



Transforming Chemistry Education through the Green Chemistry Commitment

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Executive Director
Beyond Benign



- Headquarters located in Wilmington, MA
- Co-founded by John Warner and Amy Cannon in August of 2007
- Co-located with the Warner Babcock Institute for Green Chemistry
- Created to carry on work in Green Chemistry education in the interdependent areas of K-12, Community, Academia and Industry



Green Chemistry Commitment



AMERICAN COLLEGE & UNIVERSITY
PRESIDENTS CLIMATE COMMITMENT



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Green Chemistry Commitment

- Goals:
 - Work with higher education institutions
 - Highlight existing work and programs
 - Unite the community around common goals & objectives
 - Systematically bring Green Chemistry in to academia for lasting change
 - To transform chemistry education

Green Chemistry Commitment

- Process:
 - First draft
 - Talking to the community, gathering feedback
 - Formation of Faculty Advisory Board (summer 2011)
 - Creation of GCC Version 2.2
 - Green Chemistry Commitment Summit (January 2012)
 - Talking to the community, gathering feedback
 - Finalizing GCC (October 2012)
 - Dissemination and Roll-out (target: June 2013)



Faculty Advisory Board

Dr. John Arnold

Professor, Department of Chemistry, UCal, Berkeley

Dr. Ed Brush

Professor, Department of Chemistry
Bridgewater State University

Dr. Rich Gurney

Associate Professor, Chair
Department of Chemistry and Physics, Simmons College

Dr. Jonathan E. Kenny

Professor, Department of Chemistry, Tufts University

Dr. Wei Zhang

Associate Professor, Dept of Chemistry, Director, Center for
Green Chemistry, UMass Boston

Dr. Anne Marteel-Parrish

Frank J. Creegan Chair in Green Chemistry, Associate Professor,
Washington College

Dr. Martin Mulvihill

Executive Director, Berkeley Center for Green Chemistry, UCal,
Berkeley

Dr. William Petuskey

Professor and Chair, Dept of Chemistry & Biochemistry, Arizona
State University

Prof. Irvin J. Levy

Professor, Chair, Department of Chemistry, Gordon College

Dr. Bill Tolman

Distinguished McKnight University Professor, Chair, Dept of
Chemistry, University of Minnesota

The Commitment Text: Understanding the Student Learning Objectives



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The Commitment Text:

- Focused on Student Learning Objectives:
 - Knowledge-based
 - Skills and performance based
 - Ethical
 - Affective

The Commitment Text:

Green Chemistry Student Learning Objectives

Upon graduation, we believe all chemistry majors should have proficiency in the following essential green chemistry competencies:

- **Theory:** a working knowledge of the twelve principles of Green Chemistry
- **Toxicology:** understanding of the principles of toxicology, the molecular mechanisms of how chemicals affect human health and the environment, and the resources to identify and assess molecular hazards
- **Laboratory Skills:** the ability to recognize, assess and design greener alternative chemical products and processes
- **Application:** serve society in their professional capacity as scientists and professionals through the articulation, evaluation and employment of methods and chemicals that are benign for human health and the environment

Achieving Student Learning Objectives

The *Green Chemistry Student Learning Objectives* can be carried out through a number of different formats including, but not limited to:

- **Integration**
 - Embed green chemistry throughout chemistry courses
 - Include green chemistry exercises throughout laboratory courses
 - Incorporate green chemistry principles into research projects and programs
 - Build toxicology and environmental health science modules into existing chemistry courses
- **Creation**
 - Develop new courses dedicated to green chemistry for chemistry majors
 - Design toxicology and environmental health science courses for chemistry majors
 - Develop a seminar series on green chemistry and/or toxicology for chemistry majors
- **External**
 - Encourage students to take elective courses in toxicology and/or environmental health sciences from other departments or institutions

Awards, Recognition and Reporting



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Awards

Scope of Awards: To celebrate individual, departmental and student accomplishments in green chemistry education.

Individual accomplishments can include the following:

- Creating and teaching a new course for chemistry majors on the subject(s) of green chemistry, toxicology, environmental health sciences, environmental science, etc.
- Developing new course materials, including lecture and/or laboratory exercises and resources
- Championing green chemistry education at the individual's institution and/or within the chemistry field
- Advancing student engagement in green chemistry through course work, research and/or outreach activities

Departmental accomplishments can include the following:

- Integrating green chemistry in to chemistry courses through lecture and/or laboratory courses
- Creating new required or elective courses for chemistry majors on the subject of green chemistry
- Creating a new required or elective course or seminar series on toxicology, environmental health science, environmental science, etc.
- Advancing student engagement in green chemistry through course work, research and/or outreach activities

Student accomplishments can include the following:

- Advocating for and advancing green chemistry education at the student's institution
- Creating new laboratory exercises and/or other curriculum resources in green chemistry
- Bringing green chemistry to the community or K-12 organizations through outreach and/or service learning

Assessment and Reporting

- Annual Reporting (one report at end of academic year)
 - Schools set individual goals
 - Tracking goals and accomplishments
- Assessed by an advisory board
 - Minimum of 10 faculty members representing 10 different institutions
 - Minimum of 3-4 green chemistry professionals representing stakeholder groups
 - Appointments of 3-4 years
 - Current/past members will nominate new members to the advisory board

Green Chemistry Commitment Resources



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Resources

- Curricula and course materials:
 - Model courses and curricula
 - Toxicology and environmental health sciences curricula and resources
- Resources for stakeholder groups
 - Web resources for potential signers
 - Students, faculty, administration, industry, etc.
- Future potential resources:
 - Member resources
 - Professional development opportunities
 - Mini-grants for signers (professional development, student research, or faculty staff time)

Stakeholder Engagement



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Faculty
Administration
ACS
Government
Business
Students
Etc...

Next Steps

- Participate in public comment period for ACS CPT Guidelines
- Collaborate with existing sustainability initiatives on campuses
- Recruit total of 20 initial signers of the Commitment
- Invite institutions to participate in the Launch June 2013

For More Information

- Visit www.greenchemistrycommitment.org
- Ask an advisory board member for more information
- Contact Beyond Benign directly:

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