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ABOUT
RISN

RISN advances integrated resource management through a global network of public and private partners using collaboration, research, innovation and application of technologies to create economic value, driving a sustainable circular economy.

The story of Resource Innovation and Solutions Network began with a partnership between a forward-thinking city with ambitious waste diversion goals and an innovative university that values applied research for the greater good. Phoenix's leadership envisioned a future where the environment, its residents and its economy all thrive through the intelligent management of resources and the establishment of an Ethical Circular Economy - but they knew this vision could not be realized alone.

Together, the RISN partnership between the City of Phoenix and Arizona State University created a dynamic global network - with Phoenix at its center - that has grown to encompass the entire Phoenix region, with additional partnership opportunities around the globe. Networks succeed because they accelerate the accumulation and dissemination of knowledge and best practices at a speed that would be impossible for a single entity. In effect, with a network, the whole is greater than the sum of its parts.

The accomplishments cited in this report would not have been possible without collaboration. A diverse group of partners, from communities to tribes to non-profits and corporations, have been part of this growing story. 2017 projects range from a local/regional Green Organics System Design project to global training for an Ethical Circular Economy certificate; from outreach through speaking engagements at the Ellen MacArthur Foundation's Disruptive Innovation Festival to a call for participants in the RISN Incubator.

In recent years, cities have taken on a leadership role in addressing the world's most urgent challenges. As Steve Jobs said, "Innovation distinguishes between a leader and a follower." Phoenix has landed squarely in a position of global sustainability leadership through the innovation and collaboration that are the cornerstones of the RISN partnership.
HIGHLIGHTS from the YEAR

The original concept of RISN was that it would be a virtual knowledge network. In 2017 RISN has repositioned to raise the bar and establish a real world network of public and private partners that delivers on our mission to create innovative solutions on local, national and global scales.

Accomplishments:

» Awarded the Economic Development Administration (EDA) i6 Challenge Grant for $500,000

» Launched the RISN Incubator and the first Call for Innovators to encourage and develop entrepreneurial organizations and jobs in the Phoenix area

» Delivered the Ethical Circular Economy Certificate Training in Arizona, Washington, D.C. and Lagos, Nigeria (FY2016), raising the profile of RISN internationally

» Created Economic Impact Reports that showed the maximum gross economic impact of circular economy firms and activities in Maricopa County is estimated at $1.9 billion Gross State Product

» Developed collaborative networks within Phoenix city government through projects such as Compost Application on Multi-Use Turf in City Parks, Reclaimed Asphalt Pavement and Greenhouse Gas Emissions Inventory

» Delivered a Regional Green Organics System Design that was a collaboration with nine cities, counties, tribes and organizations to provide a regional solution to green organics waste
Reclaimed Asphalt Pavement Project (RAP)
December 12, 2016-August 31, 2017

OVERVIEW: The purpose of the RAP project is to conduct research and testing related to the reclamation and reuse of asphalt pavement in City of Phoenix pavement projects. This project is currently in the laboratory testing phase. The research team is testing three types of pavement: binder, virgin aggregate and reclaimed asphalt to establish engineering properties and create a new mix design.

RESULTS: Preliminary results indicate that the mix is feasible and a Pilot Phase II could potentially be recommended.

DIVERSION IMPACT: If implemented, we will incorporate RAP into new mixes on future pavement projects in the City of Phoenix that will lead to less need for virgin binder and aggregate. No current diversion impact.

BENEFITS: Cross-department collaboration.

Phoenix Staff: Peter Rupal, City of Phoenix
ASU Faculty: Kamil Kaloush, Shane Underwood
ASU Global Sustainability Solutions Services Staff: Stratis Giannakouros, Project Manager; Marta Hulley Friedman, Director; Jessica Groeneveld, Program Coordinator
ASU Students: Gonzalo Zelada Arredondo, Graduate Research Assistant; Phani Sasank Kaligotia, Graduate Student; Padmini Priyandarsini, Post Doctoral Researcher
Compost Application on Multi-Use Turf in City Parks Study—Year 2
September 1, 2016-August 30, 2017

OVERVIEW: 2017 is the second year of a three-year project designed to study the economic, environmental and operational impacts of applying municipally-generated compost on multi-use turf in city parks. For this study, compost is being applied at plots of turf at six city parks and three plots of turf in downtown Phoenix near City Hall and the City Council Chambers. Each park included in the study contains one or two study zones and a control zone where traditional turf management practices will be continued. Compost is applied to the study zones one or two times per year and to the downtown plots two times per year. The goals of year two are to continue the study from year one on the impact that the compost has on the soil, identify the volume of compost that will be needed at each of the parks and begin a Cost Benefit Analysis Decision Support tool that identifies the economic and environmental cost differential of moving toward managing the parks’ multi-use turf using compost as opposed to current non-organic methods.

RESULTS: Initial results indicate that compost is beginning to have a positive effect on the soil, increasing the levels of many macro and micronutrients at a rate higher or equivalent to that of the chemical fertilizer.

DIVERSION IMPACT: Provides offtake for diverted material. No direct diversion impact.

BENEFITS: The Parks Turf Study is a step toward solidifying the position of the City of Phoenix as a sustainability leader and a pioneer in the circular economy. Cross department collaboration.

Phoenix Staff: Chuck Hamstra, Deputy Director, Public Works; Stacy Hettmansperger, Operations Manager, Public Works; Larry Polk, Special Operations Supervisor, Parks and Recreation

ASU Faculty: Rebecca Ball; Beth Polidoro

ASU Global Sustainability Solutions Services Staff: William Campbell, Senior Project Manager; Marta Hulley Friedman, Director; Jessica Groeneveld, Program Coordinator

ASU Students: Vatika Vardhan Chauraisia, Graduate Student; Iraj Khadka, Undergraduate Student; Coby Teal, Graduate Student; Karishma Thakkar, Graduate Student
Economic Impact Report Phase I
March 2016- October 2016

OVERVIEW: The purpose of this report was to estimate the maximum gross impact of circular economy activities in Maricopa County in 2014, which extended beyond recycling to also take into account repair and maintenance activities and reuse activities.

RESULTS:
» The maximum gross economic impact of circular economy firms and activities in 2014 is estimated at $1.9 billion Gross State Product (GSP); 35,454 jobs paying over $1.2 billion in labor income; and $158.5 million in state and local tax revenues.

» The maximum gross economic impact of recycling in Maricopa County in 2014 is estimated at almost $874 million GSP; 9,610 jobs paying over $560 million in labor.

BENEFITS: The economic impact study presented an immense opportunity to further investigate how specific waste streams might impact the city economically with its circular economy efforts; specifically plastics, paper, glass and metal.

Phoenix Staff: Ginger Spencer, Director, Public Works; Brandie Barrett, Deputy Director, Public Works

Project Partners: Anthony Evans, Sr. Research Fellow; L William Seidman Research Institute, W.P. Carey School of Business

ASU Global Sustainability Solutions Services Staff: Mara DeFilippis, Engagement Manager; Raj Buch, Practice Lead; Marta Hulley Friedman, Director; Jessica Groenveld, Project Coordinator
Economic Impact Report Phase II
November 7, 2016-July 17, 2017

OVERVIEW: The primary objective of the Economic Impact Report II is to identify and quantify the economic impact of waste diversion options for the currently recycled and additional recoverable tons of plastic, glass, metals and paper in the City of Phoenix municipal waste stream.

PROJECT STATUS: The report draft for this project is under review.

RESULTS: Recommendations regarding economic development strategies, investments and expected outcomes for plastic, glass, metals and paper waste streams.

DIVERSION IMPACT: Quantifies potential diversion in terms of economic development through locally processing and manufacturing of waste streams by way of business attraction and/or expansion.

BENEFITS: The economic impact study presented an immense opportunity to make a positive economic impact on the city through its circular economy efforts; specifically those involving plastics, paper, glass and metal.

Phoenix Staff: Ginger Spencer, Director, Public Works; Brandie Barrett, Deputy Director, Public Works

Project Partners: Anthony Evans, Sr. Research Fellow; L William Seidman Research Institute, W.P. Carey School of Business

ASU Global Sustainability Solutions Services Staff: Mara DeFilippis, Engagement Manager; Raj Buch, Practice Lead; Marta Hulley Friedman, Director; Jessica Groenveld, Project Coordinator
OVERVIEW: This report revealed the largest contributors to Phoenix's GHG emissions and identified areas where city efforts have made the largest impact. Tracking emissions over time will allow Phoenix to evaluate the effectiveness of its emissions reduction policies and programs. Furthermore, the inventory provides a platform for Phoenix to develop best practices for reducing its carbon footprint.

RESULTS:
- 2012 total Greenhouse Gas Emissions in Phoenix were 16,148,539 metric tons of CO₂ equivalent*.
- Total per capita emissions were eleven metric tons of CO₂ equivalent for Phoenix.
- The transportation sector is the largest source for emissions, responsible for 56% of total emissions in Phoenix.

DIVERSION IMPACT: No waste diversion impacts were directly investigated.

BENEFITS: Provides comprehensive information for decision-making around the City of Phoenix’s greenhouse gas emissions reduction goals. By reducing greenhouse gas emissions, the City will help to reduce the incidence of health problems from particulate matter (PM) in these emissions and help to mitigate climate change.

Phoenix Staff: Joe Giudice, Environmental Programs Manager, City of Phoenix; Joe Gibbs, Environmental Quality Specialist, City of Phoenix

ASU Global Sustainability Solutions Services Staff: Raj Buch, Practice Lead; Richard Rushforth, Project Manager; Marta Hulley Friedman, Director; Jessica Groenveld, Project Coordinator

ASU Students: Kyrie Hooten, Graduate Student, School of Sustainability

*CO₂ equivalent or carbon dioxide equivalent, is a standard unit for measuring carbon footprints. The idea is to express the impact of each different greenhouse gas in terms of the amount of CO₂ that would create the same amount of warming.
**Green Organics System Analysis and Design**  
*July 1, 2015- September 1, 2016*

**OVERVIEW:** The Green Organics System Analysis and Design Project was primarily designed and developed during FY15-16. However, the final report and presentation were delivered in FY16-17.

This project, collaboratively funded by six municipalities, two counties and a Native American tribe, assessed the feasibility of a regional approach to building an organics management system. In support of this, the Regional Circular Organic Resource System Design Model (RCORS) was developed. RCORS could simulate and visualize viable collection alternatives and the financial requirements for the organics processing technology that could support cost-effective collections for the municipalities and financial viability for an organic processing facility. The results, outlined in this report, identify plausible pathways to achieving an envisioned 2050 scenario of a regional, multi-site organics processing system that diverts organic waste in the Phoenix Metropolitan Area from landfills.

**RESULTS:** Several key conclusions can be reached from this study. The first and most important finding is that the regional approach is viable and that collaborations can result in processing facilities that are financially more resilient. A related finding is that collaborations will be based on location-specific requirements. Finally, the public sector has a longer view of capital investment and resource stewardship and is more likely to implement such an organics recovery programs.

**DIVERSION IMPACT:** This report presented a pathway for the potential of diverting 400,000 tons of organics waste.

**BENEFITS:** In this three-phase scenario, eleven organic waste processing facility sites could be implemented by 2050 with a total annual organic diversion across the three phases of 400,000 tons resulting in the diversion of 56% of green organics for the participating municipalities.

Project Stakeholders: Scott Bouchie, City of Mesa; Patrick Murphy, City of Mesa; Stuart Kent, City of Peoria; Chuck Hamstra, City of Phoenix; Ginger Spencer, City of Phoenix; Gabriel Fragoso, City of Scottsdale; Frank Moreno, City of Scottsdale; Tony Miano, City of Tempe; Steven Pietrzkowsky, City of Tempe; Frank Schinzel, Maricopa County Air Quality Department; Louis Anderson, Pinal County; Jason Jordan, Pinal County; Joe Ramirez, Pinal County; Richard Allen, Salt River Landfill; Brad Frisk, Town of Gilbert; Ramona Simpson, Town of Queen Creek

ASU Faculty: Paul Coseo; Nicole Darnall, Nathan Parker; Tom Seager; David Swindell; Emily Vaiu

ASU Staff: Global Sustainability Solutions Service: Raj Buch, Practice Lead; William Campbell, Senior Project Manager; Mara DeFilippis, Engagement Manager; Marta Hulley Friedman, Director; Jessica Groeneveld, Program Coordinator; Dan O’Neill, General Manager; Kristen Osgood, Project Manager University Sustainability Practices: Corey Hawkey, Sustainability Program Manager Decision Theater: Sri Kandala, Senior Research Analyst; Rahul Salla, Director of Software Development

ASU Students: Achal Dalal, Graduate Student; Dylan George-Sills, Graduate Student; Natalie Melkonoff, Graduate Student; Siddhanth Paralkar, Graduate Student; Samantha Rhea, Graduate Student
2017 Sustainability Solutions Festival
February 2017

OVERVIEW: Throughout the month of February, the 2017 Sustainability Solutions Festival challenged participants to (re)imagine the planet as our home through 17 separate events, focused on diverse audiences. These included GreenBiz 17, Second Nature Presidents Climate Commitment, Global Reporting Initiative and the World Business Council for Sustainable Development conference. Public events included ASU's Night of the Open Door, City Lights Movie Nights Film Screening and Family Day at Arizona Science Center.

RESULTS:
» 37,826 people were engaged in 17 events in and around Phoenix
» 2,500 Sustainability Kits were distributed at public events
» Estimated 3.5 million impressions across traditional and digital media
» 5,000 site visits by 4,280 unique users on the Festival web page, sustainabilityfestival.asu.edu, between January 1 and February 18, featuring sponsor logos prominently
» 1.1 million impressions across 24,528 social media interactions on Facebook, Instagram, Snapchat and Twitter

BENEFITS: The event helps to raise the profile of Phoenix as a sustainability leader among diverse audiences: the global business community, government entities, thought leaders and the public.

Project Partners: City of Phoenix Public Works Department, City of Phoenix Water Department, City of Phoenix Aviation, Salt River Project, Walton Family Foundation, Goodwill of Central Arizona, Ewing Irrigation Systems and Landscape Supply, Southwest Gas, GreenBiz, Downtown Phoenix Inc., Arizona Science Center, Budget Dumpster
The RISN Incubator is issuing a Call for Innovators, June 12-July 24, 2017 to identify startups and early stage business ventures developing solutions for waste diversion, minimization and reuse/recycling innovation.

From the nation’s top university for innovation and a civic leader in sustainability, the RISN Incubator provides ventures an opportunity to rapidly scale and transform your startup into a vehicle to solve some of the world’s greatest challenges.

The RISN Incubator will help you TEST your concepts, BUILD your company and SCALE to market.

Timeline:
- Release and distribution of CFI: June 12, 2017
- Deadline for submissions: July 24, 2017
- Finalist Notification: August 7, 2017
- Demo Day & Expo: Dec. 2017

The RISN Incubator will provide:
- dedicated expert mentors to guide advancement
- unmatched strategic advisement
- introductions to industry stakeholders
- access to technical experts in the field of material reuse, technology and the circular economy
- business trainings on topics related to building a cost and revenue model, operations, value proposition, understanding your customers and more
- waste from the City of Phoenix for use in the development, testing and activation of a product or service
- a process for entrepreneurs and their ventures to be continuously evaluated and pre-qualified for funding opportunities

RISN Incubator services are co-funded by the U.S. Economic Development Administration, the City of Phoenix and Arizona State University (Entrepreneurship+Innovation and the Rob and Melani Walton Sustainability Solutions Initiatives).
The Review Process:

1. Submissions will be reviewed by RISN Incubator staff and a selection committee comprised of circular economy entrepreneurship and innovation experts, investors, ASU faculty, technical experts and more.
2. Early stage ventures may be invited to participate in the Design Challenge, with the winner(s) invited to join the RISN Incubator. Promising startup companies that are further along may be invited to join the RISN Incubator directly. Interviews may be requested at any time during the review process.
3. All submissions will be provided feedback.

The RISN Incubator is the latest program of the Resource Innovation and Solutions Network – or RISN, a collaboration between Arizona State University and the city of Phoenix. RISN was initially created to divert waste from the landfill and ultimately launch a vibrant local circular economy.

Circular economy is a closed loop model that sees all resources and energy as renewable and regenerative, where all durable resources are endlessly cycled back into supply chains, and waste is minimized.

RISN’s role is to bring together university, regional government, business and non-governmental partners to transform the relationship between resources, the environment, people and the economy. The goal is to implement sustainable solutions that create a resource-focused circular economy platform that makes urban areas healthier, more livable, resilient and efficient.

The Circular Economy:

For more information on the circular economy, visit ellenmacarthurfoundation.org/circular-economy
ARIZONA STATE UNIVERSITY

GRADUATE STUDENTS
Gonzalo Zelada Arredondo | graduate research assistant
Padmini Priyandarsini Gudipudi | post doctoral researcher
Nivedita Biryani | graduate student
Amy Bergley | graduate student
Vatika Vardhan Chaurasia | graduate student
Dylan George-Sills | graduate student
Veronica Head | graduate student
Kyrie Hooten | graduate student
Phani Sasank Kaligotia | graduate student
Iraj Khadka | graduate student
Natalie Melkonoff | graduate student
Siddhanth Paralkar | graduate student
Karishma Thakkar | graduate student
Coby Teal | graduate student

CITY OF PHOENIX
Ginger Spencer | Director, Public Works
John Trujillo | Former Director, Public Works (retired)
Joe Giudice | Assistant Director, Public Works
Felissa Washington Smith | Acting Assistant Director, Public Works
Brandie Barrett | Deputy Director, Public Works
Chuck Hamstra | Deputy Director, Public Works
Jose (Jesse) Duarte | Deputy Director, Public Works
Felipe Moreno | Deputy Director, Public Works
Michelle Rodriguez | Management Assistant II, Public Works
Yvette Roeder | former Public Information Officer, Public Works
MEET THE FACULTY

Thomas P. Seager

POSITION:
» Senior Sustainability Scientist, Julie Ann Wrigley Global Institute of Sustainability
» Lincoln Fellow of Ethics and Sustainability, School of Sustainable Engineering and the Built Environment, Ira A. Fulton Schools of Engineering
» Associate Professor, School of Sustainable Engineering and the Built Environment, Ira A. Fulton Schools of Engineering

ABOUT:
Thomas P. Seager is an Associate Professor in the School of Sustainable Engineering & the Built Environment at Arizona State University in Tempe AZ. Dr. Seager leads research teams working at the boundaries of engineering and social science to understand innovation for resilient infrastructure systems, including the life-cycle environmental consequences of emerging energy technologies, novel approaches to teamwork and communication in socio-technical integrative settings, and engineering ethics education.

PROJECTS:
Year 3 Base Operations, Incubator, Regional Circular Organic Resource System (aka Green Organics)

Rebecca Ball

POSITION:
» Senior Sustainability Scientist, Julie Ann Wrigley Global Institute of Sustainability
» Associate Professor, School of Mathematical and Natural Sciences, New College of Interdisciplinary Arts and Sciences
» Affiliated Faculty, Center for Biodiversity Outcomes, Julie Ann Wrigley Global Institute of Sustainability

ABOUT:
Dr. Ball’s research focuses on the factors that control organic matter turnover and nutrient dynamics in soils, with a focus on the biotic component, both microbial and faunal. Her research also addresses how patterns of these compare across systems and biomes. The overall goal is to improve our mechanistic understanding of soil biogeochemical processes to allow improved predictions of how these processes will be affected by global change.

PROJECTS:
Compost Application on Multi-Use Turf in City Parks (aka Parks Turf Study Year 2)
**Paul Coseo**

**POSITION:**
- Senior Sustainability Scientist, Julie Ann Wrigley Global Institute of Sustainability
- Assistant Professor, The Design School, Herberger Institute for Design and the Arts
- Affiliated Faculty, Center for Biodiversity Outcomes, Julie Ann Wrigley Global Institute of Sustainability

**ABOUT:**
Dr. Coseo examines how the design of cities impact natural processes and social communities. He approaches research, teaching, and practice with a humble appreciation for how our urban designs impact the sustainability of natural and social environments. Recently, he investigated how physical characteristics of eight Chicago neighborhoods contributed to urban heat islands and heat vulnerability. His other areas of interest include adaptation to climate change, environmental negotiation, community engagement, and social justice. Dr. Coseo teaches landscape architecture courses on ecological planning and design.

**PROJECTS:**
Regional Circular Organic Resource System (aka Green Organics)

**Nicole Darnall**

**POSITION:**
- Senior Sustainability Scholar, Julie Ann Wrigley Global Institute of Sustainability
- Professor, School of Sustainability
- Professor, School of Public Affairs, College of Public Service & Community Solutions
- Associate Director, Center for Organization Research and Design

**ABOUT:**
Dr. Darnall’s research investigates non-regulatory governance as it relates to global sustainability. Operating at this nexus of the policy and management sciences, she considers a variety of non-regulatory governance approaches (e.g., voluntary programs, strategic alliances, certification, and information-based initiatives) to determine whether the absence of state coercion, combined with appropriate incentives, can encourage organizations and individuals to behave more sustainably.

**PROJECTS:**
Regional Circular Organic Resource System (aka Green Organics)
Matthew Fraser

POSITION:
» Senior Sustainability Scientist, Julie Ann Wrigley Global Institute of Sustainability
» Professor, School of Sustainable Engineering and the Built Environment, Ira A. Fulton Schools of Engineering

ABOUT:
Dr. Fraser directs several research projects on urban air quality. His research uses organic speciation and receptor modeling to apportion ambient pollutants to their original source. Dr. Fraser’s research group is involved in field-monitoring programs, source-characterization studies, emission-inventory preparation, and analytical method and instrument development projects.

Sharon Hall

POSITION:
» Senior Sustainability Scientist, Julie Ann Wrigley Global Institute of Sustainability
» Associate Professor, School of Life Sciences, College of Liberal Arts and Sciences

ABOUT:
Dr. Hall is an ecosystem scientist who explores the ecology of native and managed ecosystems that sustain people and other organisms within the community of life. Her research focuses on understanding the ecological feedbacks between humans and the environment.

Kamil Kaloush

POSITION:
» Senior Sustainability Scientist, Julie Ann Wrigley Global Institute of Sustainability
» Associate Professor, School of Sustainable Engineering and the Built Environment, Ira A. Fulton Schools of Engineering

ABOUT:
Dr. Kaloush’s research interests include both asphalt and Portland cement concrete mixtures design, characterization, advanced laboratory testing, and field performance evaluation. Dr. Kaloush is also known for his work on modified pavement systems that include the utilization of crumb rubber and fibers. Dr. Kaloush teaches courses on highway materials and construction, performance evaluation and management, and sustainable materials and energy use.
Candice Carr Kelman

POSITION:
» Assistant Director, School of Sustainability
» Senior Sustainability Scholar, Julie Ann Wrigley Global Institute of Sustainability

PROJECTS:
Circular Economy Curriculum Development

ABOUT:
Dr. Carr Kelman studies policy dimensions of sustainability issues, such as how to manage tradeoffs and foster synergies between biodiversity conservation and human development. She has studied Integrated Conservation and Development Projects in Indonesian national parks, the global trade in electronic waste and collaborative approaches to ecosystem stewardship. Two major themes in Dr. Carr Kelman’s research are the complex relationships between environment and development, and the role of governance and institutions in creating more resilient socio-ecological systems.

Nathan Parker

POSITION:
» Assistant Research Professor

PROJECTS:
Regional Circular Organic Resource System (aka Green Organics)

ABOUT:
Nathan Parker is an interdisciplinary researcher working to understand the possible futures for alternative transportation fuels and the transition pathways to those futures. He develops simulation models to envision alternative fuels production and distribution systems, as well as to evaluate their cost, economic viability, and environmental impacts.

Beth Polidoro

POSITION:
» Senior Sustainability Scientist, Julie Ann Wrigley Global Institute of Sustainability
» Assistant Professor, Environmental Chemistry, School of Mathematical and Natural Sciences, New College of Interdisciplinary Arts and Sciences
» Associate Director of Research, Center for Biodiversity Outcomes, Julie Ann Wrigley Global Institute of Sustainability

PROJECTS:
Compost Application on Multi-Use Turf in City Parks (aka Parks Turf Study Year 2)

ABOUT:
Dr. Beth Polidoro is an assistant professor of Environmental Chemistry in the School of Mathematical and Natural Sciences. Her primary research interests are in applied toxicology and environmental assessment within the context of biodiversity conservation, human health, and sustainable development. Dr. Polidoro has a broad background in the chemical, ecological and environmental sciences.
David Swindell

POSITION:
» Associate Professor, School of Public Affairs
» Director, Center for Urban Innovation

ABOUT:
Dr. Swindell's work focuses primarily on community and economic development, especially public financing of sports facilities, the contribution of sports facilities to the economic development of urban space, collaborative arrangements with public, private, and nonprofit organizations for service delivery, and citizen satisfaction and performance measurement standards for public management and decision making.

PROJECTS:
Regional Circular Organic Resource System (aka Green Organics)

Shane Underwood

POSITION:
» Assistant Professor, School of Sustainable Engineering and the Built Environment, Ira A. Fulton Schools of Engineering

ABOUT:
Dr. Underwood's research involves multi-scale modeling of asphalt concrete, looking at the material as an assemblage of different scales of materials rather than a homogenous mass to assess the performance characteristics of materials affected at the local scale. By experimenting on different assemblages of materials, then developing constitutive models, he is working to gain a better understanding of the way the materials behave.

PROJECTS:
Reclaimed Asphalt Pavement (RAP)
## RISN Affiliated Projects funded by other sources

<table>
<thead>
<tr>
<th>Sponsor</th>
<th>Title</th>
<th>Amount</th>
<th>Start</th>
<th>End</th>
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</thead>
<tbody>
<tr>
<td>Maricopa County Air Quality Department</td>
<td>Assessing Bulk Green Waste Composting Facilities in the Ozone Non-Attainment Area</td>
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<td>1/12/2017</td>
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<td>Maricopa County Air Quality Department</td>
<td>Wood Burning Analysis</td>
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<td>Economic Development Administration</td>
<td>RISN Business Incubator</td>
<td>$500,000</td>
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<td>12/31/2019</td>
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<td>City of Tempe</td>
<td>Tempe Tree and Shade Plan</td>
<td>$46,750</td>
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<td>3/1/2017</td>
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<td>City of Tempe</td>
<td>Feasibility of Tempe Anaerobic Digester</td>
<td>$71,100</td>
<td>2/12/2015</td>
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<td>Ray C. Anderson Foundation</td>
<td>Circular Economy Curriculum Development</td>
<td>$50,000</td>
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**Total:** $772,050

## RISN Affiliated Proposals submitted but not awarded

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<td>Environmental Research and Education Foundation</td>
<td>Soft Plastics Elimination in the Recycling Process</td>
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<td>APS</td>
<td>Third Party Verification of APS GHG Emissions and Water Withdrawals and Discharge</td>
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<td>Dell, Inc.</td>
<td>Ethical Circular Economy as a Net Positive Public-Private Collaboration</td>
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<td>MacArthur Foundation</td>
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<td>Department of Energy</td>
<td>The Sustainable Manufacturing and Recycle/Reuse/RemanufactureTechnology (smaRt) Institute</td>
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<td>Environmental Research and Education Foundation</td>
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<td>EBRD</td>
<td>Green City Action Plan for Tirana, Albania</td>
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**Total:** $170,798,610
**2017 Funding Allocations**

<table>
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<th>RISN and Affiliated Projects</th>
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<td>Base Operations</td>
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<td>Compost Application on Parks Turf</td>
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<td>2012 Community GHG</td>
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<td>MCAQD - Wood Burning</td>
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<td>MCAQD - VOC Emissions</td>
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</table>

**RISN Engagement**

As a global leader in promoting zero waste and circular economy practices, the RISN team is often invited to speak at and participate in conferences around the world. In 2017 RISN has been promoted and shared at 25 conferences engaging 17,000 individuals comprising local, national and global audiences. Several of these events took place in the Phoenix region.

Speaking Engagements » | Conferences Attended »
(see page 20 and 21)
Speaking Engagements

**August 2016**

» American Public Works Association  
Statewide Conference  
*Tucson, AZ*  
Dan O'Neill and John Trujillo

» American Public Works Association  
International Congress and Expo  
*Minneapolis, MN*  
Dan O'Neill and John Trujillo

**September 2016**

» Verge 2016  
*Santa Clara, CA*  
Dan O'Neill and Raj Buch

» Ethical Circular Economy  
Certification Workshop  
*Phoenix, AZ*  
Dan O'Neill, Raj Buch and Mara DeFilippis

**October 2016**

» The Association for the Advancement of Sustainability in Higher Education (AASHE),  
*Baltimore, MD*  
Dan O'Neill

» Sustainable Cities Network  
*Dubuque, IA*  
Dan O'Neill

» Dell World  
*Austin, TX*  
Dan O'Neill

**November 2016**

» Disruptive Innovation Festival, *(web)*  
Raj Buch, Ginger Spencer and William Campbell

» Mayo Clinic Workshop  
*Scottsdale, AZ*  
Raj Buch

**December 2016**

» Maricopa Association of Governments  
*Phoenix, AZ*  
William Campbell

**January 2017**

» Kiwanis Club  
*Phoenix, AZ*  
William Campbell

**February 2017**

» GreenBiz 17  
*Phoenix, AZ*  
Patricia Reiter and Mayor Greg Stanton

» World Business Council for Sustainable Development  
*Phoenix, AZ*  
Patricia Reiter

» 2017 Second Nature Presidents’ Climate Leadership Summit  
*Tempe, AZ*  
Dan O'Neill and Raj Buch

**March 2017**

» Circular Economy 100 Acceleration Workshop  
*Oxford, UK*  
Raj Buch, Ginger Spencer, Gretchen Wolfe and Marta Hulley Friedman

**April 2017**

» Sustainable Packaging Conference/SustPack 2017  
*Phoenix, AZ*  
Ginger Spencer and William Campbell

» Materials Research Society  
*Phoenix, AZ*  
William Campbell

**May 2017**

» Summit on Government Performance and Innovation 2017 by Governing Magazine,  
*Phoenix, AZ*  
Ginger Spencer and William Campbell

**June 2017**

» US Chamber of Commerce Foundation Circular Economy Summit and Ethical Circular Economy Certification Workshop  
*Washington, DC*  
Raj Buch, Ginger Spencer, Marta Hulley Friedman and Mara DeFilippis
Conferences Attended

September 2016
- Nike Circular Textiles Workshop
  Portland, OR
  Ginger Spencer and Dan O’Neill
- CE 100 USA Acceleration Workshop
  New York, NY
  Ginger Spencer, Dan O’Neill and Jesse Duarte
- Executive Certificate in an Ethical Circular Economy Coursework
  Phoenix, AZ
  Ginger Spencer, John Trujillo, Brandie Barrett, Jesse Duarte and Chuck Hamstra

October 2016
- US Chamber of Commerce Foundation Circular Economy Learning Tour
  Phoenix, AZ
  Hosted by Mara DeFilippis

February 2017
- Association for Healthcare Resources & Materials Management
  Scottsdale, AZ
  William Campbell

March 2017
- CE100 USA Acceleration Workshop
  Seattle, WA
  Raj Buch and Mara DeFilippis

April 2017
- Plasticity Forum
  Anaheim, CA
  William Campbell

June 2017
- Ellen MacArthur Foundation Annual Summit, London, UK
  Raj Buch
- US Chamber of Commerce Foundation Ethical Circular Economy Certification Workshop, Washington, DC
  Patricia Reiter, Raj Buch, Marta Hulley Friedman, Mara DeFilippis, Alicia Marseille, Ginger Spencer and Brandie Barrett
As RISN enters its fourth year under the original intergovernmental agreement, this program will focus on mutually outlined projects and provide broad institutional support for the RISN incubator. The team continues to pursue speaking engagements and key partnership opportunities for dissemination of the RISN story, City of Phoenix leadership in circular economy implementation, circular economy education, innovation, lessons learned and best practices. Additionally, funding opportunities that advance the collective efforts of Phoenix and ASU and build on the successes of the past will be sought.

**Expected Projects for FY2018**

- FY2018 Sustival Sponsorship – continuation from FY17
- RISN Incubator - continuation from FY17
- Compost Application on Multi-Use Turf in City Parks Study, Year 3 - continuation from FY17
- 2016 Community Greenhouse Gas Emissions Inventory – follow up to 2012 inventory delivered in FY17

**Projects Under Consideration for FY2018**

- Reclaimed Asphalt Pavement – Phase 2 Pilot
  Pilot testing of new asphalt mix on city streets
- Economic Impact Report – Phase 3
  Regional strategies for circular economy implementation
- Sustainability-Based Metrics for Materials Diversion
  Research and assessment of alternative measure for materials diversion that takes into account the environmental and social impacts of diverting particular materials