

**Characterization and Remediation of Per  
and Polyfluoroalkyl Substances and Other  
Emerging Contaminants  
(PFAS)**

**FINAL PROGRAM**

**Helmholtz Centre for Environmental Research GmbH - UFZ,  
Leipzig, Germany**

**March 23-25, 2020**

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## Monday, March 23, 2020

08:00 - 09:00	<b>Onsite Registration</b>
09:00 – 09:15	<b>Welcoming Remarks</b>
<b>Session A: Regulations and Guidelines</b>	
9:15 – 9:45 Keynote Lecture	<b>Guidance for the Assessment and Remediation Measures of PFASs in Germany</b> <u>Annegret Biegel-Engler</u> and Joerg Frauenstein German Environment Agency, Dessau, Germany
9:45 – 10:10	<b>Framework for Evaluating Emerging Substances of Concern</b> <u>David Moore</u> <sup>1</sup> , Betsy Ruffle <sup>2</sup> , Sagar Thakali <sup>3</sup> , Andrew McQueen <sup>4</sup> <sup>1</sup> U.S. Army Corps of Engineers, Engineer Research and Development Center, Vicksburg, MS, USA <sup>2</sup> AECOM Environment, Chelmsford, MA, USA <sup>3</sup> AECOM Environment, Conshohocken, PA, USA <sup>4</sup> U.S. Army Corps of Engineers, Engineer Research and Development Center, Vicksburg, MS, USA
10:10 – 10:30	<b>Coffee Break</b>
<b>Session B: Fate and Analytics of PFAS</b>	
10:30 – 10:55	<b>Using the TOP Assay to Detect Unknown PFAS in German Rivers</b> <u>Bernd Goeckener</u> <sup>1</sup> , Heinz Ruedel <sup>1</sup> , Mark Buecking <sup>1,2</sup> , Ina Fettig <sup>3</sup> , Jan Koschorreck <sup>3</sup> <sup>1</sup> Fraunhofer Institute for Molecular Biology and Applied Ecology IME, Schmallenberg, Germany <sup>2</sup> School of Chemistry, Monash University, Victoria, Australia <sup>3</sup> German Environment Agency (Umweltbundesamt), Berlin, Germany

10:55 - 11:20	<p><b>Compound-specific Carbon Isotope Analysis (CSIA) to Determine the Origin and Degradation of Polyfluoroalkyl Substances (PFAS)</b>  <u>Kevin Kuntze</u><sup>1</sup>, Sarah Sühnholz<sup>2</sup>, Katrin Mackenzie<sup>2</sup>, Anett Georgi<sup>2</sup>, Anko Fischer<sup>1</sup>  <sup>1</sup>Isodetect GmbH, Leipzig, Germany  <sup>2</sup>Helmholtz-Zentrum für Umweltforschung - UFZ, Leipzig, Germany</p>
11:20 – 11:45	<p><b>Perfluoroalkyl Substances (PFAS) in U.S. Market Basket Fish and Shellfish</b>  Dorin Bogdan<sup>2</sup>, Martha Maier<sup>3</sup>, <u>Betsy Ruffle</u><sup>1</sup>, Catherine Schwach<sup>5</sup>, Usha Vedagiri<sup>4</sup>  <sup>1</sup>AECOM, Chelmsford, MA, USA  <sup>2</sup>AECOM, Grand Rapids, MI, USA  <sup>3</sup>Vista Analytical Laboratory, El Dorado Hills, CA, USA  <sup>4</sup>Wood, Rancho Cordova, CA, USA  <sup>5</sup>AECOM, Oakland, CA, USA</p>
11:45 - 12:10	<p><b>A Novel Non-Target Method Using Ultra-High Resolution Mass Spectrometry for the Identification of PFASs in Environmental Samples</b>  <u>Christine Schubert</u>, Nils G. Keltsch, Oliver J. Lechtenfeld, Thorsten Reemtsma, Urs Berger  Helmholtz Centre for Environmental Research – UFZ, Department of Analytical Chemistry, Leipzig, Germany</p>
12:10 – 12:35	<p><b>Sorption Mechanisms of Perfluoroalkyl Substances in Solid Environmental Materials: Implications for Soil and Water Management</b>  <u>Joel Fabregat</u>, Miquel Vidal, Anna Rigol  Chemical Engineering and Analytical Chemistry, University of Barcelona, Spain</p>
12:35 – 13:30	<b>Lunch</b>
<b>Session C: Field Experience – PFAS - I</b>	
13:30 – 14:00 Keynote Lecture	<p><b>Groundwater Remediation and Soil Washing: Best Practice Processes and Costs for PFAS-Contaminated Media</b>  Hans-Georg Edel  Züblin Umwelttechnik GmbH, Stuttgart, Germany</p>

14:00 – 14:25	<p><b>Development of an In-Situ Remediation Method for PFAS Contaminations in the Vadose Zone - From Lab Experiments to Field Application</b>  <u>Anja Wilken</u><sup>1</sup>, <u>Debora Reinke</u><sup>2</sup>, Stephan Hüttmann<sup>1</sup>, Harald Oeder<sup>2</sup>, Martin Groß<sup>3</sup>, Michael Schwarze<sup>4</sup>, Reinhard Schomäcker<sup>3</sup></p> <p><sup>1</sup>Sensatec GmbH, Kiel, Germany  <sup>2</sup>GEOlogik Wilbers &amp; Oeder GmbH, Münster, Germany  <sup>3</sup>Technische Universität Berlin, Department of Chemistry, Berlin, Germany  <sup>4</sup>Technische Universität Berlin, Department of Process Engineering, Berlin, Germany</p>
14:25 – 14:50	<p><b>Alternatives for a PFAS Groundwater: Treatment Train Including an Emerging On-Site Destruction Technology</b>  <u>Marc Söllner</u><sup>1</sup>, Dave Woodward<sup>2</sup>, Nathan Hagelin<sup>2</sup>, and Rob Singer<sup>2</sup></p> <p><sup>1</sup>Wood E&amp;IS, Germany  <sup>2</sup>Wood E&amp;I Solutions, USA</p>
14:50 – 15:15	<p><b>CONTASORB - Novel Materials for the In-Situ Remediation of PFT-Contaminated Groundwater in Field Trials</b>  <u>Julian Bosch</u><sup>1</sup>, Elio Brunetti<sup>1</sup>, Johannes Bruns<sup>1</sup>, Alina Gawel<sup>1</sup>, Anett Georgi<sup>2</sup>, Katrin Mackenzie<sup>2</sup>, Hendrik Noll<sup>1</sup>, Sarah Sühnholz<sup>2</sup>, Heinz-Peter Thelen<sup>1</sup></p> <p><sup>1</sup>Intrapore GmbH, Essen, Germany  <sup>2</sup>Helmholtz Center for Environmental Research - UFZ, Leipzig, Germany</p>
15:15 - 15:35	<p><b>Coffee Break</b></p>
15:35 – 16:00	<p><b>Development of a Remediation Concept and Long-Term Execution in a PFAS-fire Foam Damage Case</b>  <u>Doreen Mäurer</u> and Stefan Wagner</p> <p>Tauw GmbH Germany, Münsters, Germany</p>
16:00 – 16:25	<p><b>Airport/Airbase Aquifer PFAS Remediation using Resin Technology</b>  <u>Mark Rebentrost</u><sup>2</sup>, Marilyn Sinnett<sup>1</sup>, <u>Steve Woodard</u><sup>3</sup></p> <p><sup>1</sup>San Diego, CA, USA  <sup>2</sup>Canberra, ACT, Australia  <sup>3</sup>Portland, ME, USA</p>

16:25 – 16:50	<p><b>Colloidal Activated Carbon for <i>in situ</i> Remediation of PFAS: A Review of Multiple Case Studies</b>  <b><u>Jeremy Birnstingl</u><sup>1</sup>, K. Thoreson, P. Erickson, and S. Wilson<sup>2</sup></b>  <sup>1</sup>REGENESIS, Bath, UK  <sup>2</sup>REGENESIS, San Clemente, CA, USA</p>
17:00 – 18:00	<p><b>Reception + Poster Session</b></p>
<p><b>POSTERS</b></p>	
<p><b>New Activators for Persulfate Activation</b>  <b><u>Jonas Jörns</u>, Sarah Sühnhholz, Kai Zumpfe, Katrin Mackenzie</b>  Helmholtz-Center for Environmental Research - UFZ, Department of Environmental</p>	
<p><b>Biosorption and permeabilities of PFAAs and Four of Their Alternatives and the Effects on Toxicokinetic Behaviour</b>  <b>Flora Allendorf<sup>1</sup>, Andrea Ebert<sup>1</sup>, Urs Berger<sup>2</sup>, Kai-Uwe Goss<sup>1,3</sup>, and Nadin Ulrich<sup>1</sup></b>  <sup>1</sup> Department of Analytical Environmental Chemistry, Helmholtz Centre for Environmental Research – UFZ, Leipzig, Germany  <sup>2</sup> Department of Analytical Chemistry, Helmholtz Centre for Environmental Research - UFZ, Leipzig, Germany  <sup>3</sup> Institute of Chemistry, University of Halle-Wittenberg, Halle, Germany</p>	
<p><b>Reduction of halogenated organic compounds in water: comparison of catalysts and reagents</b>  <b>Ali Shee*, Frank-Dieter Kopinke, Katrin Mackenzie</b>  Helmholtz Centre for Environmental Research - UFZ, Department of Environmental Engineering, Leipzig, Germany</p>	
<p><b>In-Situ Remediation of Atrazine and Bromacil Contaminated Groundwater: Application Screening for Two Iron-Containing Reactive Particles at the Lab-Scale</b>  <b>Alina Gawel<sup>1,2*</sup>, Sarah Sühnhholz<sup>2</sup>, Bettina Seiwert<sup>2</sup>, Mechthild Schmitt-Jansen<sup>2</sup>, Frank-Dieter Kopinke<sup>2</sup> and Katrin Mackenzie<sup>2</sup></b>  <sup>1</sup>Intrapore GmbH, Essen, Germany  <sup>2</sup>Helmholtz Centre for Environmental Research - UFZ, Leipzig, Germany</p>	
<p><b>Iron Minerals as Catalytic Activators for Persulfate for PFAS degradation</b>  <b>Sarah Suehnhholz, Frank-Dieter Kopinke and Katrin Mackenzie</b>  Helmholtz-Center for Environmental Research - UFZ, Leipzig, Germany</p>	

**A Generic Method for the Quantification of 13 Legacy, Precursor and Substitute PFASs in Various Sample Matrices**

**Jana Rupp, Thorsten Reemtsma and Urs Berger**

Helmholtz Centre for Environmental Research – UFZ, Department of Analytical Chemistry, Leipzig, Germany

**Tuesday, March 24, 2020**

**Session D: PFAS Removal – Laboratory Work**

8:30 - 9:00  
Keynote Lecture

**Field Applicability of New Methods for PFAS Removal from Water**

**Katrin Mackenzie, Anett Georgi, Sarah Sühnholz, Lin Qian, Navid Saeidi, Frank-Dieter Kopinke**

Helmholtz-Center for Environmental Research - UFZ, Department of Environmental Engineering, Leipzig, Germany

09:00 – 09:25

**Degradation of PFOS Adsorbed on Fe-zeolites under UV Irradiation**

**Lin Qian, Anett Georgi, Frank-Dieter Kopinke**

Department of Environmental Engineering  
Helmholtz Centre for Environmental Research - UFZ, Leipzig, Germany

09:25 – 09:50

**Iron Minerals as Catalytic Activators for Persulfate for PFAS Degradation**

**Sarah Suehnholz, Frank-Dieter Kopinke and Katrin Mackenzie**

Helmholtz-Center for Environmental Research - UFZ, Department of Environmental Engineering, Leipzig, Germany

09:50 – 10:15

**Mechanism and Kinetics of Perfluorooctanoic acid (PFOA) Degradation in Water by UV/persulfate System**

**Zhongfei Ren and Tiina Leiviskä**

Chemical Process Engineering, University of Oulu, Oulu, Finland

10:15 – 10:30

**Coffee Break**

10:30 – 10:55	<p><b>Electrochemical Processes: Are they a Solution for Poly- and Perfluoroalkyl Substances (PFASs) in Water?</b>  <b>Nick Duinslaeger<sup>1</sup> and Jelena Radjenovic<sup>1,2</sup></b>  <sup>1</sup>Catalan Institute for Water Research (ICRA), Scientific and Technological Parc of the University of Girona, Girona, Spain  <sup>2</sup>Catalan Institution for Research and Advanced Studies (ICREA), Barcelona, Spain</p>
10:55 – 11:20	<p><b>Remediation of PFAS Impacted Groundwater by Membrane Separation and Electrochemical Degradation</b>  <b>Álvaro Soriano, Daniel Gorri, Ane Urtiaga</b>  Department of Chemical and Biomolecular Engineering, University of Cantabria, Santander, Spain</p>
11:20 – 11:45	<p><b>Optimization of Electrochemical Degradation of PFASs Using Boron Doped Diamond (BDD) Electrodes</b>  <b>J. N. Uwayezu, Ivan Carabante, J. Kumpiene</b>  Waste Science and Technology, Luleå University of Technology, Luleå, Sweden</p>
11:45 – 12:10	<p><b>Optimizing PFAS Adsorption by Improved Understanding of Surface Chemistry and Microporosity Effects</b>  <b>Anett Georgi<sup>1</sup>, Navid Saeidi<sup>1</sup>, Lin Qian<sup>1</sup>, Zhe Yi<sup>1,2</sup>, Urs Berger<sup>2</sup>, Frank-Dieter Kopinke<sup>1</sup></b>  <sup>1</sup> Helmholtz-Center for Environmental Research - UFZ, Department of Environmental Engineering, Leipzig, Germany  <sup>2</sup> Helmholtz-Center for Environmental Research - UFZ, Department of Analytical Chemistry, Leipzig, Germany</p>
12:10 – 12:35	<p><b>Electrosorption/Desorption for Removal of Perfluoroalkyl Acids from Water</b>  <b>Navid Saeidi, Anett Georgi, Frank-Dieter Kopinke</b>  Helmholtz Center for Environmental Research – UFZ, Department of Environmental Engineering, Leipzig, Germany</p>
12:35 – 13:30	<p><b>Lunch</b></p>
13:30 – 13:55	<p><b>Testing PFAS-Immobilization</b>  <b>Thomas Bierbaum<sup>1</sup>, Hue Nguyen<sup>1</sup>, Norbert Klaas<sup>1</sup>, Claus Haslauer<sup>1</sup>, Jürgen Braun<sup>1</sup>, Frank Thomas Lange<sup>2</sup>, Marco Scheurer<sup>2</sup></b>  <sup>1</sup>Universität Stuttgart, IWS/VEGAS, Stuttgart/Deutschland  <sup>2</sup>TZW: DVGW-Technologiezentrum Wasser, Karlsruhe/Deutschland</p>



13:55 – 14:20	<p><b>Organically Bonded Fluorine &amp; PFAS – A Treatment Challenge?</b>  <b>Jurgen Buhl</b>  Cornelsen Umwelttechnologie GmbH, Essen, Germany</p>
<p><b>Session E: Other Contaminants</b></p>	
14:25 – 14:50	<p><b>Electrosorption of Polar Organic Micropollutants on Activated Carbon-Based Materials</b>  <u>Jieying Zhou</u>, Navid Saeidi, Frank-Dieter Kopinke, Lukas Y. Wick, Anett Georgi  Helmholtz Centre for Environmental Research – UFZ, Department of Environmental Engineering, Leipzig, Germany</p>
14:50 – 15:15	<p><b>Fatty Acid Bilayer-Coated Iron Nanoparticles with Selective Reactivity to Hydrophobic Contaminants and Aqueous Mobility in Subsurface</b>  Heesoo Woo<sup>1</sup>, Seunghak Lee<sup>1</sup>, and <u>Junbom Park</u><sup>2</sup>  <sup>1</sup> Center for Water Resource Cycle, Korea Institute of Science and Technology (KIST), Seoul, Republic of Korea  <sup>2</sup> Department of Civil and Environmental Engineering, Seoul National University, Seoul, Republic of Korea</p>
15:15 – 15:40	<p><b>Estimation of Sorbed-Phase Biodegradation Rate in Activated Carbon Barriers Using Microbial Diagnostics, CSIA and <i>In Situ</i> Microcosms</b>  <u>Jeremy Birnstingl</u><sup>1*</sup>, Matthew Burns<sup>3</sup>, Samuel Rosolina<sup>2</sup>  <sup>1</sup>Regenesis Ltd., Bath UK  <sup>2</sup>Microbial Insights, Knoxville, TN, USA  <sup>3</sup>WSP, Boston, MA, USA</p>
15:40 – 16:00	<p><b>Coffee Break</b></p>
16:00 – 16:25	<p><b>Clay-Metal-Organic Matrices for the Adsorption and Oxidation of Micropollutants</b>  Samapti Kundu, Naama Korin and <u>Adi Radian</u>  Faculty of Civil and Environmental Engineering, Technion, Haifa, Israel</p>
16:25 – 16:50	<p><b>Combined Thermal Desorption of Chlorinated Solvents and PCBs</b>  <b>Laurent Thannberger</b>  VALGO, Petit-Couronne, France</p>

16:50 – 17:15	<p><b>Nanoscale Zero-Valent Iron Particles: An Efficient Tool for Elimination of Persistent/Halogenated (F, Cl, Br) Compounds</b>  <b><u>Jan Filip</u><sup>1</sup>, Viktorie Víchová<sup>1</sup>, Martin Solár<sup>1</sup>, Tomáš Cajthaml<sup>2,3</sup> and Petr Kvapil<sup>4</sup></b>  <sup>1</sup>Regional Centre of Advanced Technologies and Materials, Palacký University, Olomouc, Czech Republic  <sup>2</sup>Institute of Microbiology, Czech Academy of Sciences, Prague, Czech Republic  <sup>3</sup>Institute for Environmental Studies, Faculty of Science, Charles University, Prague, Czech Republic  <sup>4</sup>Photon Water Technology s.r.o., Liberec, Czech Republic</p>
17:15 – 17:40	<p><b>Tuning the Mobility of Particles for Nanoremediation Interventions: A Modeling Approach</b>  <b><u>C. Bianco</u>, T. Tosco, R. Sethi</b>  Groundwater Engineering Group, DIATI, Torino, Italy</p>
17:40 – 18:05	<p><b>Evaluation of Sources and Sinks for Chiral Pesticides in Groundwater – A Case Study</b>  <b><u>Kevin Kuntze</u><sup>1</sup>, Katerina Tsitonaki<sup>2</sup>, Sandra Roost<sup>2</sup>, Stella Dalby Agger<sup>3</sup>, Schouw Christiansen<sup>3</sup>, Nanette Levanius<sup>4</sup> and Anko Fischer<sup>1</sup></b>  <sup>1</sup> Isodetect GmbH, Leipzig, Germany  <sup>2</sup> Orbicon A/S, Taastrup, Denmark  <sup>3</sup> The Region of Zealand, Denmark</p>
18:05 – 18:30	<p><b>Improved Detoxification of Hexachlorocyclohexane By Newly Developed Anaerobic Microbial Consortia</b>  <b><u>Muhammad Imran Khan</u><sup>1,2</sup>, Muhammad Hayder Ali<sup>2</sup>, Carsten Vogt<sup>1</sup>, Ivonne Nijenhuis<sup>1</sup></b>  <sup>1</sup>Department of Isotope Biogeochemistry, Helmholtz Centre for Environmental Research- UFZ, Leipzig, Germany  <sup>2</sup>Institute of Soil and Environmental Sciences, University of Agriculture, Faisalabad, Pakistan</p>
19:30 - 21:30	<p><b>Conference Dinner</b></p>

**Wednesday, March 25, 2020**

**Session F: Field Experience – PFAS - II**

08:30 – 08:55	<p><b>Comparison of Innovative and Conventional Treatment Techniques of PFASs in Water and Soil</b> <b><u>Lutz Ahrens</u><sup>1</sup>, Vera Franke<sup>1</sup>, Mattias Söregård<sup>1</sup>, Winnie Nassazzi<sup>1</sup>, Georgios Niarchos<sup>2</sup>, Fritjof Fagerlund<sup>2</sup>, Dan Berggren Kleja<sup>3,4</sup>, Philip McCleaf<sup>5</sup>, and Karin Wiberg<sup>1</sup></b></p> <p><sup>1</sup> Department of Aquatic Sciences and Assessment, Swedish University of Agricultural Sciences (SLU), Uppsala, Sweden <sup>2</sup> Department of Earth Sciences, Uppsala University, Uppsala, Sweden <sup>3</sup> Department of Soil and Environment, Swedish University of Agricultural Sciences (SLU), Uppsala, Sweden <sup>4</sup> Swedish Geotechnical Institute (SGI), Stockholm, Sweden <sup>5</sup> Uppsala Water and Waste AB, Uppsala, Sweden</p>
08:55 – 9:20	<p><b>PFAS Investigation and Remediation Techniques</b> <b>Arul Ayyaswami</b> Tetra Tech, Langhorne, PA, USA</p>
9:20 – 9:45	<p><b>Immobilisation of PFAS In Soil – A New Approach</b> <b>Jurgen Buhl</b> Cornelsen Umwelttechnologie GmbH, Essen, Germany</p>
9:45 – 10:10	<p><b>Treatment Train Suggestion for Drinking Water Producers Dealing with Contaminated Raw Water</b> <b><u>Vera Franke</u><sup>1</sup>, Philip McCleaf<sup>2</sup>, Lutz Ahrens<sup>1</sup></b></p> <p><sup>1</sup>Department of Aquatic Sciences and Assessment, Swedish University of Agricultural Sciences (SLU), Uppsala, Sweden <sup>2</sup> Uppsala Water and Waste AB, Uppsala, Sweden</p>
10:10 – 10:30	<p><b>Coffee Break</b></p>
10:30 – 10:55	<p><b>PFAS Removal System for Town Water Supply in Australia</b> <b><u>Mark Rebentrost</u><sup>2</sup>, Marilyn Sinnett<sup>1</sup>, <u>Steve Woodard</u><sup>3</sup></b></p> <p><sup>1</sup>San Diego, CA, USA <sup>2</sup>Canberra, ACT, Australia <sup>3</sup>Portland, ME, USA</p>

10:55 – 11:20	<b>PFAS Removal from Water by Plants</b> <b><u>Tommy Landberg</u> and Maria Greger</b> Dept. of Ecology, Environment and Plant Sciences, Stockholm University, Stockholm, Sweden
11:20 – 11:45	<b>Remedial Investigation and Feasibility Study at a PFAS Impacted Airfield in Germany</b> <b><u>Matthias Kukulus</u>, Marc Söllner</b> Wood E&IS GmbH, Germany
11:45	<b>Adjourn</b>
11:45 – 12:30	<b>Lunch</b>