RICH EARTH INSTITUTE

10th Annual Rich Earth Summit

AGENDA

November 12 - 14, 2024

Hybrid*: Virtual (Zoom) & In-Person (Brattleboro, VT, US)

**All sessions are fully accessible for both virtual and in-person participants unless denoted otherwise.*

Tuesday, November 12, 2024

Time (EST)	Description	Session Type
8:45 - 9:00	**Summit Gathering** ▹ **In-person:** *Coffee & mingling* ▹ **Virtual:** *Live, virtual bulletin board for sharing announcements, upcoming events, etc.*	
9:00 - 9:15	**Summit Welcome & Opening Remarks** *Rich Earth Institute*	
9:15 - 10:15	**To Have Excretory Justice, We Have to Deal With Our Crap** *Sarah Nahar, M.Div, Syracuse University (New York, US)*	**Keynote**
10:15 - 11:35	**Dynamics of Creating Circular Systems: Design, Drivers, and Impacts** ▹ **A Decade of Innovation: EOOS' Journey in Designing Urine-Separating Interfaces and Future Developments** - *Lotte Kristoferitsch, EOOS / Social Design (Austria)* ▹ **An Earth-centred governance lens for nutrient circularity in the food system** - *Jordan Roods, Institute for Sustainable Futures, University of Technology Sydney (Australia)* ▹ **Contaminant risks in an agricultural-sanitation circular economy** - *Laura Carter, University of Leeds (United Kingdom)* ▹ **Estimating environmental and societal impacts from scaling up urine concentration technologies** - *Matilda Gunnarsson, Stockholm Environment Institute (Sweden)* ▹ **Modeling US Economic & Environmental Drivers** - *Nolan Grant, University of Vermont/Brightwater Tools (Vermont, US)* ▹ **Driver, Strategy and Technology Factsheets for Urine Diversion & Resource Recovery** - Rosanne Wielemaker, Eawag (Switzerland)	**Panel: Presentations & Discussion**
11:35 - 11:45	**Break**	
11:45 - 12:05	**Urine Processing Treatment Technologies: State of the Field** *Kai Udert, Swiss Federal Institute of Aquatic Science and Technology (Switzerland)*	**Introductory Presentation**
12:05 - 1:10	**Container Based Systems: Climate Resilience at the Intersection of Resource Recovery & Sanitation Justice**	**Panel: Presentations & Discussion**

	▹ **Obstacles and Opportunities for Disrupting Flush Toilets: three case studies from Uganda and the USA** - *Ryan Smith and Alisa Keesey, Give Love (California, US)* ▹ **Mosan: Urine Collection & Processing Overview** - Raluca Anisie, Mosan (Guatemala) ▹ **Next Generation Sanitation: A New Way** - Birger Lundgren, Sanitation Ambassadors (South Africa) ▹ **Nutriente recovery and reuse** - Aguatuya, Lourdes Valenzuela (Bolivia) ▹ **The Effluent Diversion Unit** - Bara Wahbeh, AKYAS environmental consultancy (United Arab Emirates)	**Implementation**
1:10 - 2:00	**Lunch** ▹ **In-person:** *Catering provided* ▹ **Virtual:** *Informal breakout sessions hosted for continued conversation; live virtual bulletin board shared*	
2:00 - 3:00 **CONCURRENT SESSIONS**	**Exploring Design Principles for Equity & Justice in Urine Reclamation** **Marisa Manheim, Julia Dorr (University of Buffalo); Hayley Joyell Smith (PHLUSH); Tatiana Schreiber, Julia Cavicchi, Jamina Shupack (Rich Earth Institute)** This interactive session will delve into urine separation design principles that emerged from a co-design workshop. In breakout discussions, participants will reflect on their own work and experiences, sharing stories that reveal both the challenges and opportunities of applying these principles. By addressing the tensions between aspirations and real-world constraints, attendees will offer insights that help refine the principles, ensuring their practical relevance across diverse contexts.	**Interactive Session**
2:00 - 3:00 **CONCURRENT SESSIONS**	**Advances in Treatment Technologies (Part 1): Resource Recovery and Contaminant Removal** ▹ **P in our Pee: Advancing Phosphorus Recovery from Fresh and Hydrolyzing Urine** - *Lucas Crane, Arizona State University, NSF Science and Technologies for Phosphorus Sustainability (STEPS) Center (Arizona, US)* ▹ **Effect of hydraulic retention time on urine nitrification in pilot-scale activated carbon incorporated membrane bioreactor and application on hydroponics** - *Weonjung Sohn, University of Technology Sydney (Australia)* ▹ **Biochar-based nutrient recovery for a circular bionutrient economy** - Lucinda Li, Cornell University (New York, US) ▹ **PFAS and Pharmaceutical Removal from Urine by Biochar** - *Zhenyu Xia, University of Michigan (Michigan, US)*	**Panel: Presentations & Discussion** **Technical**

3:00 - 3:30	**Day 1 Closing Session** Summit attendees reconvene together for a facilitated sharing session. Participants from the co-creation session will present the design principles emerging from that workshop. Participants from the technical session will share brief summaries of the treatment technologies explored, key takeaways, and outstanding questions. We'll then explore the intersections between these areas, fostering a collaborative discussion, and setting the stage for Day 2.	**Interactive Session**
3:30 - 4:00	**Seeding Connections** ▹ **Virtual:** *Randomly generated virtual breakout rooms open for virtual Summit participants to meet each other, connect, and have informal conversations.* ▹ **In-person:** *Mingling over light refreshments* ● ***Explore Wasted*'s VIPee Trailer on-site***	**Interactive Session**
6:30 - 7:30	**Dinner** ▹ **In-person:** *In-person Summit attendees are invited to dine together in Brattleboro*	**In-person**

Wednesday, November 13, 2024

Time (EST)	Title	Session Type
8:45 - 9:00	**Summit Gathering** ▹ **In-person:** *Coffee & mingling* ▹ **Virtual:** *Live, virtual bulletin board for sharing announcements, upcoming events, etc.*	
9:00 - 9:15	**Grounding Activity for Summit Day 2**	**Interactive Session**
9:15 - 10:45	**Implementation Projects: Nutrient Cycling for Clean Waters & Fertile Farms** ▹ **Green Center Cubie-Based Urine Diversion Pilot Study -** *Earle Barnhart & Hilda Maingay, Green Center Inc (Massachusetts, US)* ▹ **What's up with Urine Diversion on Cape Cod** - *Bryan Horsley, Barnstable County Department of Health and Environment - MASSTC (Massachusetts, US)* ▹ **The nutrient cycle in a community-supported agriculture (CSA) in the Paris region** - *Louise Raguet, OCAPI Research program (France)* ▹ **Decentralized Implementation of the Pitribon System in Housing Cooperatives -** *Marius Klinger, Aneco (Switzerland)* ▹ **Urine to Fertilizer in Burlington, VT: Process and Characterization -** *Benson Colella, Wasted *PBC (Vermont, US)* ▹ **How 'Wee' can fix the UK -** *Hannah Vandenbergh, NPK Recovery (United Kingdom)* ▹ **Urine nitrification in Switzerland and Europe, updates from**	**Panel: Presentations & Discussion** **Implementation**

	VunaNexus - *Nadège de Chambrier, VunaNexus, Switzerland* ▷ **Onsite urine treatment for public toilets: preparing a pilot implementation with the city of Zurich -** *David Hasler, EAWAG (Switzerland)*	
10:45 - 11:25	**Challenges & Opportunities for Scaling Urine Reclamation with Sanitation Service Providers** **Facilitator: Sarah Nahar, Syracuse University** **Speakers: Rémi Kaupp (Executive Director, Container-Based Sanitation Alliance), Kai Udert (EAWAG), Raluca Anisie (Mosan)** This panel will facilitate knowledge sharing between urine recycling experts and container based sanitation practitioners. In this roundtable discussion, Rémi Kaupp (Executive Director, Container-Based Sanitation Alliance) will share perspectives from member organizations on key challenges for integrating urine reclamation into programs providing sanitation access from members of the CBSA. We will then facilitate discussion about opportunities for addressing these challenges--with the goal of supporting collaborative problem-solving and deepening our understanding of the dynamics at play. Summit attendees with direct experience on this topic will also be invited to share their perspectives during this time.	**Roundtable discussion** **Implementation**
11:25 -11:35	**Break**	
11:35 - 11:55	**Launching a Farmer Guide to Using Urine Fertilizer** - *Rich Earth Institute (Vermont, US)* The Rich Earth Institute will present its new *Farmer Guide to Fertilizing with Urine*, covering key topics from the guide, including urine nutrient content, application methods, crop-specific experiences, and perspectives on communication. The guide summarizes Rich Earth's 12 years of research with farmer-partners in Southern Vermont, along with insights from the global research community.	**Introductory Presentation**
11:55 - 12:55	**Urine Fertilizer in Agriculture (Part 1): Nutrient Cycling for Climate-Resilient Food Systems** ▷ **Putting the P(ee) in Perennial Agriculture** - *Madeline DuBois, The Land Institute (Kansas, United States)* ▷ **Using Urine as alternative fertilizer in Nigeria south East zone** - *Sr. Stella Ewa ISMV, Life Giver Foundation (Nigeria)* ▷ **From Waste to Resource: Using Human Urine as Fertilizer for Sustainable Corn Production** - *Florent Brun, Programme OCAPI - Leesu - Ecole des Ponts Paris Tech (France)* ▷ **Innovative Nutrient Recycling: Enhancing Fish Production in Africa Using Animal and Human Urine** - *Dr. Isa Olalekan Elegbede, Lasu (Nigeria)* ▷ **Urine applicator for small vegetable farms** - *Loïc Déchaseaux LEESU / OCAPI (France)*	**Panel: Presentations & Discussion** **Agriculture**

12:55 - 1:55	**Lunch** ▹ **In-person:** *Catering provided* ▹ **Virtual:** *Informal breakout sessions hosted for continued conversation, live virtual bulletin board*	
1:55 - 3:00 **CONCURRENT SESSIONS**	**Fertile Futures: Student Explorations with Urine Reclamation** **Moderator: Hayley Joyell Smith, PHLUSH** ▹ **Transdisciplinary approaches to sustainable decentralized wastewater treatment and resource recovery in Monteverde, Costa Rica** - *Kevin Orner, West Virginia University (West Virginia, US)* ▹ **"Pee Lab": Experiments with Urine Fertilizer at Putney School** - *Abby Verney-Fink, Putney School (Vermont, US)* ▹ **Spreading the Word on Cape Cod's Golden Opportunity: Making Education on Urine Diversion More Accessible** - *Maura Whalen, Maggie Mu (Wellesley College), Jane Ward (Massachusetts, US)* ▹ **A Simple Peecycling Lesson Plan** - *Julia Cavicchi, Rich Earth Institute (Vermont, US)*	**Panel: Presentations & Discussion**
1:55 - 3:00 **CONCURRENT SESSIONS**	**Urine Fertilizer in Agriculture (Part 2): Optimizing Nutrient Recovery and Soil Carbon Sequestration with Biochar** ▹ **Functional Group Analysis for Screening Biochars for Total Ammonium Nitrogen Recovery from Hydrolyzed Urine** - *Soliver Fusi, University of California, Berkeley (Kenya)* ▹ **Assessing the impact of human urine fertilization on soil nutrient dynamics and bacterial communities** - *Manon Rumeau, University of Birmingham (United Kingdom)* ▹ **Nitrogen and Phosphorus Mineralization Dynamics of Human-Excreta Derived Fertilizers** - *Elena Bischak, California Association of Resource Conservation Districts, (California, US)* ▹ **The potential of urine-enriched human feces biochar for maize production in the Guatemalan highlands** - *Raluca Anisie, Mosan (Guatemala)* ▹ **Urine-powered composting of cereal residues rivals mineral soil in crop yield with biochar benefits** - *Krisztina Mosdossy, Cornell University (New York, US)*	**Panel: Presentations & Discussion** **Agriculture**
4:00 - 5:00	**Research Center Open House -** *Rich Earth Institute* T*he Open House is free to the public and will feature:* • *Updates about Rich Earth Institute's ongoing social, technological, and agricultural research projects* • *Tours of Rich Earth's urine fertilizer processing facility* • *Q & A with the Brightwater Tools team (a spin-off of Rich Earth) about their technologies for regenerative sanitation* • *Light refreshments (including harvests from Rich Earth's demonstration garden)*	**In-person** **Free, open to the public**
6:30 - 7:30	**Dinner**	**In-person**

	▹ **In-person:** In-person Summit attendees are invited to dine together in Brattleboro	

Thursday, November 14, 2024

Time (EST)	Title	Session Type
8:45 - 9:00	**Summit Gathering** ▹ **In-person:** *Coffee & mingling* ▹ **Virtual:** *Live, virtual bulletin board for sharing announcements, upcoming events, etc.*	
9:00 - 9:10	**Grounding Activity for Summit Day 3**	
9:10 - 10:20	**Advances in Treatment Technologies (Part 2): Nitrogen Retention and Microbial Dynamics** ▹ **An Introduction and Evaluation of Ammonium Recovery from Urine using Ion Exchange -** *Camille Brule and Kara Nelson, UC Berkeley (California, US)* ▹ **Microbial Succession of Human Feces in Self-Contained Composting Toilets** - *Jeff Meilander, Northern Arizona University (Arizona, US)* ▹ **Method validation, detection and quantification during assessing fate of selected antimicrobials through struvite making from source separated human urine by liquid chromatography-tandem mass spectrometry** - *Nebiyat Nigusie Woldeyohannis, Addis Ababa University (Ethiopia)* ▹ **Evaluation of membrane fouling during dewatering and nutrients concentration from fresh urine by Forward Osmosis** - *Maano Tshimange, University of Surrey (United Kingdom)* ▹ **Circular fertiliser production by solar-thermal driven passive drying of acid- and base-stabilised fresh human urine** - *Charles Buregeya Niwagaba, Sustainable Sanitation and Water Renewal Systems (Uganda)*	**Panel: Presentations & Discussion**
10:20 - 10:30	**Break**	
10:30 - 10:50	**Orientation to the Nutrient Cycling Regulation Landscape** *Mathew Lippincott, University of Michigan (Michigan, US)*	**Introductory Presentation**
10:50 - 11:50	**State-to-State Peer Exchange, National Progress, and Global Collaboration: Navigating Regulatory Pathways and Creating New Standards**	**Roundtable Discussion**
11:50 - 12:40	**Lunch** ▹ **In-person:** *Catering provided* ▹ **Virtual:** *Informal breakout sessions hosted for continued conversation; live virtual bulletin board*	

12:40 - 1:40	**Virtual Tours: Processing Facilities** ▷ **Distributed Source Separation at Noorderhoek** - *Sybrand Metz, Desah (Netherlands)* ▷ **Pee-recycling in Sweden with SLU & Sanitation360 -** *Nicola Parfitt, Sanitation360 (Sweden)* ▷ **How recycling our waste can change the environmental climate** - *Niko Bogianzidis, öKlo GmbH (Austria)* ▷ **YouGo Gardening Tour** - *Rebecca Nelson, Cornell University (New York, US)*	**Virtual Screening** **Implementation**
1:40 - 2:40	**Strategies for Knowledge Sharing & Communication** *This session will explore strategies to collaborate, share ideas, and stay connected both between and beyond organizations working to advance urine reclamation systems. Michel Reichmann will present* ***Insights from the Connect the Networks Congress for Resource-Oriented Sanitation****, followed by discussion on this topic in breakout rooms.*	**Roundtable Discussion**
2:40 - 3:30	**Themed Breakout Discussions** ▷ **Virtual: Themed Breakout Discussions** *Participants are invited to join randomly generated breakout rooms to informally connect.* ▷ **In-person: Mobile Unit Brainstorm & Feedback Session** **Marisa Manheim, Julia Dorr (University of Buffalo); Hayley Joyell Smith (PHLUSH); Tatiana Schreiber, Julia Cavicchi, Jamina Shupack (Rich Earth Institute)** *In an interactive workshop, participants will create plans for a source separation educational mobile unit, generating ideas around how a mobile unit can be utilized to foster urine diversion implementation in the US. Small group discussions will focus on public education and social research; unit design features; and training opportunities for key stakeholders necessary for the scaling of urine reclamation systems.*	**Interactive Session**
3:30 - 4:00	**Summit Closing** ▷ **Final reflections and take-aways from the Summit** ▷ **Opportunities for further engagement, upcoming events** ▷ **Golden Funnel Award Ceremony**	

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