NIOSH Training Project Grant (TPG): Industrial Hygiene University of Toledo

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List of Abbreviations

ANSAC .....Applied and Natural Science Accreditation Commission
ABET .....Accreditation Board for Engineering and Technology
IH .....Industrial hygiene
CIH .....Certified industrial hygienist
CSP .....Certified safety professional
GSP .....Graduate safety practitioner
MSOH .....Master of Science in Occupational Health
NIOSH .....National Institute for Occupational Safety and Health
OSH.....Occupational Safety and Health

Abstract

The Master of Science in Occupational Health (MSOH) degree Industrial Hygiene (IH) program, founded in 1985, is administered through the College of Health and Human Services at the University of Toledo (UT) – Health Science Campus. The MSOH-IH program has been accredited by ABET since 1996 and has received NIOSH TPG funding for 17 years. National trends indicate a continued demand for trained occupational health professionals and NIOSH training grants are integral to the continued functioning of occupational safety and health (OSH) programs. The MSOH-IH program at UT and the subsequent NIOSH TPG fulfill an important local, regional, and state gap by providing academic opportunities for Occupational Safety and Health professionals in northwest Ohio.

The objective of the NIOSH TPG is to recruit graduate-level students into the MSOH-IH program at University of Toledo and produce trained industrial hygienists. To meet this objective, the primary goal of the MSOH-IH program is to provide master-level education and training to graduate students for the purpose of increasing their knowledge, comprehension, skills and attitudes essential to the advancement of OSH science, practice and research. Graduates are prepared for employment as highly qualified, educated, and professionally trained OSH specialists, many of whom remain in northwest Ohio because of competitive salaries and industrial opportunities. The NIOSH scholarship funding eases the financial burden of individuals, including those from underrepresented minorities, and enables them to primarily focus on their education.

Over the past 15 years, 59 trainees have received NIOSH TPG funding. Twenty-three trainees received funding over the past project period (2015-2020). These trainees have been both full-time and part-time and nearly half of those recruited were from northwest Ohio. The program was successful in sustaining 21 percent underrepresented or underserved trainees. Trainees have presented their research at local, regional and national conferences and one student received a graduate research award.

Sixteen trainees graduated over the project period; all students that matriculated into the MSOH-IH program completed it. Thirteen of these trainees are successfully employed in OSH. The majority (69%) remained in northwest Ohio, which contributes to filling the demand for OSH professionals. This is particularly important in this region as it helps alleviate some of the “brain drain” seen in Ohio moving patterns. The remaining are working in other parts of Ohio, out of state or internationally. They are employed in a range of fields (manufacturing, government, healthcare, and consulting) as industrial hygienists, compliance officers, and environmental health and safety managers. The companies range in size from a few hundred to 100,000 workers whose health and wellbeing benefit from these trained OSH specialists. Over a third of trainees have obtained professional certification in the field, further demonstrating their commitment to the field of occupational safety and health. The scholarships available through the MSOH-IH program’s existing NIOSH TPG funding have allowed recruitment of exceptional students who otherwise could not afford to attend graduate school. Tuition scholarships serve as a positive incentive to attract individuals to the program and fulfill the need for OSH professionals in northwest Ohio and beyond.

1 Background

The Master of Science in Occupational Health (MSOH) degree Industrial Hygiene (IH) program, founded in 1985, is administered through the College of Health and Human Services at the University of Toledo (UT) – Health Science Campus. The MSOH-IH program has been accredited by ABET since 1996 and has received NIOSH TPG funding for 17 years. National trends indicate a continued demand for trained occupational health professionals (McAdams et al., 2011) and NIOSH training grants are integral to the continued functioning of occupational safety and health (OSH) programs. The IH program at UT and the subsequent NIOSH TPG fulfill an important local, regional, and state gap by providing academic opportunities for Occupational Safety and Health professionals in northwest Ohio.

The objective of the NIOSH TPG is to recruit graduate-level students into the MSOH-IH program at University of Toledo. To meet this objective, the primary goal of the IH program is to provide master-level education and training to graduate students for the purpose of increasing their knowledge, comprehension, skills and attitudes essential to the advancement of OSH science, practice and research. Graduates are prepared for employment as highly qualified, educated, and professionally trained OSH specialists, many of whom remain in northwest Ohio because of competitive salaries and industrial opportunities. The NIOSH scholarship funding eases the financial burden of individuals, including those from underrepresented minorities, and enables them to primarily focus on their education. The specific aims were 1) recruit potential students from northwest Ohio and surrounding areas and award tuition scholarship; 2) educate and train graduate students and professionals to be successful in the industrial hygiene discipline; 3) produce qualified graduates that gain successful employment in the field of industrial hygiene or a related field.

2 Results

The program ensured scholarships were awarded to the FT equivalent of three NIOSH trainees per year, while maintaining underrepresented or underserved students at levels reflective of the IH program. There were a total of 23 NIOSH trainees over the reporting period (Tables 1 & 2, Appendix A). Trainees have been both full-time (9) and part-time (14). Twenty-one percent of trainees were underrepresented or underserved students. While there were a higher percentage of male trainees (57%) there were still over 40 percent females. Nearly half (11) of trainees were from northwest Ohio; 17 percent (4) were from other parts of Ohio; and, the remaining 35 percent (8) trainees were from out of state. Nearly 40 percent of trainees in the reporting period were seeking dual degrees (MSOH-IH and MPH) which has provided an additional set of skill that employers have reported as valuable.

All students and trainees maintained acceptable GPAs (>3.0) while in the program. Trainees completed internships in a variety of facilities over the reporting period and gained valuable industrial hygiene experience. Sites represented the petroleum, aerospace, glassmaking, healthcare, and the automotive, all important industries in the region, as well as, transportation, energy, and government. One trainee was part of the Junior Commissioned Officer Student Training and Extern Program (Indian Health Service). He was assigned to a unit in New Mexico and conducted indoor air quality investigations; participated in group presentations on roadway safety; and, performed inspections of construction and renovation projects.

Trainees have the opportunity to enhance their communication skills and educate others about safety and health, including potential career opportunities. Through community engagement, trainees filmed a series of training exercises using a drone for both the Toledo Fire Department HAZMAT team and during a regional training exercise at the Owens Community College Center for Emergency Preparedness, evaluating the performance of participants. Trainees also had the opportunity to mentor local high school students at the Toledo Public Schools Natural Science Technology Center. This involved presenting an introductory overview of ambient air quality and particulates; demonstrating different air monitoring instrumentation; assisting the students with setting up air sampling stations and collecting weekly data; and, assisting with preparing a poster to present to their peers. Finally, trainees have also mentored NSF Research Experience for Undergraduates program students, which includes guidance on study design, data analysis, and writing the scientific paper.

Several MSOH-IH students, including trainees, are involved as members or officers in the Public Health Student Organization (PHSO) at UT. The group provides academic and professional development, support and guidance to students in the MSOH-IH and MPH programs by: promoting community service within the Public and Occupational Health fields; helping students gain networking and mentoring opportunities in Public and Occupational Health; and, informing students about interesting internships and careers in Public and Occupational Health. PHSO participates in a number of volunteer and outreach activities and trainees were part of a group of students requested to present on occupational health issues in American culture. PHSO members and trainees have also participated in educational events introducing youth to the topic of industrial hygiene. One of these sessions involved the Cub scouts in the Northwest District and demonstrated how environmental conditions including particles and noise can be measured, and how excessive noise in the environment can damage the ear.

Sixteen trainees graduated between 2015 and 2020 (32% dual degree, MSOH-IH & MPH). All students that matriculated into the IH program completed it. There are 7 current trainees (57% dual degree). Trainees that graduated during the reporting period completed theses on topics such as exposure assessment to chemical, biological agents, or physical agents, specifically noise. Scholarly projects by trainees explored a range of topics such as hazard perception and hexavalent chromium; formaldehyde exposure; reproductive and developmental hazards; and, noise control evaluation in the automotive industry.

The MSOH-IH program has provided well-trained graduates to meet the demand for a professional OSH workforce. One trainee was employed in OSH and is now continuing their education with a goal of occupational medicine. Thirteen (87%) trainees are successfully employed in OSH. Sixty-nine percent remained in the northwest Ohio region and another eight percent in Ohio. The remaining are working out of state (15%) or internationally (8%). These graduates are impacting the safety and health of workers in various industries including petrochemical, glass making, automotive, chemical and food production. They are employed in a range of fields (manufacturing, government, healthcare, and consulting) as industrial hygienists, compliance officers, and environmental health and safety managers. The companies range in size from a few hundred to 100,000 workers whose health and wellbeing benefit from these trained OSH specialists. Two of the current trainees, near completion of the program, have secured employment as OSH professionals. The positions are in northern Ohio, in

government and manufacturing. Over a third of trainees have obtained professional certification in the field, further demonstrating their commitment to the field of occupational safety and health.

3 Accomplishments

As part of their NOISH traineeship and research activities, students are encouraged to present their work or help faculty disseminate their research findings at local, regional, and national conferences. Over the reporting period, 5 trainees presented posters at local, regional, or national conferences, gaining experience disseminating research findings and networking with students and faculty from other institutions. Two trainees were also involved in writing manuscripts for potential publication. Two trainees were engaged in separate funded University of Cincinnati PRP Pilot Projects, air sampling for emerging environmental contaminants and the use of drones for emergency response.

There were a number of opportunities for NIOSH trainees to collaborate with the faculty (primary and secondary) as well as different units at UT (Colleges of Medicine and Nursing, clinical operations, and the Department of Environmental Health and Radiation Safety (EHRS)), and become involved in applied research and technical projects to prepare them for the OSH workforce. These interactions with EHRS allowed NIOSH trainees to participate in applied industrial hygiene projects, for example, chemical and noise exposure evaluations in a variety of settings including anatomy and histology laboratories. Collaborations with secondary faculty examined occupational aspects of long-term care settings (Dr. Steiner), drone applications (Dr. Rega), and diseases and symptoms related to environmental exposures (Dr. Saltzman). Most trainees volunteered to participate in different faculty or student projects. The industrial hygiene program also collaborated with outside entities. One example is a collaboration with a fortune 500 company that involves significant engagement with a new course on health, safety and worker well-being, guest speakers in the foundation courses, internships, a project site, and data sets on injuries and exposure for class and student projects.

Our trainees have received several honors and awards. One trainee received a Graduate Student Research Award, which provided funding from the University of Toledo Graduate Student Association for their thesis work on noise in nursing homes. Another trainee was nominated for and accepted one of ten positions to UT's College of Business and Innovations Advanced Leadership Academy, designed to improve the leadership skill set, thinking, and acumen of select students to improve their career trajectory in a dynamic pan collegial learning environment. Students were invited based on their academic and professional records of success and the recommendation of graduate faculty. Academy members included masters and Ph.D. students from the UT colleges of business, health and human services, engineering, nursing, pharmacy, and education.

Two of our trainees have been awarded additional scholarships to assist financially with their dual degrees: Taiwo Oyadiran (2019-2020, American Industrial Hygiene Foundation (AIHF) General Scholarship) and Victoria Simpson (2019-2020, AIHF Ralph J Vernon Memorial Scholarship; 2019-2020 Board of Certified Safety Professionals Foundation Qualified Academic Program/Graduate Safety Practitioner Scholarship; 2018-2019, AIHF TSI / Arthur J. Abram Memorial Scholarship). Benjamin Smigielski received an Ohio Bureau of Workers' Compensation Occupational Safety & Hygiene Fellowship.

The IH program remains dedicated to establishing a diverse and inclusive atmosphere through the recruitment and retention of exceptional underrepresented and underserved students from a variety of racial and ethnic backgrounds. Over the past training period 21% of the trainees were underrepresented or underserved. All trainees continue to successfully gain employment in the OSH field and many secure positions prior to graduation.

4 Summary

Over the past 15 years, 59 trainees have received NIOSH TPG funding. Twenty-three trainees have received funding over the past project period (2015-2020). Of these, 16 have completed their research projects and graduated from the program. Most graduates are successfully employed as OSH professionals in northwest Ohio and beyond. Seven trainees are currently in the program and projected to graduate over the next two years. Retention was not an issue over the past project period; all trainees remain in the program or have graduated. Students numbers in the MSOH-IH program have been stable over the past 10 years and have provided a sufficient pool from which to draw new trainees. The program was successful in sustaining 21 percent underrepresented or underserved trainees. The scholarships available through the MSOH-IH program's existing NIOSH TPG funding have allowed recruitment of exceptional students who otherwise could not afford to attend graduate school. Tuition scholarships will continue to serve as a positive incentive to attract individuals to the program and fulfill the need for OSH professionals in northwest Ohio and beyond.