GC3 Member Update Call

February 10, 2016

GREEN CHEMISTRY & COMMERCE COUNCIL

Business Mainstreaming Green Chemistry

Desired Outcomes

- Update GC3 Members on GC3 Membership, Projects and Initiatives
- Seek input from GC3 Members
- Engage dialogue on GC3 directions

Agenda

12:00-12:20	Overview and GC3 Update
12:20-12:40	GC3 Mainstreaming Green Chemistry Initiative
12:40-1:00	GC3 Collaborative Innovation Project Update

Today's Speakers

Joel Tickner

Monica Becker

Amy Perlmutter

Advisory Committee

- John Frazier
- James Ewell, GreenBlue
- Barbara Hanley, HP Inc.
- Al Iannuzzi, Johnson & Johnson
- Bob Israel, Valspar
- Rich Liroff, Investor Environmental Health Network
- Roger McFadden, Staples
- Ken Zarker, Washington State Department of Ecology
- Al Innes, State of Minnesota
- Bob Buck, The Chemours Company

Staff

- Joel Tickner, Director
- Monica Becker, Co-Director & Innovation Project Lead
- Sally Edwards, Retail Project Lead
- Amy Perlmutter, Mainstreaming Project Lead
- Saskia van Bergen, Education Project Lead
- Laura Hoch, Technical Fellow
- Jennifer Landry, Business Manager

GC3 Membership Update

- 90 Total Members
- New Members:

- Revisions to membership guidelines this spring

GC3 Activity Update

- Published three Strategic Research Initiative Papers during past nine months:
  - Making the Business & Economic Case for Safer Chemistry
  - Advancing Green Chemistry: Barriers to Adoption & Ways to Accelerate Green Chemistry in Supply Chains
  - Measuring Progress towards Green Chemistry
- Released GC3 Agenda to Mainstream Green Chemistry

Other GC3 Successes

- Launched Innovation Portal
- Launched Safer Chemistry Training for Businesses
- Reorganized Retailer Portal
- Released Criteria Document for Safe and Effective Preservatives
- Significant engagement with office of Senator Chris Coons on Sustainable Chemistry Research and Development Act

Accelerating Business and Policy Attention to Green Chemistry and GC3

- Hosted Congressional Briefing with ACS and ASBC
- Significant media attention to GC3 efforts and presentations at major conferences
- Co-sponsor/organizer of 2015 German Sustainable Chemistry Conference and engaged in new International Coordinating Center for Sustainable Chemistry

Efforts this Spring

- Increase outreach efforts to improve our message on the GC3 value proposition
- Increase membership, particularly in specific sectors
- Outreach on the Agenda to Mainstream Green chemistry
- Initiate Preservatives Innovation Challenge
- Release retailer-chemical company joint statement

GC3 Innovators Roundtable

GC3 INNOVATORS ROUNDTABLE
MAY 24-26, 2016 | BURLINGTON, VT
hosted by seventh generation.

11th Annual Innovators Roundtable

Hosted by Seventh Generation

Hilton Burlington Hotel, Burlington, VT

May 24-26, 2016

Registration is now open to members only!
Opens to non-members on March 1.
Space is limited. Register today.

11th Annual GC3 Innovators Roundtable Update - Sessions

- Learning from GC3 Collaborations to Drive Green Chemistry
- Investing in Green Chemistry Solutions: Challenges and Opportunities
- Connecting Green Chemistry to Climate Change and the Circular Economy
- Accelerating Green Chemistry at a Global Level: Building International Collaborations
- Effective Communication to Mainstream Green Chemistry
- Safer and Better: High Performing Green Chemistry Solutions

Roundtable Update – Additional Sessions

- Pre-Meeting: Growing the Ecosystem of Green Chemistry Entrepreneurs: A Learning, Mentoring and Networking Event
- Interactive Session – Overcoming Barriers to Mainstreaming Green Chemistry
- Keynotes: John Warner; Gary Cohen; John Replogle; Ben Cohen (invited);

GC3 Retailer Leadership Council

GC3 Retailer Leadership Council - dialogue with chemical manufacturers

GC3

Joint Statement on using Green Chemistry and Safer Alternatives to Advance Sustainable Products

5 elements:

- Goal setting and continuous improvement
- Communication
- Transparency
- Information on new chemicals and safer alternatives
- Support for green chemistry education

Innovation Portal

www.greenchemistryportal.org

Innovation Forum

- Building an online community of green chemistry innovators
- Two successful Ask the Innovators Q&A sessions
  - Over 100 unique visitors to BCGC, over 300 to DWRs
- Upcoming sessions:
  - Mainstreaming Agenda (March)
  - Flame retardants (April)

Innovation Map

- Mapping organizations involved in green chemistry efforts
- Over 400 companies and other organizations
- Expanding to include new green chemistry organizations and their members

ACS Green Chemistry Institute®

GC3

www.greenchemistryportal.org

WELCOME TO THE GREEN CHEMISTRY INNOVATION PORTAL

A PLACE FOR GREEN CHEMISTRY PROFESSIONALS AND INNOVATORS TO CONNECT AND COLLABORATE

The Green Chemistry Innovation Portal is a multi-faceted tool to connect and expand the green chemistry community. Whether you want to discuss solutions for a pressing business need, build a collaboration around your new technology, or just meet other like-minded professionals, the Portal can help. See the Innovation Map for an overview of the community, or dig right into the Innovation Forum to talk to others like you.

Sign up for our mailing list to receive occasional updates about the Innovation Portal.

INNOVATION MAP

EXPLORE THE COMMUNITY

INNOVATION FORUM

JOIN THE DISCUSSION

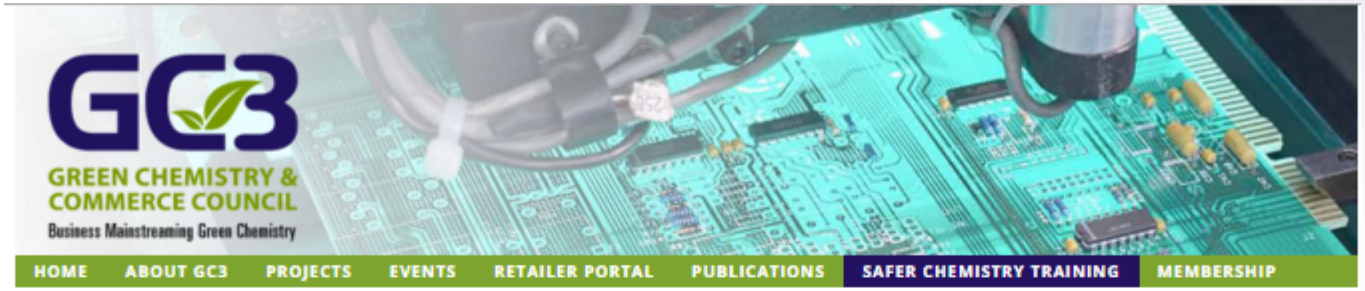
Education

Safer Chemistry Training for Businesses

- Creation of Additional Safer Chemistry Online Training Recordings
  - Webinar on Supply Chain Communication- tentative March
  - Webinar on Metrics for Chemists- tentative April
- Career webinar presented by GC3 members for students- tentative March

Innovators Internship

- 2016 Innovators Internship
  - 4 internship positions
  - Application period opens next week



SAFER CHEMISTRY TRAINING
- Introduction
- Webinars
- Presenters
- Additional Resources

GC3 Safer Chemistry Training Webinars

A full list of our educational safer chemistry webinars is shown in the table below. Click on any webinar title (in the first column) to learn more about the webinar and to view an archived version. You can also click on a presenter's name to read a brief bio. Each presenter has been assigned a *chemistry rating* indicating the level of chemistry knowledge recommended for viewing their presentation. The ratings range from 1, indicating no specific chemistry knowledge needed, to 5, indicating an advanced chemistry education is recommended.

Webinar Title and Description	Presenters	Chemistry Rating
Foundations for Green Chemistry and Green Engineering		
Green Chemistry: Benign by Design One of the fathers of green chemistry, Dr. John Warner, provides an introduction to green chemistry, as well as ideas for how to build this concept into education and practice.	John Warner Warner Babcock Institute for Green Chemistry	1
Introduction to Green Engineering Green engineering applies principles similar to those of green chemistry to process and product design. In this webinar, experts in green engineering introduce principles, tools, and examples of this practice.	Julie Zimmerman Yale University	1
	Matthew Eckelman Northeastern University	1
	Julie Schoenung University of California Davis	1
The Role of Policy in Green Chemistry Research and Adoption This webinar provides an overview of the range of policies that can affect chemical design and product development and adoption, with examples from a major chemical manufacturer.	Robert Giraud DuPont Company	1
	Joel Tickner Green Chemistry & Commerce Council	1
Green Chemistry in Business		
The Value of Green Chemistry Green chemistry leaders in industry discuss their efforts to build awareness and make a case within their firms, supply chains, and customers on the value of green chemistry.	Helen Holder Hewlett-Packard	1
	Tse-Sung Wu	

Question & Answer

Mainstreaming Green Chemistry Project Group

GREEN CHEMISTRY & COMMERCE COUNCIL

Business Mainstreaming Green Chemistry

Mainstreaming GC Project Group Activities

- ✓ Finalized Agenda to Mainstream GC (December, 2015)
- Outreach re: Agenda (January-March)
- Webinars
- Vision/Value Chain
- Roundtable planning- networking session on overcoming barriers

An Agenda to Mainstream Green Chemistry

Green Chemistry & Commerce Council

Agenda Goals

- Scale green chemistry innovation
- Elevate the importance of green chemistry in education and research
- Develop and pass smart policies that support markets, research, and innovation

Advisory Committee

- Eric Beckman, University of Pittsburgh
- Mark Brady, Business Oregon
- David Constable, American Chemistry Society
- Tracey Easthope, Michigan Ecology Center
- Mary Grim, Timberland LLC
- Al Innes, Minnesota Pollution Control Agency
- Bob Israel, Valspar Corporation
- Julie Jones, Advancing Green Chemistry
- Kendra Martz, Construction Specialties, Inc
- Marty Mulvihill, UC Berkeley
- Beverly Thorpe, Clean Production Action
- Martin Wolf, Seventh Generation
- Ken Zarker, Washington State Department of Ecology

Contents

Why An Agenda to Mainstream GC?

- Overview
- Defining Green Chemistry
- How Green Chemistry is Practiced
- The Growth of Green Chemistry
- The Case for Green Chemistry
- Drivers and Barriers

Five Key Strategies

Taking Action

Defining Green Chemistry

- The design of chemical products/processes that reduce or eliminate the use and generation of hazardous substances throughout their lifecycle.
- Builds on conventional chemistry and engineering by applying 12 fundamental principles that guide molecular design of sustainable chemical products/ processes.
- Product developers, manufacturers, retailers, brands: all play important role in implementation.
- Can be an iterative process or it can yield a disruptive innovation.

Five Key Strategies:

The GC3 calls for continuing research and dialogue among stakeholders to keep an up-to-date understanding of the changing market factors driving and holding back green chemistry and adoption, and to use this understanding to grow green chemistry practice.

Five Key Strategies:

The GC3 calls for and will support smart state and federal policies that accelerate and enhance green chemistry innovation and adoption.

Five Key Strategies:

The GC3 supports efforts that help create collaborations within and among supply chains and industry sectors, and which involve other key stakeholders, for the purposes of growing demand, building capacity, stimulating innovation, and improving information flow.

Five Key Strategies:

The GC3 supports the dissemination of information to the marketplace that supports green chemistry education, research, and practice.

Five Key Strategies:

The GC3 supports the development and use of metrics to track and understand green chemistry benefits and progress.

Taking Action

- Support the proposed federal “Sustainable Chemistry R&D Act of 2015” or similar legislation that meets the GC3’s criteria of smart policies

  (Status: held Congressional briefing Jan 13, 2016)

- Expand the development and use of innovative tools and resources to accelerate green chemistry

  (Status: launching/revamping Portals: Innovation, Retail, Education)

Taking Action

- Convene a National Summit on Green Chemistry Education

  (Status: to be developed)

- Build agreement on priority metrics needed to measure progress in GC and ways to gather such metrics

  (Status: will hold meeting at GC3 Roundtable this year)

Taking Action

- Engage with public and private sector funding entities to target critical green chemistry needs

  (Status: to be developed)
- Advance collaborative supply chain partnerships

  (Status: Preservatives Project underway, additional project TBD)

GC3 Actions, Barriers Addressed, and Strategies Used

Action	Barriers Addressed	Key Strategies Addressed
Support the proposed federal "Sustainable Chemistry Research and Development Act of 2015," or similar legislation that meets the GC3's criteria for "smart policies"	• Perception of lack of value in pursuing green chemistry • High cost and long time frame to research, develop, test, and scale up safer alternatives • Lack of technically and/or economically feasible alternatives • Lack of green chemistry-trained chemists and chemical engineers	• Enhance Market Dynamics • Support Smart Policies
Expand the development and use of innovative tools and resources to accelerate green chemistry	• High cost and long time frame to research, develop, test, and scale up safer alternatives • Incumbency of existing chemicals and markets • Supply and demand not in sync • Lack of green chemistry-trained chemists and chmiecal engineers	• Foster Collaborations • Inform the Marketplace
Convene a National Summit on Green Chemistry Research and Education	• Lack of green chemistry-trained chemists and chemical engineers • Lack of alignment of industry need and academic workforce • Inertia and incumbency of traditional chemistry education	• Enhance Market Dynamics • Inform the Marketplace
Build agreement on the priority metrics needed in the short term to measure progress in green chemistry and ways to gather such information	• Lack of agreement on what should be "counted" as green chemistry • Lack of data to measure progress and make the case for green chemistry benefits	• Enhance Market Dynamics • Track Progress
Engage with federal agencies to open funding channels targeted at critical green chemistry needs	• High cost and long time frame to research, develop, test, and scale up safer alternatives • Lack of financial and policy support for green chemistry research and companies • Lack of technically and/or economically feasible safer alternatives • Incumbency of existing chemicals and markets	• Enhance Market Dynamics • Support Smart Policies
Advance Collaborative Supply-Chain Partnerships	• Lack of technically and/or economically feasible safer alternatives • Lack of communication within supply chains	• Enhance Market Dynamics • Foster Collaborations

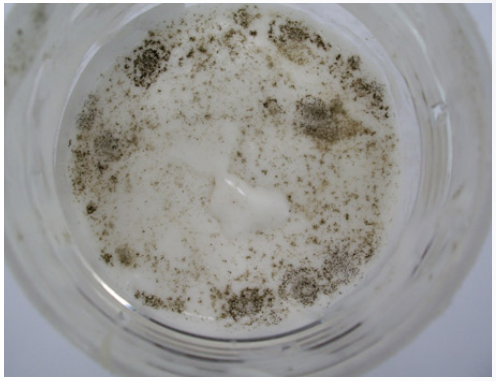
Engaging GC3 Members in Outreach

- Things you can do:
  - Write articles in company newsletter
  - Talk about Agenda when do public speaking
  - Share with groups you are members of
  - Talk it up! to regional, professional, and academic organizations, other businesses, supply chain
  - Tweet (@The_GC3)
- Press release will be available to download and adapt to your needs
- Contact Amy with other ideas, or let her know what you need to help get the word out

Question & Answer

Update on Collaborative Innovation Project: Preservatives

The need for preservatives



Water-based consumer products require preservation

Preservatives prevent:

- Growth of bacteria, yeast, and mold
- Odor issues
- Product performance
- Pathogens

The challenge

- Regulatory restrictions; consumer, NGO, and retailer pressure are reducing the current palette of safe and effective preservatives available to formulators

- Too few effective preservatives used in products that require microbial control can increase sensitization and allergic reactions

- Formulators are seeking new, safe, and effective preservatives systems for use in their products to meet the diverse needs of their customers and other stakeholders

Participants To Date

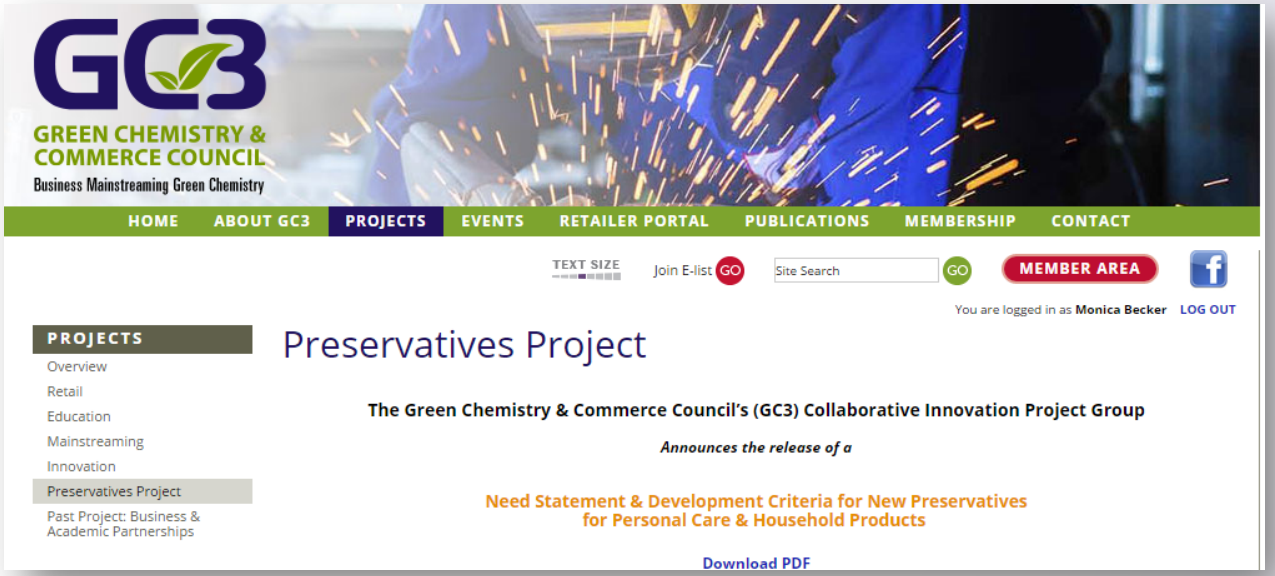
Aubrey Organics	Environmental Defense Fund (EDF)	Procter & Gamble
Aveda/Estee Lauder	Henkel	Seventh Generation
BabyGanics	Johnson & Johnson	Staples
Beautycounter	L'Oreal	Target
Beiersdorf	Method	Unilever
Colgate-Palmolive	Minn. Green Chemistry	Walmart

Our Goals

To accelerate innovation & scale of new, safe, effective preservative systems for personal care, household, industrial & institutional products

To create a new model of **pre-commercial collaboration** whereby companies with common technology needs can collaborate to accelerate the development and scale of these technologies

Need Statement & Development Criteria for New Preservatives for Personal Care & Household Products



Designed to:

Motivate and guide R&D within the chemical supplier, entrepreneurial, and academic communities

Guide collaborative sponsorship of technology searches, R&D, testing, and evaluation of new technologies

http://greenchemistryandcommerce.org/projects/preservatives-project

Need Statement & Development Criteria for New Preservatives for Personal Care & Household Products

	GENERAL CRITERIA (For Personal Care, Household, and Natural/Organic Products)	ADDITIONAL WANTS
1. Performance		
Activity	Broad spectrum activity: gram-positive & gram-negative bacteria, yeast & mold	Not likely to build microbial resistance
	In formulation, at use levels, meets preservative challenge test acceptance criteria (e.g., USP 51, CTFA M-3, or similar)	
	Low number of ingredients needed to get broad spectrum activity (ideally 1 - 3 ingredients)	
pH Activity	pH 5 – 8	pH 5 – 10
Shelf Life in Formulated Product	Shelf life of 2 years	Shelf life
	Can withstand freeze/thaw	Stable fro
		UV stable

Articulates the need for new preservatives

Provides a set of detailed development criteria for new preservatives, including:

- Performance
- Regulatory
- Human health
- Environment
- Business factors

GC3 Collaborative Open Innovation Competition: Preservatives

Objectives for the Competition

1. Identify new, safe and effective concepts and technologies for preservation for PC, HH, and I&I products and accelerate their development, commercialization and scale-up;
2. Increase awareness in industry, academia, and government of the need for these technologies; and
3. Increase interest and activity in, and funding for R&D of novel, safe, effective preservative systems.

Sponsoring/Participating in the Competition

Current Sponsors:

We are signing on new sponsors/participants now

Formulators/Brands

Beautycounter
Babyganics
Beiersdorf
Colgate Palmolive
Johnson & Johnson
Method
P&G
Reckitt Benckiser
Seventh Generation
Target Corp.
Unilever
Walmart

Government Agencies

Minn. Pollution Control Agency

Not-for-Profits/Foundations

Forsythia Foundation
Target Foundation

*Suppliers:

In discussions with preservative suppliers on sponsorship opportunities

What will be awarded in the competition?

	Conditions	Award Level
1. Samples + substantiation	If they yield positive results in efficacy testing and safety screening	Awarded at higher level, e.g., $20k
2. White papers with substantiation	If yields positive results in safety screening	Awarded at lower level, e.g., $5k

Collaborative Open Innovation Competition

Target Audience: Researchers in academia, companies and individuals with promising ideas or technologies, current preservative suppliers

Sponsors: Formulators, retailers, government agencies & NGOs

Other Aspects include:

- T & C's for sponsors establish roles, ground-rules and IP management
- GC3 criteria document, performance testing and safety assessments will be the basis for judging new technologies
- Utilize an open innovation service provider to run challenge
- In-person pitch event for finalists, to include suppliers

Benefits of Sponsorship for Formulators/Brands

1. Access to all information, technologies, innovators from the competition

2. Influence over which technologies are accelerated through the competition

3. Access to results of performance tests on samples and safety screens, conducted by third party labs/assessors

4. Participation in partnerships to accelerate promising technologies, e.g.,
   a. R&D and scale-up
   b. Registration

5. Demonstrated leadership to customers (retailers, consumers)

Awards/Incentives for Innovators to Participate

1. Cash*
   a. Samples + substantiation - Awarded at higher level
   b. White papers + substantiation - Awarded at lower level
2. Efficacy testing by contract lab, results shared with innovator and group of sponsors
3. Safety screening by risk assessment firm, with results shared with innovator and group of sponsors
4. Possibly angel or venture fund deal-making
5. Travel to pitch event*
6. Opportunity to engage with formulators and retailers
7. Exposure & recognition
8. Possible partnerships for further development and production of technologies

**For finalists only*

Collaborative Open Innovation Competition

Timeline:

Jan/Feb/Mar	Recruit sponsors
March	Competition design begins
April/May	Launch competition
Aug/Sept	Evaluate submissions; conduct efficacy testing and safety assessments
Oct/Nov	Choose finalists and hold pitch event
Dec – Q1 2017	Conduct additional acceleration activities

Thank you for joining us!

GREEN CHEMISTRY & COMMERCE COUNCIL

Business Mainstreaming Green Chemistry