A CASE FOR GREEN CHEMISTRY EDUCATION AT THE UNIVERSITY OF COLORADO BOULDER

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Links to: Full Report and Short Video Presentation

The need for green chemistry education is becoming increasingly clear. Green chemistry, defined by the EPA as "the design of chemical products and processes that reduce or eliminate the generation of hazardous substances," is only made possible when members of society are properly educated with the knowledge and tools necessary to to conduct scientific processes in a more responsible manner.

In many ways, the University of Colorado Boulder (CU Boulder) is already a leader in green chemistry by implementing numerous actions in line with the principles of green chemistry that many universities across the nation have yet to begin. However, there is much more that CU Boulder could be doing to provide students with the opportunity for green chemistry education, especially in a manner that can be recognized on their resumes as they leave the university and further their careers.

As CU Boulder strives to "shape tomorrow's leaders, be the top university for innovation, and positively impact humanity" the campus should consider joining other universities in providing robust green chemistry education opportunities. This move would help CU Boulder students best address some of the most complex issues facing their time.

ACTIONS TAKEN AT CU BOULDER

Chemistry Teaching Lab Modifications

- Restructured many teaching lab experiments and procedures in order to reduce waste and minimize the use of toxic chemicals
- Energy and water efficient practices implemented
- Distillation of solvents for reuse
- Recycling of brown glass chemical bottles and metal solvent drums

Water Reductions in Chemistry Labs

- Use of small vacuum pumps to replace water aspirators
- Use of recirculating chillers and processed chilled water for cooling in place of single-pass tap water use

EH&S Waste Minimization Efforts

- The treatment of hazardous waste to make it non-hazardous where feasible
- Support of solvent re-use and solvent recycling including actions such as distilling solvents for re-use and ensuring the efforts follow regulations for safe and compliant storage and transport of chemicals
- Redistribution of surplus chemicals to other campus labs (e.g., when a lab retires or moves)

Green Labs Program

- Green chemistry webinars, speaker, and trivia events
- Survey of undergraduate interest in green chemistry education
- Presentations on sustainability and green chemistry efforts at CU Boulder, including during new graduate student orientations
- Stimulation of green chemistry ideas and efforts in the Chemistry Department

Green Chemistry Scholarship Program

- Offers CU Boulder students the opportunity to take an online Green Chemistry and Chemical Stewardship Certificate Program with the University of Washington
- To date, 2 undergraduate students have completed the course in 2019, 1 undergraduate in 2020, and 3 students (1 undergraduate & 2 graduates) are participating in the 2020-2021 program

> "When I heard of the green chemistry scholarship program, I was incredibly excited by the prospect of being able to learn more about sustainability and other areas of green chemistry in my undergraduate career. With the information I have been learning in the course, I hope to be able to share that knowledge and encourage my peers to consider different aspects when making decisions in their own research."
>
> *-Niamh Brown*
> *2020-2021 Green Chemistry Scholarship Recipient*

"Our goal is nothing less than being the global leader in sustainability – and that aspiration carries with it great responsibility to advance on all fronts ..."

-Phil DiStefano, CU Boulder Chancellor

BENEFITS OF PROVIDING OPPORTUNITIES FOR GREEN CHEMISTRY EDUCATION

+ Attracts prospective students & faculty

+ Workforce preparedness

+ Competitive edge for the university

+ Alumni engagement & support

+ Interdisciplinary education

+ Alignment with CU Boulder's goals & values for sustainability and eco-social justice

RECOMMENDED ACTIONS FOR CU BOULDER

1. Make the **Green Chemistry Commitment**

2. Offer courses with an emphasis on green chemistry

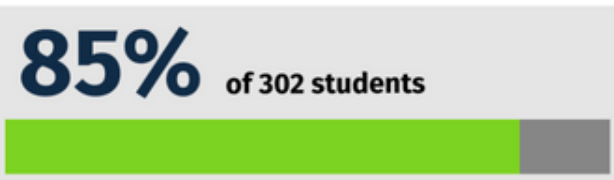
3. Highlight green chemistry actions that have already been implemented

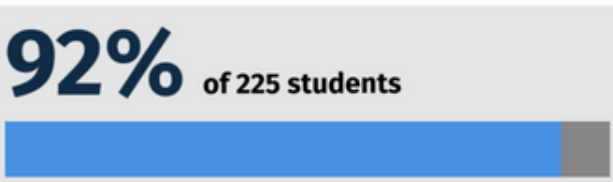
4. Integrate green chemistry professionals/speakers into seminar series or on-campus events

5. Engage students to help grow green chemistry on campus

Survey of Student Interest in Green Chemistry

% of students very interested, interested, or a little interested in learning more about green chemistry.





Select Survey Feedback

"Would love to see CU take a lead in green chemistry."

"Green chemistry for non majors would be a valuable class for many in engineering, public policy, etc."

"Needs to be more student events relating to green chemistry."

"Green chemistry sounds extremely interesting."

"If possible, green chemistry should be integrated into existing courses."