



Abstract-Keynote Session

Speaker

Heidi Foth

Institution

Institute for Environmental Toxicology,
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Email

Origin

Germany

Abstract

K01

Title:

Disn of the European chemical legislation REACH, its strategies for innovation and challenges for toxicological sciences

Abstract:

Industrial chemicals with inadequate safety data sets may pose a risk for employees, consumers and the environment. However, industrial chemicals are urgently needed for chemical synthesis or technical purposes. The new chemical legislation of the EU, Registration, Evaluation and Authorization of Chemicals (REACH) will force the responsibility of manufacturers and importers of chemical substances to gather the information needed to define the right circumstances of use and control of chemical substances and products. Producers, importers and down stream users will have to compile and communicate standard information for all chemicals produced or imported in quantities beyond 1 t/a. These standard data sets are designed to guarantee adequate handling in the production chain, in transport and in use. The rules for handling shall prevent the substances from being released to and distributed within the environment. A new independent institution, the European Chemical Agency (ECHA) will be established in order to ensure effective management on community level. The Agency shall undertake all tasks related to the registration, the management of dossiers and the coordination of the evaluation of chemicals. The innovations under REACH will introduce some flexibility, such as waiving of standard tests and simplification of administrative procedures, in order to gain resources. REACH focus also on new approaches to adapt standard testing regimes in order to foster a risk oriented approach in required work load, to decrease animal based tests and to strengthen weight of evidence in order to avoid unnecessary tick box testing. Emphasies will be laid on assessment of exposure which have strong impact to decide.



Abstract-Keynote Session

Speaker

Makram T. Suidan

Institution

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Email

Origin

USA

Abstract

K02

Title:

Fate of Sex Hormones during Wastewater Treatment

Abstract:

Estrogens are discharged to the environment via excretions from humans and animals or as a result of disposal of expired and/or discarded pharmaceuticals in landfills. Sex hormones have been reported to persist in landfill leachates and municipal wastewater treatment plant effluents. Research in the author's laboratory examined the fate of seven sex hormones (estrone (E1), estradiol (E2), estriol (E3), ethinylestradiol (EE2), testosterone, androstenedione, and progesterone) in two pilot-scale wastewater treatment plants operated under conventional loading conditions. The pilot plants were fed a complex synthetic wastewater consisting of both soluble and suspended contaminants spiked with 100 ng/L of each of the hormones. Testosterone, androstenedione and progesterone were completely removed in the treatment plants, while E1, E2, E3 and EE2 persisted in the final effluent at 9%, 0.5%, 3% and 30% of their concentrations in the feed wastewater.

Estrogens were observed to undergo abiotic transformations when exposed to suspended solids of vegetable origins. Decreases in estrogen concentrations of 53%, 56%, 78% and 50% were observed for E1, E2, E3, and EE2 after contacting the vegetable matter for 24 h. Radiolabeled tracer studies of E2 revealed that the lost E2 was partly transformed to aqueous phase and extractable products while an appreciable fraction of the radioactivity was not extractable from the solids. Research aimed at understanding this transformation process and developing new treatment processes for control of estrogens is underway in our laboratory.



Abstract-Keynote Session

Speaker

Fredrick Semazzi

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Abstract: K03

Title:

Pathways for Integrating Research into Global Climate Information Services

Abstract:

This talk will explore opportunities for integrating research into the emerging global climate information services program. They include application of the existing research knowledge to enhance current climate services practices, strategic alignment of ongoing research being performed by the international climate research community to maximize their benefits, and undertaking new and high priority research that is critical for shaping the next generation of the climate information services. Previous climate services have been confined to seasonal prediction. This talk will review specific examples of how the present portfolio may be extended to include intraseasonal time scales for applications in the health sector and the applications of climate change information in the hydroelectric power generation sector. In addition, these emerging opportunities information technology (IT) must be exploited to achieve these goals. Integrating of research into RCOFs requires a dedicated global mechanism to coordinate the research, networks, and infrastructure. This will require a careful mix and harmonization among regional and national climate information services programs while also preserving the unique attributes of each region/country which are important for maximizing their responsiveness to local and regional end-user application sector needs. The distinguishing factor from traditional climate research is that climate information application research must be constrained by end-users needs rather than scientific curiosity. It is apparent that the way forward must embrace an iterative approach involving two-way interaction between researchers working on the interface climate information application research and the end-user community.



Abstract-Keynote Session

Speaker	Peter Penning
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Abstract	K04

Title:

Cleaner Production: Saving Money while Saving the Environment

Abstract:

The traditional approach to resolving environmental problems is to clean up the mess after the event. Cleaner Production looks at environmental issues from a prevention point of view: how not to get environmental problems rather than solving them. By doing so, the Cleaner Production approach usually brings financial awards. Several studies have revealed that for every dollar spent on Cleaner Production 8 to 9 dollars are earned in return, within a reasonable payback period.

Cleaner Production focuses on 6 areas of improvement: technology adjustment, good housekeeping, product modification, raw material substitution and internal re-use. Common tools in the Cleaner Production consultant's toolbox are eco-design, Six Sigma and lately Cradle to Cradle.

Cradle to Cradle is a leading concept for new product development. The aim of Cradle to Cradle is to design industrial processes and products that are safe, profitable and completely renewable. A well-designed product should be part of a closed biological or technical cycle, and deliver both economic and ecological value. A product (in its entirety or as components) that ends up in an uncontrolled fashion must be designed to fit in a biological circle of life where innovative designs are needed to eliminate negative impacts on the natural environment. More inert products are characterized within technical circles of life. These materials and substances must be suitable for (endless) reuse in eliminate the need for a fresh supply of raw materials.

Cleaner Production assessments should always precede any end-of-pipe solutions. Not only does Cleaner Production save money, but the end-of-pipe solution can be dimensioned on a smaller scale and hence save money on design and installation. Using the Cradle to Cradle approach when designing products even goes further and reduces environmental impact altogether.



Abstract-Keynote Session

Speaker	Shu Tao
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Abstract	K-05

Title:

Emission, fate and exposure risk of polycyclic aromatic hydrocarbons in China

Abstract:

An Euler atmospheric transport model was applied to model the near ground atmospheric concentration of polycyclic aromatic hydrocarbons (PAHs) in China based on a high-resolution emission inventory. The results were used to assess inhalation exposure and lung cancer risk of Chinese population. Monte Carlo simulation was conducted to address the uncertainty and variability in exposure concentration, intake rate and cancer risk. Frequency distributions of inhalation rate and lung cancer susceptibility were used for the simulation. For the latter, the frequencies of various genotypes for genes associated with the metabolism of PAHs and DNA repair were collected and a dose-response relationship between the number of at-risk alleles and DNA adduct level was derived from the literature. The distribution of the risk-related genotypes was transformed to the distribution of DNA adduct level as an indicator for individual susceptibility. It was found that the means of the total PAH concentration and benzo[a]pyrene equivalent concentration were 200 (106~370 as interquartile range, IR) ng/m³ and 2.43 (IR 1.29~4.50) ng/m³, respectively. 5.8% (IR 2.0%~11%) of territory where 30% (IR 17%~43%) of population live, exceeded the national standard for PAHs. The calculated extra life-long lung cancer morbidity of Chinese population due to inhalation exposure to PAHs was 51.5,10⁻⁵ (IR 27.3~95.3,10⁻⁵). Due to inter-individual variabilities in inhalation rate and susceptibility, size of the populations with very low or very high lung-cancer risk increased and the size of population with PAH induced extra lung-cancer morbidity greater than 100,10⁻⁵ were 11% (IR 3.3%~24%) and 22% (IR 15%~32%) with or without taking the inter-individual variabilities into consideration.



Abstract-Keynote Session

Speaker**K. Stamnes**

Institution:

Stevens Institute of Technology

Email

Origin

New Jersey, USA

Abstract

K-06

Title:

Satellite Remote Sensing of the Environment: Challenges and Opportunities

Abstract:

Traditional satellite remote sensing retrievals rely on a simplified two-step approach based on an initial atmospheric correction step (to provide surface radiances) followed by regression methods to infer surface parameters. Simultaneous retrieval of aerosol and surface parameters by means of classical inverse techniques based on coupled atmosphere-surface radiative transfer and surface BRDF modeling may yield considerable improvement in retrieval accuracy compared with two-step methods. However, to obtain detailed and accurate aerosol information one needs a sensor that measures polarization as well as total radiance. Polarization measurements and multi-angle observations are particularly important for retrieval of absorbing aerosols over land and coastal waters.

Sensors such as POLarization and Directionality of the Earth's Reflectances (POLDER) and the Aerosol Polarimetry Sensor (APS) are designed to provide global-scale aerosol information sufficiently accurate to address important aerosol forcing issues. APS is an along-track polarimeter with an IFOV of about 6 km, nine channels from 412 nm to 2250 nm, and a multi-angle facility for measuring up to 250 different scattering angles.

Polarimetry sensors offer the opportunity to obtain reliable information about land (including snow) as well as coastal water properties, because their polarization features allow for much more accurate characterization of atmospheric aerosol properties than is possible with radiance-only sensors such as SeaWiFS, MODIS and MERIS. A polarimetry sensor with multi-angle observation capability can be used to obtain accurate aerosol characterization over land as well as highly productive open-ocean and coastal waters, and to extend and improve the retrieval capability to Polar Regions. To be specific we will describe methods for simultaneous retrieval of a consistent set of aerosol properties and surface parameters from existing radiance-only sensors as well as the improvements expected from the use of polarimetry sensors.