

# 11<sup>th</sup> Annual GC3 Innovators Roundtable Session Proceedings

Hosted by Seventh Generation in Burlington, VT

May 25<sup>th</sup>, 2016

---

## KEYNOTE II

**John Warner**, Warner Babcock Institute for Green Chemistry (WBI)

Dr. Warner provided an overview of the core aspects of green chemistry that relate to innovation and getting products to market. Central to the topic of ensuring that green chemistry innovations get to market is a focus on creating safer more sustainable materials that make up the products that we buy. If the building blocks are not safe and sustainable it is impossible to build a safe and sustainable product. We therefore need to focus on training chemists to create safer materials and building blocks. In particular, training of the next generation of students is crucial to harnessing the power of green chemistry.

Dr. Warner also discussed several key elements of innovation. At WBI, they have created a business model, termed a "Technology Greenhouse," in which the technical and economic factors are integrated into the design process to ensure that when the actual prototype is ready, it is faster to market. Researchers at WBI spend about 80% of the time doing contract innovation and 20% on self-funded in-house innovation. Over the past few years, they have invented a number of new innovative green chemistry solutions in a variety of product categories, ranging from hair dye that returns grey hair to a person's natural hair color, to asphalt that can be more effectively recycled, to a formaldehyde-free wood composite. He stressed that they have been so successful not *in spite* of green chemistry but *because of* green chemistry. By looking at things through a green chemistry lens, it has forced he and his team to think of things differently, resulting in innovative new ways to look at and solve technical challenges.

## KEY TAKEAWAYS

### Opportunities for Safer Chemicals and Products:

- If the building blocks, the materials that make up a product, are not sustainable it is impossible to build a sustainable product. Programs are needed to train the people who can make these materials.
- Innovation happens not within the field of focus, but in the periphery – most invention happens when we are trying to do something else, but then notice an outlier.

- Innovation is orthogonal to complexity – the simpler the better.

### **Key Drivers for Safer Chemicals and Products:**

- Products must have excellent cost and performance; being more environmentally benign is an added benefit.
- Necessity is the mother of invention – looking at things through the lens of green chemistry leads to success.

### **Challenges for Implementation/Lessons Learned:**

- Integrate business and science into the beginning of the design process in order to speed the time from innovation to market.
- There is a linear relationship between the number of people and how innovative the group is: the more people, the more ideas the group has access to. However, decision-making is non-linear; having more people does not lead to better decisions. This is why some large companies can have trouble innovating.
- Customers might not always be loud enough or well-articulated enough to communicate what they want.
- Lack of trained workforce is a barrier to truly harnessing the potential of green chemistry.
- The point of the 12 Principles of Green Chemistry is to address that which someone wearing a lab coat can do – it is not intended to tackle social justice.
- Focus on what is being done, not on what isn't being done, in order to get things done.
- Play to our strengths- identify what we are good at. Chemists should do chemistry, others can focus on areas in line with their strengths.

### **Helpful Actions to Advance Green Chemistry (E.G. Policies, Education, Partnerships):**

- Training of the next generation of students is crucial to building a workforce that knows how to harness the power of green chemistry.
- Give a voice to the customer—educate them and articulate their needs.

### **Role for the GC3 in Helping to Advance GC in This Area:**

- Help to build a better-trained workforce through education.
- Advocate on behalf of the public for safer chemistries.