomechanical processing of HSLA steel grades. Cold and hot rolling, skin pass rolling, pack annealing, thermal fatigue are further topics that have been faced in the frame of various industrial research activities.

The subject of metal matrix composites is another field of wide activity, covering a large number of papers since 1989. On these materials several properties have been investigated, initially related to the fundamental properties and in a second stage, following the natural process of development, concerned with manufacturing of products (welding, plastic deformation, casting).

Significant research activities were also dedicated during years to light alloys. Aluminium alloys were investigated in many circumstances, either for comparison purpose to the corresponding aluminium matrix composites or as a free-standing subject, considering aging behaviour, mechanical properties and weldability.

Magnesium alloys were also considered, either as cast and wrought products, and investigated for their microstructural and high-temperature behaviour. More recently, the use of Mg alloys as biodegradable materials for biomedical devices has been deeply investigated, considering alloy selection, corrosion behaviour and manufacturing processes required to optimize expected properties.

Ultrafine-grained alloys produced by severe plastic deformation techniques are one of the most significant research subject in recent years. Aluminium, titanium and magnesium alloys were successfully refined by Equal Channel Angular Pressing (ECAP) and other severe plastic deformation techniques down to the submicrometer grain-size scale and investigated in their physical and mechanical properties.

Finally, as far as the topics related to metalworking technology are concerned, the studies on welding science have to be mentioned for the wide range of materials and processes considered: austenitic and duplex stainless steels, metal matrix composites, aluminium alloys joined by laser, GTAW (Gas Tungsten Arc Welding) and resistance welding. Of relevance is also the recent subject of additive manufacturing of metallic alloys by selective laser melting, facing issues about new alloy development, especially for Fe-based and Al-based materials and control of microstructure, texture and properties of parts as a function of processing conditions.

The research topics above listed result in more than about 250 papers published since 1989. Current research tracks given by Scopus based on data updated on June 2023, provide a total of 5000+ citations from 220 indexed papers and an h-index of 36. Various industrial and fundamental research projects were led by Prof. Vedani, funded by Italian public institutions, by the European Union, by private companies.

He was co-founder of AddMe.Lab, a laboratory set up at Department of Mechanical Engineering of Politecnico di Milano dedicated to additive manufacturing of metals by several commercial and self-designed equipment. The lab is a joint initiative launched in 2015 among several research groups and a team of five industrial partners aimed at developing multidisciplinary knowledge about additive manufacturing technologies for metals.

Professor Vedani is involved in various academic activities. He has been appointed deputy director of the Department of Mechanical Engineering from 2013 to 2017. From 2009 to 2011 and since 2017 he is chief of the Materials Section in the same department and responsible of the Advanced Materials research group (www.mecc.polimi.it). From 2017 to 2020 he coordinated the Scientific Board and was member of the PhD Board of the Department of Mechanical Engineering.

From 2008 to 2012 he served as President of the "Physical metallurgy and materials science" Technical Committee of the Italian Association for Metallurgy. From 2013 to 2017 he served as President of the "Light Metals" Committee in the same association. In the period 2008-2012 he operated as elected Italian member in the Executive Committee of FEMS (the Federation of the European Materials Societies).

Milan, June 2023

Vedani Massimo