

The Research Group
Analytical, Environmental and Geo- Chemistry

has the honor to invite you to the public defense of the PhD thesis of

Sam DE CRAEMER

to obtain the degree of Doctor of Sciences

Title of the PhD thesis:

Trace elements and polycyclic aromatic hydrocarbons in blood and urine as exposure biomarkers in the Flemish population

Promotors:

Prof. Dr. Martine Leermakers
Prof. Dr. Yue Gao

The defense will take place on

Thursday November 9 2017 at 16:00 h

in Auditorium D.2.01 at the campus
Humanities, Sciences and Engineering of the
Vrije Universiteit Brussel, Pleinlaan 2 - 1050
Elsene, and will be followed by a reception.

Members of the jury:

Prof. Dr. Steven Ballet (chairman)
Prof. Dr. Marc Kochzius (secretary)
Prof. Dr. Em. Willy Baeyens (co-promotor)
Prof. Dr. Em. Nik Van Larebeke
Prof. Dr. Catherine Bouland (ULB)
Dr. Elly Den Hond (PIH Antwerpen)

Curriculum vitae

In 2013, Sam De Craemer received his Master's degree in Chemistry at Ghent University. He started his PhD at VUB on environmental metal exposure in September 2013, working on aspects of analytical measurement and of environmental exposure and health science. The PhD has resulted in the publication of 4 papers in international peer-reviewed journals, with more in preparation, and has been presented at several international conferences. In addition, he participated in the sample analysis and data interpretation in several policy-oriented projects during the course of his research.

Abstract of the PhD research

From its prominence in the news and in public debate, it is evident that exposure of the general population to pollutants is a topic of concern. Many people worry about the threat this poses to their own health and that of their family, while governments worry over the cost to society. Among these pollutants are trace elements, which are usually present in low amounts in the environment in elemental form or in simple inorganic molecules, and polycyclic aromatic hydrocarbons (PAH's). Man-related sources like fuel combustion and processing of ores notably increased their presence. The most well-known of these elements are toxic metals, including cadmium, lead and mercury. PAH's are produced during various combustion processes. Monitoring the exposure of humans to these pollutants and assessing the health effects of these exposures is crucial in order to motivate and guide measures to protect public health.

The research in this PhD took place in framework of the Flemish Environment and Health Study (FLEHS). Several aspects of the determination and effects of environmental exposure to pollutants were investigated. Analytical methods to determine concentrations of trace elements in human samples like blood and urine were developed or improved, and validated. The viability of some new markers for environmental exposure was assessed. Unmetabolized PAH's in urine seem useful as markers for PAH exposure in a feasibility study. Application of the methods for trace elements on samples from participants of the third FLEHS study allowed to determine the exposures of Flemish adolescents, newborn-mother pairs and adults, which allowed comparison with health-based guidelines and the establishment of time trends. Associations of trace element exposure with personal and lifestyle variables of the participants in all age groups were determined, as this shows who is more highly exposed. Associations of trace metal exposure with hormonal concentrations and sexual maturation in adolescents over several FLEHS studies were also investigated, since their disturbance during adolescence can have long-term effects on health. The most consistent associations were found for lead and copper, followed by arsenic, thallium and cadmium.