

Biological Hazard Site Training in Emerging Technologies (BioSTET) for Health and Safety



SRP Progress in Research Webinar

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Presented by:

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Rod Handy, East Tennessee State University



CAL POLY



Our Project Team

- **University of Utah (Project Lead Institution):**

- Darrah Sleeth (Project Co-PI)
- Rachel Brown (Project Coordinator)
- Scott Collingwood (Co-Investigator)
- Steven Lacey (Co-Investigator)
- Research Assistant (TBN, Fall 2024)

- **East Tennessee State University**

- Rod Handy (Project Co-PI)

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Project Period: 9/22/2021 – 8/31/2026

- **Cal Poly – San Luis Obispo:**

- Michael Whitt (Sub PI)

- **Montana Tech:**

- David Gilkey (Sub PI)

- **Weber State:**

- Kirk Godfrey (Sub PI/CE Director)

- **Texas A&M:**

- Shawn Gibbs (Consultant)

- **UCLA:**

- Rachael Jones (Consultant)

- **Fulcrum Labs**

Introduction

- Biological hazards present an ongoing threat to occupational health, especially in site cleanup:
 - Research on emerging technologies has offered promising inroads to safer resolution of these hazards
 - However, new/supplemental training, as well as further advances in research, are needed
- BioSTET (Biological Health and Safety Training in Emerging Technologies) is an attempt to help address this need with a multi-institutional effort



Project Goal

The goal is to create continuing education (CE) and academic courses in emerging technologies specific to site biological health and safety



Specific Aims

This collaborative, multidimensional educational experience will facilitate not only skills development and field application, but also create opportunities for innovative, cross-disciplinary research experiences and curriculum development on emerging technologies:

- **Aim 1** seeks to successfully develop, implement, and assess twelve continuing education modules and learner certificate program for site biological/infectious agent health and safety
- **Aim 2** seeks to successfully develop, implement, and evaluate a collaborative and joint 4+1/graduate *research* topics course in site biological/infectious agent health and safety
- **Aim 3** seeks to successfully develop, implement, and evaluate a collaborative and joint graduate *applied* topics course utilizing products resulting from the research course in site biological/infectious agent health and safety

Phase 1 Overview

- Content experts developed CE modules
- External peer-review of the modules resulted in further changes
- Fulcrum Labs developed highly interactive, adaptive learning modules for asynchronous online instruction
- Marketing the CE course (this is ongoing!)
- Material was also adapted for in-person presentation delivery
- Began work on graduate-level course development across multiple institutions for (a) research topics and (b) applied topics

Phase 1: Continuing Education

- Eleven (11) CE modules were developed and a certificate for biological health and safety, in the style of a HAZWOPER supplement, was created
- Subject matter experts (Drs. Sleeth, Handy, Whitt, Birkenbuel, Gilkey, and Lacey) developed the content, which was peer-reviewed by additional experts in the field (Drs. Jones and Gibbs)
- Fulcrum Labs and Equanimity digitized the content on their adaptive learning platform, which provides in-depth analytics on learner performance, learner progress, and content performance



BioSTET CE Course Modules

- UNIT 0: Biological Hazard Site Training in Emerging Technologies Disclaimer
- UNIT 1: SITE HEALTH & SAFETY PLAN INTEGRATION OF BIOLOGICAL SAFETY
- UNIT 2: BIOAEROSOL SAMPLING TECHNIQUES
- UNIT 3: BIOAEROSOL CHARACTERIZATION TECHNIQUES
- UNIT 4: SAFE SITE WORKER HYGIENE PRACTICES
- UNIT 5: RESPIRATORY PROTECTION DEVICES AND THEIR INTEGRATION WITH HEALTH AND SAFETY
- UNIT 6: TECHNIQUES FOR EFFECTIVE PPE DONNING AND DOFFING
- UNIT 7: EFFECTIVE DECONTAMINATION AND CONTROL ZONES FOR BIOLOGICAL SAFEGUARDING
- UNIT 8: SITE CONTROL OF BLOODBORNE PATHOGENS
- UNIT 9: EMERGING STRATEGIES FOR EFFECTIVE FIRST AID AND CPR
- UNIT 10: NOVEL STERILIZATION TECHNIQUES FOR SITE SAFETY
- UNIT 11: PROTECTIVE MEASURES: ANIMALS, INSECTS, & PLANTS

102: BIOLOGICAL AND INFECTIOUS AGENTS IN THE FIELD

28%

READ

PRACTICE

KEY DEFINITIONS

Biological agents (*noun*): are bacteria, viruses, fungi and other microorganisms and their toxins. They are widely found in the natural world and everyday human environments, including workplaces, and they are mostly innocuous. Organisms classified as biological agents include bacteria, fungi, internal parasites, and associated toxins.

Infectious agents (*noun*): are microorganisms that are capable of producing infection or infectious disease. Common infectious agents include bacteria, fungi, viruses, and common parasites.

Site clean-up workers have a high risk of contact with both biological and infectious agents due to the various types of activities involved with their jobs and the possibilities of contamination. These agents may be naturally occurring in the work environment, or have been introduced by human activity. The concern for biological and infectious agent exposures on-site has been significantly enhanced recently due to the COVID-19 pandemic. In essence, it is now even more essential that we protect workers from

102: BIOLOGICAL AND INFECTIOUS AGENTS IN THE FIELD

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PRACTICE

Select the correct answers.

In regards to monitoring bioaerosols and what to include on a HASP, which of the following statements are true? Select all that apply.

- While specific methods for monitoring bioaerosols in the workplace have been established, these are primarily for outdoor air quality investigations and there is no consensus about preferred bioaerosol sampling methods.
- While specific methods for monitoring bioaerosols in the workplace have been established, these are primarily for indoor air quality investigations and there is no consensus about preferred bioaerosol sampling methods.
- The best strategy for monitoring seems to be qualitative observation of employee behavior

Phase 1: Continuing Education

- The CE modules were successfully launched in 2022 as free online training
- ~234 learners have completed the modules
- The CE staff at the Rocky Mountain Center for Occupational and Environmental Health (RMCOEH) now manage/promote the course through their registration system
- Certificate and 0.6 CEU credits available on completion



Extensive Marketing

Examples:

- National CERT (Community Emergency Response Team) Conference (presentation/booth; ~5,000 attendees)
- International Association of Emergency Managers (IAEM) contact list (4,012 contacts)
- Oregon Health and Safety Conference (~2,000 contacts)
- PETE/CCCHST (Community College Consortium for Health and Safety Training) – (~30,000 student contacts)
- Montana Tech (sent to all ~3,000 students)
- RMCOEH CE (sent out in newsletter 5,000+ contacts)
- Fulcrum Labs (sent out to all hospital contacts; ~5,000)
- Utah Hospital Association (sent to all contacts; ~5,000)
- UofU (all HAZWOPER course groups/industries; 5,000+)
- Facebook/Instagram boost (1,541 clicks; 2,921 post engagements; 126,000 reached)
- LinkedIn (581 clicks)

69,000+
industry
contacts

126,000+
social media
contacts

Multiple
conferences
attended per
year

NIEHS HAZWOPER TRAINING

< Back to Education & Degree Programs

MSOH

NIEHS Hazwoper Training

P²R Academy

Prevention, Preparedness and Response

The P2R Consortium for Hazardous Waste Worker Training (P2R) is a partnership between the University of Texas School of Public Health's Southwest Center for Occupational and Environmental Health and the University of Utah's Rocky Mountain Center for Occupational and Environmental Health, currently known as the Prevention, Preparedness, and Response (P2R) Academy. The P2R Academy offers hazardous materials worker training and a HazMat Leadership Academy designed for current or aspiring managers and leaders.



Hazwoper Courses (Online and In-person)

[Biological and Infectious Agent Health and Safety in Emerging Technologies \(BioSTET\) Training](#) (Free Online)

This course will explore the fundamentals of developing a site health and safety plan that includes provisions for biological safety. Course participants will be introduced to definitions, critical components, engineering controls, PPE used to eliminate site hazards and exposures, the economics of an effective site health and safety plan, and specific applicants where the site health and safety plan effectively included biological safety, as demonstrated through clinical and/or medical device case studies.

[BioSTET Feedback](#)



[Hazwoper Train the Trainer \(Hybrid\) Certificate](#) (\$495)

The course will provide a basic overview and understanding of the content of Hazwoper training courses including the 40-hour, 8-hour refresher and First

www.OnlineHazwoper.org



HAZARD SITE TRAINING

CONTINUING EDUCATION CERTIFICATION

BIOLOGICAL HEALTH AND SAFETY

ELIMINATION OF SITE HAZARDS AND EXPOSURES

PATHOGEN CONTROL AND DECONTAMINATION

EFFECTIVE FIRST AID

... AND MORE!



REGISTER HERE



REGISTRATION QUESTIONS

(801) 626-6600

ce-enrollment@weber.edu

COURSE QUESTIONS

(541) 904-0660

onlinehazwoper@utah.edu

CEU credits count toward ABIH and BCSP certifications

Participant Comments

- “Being able to read the information”
- “Ability to reread and revisit sections”
- “The entire course was valuable”
- “I did like the AI aspect, if you were competent in the material it took you to the next section, if not it encouraged to repeat it”
- “I like the new technologies and processes”
- “The content was solid”
- “Self-paced”

Phase 2: Graduate Coursework & Integration

- The current phase involves:
 1. A collaborative research topics course in site biological health and safety
 2. A collaborative applied topics course utilizing products resulting from the research course
 3. Integration of curricula offered at the four main institutional partners (Utah, ETSU, Cal Poly, & Montana Tech)
- These courses focus on emerging technologies (e.g., devices, systems, controls) in the biological health and safety aspects of environmental characterization and remediation

University of Utah Implementation

BioSTET materials were introduced into two courses:

- OEHS 6756 – Management of Hazardous Substances
 - Students also receive a HAZWOPER certificate as part of this course
 - Fall 2023: Discussion sections on what types of emerging technologies could be developed/implemented for biological health and safety during HAZWOPER activities
- OEHS 6751 – Advanced Industrial Hygiene
 - Supplemental material for the module on Biological Hazards
 - Spring 2024: 8 students completed the CE course
- A dedicated TA/RA will begin in Fall 2024 to help facilitate/manage curricular activities across institutions

ETSU Implementation



- ETSU was added to our collaborative team, beginning July 2023
 - Rod Handy (MPI) accepted the chair position with the Department of Environmental and Occupational Health and Safety Sciences (new subcontract)
- BioSTET has been introduced into two existing courses:
 - ENVH 5700 Industrial Hygiene and Safety (Fall 2023)
 - ENVH 4397/5397 Environmental Analysis (Spring 2024)
- Class discussions and assignments have focused on how biological/infectious agent health and safety could be added as a supplement to the current topic items in HAZWOPER:
 - Brainstorming has resulted in some innovative approaches to keep site workers safe using creative administrative, engineering, and PPE strategies (some in tandem)
- ENVH 4727/5727 HAZWOPER will be taught Fall 2024:
 - The left-over contact hours above the 40-Hour requirement will include BioSTET discussion and integration into the course
- In Fall 2024, the plan is to collaborate with the other project institutions to further develop our research topics course:
 - Plans to have students and faculty from the project institutions to come together virtually to work on this effort

California Polytechnic State University

- Graduate Course in Biomedical Engineering
 - BMED 550 – Site Biological/Infectious Agent Health and Safety
 - Fall 2022 – 18 students
- Graduate Student Research Areas (2023-2024 : 10 students)
 - Noninvasive Cardiovascular Disease Detection
 - Development of tool for endothelial dysfunction measurement
 - Novel methodology for subclinical atherosclerosis measurement
 - Improvement of surrogate arm bench top model
 - Note: Some Environmental Risk Factors Associated with Cardiovascular Disease
 - Noise Pollution, Air Pollution, Light Pollution, and Climate Change
- Some Class Presentation Themes
 - Engineering Controls – Novel ‘BMED’ Platform Solutions & Benefits
 - Pharmaceutical and Pentachlorophenol (PCP) in H₂O: Occurrence, toxicity, risk, and potential solutions
 - Use of Radiation in Biotech
 - Airborne Pathogens and Clinical Solid Waste



Montana Tech Implementation

- The BioSTET course material was moved to PowerPoint for classroom instruction
- BioSTET course material was integrated into a graduate course: Advanced Environmental Health (IH 524) in the winter of 2023-2024
 - That was taught this spring semester
- Feedback has been very positive
- The BioSTET CE course was added as a requirement for Hazardous Materials Management (OSH 322)
 - That was taught this spring semester
- 20 students completed the BioSTET CE training through the UU



Montana Tech Implementation

- A curriculum change was submitted to the College Curriculum Committee to change the name of IH 524 to “Advanced Environmental Health and Biological Site Safety”. This proposed change will receive final approval this summer at the Montana Higher Education Commission, Board of Governor’s meeting
- A recent accreditation trip to the University of Georgia Athens provided the opportunity to promote the BioSTET course which resulted in it being adopted as a requirement for the Environmental Health Sciences program
- The new BioSTET flyer was circulated to EHAC-accredited schools as an added certificate for students to earn such as HAZWOPER and the OSHA 10- or 30-hour certificates

Phase 2: Updates and Progress

- For the last two years, a subgroup from our team has been concentrating on the further development and implementation of project subject matter into courses at all of the participating universities
- The next year of the project will continue to focus on the further development of these courses for full implementation/integration at all partner institutions
- TA/RA (PhD student) will be brought on to help manage and learn from these activities

Overall Project Benefits/Opportunities

- Incorporation of biological stressor materials into relevant curriculums
- Integration of content into both graduate/undergraduate curriculum and professional development (CE)
- Promotion of protecting workers from biological agents
- Critical thinking skills developed in allied areas of profession, especially involving emerging technologies
- Course material can be presented in such a way as to supplement traditional areas
- Integration of biological exposure content into HAZWOPER

Overall Project Challenges

Challenge	Status
Learning platforms can vary between institutions	<i>Luckily, all 4 institutions use Canvas</i>
Usability needs to be optimized	<i>Ongoing troubleshooting when problems are identified</i>
No certificate of completion was being generated by the system	<i>Fixed!</i>
Curriculum changes are tightly regulated	<i>Faculty have been able to work within their existing systems thus far. NIEHS support for this work helps provide justification.</i>
Curriculum changes take a long time to implement	<i>Still pushing forward!</i>
Institutional collaboration amongst students may take longer than anticipated	<i>Dedicated RA/TA (PhD student) will start Fall 2024 to help facilitate this effort</i>

Summary

- These efforts will help ensure that high-quality biological hazard training, especially as it relates to emerging technologies at site cleanup, is readily available to both working professionals and students
- The combination of CE and graduate coursework is vital for distributing this material to the widest possible audience

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- We would like to thank Kirk Godfrey (CE Director at RMCOEH) and his team for assistance with CE registration and marketing

Comments/Questions?

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FREE COURSE!

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