

A. COVER PAGE

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NIOSH Training Project Grant (TPG) Final Report
University of Arizona Industrial Hygiene Training Program
Reporting Period: 07/01/2018 – 06/30/2023
T01 OH009631, PI: Jefferey Burgess, MD, MS, MPH

1. TPG Summary

The purpose of the University of Arizona's (UA) Industrial Hygiene (IH) Program is to provide master's level graduate training in the core occupational safety and health area of IH. The Program began in 1978 and is housed in the Mel and Enid Zuckerman College of Public Health (MEZCOPH). The college offers MPH, MS, and PhD training in IH. NIOSH support during the project period included master's degree programs: MPH in Environmental and Occupational Health (EOH) – IH track and MS in Environmental Health Sciences (EHS) – Occupational Health and Safety emphasis. Both graduate level programs were certified under ABET through May 2020 and transitioned to CEPH accreditation after May 2020. During the reporting period, the program was guided by 12 faculty members and an Industrial Advisory Committee made up of OSH/IH professionals from the region.

A unique strength of the UA IH program is our focus on mining health and safety and relationship with the School of Mining and Mineral Resources (SMMR). Arizona and the Southwest have one of the richest endowments of copper and related commodities on the planet. The mineral resource development industry has a long history of occupational exposures that lead to workplace injury and illness. Solving these problems and providing a healthy and safe workplace is the role of the professional IH. The UA IH program is the only program of its kind in the Southwest, as such, we provide the bulk of the new IHs for the region. The NIOSH supported MPH EOH-IH requires forty-five credit hours to graduate, and the MS EHS-OHS emphasis requires forty-two credit hours to graduate. Both programs are typically completed in two years of full-time study. Comprehensive coursework is provided in the key areas of IH including air monitoring theory and practice, occupational safety, physical exposures, occupational controls, toxicology, and environmental health. Program graduates find employment as OSH professionals in industry, government, and academia. With education obtained in the program, and depending on their previous background, graduates can expect to sit for the CIH and/or CSP exam early within their career.

The program goals for 07/01/2018 – 06/30/2023 included the following:

- 1) To continue to provide MPH and MS level IH training; to increase the number of trained IHs, with a particular focus on the Southwest.
- 2) To continue to provide training specific to exposures in the mining industry with opportunities for student internships and research projects.
- 3) To transition to and maintain program CEPH-accreditation (adjusted mid-cycle).
- 4) To expand training, internship and student research opportunities focused on microbiological exposures.

Diversity is a priority for the program, and the University continues to support this through its emphasis on recruiting throughout the southwest.

2. Relevance

Occupational injury and illness affect millions of workers and their families every year and are tremendous economic burdens on our society. Highly qualified, technically competent, diverse, and passionate industrial hygienists are needed to meet our national goal to prevent occupational lung disease, illnesses, injuries, and fatalities, as described in the DHHS Healthy People 2030. The University of Arizona IH program provides a conduit for trained IH professionals to enter the workforce to serve the American worker population.

3. Key Personnel

The following key personnel were instrumental in the execution of the NIOSH TPG at the University of Arizona during the period of 07/01/2018 – 06/30/2023.

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* Coordinator: 07/01/2018 – 12/31/2021.

** Coordinator: 09/01/2021 – 12/31/2022.

*** Coordinator: 12/31/2022 – Present.

4. University of Arizona – TPG Website

<https://publichealth.arizona.edu/academics/masters/mph/eoh/ih>

5. High Impact Stories – 07/01/2018 – 06/30/2023

Statistics:

During the NIOSH TPG cycle of 07/01/2018 – 06/30/2023, the University of Arizona produced 14 MPH, Environmental and Occupational Health IH track (EOH-IH) and 2 MS environmental Health Sciences (EHS-OHS) graduates with 5 students currently enrolled (in-progress) at the close of the project cycle. Of the 16 graduates within the grant cycle, 15 graduates are employed in Occupational Safety and Health (OSH) related fields or are seeking an advanced degree in an OSH-related field. At the close-out of the grant cycle, 06/30/2023, the program has 5 MPH EOH-IH and 0 MS EHS-OHS students in progress. All five students are supported to some degree by the NIOSH TPG.

Students:

Highlights of recent student internships, research, and activities are detailed below:

S. Sneed is the most recent graduate of the MPH EOH-IH program (May 2023). Upon graduation, Sam was inducted into the prestigious Delta Omega Honorary Society in Public Health. Sam, an adept student and passionate about reducing exposures, both environmental and occupational, has been called to higher education electing to pursue a medical degree with goals of engaging in research in the Environmental, Occupational Safety and Health field. While applying to medical school, Sam is currently employed as a Clinical Research Coordinator at the University of Arizona Cancer Center. During Sam's MPH, he was awarded the Elbridge and Genevieve Morrill Memorial Scholarship for the 2022-2023 school year. This scholarship is awarded to MEZCOPH students with potential to succeed in Environmental and Occupational Health. Sam completed an industrial hygiene internship with the Central Arizona Project assessing hazardous noise exposures from sandblasting with various nozzle connectors as well as completing a variety of air sampling studies. During the grant cycle, he served as the student representative to the Arizona AIHA Local Section and completed one year and three months working with Dr. Paloma Beamer and the Southwest Environmental Health Sciences Center (SWEHSC). In this position, he worked half-time on Dr. Beamer's R01 study titled "*Solutions for a Changing World*," an industrial hygiene-enhanced clinical research study focused on reducing exposure to volatile organic compounds in small auto and beauty shops in Southern Tucson.

K. Turcheck completed two internships in industrial hygiene at Freeport-McMoRan's: one internship at the Bagdad, Arizona site with a second internship at the Safford, Arizona site. His research emphasis during the internships included *Exploring Dust Reduction Techniques in Ore Crushing Operations at a Surface Metal Mine* and *Defining Occupational Exposures to Sulfuric Acid in Leaching Operations*, respectively. Kyle also worked with Dr. Eric Lutz at the School of Mining and Mineral Resources' (SMMR) Safety Center of Excellence (SCE), assisting in developing the center's objectives to increase mine safety and health capacity nationwide. The NIOSH TPG funding has allowed him to focus on his career development and studies, maintaining a 4.0 GPA. Kyle is expected to graduate in December 2023 and has been offered a job with Roche, LLC part-time during his final semester of school and full-time following his graduation. Kyle aspires to obtain credentialing through the Board of Certified Safety Professionals (CSP) and Board of Global Credentialing (CIH) after his experience requirements are satisfied.

A. Stafford is also planning to graduate in December 2023. Andrew was offered an industrial hygiene internship by multiple companies, including Freeport-McMoRan, but elected to accept Raytheon Technologies 12-month internship position which was extended an additional 6-months. Andrew completed a variety of deliverables including noise studies, occupational air

sampling, and evaluation of lasers and radiofrequency radiation emitters. This excellent internship experience and his desire to help others led him to volunteer with the University of Arizona Research Laboratory and Safety Services (RLSS) to work with their chemical hygiene officer and laser safety officer to improve both programs. In April 2023, Andrew became a certified Laser Safety Officer, completing a week-long course funded by the NIOSH TPG. With a history as a first responder and wildland fire fighter, Andrew is currently working with Dr. Burgess investigating occupational exposures in wildland firefighters. Andrew presented his findings in a research poster presentation entitled, "*Evaluating occupational exposures to PAHs (known carcinogens) in wildland firefighters.*" Through Andrew's collaboration with Dr. Burgess, Andrew had the opportunity to present his findings in occupational exposures to representatives at FEMA. Andrew plans to continue his research aspirations and was accepted into the University of Arizona College of Public Health Ph.D. program in Environmental Health Sciences following completion of the MPH EOH-IH.

R. Conner recently transferred into the MPH EOH-IH program. Reagan is currently completing an internship with the University of Arizona at Research Laboratory and Safety Services (RLSS). RLSS is responsible for the occupational health and safety for all laboratories on the University of Arizona campus. Reagan is learning how to conduct performance testing of campus ventilation systems and she is creating a database with exposure recommendations and information on IACUC research drugs being used on the UA campus. Both activities also incorporate personal air sampling and evaluation of exposures. Reagan also works for Dr. Burgess coordinating a randomized controlled trial within the Firefighter Collaborative Research Project <https://fcrp.arizona.edu/>. The trial is investigating interventions to reduce serum PFAS levels, reduce cardiovascular risks, and improve epigenetic age in ~1500 Arizona firefighters. Reagan's work involves daily operations and scientific communication between the firefighters and researchers.

D. Carroll currently works as an Engineer and Safety Manager at the UA's Large Binocular Telescope Observatory. He recently re-enrolled in the program after a period of several years (Fall 2022). David has been approved to sit for the Board of Global Credentialing, Certified Industrial Hygienist (CIH) examination in the Fall of 2023.

J. Orias also recently transferred into the MPH EOH-IH program (Spring 2023). Jersey began an internship with HEXCEL Corporation in Case Grande in June 2023.

Research Highlights:

We are proud of our student involvement in research during this cycle.

T. Gustafson (22') a TPG-supported student, worked with Drs Jeff Burgess and Rustin Reed to support the industrial hygiene-related activities of an alternative diesel study at the UA's San Xavier Mine.

S. Sneed (23'), a TPG-supported student, worked with Dr. Paloma Beamer and the Southwest Environmental Health Sciences Center (SWEHSC) on Dr. Beamer's R01 study titled "*Solutions for a Changing World*," an industrial hygiene-enhanced clinical research study focused on reducing exposure to volatile organic compounds in small auto and beauty shops in Southern Tucson.

K. Turcheck, a TPG-supported student, also worked with Drs Burgess and Reed to support the alternative diesel study at the UA San Xavier Mine.

A. Stafford has been working with Dr. Burgess investigating occupational exposure in wildland firefighters. Andrew presented his findings in a research poster presentation entitled, *“Evaluating occupational exposures to PAHs (known carcinogens) in wildland firefighters.”* Andrew continues to work with Dr. Burgess on a variety of wildland firefighter research.

R. Conner currently works for Dr. Burgess, also investigating occupational exposures in firefighters.

Employment:

All our recent TPG-supported graduates have transitioned successfully to paid employment with prestigious organizations. During the cycle, 15 of 16 graduates are employed in OSH-related fields or have elected to seek advanced degrees in OSH-related fields.

Recent graduates hold IH-positions with the following organizations: Freeport-McMoRan, Raytheon Missile Systems, Tucson VA Medical Center, Sonora Quest Laboratories, United States Air Force, Automatic Data Processing, Intel Corporation, Terracon, LLC, Arizona Department of Occupational Safety and Health, and the University of Arizona.

Our current TPG-supported students have completed industrial hygiene internships with Freeport-McMoRan, Raytheon Missile Systems, Central Arizona Project, HEXCEL Corporation, and the University of Arizona.

Extramural Training Opportunities:

Despite the disruption of the coronavirus pandemic, students had the opportunity to attend a variety of extramural training opportunities funded by the NIOSH TPG throughout the cycle. Online instruction included: Bowen CIH Preparatory Courses and the Laser Safety Officer Course.

Most recently, as a rebound from pandemic restrictions, students attended the American Industrial Hygiene Association Conference and Exposition (AIHce) in Phoenix, Arizona. Four of the five current NIOSH trainees attended the conference, including Professional Development Courses (PDCs) as well as the full conference venue.

UA Faculty manned a UA Copenhaguen booth serving as a focal point for current students, UA NIOSH TPG alumni, and interested professionals to congregate and learn about the current NIOSH TPG programs at the UA.

Honors and Awards:

NIOSH TPG students earned a variety of honors and awards during the cycle.

L. Harris received the 2019 American Industrial Hygiene Foundation (AIHF) Award Dennis Paustenbach Scholarship.

V. Lugo received the 2019 Walter Winterhoff scholarship and was named a 2019 Arizona Area Health Education Centers (AzaHEC) Scholar.

J. Fischback received the 2019 and 2020 SueBob Scholars Endowment and the Society for Mining, Metallurgy, & Exploration (Morenci Chapter) scholarship. Research grant from the Arizona Local Section of the American Industrial Hygiene Association.

J. Senia was nominated to Delta Omega, the honorary society for graduate students in public health, in May 2019 for his contributions to public health.

I. Kenny was awarded the 2020 Mel and Enid Zuckerman Scholarship.

Natasha Ng was awarded the 2020 David V. MacCollum Visionary Scholarship through the American Society of Safety Professionals.

S. Sneed was awarded the 2022-2023 Elbridge and Genevieve Morrill Memorial Scholarship and inducted into the Delta Omega honorary public health society (2023).