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## Chemistry and Systems Thinking

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### PURPOSE OF THE ABSTRACT

The ACS Green Chemistry Institute has been working with key stakeholders in the chemistry education community to think about how sustainable and green chemistry concepts might be integrated into chemistry education at the undergraduate to graduate level. One concept that is integral to truly understanding sustainable and green chemistry is systems and systems thinking. Systems thinking is more readily identified with systems biology and many parts of engineering, and it is not readily associated with chemistry. A fundamental absence of systems thinking may explain why discussions about sustainable and green chemistry in the chemistry community are so challenging.

Systems thinking is crucial because 1) we are currently operating as if there are no limits to the resources humans are currently consuming at alarming rates, 2) we are operating as if the world can continue to assimilate the chemicals and wastes produced to make the products society desires without any adverse impacts to people or the environment, and 3) we are barely scratching the surface of the innovation space available to us. The first two are possibly well-accepted by most as the underpinnings for sustainable and green chemistry, but the third may not be something many associate with sustainable and green chemistry. Innovation through the lens of sustainability and green chemistry is beginning to drive people to consider new kinds of chemistry that provide unique functions and amazing science, while preserving people's health and the environment. This talk will briefly describe systems thinking in the chemistry context as well as detail recent efforts to integrate systems thinking into the chemistry curriculum.

## FIGURES

FIGURE 1

FIGURE 2

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### KEYWORDS

Green Chemistry | Systems thinking | Education

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### BIBLIOGRAPHY