

## Final Report

### Student Research Grants, 2015-2016

#### Society for Hazard Communication (SCHC)

Below we present a summary of the SCHC research grants awarded to Samantha Couture, Alicia Melvin, and Hayley Byra. We are appreciative of the experience and opportunity that the research grants provided to these students. In general, the grants allowed them to collaborate with research institutions and companies on hazard communication challenges as well as engage with experts in the field at the annual meeting. These were extremely valuable experiences for the students that have energized them in the field and will position them for future professional activities.

#### Samantha Couture

The project “Expanding the P2OASys System to Include GHS Classifications” was a project that was designed to help update P2OASys, a hazard assessment tool created by the Toxic Use Reduction Institute, that supports informed chemical substitution/comparison through the evaluation of 61 various hazardous endpoints. As a first step, hazard endpoints were evaluated to understand if any matched those with GHS classifications or values. For those with GHS classifications or values, these were compared to existing P2OASys low, medium, high categorizations. During this review process the most health protective value was used in the P2OASys document. Therefore, if existing P2OASys classifications were more health protective than the GHS ones, the more restrictive value was kept. However, if the GHS had a more health protective value listed then that value was used. The results of this project showed that many of the hazardous endpoints of P2OASys, when compared to the GHS, were more health protective. The P2OASys hazard criteria were update to include key words, phrases, pictograms and quantitative values that were gathered from the GHS for comparative purposes.

Personal statement: By being awarded the SCHC grant and scholarship I was able to gain real world experience that will help me in my future career. As an undergraduate we were told that getting real world experience while in school is extremely valuable. Without the SCHC experience I am certain that I would not have as much confidence in the quality of my work and the ways that I present to an audience. Furthermore, I was able to increase my knowledge in technical information and data collection by reviewing the GHS and evaluating the hazard endpoints against P2OASys. By doing the P2OASys project I had to learn how to present the information and results that were gathered to a technical audience. The presentation was an incredible experience for me because several of the SCHC members were kind enough to come up to the podium and make suggestions that would improve my presentation skills. Their kind words and helpful suggestions will certainly impact how I present any information in the future.

Alicia Melvin

My project, "Identifying structural alerts for Benchmark 1 chemicals in the Green Screen" involved an analysis of various chemical and physical properties of 100 Benchmark 1 chemicals to identify Benchmark 1 structural alerts chemicals. The final preliminary results of the research identified eleven potential structural alerts. These results were presented at the SCHC conference in April.

Personal Statement: The experience and knowledge I gained from this research project funded by the Society for Chemical Hazard Communication has rippled throughout my academic and professional career. With this project, I was able to work with a wonderful team of toxicologists at ToxServices LLC. to develop a project; collect data and analyze results; and present our results at a national conference. I gained practical knowledge and critical thinking within the scope of chemical toxicology and hazard communication.

This experience helped me learn that there is a whole field directed to chemical hazard communication, and that there are still many opportunities to develop methods and policy to improve hazard communication around the world. Due to presentations I was exposed to at the conference to topics like Dr. Michael Cleuver's talk on "REACH 2018: How to prepare for registration following ECHA's roadmap" and other global GHS topics. The knowledge I gained helped me during my internship at the European Trade Union Institute in Brussels, Belgium this past summer. I had to evaluate high volume chemicals of higher concern and prioritize them for the Trade Union for REACH authorization using multiple chemical information resources. I reflected on the topics of hazard communication and the importance of communication up and down the supply chain when revising the Trade Union List and attending EU conferences.

The Society for Chemical Hazard Communication highlighted the importance of integrating stakeholders into the process of improving health and safety. I had the opportunity to meet and have great feedback from amazing, relatable people to help improve my own career and public speaking. I have also been able to apply the skills and lessons learned from the spring conference to educate non- health science or occupational and environmental hygiene majors within the Toxic Use Reduction Laboratory at the University of Massachusetts Lowell.

I was recently hired as the Program Manager for Beyond Benign's Green Chemistry Commitment program. I am hoping to take the lessons learned, as well as the connections I have made from this experience, to influence my contribution to the promotion of green chemistry within higher education. I think aspects of occupational health, toxicology, chemical hazard communication, and policy are always changing.

Hayley Byra

My project was entitled, “Advancing Hazard Communication for Chemical Accident Prevention: Review of Risk Management Plans for Chemical Safety Improvements.” It explored how communication of worst case accident scenarios can lead to accident prevention activities. In particular, the research focused on two elements: A review of why companies have delisted in the past five years from the RMP rule reporting requirements and a review of prevention options for the 101 facilities that have the largest worst case scenarios, affecting more than one million people. The review included a survey of facilities that have delisted as well as a literature review and interviews with experts in the field.

We found – from a relatively small sample - that most common reason for deregistration was as a result of terminated operations. 28% reported changing business activities, removing the chemical or product of the market. 21% said they had reduced RMP substance below threshold, and unfortunately only 10% had switched to a less acutely hazardous chemical. Of the 400 facilities investigated, anhydrous ammonia was reported more than any other chemical. In cases where dry urea or liquid nitrogen is not a feasible alternative, improved safety measures were taken into consideration. EVAPCO has developed a solution to address these challenges. The Evapcold Low Charge Refrigeration product line for cold storage applications reduces anhydrous ammonia use by 90% and reduces transport.

The analysis found that President Barack Obama’s executive order to improve chemical facility safety and security has reinforced the urgency to eliminate the risk of a toxic release, and develop safer alternatives. Chemical spills and accidents are completely preventable, and with the increased attention and communication industry is moving in a positive direction towards less hazardous production methods.

Personal Statement: Participating in the Society for Chemical Hazard Communication internship was an excellent learning experience. This was my first opportunity to undertake a research project, and apply what I have learned in school to real world situations. Throughout the research process, I was able to learn about chemical accident risks and enhance my interest in environmental and occupational health. Attempting to speak to someone at many of the chemical facilities was challenging, but it was interesting to hear what industry is doing to improve safety. This project enhanced my public speaking skills and professional etiquette. At many points in the project I reached out to a variety of people for help or advice. The MA Toxic Use Reduction Institute has been a valuable resource, and continues to be. After spending time there I, have established great connections with key people who can support me in the future. Presenting at the poster session at the SCHC conference was an outstanding experience. I was grateful to hear all of the positive feedback and to make connections with professionals from the U.S. and beyond.