



Environmental and Occupational
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Hybrid Summer Internships Facilitate Nationwide Collaboration in Toxicology Training

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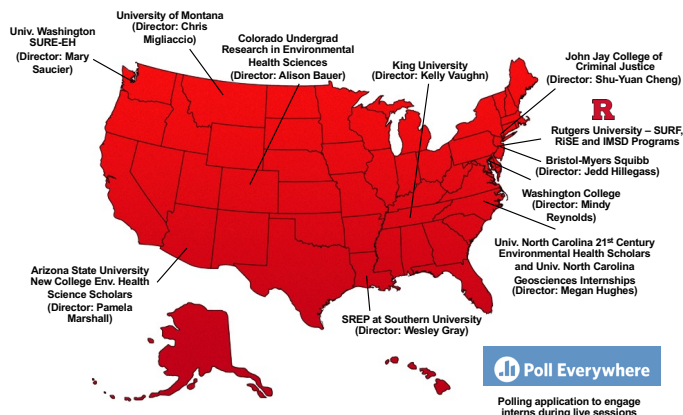
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Abstract

Educational challenges during the past two years have required summer internships to reimagine and innovate their programming. Most notably, this redesign of activities necessitated incorporation of online platforms. In 2021, the Rutgers Summer Undergraduate Research Fellowship (SURF) was run in a hybrid fashion with all career development activities held on Zoom. Capitalizing on this format, we sought to expand the reach of five interactive Zoom training activities to over 100 summer undergraduate and high school interns participating nationwide. Directors from 14 programs in biomedical science, toxicology, and environmental health science registered their interns for any or all of the activities. Topics of the five activities included Developing LinkedIn Profiles, Lead in Drinking Water, Careers in Toxicology, Communicating Science, and Developing Chemical Warfare Countermeasures. Including the 20 Rutgers SURF interns, participation ranged between 38 and 75 individuals each session. Online polling was used to engage participants in activities, solicit real-time feedback, and assess the quality of each session. Using a 5-point Likert scale, the most popular activity was LinkedIn (mean:4.5) and the least popular was Communicating Science (mean:4.1) though overall enthusiasm for all five sessions was high. For the Lead in Drinking Water activity, sampling kits were mailed to participants' homes and 53 completed tests were returned to Rutgers. Concentrations of lead in all water samples were below federal action limits and provided to participants during a second online session addressing risk assessment. Online collaboration between intern programs capitalizes on available resources and increases the reach of interactive learning while enhancing toxicology literacy and awareness of toxicology career paths.

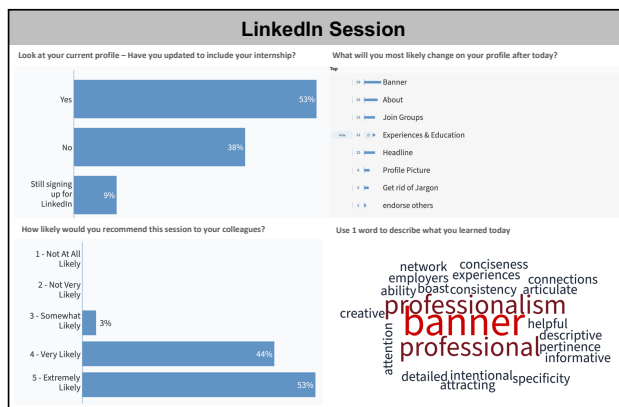
Programs Participating in Online Toxicology Training Hosted by the Rutgers SURF Fellowship



SURF Activities	Mean	SD
Ice Cream Truck Networking	4.92	0.28
Pizza and Painting Networking	4.90	0.32
Tie Dye of Lab Coats	4.85	0.38
Weekly Snacks for Zoom Meetings	4.69	0.60
Written and Graphical Abstract Training	4.67	0.59
CounterACT Repurposing of FDA-Approved Drugs	4.56	1.03
Effective LinkedIn Profiles and Contest	4.56	0.86
Toxicology Career Panel	4.56	0.70
Science Communication	4.56	0.86
Reproductive Toxicology Seminars	4.35	0.79
Lead in Drinking Water Activity	4.33	0.77
Responding to Emergencies	4.31	0.70
Ethics and Responsible Conduct of Research/Lab Safety	4.29	0.69
Honors Research Presentations	4.28	0.75
Biweekly Meetings with Teaching Assistants	4.00	1.14

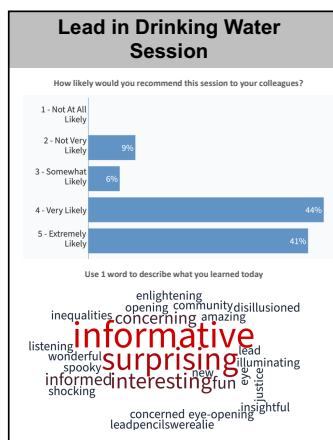
Ranking of Activities by 20 Rutgers SURF Interns During Post-Program Survey. Activities were rated on a scale of 1 (lowest) to 5 (highest).

Description and Assessment of Interactive Sessions



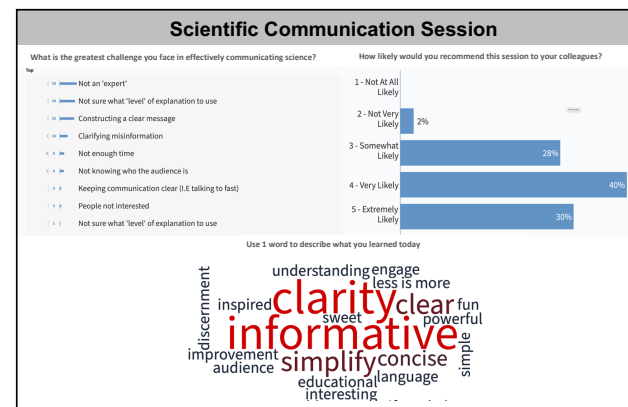
At the start of this session, interns log into their accounts and make edits directly to their LinkedIn profiles in real-time. The instructor walks interns step-by-step through the most important parts of their profile and how to utilize LinkedIn for networking and promotion. Within SURF, program leadership judge and award \$25 gift cards to the top 10 LinkedIn profiles.

**40
interns**



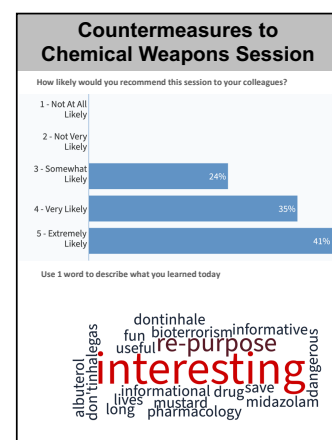
For this activity, interns were mailed two kits: 1) simulated lead testing in biological specimens using a Science TakeOut® kit and 2) tubes for sampling their own drinking water for lead contamination. There were two live sessions. The first session included 1) didactic lecture about lead toxicity and history of exposures, 2) perspective of a lead toxicity to a community by our Trenton-based community group Isles, 3) overview of sampling their own drinking water and shipping back to Rutgers, and 4) instructor-led guide through the Science TakeOut® kit in zoom breakout rooms. The second session included 1) report of the lead levels in intern homes (all were below actionable levels) and 2) discussion of how risk assessments are performed for environmental chemicals.

**75
interns**



The ability for scientists to 'distill their scientific message' is key to communicating with diverse audiences ranging from citizens, policy makers, and other researchers. This session uses approaches from the Alan Alda Center for Communicating Science including 1) developing a scientific headline and 2) 'muddy' project descriptions. Interns work in small groups to complete the activity (in breakout rooms) and nominate one intern to compete in the main room. Everyone votes on the best mini-presentations. Gift cards are awarded to those with the most votes.

**75
interns**



Scientists from the U54 CounterACT center at Rutgers University hosted a pharmacology and toxicology session about re-purposing FDA-approved drugs to treat chemical weapons. For this session, students worked in groups to develop a rubric based on the desired pharmacologic properties of a new treatment for chemical weapon toxicity. Next, groups considered a specific chemical threat exposure through a hypothetical case study and used their rubric to prioritize potential re-purposed therapeutic interventions. This session ended with a 'sales pitch' for a NIH grant to test their re-purposed drug.

**45
interns**

Main Takeaway

Online collaboration between intern programs capitalizes on available resources and increases the reach of interactive learning while enhancing toxicology literacy and awareness of career paths.

Acknowledgments

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<https://surf.rutgers.edu>

