SCIENTIFIC SPONSORS

Environment and Conservation Fund (Hong Kong)

Center for Water Technology and Policy (HKU)

Resistomap Oy

Wellcome Trust

WYNG Foundation

Welcome to Hong Kong!
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# Program Overview • Sunday, Monday & Tuesday (9–11 June)

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**Key**
- Plenary Session
- Scientific Session
- Poster Session
- Round Table Session
- Networking Program

**Notes:**
- Session 7: AMR/ARG sources, mitigation
- Session 10: AMR/ARG sources, mitigation: water environments
- Session 8: AMR/ARG sources, mitigation
- Session 11: ARG genetic linkages, gene/plasmid mobility, HGT
- Session 9: AMR/ARG sources, mitigation
- Session 12: Environmental antibiotic bioavailability, biodegradation, co-selection
- Poster Session IV: Poster Session
ORGANIZATION AND IMPRINT

Venue
The University of Hong Kong
Lecture Hall II (CPD-LG.07-10)
LG/F Centennial Campus
Hong Kong, CN

Date
9–14 June 2019

Conference Website
www.antibiotic-resistance.de

Conference Chair
Tong Zhang
Professor, Department of Civil Engineering
Director, Center for Environmental Engineering Research (CEER)
Honorary Professor, School of Public Health
The University of Hong Kong, CN

Conference Co-Chair
Keiji Fukuda
Professor, Director
School of Public Health
The University of Hong Kong, CN

Conference Organization
Registration, General Information
Secretariat
Vicky Fung, Ruby Kwok, Xiaole Yin and Yu Deng
edar5@hku.hk

Abstract Management
Nadia Al-Hamadi
edar@conventus.de

Design/Layout
Layout krea.tif-studio UG (limited liability)
Editorial Deadline 20 May 2019
Dear friends and colleagues,

Antibiotic resistance (AMR) is an emerging global challenge of fundamental importance that is threatening human health, agriculture, economies and the ecosystem. It increasingly has been recognized across society, including by scientists, doctors, engineers, governments and the general public in the recent years. Effective policies and actions to combat AMR depend on understanding this problem including the factors driving the development of AMR, such as current practices in the different use sectors, assessment of the global scope and nature of the problem, and what are the most effective mitigation and stewardship practices. The role of the environment in AMR has been listed by UNEP Frontiers 2017 as the first of six emerging issues of environmental concern.

EDAR1, held in Canada in 2012, was a catalyzing international effort to address the environmental aspect of this problem. This momentum continued with EDAR2, 3, and 4 in China, Germany and United States, respectively. Over these four conferences, the scope of discussion has grown in size and become more comprehensive. The focus of concerns now encompasses all critical environmental aspects with an emphasis on considering issues holistically, and complementary to discussions in health and other arenas.

Research programs have continued to provide new insights making another gathering, EDAR5, a very timely opportunity to share findings and to identify key issues for advancing protection of public health and the environment. EDAR5 will broadly cover environmental AMR but will especially emphasize:

- fundamental scientific aspects of environmental AMR including sources and drivers
- approaches to effective mitigation in different use sectors
- connections between environmental hotspots and point sources such as medical settings
- risk assessment and policy implications
- global aspects and how to better communicate and inform all countries/regions

We believe that the discussions and ideas stimulated by the conference will further catalyze new research directions and perspectives and will foster effective and practical solutions for protecting the environment and human health.

We sincerely look forward to working with all of you and to welcoming you to The University of Hong Kong, a pioneering global university in Asia, founded in 1911.

Please come and enjoy your stay here.

Best wishes,

Tong Zhang
Conference Chair
The University of Hong Kong

Keiji Fukuda
Conference Co-Chair
COMMITTEES

Local Organizing Committee
Olivia Chan
Benjamin J. Cowling
Keiji Fukuda (Co-Chair)
Paul K. S. Lam
Frederick Lee
Kenneth M. Y. Leung
Xiao-Yan Li
Xiang-Dong Li
Bing Li
Anthony Ng
Ken Ng
Kaimin Shih
Ai-xin Yan
Tong Zhang (Chair)

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Martin J. Blaser (US)
Changjun Cha (KR)
Gianluca Corno (IT)
Gautam Dantas (US)
Keiji Fukuda (CN)
William Gaze (GB)
Michael Gillings (AU)
Michael S. Gilmore (US)
David Graham (GB)
Yoichi Kamagata (JP)
Joakim Larsson (SW)
Bing Li (CN)
Celia M. Manaia (PT)
Renata C. Picao (BR)
Amy Pruden (US)
Pascal Simonet (FR)
Kornelia Smalla (DE)
Barth F. Smets (DK)
Satoru Suzuki (JP)
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Fiona Walsh (IR)
Elizabeth M.H. Wellington (GB)
Gerry Wright (CA)
Min Yang (CN)
Tong Zhang (CN)
Peter Vikesland (US)
Baoli Zhu (CN)
Yongguan Zhu (CN)
Martin Blaser (US)
Henry Rutgers Chair of the Human Microbiome
Professor of Medicine and Microbiology – RWJMS
Director, Center for Advanced Biotechnology and Medicine
Rutgers University

Title of talk
*Antibiotic Resistance as the ‘tip of the iceberg’ of microecological change*

Martin Blaser serves as the Henry Rutgers Chair of the Human Microbiome at Rutgers University. He is Professor of Medicine and Microbiology at the Robert Wood Johnson Medical School, and he is director of the Center for Advanced Biotechnology and Medicine. A physician and microbiologist, Prof. Blaser is interested in understanding the relationships we have with our persistently colonizing bacteria. His work over 30 years focused on particular organisms, including *Campylobacter* species and *Helicobacter pylori*, which also are model systems for understanding the interactions of residential bacteria with their human hosts. Over the last 15 years, he has been actively studying the relationship of the human microbiome with health and with such important diseases as asthma, obesity, diabetes, and allergies. Over the course of his career, Prof. Blaser has served as the advisor for a large number of students, post-doctoral fellows, and junior faculty. He served as President of the Infectious Diseases Society of America, Chair of the Board of Scientific Counselors of the National Cancer Institute, Chair of the Advisory Board for Clinical Research of the National Institutes of Health, and on the Scientific Advisory Board of the Doris Duke Charitable Foundation. He was elected to the National Academy of Medicine and the American Academy for Arts and Sciences. He holds 28 U.S. patents relating to his research, and has authored over 550 original articles. Recently, he wrote “Missing Microbes”, a book targeted to general audiences. He now is serving as the Chair of the Presidential Advisory Council for Combating Antibiotic-Resistant Bacteria.

Helmut Bürgmann (CH)
Senior research scientist
Department Surface Waters Research & Management
Eawag

Title of talk
*Swiss River Resistome – how antimicrobial resistance moves through Europe’s water castle*

Dr. Helmut Bürgmann leads the Microbial Ecology group of the Surface Waters department of Eawag – Swiss Federal Institute of Aquatic Science and Technology. He received his Ph.D. from ETH Zurich in 2003 and was a postdoctoral research associate at the University of Georgia before joining Eawag in 2006. Trained as a geo-ecologist, microbial ecologist and environmental microbiologist, his interests focus on the diverse roles and functions of complex microbial communities in environmental and urban water cycles. Since 2009, the spread and fate of anthropogenic antimicrobial resistance into and through aquatic environments and their microbiomes has become a major focus of his research. He has focused specifically on the resistome in wastewater and its current and historical impact on receiving surface waters in Switzerland but has also investigated wastewater treatment strategies to reduce the antimicrobial resistance load in treated wastewater.
**INVITED SPEAKERS**

**Chang-Jun Cha (KR)**
Director
Institute of Microbiomics and Center for Antibiotic Resistome
Department of Systems Biotechnology
Chung-Ang University

Title of talk
*Dynamics of river resistome associated with human gut and pathogen resistomes*

Professor Chang-Jun Cha obtained his BSc at the Department of Microbiology, Seoul National University, Korea and his Ph.D. at the Institute of Biotechnology, University of Cambridge, UK. His PhD thesis was about the metabolism and enzymology of aromatic ring degradation in nocardioform actinomycetes. After his postdoctoral research at the National Center for Toxicological Research of U.S. FDA, he became a faculty member of Department of Systems Biotechnology, Chung-Ang University, Korea, where he is also acting as a director of Institute of Microbiomics and Center for Antibiotic Resistome. He was a member of local organizing committee of ISME-15 meeting held in Korea and is currently serving as a secretary of local organizing committee of IUMS 2020 congresses, Daejeon, Korea. His main research theme is microbial degradation of environmental pollutants including antimicrobials, especially focusing on discovery of novel resistance mechanisms by enzymatic inactivation. He is currently leading a national project developing “National Surveillance System of Environmental Resistome” by both culture-dependent and -independent methods.

**Philippe F.-X. Corvini (CH)**
Professor and head
Institute for Ecopreneurship
School of Life Sciences
University of Applied Sciences and Arts Northwestern Switzerland

Title of talk
*Are antibiotics solely poisonous molecules from a bacterial cell perspective?*

Philippe François-Xavier Corvini (born 1972) obtained Ph.D. in Biotechnology at ENSAIA (France). He is full professor and head of the Institute for Ecopreneurship at the School of Life Sciences at the University of Applied Sciences and Arts Northwestern Switzerland (FHNW). He is a specialist of the biodegradation of micropollutants.

Significant achievements by Corvini and his team were i) the discovery of *ips*-*o*-substitution mechanism in the biodegradation pathways of endocrine disrupting alkylphenols like nonylphenol and bisphenol A in *Sphingomonas* sp. strain TTNP3 ii) the co-existence of sulfonamide resistance genes and sulfonamide catabolic genes in *Microbacterium* sp. strain BR1. He is co-author of more than 100 papers. He is/was involved in several European projects as coordinator, manager and partner. He is also adjunct professor at Nanjing University and at the Yancheng Institute of Environmental Technology and Engineering and Doctor Honoris Causa of Iasi University (Romania). He is vice-president of the European Federation of Biotechnology (EFB) and chairs the Environmental Biotechnology section of EFB. He is member of the sub-committee Biotechnology of IUPAC and the board of the International Society of Environmental Biotechnology.
INVITED SPEAKERS

Dame Sally Davies (GB)
Chief Medical Officer for England
Chief Medical Advisor to the UK Government

Title of talk
*Sustaining action on AMR: What next after the IACG?*

Dame Sally founded the National Institute for Health Research and is a Non-Executive Director of Genomics England Ltd. She was a member of the WHO Executive Board and the Strategic and Technical Advisory Group on AMR. She was appointed a co-convener of the UN Inter-Agency Co-ordination Group (IACG) on AMR, set up in response to the UNGA 2016 declaration. The IACG has just published its final report and recommendations. Dame Sally received her DBE in 2009, was elected Fellow of the Royal Society in 2014, and a member of the National Academy of Medicine, USA in 2015.

Maria Gloria Dominguez-Bello (US)
Henry Rutgers Professor of Microbiome and Health
Department of Biochemistry and Microbiology, Department of Anthropology
Interim Director, NJ Institute for Food, Nutrition and Health (IFNH)
Rutgers, The State University of New Jersey

Title of talk
*The neonatal microbiota and antibiotic resistance genes*

Maria Gloria Dominguez-Bello received her Bachelor of Science in Biology (1983) from Simon Bolivar University in Venezuela, and her Masters (1987) and Ph.D. (1990) in Nutrition and Microbiology, respectively, from the University of Aberdeen in Scotland. She was a post-doctoral fellow at the Institute National de la Recherche Agronomic in France, and worked at the Venezuelan Institute for Scientific Research, at the University of Puerto Rico, New York University and is currently a Henry Rutgers Professor of Microbiome and Health at the Departments of Biochemistry and Microbiology and of Anthropology. She is also the Interim Director of the Institute for Food Nutrition and Health (IFNH), at Rutgers University. She is a Fellow of the American Academy of Microbiology, and of the Infectious Diseases Society of America, serves on the editorial board of several biomedical journals. She has over 120 scientific publications with synergistic multidisciplinary collaborations in Chile, Venezuela, Bolivia, Peru, Brazil, Tanzania, Spain, Belgium, and the USA. Her lab currently focuses on multidisciplinary approaches to study the impacts of modern practices on the microbiome.
INVITED SPEAKERS

William Gaze (GB)
Professor
Environment and Sustainability Institute
University of Exeter

Title of talk
Considering the environmental dimension of antibiotic resistance using an integrated theoretical framework

William Gaze is a Professor at The European Centre for Environment and Human Health, part of the University of Exeter Medical School. Prof. Gaze conducted research in the natural and farmed environments on projects relating to human health. Prof. Gaze’s interests include the evolution of antibiotic resistance in natural and farmed environments, particularly how biocides and detergents may co-select for resistance to clinically important antibiotics. Other research interests include the ecology of bacterial and viral human pathogens associated with protists, such as Acanthamoeba sp., which act as alternate environmental hosts in soil and aquatic systems.

Michael Gillings (AU)
Professor
Department of Biological Sciences
Macquarie University

Title of talk
Diversity and biogeography of integron gene cassettes

Michael Gillings is in the Department of Biological Sciences at Macquarie University, where he is Professor of Molecular Evolution. In general, his interests focus on genetic diversity and its role in evolution. This allows an eclectic research program, with papers on viruses, bacteria, fungi, diatoms, green algae, invertebrates, plants, sharks, and mammals in the last five years. Two of his main research programs include the origins and environmental consequences of antibiotic resistance, and the new geological era of the Anthropocene, precipitated by human effects on planetary systems. He teaches a large first year class, with 1100 students, and contributes regularly to radio, television and on-line forums.
William Hanage (US)
Associate Professor
Department of Epidemiology
Harvard T. H. Chan School of Public Health

Title of talk
Relating antibiotic resistance to bacterial population structure

Dr. Hanage is an Associate Professor of Epidemiology in the department of Epidemiology, and a faculty member in the Center for Communicable Disease Dynamics. He employs a mix of theoretical and laboratory work to research the evolution and epidemiology of infectious disease. After his Ph.D., he did post-doctoral study at the University of Oxford and Imperial College London, before being awarded a Royal Society University Research Fellowship. Prior to joining the Center for Communicable Disease Dynamics, he was a Reader in the department of Infectious Disease Epidemiology at Imperial College London. There he worked extensively developing multilocus sequence typing and analysis for the study of bacterial pathogens and species, as well as means of analyzing data developed using this method. He is particularly interested in using an evolutionary framework such as methods derived from population genetics to inform epidemiology. In 2012 he received the Fleming Prize for research in Microbiology and was the recipient of a 2012 ICAAC Young Investigator Award from the American Society for Microbiology.

Timothy Jinks (GB)
Head of Drug Resistant Infections Priority Program
Wellcome Trust

Title of talk
International action for AMR: prioritizing environmental AMR

Dr. Timothy Jinks is the Head of Drug Resistant Infections Priority Program leading Wellcome Trust’s strategic plan to address antimicrobial resistance. He also serves as Wellcome Trust’s Non-Executive Director of the antiviral drug development company Reviral Ltd. In his preceding role in Wellcome’s Innovations Division, he was responsible for a portfolio of over a dozen early stage product development projects covering therapeutics, diagnostic and devices spanning across therapeutic areas such as infectious diseases and oncology. Prior to joining the Trust in 2012 he has over a decade of industry experience, most recently as a consultant providing business development, licensing and commercial research services.
INVITED SPEAKERS

Joakim Larsson (SE)
Professor and Director
Department of Infectious Disease
Centre for Antibiotic Resistance Research
University of Gothenburg

Title of talk
*The environment as a source for antibiotic resistance genes*

Joakim Larsson received his Ph.D. in animal physiology in 2000 in Gothenburg, and after two years of guest research at marine labs in Canada and USA, he decided to combine his interest for the environment with medicine. He became associate professor in human physiology in 2007 and full professor in 2013. From 2016 he is director for the Centre for Antibiotic Resistance Research (CARe) at University of Gothenburg, involving more than 100 researchers, from six faculties. His most cited papers include the identification of ethinylestradiol as an important contributor to the feminization of wild fish, and a series of studies showing that manufacturing discharges is the cause for the most severe cases of pharmaceutical pollution observed in the environment. The research of his own research group, which include just over 20 people, focus today mainly on the environmental dimensions of antibiotic resistance. Current projects include research on the role of antibiotics, metals and antibacterial biocides in the promotion of antibiotic resistance, exploration of the environmental resistome for novel resistance genes, evaluation of advanced effluent treatment technologies, surveillance of resistance in the human population using sewage bacteria, and aquatic and aerial transmission of resistant pathogens. In 2012, Joakim Larsson received the Eric K. Fernströms prize for young researchers.

Xiang-Dong Li (HK)
Chair Professor
Department of Civil & Environmental Engineering
The Hong Kong Polytechnic University

Title of talk
*Bacteria and associated antibiotic resistance genes in air PM2.5 and the exchange of ARGs at the human-atmosphere interface*

Professor Xiang-dong Li obtained his B.S. degree in Earth Sciences and his M.S. degree in Geochemistry from Nanjing University, and his Ph.D. degree in Environmental Technology from Imperial College London. Prof. Li’s major research interests include regional pollution, urban environmental studies, and remediation of contaminated soils. He has published more than 190 papers in leading international journals and is one of the highly cited researchers in Environment/Ecology of the Web of Science database. He was awarded the Outstanding Young Researcher (Oversea) Fund from the Natural Science Foundation of China (NSFC) in 2007. Professor Li is the Associate Dean (Research) of Faculty of Construction and Environment and past president (2011–2013) of the International Society of Environmental Geochemistry and Health (SEGH). He is currently an Associate Editor for Environmental Science & Technology (ES&T). Prof. Li is also an associate editor and editorial board member for several other international journals in related research fields.
INVITED SPEAKERS

Bing Li (CN)
Associate professor
Division of Energy & Environment
Graduate School at Shenzhen Tsinghua University

Title of talk
Could chlorination promote the antibiotic resistance in drinking water and reclaimed water treatment systems?

Dr. Bing Li is working as the associate professor in Graduate School at Shenzhen, Tsinghua University, China. He received his Ph.D degree in Environmental Engineering from The University of Hong Kong (HKU) in 2011 and was awarded the HKU “Outstanding Research Postgraduate Student Award”. In 2016, he won the First Prize in Natural Science Award from the Ministry of Education and the State Environmental Protection Young Talent in Professional Technology Award. His research interests mainly focus on the application of high-throughput sequencing to investigate the fates of antibiotics resistant bacteria and genes in drinking water/sewage treatment plants as well as natural environments, to characterize the microbial community and gene expression related to soil/sediment bioremediation, as well as biodegradation pathway of emerging pollutants via metagenomic & metatranscriptomic approaches. Currently, Dr. Li has published 50 papers with 6 papers selected as ESI “Highly Cited Papers” on the top journals including ISME J, Microbiome, Environmental Microbiology and Environmental Science & Technology etc. The total citations are over 2200 and the H index is 24 (Google Scholar data).

Amy Pruden (US)
W. Thomas Rice Professor
Civil & Environmental Engineering
Virginia Tech

Title of talk
Identifying critical management points for mitigating the spread of antimicrobial resistance using ‘omics-based approaches

Amy Pruden is the W. Thomas Rice Professor of Engineering at Virginia Tech in Blacksburg, VA USA. She earned her B.S. in Biological Sciences and Ph.D. in Environmental Science, in 1997 and 2002 from the University of Cincinnati, and served as an Assistant Professor in Civil Engineering at Colorado State University from 2002-2008, joining the Civil & Environmental Engineering faculty at Virginia Tech in 2008. Her primary expertise is on tracking pathogens and antibiotic resistance genes through environmental systems and developing engineering control strategies for protecting public health. Her broad research mission is to advance the sustainability and health of our water systems through fundamental understanding of microbial ecology. Prof. Pruden received the Presidential Early Career Award in Science and Engineering in 2007 and the Paul L. Busch Award in 2014. Currently she is a co-PI on a National Science Foundation Partnership in International Research and Education (PIRE) grant, in collaboration with several international scientists, focused on comparing the “resistome” of wastewater treatment plants on an international scale. Prof. Pruden is an Associate Editor for Environmental Science & Technology and currently serves on the American Society for Microbiology Antimicrobial Resistance Coalition Steering Committee. Her research has been funded by the National Science Foundation, Water Research Foundation, Water Environment Research Foundation, the U.S. Department of Agriculture, and The Alfred P. Sloan Foundation.
Pascal Simonet (FR)
CNRS Research Director
University of Lyon

Title of talk
*Review on the soil resistome*

Pascal Simonet’s research group has had the general objectives of determining the involvement of horizontal gene transfers (HGT) in the adaptation and evolution of bacteria to new environments and was among the first to investigate environmental bacteria with metagenomic approaches. Several of his group’s studies were devoted to investigate the fate of DNA released by genetically engineered organisms including the possibility that antibiotic resistance genes transform indigenous bacteria. This led them to investigate the natural occurrence and the fate of antibiotic resistance genes in the environment and their potential to be transferred to pathogens. Using metagenomic sequences, they show that ARGs can be detected in all environments analyzed being an abundant reservoir of potentially transferable resistance for pathogens. Soil metagenomes had the most diverse pool of ARGs and his study described the diverse and abundant antibiotic resistance genes in nonclinical environments and shows that these genes are not randomly distributed among different environments.

Kornelia Smalla (DE)
Professor and Acting Head
Institute for Epidemiology and Pathogen Diagnostics
Julius Kühn Institute
Technical University of Braunschweig

Title of talk
*Sampling the transferable resistome of produce*

Kornelia Smalla is the head of the microbial ecology group in the Institute for Epidemiology and Pathogen Diagnostics at the Julius Kühn-Institut (JKI), Federal Research Centre for Cultivated Plants, in Braunschweig. She studied chemistry and did her Ph.D. in biochemistry at the Martin-Luther-University in Halle. The venia legendi for microbiology was obtained at the Technical University Braunschweig where she is an adjunct Professor for Microbiology. From the beginning of the 1990’s Kornelia Smalla contributed to the new field of molecular microbial ecology. Her long term research interest is unraveling the complex interaction in the rhizosphere and how soil bacteria respond to changing environmental conditions. A focus of her research is how agricultural management systems and the use of organic fertilizers in particular influence the abundance of antibiotic resistance genes and mobile genetic elements such as plasmids and integrons. She has a long-term interest in ecology of broad host range plasmids and the plasticity of their accessory gene load. A more recent research interest is on the understanding which factors influence the presence transferable antibiotic resistance genes on fresh produce. She has served as the editor of FEMS Microbiology Ecology, Frontiers in Microbiology and BMC Microbiology.
Barth F. Smets (DK)
Professor
Department of Environmental Engineering
Technical University of Denmark

Title of talk
Transfer and long-term persistence of plasmids encoding antimicrobial resistance in environmental microbial communities

Barth F. Smets is Professor of Environmental Microbiology at the Technical University of Denmark. His research focuses on Microbial Resource Management and Engineering: the bridge between environmental engineering and microbial ecology. His research group uses both advanced experimental (microscopic, molecular, omic) tools as well as computational (agent and continuum models) approaches to study fundamental and applied microbial ecological questions, with a focus on mixed microbial communities within water engineering applications. Central interests are the ecology of antibiotic resistance genes, the microbial ecology of drinking water production systems, dynamics and control of nitrogen-fueled microbial communities, and new biotechnologies for nutrient recovery, and a general interest in the forces that shape and control microbial communities and their activities. He has ca. 175 ISI publications, with an H-index of 34.

Satoru Suzuki (JP)
Professor
Center for Marine Environmental Studies
Ehime University

Title of talk
Ecological perspective of dissemination of antibiotic resistance genes in marine environment

Professor Satoru Suzuki works in the Ehime University. He received Ph.D. from Hokkaido University in Virology. His present expertise is marine microbial ecology by ecological and molecular biological approaches. His recent interests are in 1) Occurrence, latency and transfer of antibiotic resistance genes in marine and human-related aquatic environments. Resistances to tetracycline, sulfonamide and quinolone are targets. 2) Role of microbes for formation and decomposition of protein in marine environment. Proteases and refractory proteins are focused. He is the associate editor of journals “Frontiers in Microbiology” and “Microbes and Environments”.
INVITED SPEAKERS

James M. Tiedje (US)
University Distinguished Professor and Director
The Center for Microbial Ecology
Michigan State University

Title of talk
*Progress and challenges after a decade of environmental ARG research*

James M. Tiedje is University Distinguished Professor of Microbiology and Molecular Genetics, and of Plant, Soil and Microbial Sciences, and is Director of the Center for Microbial Ecology at Michigan State University. He received his B.S. degree from Iowa State University and his M.S. and Ph.D. degrees from Cornell University. His research focuses on microbial ecology, physiology and diversity, especially regarding the nitrogen cycle, biodegradation of environmental pollutants and use of molecular methods to understand microbial community structure and function. His group has discovered several microbes that biodegrade chlorinated pollutants and is using genomics to better understand microbial functions in their environment. He has served as Editor-in-Chief of Applied and Environmental Microbiology and Editor of Microbial and Molecular Biology Reviews. He has over 500 refereed publications including seven in Science and Nature. He shared the 1992 Finley Prize from UNESCO for research contributions in microbiology of international significance, is Fellow of the AAAS (The American Association for the Advancement of Science), the American Academy of Microbiology, and the Soil Science Society of America, and is a member of the U.S. National Academy of Sciences. He was President of the American Society for Microbiology and the International Society for Microbial Ecology.

Edward Topp (CA)
Principal Research Scientist
London Research and Development Centre
Agriculture and Agri-Food Canada

Title of talk
*Factors determining the selection and dynamics of antibiotic resistance in farming systems*

A native of Montréal, Ed obtained his Ph.D. from the Department of Microbiology at the University of Minnesota in 1988. Ed is a principal research scientist with Agriculture and Agri-Food Canada (AAFC) and has courtesy professorship appointments in the Department of Biology at the University of Western Ontario in London Canada, and the Department of Soil and Water Sciences at the University of Florida in Gainesville. Ed’s research concerns the interface between agriculture and human and environmental health and has generated over 260 co-authored publications. In the last decade he has notably led several national studies concerning the fate and management in agro-ecosystems of pharmaceuticals and pathogenic and antibiotic-resistant bacteria carried in organic fertilizers of animal and human [biosolids] origin. Ed has organized a number of international workshops and conference sessions concerning antibiotic resistance, agriculture, and the environment. He is the project coordinator for the Genomics Research and Development Initiative project on antimicrobial resistance, a key component of the innovation pillar of the Canadian Federal Framework.
for action on antimicrobial resistance. Ed is a member of the Science Advisory Board for JPIAMR, and a designated FAO/WHO “expert” for foodborne antimicrobial resistance. He is a Past-President [2011] of the Canadian Society of Microbiologists, recently received the AAFC ‘Gold Harvest Award’ for career achievement, the Canadian Public Service Award for Excellence for research contributions and was elected to the Academie d’Agriculture de France.

Dan Turner (GB)
Vice President
Oxford Nanopore Technologies

Title of talk
*Nanopore sequencing – towards real time surveillance of environments*

Dan Turner is Vice President, Applications at Oxford Nanopore Technologies and is a highly experienced scientist who has worked in the field of next-generation sequencing for the last 11 years. Dan provides leadership for multi-disciplinary teams in Oxford, New York and San Francisco. The Applications group aims to bring together sample prep technologies, genomics applications and bioinformatics, to expand the utility of Oxford Nanopore Technologies devices and illustrate the benefits of these technologies to the wider world. Before joining Oxford Nanopore Technologies, Dan was Head of Sequencing Technology Development at the Wellcome Trust Sanger Institute, and prior to this he held postdoctoral positions at the Sanger Institute and Cornell University Medical College in Manhattan.

Peter Vikesland (US)
Nick Prillaman Professor
Civil & Environmental Engineering
Virginia Tech

Title of talk
*International examination of the antibiotic ‘resistome’ in sewage and treated wastewater*

Peter Vikesland directs a research group examining the environmental applications and implications of nanotechnology. He received his B.A. degree in Chemistry from Grinnell College in 1993. He then received his M.S. and Ph.D. degrees in Civil and Environmental Engineering from the University of Iowa in 1995 and 1998, respectively. After completing a postdoctoral fellowship at Johns Hopkins University, he joined the faculty at Virginia Tech in 2002. Vikesland is National Science Foundation (NSF) CAREER awardee and was the 2012 UPS Foundation Visiting Associate Professor of Civil and Environmental Engineering at Stanford University. Vikesland currently serves as the Director of the Virginia Tech Sustainable Nanotechnology Interdisciplinary Graduate Education Program and currently leads an international team of researchers as the principal investigator for a five-year Partnerships in International Research and Education grant from the National Science Foundation Halting Environmental Antimicrobial Resistance Dissemination (HEARD).
INVITED SPEAKERS

Elizabeth M. H. Wellington (GB)
Professor
School of Life Sciences
University of Warwick

Title of talk
What impacts do antibiotics have on environmental microbiomes?

Professor Liz Wellington is an active member of the Environment theme within the School of Life Sciences at the University of Warwick. She holds a personal chair and, with her research group, is involved in the study of bacteria in soil and survival of pathogenic bacteria in the environment. Research work focuses on understanding the ecological roles for specific bacterial activities including antibiotic production, resistance and exoenzyme production and analysing the impact of lateral gene transfer. During the past decade expertise has been developed in the detection, quantification and analysis of soil microbial communities, including the identification of pathogen reservoirs outside of their hosts. Her group was one of the first to report the molecular detection of antibiotic biosynthesis in soil and co-evolution of resistance in non-producers. Subsequent work indicated that waste disposal practices further disseminate antibiotic resistance gene into the environment. Studying the fate of introduced bacteria in the environment has focused on the survival of pathogens such as Salmonella species, MRSA, Dichelobacter nodosus and slow growing mycobacteria including the M. tuberculosis complex. Recent research produced the first non-invasive methods for monitoring shedding in wild life and cattle infected with bTB in order to elucidate the impact of control measures on transmission.

Min Yang (CN)
Professor and deputy director
Research Center for Eco-Environmental Sciences
Chinese Academy of Science

Title of talk
Development of antibiotic resistance during antibiotic wastewater treatment and control strategy

Professor and deputy director of Research Center for Eco-Environmental Sciences (RCEES), Chinese Academy of Sciences. He is now focusing on the following research topics: identification and control of harmful pollutants in drinking water and wastewater. Except for academic research, he is also active in governmental and industrial consulting activities. His group has published over 200 papers in international journals, applied for over 100 patents, and provided technological support to over 20 wastewater treatment engineering projects. He was the former chair of Chinese Society of Microbial Ecology, and former Program Committee member and board member of IWA. He was awarded the second prize of China’s National Nature Science. He created North Research Center for Rural Area Wastewater Treatment affiliated with the Ministry of Urban-Rural Development in 2008, CAS-TWAS Centre of Excellence for Water and Environment (CEWE) in 2013, and National Engineering Lab for Industrial Wastewater Treatment Technologies in 2016. CEWE is now becoming an important platform in promoting the cooperation between China and the other developing countries in the water and environment area.
Guang-Guo Ying (CN)
Director and Professor
The Environmental Research Institute
South China Normal University

Title of talk
Antibiotics and ARGs in livestock environments

Prof. Guang-Guo Ying is the Director and Distinguished Professor of environmental chemistry and ecotoxicology in the Environmental Research Institute (ERI) of South China Normal University. He received his B.Sc. from Zhejiang University, M.Sc. from graduate school of the Chinese Academy of Sciences, and Ph.D. (Environmental Chemistry and Toxicology) from the University of Adelaide (Australia). He has worked as a research scientist at the University of Melbourne and CSIRO Land and Water (Australia) for many years. He was recruited by the Chinese Academy of Sciences through “100 Talents” program, and received “Distinguished Young Scholar” Award from the National Natural Science Foundation of China. He is also a research professor in State Key Laboratory of Organic Geochemistry, Guangzhou Institute of Geochemistry, Chinese Academy of Sciences.

His research interests focus on environmental contamination assessment and remediation technology, including the fate and effects of contaminants in the environment. He is currently conducting research in emerging science areas such as antibiotics and AMR, endocrine disrupting chemicals and pharmaceuticals and personal care products in the environment, and environmental issues associated with wastewater and biosolid reuse as well as water quality improvement technology. He is interested in the development of chemical and biological tools for the risk assessment of contaminants in soil and water environments.

Yongguan Zhu (CN)
Director General
Institute of Urban Environment
Chinese Academy of Sciences

Title of talk
Pollution and solution of antibiotic resistance genes at large scale

Yongguan Zhu, Professor of biogeochemistry and environmental soil science and soil biology, is the Director General of the Institute of Urban Environment, Chinese Academy of Sciences (CAS). He has been working on the biogeochemistry of nutrients, metals and emerging pollutants (such as antibiotics and antibiotic resistance genes). Professor Zhu is a leader in taking multi-scale and multi-disciplinary approaches to soil and environmental problems. He obtained his B.Sc. from Zhejiang Agricultural University in 1989, and M.Sc. from CAS in 1992, and then a Ph.D. in environmental biology from Imperial College, London in 1998. Prof. Zhu is currently the co-editor-in-chief of Environmental Technology & Innovation (Elsevier), associate editor of Environment International (Elsevier), and editorial members for a few other international journals.
Baoli Zhu (CN)
Professor
Institute of Microbiology
Chinese Academy of Sciences

Title of talk
The drug resistome in the human gut microbiome in relation with farm animals

Prof. Zhu Baoli working as principal investigator and Director of Microbial Genome Research Center in The Institute of Microbiology, full professor of the graduate school, Chinese Academy of Sciences. He got his Ph.D. degree from Beijing Agricultural University in 1992, and his Ph.D. work is on the construction of secretive-expression vector for the high-level expression of porcine growth hormone (pGH) gene in E.coli in order to obtain biologically active form of pGH directly from periplasmic space of E.coli. And then he became a research scientist in Beijing Agricultural University in 1993. Now his research is mainly focused on microbial genomics, metagenomics, genetic testing of pathogenic microbes and immunogenomics. His current research projects include human microbiome study on HBV patient, comparative genomics on BCG vaccine and Streptococcus suis, antibiotic resistance genes on different bacterial genomes and single cell genomics.
17:00–18:15 Opening Session
Lecture Hall II
Chairs Tong Zhang, Keiji Fukuda

17:15–18:15 Antibiotic Resistance as the ‘tip of the iceberg’ of microecological change
Martin Blaser (New York/US)

18:15–20:30 Welcome Reception and Lion Dance
Foyer and Lecture Hall II
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<tr>
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<th>Session 1: Assessment, mitigation, stewardship; human impact</th>
<th>Lecture Hall II</th>
<th>Chairs</th>
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<tr>
<td>08:30–10:15</td>
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<td>Timothy Vogel, Yu Zhang</td>
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<tr>
<td>08:30–09:00</td>
<td>Factors determining the selection and dynamics of antibiotic resistance in farming systems</td>
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<td>Edward Topp (Ontario/CA)</td>
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<tr>
<td>09:00–09:15</td>
<td>Monitor antibiotic resistance in community through its wastewater: a WGS analysis of ARGs in wastewater Salmonella isolates</td>
<td>Tao Yan (Honolulu/US)</td>
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<tr>
<td>09:15–09:30</td>
<td>Population-level surveillance of antibiotic resistances in Escherichia coli through sewage analysis</td>
<td>Marion Hutinel (Göteborg/SE)</td>
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<tr>
<td>09:30–09:45</td>
<td>Antibiotics, antibiotic resistance and pathogenic features of heterotrophic plate count bacteria isolated from South African drinking water production facilities</td>
<td>Carlos Bezuidenhout (Potchefstroom/ZA)</td>
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<tr>
<td>09:45–10:15</td>
<td>The neonatal microbiota and antibiotic resistance genes</td>
<td>Maria Gloria Dominguez-Bello (New Brunswick/US)</td>
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<tr>
<th>Time</th>
<th>Session 2: Assessment, mitigation, stewardship; human impact</th>
<th>Lecture Hall II</th>
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<td>Tao Yan, Timothy Johnson</td>
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<tr>
<td>10:45–11:15</td>
<td>The drug resistome in the human gut microbiome in relation with farm animals</td>
<td>Baoli Zhu (Beijing/CN)</td>
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<tr>
<td>11:15–11:30</td>
<td>Whole genome sequencing (WGS) of Escherichia coli from agriculturally important food animals and patients with urinary tract infections: Is there a link?</td>
<td>Steven Djordjevic (Broadway/AU)</td>
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<tr>
<td>11:30–11:45</td>
<td>Survival of wastewater antibiotic resistant bacterial isolates in a healthy human gut microbiome</td>
<td>Nazareno Scaccia (Porto/PT)</td>
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<tr>
<td>11:45–12:00</td>
<td>Environmental Antibiotic Resistance Monitoring: Linking Environmental and Clinical Surveillance</td>
<td>Amy Kirby (Atlanta/US)</td>
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<tr>
<td>12:00–12:30</td>
<td>What impacts do antibiotics have on environmental microbiomes?</td>
<td>Elizabeth M. H. Wellington (Coventry/GB)</td>
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</tbody>
</table>
14:00–16:00 Session 3: Risk scenarios, assessment, modelling
Lecture Hall II

Chairs
Steven Djordjevic, Yong Qiu

14:00–14:30 Relating antibiotic resistance to bacterial population structure
William Hanage (Boston/US)

14:30–14:45 Parallel screening of bacterial isolates for extended-spectrum beta-lactamase
07 genes using digital multiplex ligation assays
Timothy R. Julian (Duebendorf/CH)

14:45–15:00 Modelling human exposure to antibiotic resistance gene-bearing Escherichia coli
08 in Hong Kong’s coastal bathing waters
Anne Leonard (Truro/GB)

15:00–15:15 Source tracking of antimicrobial resistance in emerging countries
09 Amelie Ott (Newcastle-upon-Tyne/GB)

15:15–15:30 The urban airborne antibiotic resistance genes associated with Municipal Solid
010 Waste Disposal System
Yi Luo (Tianjin/CN)

15:30–16:00 Bacteria and associated antibiotic resistance genes in air PM2.5 and the ex
change of ARGs at the human-atmosphere interface
Xiang-dong Li (Hong Kong/HK)

16:15–18:30 Poster Session I
Lecture Hall II

AMR/ARG sources, mitigation: aquaculture, production, hospitals, other ............................................ 34
AMR/ARG sources, mitigation: terrestrial and agriculture ................................................................. 35
AMR/ARG sources, mitigation: water environments ................................................................. 39
08:30–10:15  Session 4: AMR/ARG sources, mitigation
Lecture Hall II
Chairs  Carlos Bezuidenhout, Jianqiang Su

08:30–09:00  Development of antibiotic resistance during antibiotic wastewater treatment and control strategy
Min Yang (Beijing/CN)

09:00–09:15  Pollution from azithromycin-manufacturing promotes the spread of antibiotic-resistance genes and alter bacterial community in receiving river sediments
Nikolina Udikovic-Kolic (Zagreb/HR)

09:15–09:30  Hospital sewage is an unexplored reservoir of carbapenemases and other novel mobile antibiotic resistance genes
Nachiket Marathe (Bergen/NO)

09:30–09:45  Hospital wastewater treatment by aerobic granular sludge: evaluation of simultaneous removal of chemical oxygen demand, ammonium, phosphate and antimicrobial-resistant bacteria
Leonardo Moura, Renata Picão (Rio de Janeiro/BR)

09:45–10:15  International examination of the antibiotic ‘resistome’ in sewage and treated wastewater
Peter Vikesland (Blacksburg/US)

10:45–12:30  Session 5: AMR/ARG sources, mitigation
Lecture Hall II
Chairs  Diana Aga, Yi Luo

10:45–11:15  Dynamics of river resistome associated with human gut and pathogen resistomes
Chang-Jun Cha (Anseong/KR)

11:15–11:30  Differing ecological responses to recycled water treatment units significantly affect microbiome and resistome related risks
Barbara Drigo (Mawson Lakes/AU)

11:30–11:45  Disinfectants facilitate transformation of extracellular antibiotic resistance genes
Jianhua Guo (Brisbane/AU)

11:45–12:00  The dynamics of antibiotic resistance genes in topsoil and groundwater of an agricultural area frequently irrigated with wastewater
Ioannis Kampouris (Dresden/DE)
12:00–12:30  Could chlorination promote the antibiotic resistance in drinking water and reclaimed water treatment systems?  
Bing Li (Beijing/CN)

14:00–15:45  Session 6: AMR/ARG sources, mitigation  
Lecture Hall II  
Chairs  
Chang-Jun Cha, Jie Feng

14:00–14:30  Swiss river resistome: how antimicrobial resistance moves through Europe’s water castle  
Helmut Bürgmann (Kastanienbaum/CH)

14:30–14:45  Development of an AMR map of the River Ganga  
017  
Deepak Kumar Prasad (New Delhi/IN)

14:45–15:00  Dissemination Dynamics of Carbapenem Resistance in Urban Sewershed in the United States: A Spatial and Temporal Investigation  
018  
Jiyoung Lee (Columbus/US)

15:00–15:15  Suspect screening for antimicrobials and other micropollutants in wastewater and surface waters from the Philippines using high resolution mass spectrometry  
040  
Diana Aga (Buffalo/US)

15:15–15:30  Environmental transmission of antibiotic resistant bacteria through waste water run-off from rural households, poultry farms and urban food markets in Bangladesh  
020  
Muhammad Asaduzzaman (Dhaka/BD)

15:30–15:45  Management strategy of antibiotics and antibiotics resistance in environment  
019  
Mahesh Pradhan (Osaka/JP)

16:00–17:00  Poster Session II  
Lecture Hall II

AMR/ARG sources, mitigation: aquaculture, production, hospitals, other ............................................ 34
AMR/ARG sources, mitigation: terrestrial and agriculture ................................................................. 35
AMR/ARG sources, mitigation: water environments ................................................................. 39

17:00–22:00  Social Evening  
Club One  
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<tr>
<td>08:30–09:00</td>
<td>The environment as a source for antibiotic resistance genes (Joakim Larsson, Gothenburg/SE)</td>
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<tr>
<td>09:00–09:15</td>
<td>Nationwide surveillance reveals frequent detection of carbapenemase-producing Enterobacteriaceae in Dutch wastewater (Heike Schmitt, Bilthoven/NL)</td>
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<tr>
<td>09:15–09:30</td>
<td>The AREST Project: Antimicrobial Resistance and the Environment: Sources, persistence, Transmission and risk management (Dearbháile Morris, Galway/IE)</td>
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<tr>
<td>09:30–09:45</td>
<td>Fates of antibiotic resistance genes in urban water system (Xuxiang Zhang, Nanjing/CN)</td>
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<tr>
<td>09:45–10:15</td>
<td>Pollution and solution of antibiotic resistance genes at large scale (Yongguan Zhu, Beijing, Xiamen/CN)</td>
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<tr>
<th>Time</th>
<th>Session 8: AMR/ARG sources, mitigation</th>
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<tr>
<td>10:45–11:15</td>
<td>Ecological perspective of dissemination of antibiotic resistance genes in marine environment (Satoru Suzuki, Matsuyama/JP)</td>
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<tr>
<td>11:15–11:30</td>
<td>Antibiotic resistance genes in manure, stored manure and soil after manure application (Marko Virta, Helsinki/FI)</td>
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<tr>
<td>11:30–11:45</td>
<td>From presence to future: regulatory actions tackling antibiotic resistance today and in the advent of the new European veterinary legislation (Thomas Heberer, Berlin/DE)</td>
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<tr>
<td>11:45–12:00</td>
<td>How do metal pollutant concentration and speciation affect wastewater microbial diversity and antibiotic resistance? (Erica Donner, South Australia/AU)</td>
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<tr>
<td>12:00–12:30</td>
<td>Review on the soil resistome (Pascal Simonet, Lyon/FR)</td>
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</tbody>
</table>
14:00–16:00  Session 9: AMR/ARG sources, mitigation
Lecture Hall II
Chairs  Marko Virta, Li Xu

14:00–14:30  Nanopore sequencing: towards real time surveillance of environments
Dan Turner (Oxford/GB)

14:30–14:45  Long-term Effect of Different Fertilization and Cropping Systems on the Soil
Antibiotic Resistome
Fang Wang (Nanjing/CN)

14:45–15:00  Assessing the effect of non-therapeutic vs. therapeutic antimicrobial use in
animal production on antimicrobial resistance
Eddie Cytryn (Rishon Lezion/IL)

15:00–15:15  Will antibiotic-alternative growth promoters reduce antibiotic resistance in the
microbiome?
Timothy Johnson (West Lafayette/US)

15:15–15:30  A pharmaceutical anthropology exploration of antimicrobial use among
commercial poultry farmers in Bangladesh: a study protocol
S. M. Murshid Hasan (Salaya/TH)

15:30–16:00  Antibiotics and ARGs in livestock environments
Guang-Guo Ying (Guangzhou/CN)

16:15–18:30  Poster Session III
Lecture Hall II

AMR/ARG sources, mitigation: water environments .............................................................. 43
ARG genetic linkages, gene/plasmid mobility, HGT ............................................................. 43
Assessment, mitigation, stewardship; human impact ............................................................ 45
Consumer trends, public communication, engagement ..................................................... 46
Environmental antibiotic chemistry, bioavailability, biodegradation, and metabolism ........ 46
National program, sector outcomes, policy, initiatives ..................................................... 47
Natural resistome, selection and evolution ....................................................................... 47
Risk scenarios, assessment, modelling ............................................................................. 50
Others ............................................................................................................................. 50
08:30–10:15  Session 10: AMR/ARG sources, mitigation: water environments
Lecture Hall II
Chairs  Hui Li, Windi Muziasari

08:30–09:00  Identifying critical management points for mitigating the spread of antimicrobial resistance using 'omics-based approaches
Amy Pruden (Blacksburg/US)

09:00–09:15  New highly-multiplexed deep ARG sequencing technology reveals unreported ecological dynamics in wastewater systems and pig manure
Hend Salem (Montreal/CA)

09:15–09:30  Hard exam effect: an explanation to the fitness cost mitigation of bacterial antibiotic resistance in drinking water
Xin Yu (Xiamen/CN)

09:30–09:45  Whom to fight: top risk antibiotic resistances for global action
An-Ni Zhang (Boston/US)

09:45–10:15  Diversity and biogeography of integron gene cassettes
Michael Gillings (Sydney/AU)

10:45–12:30  Session 11: ARG genetic linkages, gene/plasmid mobility, HGT
Lecture Hall II
Chairs  Michael Gillings, Anne Leonard

10:45–11:15  Sampling the transferable resistome of produce
Kornelia Smalla (Braunschweig/DE)

11:15–11:30  The impact of different molecular methods on antibiotic resistance gene (ARG) quantification: comparing qPCR to next generation sequencing
Gabriela Karina Paulus (Nieuwegein/NL)

11:30–11:45  Identification of potential antibiotic resistance gene host organisms from complex microbial communities using metagenomic assembly and binning
Kart Kanger (Tartu/EE)

11:45–12:00  A multiplayer game: species of Clostridium, Acinetobacter, and Pseudomonas are responsible for the persistence of antibiotic resistance genes in manure-treated soils
Jie Feng (Beijing/CN)

12:00–12:30  Transfer and long-term persistence of plasmids encoding antimicrobial resistance in environmental microbial communities
Barth F. Smets (Kgs. Lyngby/DK)
### Session 12: Environmental antibiotic bioavailability, biodegradation, Co-selection

**Lecture Hall II**

**Chairs** Dominic Frigon, Fang Wang

**14:00–14:30** Considering the environmental dimension of antibiotic resistance using an integrated theoretical framework  
William Gaze (Truro/GB)

**14:30–14:45** Reveal transfer properties of antibiotic resistance genes in biofilm using three-dimensional imaging system  
Yong Qiu (Beijing/CN)

**14:45–15:00** Metals from waste cattle footbath as a route to AMR mitigation using layered double hydroxide adsorbents  
Rachel L. Gomes (Nottingham/GB)

**15:00–15:15** Bioavailability of soil-sorbed tetracycline to antibiotic resistant *Escherichia coli*  
Hui Li (East Lansing/US)

**15:15–15:45** Are antibiotics solely poisonous molecules from a bacterial cell perspective?  
Philippe F.-X- Corvini (Muttenz/CH)

### Poster Session IV

**Lecture Hall II**

- AMR/ARG sources, mitigation: water environments ................................................................. 43
- ARG genetic linkages, gene/plasmid mobility, HGT ................................................................. 43
- Assessment, mitigation, stewardship; human impact ............................................................... 45
- Consumer trends, public communication, engagement ........................................................ 46
- Environmental antibiotic chemistry, bioavailability, biodegradation, and metabolism .......... 46
- National program, sector outcomes, policy, initiatives .......................................................... 47
- Natural resistome, selection and evolution .............................................................................. 47
- Risk scenarios, assessment, modelling .................................................................................. 50
- Others .................................................................................................................................... 50
17:00–19:00 Round Table Session I: Standardized procedures for Large Survey of antibiotics, ARGs and their transferability in the agro-ecosystem
Room CPD-LG34
Discussants Kornelia Smalla, Timothy Vogel, Yongguan Zhu, Xian-dong Li

17:00–19:00 Round Table Session II: Standardized procedures for Large Survey of antibiotics and ARGs in water environment
Room CPD-LG63
Discussants Peter Vikesland, Helmut Bürgmann, Guanguo Ying, Bing Li

17:00–19:00 Round Table Session III: Prioritising action on environmental AMR (organized by HKU and Wellcome Trust)
Room HW612B
Discussants by invitation only
08:30–10:15  Closing Session
Lecture Hall II
Chairs  Helmut Bürgmann, Xin Yu
08:30–09:15  Flash talks of Junior Researchers
09:15–09:45  International action for AMR: prioritizing environmental AMR
Timothy Jinks (London/GB)
09:45–10:15  Sustaining action on AMR: What next after the IACG?
Sally Davies (Birmingham/GB)

10:45–12:30  Closing Session
Lecture Hall II
Chairs  Helmut Bürgmann, Xin Yu
10:45–11:15  Progress and challenges after a decade of environmental ARG research
James M. Tiedje (East Lansing/US)
11:15–12:15  Closing Panel Discussion
Moderator  Keiji Fukuda (Hong Kong/HK)
12:15–12:20  Farewell
Tong Zhang (Hong Kong/HK)
12:20–12:30  Introduction to EDAR6
Joakim Larsson (Gothenburg/SE)
POSTER SESSION I + II
MONDAY, 10 JUNE, 16:15–18:30 & TUESDAY, 11 JUNE, 16:00–17:00

AMR/ARG sources, mitigation: aquaculture, production, hospitals, other

P1  Deciphering of microbial community and antibiotic resistance genes in activated sludge reactors under high selective pressure of different antibiotics
Renxin Zhao (Shenzhen/CN)

P2  High-efficiency biodegradation of chloramphenicol by the enriched bacterial consortia: bacterial community characterization and metabolic pathways
Jiayu Zhang (Shenzhen/CN)

P3  Airborne Resistome Variation in Different Hospital Settings Over Time
Xiang Li (Shenzhen/CN)

P5  Marine bivalves as sentinel tools for antimicrobial resistance surveillance in Norway
Cecilie Smith Svanevik (Bergen/NO)

P6  Wastewater from German pig slaughterhouses: reservoir for ESKAPE pathogens and an important vector for their dissemination into surface water
Mykhailo Savin (Bonn/DE)

P8  Occurrence and diversity of ARGs and antibiotic-resistant bacteria in untreated train wastewater
Wei Ting (Beijing/CN)

P10 Shellfish as an exemplar for assessing the burden of antimicrobial resistance in the environment
Edel Chambers (Weymouth/GB)

P11 Resistance and virulence genes in methicillin-resistant Staphylococcus aureus (MRSA) from a wastewater treatment plant (WWTP) and receiving water in South Africa
Carlos Bezuidenhout (Potchefstroom/ZA)

P12 Antibiotic resistance genes in coastal mariculture systems
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P17 Turning pig manure into biochar can effectively mitigate antibiotic resistance genes as organic fertilizer
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Yanan Wang (Jiangsu/CN)

P42  Removing AMR cow-selection drivers using tuneable sorbent materials
Claire Stringer (Nottingham/GB)

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Harshita Singh (Roorkee/IN)

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   Clare McCann (Newcastle upon Tyne/GB)

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   Lauren Wind (Blacksburg/US)

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   Alyssa Grube (Chapel Hill/US)

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   Carolina Jiménez (Piracicaba/BR)

P56 Antibiotic resistance in the environment: Using long read sequencing to identify the composition of ARG cassettes on class one integrons recovered from residential and livestock producing areas of Pakistan and the UK
   Robert S. James (Coventry/GB)

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   Anna Barra Caracciolo (Monterotondo (Rome/IT)

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Benjamin Davis (Blacksburg/US)

P64  The dynamics of the environmental resistome in flowing water
Ewa Korzeniewska (Olsztyn/PL)

P66  Intra-urban dissemination of multidrug-resistant bacteria in two socio-spatially distinct districts in a municipal wastewater system in the Ruhr Metropolis, Germany
Dennis Schmiege (Bonn/DE)

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Peng Shi (Nanjing/CN)

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Miaomiao Liu (Tokyo/JP)

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P75  Existence of Antibiotic resistant bacteria and antibiotic resistance genes in six wastewater treatment plants of South Korea.
Yeonghyeon Kim (Gwangju/KR)

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Hongyan Zhai (Tianjin/CN)

P78  A novel IncP-6 plasmid harbouring blaKPC-2 and qnrS2 genes in Aeromonas taiwanensis isolates
Xiaohui Chi (Hangzhou/CN)

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Sonia Gupta (New Delhi/IN)

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Claudia Stange (Karlsruhe/DE)

P83 Source water resistome at continental scale: Effects of antibiotic, bacterial community, and mobile genetic elements
Yu Zhang (Beijing/CN)

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Jahnavi kurasam (Roorkee/IN)

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Juan Tong (Beijing/CN)

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Kihyun Lee (Anseong/KR)

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Jong-Chan Chae (Iksan/KR)

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Refilwe Mabeo (Potchefstroom/ZA)

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Yu Zheng (Guangzhou/CN)

P109 Behavior of class 1 integron and sul resistance genes among different plant rhizosphere in response to sulfonamides-disturbance in pilot-scale constructed wetlands
Ying Man (Guangzhou/CN)

P110 Developing internationally coordinated marine AMR surveillance: A case study from the Arabian Gulf: initial results and lessons learnt
Edel Chambers (Weymouth/GB)

P112 Antibiotic Resistance Genes, Emerging Pollution in River Environment in Indonesia
Windi Muziasari (Helsinki/FI)

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Xinli An (Xiamen/CN)

P116 Antimicrobial resistance: escalation and exposure during ritual mass bathing in Ganges river
Gargi Singh (Roorkee/IN)

P117 Antibiotic resistance along the river basin used as a conduit for urban waste
Kenyum Bagra (Roorkee/IN)

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Kerry Hamilton (Tempe/US)

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Emily Garner (Blacksburg/US)

P120 Temporal Variation of Antibiotic Resistance Genes at a Small Conventional Wastewater Treatment Plant
Majeed Haniyyah (Blacksburg/US)

P121 Photodegradation of Cephalexin by ZnO Nanowires under Simulated Sunlight: Mechanisms, Influencing Factors and Bioactivity
Hui Li (East Lansing/US)

P122 Development and dissemination Mechanism of bacterial antibiotic-resistance under exposure to photocatalytic inactivation technology
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Bing Xie (Shanghai/CN)

P65 Aromatic compounds lead to increased abundance of antibiotic resistance genes in wastewater treatment bioreactors
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Liping Ma (Shanghai/CN)

P111 Anbiotic resistance in rivers under urban impact: European wide results and a first model on E. coli spread in river networks
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P128 Quinolone resistance gene qnrD in Proteus sp. 3M can be transferred into intestinal bacteria via transformation
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P129 Spread of MCR-3 Colistin Resistance in China: An Epidemiological, genomic and Mechanistic Study
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P133 The impact of antibiotic pressure on gene cassettes of bacterial class 1 integrons in activated sludge
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P145 Transfer mechanism of bacterial antibiotic-resistance gene at the interface of environmental mineral without or with light irradiation
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P147 IncN plasmids are vectors disseminating colistin resistance in wastewater microbiota
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P148 Significance of Extracellular Fractions in Total Antibiotic Resistance Genes Associated with Inhalable Airborne Particles
Tangtian He (Kowloon/HK)

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Xu Yanbin (Guangzhou/CN)

P150 Surveillance of sewage bacteria to predict the clinical antibiotic resistance situation in sub-Saharan Africa
Carl-Fredrik Flach (Gothenburg/SE)

P151 Low-energy Downflow Hanging Sponge Reactor for reducing resistant bacteria transmission to the environment
Andrew Zeeland (Newcastle upon Tyne/GB)

P152 Bacteria and antibiotic resistance genes in inhalable and exhaled fine aerosols
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P153 A review of different approaches to tackle AMR in animals in low-middle income countries
S. M. Murshid Hasan (Salaya/TH)

P154 Resistormap provides a complete service to map environmental resistomes
Windi Muziasari (Helsinki/FI)

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P156 Combined effects of dissolved organic matter, pH, ionic strength and halides on photodegradation of oxytetracycline in estuarine waters
Ya-nan Zhang (Changchun/CN)

P157 Soil oxytetracycline pollution alters the microbial community and enhances the abundance of antibiotic resistance genes in the gut of Enchytraeus crypticus
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P158 Temporal Shifts of Antibiotic Resistance genes and Bacterial Communities in the Soils Amended with Antibiotics
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P159 Adjuvant effect of silene armeria extract with polymyxin B against Acinetobacter baumannii
Jaebok Lee (Seoul/KR)

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Esther Lou (Houston/US)

P162 Core and active microbiome for sulfamethoxazole mineralization in an activated sludge enriched bacterial consortium
Mengyuan Qi (Harbin/CN)

P163 A novel pathway for chloramphenicol mineralization in an activated sludge bacteria
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P164 Determining veterinary antibiotics to inform on their persistence and risk as a route to AMR in dairy farm environments
Rachel L. Gomes (Nottingham/GB)

P165 Fate of antibiotic resistance genes in two-stage thermophilic alkaline fermentation followed by mesophilic anaerobic digestion process
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P168 DNA and protein stable isotope probing of dominant sulfamethoxazole-degraders in pig farm-impacted soil
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P170 Removal of antibiotics and resistance-promoting pharmaceuticals in a column study simulating managed aquifer recharge
Jakub Modrzynski (Copenhagen/DK)

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P172 Managing pollution from antibiotics manufacturing: charting actors, incentives and counterincentives
Christian Munthe (Gotheburg/SE)

P173 The One Health stewardship of colistin against mcr-1 in food animals, China
Wenguang Xiong (Guangzhou/CN)

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P174 Developmental dynamics of antibiotic resistome in aerobic biofilm microbiota treating wastewater under stepwise increasing tigecycline concentration
Zhe Tian (Beijing/CN)

P175 Antimicrobial resistant bacteria in soil microbiomes
Marcela Hernandez (Southampton/GB)

P177 Antibiotic resistance genes attenuated with salt accumulation in saline soil
Lu Tan (Tianjin/CN)

P178 Large-scale biogeographical patterns of bacterial antibiotic resistome in the waterbodies of China
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P204 Bacteria and Antibiotic Resistance Genes (ARGs) in PM2.5 from China: Implications for Human Exposure
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Daniel Duarte, Ad Ragas (Nijmegen/NL)

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P219 Antibiotic resistance genes (ARGs) and antibiotic resistant bacteria (ARB) in indoor dust and soil of Hong Kong
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### Postgraduate students/Retiree*

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### Social Program

- Welcome Reception (9 June) HK$ 0
- Welcome Reception acc. Person HK$ 250
- Social Evening (11 June) HK$ 800

*Please send a confirmation of your status either to edar5@hku.hk. indicating the keyword: EDAR 2019

### General Terms and Conditions

Please find our general terms and conditions at www.antibiotic-resistance.de.

### WiFi Access

WiFi is available for free throughout the HKU campus. Please access via the guest network: Wi-Fi.HK via HKU.

### Name Badge

Please wear your name badge during the entire conference, including the networking activities. Admission to scientific sessions is restricted to delegates wearing their badge.
Online Program Planer
For current detailed information regarding the scientific program please have a look at our session planer at http://programm.conventus.de/edar2019. Compose your individual program and review it at any time on your way.

Publication of Abstracts
All abstracts of poster and oral presentations will be published in the abstract book online, that you are welcome to download from our conference website www.antibiotic-resistance.de.

Login EDAR5
Password Hongkong_2019

Poster Sessions
Posters should be no larger than **DIN A0 (84.1 cm x 118.9 cm, vertical format only)**. They are only to be used with the designated velcro provided by the organizer. The display boards will be numbered with your poster ID. You will find your poster number in the program book on pages 34 ff. Poster presenters are asked to be present during their poster sessions.

Posters should be hung up by the first day of the poster session at 08:00 and removed by the last day of the poster session until 17:00. For Sessions I and II, 17:00 of 11 June; and for Sessions III and IV, 17:00 of 13 June. Posters will not be redirected. All posters that have not been removed by then will be disposed.

Poster Session I
Monday, 10 June, 16:15–18:30
&
Poster Session II
Tuesday, 11 June, 16:00–17:00
see pages 34 ff.

Poster Session III
Wednesday, 12 June, 16:15–18:30
&
Poster Session IV
Thursday, 13 June, 16:00–17:00
see pages 43 ff.
GENERAL TIPS FOR AUTHORS AND PRESENTERS

Submitting your Presentation/Technical Information
Please prepare your presentation in 16:9 aspect ratio.
A presentation notebook (Windows OS) with a PDF reader and MS Office PowerPoint 2016 will be provided. The use of personal notebooks is possible upon pre-agreement. However, it may interrupt the flow of the program in the lecture hall. Please provide an adapter for HDMI if necessary. A notebook, microphone and (traditional and spotlight) laser pointers are available at the speaker’s podium in the lecture hall. If necessary, a technical assistant can help you.

Please note that certain encodings for video and audio files could lead to problems. Please visit our Media check-in for further information in advance.

Media Check-in
The media check-in is located in the plenary hall (Lecture Hall II)
Please submit your presentation at the media check-in in the plenary hall ideally the day before your presentation, but no later than 2 hours before the presentation should begin. You may view and/or edit your presentation. For submission, please use a USB flash drive, which should not be protected with software.

Speaking Time
Please prepare your presentation for the allotted amount of time. Chairs may interrupt should you overrun your time limit. Speaking time is assigned as follows (speaking + discussion time):
1. Invited speakers 25 + 5 minutes
2. Oral abstract presenters 12 + 3 minutes
Welcome Reception
Immediately after the opening lecture, the organizers welcome all participants of EDAR5 to The University of Hong Kong. Meet your old friend and make new friends. Enjoy fresh drinks and snacks.

Date: Sunday, 9 June
Time: 18:15–20:30
Venue: Foyer and Lecture Hall II
The University of Hong Kong, Lecture Hall II (CPD-LG.07-10)
LG/F Centennial Campus, Hong Kong, CN
Fee: incl. for participants
HK$ 250 for acc. persons

Social Evening
We are delighted to present this exceptional evening and cordially invite you to join a memorable evening at “Club one, Repulse Bay”. Enjoy a familiar evening with colleagues and friends, have casual conversations and get to know each other even better – socialize and extend your network!

Club One Repulse Bay is located at the renowned scenic area in Hong Kong South. It is one of the most luxury banquet venues. Its unique banquet hall embraces the breathtaking sea view of the Repulse Bay. And dinner buffet and free flow beverage will be provided.

An optional guided walk is provided along the beautiful coastline from Deep River Bay to Repulse Bay before the start of the banquet.

We are delighted to present this exceptional evening and cordially invite you to join us!

Date: Tuesday, 11 June
Time: 17:00–22:00
Meeting Time: 17:00 at Lecture Hall II
Venue: Club One, 16 Beach Rd, Repulse Bay, Hong Kong
Transfer: Free Shuttle bus is provided between Lecture Hall II, HKU and Club One, Repulse Bay.
Fee: HK$ 800
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