

EREFerence

ISSUE 1 November 2016

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**Environmental Research
& Education Foundation**
Lighting a path to sustainable waste management practices

New Report from Data & Policy Program

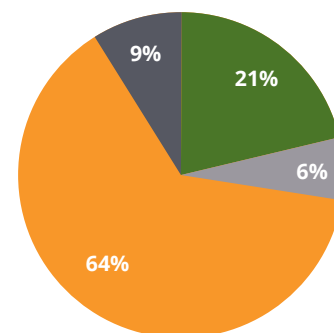
Municipal Solid Waste Management in the U.S.: 2010 & 2013

In September, a multi-year Data & Policy (D&P) project culminated with the publication of a new report: Municipal Solid Waste Management in the U.S.: 2010 & 2013. The report summarizes the amount of municipal solid waste (MSW) managed based on over 9,000 identified landfills, waste-to-energy (WTE) incinerators, composting and recycling facilities actively managing MSW. Results indicate 21% of MSW was managed via recycling, with an additional 6% of MSW managed via composting.

The report provides detailed information for each management endpoint, including national, regional and/or state statistics on:

- Number and types facilities
- Tonnage managed via landfilling, WTE, composting and recycling
- Regional differences in waste management
- Interstate transport of MSW
- Ownership demographics
- Types of non-MSW materials managed at MSW facilities (e.g. C&D at MSW landfills)
- MRF residual (i.e. contamination) rate

TONS MANAGED



- Recycling
- Composting
- Landfilling
- Waste-to-Energy

continued on page 6

UPCOMING EVENTS

Nov 17 EREF Fall Classic & Poker Tournament

Nov 22 Webinar: Sulfate Conversion to Hydrogen Sulfide (H₂S) in Landfills

Dec 8 Webinar: A New Microbial DIET for Anaerobic Digesters

Dec 14 Webinar: Exothermic Reactions in Elevated Temperature Landfills: Field Observations & Laboratory Experiments

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* deceased

EREF Board of Directors Elects 2016 Officers

**CHAIRMAN**

Leonard "Butch" Joyce, P.E.
President and CEO
Joyce Engineering, Inc.

Butch Joyce founded Joyce Engineering, Inc. in 1983. Joyce Engineering offers consulting engineering, training and environmental and operations management services to the waste industry throughout the southeastern U.S. Butch has

been a member of the Board of Directors of the Virginia Waste Industries Association since 1990, serving as its Chairman, and currently chairs the Legislative Committee. He has served on the EREF Board of Directors since 1999.

**VICE CHAIRMAN**

Patrick Carroll
President and CEO
Environmental Solutions Group

Pat Carroll has been President and CEO of the Environmental Solutions Group (ESG) since 2010. ESG is a combination of Heil Environmental, Marathon Equipment Company, Curotto-Can Company, AWTI and Bayne Machine Works. Prior

to this role, Pat was the President of DE-STA-CO (a Dover Company) for 5 years. Pat holds a Bachelor of Science degree in Engineering Science from Montana Tech and an MBA from the University of Texas at Austin.

**SECRETARY/TREASURER**

Ven Poole
Chairman and CEO
Waste Industries

Ven Poole joined Waste Industries in 1990 and has served as the Chief Executive Officer since 2008. Waste Industries provides waste collection services across the southeastern U.S. Prior to being CEO, Ven served as Vice President, Corporate

Development at Waste Industries for six years. He holds a B.S. in Aerospace Engineering from NC State University and has more than 22 years of experience in the solid waste industry.

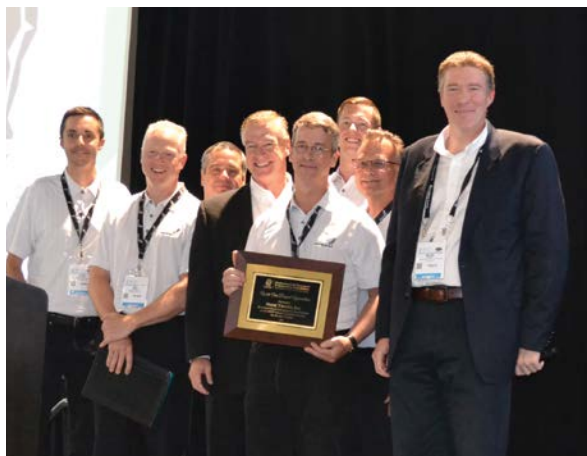
EREF Annual Charitable Auction at WasteExpo Raises More Than \$1.6 Million

HAVING RAISED MORE THAN \$17 MILLION SINCE ITS INCEPTION

IN 1994, the EREF Annual Charitable Auction (held at WasteExpo) features generous donations from members of the waste industry and provides opportunities for exhibitors to increase their visibility at WasteExpo.

This year EREF took both the Live and Silent Auctions online by incorporating mobile bidding into the Silent Auction and online bidding into the Live Auction. The Silent Auction brought in more than \$51,000, nearly \$6,000 more than last year, while the Live Auction raised more than \$1.5 million. [Click here to view the donations and winners.](#)

During the Live Auction, representatives from The Antonacci Foundation, Rehrig Pacific, PTR Baler & Compactor Company and the Detachable Container Association presented EREF CEO and President, Bryan Staley, with checks to support solid waste research. Following words from EREF scholar, Nicholas Hotzelt, who received funding for his Masters research on landfill leachate at Clemson University, bidders were asked to raise their paddles to Fund a Need. Money raised supports EREF's scholarships and Data & Policy Program (D&P). In total, EREF received over \$62,000 to directly fund research in the solid waste industry through scholarships and internships. •



EREF honored Mack Trucks for 20 years of donating to the EREF Live Auction



"Thank you for all those who supported the EREF auction. Every pledge, donation and contribution benefits the foundation and gives students like myself an opportunity to pursue research that can benefit the waste industry."
Nicholas Hotzelt, EREF Scholar

THANK YOU TO OUR SPONSORS

Big Truck Rental
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Bridgeport Manufacturing
Booklet

Card Payment Services
Paddles

Michael Hoffman, Stifel
Mobile Bidding

National Waste &
Recycling Association
Strategic Partner

Rehrig Pacific Company
VIP Reception

Ritchie Bros. Auctioneers
Professional Auctioneer

Scottrade Bank
Equipment Finance
Chairs

WasteExpo/Waste360
Booth Space

IT'S NOT TOO LATE TO REGISTER!

2016  EREF

FALL CLASSIC & NETWORKING EVENT

SPONSORED BY:



WASTE CONNECTIONS, INC.
Connect with the Future

2016 EREF FALL CLASSIC & POKER TOURNAMENT
NOVEMBER 17, 2016
THE WOODLANDS, TX

REGISTRATION

Registration for Golf and Poker is available at www.erefndn.org.

Registration is required to play in the Poker Tournament. Spectators are welcome, but we do request that you register as well (free of charge). You do not need to participate in the EREF Fall Classic to participate in the Poker Tournament.

Poker registration includes food, drinks and a player's seat with chips. Format is Texas Hold 'Em. Poker chips have no cash value. A \$500 donation is encouraged.

SPONSORSHIP OPPORTUNITIES AVAILABLE!

For more information, please e-mail events@erefndn.org.

All proceeds from the EREF Fall Classic and Poker Tournament will support EREF's mission to fund scientific research and educational initiatives to establish sustainable waste management practices.

SCHEDULE OF EVENTS

WEDNESDAY,
NOVEMBER 16

6:00 pm - 8:00 pm
Welcome Reception

THURSDAY,
NOVEMBER 17

7:00 am - 8:30 am
Breakfast

8:30 am
Shotgun Start

2:00 pm - 4:00 pm
Awards Luncheon

6:00 pm - 9:00 pm
Poker Tournament

EREF FALL CLASSIC
POKER
TOURNAMENT

New Project from the Data & Policy Program — School Cafeteria Discards Assessment Project

THE DATA & POLICY PROGRAM (D&P) was developed as part of the foundation's effort to expand EREF's mission to advance knowledge and education for sustainable solid waste management. The primary objective of the D&P is to aggregate and analyze solid waste data. The program also provides valuable experience to undergraduate and graduate students who assist in data gathering and analysis.

What types of projects are done by the D&P? They include collection and aggregation of data (e.g. compiling estimates of generated waste tonnage), policy analysis (e.g. comparing state recycling policies) and evaluating statistical trends and correlations (e.g. the relationships between population demographics, human behavior and recycling rates).

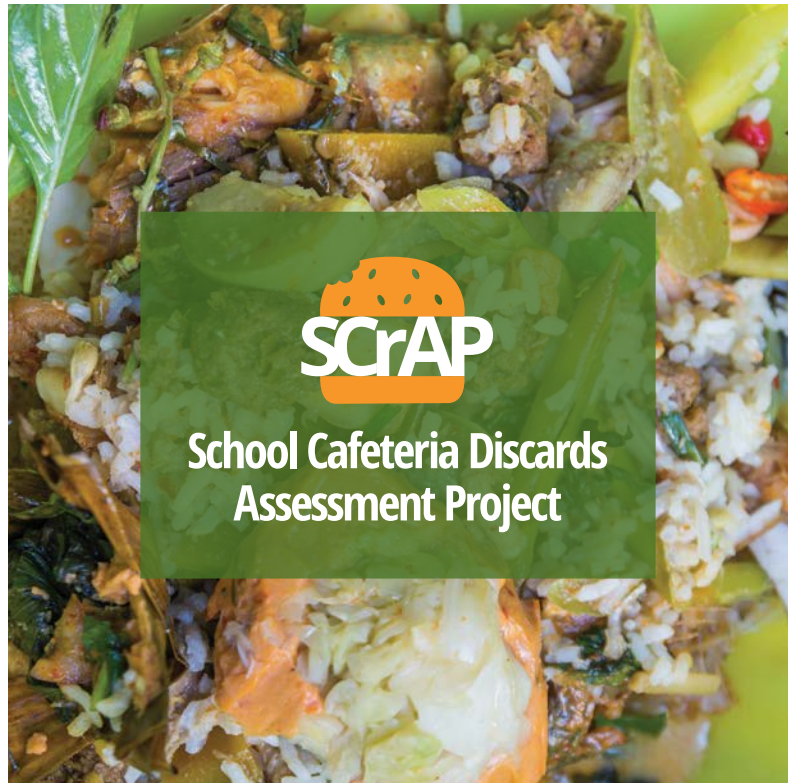
Currently, the program is conducting food waste research through the School Cafeteria Discards Assessment Project (SCrAP). EREF developed SCrAP to quantify both food waste and related wastes (e.g. recyclables, to landfill) generated in cafeterias at K-12 schools nationally.

SCrAP aims to gather information regarding the amount of waste generated in school cafeterias and gain an understanding of how this waste is managed both at the school and after it is hauled away.

In order to obtain accurate data, EREF has turned to elementary, middle and high schools and private schools across the United States to compile data to better understand food waste generation.

School participation can be as simple as completing a questionnaire or as involved as conducting waste weight measurements. SCrAP participants will receive waste related educational materials for the classroom, a snapshot results report tailored for each school (for specified participation levels) and the chance to win money to support the school, up to a maximum of \$1,500.

This project will continue throughout the 2016–2017 school year. •



HOW YOU CAN HELP

Tell your customers.

We need schools to participate! Contact news@erefdn.org for promotional materials, or point them to the [EREF website](#) for more information.

Engage with SCrAP on social media.

Like/follow the program on [Facebook](#) and [Instagram](#) and encourage your customers to post photos of their own food waste using the hashtag #myfoodscraps.



NEW REPORT FROM THE DATA & POLICY PROGRAM CONTINUED FROM PAGE 1

This study represents the first comprehensive evaluation of MSW management based on a bottom-up facility-based methodology, which was developed in an effort to more accurately and discretely track how MSW is managed in the U.S. The table below compares summary results from this effort compared to the U.S. EPA's Facts and Figures report.

EREF 2013 NATIONAL MSW MANAGEMENT RESULTS AND EPA ESTIMATES

	EREF Estimate (million tons)	EPA Estimate (million tons)	Percent Difference
Landfilling	222.0	134.3	65%
Recycling	73.0	64.7	13%
Waste-to-Energy	30.7	32.6	-6%
Composting	21.3	22.4	-5%
TOTAL	347.0	254.0	37%

Purchase "Municipal Solid Waste Management in the U.S.: 2010 & 2013" [here](#). •

SPECIAL ANNOUNCEMENT

EREF Forms Collaborations with the OWMA and SWANA

EREF HAS ESTABLISHED MEMORANDUMS OF UNDERSTANDING with the Ontario Waste Management Association (OWMA) and the Solid Waste Association of North America (SWANA).

The objective of the collaborative effort between EREF and the OWMA (www.owma.org) is to more effectively fund and facilitate research that addresses the needs of the Canadian waste management sector and fosters relationships with Canadian academic institutions. EREF's current activities, which include funding of scholarships to students at Canadian institutions and research efforts that address issues of interest to the Canadian waste industry, set a strong precedent for this collaboration. Additional ties include a member of the EREF Board of Directors that is a faculty member at the University of New Brunswick. Most recently EREF awarded a scholarship to Jillian Treadwill from McGill University, which was a scholarship

established by Ontario-based Ice River Springs. EREF and the OWMA will send a letter to Canadian academic institutions that highlights the importance of academic research institutions in facilitating credible research related to waste management and encouraging them to participate in these programs.

EREF and SWANA will jointly conduct data aggregation and similar applied research efforts of mutual interest, identify methods to fund these efforts, increase collaboration on educational efforts and create relationships and strategies that will allow for reciprocal awareness of both organizations. This partnership between EREF and SWANA (www.swana.org) will also allow the two organizations to work together on research that pertains to issues such as policy impacts, mitigation of risk (including safety or environmental), technical issues and improvement of operations/efficiency/bottom line. •

Three New Research Grants Awarded from Proposal Submissions in Early 2016

Assessing Accuracy of Tracer Dilution Measurements of Methane Emissions from Landfills with Wind Modeling

Investigators: University of Delaware and University of California, Berkeley
Award Amount: \$93,069

Waste Management Inc. and the US EPA employed the Tracer Dilution Method (TDM) over the last six years to measure CH₄ emissions at landfills with different climates, in different operational stages, and with or without landfill gas collection systems. In the tracer dilution method, an easily measured gas is released at a known flow rate at the landfill. Concentrations of that gas are quantified down wind of the landfill and correlated to methane concentrations emitted from the landfill. These data provide valuable insight into CH₄ emissions and represent a significant financial investment. The TDM, however, has not yet been verified with known emissions from an actual landfill. Further, there could be biases in TDM data, since data are typically collected during the day and require particular wind conditions. Thus, the accuracy of the Waste Management/US EPA data and how the data might be used to estimate annual CH₄ emissions at any given landfill remain unknown.

This work addresses these limitations by applying a land-atmosphere model to a southeastern US landfill where over 440 independent measurements were performed over three years. These measurements span seasonal climate variations at the site (making it the most well sampled site for whole landfill emissions in the US).

The main objectives of this research are to (1) develop a three dimensional land-atmosphere model for the southeastern US landfill, validating the model with observed tracer gas data in the field, (2) use this new model to simulate CH₄ emissions and estimate measurement error for prior daytime field measurement campaigns at this site, (3) use the model to estimate emissions at night and during periods when field measurements were not performed, and (4) from this modeling work assess the representativeness of CH₄ emission data from limited measurements for calculating year-round CH₄ emissions for any given landfill.

Mineralogy Optimization for Metal and Chloride Immobilization in Co-Disposed Flue Gas Desulfurization Brines and Bituminous Coal Fly Ash

Investigator: Georgia Institute of Technology
Award Amount: \$195,917

The United States coal-fired power industry faces increasing demands to improve coal fly ash (CFA) and flue gas desulfurization (FGD) wastewater disposal practices. The zero liquid discharge (ZLD) options for FGD wastewater are attractive but the residuals present new challenges for the solid waste industry due to significant concentrations of mobile heavy metals and chloride. The project investigators have developed a novel ZLD method by coupling FGD brines with a solidification/stabilization (S/S) process. This project aims to optimize the immobilization of heavy metals in disposed FGD brines and CFA.

The specific research objectives are to (1) optimize oxyanion immobilization in concentrated FGD brine S/S with CFA through a combination of chemical reduction and incorporation in cement minerals, (2) evaluate variables including temperature, pH, calcium oxide content, temperature, and reactive Al₂O₃ that promote chemical incorporation of oxyanions and Cl⁻ in the AFm phase, (3) evaluate the stability of immobilized oxyanions and Cl⁻ in short- and long-term leaching tests under varied conditions, and (4) optimize the impact of S/S solid mineralogy on oxyanion and Cl⁻ stabilization over the short- and long-term.

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NEXT PRE-PROPOSAL DEADLINE IS JANUARY 6, 2017

The next pre-proposal deadline for EREF Research Grants is January 6, 2017. Pre-proposals will be accepted starting from 15 days prior to the deadline date and up to the close of business (5:00 p.m. eastern time) on the deadline date.

Submissions are only accepted through the **EREF online system**. Please review the instructions carefully before preparing your submission. There are a number of topics that may require approval before a pre-proposal will be considered. These topics include, life-cycle/process models, evaluating the application of pyrolysis/gasification to manage niche/minor waste streams, development of gasification/pyrolysis and using algae to create biofuels from waste. Investigators who would like to propose a research topic where the primary objectives relate to one of these areas should contact EREF to discuss the topic prior to submitting a pre-proposal.

To do this, please e-mail a description of the proposed research (1-page or less) to proposals@erefndn.org that requests review of the concept. This request should be made 2 weeks or more in advance of any pre-proposal deadline.

EREF AWARDS 3 NEW RESEARCH GRANTS CONTINUED

Developing Strategies to Recover and Treat Nutrients in the Landfill Leachate

Investigator: University of Utah and University of Central Florida
Award Amount: \$141,704

The desire to recover useful resources, especially nutrients, from waste streams is continuously increasing. The existing leachate management paradigm considers leachate a challenging waste and this paradigm poses tremendous burden on landfill managers. Additionally, the practice to send leachate to municipal wastewater treatment plants (WWTPs) is not sustainable in terms of increasing the overall nitrogen and carbon loading on WWTPs. Treatment of WWTP anaerobic digester reject water (called centrate) is becoming very common in WWTPs. The idea that leachate can be combined with the anaerobic digester reject water at the treatment plant not only alleviates the problem of extra nitrogen and carbon loading but also provides a unique opportunity to recover useful resources such as nutrients and carbon.



This collaborative proposal is formulated around the theme of co-management of digester centrate and leachate to recover useful resources and treat the residues using innovative approach with following objectives (1) to determine the optimal conditions that result in maximum recovery of both nitrogen and phosphorus from the amalgamated anaerobic digester centrate and two types (i.e., normal and elevated temperature) of landfill leachates using direct chemical precipitation, (2) to characterize the recovered struvite to determine its fertilizer quality and check for the presence of other metals and hormones, (3) to initiate and operate high rate granular COD removal (Stage 1) and a single-stage PN/A (Stage 2) reactor to develop operational strategies for the treatment of residual liquid waste obtained after nutrient recovery, and (4) to conduct life cycle analysis (LCA) for the proposed nutrient recovery and treatment scheme. •

Coal Ash Management Forum

ON JULY 21 – 22, 2016,

EREF and the National Waste & Recycling Association (NWRA) held their inaugural Coal Ash Management Forum in Charlotte, North Carolina, with nearly 300 in attendance.

The forum, which was geared towards utilities, engineers, landfill and ash managers, as well as consultants and suppliers, provided an opportunity for the utilities and waste sectors to share ideas, research, operations strategies and case studies on how to manage coal ash beneficially or in a landfill setting.

KEY TOPICS INCLUDED:

- current research and management perspectives on coal combustion residuals
- geotechnical and other design considerations
- transportation considerations/onsite vs. offsite management
- hydrogen sulfide (H₂S) & odor management issues
- overview of coal generation/management
- leachate management
- ash basin closure technologies and moisture management
- case studies

Attendees included consultants, industry professionals, state/federal agency personnel from across the country, and faculty/students from local and out-of-state universities. Members of the press were present, representing the Greensboro News & Record and Time Warner Cable News.

Due to positive feedback and the ever-expanding and evolving nature of coal ash research, EREF is considering a follow-up conference within the next two years as research and technologies continue to develop.

The Coal Ash Management Forum was featured in the Greensboro News & Record. [View the article here.](#) •



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Record 12 Scholarships Awarded for 2016

THE EREF SCHOLARSHIP PROGRAM RECOGNIZES STUDENTS WITH ACADEMIC EXCELLENCE, PROFESSIONAL INVOLVEMENT AND AN INTEREST IN SOLID WASTE MANAGEMENT ISSUES AT THE DOCTORAL AND MASTER'S LEVELS.



Vinny Anderson
The Ohio State University, MS
Carl J. Apicella Scholar 2016

An Integrated Forward Osmosis-Membrane Distillation Membrane Process for Flue Gas Desulfurization Wastewater Treatment



Hongyue Jin
Purdue University, Ph.D.
EREF Scholar 2016

Value Recovery of Rare Earth Permanent Magnets: Economic and Environmental Impacts and Associated Pricing Strategy



Danni McPherron
Indiana University
Bloomington, MS
EREF Scholar 2016

A Growing Food Waste Problem: Bridging the gap between wasted resources and wasted food



Serena Pozza
Yale University, MS
GarbageMan's Invitational Master's Scholar 2016

How Closed-loop Production Systems Can Reduce Waste



Gomathy Radhakrishna Iyer
University of Texas at Arlington, Ph.D.
Evergreen Surety Bond Scholarship Scholar 2016

Development of Landfill Bio Covers from Yardwaste to Oxidize Methane Escaping Landfill



Amirhossein Rezaei Adaryani
University of North Carolina at Charlotte, Ph.D.
EREF Scholar 2016

Biodegradation of Contaminants of Emerging Concern by White-rot Fungi in Municipal Leachate



Syeed Md Iskander
Virginia Tech, Ph.D.
EREF Scholar 2016

An Integrated Leachate Treatment System for Removing Contaminants and Recovering Resources



Marija Krstic
The City College of New York, Ph.D.
EREF Scholar 2016

Recycled Glass as a Supplementary Cementitious Material in High Performance Concrete

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RECORD 12 SCHOLARSHIPS AWARDED FOR 2016 CONTINUED



Riley Coulthard
Yale University, Ph.D.
Fiessinger Doctoral Scholar 2016

Carbon Nanotube Enabled
Technology for Reclamation of
Rare Earth Elements from Coal
Combustion Residues



Shakira Hobbs
Clemson University, Ph.D.
EREF Scholar 2016

Strategic Sustainability Assessment
of Enhanced Aerobic and Anaerobic
Digestion of Food and Bioplastic
Waste for Municipalities



Caroline Larose
University of Michigan, MS
Robert P. Stearns/SCS Engineers
Master's Scholar 2016

Material Flows: Strategies to reduce
Ann Arbor's municipal solid waste
and improve diversion



Jillian Treadwell
McGill University, MS
Ice River Springs Master's
Scholarship for Sustainability
Scholar 2016

Driving Factors for Organic Waste
and Phosphorus Recycling: A
quantitative analysis and scenario
based model •

Three New Named Scholarships are Inspiring Lives through Education

NAMED SCHOLARSHIPS support the education of students that will become the next generation of waste industry professionals. The following three scholarships were recently established and awarded to 2016 EREF scholars.

Ice River Springs Master's Scholarship for Sustainability



Fully integrated from water source to the manufacturing of bottles, Ice River Springs is an Ontario-based company that makes bottles, caps and packages, and packages spring water, purified water and distilled water. The company strives to constantly innovate finding new ways to recycle, reduce energy consumption and minimize waste. Ice River Springs is the only beverage company in North America to operate a closed loop system that reclaims plastic from used containers and produces 100% recycled bottles along with filling and distribution.

"The Ice River Springs Master's Scholarship for Sustainability was created to promote recycling, reduce the amount of material being landfilled and decrease the carbon footprint by emphasizing plastics recycling," said Sandy Gott, Executive Vice President and CoOwner at Ice River Springs. "EREF funds the scientific research behind the technology that can make a true environmental impact, and this fits our corporate values."

The 2017 EREF Scholarship application deadline is May 3. For more information on the EREF Scholarship Program, please visit <https://erefdn.org/scholarship-program/>.

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ADDITIONAL NAMED SCHOLARSHIPS

Fiessinger Doctoral
Scholarship

Robert P. Stearns/
SCS Engineers Master's
Scholarship

Robert J. Riethmiller/
PTR Baler and Compactor
Master's Scholarship

Waste Industries
Scholarship Honoring
Lonnie C. Poole, Jr.

Carl J. Apicella
Scholarship

Reinhart Master's
Scholarship

EREF scholarships foster the promising futures of deserving and exceptional students. Through a scholarship commitment, donors have a lasting impact on today's students and the promise of their future careers, along with long-term research and development visions for the solid waste industry. For more information on EREF named scholarships, please send an e-mail to kpickurel@erefndn.org.

THREE NEW NAMED SCHOLARSHIPS ARE INSPIRING LIVES THROUGH EDUCATION CONTINUED

THE ELIGIBILITY REQUIREMENTS FOR THE ICE RIVER SPRINGS MASTER'S SCHOLARSHIP FOR SUSTAINABILITY ARE AS FOLLOWS:

- Master's students enrolled full-time
- Must be enrolled at a Canadian academic institution
- Area of research that relates to recycling, with preference given to applicants exploring the recyclability of plastics, plastic bottles and/or PET (polyethylene terephthalate) plastic

GarbageMan's Invitational Master's Scholarship

The GarbageMan's Invitational was founded in 2010 by Kerry Holmes (Vice President of Sales, Consolidated Fabricators), Mike Melideo (Owner, Consolidated Fabricators) and Ray Burke (Vice President, Clean Energy). These three men set out to create a unique annual networking event for their customers and prospects in the solid waste and recycling industry throughout the United States and Canada.



EREF Scholar Arlene Janousek joined EREF at the 2016 GarbageMan's Invitational

The sponsors of the GarbageMan's Invitational felt strongly that there should be an element of "giving back" to the industry. "As the leader in solid waste research and education, EREF was an easy choice as the charity to benefit from the event," said Kerry Holmes. "EREF, with its presence throughout North America, is well aligned with the GarbageMan's Invitational's goal to attract more industry leaders throughout the United States and Canada."

100% of any donations made to EREF through the GarbageMan's Invitational will fund graduate students pursuing excellence in solid waste management research and education.

Evergreen Surety Bond Scholarship

Founded specifically to serve the needs of the waste industry and contractors who need payment and performance bonds, Evergreen National Indemnity Company (Evergreen) has become an industry leader in surety bonds. Evergreen was one of the first firms to tackle the requirements of Subtitle D and is frequently called upon to give recommendations to regulators and rating agencies on surety issues. •

EREF Scholars – Where are They Now?



Kyle Bibby
Yale University, Ph.D.
EREF Scholar 2009

USING MOLECULAR TECHNIQUES TO DETERMINE THE FATE OF PATHOGENS (E.G. VIRUSES) IN LANDFILL LEACHATES AND SOURCE MATERIAL

Dr. Kyle Bibby is currently an Assistant Professor in the Department of Civil and Environmental Engineering at the University of Pittsburgh. His research group uses genomics tools to study microbiology to improve human health and environmental quality. Current research projects include investigating improved detection methods for viruses in the environment and treatment for wastewater from hydraulic fracturing, with current and previous funding from the National Science Foundation, Department of Energy, and the Alfred P. Sloan Foundation, among others. In addition to his research efforts, he teaches courses in Environmental Engineering Microbiology, Environmental Bioprocesses, and Introduction to Environmental Engineering. Dr. Bibby is a registered Professional Engineer in Illinois.

You can find Dr. Bibby on Twitter (@EnvEOmics) or on the web (bibbylab.blogspot.com).



Grace Schwartz
Duke University, Ph.D.
EREF Scholar 2012

A NEW HAZARD ASSESSMENT PROTOCOL FOR COAL COMBUSTION PRODUCTS

Grace is currently a Postdoctoral Fellow in the Microbial Ecology laboratory at the Smithsonian Environmental Research Center in Edgewater, Maryland. Her expertise is in trace element biogeochemistry, and at the Smithsonian she studies mercury biogeochemistry.

In particular, Grace is researching the use of activated carbon amendments as an in situ treatment method for remediating mercury-contaminated sites. Different environmental parameters, such as the amount of carbon and sulfide in the contaminated soil, can greatly impact how effective activated carbon is for mercury remediation. The overall goal of Grace's research is to determine what environmental parameters are most important for predicting activated carbon effectiveness and to develop a model predicting the efficacy of activated carbon for mercury remediation across ecosystems. •



"EREF was key in helping fund my Ph.D. research on coal combustion product disposal. With new federal and state regulations for coal ash disposal being announced in the last year, I feel that my research has made a real impact in informing policy decisions, and I thank EREF for supporting my work. I also feel that EREF enriched my graduate school experience by introducing and exposing me to the industrial side of solid waste management. I now have a broadened perspective of the considerations that companies face in managing solid waste, which is helpful in my current collaborations with industrial sponsors."
Grace Schwartz

New Staff & Interns



Stephanie Bolyard
Research and Scholarship
Program Manager

Dr. Stephanie C. Bolyard joined EREF in April as the Research and Scholarships Program Manager. Stephanie has a Ph.D. and M.S. in Environmental Engineering from the University of Central Florida (UCF), as well as a BS in Chemistry from the University of Florida. Stephanie's research expertise includes solid waste management, analytical chemistry, advance spectroscopic techniques, biological and advanced oxidation processes, domestic wastewater treatment and nanotechnology. Stephanie worked for Brown and Caldwell and the Florida Department of Environmental Protection prior to starting her graduate studies. Collectively, she has eight years of academic and professional experience in various fields, including domestic wastewater permitting, environmental compliance and solid waste management. Stephanie has held numerous leadership roles in the Association of Environmental Engineering and Science Professors, International Waste Working Group, American Academy of Environmental Engineers and Scientists and the Water Environment Federation, and in her spare time she enjoys cooking, baking, traveling and running.



Catherine Ardoin
Communications Coordinator

Catherine Ardoin joined EREF in February as Communications Coordinator, a role which is responsible for executing all communications supporting brand awareness, programs, partnerships, fundraising and marketing campaigns. Catherine graduated Magna Cum Laude from Campbell University in 2014 with a Bachelor of Arts in Communication Studies that included focuses in public relations, health communication and broadcasting. Prior to joining the EREF team, she served as a Social Media Coordinator for a North Carolina-based author. Outside of the office, Catherine enjoys reading, attending concerts, cooking and visiting the beach as much as possible.



Jennifer Gloc
Executive Assistant to the CEO
& Events Manager

Jennifer Gloc joined EREF in October as the Executive Assistant to the CEO and Events Manager. The responsibilities of this position include event planning and logistics, webinar production, maintaining continuing education accreditation and general office and CEO support. She brings to the role more than ten years of experience in non-profit project and event management.

Jennifer grew up in New England and received her BA in Communications from the University of Hartford before moving to North Carolina. She lives in Durham with her husband Andrew and their 6 ½ year old son David. She loves live music, animals and, thanks to the two leading men in her life, all things Star Wars.



Jessica Citrola
Research Intern

Jessica Citrola is a senior at North Carolina State University majoring in Environmental Sciences with a focus in Environmental Policy and Economics. She became interested in the importance of environmental protection at an early age. Living abroad in Taiwan and backpacking during college exposed her to many different aspects of global environmental issues and policies. Her experience abroad, her college career and interning at EREF has inspired Jessica to pursue a career with a government agency or an environmental research company that works with international environmental issues and policy.

At EREF, she primarily works on EREF's School Cafeteria Discards Assessment Project, a program which aims to quantify food waste and other related wastes generated by K-12 schools nationally. Jessica enjoys the opportunity to work with other talented interns on this project, which explores an increasingly concerning environmental and economic issue.

NEW STAFF & INTERNS CONTINUED



Caroline LaFave
Research Intern

Caroline LaFave joined EREF in May 2016 and currently attends North Carolina State University, studying Environmental Engineering with minors in Spanish Language and Business Management. She became interested in environmental engineering during her senior year of high school after a service trip to Panama where she spent a week teaching the people of Piriati Embera

about sustainable farming methods and safe waste management practices. This motivated her to discover what happens to waste in the U.S., and how this material is managed for a large population.

Her current work at EREF involves determining the extent of available data of landfill leachate quality and treatment strategies; ascertaining the state of practice of leachate generation, treatment, and management across the U.S.; and gaining an understanding of the relative fate and importance of emerging contaminants in leachate and other routes of transport.

She credits her work at EREF with directly connecting her with the recent issues and areas of study within the field of solid waste, both domestically and globally, as well as with other students and professionals who share the same interests. After graduating in December 2016, she hopes to continue her work towards a more sustainable and environmentally friendly future within the field of solid waste management.



Evan Houser
Research Intern

Evan Houser began his EREF internship in April 2016 and is currently a senior Environmental Engineering major at North Carolina State University. He chose his field based on how unique it felt and how crucial scientific research and finding sustainable practices are to the future and living a healthy life.

He is working on the School Cafeteria Discards Assessment Project, a research project which measures the composition of waste generated at K – 12 schools across the United States. With his fellow interns, he developed a large database of schools as potential candidates for data measurement, and determined the best approach for conducting a waste composition analysis without having to travel to each school.

He views EREF's smaller size as an opportunity to build relationships with all levels of staff and feels encouraged to ask questions that allow him to grow in his field.

In his spare time, Evan enjoys disc golf, traveling and going to theme parks.

EREF STAFF

Bryan Staley
President & CEO

Kristy Pickurel
VP, Development & Communications

Stephanie Hollomon
Administrative Director

Jennifer Gloc
Executive Assistant to the CEO & Events Manager

Stephanie Bolyard
Research & Scholarship Program Manager

Debra Kantner
Data & Policy Program Manager

Catherine Ardoin
Communications Coordinator

Interns

Brianna Holland
Heather Troutman
James Wallace
Jessica Citrola
Caroline LaFave
Evan Houser
John Mullan
Britney Callahan

NEW STAFF & INTERNS CONTINUED



John Mullan
Research Intern

John Mullan, who began interning with EREF in April 2016, is a rising junior at UNC Chapel Hill double majoring in Mathematical Decision Sciences and Environmental Studies with a minor in Information Systems. Having always been interested

in the way humans interact with the environment, he chose his field after learning how the power of data and research could allow him to apply that interest to better the environment.

He intends to pursue a career in data analytics or operations research with a focus on making processes (organizational, production, etc) more efficient, meaning they require less energy and inputs, to benefit the environment.

John works with fellow EREF interns on the School Cafeteria Discards Assessment Project to collect and organize data, conduct sustainability research, and perform analysis. John considers his EREF internship experience to be second-to-none. Not only does it provide hands-on opportunities, but the work helps to better our environment, our communities, and the solid waste industry. When he's not working, he enjoys hunting, reading, and playing basketball. •

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