

# The Thirty-First International Conference on Solid Waste Technology and Management

Philadelphia, PA, USA

April 3 – April 6, 2016

## AGENDA

(updated March 22, 2016)

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- Dr. Joseph Akunna, University of Abertay Dundee, UK
- Ofira Ayalon, University of Haifa and Samuel Neaman Institute, Technion, Israel
- Giuseppe Bonifazi, Sapienza – Università di Roma, Italy
- Maria Cristina Borba Braga, Parana Federal University, Brazil
- Shouu-Yuh Chang, North Carolina A&T State University, USA
- Toru Furuichi, Hokkaido University, Japan
- Professor Sadhan Kumar Ghosh, President, International Society of Waste Management, Air and Water, & Mechanical Engineering Dept., Jadavpur University, India
- Dr.(Mrs.) Kasturi Gadgil, I.I.T., Delhi (retired), India
- Ruby Mejía de Gutiérrez, Universidad del Valle (Cali), Colombia
- Mervat El-Hoz, University of Balamand, Lebanon
- Maria Liubarskaia, Saint-Petersburg State University of Economics, Baltic Academy for Tourism and Entrepreneurship, Russia
- Dr. Mary Purcell, Cork Institute of Technology, Ireland
- Ilan Nissim, Ministry of National Infrastructures, Energy and Water Resources, Israel
- Sara Ojeda-Benitez, Institute of Engineering, Autonomous University of Baja California, México
- Dr. Chukwu Onu, Southern University and A & M College, USA
- Professor Paul Phillips, University of Northampton, UK
- Dr. Eva Pongrácz, University of Oulu, Finland
- Prof. Krishna Reddy, University of Illinois at Chicago, USA
- Dr. Jerry E. Uhuo, National Assembly Abuja, Nigeria
- Prof. Dongmin Wang, Director of Solid Waste Subcommittee of The Chinese Ceramic Society, P.R. China
- Anita Závodská, Barry University, USA

# CONFERENCE SUMMARY

## SUNDAY, APRIL 3, 2016

- Pre-Conference Tour of Philadelphia
- Opening Reception

## MONDAY, APRIL 4, 2016

Opening Plenary

### Oral Presentations

- 1A Utilization of Wastes in Construction 1
- 1B Education and Public Involvement
- 1C Geotechnical Analyses
- 1D Innovative Technologies and Concepts 1
  
- 2A Environment Impacts
- 2B Recycling
- 2C Utilization of Wastes in Construction 2
- 2D Landfill
  
- 3A Ash Management
- 3B Case Studies
- 3C Food Wastes
- 3D Biofuels from Wastes
  
- 4A Biological Treatment 1
- 4B Industrial Wastes
- 4C Utilization of Wastes in Construction 3
- 4D Construction and Demolition Wastes
- 4E Policy

Poster Session 1

## TUESDAY, APRIL 5, 2016

### Oral Presentations

- 5A Agricultural Wastes
- 5B Contaminated Sites 1
- 5C Medical Wastes
- 5D Innovative Technologies and Concepts 2
  
- 6A Thermal Treatment and Energy Recovery
- 6B Electronic Wastes
- 6C Biological Treatment 2
- 6D Sludge

Poster Session 2

### Special Sessions

- 7A Professional Education Course 1A
- 7B Professional Education Course 1B
- 7C Landfill and Remediation
- 7D Innovative Technologies and Concepts 3
  
- 8A Solid Waste Subcommittee of Chinese Ceramic Society
- 8B Professional Education Course 2

Closing Reception

## WEDNESDAY, APRIL 6, 2016

Technical Field Trips

# DETAILED AGENDA

SUNDAY, APRIL 3

12:00 p.m. - 6:00 p.m.

Conference check-in and registration

1:00 p.m. - 5:00 p.m.

Guided Tour of Philadelphia: The tour will include the Liberty Bell, Independence Hall and the Betsy Ross House along with a bus tour of the city.  
(additional fee)

5:00 p.m. - 6:00 p.m.

Welcome Reception

MONDAY, APRIL 4

8:00 a.m. - 5:30 p.m.

Conference check-in and registration

8:00 a.m. – 9:00 a.m.

Coffee

9:00 a.m. – 9:40 a.m.

Opening Plenary

Keynote Speaker: Shawn M. Garvin, Regional Administrator, US EPA Mid-Atlantic Region: Food Waste Prevention and Recovery

Plenary Presentations:

Activities in the Chinese Ceramic Society, Dongmin Wang, China University of Mining & Technology, China

Resource Efficient Sustainable Circular Economy in Waste Management in Asia, Sadhan Kumar Ghosh, International Society of Waste Management, Air and Water & Jadavpur University, India

9:45 a.m. – 11:10 a.m.

Sessions 1

SESSION 1A

*Utilization of Wastes in Construction 1*

High Strength Lightweight Fly Ash Based Alkali Activated Materials, Ze Liu, China University of Mining & Technology, Beijing, China

Compressive Strength and Abrasion Resistance of Concrete Containing Used-Foundry Sand, Gurpreet Singh Dhanoa, Punjabi University, Rafat Siddique, Thapar University, India

Study on the Carbonation for Utilization of Construction Wastes, *Changsik Choi*, Institute for Advanced Engineering, *Bum Eui Hong*, Institute for Advanced Engineering, *Sungkyu Lee*, Institute for Advanced Engineering, *Cheol Jin Jeong*, **Korea**

Beneficial Use of Lightweight Aggregate Sintered from Dredged Material for Green Roof Construction, *Rui Liu*, Kent State University, *Reid Coffman*, Kent State University, *Timothy Ong*, Kent State University, **USA**

## **SESSION 1B**

### ***Education and Public Involvement***

Single-Use Carrier Bags Charge in Scotland: Public Perceptions and Attitudes, *Adekunle Oke*, Robert Gordon University, **Scotland, UK**

Factors Affecting the Acquisition and Disposal of Second-hand Products Among Online Users, *Lorena Fortuna*, City College of New York, *Vasil Diyamandoglu*, City College of New York, **USA**

Teaching Solid Waste Management at University, *Anita Závodská*, Barry University, *Anne Morrissey*, Dublin City University, **USA**

‘Nothing Can Be Done to Make Our Markets Clean’: A Qualitative Study of Attitudes of the African Marketplace Users Toward Waste, *Adeni Abigo*, University of Brighton, *Kassim Gidado*, University of Brighton, *Paul Gilchrist*, University of Brighton, *Emmanuel Aboagye-Nimo*, **United Kingdom**

## **SESSION 1C**

### ***Geotechnical Analyses***

Study of Influential Factors in the Compaction of Municipal Solid Waste in Lysimeters, *Rafael Lourenço Thomaz Favery Favery*, University of Campinas, *Mariana Politti Manzatto*, University of Campinas, *Renata Lima Moretto*, University of Campinas, *Gustavo Henrique Tonelli Dutra de Almeida*, *Miriam Gonçalves Miguel*, *Eglé Novaes Teixeira*, **Brazil**

Geotechnical Considerations for Building on and in Mined Sites, *Dorairaja Raghu*, Hatch Mott MacDonald, *Vatsal Shah*, Hatch Mott MacDonald, **USA**

## **SESSION 1D**

### ***Innovative Technologies and Concepts 1***

Bright Green Island of Bornholm – Waste to Resource Labs Driving Sustainable Transition, *Hans-Christian Holmstrand*, Aalborg University, Resourcelab Bornholm, *Jens Hjul-Nielsen*, BOFA (Bornholms Municipal Waste Management Company), **Denmark**

Integrated Waste Management Systems for Developing Economies, *Lakshmi Raghupathy*, Teri University, **India**

Removal of Antimony from Crude Lead, *Walaa Nagy*, Chloride Egypt S.A.E, *Shakinaz El Sherbiny*, Cairo University, *H.A. Sibak*, Cairo University, *S.T. Elsheltawy*, **Egypt**

Cellulose Degradation Associated and Electricity Production by Mixed Cultures in Microbial Fuel Cell, *Zainab Ziad Ismail*, Baghdad University, *Ali Jwied Jaeel*, Wasit University, **Iraq**

Integrated Waste Management for Restoration of Saweni Beach of the Fiji Islands, *Ajantha Perera*, Fiji National University, **Fiji Islands**

11:10 a.m. – 11:30 a.m.  
Break

11:30 a.m. – 12:50 p.m.  
Sessions 2

## **SESSION 2A** *Environment Impacts*

Analyzing Environmental Impacts and Energy Production of Various Treatment Method for Sewage Sludge and Food Waste in Macau using Life Cycle Assessment, *Irene Lo*, The Hong Kong University of Science and Technology, *Sam Chiu*, The Hong Kong University of Science and Technology, **Hong Kong, China**

Assessment of the Emissions for the Collection of Biodegradable Waste in a Life Cycle Perspective: The Influence of Source Separation Intensity and Collection Frequency, *Francesco Di Maria*, Dipartimento di Ingegneria - Università di Perugia, *Caterina Micale*, Dipartimento di Ingegneria - Università di Perugia, **Italy**

An Analysis of Grey Water Recycling Technologies Using AHP, *Biswajit Debnath*, International Society of Waste Management, Air and Water (ISWMAW), *Aryama Raychaudhuri*, NIT Trichy, *Sadhan Kumar Ghosh*, Jadavpur University, **India**

## **SESSION 2B** *Recycling*

Green Construction and Clean Environment through City and River Solid Waste Processing, *Yash Pal Gupta*, Naini Bridge Information, COWI-DIPL, *Pramila Gupta*, Allahabad Agricultural Institute, Naini, **India**

The Separation of Household Organic Waste as a Method of Municipal Waste Reduction in the Czech Republic, *Anita Závodská*, Barry University, *Libuše Benešová*, Charles University in Prague, *Jakub Šmíd*, Charles University in Prague, **USA**

Techno Commercial Viability of Waste Plastic to Zero Waste (Plastic to Oil) in Developed and Developing Nations, *Kalyan Anne*, Pyrocrat Systems LLP, **India**

## **SESSION 2C** *Utilization of Wastes in Construction 2*

Utilizing Industrial Wastes to Prepare High Performance Soil Stabilizer, *Hao Yu*, Beihang University, *Xin Huang*, Beihang University, *Dezhi Shao*, Beihang University, *Jinlong Liu*, **China**

## SESSION 2D

### *Landfill*

Determination of Greenhouse Gas Fugitive Emissions in a Municipal Solid Waste Landfill, *Carlos Sánchez*, Technical University of Madrid, *Adolfo Narros*, Technical University of Madrid, *Isabel del Peso*, Technical University of Madrid, *M del Mar de la Fuente*, *Encarnación Rodríguez*, **Spain**

Effects of Waste Composition and Cover Practices on Landfill Methane Emissions, *Douglas Haith*, Cornell University, **USA**

High Efficiency Landfill Gas Fired Power Plant Process with ORC, *Petri Kouvo*, HSY Helsinki Region Environmental Services Authority, **Finland**

Surfactant Waste Can It Be Disposed to Anaerobic Bioreactor Landfills?, *Karthik R. Manchala*, Virginia Tech/Atkins North America Inc., *John Novak*, Virginia Tech, **USA**

12:50 p.m. - 1:45 p.m.

**Awards Luncheon**

**Presentation of the Russell Ackoff Award, Roy F. Weston Award, Iraj Zandi Award and Student Paper Award**

1:45 p.m. – 3:35 p.m.

**Sessions 3**

## SESSION 3A

### *Ash Management*

Leaching Behavior and Stabilization of Heavy Metals in a Typical Fly Ash, *Qun Chen*, Tsinghua University, *Ruixiao Lin*, Tsinghua University, *Yuxuan Guo*, Tsinghua University, *Xue Gong*, *Yuqun Zhuo*, **China**

The Study and Application on Fly Ash Autoclaved Aerated Concrete in Self-Insulation System of External Wall, *Pengxuan Duan*, Beijing Building Materials Academy of Sciences Research, **China**

Transfer of Eco-Core Technology to Coal Ash Composite Products, *Kunigal Shivakumar*, North Carolina A&T State University, **USA**

Shear Behavior of Rae Bareilly Pond Ash at Low Confining Pressure, *Sarvesh Chandra*, Indian Institute of Technology Kanpur, *Rashmi Kumari*, Indian Space Research Organization, *Rajesh Sathiyamoorthy*, IIT Kanpur, **India**

Innovative Green Management Approaches to Address Fly Ash Issues in China, *Jinder Jow*, National Institute of Clean-and-Low-Carbon Energy, **China**

## SESSION 3B

### *Case Studies*

Status of Solid Waste Material Recovery (SWMR) in Benin Metropolis, Nigeria, *Dennis Iyeke Igbinomwanhia*, University of Benin, *Emmanuel Ehis Osolease*, University of Benin, **Nigeria**

Eco-Waste Reduction and Diversion Program in Makati City, *Andrew Lou Mungcal*, University of Makati, *Mildred Castillo*, National Economic Development Authority, **Philippines**

Solid Waste Characteristics and Its Economic Potentials in Bauchi Metropolitan Area, *Haruna Abdu Usman*, Abubakar Tafawa Balewa University Bauchi, *Sarkile Kawuwa*, Abubakar Tafawa Balewa University Bauchi, *Muhammad Aminu Adamu*, Abubakar Tafawa Balewa University Bauchi, **Nigeria**

Investigating the Impact of Waste Reduction Measures for Jos, Nigeria, *Janet Agati Yakubu*, University of Brighton, *Ryan Woodard*, University of Brighton, *Kassim Gidado*, University of Brighton, *E. Aboagye-Nimo*, University of Brighton, **United Kingdom**

Waste Management in USA through Case Studies: E-waste Recycling and Waste to Energy Plant, *Sadhan Kumar Ghosh*, Jadavpur University & International Society of Waste Management, Air and Water (ISWMAW), *Joonheon Lee*, Seoul National University, *Achi Chibueze Godwin*, University of Ibadan, *Adekunle Oke*, *Reem A. Al-Rawi*, *Mervat El-Hoz*, **India**

### **SESSION 3C** ***Food Wastes***

An Ecological Comparison of Food Waste Management Options Using a Hybrid Life Cycle Assessment Approach: A UK Case-Study of Composting, Anaerobic Digestion and Animal Feed, *Ramy Saleemdeeb*, Cambridge University, *Erasmus Ermgassen*, Cambridge University, *Mi-Hyung Kim*, Seoul National University, *Andrew Balmford*, *Abir Al-Tabbaa*, **United Kingdom**

Food Waste in the UAE Hospitality Sector: Decreasing the ‘Too Much’, *Sanaa Iqbal Pirani*, Masdar Institute of Science and Technology, *Hassan Arafat*, Masdar Institute of Science and Technology, **United Arab Emirates**

Conversion of Food Waste into Energy (Methane) Using Anaerobic Digestion, *Adekunle Oke*, Robert Gordon University, *Moses Ayololuwa Ejiwale*, Osun State Local Government Service Commission, **Scotland, UK**

### **SESSION 3D** ***Biofuels from Wastes***

Co-pyrolysis of Agricultural Waste and Biomass for Production of Liquid Fuels and Chemicals, *Christina Dorado*, USDA-ARS, *Charles A. Mullen*, USDA-ARS, *Akwasi A. Boateng*, USDA-ARS, *Mark A. Schaffer*, **USA**

Recent Trends in Solid Waste Utilization for Biodiesel Production, *Shakinaz El-Sheltawy*, Cairo University, *Eslam Al-Sakkari*, Cairo University, **Egypt**

Modeling and Process Simulation of Biodiesel Production from Soybean Oil Using Cement Kiln Dust as a Heterogeneous Catalyst, *Shakinaz El-Sheltawy*, Cairo University, *Eslam Al-Sakkari*, Cairo University, *Mai Fouad*, Cairo University, **Egypt**

Lignocellulosic Biomass Supply Chain for Bioethanol Production, *Aryama Raychaudhuri*, NIT Trichy, *Sadhan Kumar Ghosh*, Jadavpur University & International Society of Waste Management, Air and Water (ISWMAW), *S. T. Ramesh*, NIT Trichy, **India**



3:35 p.m. – 3:55 p.m.

**Break**

3:55 p.m. – 5:35 p.m.

**Sessions 4**

## **SESSION 4A**

### ***Biological Treatment 1***

Assessment and Comparison of the Leaching Behaviour of Two Types of Compost Materials from Aerobic/Anaerobic Biodegradation Processes, *Francesco Lombardi*, University of Rome "tor Vergata", *Renato Gavasci*, University of Rome "tor Vergata", *Piero Sirini*, University of Florence, *M.C. Di Lonardo*, *S. Pantini*, *I. Verginelli*, *G. Costa*, **Italy**

Partial Flow Digestion in Municipal Biowaste Management, *Aino Kainulainen*, Helsinki Region Environmental Services Authority, *Christoph Gareis*, Helsinki Region Environmental Services Authority, *Petri Kouvo*, Helsinki Region Environmental Services Authority, **Finland**

A Potential Utilization of Municipal Solid Waste (MSW) through Vermicomposting, *Ornuma Taeporamaysamai*, Chulalongkorn University, *Chavalit Ratanatamskul*, Chulalongkorn University, **Thailand**

Assessment of Unprocessed Food and Yard Waste Composting at Universidad Industrial de Santander, Colombia, *Ricardo Oviedo-Ocaña*, Universidad Industrial de Santander, *Isabel Dominguez*, Universidad Industrial de Santander, *C.F. Pachón*, *A. Forero*, **Colombia**

## **SESSION 4B**

### ***Industrial Wastes***

Microwave Activation of Electric Arc Furnace (EAF) Slag for Strengthening Calcium Extraction with Ammonium Chloride Solution, *Zhibo Tong*, Wuhan University of Science and Technology, *Guojun Ma*, Wuhan University of Science and Technology, *Xiang Zhang*, Wuhan University of Science and Technology, **China**

Study on the Utilization of Red Mud, *Yihe Zhang*, China University of Geosciences, Beijing, *Xinke Wang*, *Fangshan Zhou*, **China**

Application of Industrial Solid Waste in Building 3D Printing Materials, *Xiqiang Lin*, Technology Center, China State Construction Co. Ltd., **China**

Research on the Particle Size Distribution Fractal Dimension of Ultra Fine Phosphorus Slag Powder, *Guoyou Li*, Technology Center, China State Construction Co. Ltd., **China**

Recycling of Kiln Rollers Grind Waste for the Preparation of Nano-size Support Ceramic Membranes, *Mai Roushdy*, British University, *Shereen Kamel Amin*, National Research Centre, *Shakinaz El-Sherbiny*, Cairo University, *H. Abdallah*, *M.F. Abadir*, **Egypt**

Thinking Over the Utilization of High-Alumina Fly Ash in China, *Shuhua Ma*, Institute of Process Engineering, Chinese Academy of Sciences, *Xiaohui Wang*, Institute of Process Engineering, Chinese Academy of Sciences, *Shili Zheng*, Institute of Process Engineering, Chinese Academy of Sciences, *Jian Ding*, *Yuejiao Wang*, *Zhenhua Tang*, **China**

#### SESSION 4C

##### *Utilization of Wastes in Construction 3*

Studies on Preparation of  $\alpha$  High-Strength Gypsum BY Autoclaved Semi-Dry Process and Its Products, *Ying Li*, Beijing Building Materials Academy of Sciences Research, **China**

Recycling of Granite Waste from Sawing Operation in Clay Brick for Civil Construction, *Carlos Maurício Fontes Vieira*, State University of the North Fluminense, *Juliana Gazem Rufino de Carvalho*, State University of the North Fluminense, **Brazil**

Concretes Based on New Alternative Binders Based on Waste Glass, *J Iván Escalante-García*, Cinvestav Saltillo, *Dulce E. Ortega-Zavala*, Cinvestav Saltillo, *Ulises Avila-López*, Cinvestav Saltillo, *Ricardo Martínez-Lopez*, **México**

#### SESSION 4D

##### *Construction and Demolition Wastes*

Quantification of Construction and Demolition Wastes Produced in Coastal Communities: The Case Study of the State of Paraná, *Generoso De Angelis Neto*, Maringá State University, *Maria Cristina Borba Braga*, Parana Federal University, **Brazil**

Construction and Demolition Waste Management Using Domain Based Fuzzy Goal Programming, *Sadhan Kumar Ghosh*, Jadavpur University & International Society of Waste Management, Air and Water (ISWMAW), *Payel Ghosh*, Adamas University, **India**

Construction & Demolition Waste Recycling in India, *Lakshmi Raghupathy*, Teri University, **India**

#### SESSION 4E

##### *Policy*

Codes for Solid Waste Management for Developing Countries: India and Egypt, *Sadhan Kumar Ghosh*, Jadavpur University, *S. T. El Sheltawy*, Cairo University, *S. A. El Sherbiny*, Cairo University, *M. M. K. Fouad*, **India**

Strategies for Reducing Municipal Solid Waste in Lebanon, Nigeria and India, *Mervat El-Hoz*, University of Balamand, *Adeniyi S. Aremu*, University of Ilorin, *Aryama Roychoudhury*, NIT Trichy, *Olasunkanmi M. Ojowuro*, *Abdulwahab Ugunbiyi*, *Sadhan Kumar Ghosh*, **Lebanon**

Post Earthquake Waste Management Scenario in Nepal, *Himadri Sekhar Halder*, International Society for Waste Management, Air and Water, *Soumyajit Chatterjee*, International Society for Waste Management, Air and Water, *Biswajit Debnath*, International Society for Waste Management, Air and Water, *Sannidhya Kumar Ghosh*, *Sadhan Kumar Ghosh*, **India**

Effects of 3R Promotion Measures on Citizen Participation in 3R, *Yasuhiro Matsui*, Okayama University, *Vu Chi Mai Tran*, Okayama University, **Japan**

A Review of Reverse Logistics in Sustainability of the Organization, *Debashree De*, Indian Institute of Technology, Kharagpur, *Pradip Kumar Ray*, Indian Institute of Technology, Kharagpur, *Sadhan Kumar Ghosh*, Jadavpur University, Kolkata, **India**

5:40 p.m. – 6:40 p.m

**Posters 1**

6:10 p.m. – 7:10 p.m

**Reception**

## **POSTER SESSION 1**

Solid Waste Reduction Management with Special Reference to Developing Countries, *Patrick Nwaopani*, University of South Africa, *Munyaradz Mujuru*, University of Limpopo, **South Africa**

Strategic Management of Waste Cycle in Large and Densely Populated Towns – The Case of Naples (Italy), *Paola Olimpia Achard*, University of L'Aquila, *Massimiliano Fabbricino*, University of Naples Federico II, **Italy**

Assessment of Resilience in Municipal Solid Waste Management Companies, *Massimiliano Fabbricino*, University of Naples Federico II, *Patrizia Agnello*, INAIL, *Paolo Bragatto*, INAIL, *Paola Olimpia Achard*, **Italy**

Medical Waste of Light-Based Scaffold Fabrication Materials and Their Environmental Impacts, *Ozlem Yasar*, New York City College of Technology, **USA**

Techno Commercial Viability of Waste Plastic to Zero Waste (Plastic to Oil) in Developed and Developing Nations, *Kalyan Anne*, Pyrocrat Systems LLP, **India**

Waste Tablets Characterization Aiming Recycling, *Vinicius Coelho Nóbrega da Motta*, UFES, *Renato Ribeiro Siman*, UFES, *Luciana Harue Yamane*, UFES, **Brazil**

Study of Influential Factors in the Compaction of Municipal Solid Waste in Lysimeters, *Rafael Lourenço Thomaz Favery Favery*, University of Campinas, *Mariana Politti Manzatto*, University of Campinas, *Renata Lima Moretto*, University of Campinas, *Gustavo Henrique Tonelli Dutra de Almeida*, *Miriam Gonçalves Miguel*, *Eglé Novaes Teixeira*, **Brazil**

Generation of Value Added Products from Food Waste through Biphasic Anaerobic Digestion, *Sameena Begum*, CSIR-Indian Institute of Chemical Technology, *Kiran Golluri*, CSIR-Indian Institute of Chemical Technology, *Bharath Gandu*, CSIR-Indian Institute of Chemical Technology, *Kranthi Kuruti*, *Shruthi Ahuja*, *D.K. Ahuja*, *Y.V. Swamy*, **India**

Case Study of a Solar Tower/Compost Waste-to-Energy Test Facility, *Kevin Anderson*, Cal Poly Pomona, *Pedro Perez*, Cal Poly Pomona, *Benjamin Kampen*, Cal Poly Pomona, *Chris McNamara*, *Joseph Juarez*, *Suzanne Shihadeh*, *Ali Sharbat*, *Reza Baghaei Lakeh*, *Marayam Shafahi*, **USA**

Study on the Carbonation for Utilization of Construction Wastes, *Changsik Choi*,

Institute for Advanced Engineering, *Bum Eui Hong*, Institute for Advanced Engineering, *Sungkyu Lee*, Institute for Advanced Engineering, *Cheol Jin Jeong*, **Korea**

Waste Management in USA through Case Studies: E-waste Recycling and Waste to Energy Plant, *Sadhan Kumar Ghosh*, Jadavpur University & International Society of Waste Management, Air and Water (ISWMAW), *Joonheon Lee*, Seoul National University, *Achi Chibueze Godwin*, University of Ibadan, *Adekunle Oke*, *Reem A. Al-Rawi*, *Mervat El-Hoz*, **India**

An Analysis of Grey Water Recycling Technologies Using AHP, *Biswajit Debnath*, International Society of Waste Management, Air and Water (ISWMAW), *Aryama Raychaudhuri*, NIT Trichy, *Sadhan Kumar Ghosh*, Jadavpur University, **India**

Beneficial Use of Lightweight Aggregate Sintered from Dredged Material for Green Roof Construction, *Rui Liu*, Kent State University, *Reid Coffman*, Kent State University, *Timothy Ong*, Kent State University, **USA**

Surfactant Waste Can It Be Disposed to Anaerobic Bioreactor Landfills?, *Karthik R. Manchala*, Virginia Tech/Atkins North America Inc., *John Novak*, Virginia Tech, **USA**

Handling Scrap Tyres in Botswana: Initiatives, Practices, and Consequences, *Daniel Mmereki*, Chongqing University, *Andrew Baldwin*, Chongqing University, *Hong Liu*, Chongqing University, *Baizhan Li*, **Botswana**

## **TUESDAY, APRIL 5**

8:00 a.m. - 5:30 p.m.

Conference check-in and registration

8:00 a.m. – 8:30 a.m.

Coffee

8:30 a.m. - 10:10 a.m.

**Sessions 5**

### **SESSION 5A**

#### ***Agricultural Wastes***

Filtrate Reducer FBR of Drilling Fluid Prepared with Cellulose and Lignin in Biogas Residues, *Fengshan Zhou*, China University of Geosciences, Beijing, *Zhen Yan*, **China**

A Sustainable Local Energy System Producing Amorphous Silica from Rice Husk and Developing Its Use in Geopolymer Concrete, *Masafumi Tateda*, Toyama Prefectural University, **Japan**

Comparative Study of Whey Utilization in India, New Zealand, and Australia - Identifying Untapped Potential and Means of Utilization, *Monami Das*, International Society of Waste Management, Air and Water (ISWMAW), *Sadhan Kumar Ghosh*, Jadavpur University & International Society of Waste Management, Air and Water (ISWMAW), **India**

Exploring Recycled Waste in Enhancing Soil Enzymes Activity and Biomass Production in Arugula and Mustard Greens, *George Antonious*, Kentucky State University, **USA**

New Uses for Collagen Dispersion Produced from Waste Proteins, *Gennaro Maffia*, Manhattan College, *Olivia Mason*, *Joseph DiMarco* and *Ryan L'Abatte*, **USA**

## **SESSION 5B** ***Contaminated Sites 1***

Studies of Adsorption-Desorption Dynamics of Metals on Simulated Soil and Their Potential Beneficiation for Metal Recovery, *Leonard Mgbeahuruike*, Manchester Metropolitan University, *Herman J. Potgieter*, University of Witwatersrand, Johannesburg, *Sanja Potgieter-Vermaak*, Manchester Metropolitan University, *Judith Barrett*, *Lizelle Van Dyke*, **United Kingdom**

Latest Results of the Remediation of a Cr-contaminated Site Using the FerroDECONT Process, *Klaus Philipp Sedlazeck*, Montanuniversität Leoben, *Daniel Höllen*, *Peter Müller*, *Robert Mischitz*, *Roland Pomberger*, **Austria**

Bioremediation of Polycyclic Aromatic Hydrocarbon Contaminated Soil by a Microbial Consortium through Supplementation of Biosurfactant Produced by Pseudomonas aeruginosa Strain, *Fisseha Andualem Bezza*, University of Pretoria, *Evans MN Chirwa*, University of Pretoria, **South Africa**

Application of a Coupled Estimation Method Using Flow and Transport Equations to a Real 1,4-dioxane Groundwater Contamination Site with Complex Hydrogeological Structure, *Kazuei Ishii*, Hokkaido University, *Toru Furuichi*, Hokkaido University, *Atsushi Fujiyama*, Hokkaido University, **Japan**

Study on Multi-criteria Decision Making with Multiple Evaluators to Evaluate Remedial Alternatives for an Illegal Waste Dumping Site, *Atsushi Fujiyama*, Hokkaido University, *Kazuei Ishii*, Hokkaido University, *Toru Furuichi*, Hokkaido University, **Japan**

## **SESSION 5C** ***Medical Wastes***

Medical Waste of Light-Based Scaffold Fabrication Materials and Their Environmental Impacts, *Ozlem Yasar*, New York City College of Technology, **USA**

Bio-medical Waste Management in India – A Novel Approach, *Lakshmi Raghupathy*, Teri University, **India**

Quantification of Medical Wastes Produced in Coastal Communities: The Case Study of the State of Paraná, *Generoso De Angelis Neto*, Maringá State University, *Maria Cristina Borba Braga*, Parana Federal University, **Brazil**

## **SESSION 5D** ***Innovative Technologies and Concepts 2***

Massive Sodic Soil Reclamation Using Flue Gas Desulfurization Gypsum in China, *Qun Chen*, Tsinghua University, *Yan Li*, Tsinghua University, *Shujuan Wang*, Tsinghua University, *Yuqun Zhuo*, **China**

Challenges of Urban Solid Waste Management in Developing Countries, *Olufemi Oyedele*, Obafemi Awolowo University, **Nigeria**

Geospatial Technology as a Tool in Municipal Solid Waste Management and Monitoring in Nigeria, *Olaide Monsor Aderoju*, University of Porto, *Guerner Antonio Dias*, University of Porto, *Renato Guimarães*, University of Porto, **Portugal**

Kinetics of Synthetic Wastewater Oxidation in Supercritical Water, *Sijie Zhang*, Carleton University, *Rui Zhao*, Carleton University, *Jie Liu*, Carleton University, *Junjie Gu*, **Canada**

Big Data on Campus Waste Audit for Cost-effective Trash Management, *Moe Chowdhury*, Jackson State University, **USA**

10:10 a.m. – 10:30 a.m.

**Break**

10:30 a.m. – 12:25 p.m.

**Sessions 6**

## **SESSION 6A**

### ***Thermal Treatment and Energy Recovery***

Tar Conversion Characteristics During Catalytic Gasification-Reforming of Municipal Solid Waste, *Wei Wu*, Northeastern University, *Xianchao Zhou*, Northeastern University, *Xiangli Nan*, Northeastern University, **China**

Case Study of a Solar Tower/Compost Waste-to-Energy Test Facility, *Kevin Anderson*, Cal Poly Pomona, *Pedro Perez*, Cal Poly Pomona, *Benjamin Kampen*, Cal Poly Pomona, *Chris McNamara*, *Joseph Juarez*, *Suzanne Shihadeh*, *Ali Sharbat*, *Reza Baghaei Lakeh*, *Marayam Shafahi*, **USA**

Adsorption Capacity and Mechanism of Cadmium on Orange Peel-Derived Biochar at Different Pyrolysis Temperatures and Times, *Hai Tran*, Chung Yuan Christian University, *Sheng You*, Chung Yuan Christian University, *Huan Chao*, Chung Yuan Christian University, **Taiwan**

Mathematical Correlation for Tungsten-Based Alloy Nanopowder to Determine the Relation between Temperature Time and Weight under Certain Temperatures, *Abdulsalam Alhazza*, Kuwait Institute for Scientific Research, **Kuwait**

## **SESSION 6B**

### ***Electronic Wastes***

Development of an Electrolytic Process for Selective Extraction of Copper Chemically and Biologically Leached from Electronic Waste, *Mynepalli Kameswara/Sridhar*, University of Ibadan, *Taiwo Babatunde/Hammed*, University of Ibadan, *Hana Ifeoluwa/Oyelami*, University of Ibadan, **Nigeria**

Waste Tablets Characterization Aiming Recycling, *Vinicius Coelho Nóbrega da Motta*, UFES, *Renato Ribeiro Siman*, UFES, *Luciana Harue Yamane*, UFES, **Brazil**

Potential Environmental and Health Impact Due to Unceasing Growth of E-waste, Recycling and Future Challenges, *Shamim Ahsan*, Metropolitan State University of Denver, **USA**

Bio-metallurgical Recovery of Gold from Printed Circuit Boards (PCB): A Review, *Biswajit Debnath*, International Society for Waste Management, Air and Water, *Sadhan Kumar Ghosh*, Jadavpur University, **India**

Waste Management in India: E-waste Recycling and Bio-methanation – Case Studies, *Sadhan Kumar Ghosh*, Jadavpur University & International Society of Waste Management, Air and Water (ISWMAW), *Reshma Roychoudhury*, Heritage Institute of Technology, *Sushant B. Wath*, CSIR – NEERI, *Biswajit Debnath*, *Sandhya Jayakumar*, *Ajay Maloo*, **India**

## SESSION 6C

### *Biological Treatment 2*

Environmental Sustainability of the Management of Bio-Waste by Co-Digestion with Sludge in a Life Cycle Perspective, *Francesco Di Maria*, Dipartimento di Ingegneria - Università di Perugia, **Italy**

Novel Up Flow Anaerobic Sludge Blanket Solid-State Reactor for Treatment of the Organic Fraction of Municipal Solid Wastes, *Gabriela Zafra Jiménez*, Tecnológico de Estudios Superiores de Ecatepec, *José Guadalupe Vian Pérez*, Universidad Autónoma Metropolitana Azcapozalco, *Sergio Esteban Vigeuras Carmona*, Tecnológico de Estudios Superiores de Ecatepec, *Alejandra Velasco Pérez*, **México**

Generation of Value Added Products from Food Waste through Biphasic Anaerobic Digestion, *Sameena Begum*, CSIR-Indian Institute of Chemical Technology, *Kiran Golluri*, CSIR-Indian Institute of Chemical Technology, *Bharath Gandu*, CSIR-Indian Institute of Chemical Technology, *Kranthi Kuruti*, *Shruthi Ahuja*, *D.K. Ahuja*, *Y.V. Swamy*, **India**

Plasma Gasification Technology for Energy Recovery from Waste, *Rahul Baidya*, Jadavpur University, *Sadhan Kumar Ghosh*, Jadavpur University, **India**

Utilization of Discarded Waste in a Composting Plant for Energy Recovery by Plasma Gasification-A Proposed Model, *Rahul Baidya*, Jadavpur University, *Sadhan Kumar Ghosh*, Jadavpur University, **India**

## SESSION 6D

### *Sludge*

Assessment of the Accuracy of the Results Produced by the Use of a Protocol to Quantify Viable Eggs of Ascaris in Sewage Sludge, *Maria Carolina Vieira da Rocha*, Parana Federal University, *Thays Kurek Sehenem*, Parana Federal University, *Maria Cristina Borba Braga*, Parana Federal University, **Brazil**

Identification of Viable Eggs of Ascaris suum in Sewage Sludge by a Biomolecular Technique, *Maria Carolina Vieira da Rocha*, Parana Federal University, *Thays Kurek Sehenem*, Parana Federal University, *Maria Cristina Borba Braga*, Parana Federal University, **Brazil**

Source Apportionment of Odor Emission from MSW and Control, *Ziyang Lou*, Shanghai Jiao Tong University, *Zhongtao Sun*, Shanghai University of Electric Power, **China**

Influence of Sludge and Sludge Bio-Char on the Transfer of Available Heavy Metals in

Soil, *Guangwei Yu*, Institute of Urban Environment, Chinese Academy of Sciences, *Yin Wang*, Institute of Urban Environment, Chinese Academy of Sciences, *Xiang Zhang*, Institute of Urban Environment, Chinese Academy of Sciences, *Xiao-da Tang*, *Zhen Yu*, *Jie Li*, *Xing-dong Wang*, *Zhen-Jiao Xing*, *Zhiwei Li*, **China**

Municipal Solid Waste Management in Hangzhou, China, *Jouni Havukainen*, Lappeenranta University of Technology Energy, *Xiaodong Li*, State Key Laboratory of Clean Energy Utilization, Institute for Thermal Power Engineering of Zhejiang University, *Mingxiu Zhan*, State Key Laboratory of Clean Energy Utilization, Institute for Thermal Power Engineering of Zhejiang University, *Mika Horttanainen*, *Yan Jianhua*, *Viktoria Kapustina*, **Finland**

Evaluation of Biochar Derived from Fecal Sludge: Nexus Approach Towards Sanitation, Energy and Soil Amendment, *Asgdom Malu*, Jimma University, *Abebe Betene*, Jimma University, *Wakagari Regassa*, Jimma University, *Helmut Kloos*, **Ethiopia**

12:25 p.m. – 1:25 p.m.  
Poster Session 2

## POSTER SESSION 2

Estimating Construction and Demolition (C&D) Waste Arising in Libya, *Ashraf Ali*, University of Wolverhampton, *Chukwunonye Ezeah*, University of Wolverhampton, *Jamal Khatib*, University of Wolverhampton, **United Kingdom**

Chemical Recycling: Discarded PET Bottles as Raw Material to Produce Flexible PVC, *Sandro Donnini Mancini*, Unesp, *Beatriz Barcellos Mattos*, Unesp, *Luana Misae Hoshi Pinto*, Unesp, *Gustavo B. Silva*, *Antonio Rodolfo Junior*, **Brazil**

Environmental Impact Assessment of Municipal Solid Waste Management Systems by Life Cycle Assessment, *Michel Xocaira Paes*, Unesp, *Gerson Araujo de Medeiros*, Unesp, *Sandro Donnini Mancini*, Unesp, **Brazil**

Proposal of Destination and Reusing of Thermal Transfer Ribbon, *Camila Honorina Barbosa Nascimento*, Senai College of Environmental Technology, *Fernando Codelo Nascimento*, Senai College of Environmental Technology, *Edilene de Cássia Dutra Nunes*, Senai College of Environmental Technology, *Antônio Donizetti Giuliano*, **Brazil**

The Impact of Medical Waste for Human Health and Environment, *Vanessa Resende Cruvinel*, University of Brasilia- Brazil, *Hayssa Moares Pintel Ramos*, University of Brasilia, *Dayani Galato*, University of Brasilia, **Brazil**

Study of Properties of Rigid PVC Additived with Thermoset Composite Micronized, *Eliseu William*, College SENAI of Environmental Technology, *Gerson Marinucci*, IPEN, *Eliseu William*, College SENAI of Environmental Technology, **Brazil**

Electronics Waste: The Opportunity to Create Sectoral Agreement in Brazil, *Marcela Moraes*, Universidade Federal do Espirito Santo, *Vinícius Coelho Nóbrega*, Universidade Federal do Espirito Santo, *Renato Ribeiro*, Universidade Federal do Espirito Santo, *Yamane, L.H.*, **Brazil**

Utilization of Some Environmental Resource Materials as a Soil Conditioner, *Ahmed Ali*



*Abuzkhar*, University of Tripoli, *Ahmed Isa Tamzini*, University of Aljabal Algharbi,  
**Libya**

A Review of the Existing Waste Oil Management Systems, *Viktorii Kapustina*,  
Lappeenranta University of Technology, *Mika Horttanainen*, Lappeenranta University of  
Technology, **Finland**

The Effect of Curing Time and Temperature on the Properties of CFB Fly Ash Based  
Foam Geopolymer, *Ningning Shao*, China University of Mining & Technology, Beijing,  
**China**

Is the Use of Filled PET Bottles as Building Blocks a Safe Practice?, *Carmen Leonor  
Barajas*, Universidad Francisco de Paula Santander, *Luis Emilio Vera*, Universidad  
Francisco de Paula Santander, **Colombia**

Design and Construction of Reactors for Anaerobic Degradation of Plastic Films  
Simulating a Landfill, *Daniel Alejandro Valdés Acata*, Metropolitan Autonomous  
University. Corporation Azcapotzalco, *Alethia Vázquez Morillas*, Metropolitan  
Autonomous University. Corporation Azcapotzalco, *Margarita Beltrán Villavicencio*,  
Metropolitan Autonomous University. Corporation Azcapotzalco, *Abad Aldana Laura  
Gisela*, *Sánchez Martínez Juana*, *Velasco Pérez Maribel*, *Cano Blanco Mauricio*, **Mexico**

Study on the Utilization of Red Mud, *Yihe Zhang*, China University of Geosciences,  
Beijing, *Xinke Wang*, *Fangshan Zhou*, **China**

Studies of Adsorption-Desorption Dynamics of Metals on Simulated Soil and Their  
Potential Beneficiation for Metal Recovery, *Leonard Mgbeahuruike*, Manchester  
Metropolitan University, *Herman J. Potgieter*, University of Witwatersrand,  
Johannesburg, *Sanja Potgeiter-Vermaak*, Manchester Metropolitan University, *Judith  
Barrett*, *Lizelle Van Dyke*, **United Kingdom**

Comparative Study of Whey Utilization in India, New Zealand, and Australia -  
Identifying Untapped Potential and Means of Utilization, *Monami Das*, International  
Society of Waste Management, Air and Water (ISWMAW), *Sadhan Kumar Ghosh*,  
Jadavpur University & International Society of Waste Management, Air and Water  
(ISWMAW), **India**

Codes for Solid Waste Management for Developing Countries: India and Egypt, *Sadhan  
Kumar Ghosh*, Jadavpur University, *S. T. El Sheltawy*, Cairo University, *S. A. El  
Sherbiny*, Cairo University, *M. M. K. Fouad*, **India**

Strategies for Reducing Municipal Solid Waste in Lebanon, Nigeria and India, *Mervat  
El-Hoz*, University of Balamand, *Adeniyi S. Aremu*, University of Ilorin, *Aryama  
Roychoudhury*, NIT Trichy, *Olasunkanmi M. Ojowuro*, *Abdulwahab Ugunbiyi*, *Sadhan  
Kumar Ghosh*, **Lebanon**

Post Earthquake Waste Management Scenario in Nepal, *Himadri Sekhar Haldar*,  
International Society for Waste Management, Air and Water, *Soumyajit Chatterjee*,  
International Society for Waste Management, Air and Water, *Biswajit Debnath*,  
International Society for Waste Management, Air and Water, *Sannidhya Kumar Ghosh*,  
*Sadhan Kumar Ghosh*, **India**

Construction and Demolition Waste Management Using Domain Based Fuzzy Goal  
Programming, *Sadhan Kumar Ghosh*, Jadavpur University & International Society of  
Waste Management, Air and Water (ISWMAW), *Payel Ghosh*, Adamas University,  
**India**

Preparation on Glass-Ceramics of Red Mud and Andradite by Sintering Method, *Yingmo Hu*, China University of Geosciences, *Yuhang Liu, Hongwei Huang, Fengshan Zhou, Yihe Zhang*, **China**

Novel Fertilizer Based on Solid Waste, *Pan Hu*, China University of Geosciences, *Yihe Zhang, Fengshan Zhou, Xinke Wang*, **China**

Effects of 3R Promotion Measures on Citizen Participation in 3R, *Yasuhiro Matsui*, Okayama University, *Vu Chi Mai Tran*, Okayama University, **Japan**

Construction and Demolition Waste Management (Tehran Case Study), *Babak Rouhi Broujeni*, Islamic Azad University, *Ghassem Ali Omrani, Reza Naghavi, Fatemeh Azadi*, **Iran**

Coal Production Chain Rating, *Marco Gaya de Figueiredo*, Universidade do Estado do Rio de Janeiro, *Luana Baia Ventura*, Universidade do Estado do Rio de Janeiro, *Wallace Souza*, Universidade do Estado do Rio de Janeiro, **Brasil**

Incorporation of Polypropylene Waste Arising from Disposable Diapers Production for Manufacturing Automotive Parts, *Giancarlo Tanabe Denane*, Faculdade Senai de Tecnologia Ambiental, SBC, São Paulo, *Fernando Codelo Nascimento*, Faculdade Senai de Tecnologia Ambiental, SBC, São Paulo, *Clodoaldo Lazareti*, Faculdade Senai de Tecnologia Ambiental, SBC, São Paulo, **Brasil**

1:25 p.m. – 2:15 p.m.

**Luncheon**

2:15 p.m. – 4:15 p.m.

**Sessions 7**

## **SESSION 7A**

### ***Professional Education Course 1A***

Environmental Strategy to Finance and Properly Close a Legacy Landfill, *Angelo C. Fatiga*, Business Development Associate, Pennoni, **USA**

## **SESSION 7B**

### ***Professional Education Course 1B***

Advanced Tools Used to Aid in Conceptual Designs and Visualizations of Capping Landfills Including: SiteOps, Autodesk, Bentley, Sketchup, Photoshop, and Rhino, *Angelo C. Fatiga*, Business Development Associate, Pennoni, **USA**

## **SESSION 7C**

### ***Landfill and Remediation***

Polycyclic Aromatic Hydrocarbons (PAHs) Biodegradation Enhancement Potential of the Lipopeptidal Biosurfactant Produced by Paenibacillus dendritiformis CN5 Strain, *Fisseha Andualem Bezza*, University of Pretoria, *Evans MN Chirwa*, University of Pretoria, **South Africa**

Application of Biosurfactant Produced by Ochrobactrum intermedium CN3 for

Enhancing Petroleum Sludge Bioremediation, *Fisseha Andualem Bezza*, University of Pretoria, *Mervyn Beukes*, University of Pretoria, *Evans MN Chirwa*, University of Pretoria, **South Africa**

Asbestos Landfills: Italian Data and Waste Management at Superfund, *Sergio Malinconico*, INAIL-Italian Workers' Compensation Authority, *Federica Paglietti*, INAIL-Italian Workers' Compensation Authority, *Beatrice Conestabile Della Staffa*, INAIL-Italian Workers' Compensation Authority, *Sergio Bellagamba*, *Paolo De Simone*, **Italy**

Monitoring Changes in Moisture Distribution in a Sanitary Landfill Provisionally Covered with HDPE Geomembrane, *Francisco J.P. Oliveira*, FRAL Consultoria, *Ana Elisa S. Abreu*, FRAL Consultoria, *Thelma S.M.M. Kamiji*, FRAL Consultoria, *Caio D.M.A. Nascimento*, **Brazil**

## SESSION 7D

### *Innovative Technologies and Concepts 3*

Handling Scrap Tyres in Botswana: Initiatives, Practices, and Consequences, *Daniel Mmereki*, Chongqing University, *Andrew Baldwin*, Chongqing University, *Hong Liu*, Chongqing University, *Baizhan Li*, **Botswana**

Model of Secure Landfill Using Abandoned Mine Pit: Technical and Economic Imperatives in Poor Developing Nations, *Michael Nwachukwu*, Federal University of Technology, *Maureen Nwachukwu*, Federal University of Technology, **Nigeria**

Fiji Towards Zero Waste: Effectiveness of Empowering Children and Youth of Fiji Islands for Integrated Waste Management, *Ajantha Perera*, Fiji National University, **Fiji Islands**

Supercritical Water Oxidation of Synthetic Wastewater, *Rui Zhao*, Carleton University, *Sijie Zhang*, Carleton University, *Junjie Gu*, Carleton University, *Jie Liu*, **Canada**

Biochars from Organic Materials in Municipal Solid Waste Streams for Environmental Sustainability, *Mohamed Ahmedna*, Qatar University, *Djaafar Rehrah*, Qatar University, *Rishipal Bansode*, North Carolina A&T State University, *Priscilla Randolph*, *Osman Hassan*, **Qatar**

4:15 p.m. – 4:35 p.m.

**Break**

4:35 p.m. – 6:35 p.m.

**Sessions 8  
Special Sessions**

**SESSION 8A**

***Solid Waste Subcommittee of Chinese Ceramic Society***

Characteristics of Ash and Slag from Coal Gangue Combustion in the Circulation Fluidized Bed Boiler at Different Conditions, *Zhibin Ma*, Shanxi University, *K. K. Chang, K. Z. Yan, Y. Y Guo, F. Q. Cheng, China*

The Mechanical Properties and Hydration Mechanism of High Strength and High Volume CFB Fly Ash Cement, *Dongmin Wang*, China University of Mining & Technology, *Da-peng Zheng, Duan-le Li, Cai-fu Ren, Jin-ge Yin, China*

The Adsorption Mechanisms of Pb by Wood Chars, *Changfu You*, Tsinghua University, *Qun Chen, China*

Synthesis and Utilization of Ca/Mg/Al/Fe Layered Double Hydroxides Using Steelmaking Slag as Raw Material, *Huiquan Li*, Institute of Process Engineering, Chinese Academy of Sciences, *C. Y. Wang, Y. Chen, X. R. Wang, China*

Hydrothermal Synthesis of Zeolite 13x from the Desilication Solution of High Alumina Fly Ash and Calcined Coal Gangue, *Xingrui Wang*, Institute of Process Engineering, Chinese Academy of Sciences, *H. Q. Li, Z. L. Yan, C. Y. Wang, China*

**SESSION 8B**

***Professional Education Course 2***

Novel Uses for Waste Collagen, *Gennaro Maffia*, Professor & Chair, *Olivia Mason*, Department of Chemical Engineering, Manhattan College, **USA**

6:45 p.m. – 7:45 p.m.

**Closing Reception**

**WEDNESDAY APRIL 6**

8:00 a.m. – 9:00 a.m.

Conference check-in and registration

8:00 a.m. – 9:00 a.m.

Coffee

## **FIELD TRIP 1 – Environmental Landfill and Recycling**

### **Delaware Solid Waste Authority Cherry Island Landfill**

The Cherry Island Landfill is a municipal solid waste landfill located in Wilmington, Delaware. The site recently underwent a major landfill expansion. The expansion project included the successful design and construction of an 8,000-ft (1.5 mile) long, 60-ft high mechanically stabilized earth (MSE) berm over extremely soft river-dredge material. The site is located at the confluence of the Delaware and Christina Rivers. The completion of this landfill expansion project represents a significant engineering achievement considering the size of the MSE berm and the deep layer of very soft soils over which the berm was constructed. The berm consists of 1.5 million cubic meters of fill and is one of the highest and most massive reinforced structures constructed over soft soils ever built in the United States. By completing this berm the capacity of the landfill to received waste was increased by an estimated 50 years. This pioneering project was selected as a finalist for the 2012 Outstanding Civil Engineering Achievement (OCEA) award by the American Society of Civil Engineers.

The Cherry Island Landfill manages approximately 1,200 tons of solid waste per day and operates four (4) unique handling areas. The state-of-the-art operation utilizes recovered resources for all operational needs such as landfill cover and access road construction. Zero virgin materials are imported for operational purposes. The landfill collects and processes approximately 3,000 scfm of landfill gas for the generation of green power. The landfill also operates a recycling area which removes materials such as metals, tires, drywall, and yard waste from the solid waste stream.

### **ReCommunity Delaware**

The Delaware Solid Waste Authority is nationally recognized for its management of Delaware's solid waste material. It efficiently operates 3 landfills using innovative technology in order to provide a reliable disposal method for trash while protecting groundwater resources and preventing odors. DSWA also provides opportunities for disposal of special wastes including household hazardous waste, electronics, and used motor oil and filters. DSWA partners with national recycling leader ReCommunity, who operates a Materials Recovery Facility (MRF) in Delaware.

The MRF processes, sorts, and bales all of Delaware's single stream recyclable material as well as some material from counties in Maryland and Pennsylvania. The bales of material are then taken to different manufacturing facilities where the material is recycled and made into new products.

## **FIELD TRIP 2 – Waste to Energy**

### **Covanta Plymouth Renewable Energy, LP**

The Plymouth Renewable Energy facility began commercial operation in February 1992 for the Waste System Authority of Eastern Montgomery County (WSA), which collects waste from 22 local municipalities. Covanta assumed ownership and operations of this Energy-from-Waste (EfW) facility in 2009. The facility processes approximately 1,216

tons per day of municipal solid waste, and uses that waste to generate approximately 32 megawatts of renewable energy that is sold to Exelon energy provider. This is enough green power to meet the needs of more than 25,000 homes.

In 1998, the Plymouth Renewable Energy facility was designated as a VPP STAR by the Occupational Safety and Health Administration (OSHA) and the facility's Environmental Management System received ISO 14001 registration.

The Plymouth Renewable Energy facility, through the use of advanced EfW technology, offers Montgomery County the most environmentally-responsible means of solid waste disposal. The Facility reduces waste to an inert ash that is only about 10% of its original volume, generates valuable renewable energy, and results in a net reduction of greenhouse gas emissions when compared to conventional landfilling practices. In fact, every ton of municipal waste processed at the facility offsets an equivalent ton of GHG emissions—that's approximately 412,000 tons of GHG equivalent avoided last year alone. The facility employs advanced emission control technology to treat flue gases and ensure that emissions are below the limits set by state and federal agencies. The state-of-the-art air pollution control systems include flue gas scrubbers, lime injection, fabric filter baghouses, nitrogen oxide control, and advanced mercury control. Additionally, the facility employs a Continuous Emissions Monitoring System, which measures the precise concentration levels of specific restricted gaseous compounds in the exhaust stack and is monitored 24/7.