



BIODIVERSITY

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Green Chemistry design principles are being applied to a range of fields, including:

- * Renewable energy technologies
- * Plastics
- * Pharmaceuticals
- * Pesticides
- * Paints and coatings
- * Textile manufacturing
- * Pulp and paper
- * Water purification
- * Basic chemical feedstocks

Web Resources

Green Chemistry

Institute: <http://www.chemistry.org/portal/a/c/s/1/acdisplay.html?DOC=greenchemistryinstitute/index.html>

Funders Address Opportunities for a Greener Chemistry

By Karen Peabody O'Brien, Green Chemistry Institute

Imagine a world in which – instead of toxic solvents and chemicals – industrial manufacturing used sugar, starch and sunlight as inputs. Imagine products which, rather than emanating bio-accumulative and persistent chemicals, biodegrade into utterly benign substances. What if, instead of being based on fossil fuels, industrial chemicals were bio-based and generated by farmers practicing sustainable agriculture? Imagine a workplace of “green” jobs free of hazmat gear; imagine factories without scrubbers, and a world where CO₂ is used as a valuable industrial input rather than emitted as a green house gas. These things are not merely possible; they are happening now in Green Chemistry.

By definition, Green Chemistry is “the utilization of a set of principles that reduces or eliminates the use or generation of hazardous substances in the design, manufacture and application of chemical products.” Green Chemistry holds the promise of not only changing the field of chemistry, but of fundamentally reorienting societies towards a carbohydrate-based economy, bio-based production, and green jobs.

At a time of increasing demand for non-toxic alternatives and substitutes to our traditional chemical products, Green Chemistry is a vital source of these alternatives. While previous generations of chemists in both academia and industry operated as though separate from the human and natural world, we now have hard scientific evidence of the consequences of this narrow perspective. There has been a sea change in our understanding of chemicals and their effect on environment and health that requires an entirely new way of approaching chemical design.

Green Chemistry designs products to ensure that they are not harmful to human health and the environment. By engaging molecular designers, Green Chemistry has demonstrated that hazard and toxicity are not necessary components of our quality of life. Green Chemistry is illustrating how we can improve life both in the industrialized world and the developing world without the negative consequences that have historically accompanied the Western industrial model.

This nascent change is taking place across the globe in both universities and in industry. The question is: how can we ensure that this shift in perspective and chemical design takes root quickly and broadly enough to move us toward a truly sustainable future?

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What is Green Chemistry?

Green Chemistry is based on a set of specific chemical design principles, which moves products and processes toward an economy based on renewable feedstocks, where toxicity is deliberately prevented at the molecular level. Chemicals and chemical processes are designed to eliminate waste, minimize energy use and degrade safely upon disposal.

Green chemists and engineers employ life cycle and biological systems thinking in the act of creating the chemicals that would form the foundation of our economy. The science is rigorous (at least as practiced by the leaders, who are working intensively to set and maintain high standards for the field), and many specific applications are now emerging in industry and in academia.

Green Chemistry places ecological health at the very heart of production and consumption. It uses the creativity of nature's biological processes to create molecules, materials and processes that are safe and high performing. Green Chemistry provides the means of shifting away from a petrochemical-based economy to a bio-based economy. This has profound consequences for a wide range of issues, from environmental justice to environmental health to national security and the farm economy. While no one science supplies all the answers, Green Chemistry plays a foundational role in many core areas of work on issues of sustainability.

Green Chemistry 101

As funders learned who attended a two day, CGBD-sponsored "Green Chemistry 101" workshop held this winter in Washington, DC, there is much in Green Chemistry that is elemental to all our work on sustainability. Numerous participants in this workshop admitted that they had registered with doubts that they would find the subject of chemistry compelling, let alone directly relevant to their work. But this is indeed what occurred. The workshop was designed to provide a diverse array of funders a primer to learn from Green Chemistry leaders and then to explore with peers the potential convergences of visions, strategies, and areas of expertise.

Participants learned more than just the definition of Green Chemistry and its proponents' efforts to design safer molecules. They learned that many problems urgently concerning philanthropy flow in part from the

fact that those who design the material base of human societies almost never have training in what might be an environmental or human health hazard.

Funders learned that the emerging field of Green Chemistry holds the potential not only to make safer products, but also to enable fundamental societal transitions towards renewable resources-based political economy, a world in which the ethics and intention of materials design links to greener jobs, industries and products. And as workshop participants discovered, Green Chemistry has great potential to offer to grantmaker concerns as diverse as environmental justice, water systems, energy and agriculture (to name a few).

Green Chemistry Opportunities

For environmental health and clean production advocates, Green Chemistry provides much of the specific content to the "how" and "what" questions around safer alternatives and long-term solutions.

For fenceline communities and environmental justice advocates, being able to point to safer and available green technologies obviates the argument that dirty traditional industries are necessary for jobs and economic growth. It also suggests exciting potential for healthy job-generating and wealth-generating opportunities for communities in desperate need of non-toxic economic development.



For the sustainable agriculture movement and rural development, a growth in demand for bio-based industrial feedstocks offers new markets to rural communities and could (if channeled with safeguards related to sustainable production and genetically modified organisms) dramatically increase demand for agricultural practices that are both environmentally and economically sustainable.

For climate change and clean energy advocates, a shift to bio-based fuels holds promise of avenues for reducing carbon-intensity of energy use. Bio-based chemicals also hold the promise of “fixing” carbon in consumer products. Green Chemistry has already yielded tremendous gains in energy and material efficiency of chemical manufacturing, a highly energy-intensive sector of the economy. Green Chemistry will also help reduce harmful side-effects of new energy technologies as they come to scale, for example, making solar manufacturing healthier and more efficient. Green chemists are actively seeking new ways to improve those processes.

For labor and progressive business, Green Chemistry offers not only the potential for cleaner, safer jobs, but also the prospect of reinvigorating the American economy through promotion of healthy and innovative technologies.

For national and homeland security, Green Chemistry reduces reliance on foreign oil and replaces highly vulnerable domestic targets for terrorism (refineries, trains with chemical tank cars, etc.) with structures and materials that cannot be used to generate large explosions or to poison large volumes of air and water.

Green Chemistry Obstacles



Inertia and embedded capital impede change in both academia and industry. Green chemistry fights an uphill battle against

entrenched interests and the endemic perception that if it’s “green” it must also be of lesser quality and less profitable. Few chemists are trained to do “truly green” chemistry, and the rigorous, high standards at the heart of the work have yet to be broadly institutionalized much less protected.

Despite passionate student interest in the field, Green Chemistry remains the poor stepchild to conventional chemistry. Academics without tenure are at risk of marginalization for endorsing it and have few resources to institutionalize and further their work.

Likewise, Green Chemistry champions in industry must overcome internal resistance, high research and development start-up costs, and supply-and-demand systems built around toxic products. They must convince investors and shareholders of the benefits of risking company reputation, research and development dollars, and profitability on a new and unfamiliar approach with few developed markets.

“Dinosaurs (fossil fuels) are not a renewable resource” but current technology, production, and market structures are predicated on them. Petroleum and natural gas are the feedstock for many materials, with many environmental, health and security consequences associated.

Biomass offers an alternative. Bio-based feedstocks are available worldwide, are much more broadly distributed than petroleum, and offer many potential benefits, from carbon fixing in soil to a bigger sustainable agriculture market. Once at scale, biomass feedstocks are cost competitive with petroleum. However, it is a big challenge to shift the manufacturing paradigm and capital infrastructure. Billions are invested in existing plants (both production and fabrication).

Similarly, the lack of Green Chemistry information and solutions has been a limiting factor. Policymakers and consumer-oriented companies need to know that cost-effective safe substitutes are available. Consumers need to know what they can buy.

Chemical manufacturers want to maintain market share and shareholder value while minimizing liability. Downstream industries purchasing chemicals want safe, reliable, affordable substitutes for key



ingredients in their products. Without safer alternatives, the move to tighten controls on dangerous chemicals can only go so far.

Grantmaking Strategies

At the Green Chemistry 101 workshop, funders met for a half-day strategies discussion. Various strategies-in-development were discussed in areas of capacity-building; applications, markets, and solutions paths and politics.

Academic & Other Capacity-Building

Goals identified include: support the training of the much-needed next generation of green chemists; enabling and accelerating shifts towards safer chemicals, products, and processes by supporting leading university research and development; and maintaining high standards for the field. Strategies discussed include: developing and/or supporting academic centers of excellence; capacity-building of other organizations central to advancing Green Chemistry; and leveraging public investment (federal and state resources) to create new capacity across the board.

Applications

Goals identified include: accelerating development of Green Chemistry solutions for high priority problems; and building capacity and alliances in areas of high interest. Potential application areas include ecosystem contamination, human health threats, climate change, chemical-intensive agriculture, and toxic jobs and economies.

Market Strategies

Goals identified include: accelerating industry shifts; influencing development of the green economy upstream; and possibly even capturing assets for the field, through strategies such as:

- Demand side: using market campaigns to create markets for wedge products like corn-based plastic (PLA);
- Supply side: enabling and demanding sustainably-produced feedstocks; and
- Venture capital and investment: enabling and leveraging opportunities (e.g., around PLA).

Solutions Paths & Politics

Goals and strategies discussed included:

- Developing an alignment of visions and strategies in Green Chemistry and the bio-based economy, including encouraging further collaboration among interested funders and funder groups;
- Accelerating transition paths for key industries and communities caught in the toxic economy (e.g., by developing economic development/job creation strategies for communities caught in the toxic economy); and
- Careful navigation of the politics of Green Chemistry and chemical policy reform through tactical separation as needed between policy campaigns and messages.



CGBD WORKING GROUPS

Health & Environmental Funders Network

On April 17-18, HEFN and some of its California members convened a meeting of grantmakers working on environmental health and environmental justice in California. HEFN Coordinator Kathy Sessions reported on a survey of “who’s funding what” in California on environmental health and justice issues and highlighted ways to link California grantmaking strategically with policy and market investments elsewhere.

On May 3, HEFN hosted a meeting of Catalysts for a Healthy Future, the funder collaborative on chemicals, environment and health. The agenda will focus on collaborative opportunities and strategies. A larger meeting of the Catalyst funders is in the works for October.

In addition to the meetings mentioned above, HEFN



members continue to meet by monthly conference call to discuss a wide range of issues. Recent conference call topics have included “Faith, Values and Action,” and “HEFN Catalysts for a Healthy Future: Updates on the Chemicals Movement and Funder Collaboration.”

HEFN continue to support restoration efforts along the Gulf Coast. A funder matchmaker website has been established to minimize barriers among groups

in the field and funders interested in supporting them. NGOs may post funding requests on the website, www.ccp.org/forms/new_hurricane_funding.html. The requests will be posted on a password-protected site for viewing by funders only.

Lastly, HEFN is excited to announce a new team member. Please welcome Gaea Honeycutt, HEFN’s new

part-time program assistant. Gaea has nearly 13 years experience in the non-profit sector, including work on youth violence prevention and health policy. She holds an M.P.P. from the Irving B. Harris Graduate School of the University of Chicago, and received her B.A. in Communications from Bentley College.

Climate and Energy

For the past three months, the Climate and Energy Funder Group has focused on planning its annual meeting in late April in Phoenix, Arizona. Convened at the Desert Botanical Gardens, the meeting provided



funders with an opportunity to learn about the work being led by Arizona’s Governor Napolitano to develop a long-term plan for reducing emissions in the state. The meeting also allowed funders to hear directly from mayors and state officials about similar work being led in New Mexico, California, Colorado, and Utah. The meeting also focused on progress region wide inside the Western Governors’ Association and the Western Regional Air Partnership.

In addition to discussions on the West, the meeting took an in depth look at the issue of new and existing coal-burning facilities, discussed recent important state-based policies, such as the Regional Greenhouse Gas Initiative in the Northeast, activity in North Carolina, and examined efforts to engage new constituencies in the fight to slow global warming. The meeting also reviewed future strategies for developing a national-level policy on global warming.

The Climate and Energy Funders Group will host a session at the Environmental Grantmakers Association retreat in October, titled “From The Bottom Up: State and Local Leadership on Global Warming.” The session will feature a state legislator from North Carolina and a California state official and will examine the importance of success at the state level for securing a federal policy on greenhouse gas reductions.

Finally, over the last quarter the Climate and Energy Funders also hosted two conference calls. The first featured Betsy Taylor, former President of the Center for a New American Dream, who briefed the group on Vice President Al Gore's presentation to the Wednesday Group meeting convened by Grover Norquist. As a next step, Norquist and Taylor agreed to convene a June meeting to discuss action on climate change. The second conference call briefed funders on progress around carbon caps proposed by California and seven New England states.

Marine

The Marine Working Group hosted its annual winter meeting in early March. With a regional emphasis on the Mesoamerican reef, the meeting was held in Belize. The focus of the meeting was on improving funder collaboration in marine conservation, centering on opportunities in coral reef conservation, international fisheries reform, domestic aquaculture policy development, marine mammal conservation, and ocean governance.

Prior to the funder-only discussions on collaborative funding, the meeting agenda included:

- Updates on several key marine conservation issues since last year's winter meeting;
- Investigating methods to measure marine ecosystem health; and
- Tools for conservation on the Mesoamerican Reef and other regions.

In order to witness marine conservation "on the water," during the meeting funders visited Hol-Chan, Belize's oldest marine reserve and best-known "no-take" zone. This small underwater reserve features a thirty-foot deep channel of coral grottos and caves, and is conveniently located about four miles from San Pedro, the site of the meeting. Funders were able to observe and discuss some of the most glaring threats to the Reserve, such as tremendous visita-

tion pressure; impact from clearing of mangrove and habitat alteration adjacent to the Reserve; inadequate waste management for



growing coastal communities; coral bleaching and mechanical damage from major hurricanes. Hol Chan was heavily overfished prior to its legal protection in 1987, but populations are recovering. Those funders who chose to snorkel saw spotted eagle rays, moray eels, yellowtail snapper, parrotfish, and a host of other coral fish species.

Land and Freshwater Conservation

On April 6, the Working Group convened its "monthly" conference call on the Arctic National Wildlife Refuge. Cindy Shogan of the Alaska Wilderness League joined funders on the call, addressing the current status and strategy of the refuge campaign as well as its immediate and longer term resource needs. The next conference call is tentatively planned for June 8.

On May 10, the Working Group will host the next in its series of semi-regular conference calls regarding the Roadless Area Conservation Rule. On the call, funders will be joined by Rob Vandermark and Mat Jacobsen of the Heritage Forest Campaign and Kristen Boyles of Earthjustice.

Over the past several months, opposition to the Bush Administration's repeal of the 2001 Roadless Area Conservation Rule has taken many forms and continues to grow. Attorneys general and governors from six states - Washington, California, Oregon, Montana, Maine, and New Mexico - have joined in a lawsuit challenging the legality of the repeal and substitute rule. Additionally, even though they object to the administration's substitute petition process, many of the governors of the above states have joined with other governors from around the nation in filing or



announcing their intentions to file petitions for the complete protection of roadless areas in their states. Thus far, the governors of Virginia and North Carolina have filed petitions.

Citizens from across America have united to reinstate strong protections for our last pristine national forests. Twenty conservation organizations have filed their own suit claiming that the 2001 rule was illegally reversed, and in late February 2006, more than a quarter of a million Americans filed a formal petition under the Administrative Procedures Act requesting the U.S. Department of Agriculture reinstate the original rule.

Lastly, the Heritage Forests Campaign recently released a report demonstrating that despite assurances to the contrary, the U.S. Forest Service has begun to move forward with logging, mining, road construction, and other activities in national forest roadless areas while their status remains in dispute. In conjunction with the report, coalitions from 18 states, as well as a coalition of national business leaders in the outdoor industry and four governors have requested a moratorium on all activities in roadless areas until their disposition is resolved.

MEMBER NEWS

John R. Nordgren has joined the Kendall Foundation as Program Officer. John's primary responsibility is for leadership of the Foundation's Northern Appalachians Landscape Conservation Program. John has been a leader in the development and management of applied conservation science programs. His background includes work as a researcher, writer, program manager, and advocate in Washington, D.C. and in the greater Boston area. He was most recently on the staff of the Manomet Center for Conservation Sciences, where he directed the conservation science programs.

The Kendall Foundation also recently appointed **Douglas Foy** to a three-month consultancy to help New England "accelerate the development of 'solutions to climate change' by reducing dependence on hydrocarbon energy sources through advances in energy efficiency and the expansion of renewable forms of power." Foy left Governor Romney's Cabinet on March 20, where he was responsible for Housing, Transportation and the Environment. He previously served as head of the Conservation Law Foundation in Boston.

The Town Creek Foundation is very pleased to announce that **Teresa L. Darrah** has joined its staff as a Program Associate. Teresa, who has a MA in Science, Health and Environmental Communication from Marquette University and a BS in Biology from Heidelberg College, has worked with the Alaska Conservation Foundation and the Friends of Milwaukee's Rivers. She has also conducted exit polling for WMTJ News Channel 4.

The David and Lucile Packard Foundation announced the hire of **Dr. Walter V. Reid**, consulting professor at the Stanford Institute for the Environment and creator and former director of Millennium Ecosystem Assessment, as the Foundation's new director of Conservation and Science.

The Turner Foundation has hired **Judy Adler** as the new program officer concentrating on air, energy and climate. Judy is currently employed as a program manager for the State of Georgia at the Pollution Prevention and Assistance Division (P2AD). For the last three years she had responsibility for water conservation, water and air pollution prevention, and energy efficiency.



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