10th Annual GC3 Innovators Roundtable Session Summaries

Thursday, April 30th

Appendix: Project Group Breakout Sessions

Innovation Group

The goal of this session was to discuss two ongoing innovation projects which are expected to continue into the coming year, and gather feedback and suggestions for improvement.

Ongoing Project: Green Chemistry Innovation Portal

Online platform for growing and connecting the green chemistry community and solving green chemistry challenges

- partnered with ACS Green Chemistry Institute
- forum component on ACS Network to facilitate connections and partnerships, encourage sharing of expertise and information
    - could we include links to green chemistry journals? (*Green Chemistry* is RSC journal, not ACS)
    - include regulatory information? (this is already covered by IC2)
    - appropriate level of management will be determined as forum evolves
    - potential for crowd-sourced tracking of GC innovations (but must keep barrier to entry low—could "sticky" this thread to top of forum)
    - needs robust search function – ACS built-in search function is not sophisticated
    - ability to "tag" posts should be included, possibly with guidelines
- map component on Kumu to introduce outsiders to community, identify research groups in green chemistry, help companies find technical partners
    - could GCEdNET be incorporated? (GC educators)
    - people cannot be included due to complexity, but viewers interested in personal connections (provide GC3 contact, also point to forum)
    - logistical demands of updating could be time-consuming
    - user profiles for self-updating? Not realistic to expect people to commit to update these
    - fillable form for companies to add themselves

- can expand the map by networking, asking companies who they work with

Ongoing Project: Collaborative Innovation for Safer Preservatives

Sector-wide collaboration to accelerate commercialization of safer preservative systems for personal care and household cleaning products

- creating new model of pre-competitive collaboration for development and scale-up of green chemistry technologies
- currently developing list of criteria for ideal safer preservative, to be distributed to guide and encourage R&D
  - funding for R&D? Crowdsourcing? IP issues?
  - lessons to be learned from this work as it scales?
  - GC solutions require systemic changes

Education Group

The goal of this session was to get feedback about ongoing education projects, as well as brainstorm ideas for future projects that the GC3 could undertake to further green chemistry education.

Ongoing Project: Education Portal

Online portal allowing easy access to GC3 Education Series webinars, designed for education of professionals and students around green chemistry-related topics.

- Beta version is now live and improving based on feedback
- Features include presenter bios, hyperlinks to each presenter's talk, suggested prerequisites, additional reading
- Webinars are members-only for the first year, then publicly available
  - Metrics on engagement?
- Additional topics?
  - More business examples
  - More GC assessment tools for synthetic chemists (LCA intro, alternatives assessment intro, list translators, etc.)
  - Supply chain management/communication

Ongoing Project: Fellows Program

Summer internship program intended to provide training for next-generation workforce, provide students with industry experience and industry with desirable future hires.

- One company participating in this year's pilot
- Fellows from 2015 and 2016 will attend 2016 Roundtable to learn about industry
- No unpaid internships; would like to standardize stipends if possible
  - Non-profits would like to participate, but have difficulty finding funding
  - Universities (e.g. OSU) might be able to provide funding for students to be paid for non-profit internships. Look into this on case-by-case basis

Ongoing Project: Policy Statement on Green Chemistry in Higher Education

Statement calling on higher education institutions to integrate green chemistry and sustainability principles into chemistry, engineering, science, and business curricula.

- currently signed by 30 GC3 organizations
  - would like more signatories, preferably all GC3 members

- needs more power/influence
    - metrics for demonstrating that companies are following commitment
    - students need to see how green chemistry can give them an advantage
    - GC3 companies could track student hiring over the next 5 years and report
    - Ask signatories to put GC in job descriptions, monitor how many people with GC experience make it to the interview

Project Idea: Outreach Education Webpage

Short stories of member outreach successes, example activities, links to resources

- Tools for companies looking for a starting point in outreach
- List of speakers willing to talk about green chemistry topics? Ex: EPA had list of speakers and topics

Other Ideas/Comments

- Nike interested in collaborative real world engagement project with schools
- Case studies from mainstreaming document
    - Could be examples for students, but would need solid data
    - Need science case studies as opposed to typical economic ones
    - Examples of GC being implemented in companies, tell stories and show impact – could be helpful to professors
    - Expand case studies with multiple angles—engineering, business, toxicology, public health—to break down disciplinary "silos" for students
- Influence textbook companies to incorporate/embed green chemistry in chem textbooks – e.g. case studies that are woven throughout
    - Can GC3 or members apply pressure here? GC3 could provide case studies
- Many US schools use ACS standards, which don't include green chemistry
- Short videos with definitions of GC from major industry players?
- Certification in GC/chemical stewardship at UW now available online
- Consider idea of Summit for Green Chemistry in Education
- Need more advocates within companies
- Companies don't market sustainability enough
    - Shouldn't need to add GC in job descriptions because it would be obviously embedded in mission statement
    - Large companies are more conservative about this; don't want to spend time responding to complaints about not doing enough
- Need "green chemistry" to be included in job descriptions
    - GC3 posting jobs?
    - Can GC3 ask companies to post their job opportunities to the GC3 LinkedIn page?
- GC3 should ask companies with green chemistry related press releases to send them to GC3 for promotion

Mainstreaming Group

The goal of this session was to start a discussion about what mainstreaming green chemistry will look like when the industry is mature, and what various steps along the way to get there might be. The purpose is to help identify where the GC3 and its members can focus efforts to accelerate green chemistry, and be able to track progress.

Maturity Ladder of Green Chemistry

The concept of a maturity ladder was introduced, and several models discussed. In a maturity ladder, the top rung of the ladder is the end goal, with lower rungs as the steps to get there. The first model presented, from Johnson & Johnson, is used by that company for improving their safety culture and includes the following five major steps:

1. Broken
2. Beginning
3. Improving
4. Succeeding
5. Leading

Relevant to this maturity ladder, participants felt the current state of green chemistry is probably in the "Beginning" stage for industry, and perhaps the "Broken" stage for education.

The group then reviewed the Industry Sector Maturity model for mainstreaming global supply chain sustainability from the IDH Monitoring Protocol which included the following 4 major steps:

1. Initiation
2. First mover
3. Critical mass
4. License to operate

A final model from International EcoCity was also shown, looking at steps from an unhealthy city to a "Gaia" type city.

Thoughts regarding indicators and outcomes for mainstreaming green chemistry:

- Need something quantitative
- Elimination of environmentally induced diseases
- Indicators: 30,000 chemicals in commerce are green
- Indicators should include product- and company-related quantitative goals
- Need a change in culture, mindshift—this is difficult to measure
- Green chemistry is not a checkbox, it is a way of thinking, so is not always easy to measure

Drivers required for mainstreaming green chemistry education:

- Increased hiring in green chemistry
- Increased R&D funding for green chemistry

Some key points/questions brought up in the discussion:

- What would be the impact if environmental regulatory groups in all 50 states took this same approach?
- Change is discontinuous, there are probably tipping points where major progress will occur
- What levers should we focus on?

Michigan Ecology Center Green Chemistry Checklist

The group looked to the Michigan Ecology Center Green Chemistry Checklist: A Guide for Business. This is a tool that industry can use to track their progress in green chemistry. It includes four areas—Education, Hiring, Support & Communication, Design & Innovation—with specific steps for each area. Discussion focused on this framework, expanding hiring to include workforce development.

The group started a brainstorm around education, looking at potential rungs:

- Initial rung: green chemistry class offered at each school
- Other potential rungs:
    - Bridging green chemistry to engineering
    - Outreach and education to high school teachers on GC
    - Educating the public on green chemistry
    - Editorial policy in professional journalism
- Ultimate rung: every school teaches green chemistry as chemistry; the 12 Principles are embedded

Vision statements were proposed for Hiring & Workforce:

- GC is fully valued in the chemical profession and the subsets of related professions
- GC principles are embedded in the requirements for hiring chemists/engineers

As well as Design & Innovation:

- 100% of chemistry related R&D (firm and government) is going towards projects with green chemistry as a core element

Retail Leadership Council

This workgroup focuses on engaging retailers in the push to promote safer chemicals, materials and products across retail supply chains.

Areas of Agreement

- RLC/Chem industry group is excellent forum to participate in conversations not normally had—helps understand needs, issues and each other's businesses
    - Build understanding between B2B businesses and B2C businesses
    - Find leverage points on both sides to help upstream and downstream decisions
    - Create demand at the retail level for safer chemicals and products and then safer chemicals and products will be "pulled through" the supply chain, starting with the chemical manufacturers
- Brand owners need to be involved—when and where should group be going?
- Convergence work needs to be done. Mapping needs to be done to identify opportunities for convergence. Create a "turbo-tax" of chemicals.
- Need to get ahead of regulations
- Need to continue and increase case studies: include lessons learned (successes and failures)
    - Evaluate/update on the 2008-2010 case studies. Where are they now?
- Significant need for consumer education. How to do this?

Areas of Disagreement or Lack of Conclusion

- Varied need for access to updated database on chemical regulations and ingredient disclosures. Large companies/retailers have internally; smaller companies want help.
- Expand the GC3 newsletter?

- GC3 as a conduit for tools: Pharos, Greenscreen, etc. Where are they going? What is on the horizon? Peer reviews of tools.

Suggested Next Steps for the GC3

- Continue work of Retailer Leadership Council
- Map related initiatives to identify opportunities for convergence
- Develop new case studies to share retailer progress in chemicals management
- Provide basic education on materials and functional uses of chemicals
- Provide education at merchant/supplier interface and with consumers
- Provide access to updated database on chemical regulations (it was noted that IC2 manages such a database – see http://www.theic2.org/chemical-policy)