

GC3 INNOVATORS ROUNDTABLE

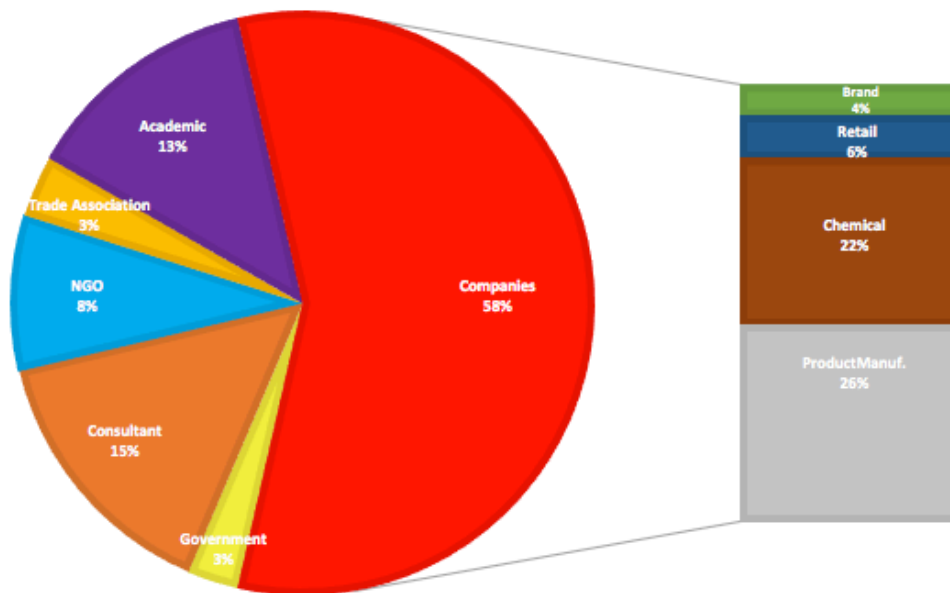
APRIL 25-27, 2017 | GRAND RAPIDS, MI

Session Proceedings

April 23-25, 2017 marked 12th Annual Innovators Roundtable organized by the Green Chemistry & Commerce Council (GC3). One hundred and seventy-five people from 128 different organizations convened at the headquarters of Steelcase Inc., in Grand Rapids, Michigan, to talk about emerging technology, policy, tools, and partnerships to advance green chemistry, and to discuss challenges and successes. Attendees learned from their peers and from other leaders in both structured and unstructured settings, exchanged knowledge, and met potential new collaborators for their work.

The Roundtable attracted an international group of companies, both established and start-up, representing all parts of the value chain, as well as others who support their work, such as NGOs, investors, academics, and government leaders.

MAKE UP OF 2017 GC3 ROUNDTABLE PARTICIPANTS



Attendees heard from 35 motivating speakers about topics including what the new political landscape means for green chemistry, product design for the circular economy, what we are learning from chemical ingredient transparency, lessons from the C-Suite about green chemistry innovation, the role of formulators as the supply-chain's hidden middle, challenges and opportunities to using sustainable feedstocks at scale, innovative partnerships that advance green chemistry, and more. They also participated in interactive sessions to brainstorm solutions to common green chemistry challenges facing companies, and provided input into GC3 programming for the coming year.

A key theme throughout the Roundtable, kicked off by US Senator Chris Coons of Delaware—the leading advocate for sustainable chemistry in Washington, D.C., —was that, in light of the current political landscape and attacks on science, it is important for the people in the room to be advocates

for the value of science as we identify effective green chemistry solutions. As we do this, we must understand the language that matters to the audience we are speaking to. In this case, it's the language of jobs and innovation.

GC3 programs were highlighted, including the Safer Preservatives Challenge, the Retail Leadership Council, and the Green and Bio-based Startup Network. The GC3 Startup Network held a [Green & Bio-based Chemistry Technology Showcase and Networking](#) Event in conjunction with the Roundtable. This event brought together more than dozen start-ups with larger companies in the value chain to identify new partnerships and opportunities.

In addition to the takeaways described in these proceedings, attendees noted that they:

- left the Roundtable with actionable ideas;
- made valuable contacts and connections;
- learned about models for collaboration along the value chain which can be used for other green chemistry problems that need solving;
- gained an increased sense of the importance and difficulty of working with their entire supply chain;
- gained an appreciation for the visionary goals and practical challenges of green chemistry;
- now realize that much more desire and effort to implement green chemistry and sustainable practices goes on at companies than the public is aware of;
- see that even small start-ups can make a large difference in this space; and
- appreciate that, no matter the political priorities, green and more sustainable chemistry and products make good business sense and can provide a competitive edge—if a product is not “green,” there will be no market for it.

One message was clear from the Roundtable: while there are still challenges to overcome, we have many green chemistry successes to point to and green chemistry is a field that will continue to grow and make continuous improvements. The GC3 is proud to be the unique international collaborative network bringing together the entire value chain to accelerate the adoption of green chemistry.

APRIL 25, 2017

Welcome and Opening Remarks

Speaker:

Joel Tickner, Green Chemistry & Commerce Council (GC3), UMASS Lowell

Summary:

Dr. Tickner presented an overview of the GC3 and how the changing political landscape might shape the GC3's efforts moving forward. The 2016 elections had significant implications for science and environmental and health policies. The current administration has questioned aspects of climate change science and has proposed significant reductions in budgets for a number of critical science funding programs as well as government scientific research initiatives. These actions raise key questions about the role and responsibility of scientists in academia, government and industry to "protect" and "promote" science. Science is a non-partisan issue and a number of important initiatives focused on safer chemistry have occurred under Republican leadership, for example the first Green Chemistry Research and Development Act in the House of Representatives.

Business has a critical role to play in promoting the benefits of green chemistry and demonstrating the value of safer chemicals and products to their businesses. For example, more than 150 companies across the value chain sent a letter to EPA Administrator Pruitt supporting EPA's Safer Choice program as being good for business. Tickner noted that he is optimistic that progress made to date in the U.S. has been done as a result of market leadership (with GC3 members such as Apple, Target, and CVS Health recently issuing safer chemicals programs) not government leadership. Further, he noted there is significant common ground and we must find ways to use a common language to promote green chemistry, focused on the jobs and innovation benefits it provides.

Tickner went on to note how GC3 projects are gaining momentum, and will continue to do so regardless of what is happening in Washington. The Green & Bio-Based Start Up Network is bringing together innovators in the green and bio-based chemistry space with larger companies that can help accelerate market entrance. The Collaborate Preservatives Innovation Challenge is convening 20 firms across the value chain to identify, evaluate, and, hopefully, scale safe and effective preservatives for consumer products, a model that the GC3 looks forward to replicating. Tickner identified four ways that the GC3 could increase its impact in the current political environment:

- connect companies and value chains for partnerships to accelerate innovation and market adoption;
- create and replicate market-based models for collaborative innovation;
- leverage GC3 membership to engage the highest levels of business and government in advocating for green chemistry; and
- grow the network globally.

Over the coming year, the GC3 will work to identify opportunities to leverage its market strength to affect government and market policies, enhancing its impact in driving green chemistry innovation.

Chris Coons, U.S. Senator Delaware

Senator Coons could not be at the Roundtable to welcome people in person, but instead he sent a video message. Senator Coons said that he appreciates the efforts those in the room undertake to advance the field of green and sustainable chemistry. His background is in chemistry and he supports federal leadership in the field. He has introduced the federal Sustainable Chemistry R&D Act for the last few years, and is a co-founder of the new bi-partisan Senate Chemistry Caucus. He is optimistic about all the opportunity that chemistry innovation holds for the world, and expressed that sustainable chemistry can solve society's most vexing challenges.

Senator Coons said that he is worried that the current administration and many of his colleagues are taking positions that could undermine the United States' ability to lead the world towards a greener and more sustainable future. In March, President Trump released his 2018 budget blueprint, full of deep cuts that could threaten programs that support research and development, new technologies, and more.

Senator Coons said that this budget should be a call to arms for scientists, technologists, and engineers to defend science and innovation. Because chemistry is the central science, it plays a unique role in promoting scientific discovery and promoting public trust. The concept of sustainable chemistry is a simple but powerful vision; it is a critical and growing industry for America to lead. What can we do in this political environment? We must make the case that this sector is an industry, that green and sustainable chemistry stand for jobs and innovation and nothing less than the future of products, materials, and chemicals in this country. We must work together to support scientific advancement. He asks us to:

- advocate for the value of science and scientific issues;
- promote scientific literacy;
- engage new audiences with our work;
- speak out and make the case for investing in science;
- talk about the economic impact of our industry and businesses; and
- don't just publish research, publicize it- tell the world what we do and why it matters.

He concluded by noting that chemistry can lead the way and redefine what is possible and that sustainable chemistry will be at the heart of innovation and jobs creation.

Keynote Address

Speaker:

Paul Anastas, Center for Green Chemistry and Green Engineering, Yale University

Summary:

As a consultant and as an academic, Dr. Anastas says he looks at things from different perspectives. Looking at things this way opens up possibilities, it can change whether we look at issues as problems or as opportunities. Despite the changed political landscape, he believes science will persevere and that we can meld our differences of opinion. How we communicate about green chemistry is a reflection of how we perceive it. Green chemistry has shifted from being about efficiency in its first decade, to being about elegance in its second. Now, green chemistry is about performance and

function, not about a specific green chemistry principle. Disruption is happening in ways that still provide function, but allow for elimination of certain products altogether— for example, adhesion without adhesives, and flame retardancy without flame-retardants.

Many lies are being told by the status quo – that green chemistry is difficult or not occurring or can't occur - and these lies influence policy, investment, business decisions, and design choices. Recognizing the lies and fighting back is essential to move forward on the path to green chemistry. When people say that green chemistry is not adopted widely enough, we know that is not true. A tremendous amount of green chemistry is never discussed; that doesn't mean it doesn't exist.

Key Takeaways:

Helpful Actions to Advance Green Chemistry

- To continue to build a green chemistry community, we have to:
 - catch people doing things right;
 - provide visibility, validation, accolades, recognition, support;
 - welcome them as part of the green chemistry community and have it become part of their ideology;
 - raise the bar;
 - repeat.
- Remember that:
 - it is important to speak the language of the people you are talking to;
 - green chemistry should be incorporated into every aspect of design, just as quality was in the 1990s;
 - efficiency will help companies do what they do better, but it will not help them do a better thing-- green chemistry will;
 - greener considerations redefine the value space—if we can get greener valued, the same as “better, cheaper, faster,” it changes the value space and design, and what is possible;
 - we should empower people—teach them how to cook vs. giving them a recipe;
 - never teach a pig how to dance: we can't get people to do something impossible—corporations should do what they can do well, such as scale, supply chain influence, buy and hire green, be visible, and be outrageously successful.
- It is important for us now to be visible and heed Senator Coons' call to action. We've dissuaded good communication in science in the past. Remember that green chemistry was launched under a republican president!

The Changed Political Landscape: What This Means for Green Chemistry

Moderator: Michele Jalbert, Effective Advocates LLC

Panelists:

Dave Asiello, U.S. Department of Defense

Jim Jones, Jim Jones Consulting

Brad Miller, Business + Institutional Furniture Manufacturers Association

Kevin Mulvaney, American Chemistry Council

Michael Parr, Parr Policy Group
Meredith Williams, California Department of Toxic Substances Control

Summary:

The political landscape have changed in a big way in Washington. We have to understand how to speak the language of the new people, how to frame the benefits of green chemistry, what terminology to use, and how to leverage republican priorities to meet green chemistry needs.

Michael Parr summarized the findings of interviews he and Michele Jalbert conducted of representatives from companies, trade association, federal agencies, and congressional staffers, to understand how green chemistry fits with new federal priorities, and how we should be messaging it. Messages that resonated well are that there is growing consumer demand for green and sustainable chemistry, that this is a globally competitive industry fighting for space, and that there is a legitimate role for public policy. Parr and Jalbert were told that the US is now in a deregulatory vs. regulatory age, there will be less funding available, and policy-makers will be sensitive to intervening in markets and picking winner and losers. The role for governmental policy is to see that U.S. manufacturers will succeed. Interviewees were comfortable with the broad framing of green and sustainable chemistry, but not a focus on toxicity and hazard. They are happier with the idea of better chemistry that enables the market to pick better options.

The other speakers provided their perspectives and then responded to audience comments and questions.

Key Takeaways:

Helpful Actions to Advance Green Chemistry

- Use the right language:
 - There is opportunity, if framed and communicated in the right way, to pin green chemistry to federal priorities of infrastructure and defense. There is opportunity as long as we speak the right language.
 - If there is no entity pushing for a level playing field for green chemistry, we will continue see problematic chemicals on the markets. There will be a disincentive for green chemistry if companies don't speak out. We have to make sure we are expressing our interests. Lead with the language of jobs, manufacturing, and US manufacturing.

Opportunities for Safer Chemicals and Products

- California is looking for "messy interfaces," productive areas where creativity happens. California will stay the course, no matter what happens with EPA. They are looking for other messy interfaces where they can drive change by building relationships with other states, NGOs businesses, and other regulators in order to drive change and have an impact.
- This is a great time for creating opportunities to drive science for innovation in green chemistry, to find common ground and win-win solutions.
- Regulations both here and overseas could impact the availability of products currently on the market that are toxic and used by the federal government.

- Sustainability can help support the mission of the military — it impacts health, readiness, ability to train, and ensures the availability of products to do the job. Procurement could be a critical driver for green chemistry
- Chemical transparency will continue to grow due to consumer demand and new TSCA provisions.

Challenges for Implementation/Lessons Learned

- The current administration’s support of carbon, if successful, could retard green chemistry for biobased materials.

Role for the GC3 in Helping to Advance Green Chemistry in this Area

- Help remove barriers (e.g., through activities such as the Preservatives Challenge) so that more progressive companies can have a seat at the table.
- Think about what the new administration appointees should see in order to tell them story we want them to know about green chemistry: identify companies and whose districts they are in, and bring them the contacts.
- Identify ways that members’ products support the mission of the DoD— to defend the interests of the U.S. —and sell that to the agency.

Chemical Ingredient Transparency: What are we Learning?

Moderator: Sally Edwards, Green Chemistry & Commerce Council (GC3), UMASS Lowell

Panelists:

Hal Ambuter, Reckitt Benckiser
 Frederic Issenhuth, IMD Natural Solutions
 Wendy Vittori, Health Product Declaration Collaborative
 Martin Wolf, Seventh Generation

Summary:

Ingredient disclosure in labeling of consumer products is an issue of high concern to most consumers. Panelists agreed that the questions surrounding ingredient transparency are not “why disclose ingredients?” or “what should be disclosed?” but rather “why NOT disclose ingredients?” and “HOW should the ingredients be disclosed?” The term “fragrance” was talked about as being the core of this discussion today, and that it is slowly being dissected in labeling. Among the challenges in this category are easy reporting and access to ingredients, gaining customer acceptance and understanding, and getting support from entities such as legislators for labeling. The consensus among the panelists is that manufacturers have to be honest and responsible in letting their customers know exactly what is in their products.

Key Takeaways:

Opportunities for Safer Chemicals and Products

- Transparency can be a critical driver for the design of safer chemicals and products.

- Replace parabens, sulfates, and other harmful chemicals with glycolipids.

Key Drivers for Safer Chemicals and Products

- Listen to consumers, particularly millennials, who are showing increased health consciousness.
- Get legislator, retailer, and industry support.

Challenges for Implementation/Lessons Learned

- There is no “one size fits all” name for a particular ingredient on a label, it may change from market to market; purchasers must be educated.
- Branding is hard for start-ups, consumers may not yet trust them

Helpful Actions to Advance Green Chemistry

- Easy access online: using qr codes, shared databases.

Role for the GC3 in Helping to Advance Green Chemistry in this Area

- Bring together companies who can facilitate better information sharing and labeling.
- Educate audiences on differences in labeling and why they matter.

Keynote

Speaker:

Fred Keller, Cascade Engineering

Summary:

Fred Keller, Founder and Chair of Cascade Engineering, detailed a vision of how business can be used to maximize social and environmental good, describing his company’s initiatives as case examples of how this can be achieved. Cascade Engineering is a medium-sized contract injection-molding manufacturer that employs 1,600 people. It was founded upon the belief that business can complement financial performance with important work in the social and environmental arenas. On the social side, they provide employment to those in poverty through their welfare to work program, which includes poverty simulation training for their supervisors to instill empathy and understanding. They also incorporate training for their employees to address issues of racism, and developed a program to help return incarcerated citizens back to society by providing them with an opportunity for meaningful work. On the environmental side, they have a Zero Waste policy where nothing from their facility goes to the landfill. They have also found ways to repurpose paint by-products as well as integrate the use of non-toxic plating in their manufacturing processes.

Mr. Keller also discussed at a high level how we as a community of business leaders need to reframe the concept of “sustainable” from something that is “nice” to “essential.” We are facing era of resource scarcity, which is a substantial threat to economic activity. When resources become scarce, growth will hit a wall. In order to keep the economy increasing, we must redesign our way of doing business to one that is restorative/regenerative of our natural capital. As a company, being less bad is of course

OK, but what we really need is to optimize our impact, finding those synergies that allow us to progress on both environmental and social goals while also doing good for business. By focusing less on ROI and more on the idea of “here’s a great thing we can do and it doesn’t cost very much,” we, as business leaders, can have a substantial impact on corporate culture, innovation, company perception and positive social and environmental impact within our communities.

Key Takeaways:

Key Drivers for Safer Chemicals and Products

- Business leadership that incorporates the triple bottom line of people, planet, and profit into the company’s structure and culture will drive change.

Challenges for Implementation/Lessons Learned

- In order to be successful, corporate leadership must build understanding throughout the company about the purpose of a new initiative, as well as provide the appropriate training and continuous support to employees.
- New initiatives won’t always work the first time (or the second, or third). Learning from these challenges and using that knowledge to do even better is the best way to tackle tough problems.

Helpful Actions to Advance Green Chemistry

- Bring business leaders together to tackle challenges specific to their regions. Local scalable action is critical, such as the work being undertaken by business leaders in Grand Rapids, MI to create a sustainable city.

APRIL 26, 2017

Driving Green Chemistry through Chemical Footprinting

Facilitators:

Sally Edwards, Green Chemistry & Commerce Council (GC3), UMASS Lowell
Tim Greiner, Pure Strategies Inc.

Summary:

This session provided an overview of the Chemical Footprint Project, a new initiative that provides a metric for companies to benchmark progress as they select safer alternatives and reduce their use of chemicals of high concern. The Chemical Footprint Project measures overall corporate chemicals management performance through a 20-question survey, scored to 100 points, that evaluates: management strategy, chemical inventory, footprint measurement, and public disclosure and verification. The survey is for use by manufacturers and brands that participate as Chemical Footprint Project responders. Chemical Footprint Project Signatories are investors, retailers, large-scale purchasers, and NGOs that are the audiences for the data generated by the survey.

Following an overview presentation, several GC3 members that are participating in the Chemical Footprint Project discussed its business value to their companies. One participant noted that avoidance of chemicals of concern is already fully integrated into her company's business strategy. She said that the Chemical Footprint Project survey allowed her company to identify strengths and weaknesses in its chemicals management system and helped to strengthen its work with suppliers. Another participant noted that participating in the Chemical Footprint Project helped to validate his company's process and provided a deeper understanding of its management progress. In addition, he noted that he appreciated having an opportunity to provide input as the survey is refined.

Key Takeaways:

Key Drivers for Safer Chemicals and Products

- Senior leadership support matters for strong chemical management programs at the corporate level.
- Participation in the Chemicals Footprint Project can help reduce a company's regulatory and reputational risks and provide a metric to evaluate progress.

Helpful Actions to Advance Green Chemistry

- The Chemical Footprint Project provides an example of how to measure leadership in chemicals management at the corporate level.

Keynote: Dow's 2025 Sustainability Goals

Speaker:

Neil Hawkins, The Dow Chemical Company

Summary:

The Dow Chemical Company has been working on sustainability since 1995. It rolled out new sustainability goals in 2015 and, just released new goals for 2025. In the 1990's, the focus was on the footprint of the company as they aimed to reduce greenhouse gas emissions (and they did). Up until 2015, the goal was to maximize the company's handprint on products. Now, for 2025, the goal is to focus on the blueprint of the company. Among these goals are to advance the circular economy within the company, encourage employees to participate in volunteer activities, and maximize production from every individual molecule. These goals align with the United Nations Millenium Sustainability Goals. Mr. Hawkins emphasized that a growth in customer confidence in the safety of Dow's chemical technology occurred due to the company's transparency, collaboration, and research. Dow has been finding ways to reduce emissions through the engineering of more green buildings and offsetting the GHG emissions from the last two Olympic games. Dow believes that, through their blueprint focus, they can help solve challenges with collaboration, dialogue, and green chemistry.

Key Takeaways:

Opportunities for Safer Chemicals and Products

- Increase customer confidence through transparency.

Key Drivers for Safer Chemicals and Products

- Markets that require green chemistry solutions will drive demand.

Challenges for Implementation/Lessons Learned

- The cost of green chemistry slows down its advancement.
- Careful risk assessment and management can be challenges.
- It can be difficult to educate the value chain on the business opportunities within green chemistry.

Helpful Actions to Advance Green Chemistry

- Collaboration and dialogue between companies can advance green chemistry.

Role for the GC3 in Helping to Advance Green Chemistry in this Area

- The GC3 can link companies who are educated about advancing green chemistry with those who struggle with it.

Accelerating Green Chemistry: Lessons from the C-Suite

Moderator: Joel Tickner, Green Chemistry & Commerce Council (GC3), UMASS Lowell

Panelists:

Steve Crawford, Eastman Chemical Company

Sharon Papke, Covestro LLC

Chris Ellen, BioAmber Inc.

Summary:

This session engaged C-Suite leaders in a discussion about successes in and barriers to green chemistry in their companies and what types of collaborations, supply chain engagement, policies, and actions would help accelerate their company's efforts. Each panelist provided an overview of their company, its green/sustainable chemistry vision, and an example of a successful green chemistry solution that the company has created. The panelists also discussed success factors, barriers for green chemistry investment and adoption, and how barriers are being addressed.

Mr. Crawford said that Eastman has undergone a significant transformation in the last 5 years and is moving into specialty chemicals for transportation, packaging, and building/construction. He noted that Eastman won a US EPA green chemistry award in 2009 for its GEM technology that reduced its energy footprint, and launched and accelerated the adoption of the Omnia solvent, even without a regulatory push for it. Internally, the company is working to gain more market insight and better understand consumer needs. Collaboration is critical to success: everyone along the value chain needs to be brought in and bought in. External barriers can include lack of a well-defined scope for a project. Ms. Papke noted that green chemistry does not happen without the chemical manufacturers. Covestro is a major manufacturer of polymers for building and construction, automotive, and electronics. Its research function is centralized to promote innovation. The company embeds sustainability in its development process, embedded in one of the company's three business units. Covestro developed a water-based technology for synthetic leather that reduced water usage by 95 % and energy usage by 50%. The time to commercialize a product, which is at least 10 years, can be a barrier. Capital investments required for equipment and process changes pose an additional barrier. Education of customers is key, as customers want performance, price and a green product, but often do not want to pay more.

Mr. Ellen noted that BioAmber is the first succinic acid company producer in the western hemisphere. The company markets this product as a new, smarter chemical; they do not lead with the green chemistry story. BioAmber provides its succinic acid to Covestro for incorporation into a new product. This product took a number of years to become adopted; everyone in the value chain had to understand the cost implications of adoption.

Key Takeaways:

Challenges

- The long-time frame to bring new chemicals to market and the increased costs of bio-based products are challenges to adoption.
- It can be difficult to find the right people to make a pitch to at large chemical companies.
- There is a need for more education of merchants and suppliers.

- Large manufacturers may sell to distributors rather than directly to customers, creating a barrier for the supply chain collaboration that is needed.

Lessons Learned

- Chemical manufacturers must work to better explain competencies and how they can meet the needs of customers in green chemistry.
- It is important to understand macro trends and changes in consumer behavior.
- The entire value chain should be engaged for successful adoption of green chemistry solutions.
- The C-Suite needs to support collaboration among chemists.
- Full cost accounting is needed to make the business case for green chemistry solutions.
- A project scope must be well defined to succeed.
- Transformative change is needed to develop a more collaborative business model of research and development.
- Do not overemphasize the “greenness” of a product. Instead, discuss performance and price now and in the future – green is nice to have and it can be tiebreaker.

The Supply Chain's Hidden Middle: Formulators’ Role in Green Chemistry

Moderator: Roger McFadden, McFadden and Associates, LLC

Panelists:

Dave Bartos, Canberra Corporation

Bob Israel, Valspar Corporation

Dale McIntyre, Behr Process Group

Antonio Quinones-Rivera, GOJO Industries, Inc.

Summary:

Formulators are in the middle between the chemical companies and brands or retailers. The companies on the panel have been in business a long time—the youngest company of the formulators represented is 65 years old, the oldest over 200!

Formulators have many things to balance in working with clients and suppliers, not the least of which are price and value. All of the companies provided perspective on how they work with customers and within their own companies to formulate products. They also discussed the wide variety of stakeholders they might work with to develop a product, including customers, raw material suppliers, engineers, interest groups, certifiers, trade associations, and sales and marketing representatives. They also discussed the importance of understanding regulatory constraints and consumer trends. A relationship with the customer and the supplier is key. Customers might come to formulators with ideas for products and ingredients, but it can work the other way as well. Formulators have to be able to hear the noise downstream, figure out how to solve for it, and then let people know they have the solution.

There is a tremendous amount of work to replace a molecule; there is no such thing as a drop-in replacement. Oftentimes, infrastructure and packaging have to be changed. And testing must occur in each product if a new molecule is used.

Each company gave examples of how they worked with key stakeholders and partners to bring a new product to market. In two cases, the customer had to install new technology to dispense a product. In another, academic and NGO stakeholders were brought in as part of the process of developing and testing a new product.

Key Takeaways:

Opportunities for Safer Chemicals and Products

- New customers may be more open to a new product than older customers, they are not used to legacy products. Older customers may perceive new product as different and be more resistant.
- Let stakeholders be part of the process of developing a product, transparency is important. This can reduce risk and create opportunity for a company.

Lessons Learned

- Companies coming to formulators with new ideas must first understand the formulator's businesses and what is happening up and down stream.
- Rather than talking about a product as being safer (implying a previous product was not), we should be talking about continuous improvement—that the new product is the next step in the evolution.
- Transparency, communication, trust, and relationships are key.

Role for the GC3 in helping to Advance Green Chemistry in this Area

- GC3 can help identify barriers and stakeholders and bring the full supply chain to the table.

Breakout Session: Solve My Problem

Roundtable attendees had the opportunity to engage in a facilitated discussion with their colleagues about one of four common problems within their companies and supply chains. The goal was to build individual networks, generate ideas for collaborations, and identify new approaches to addressing vexing green chemistry challenges.

1) Sourcing Renewable or Recyclable Materials

Facilitator: Laura Hoch, Green Chemistry & Commerce Council (GC3), UMASS Lowell

Summary

With an increasing focus on closed-loop manufacturing and the circular economy, companies are looking more closely at using renewable or recyclable materials. Often, this means engaging with new suppliers or re-thinking existing processes, which can be a challenge. In this session, roundtable attendees discussed problems experienced in sourcing and using renewable or recyclable materials, and brainstormed some possible solutions to help accelerate the growth of this market.

Key Takeaways:

Challenges

- Inconsistent supply of feedstock and resulting impact on product performance or appearance.
- Lack of availability of desired colors.
- Performance standards developed for non-renewable materials, which creates challenges when switching to renewable content.
- No traceability, so it's hard to know what's in a feedstock or inform customers without testing.
- Non-recyclable components can render an entire product non-recyclable.
- It is hard to separate plastics effectively and find a good source of segregated plastic stream (in the U.S.).
- Recyclers need both knowledge of product components and the ability to separate them.
- Materials change quickly over time and it is difficult for recycling systems to keep up.
- Renewables are available at large volumes, not mass, causing logistical challenges in aggregating enough mass to make a source viable for the supply chain.
- No worldwide solution exists for sustainably sourced waste material (e.g., once you start shipping it among geographies, your sustainability is reduced).
- The supply chain for renewables has to be set up from scratch—how can organic wastes be aggregated more efficiently? (Co-location has its limits)
- Better reduction pathways must be found to remove oxygen from bio-based chemicals to then functionalize the molecule.
- If you want to switch to a novel bio-based chemical, you may only have a single source and that is risky.
- Start-ups have to focus on narrow niche markets (because they can meet the scale), not the high-volume, potentially high revenue markets (an issue of matching scale of production and demand).
- B2B customers need to be patient and take the long view until something can scale, but it can be hard to get managers to agree.
- Venture Capitalists want large plants and large volumes, because they are used to fuels!
- Messaging is difficult – consumers care about safety but how to message that?
 - Renewable doesn't mean safe
 - Hard to do and understand LCAs
- Over-specifying is a problem; relaxing of specifications could open up the opportunity for renewable/recycled materials. For example, a hemp shirt is not as durable but people are buying it because of the story.

Opportunities/Solutions/Enablers

- Work recycled materials into design as an upfront design constraint (allows you to tell a story to the consumer), for example, working with the inconsistency by over-dyeing grey yarn to black, and making a heathered textile.
- Use recycled materials in less visible product locations (e.g., cabinet interiors).
- Design materials to be recyclable and re-colorable—this would require stable secondary markets, and effective reclamation infrastructure.
- Educate the recycler that material must be separated in a certain way to be useable, and create better B2B communication links/ relationships up and down the value chain.
- Limit chemical additives/ mixtures in order to facilitate recycling (e.g., in PET bottles).
- Maximize the use of in-house scrap so you know what's in it.

- Tell the story: some brands, like Aveda, will pay a small premium if they can tell a story; startups need to find those companies.
- To reduce risk from having a single source of bio-based chemicals or materials, source a bio-based chemical for a new product or one product line, until scale is reached and multiple sources are established (keeping in mind the caveat from a bio-based chemical manufacturer: If we can only sell our customer a small amount, it doesn't help with the customer's bio-based claim).
- Early-stage bio-based companies are small and need to focus on specialty chemicals.
- Regional solutions can help with sourcing and aggregation of feedstocks.

Role for the GC3 in Helping to Advance Green Chemistry in this Area

- Find and highlight examples of companies using waste as a feedstock, using green chemistry to avoid contaminants in value chain, etc.
- Facilitate further supply chain conversations about how to increase the use of renewable/recyclable materials and help accelerate the growth of this market.

2) **Funding for Green Chemistry**

Facilitators:

Joel Tickner, Green Chemistry & Commerce Council (GC3), UMASS Lowell
Michele Jalbert, Effective Advocates, LLC

Summary:

This discussion focused on the funding needs for companies with green chemistry initiatives at various stages of development, seeking different types of financial support. The recently completed inventory of federal funding, which provided information for available funding programs from R&D through commercialization, served to catalyze the discussion. Companies ranging from early-stage start-ups to manufacturers to retailers participated in the discussion, sharing experiences and ideas.

Key Takeaways:

Challenges for Implementation

- Companies are challenged by the restrictive nature of government funding opportunities - more programs with open categories would be preferred, versus specific calls for participants with narrow applicability.
- It's unclear what kind of federal funding will be continuing.
- Timelines for early stage funding are very long – NSF, DOE, etc. application processes are lengthy, especially for cash-starved early stage companies.
- There is a sense that government has no unified vision for funding across agencies and often within an agency.
- It is unclear who to connect to within agencies to shape or influence funding program parameters.
- Scale-up is a critical phase in successful commercialization and companies struggle with how to set up production infrastructure for low volume.

Lessons Learned

- Tolling facilities offer a cost-advantaged avenue for start-ups to move through early scale production.
- Industry/government partnerships, such as RAPID (Rapid Advancement in Process Intensification Deployment) one of the Manufacturing USA Centers, offer ways to share the risk of developing and scaling up new green chemistry products.
- It is important, when funding policies are implemented, that they promote rather than stifle innovation.
- Understanding derivatives is important to getting technologies to market.
- It's rare to get money for safer materials. Instead, identify strategic opportunities and how green chemistry fits in.
- Look for in-kind support- for example, getting in other companies' labs.
- There are a range of other funding opportunities that can supplement government funding programs, such as venture and angel funders, limited partnerships/joint venture and strategic investors.
- Europe has more grant funding opportunities than does the US.

Role for the GC3 in Helping to Advance Green Chemistry in this Area

- Identify pain points where funding is needed.
- Identify best practices for engaging funders
- Create success stories of jobs and manufacturing
- Educate funders
- Identify ways to pool demand

3) Embedding Green Chemistry in Company Culture

Facilitators:

Amy Perlmutter, Green Chemistry & Commerce Council (GC3) and Perlmutter Associates
Saskia van Bergen, Washington State, Department of Ecology

Summary:

To kick-start the discussion, representatives from Steelcase, Kingfisher and Mrs. Meyers briefly spoke about their company culture as it relates to green chemistry. Steelcase has conducted internal reviews and has internal resources for development teams, like their sustainability team, which helps to imbed sustainability further into their culture. Kingfisher is working to unify operations and harmonize product acquisition partially because there is commitment from the board and there is a sense of brand or reputational risk if related green chemistry issues go unaddressed. Mrs. Meyers said that green chemistry aligns with their original values of thrift, wholesome ingredients on the farm, etc. Most attendees said that they were just starting to incorporate green chemistry into their company culture. The importance of C-Suite buy in was captured by the following comment from one participant: "Corporate culture can be defined for a company by looking at what the most senior person in the company is willing to tolerate. That sets the tone and an example for the rest of the organization to emulate."

Key Takeaways:

Challenges for Implementation

- It is not always easy to know where to start.
- Various audiences, including the C-suite, respond to different types of messages and engagement— how can people identify the best ways to engage the various audiences?
- There is a lack of control of the supply chain.
- It is easy to feel overwhelmed about the enormity of the problem and understand the value of taking it on.
- There can be a lack of engaged groups within the company: purchasing, C-Suite, employees.
- Existing chemical lists aren't always used.
- The status quo frequently gets in the way of change.

Lessons Learned

- Cross-departmental discussions about green chemistry can be useful to talk about the pros, cons or obstacles to overcome.
- Benefits can result from the process of trying to change company culture, even if the ultimate goal fails.
- Present the total value proposition to the C-Suite, not just top line and bottom line costs.
- Make brands part of the equation- they should educate or train suppliers so they understand the value of positive formulation lists and drive pull-through in the value chain.
- Use the social and cultural values of the host community to make the company's case for green chemistry.
- Show that the corporate pain of staying the same is greater than the pain of changing.
- Match messaging and information to the audience being addressed within the company.
- Position the opportunity to the C-Suite as material to risk mitigation- companies don't want to be in the wrong chemistry at the wrong time. Make sure materiality assessments include green chemistry-related issues, and use results to drive corporate strategy.
- Talk about value in addition to cost. Examples are less operational complexity, lower costs for suppliers, shorter supply chain with less intensity (supply disruption), reduced employee safety risk, customer retention and growth.
- Make the message about innovation or something positive, something that is worthy of engaging people, vs. Restricted Substances Lists.
- Tie green chemistry to the Stage Gate process.
- Expand the group of stakeholders engaged to include academia, NGOs, investors, government, testing labs, worker groups, and/or the insurance industry; define how they all can work together on a common agenda.

Role for the GC3 in Helping to Advance Green Chemistry in this Area

- The GC3 can be a convener, bringing people from companies who don't attend the GC3 Roundtable traditionally to engage on the topic and help drive it further into companies.
- Work with insurance companies to quantify the types of risks that companies face by not pursuing green chemistry.
- Create material resources:
 - update the report on Making the Business Case for Green Chemistry, by Trucost;

- develop a 2-page pitch for making the business case to executives and other audiences;
- send out a short list of key learnings and outcomes of the Roundtable so participants can make the case internally for the value of the GC3; and
- develop examples and case studies of companies who have been successful.

4) Measuring Firm-level Progress in Green Chemistry

Facilitators:

Sally Edwards, Green Chemistry & Commerce Council (GC3), UMASS Lowell
Tim Greiner, Pure Strategies

This group discussed the following questions:

- What are the biggest challenges your company faces in characterizing (quantitatively and qualitatively) its progress towards implementing green chemistry solutions, and what can be done to address these challenges?
- How does your company currently assess its progress in both reducing its use of chemicals of concern and implementing green chemistry solutions?
- Are there successful models that can be adopted?

Summary:

The group had a wide-ranging discussion of the metrics companies are currently using to measure progress away from chemicals of concern and toward more sustainable chemistries. Participants shared their approaches for measuring progress and the challenges they face, including the difficulties of getting data on chemical ingredients from their supply chains, and the lack of data on many chemicals, which hampers decision-making for selecting safer alternatives.

Key Takeaways:

Approaches Being Used

- To measure progress away from ingredients of concern, one company creates ingredient restriction policies and then sets targets and objectives to meet the intention of the policy. To measure progress toward sustainable products, his company has a product-focused effort that evaluates sustainability hot spots and gives points to products that make improvements. His company does not use the term green chemistry in measuring progress. In addition, his company has a tool that evaluates new formulations, which must meet a score of 80 or above.
- Another person noted that her company has an internal policy for improving products and follows a continuous improvement model. As they select new raw materials, they look for those that meet the 12 Principles of Green Chemistry. They also set targets/goals for green chemistry and can track progress. They do not communicate much of this work externally. They also set sustainability targets for 2020 that imbed green chemistry.
- Another person noted that her company sets criteria for products to meet design for environment specifications and focuses on the more problematic chemicals. She noted that customers don't have consistent asks (e.g., some request no PFCs where others may want the stain resistance function). She also noted that her company uses different criteria for different

geographic locations. They track reductions in the use of certain chemicals such as PVC and HFRs and also noted that TB 117 change helped them move towards non-halogenated flame-retardants.

Challenges for Implementation

- Reduction in the use of chemicals of high concern is not really a true measure of green chemistry progress. To evaluate chemicals in products, it is essential to have full information on the chemicals in each component of an article.
 - One company has achieved full materials disclosure for about 20,000 products (about ½ of the product portfolio). They had to develop a portal for storing this information. This is very costly. A mechanism to check accuracy and/or consistency of data being provided is needed.
- Some formulators have problems with sharing information on ingredients as they view this information as proprietary. Protecting IP/trade secrets has to be taken seriously.
- Sometimes the best solution is a design change rather than a chemical substitution. How is this innovation measured? An example provided was Best Buy's efforts to move a power supply away from the flammable part of a TV. Because merchants were not asking for this product on a large scale, suppliers stopped making it.
- Reengineering is part of the process of innovating and reducing use of chemicals of high concern but it is not the same as having a comprehensive blueprint for sustainable chemistry.
- Participants raised concerns about regrettable substitutions and replacing a chemical of concern with one that is not well studied. The need for a minimum data set and transparency about tradeoffs was also mentioned.

Helpful Actions to Advance Green Chemistry

- Create a spider diagram that includes the key elements of a decision, including what is preferred versus what is restricted. This evaluation could be used to get a sense of how prepared a supplier is to meet goals and help companies judge what is better.
- Block Chain technology could be a means of sharing and verifying chemical ingredient information.
- Comparisons can be done within sectors or product categories to define what "better" means.
- Story telling about green chemistry success stories is important (e.g., development of alternative to BP in can linings).
- The US EPA Presidential Green Chemistry awards provide information on metrics that describe environmental benefits of new technologies.
- The Pharma roundtable at GCI has published a metrics paper. They have done a good job of going beyond yield, and this thinking has been evolving over the years. This publication includes tools used to measure progress including PMI calculator and PMI LCA calculator, etc. It also identifies green solvents and reagents.

Utilizing Sustainable Feedstocks at Scale: Challenges and Opportunities

Moderator: A.J. (Sandy) Marshal, Bio-Industrial Innovation Canada

Panelists:

Jeremy Austin, Renmatix

Karl Haider, Covestro LLC

Chad Pastor, Michigan State University Bioeconomy Institute

Summary:

Many companies are seeking ways to reduce their emissions, improve the environmental footprint of their processes, and diversify the materials used in their products beyond traditional petroleum-derived materials. While there are many sustainable and bio-based materials available, developing the supply chain to provide access to bio-based and renewable materials is no small task. This panel session focused on three case examples from companies who have successfully developed technologies based on different types of alternative feedstocks (CO₂, corn stover, and woody biomass) for their processes.

Karl Haider of Covestro spoke about a novel process, developed in partnership with a university in Aachen, Germany, to incorporate carbon dioxide (CO₂) into the polyol component of polyurethane foams, which they are selling under the brand name Cardyon. The CO₂ is a by-product of an industrial process at a Covestro facility, so they were able to co-locate the production of the CO₂-based polyurethane foam to get ready access to clean CO₂. The development process took 5 years to go from bench scale to drum scale, with the primary challenge being the development of an economically viable production process.

Chad Pastor of Michigan State University Bioeconomy Institute (MBI), which focuses on de-risking of bio-based technologies in addition to in-house technology development, spoke primarily about MBI's Ammonia Fiber Expansion (AFEX) technology, which uses ammonia to convert crop residues (e.g. corn stover, wheat hulls, grasses, etc.) into densified pellets that can be used as a feedstock in many different kinds of fermentation. As a test, they used AFEX pellets made from corn stover in a traditional fermentation process and were able to convert them into succinic acid using fermentation at the same efficiency as an identical process that used corn sugar as an input. The strength of the AFEX technology is that the processing of the crop residues can be done on a small scale using a distributed model, which dramatically improves the economics of using these crop residues and reduces risk associated with droughts or flooding.

Finally, Jeremy Austin of Renmatix spoke about their Plantrose process, which uses supercritical water to convert woody biomass to C5 and C6 sugars and other valuable co-products, including crystalline cellulose, hemicellulose, and processed lignin. He compared their process, which fractions bio-feedstocks into monetizable product streams, to barrels of oil, which are fractionated and sold in much the same way. The woody biomass already has a well-developed supply chain that makes commercializing this feedstock easier, but the same cannot be said for other alternative feedstocks, which face significant supply chain challenges. However, there was a consensus among the panelists that once the supply chain becomes stronger, there will be a rapid expansion in this space.

Key Takeaways:

Opportunities for Safer Chemicals and Products

- Bio-based/renewable materials are primed for rapid expansion once the supply chain supporting these new technologies becomes more stable.
- Repurposing and retrofitting un-used commercial production facilities can be a good way for new technologies to scale up.

Key Drivers for Safer Chemicals and Products

- Collaborations with universities and other organizations can help develop and de-risk new technologies.
- Materials are just materials – being bio-based can add a nice story, but at the end of the day, companies will be interested in a product for its cost and performance.

Challenges for Implementation/Lessons Learned

- Scaling technologies based on alternative feedstocks is difficult because the supply chain is not there (other than for woody biomass, which has a very well developed supply chain).
- A lot of biomass has a very low density and there is a limit to how far you can economically transport it.
- There is a need to build customer acceptance for new materials that do not have identical structures to the materials that are being replaced.
- There is a possible need for reformulation when using new molecules/materials.

Helpful Actions to Advance Green Chemistry

- Some policies in Europe have started to restrict the amount of ethanol that can be made from 1st generation sugars (which come directly from crops, e.g. corn) to help spur innovation and growth of processes based on 2nd generation sugars (which come from non-food based sources, e.g. agricultural residues)

Role for the GC3 in Helping to Advance Green Chemistry in this Area

- Continue to host discussions on using sustainable/bio-based feedstocks at scale to educate and build understanding of the opportunities and challenges in this space.

APRIL 27, 2017

Keynote

Speakers:

Angela Nahikian, Steelcase Inc.

Bruce Smith, Steelcase Inc.

Summary:

Angela Nahikian and Bruce Smith of Steelcase, Inc., discussed the opportunities and challenges associated with transitioning from the traditional linear industrial model to a more circular economy, framing it a systems design challenge. From their perspective, quite simply, the central difference between circular and linear economy is design intent. To move from a linear to a circular economy, designing the manufacture of products holistically, in collaboration with people in adjacent markets, is essential to building the infrastructure needed to bring better materials and processes into the supply chain that enable reuse, and remanufacture at the end of a product's useful life. The circular economy "butterfly diagram" is an illustration of how to disrupt the linear economy – there are many potential entry points and opportunities. As an example, they discussed the Steelcase Think Chair, which has been re-designed to make disassembly easier and to use less complex, cleaner materials to facilitate recycling/reuse. They discussed the need to speak the right language, framing product redesign for a more circular business model as an opportunity to recapture assets and use this as a way to generate more value. Building this economic model cannot be done in isolation – only when you begin to connect processes can you really start to see substantial benefits. They also took care to clarify the difference between a circular product system, which is simply the cycling of products, and a true circular economy, which looks at entire processes and manufacturing ecosystems. They provided some historical context on the linear economy, which has been perfected over the past several centuries, and framed the challenge as being one of disrupting this model. To be successful, companies need to give their designers the space to design outside the current state/business model, allow for more cross-collaboration throughout the supply chain, and work iteratively using learning cycles to see what works best in different situations and markets.

Key Takeaways:

Opportunities for Safer Chemicals and Products

- Sustainable design for a circular economy is an enormous design space with many opportunities.

Key Drivers for Safer Chemicals and Products

- In an industrial system, collaboration is key – it takes many people in adjacent markets to work with the design team to develop new materials and processes that enable reuse and remanufacture.
- Language matters – create the right stories that resonate and connect.
- Market ideas around the circular economy that can shift people's perspective.
- Think holistically on a longer time-scale to give new materials a chance to compete with the incumbents.

Challenges for Implementation/Lessons Learned

- Identifying how to maintain the value (both social and economic) of the materials.
- It's hard to compete with the linear model, which has been perfected for centuries.
- Designers need to be given the space to design outside the current processes and business models.
- Building this new economic model cannot be done in isolation – only when companies begin to connect processes can they really start to see substantial benefits. This requires supply chain collaboration.
- In moving towards a circular economy, it's important to make sure you are not unintentionally incorporating harmful materials. It's a supply chain challenge to work with all suppliers and designers to truly understand and test what is in the materials that are being used.

Helpful Actions to Advance Green Chemistry

- Develop clear language about the circular economy – be clear that it is not just a circular product system, but also a holistic shift in the design process that enables recapture of valuable assets.

Role for the GC3 in Helping to Advance Green Chemistry in this Area

- Facilitate supply chain dialog.

GC3 Project Breakout Discussions

These breakout groups are interactive facilitated discussions that help inform and provide direction to GC3 projects during the upcoming year.

1) Communications Strategies for Enhancing the Impact of the GC3

Facilitator: Amy Perlmutter, Green Chemistry & Commerce Council (GC3) and Perlmutter Associates

Summary:

This discussion focused on a range of topics related to how to more effectively message the work of the GC3, and how to grow membership and impact as a result. Framing questions included:

- What are things the GC3 should be doing to get its message out? Who should it be talking to and what is the best way to reach that audience?
- What do companies need to help them market the GC3 and green chemistry within companies and to networks?
- What role can social media and new digital platforms play in promoting green chemistry?
- How can GC3 support your green chemistry communications efforts?

Key Takeaways:

What Should the GC3's Message Be?

- First, decide if the focus is to get the message out about the GC3 or about green chemistry.
- Promote and make visible that there is true value in being part of the GC3. GC3 equals brains, networking, and quality.
- Keep the message positive: green chemistry (and GC3) is about innovation.
- GC3 should publicize its key messages (and encourage people to use them) to talk about the organization within companies and supply chains.
- A short list of bullet points of key accomplishments and learnings from the Roundtable would be helpful to have (along with Roundtable proceedings).
- Networking is a very critical offering of the GC3, not just customer and supplier, but across types of companies.
- GC3's role is to connect everyone to green chemistry, get people to think differently.
- There are great lessons to be learned from the people at the GC3 Roundtable and great things to learn. If GC3 continues to create that, there is value. Think of the GC3 as the system- the go- to engine.

How Should the Message Get Out?

- Develop a communications strategy.
- Explain green chemistry technology in a fun way- the National Nanotechnology Initiative has a fun song and video on You Tube aimed towards kids that could be a model: <https://www.youtube.com/watch?v=F25N8jG13c>.
- Present at webinars and conferences of other organizations, such as Sustainable Purchasing Leadership Council, Center for Life Cycle Management, Sustainable Apparel Coalition, and biomaterials groups. Present about results of projects, not just about GC3.
- Identify and compile the messages and vehicles that member companies use to communicate to their customers, supply chain, investors, board, etc. about their green chemistry efforts.
- Think about engaging the media more: hold a workshop for journalists about green chemistry, GC3 and its members, start with trade journals, send selected journals the output of the Roundtable.
- Bring together students, business, journalists, and supply-chain members to discuss green chemistry and solve green chemistry challenges. The University of Oregon was mentioned as model.
- Engage communications departments at member companies or organizations for advice and assistance.

Who Should be Members and/or Attend the Roundtable?

- Getting too large is a danger; grow thoughtfully.
- Think about including members of the entire value chain from key segments: e.g., textiles, cosmetics, retailers.
- Identify the specific titles within companies that should be members.
- Make sure retailers continue to have a visible seat at the table.
- Get the message out to get a diversity of potential members.
- Include executives from marketing and business development parts of companies.

- Identify where the vast majority of green chemists work—e.g., chemical companies—and target there.
- Consider discounts for bringing suppliers.

Other Thoughts

- The ‘homework’ questions that were sent prior to the Roundtable helped people engage with other parts of their company (and vice versa) and bring viewpoints to the Roundtable that may not have been included, since many companies can’t afford to send multiple people. In the future, it would be helpful to see the answers people found to the questions.
- There is interest in a webinar on GC3’s new messaging when it is ready.
- GC3 should have a member directory, which could include answers to some basic questions that might help people make new connections.
- Develop case studies that could be presented via webinar. Possible themes are new inventions and replacing materials.

2) Startup Network Breakout Group

Facilitator: Laura Hoch, Green Chemistry & Commerce Council (GC3), UMASS Lowell

Summary:

The GC3 Green & Bio-based Chemistry Startup Network, launched last year at the 2016 GC3 Innovators Roundtable, seeks to accelerate the growth and market adoption of green and bio-based chemistry technologies by supporting innovative startups and small companies developing greener solutions. This session began with a brief overview of the GC3 Startup Network’s mission and goals as well as a summary of the activities over the past year. To date, we have recruited 20 startup companies to formally join the network, organized three in-person events, launched a webinar series, and built a framework for future growth – including forming a Steering Committee, building several web pages, and starting a LinkedIn discussion group. The remainder of the session focused on brainstorming ways to engage different actors throughout the value chain to get information about technology needs and solutions and help startups to better understand the entry points in different markets and sectors, as described below. The GC3 will use this information to help guide it as it looks for new ways to help grow and support the green and bio-based chemistry startup community.

Key Takeaways:

Engage Different Actors Throughout the Supply Chain

- Many different actors throughout the supply chain play an important role in getting a new technology to market and scale.
- Brands and retailers indicating interest in technology are very helpful to demonstrate demand.
- Bring the middle of the supply chain in to the conversation – formulators, materials converters, etc. These companies are very important partners for startups looking to commercialize a new chemical/material.
- Bring more investors to GC3 events:
 - let’s them hear from the larger companies that they are interested in new green and bio-based chemistry technologies;

- helps them to better understand the value chain.

Highlight Needs of Larger GC3 Member Companies

- Share or document the technology interests of larger companies:
 - demonstrates that there is demand;
 - helps startups understand different entry points into a market
- Organize some “reverse pitch” webinars where larger companies talk about their technology needs and interests, both for their company and for their sector.
- Try to collect “statements of interest” or other similar public documents from larger companies that indicate the types of technologies they might be interested in.

Organize Events and Webinars That Connect Technology Demand/Supply

- Organize an open innovation challenge competition to engage both larger companies who have technology challenges and startups/other companies who could provide those solutions:
 - enables a dialog about technology challenges with many companies throughout the value chain – e.g. “top green chemistry challenges of the GC3;”
 - dialog results would be turned into the challenge categories and criteria for evaluation;
 - can be particularly attractive for large companies without their own dedicated tech scouting or open innovation programs;
 - startups who enter into the competition would get to meet in-person with companies who are directly interested in working with them (investing, partnership, joint development, etc.);
 - builds on GC3 expertise developed through the Preservatives Competition.
- Organize a sector-focused event for startups, large companies, and investors that are all in the same or similar sectors (e.g. footwear and apparel, electronics, etc.):
 - allows for a deeper dive into challenges faced by that area;
 - companies in attendance are very relevant to one another.
- Organize webinars:
 - Innovation Spotlight Series – Provide visibility to Startup Network members by featuring 2-3 startups per webinar, grouped by technology, product type, etc.;
 - Reverse Pitches - Invite large companies and investors to talk about specific technology interests and needs;
 - Highlighting Partnerships - Startups and larger companies discuss successful joint development projects, lessons learned, etc.

Build a Sense of Community for Startup Network Members

- Facilitate startup mentoring – pair startups in our network with more experienced startups or larger companies that could help provide strategic advice and insight.
- Start a Slack Channel for startup network members to allow for rapid, informal communication of relevant information, news articles, jokes, etc.
- Organize a monthly “mastermind” Google hangout where members of the Startup Network could practice giving pitches, get feedback from the group, and have discussions about key challenges or other relevant topics.

Next Steps

- The GC3 will review these ideas and develop a strategic plan for 2017/2018 in consultation with its Startup Network Steering Committee, the GC3 Advisory Board, and members of the GC3 Startup Network.

3) Advancing Federal and State Green Chemistry Policy

Facilitators:

Michael Parr, Parr Policy Group
Michele Jalbert, Effective Advocates

Summary:

Following the opening panel discussion examining the current federal and state policy landscape, this session delved into nuances of how to influence the new Administration and Congress, as well as identify policy priorities that could be helpful for GC3 members.

Key Takeaways:

Opportunities

- Focus on economic arguments in support of green chemistry policy, rather than traditional environmental arguments (e.g. product improvements, new markets, more efficient use of water, energy, advanced manufacturing, etc., new products are most profitable).
- A broader definition of sustainable chemistry will reach more policymakers.
- Focus on preventing policy barriers that stifle green chemistry innovation (vs. banning bad things).
- Protect funding from budget cuts, focus first on what is most critical and then go on the offensive.
- Promote transparency in the regulatory process: we need clearer timelines and an accelerated process for “greener” alternatives.
- New TSCA is creating new opportunities, however EPA is moving slowly, causing concern about implementation timetables.
- There are significant opportunities to streamline/improve PMN process and make process more efficient.
- Focus on the desire for efficient processes when advocating. Use states as models for innovation policy. Moving policy on the state level may be more likely, and use states to put pressure on the federal government.
- Don’t complicate/confuse the message to policymakers by talking about green chemistry, focus on innovation.
- Consider policies that focus on nature of raw materials/manufacturing process as well as finished products.
- Focus on basic science/R&D funding via appropriations process.
- Get a TSCA amendment that would create a fee that could be used for green chemistry.

Role for the GC3 in Helping to Advance Green Chemistry in this Area

- Look for anecdotes about the economic impact of green chemistry (jobs created, etc.).
- Examine trade policy -barriers & opportunities.

Partnering Across the Value Chain to Advance Green Chemistry

Moderator:

Monica Becker, Green Chemistry & Commerce Council (GC3) and Monica Becker and Associates

Panelists:

Kim Holmes, Plastics Industry Association

Alper Kiziltas, Ford Motor Company

Mark Richardson, Series One, LLC

Kris Weigel, Resinate Materials Group

Summary:

This panel highlighted two key partnerships in industry that are working to advance green chemistry principles. The first is between the Plastics Industry Association (PIA) and Series One, LLC. PIA developed a recycling committee designed to create a new demand for recycled plastic and identify unused feed streams. A key hurdle exists between the waste manager and the processor that lands too much recyclable material in landfills. The open source approach bridges the knowledge gap through transparency, effective communication, a level playing field, and a connected value chain.

The second partnership featured is between Ford Motor Company and Resinate Materials Group. These two companies created a closed recycling loop for turning PET into polyols automotive foams. The recycled PET foams demonstrate favorable mechanical and thermodynamic properties, as well as reduce the cost of the foams and extend the life of raw materials.

Key Takeaways:

Opportunities for Safer Chemicals and Products

- Because PET is a natural flame retardant, there is no need for additives.

Key Drivers for Safer Chemicals and Products

- Closed loop recycling and the circular economy will drive more use of secondary materials.
- A “champion” is needed who can keep moving a project forward and keep the focus.
- Transparency is key.

Challenges for Implementation/Lessons Learned

- No two recyclables streams are the same.
- There is not always a consistent supply of recyclable material.
- Different companies have different goals.
- Bad data can lead to recyclable material going to the landfill.

Helpful Actions to Advance Green Chemistry

- Put the use of recyclable material at the beginning of the value chain, not the end.
- Design products to specifically use recyclable material.

Role for the GC3 in Helping to Advance Green Chemistry in this Area

- Connect companies with streams of recyclables that are unused.