

Montana Tech  
NIOSH Training Project Grant  
Annual Report: July 1, 2016 – June 30, 2017  
Julie F. Hart – TPG Program Director

## **Section I**

### **TPG Summary:**

Montana Tech conducts three NIOSH-sponsored training programs under a single grant. An undergraduate program leads to a B.S. degree in Occupational Safety and Health (OSH). There are two graduate programs leading to an M.S. degree in Industrial Hygiene (IH). One IH program is conducted on campus and the other is offered through distance delivery (online). The three programs are housed in the Safety, Health and Industrial Hygiene (SHIH) Department. Seven faculty members in the department are substantially involved in teaching and research in safety, health, and industrial hygiene.

The undergraduate OSH curriculum provides a comprehensive education to develop graduates with capability for serving as exceptional safety and health professionals as well as contributing to society in general. It is accredited by the Applied Science Accreditation Commission of ABET (ASAC/ABET). The first two years of the program focus on foundation disciplines including general chemistry, college physics, calculus, organic chemistry, statistics and English composition. Humanities and social sciences are distributed throughout the four year curriculum. OSH courses are generally taken in the second through fourth years of the program. Of the 128 total hours in the curriculum, at least 46 credits are OSH courses.

The two ASAC/ABET accredited graduate programs aim to develop exceptional IH professionals. The curriculums provide a full range of IH courses and supporting electives. The on-campus program requires 37 credit hours consisting of 28 lecture courses, two hours of graduate seminar, six hours of thesis research, and a one-hour technical writing seminar. A thesis or publishable paper is required and defended at an oral examination. The IH Distance Learning/Professional Track Program also requires 37 credit hours consisting of 34 lecture courses and a three credit capstone written and oral comprehensive exam. Students in the distance delivery program may sit for the exam during the last semester of coursework. One of the courses in the distance delivery program, Sampling and Evaluation of Health Hazards, requires a one week residency on Montana Tech's campus in the summer.

The NIOSH grant provides funds for valuable program enhancement, primarily through scholarships for on campus students. Additional enhancements include student travel for professional conferences, faculty development, and partial summer salary for program enrichment by program managers. NIOSH support unquestionably enhances program quality and recognition.

### **Relevance to Public Health:**

The mission of the SHIH Department is to serve students by supplying knowledge and research opportunities that provide high quality, accessible, science and technology curricula with program educational objectives focused on preparing students for successful safety and health careers. While the focus of our programs is on the worker, many activities and responsibilities of

an industrial hygienist or safety professional extend beyond the constraints of the workplace to enhance the lives of workers, their families, and communities.

**Key Personnel:**

**Julie F. Hart, PhD, CIH**

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Dr. Hart has served as Professor and Chair in the Safety Health and Industrial Hygiene Department since 2013 and is the Principal Investigator for this project. She has a master's degree in Industrial Hygiene and a Ph.D. in Toxicology. She is a Certified Industrial Hygienist through the American Board of Industrial Hygiene. Dr. Hart continues to manage the program plan as well as teach and conduct research with undergraduate and graduate students. Dr. Hart's teaching responsibilities include Advanced Industrial Toxicology, Industrial Ventilation, and Small Particle Technology. Dr. Hart's primary research interests include characterizing worker and public health exposures to aerosols.

**Theresa Stack, CPE, CSP**

**[tstack@mtech.edu](mailto:tstack@mtech.edu)**

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Theresa Stack is an Associate Professor and the B.S. OSH Program Manager. Professor Stack was hired as an Assistant Professor in 2013 and promoted to Associate Professor in 2017. Theresa has a master's degree in Occupational and Environmental Health from the University of Washington. She is also a Certified Safety Professional and a Certified Professional Ergonomist. Theresa instructs a number of undergraduate safety and health courses as well as graduate level courses in epidemiology, sampling and ergonomics. Professor Stack's research interests include ergonomics, wearable technology for tracking worker physical demands, lightweight workers at heights and development of a harness fit test.

**Daniel A. Autenrieth, PhD, CIH, CSP**

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Dr. Autenrieth joined the Montana Tech SHIH faculty in 2015 as an Assistant Professor and he has served as the on-campus IH Program Manager since 2016. Dr. Autenrieth has a master's degree in Environmental Health and a Ph.D. in Environmental Health Specializing in Industrial Hygiene from Colorado State University. He is a Certified Safety Professional through the Board of Certified Safety Professionals and a Certified Industrial Hygienist through the American Board of Industrial Hygiene. His research interests include characterizing exposures to IH physical hazards; evaluation and effectiveness of occupational health and safety management systems; training methods in IH and OSH; and statistical assessment of direct-reading instruments and their applications. Dr. Autenrieth teaches Noise, Industrial Hygiene II – Physical Hazards, Industrial Hygiene Management, and Statistical Analysis.

**TPG Website:**

A web link for Montana Tech's Safety, Health and Industrial Hygiene Department Programs is provided in the following link: <http://www.mtech.edu/academics/mines/shih/>.

## **Section II**

### **Program Highlights:**

Efforts were made in Year 4 of this cycle to support regional and national professional societies, maintain the high quality of our faculty, prepare students for professional careers, engage in research, and renew ASAC/ABET accreditation for our three accredited programs. Summaries of these efforts conducted to sustain the strength of our three NIOSH supported trainee programs are provided below.

#### *Supporting regional and national professional societies*

Ten students and two faculty members attended the Northwest Occupational Health Conference in Portland, Oregon. Four graduates received local section AIHA scholarships at this event and all of them made a short presentation. In addition, Professor Stack presented her work titled “Standing up on the Job”.

Professor Stack attended the annual professional development conference co-sponsored by the Big Sky Chapter of ASSE. Seven students attended the conference and Professor Stack presented Return on Investment Techniques and use of the RULA Postural Evaluation Tool.

Faculty members had leadership roles in regional societies: Dr. Hart served as Montana Local Education Officer for the Pacific Northwest Section of the AIHA. Dr. Jensen served the Big Sky Chapter of ASSE as an officer, and acted as faculty advisor for the Montana Tech Student Section of ASSE. Dr. Jensen also served on the Advisory Board of the Rocky Mountain Center for Occupational and Environmental Health at the University of Utah.

Dr. Autenrieth began serving as a subject matter expert on the national AIHA OHSMS Auditor Registry Exam Committee in Year 4 of this cycle. Dr. Autenrieth also serves on the AIHA/ABIH/ACGIH Brand Refresh Task Force.

#### *Sustaining a high quality faculty*

Dr. Autenrieth successfully passed the ABIH examination to become a Certified Industrial Hygienist in Year 4 of this cycle. Dr. Jensen and Professor Stack both presented research at regional and national conferences. Dr. Autenrieth, Dr. Hart, and Professor Birkenbuel attended regional and national professional development conferences. In addition to ensuring high quality faculty through professional development, a search is currently being conducted for one additional faculty member in order to grow our department.

#### *Preparing students for OSH and IH careers*

During the 2016-17 academic year, Montana Tech had 155 undergraduates registered as Occupational Safety and Health (OSH) majors. Of those, 14 were NIOSH supported trainees. Of the 31 students awarded a B.S. in OSH, 14 took OSH positions in private industry, two are working for the government in OSH positions, six entered graduate school in industrial hygiene, one entered veterinary school, one is working out of the field, two are seeking employment in the OSH field, one is seeking graduate or professional school, one is not seeking employment, and three international graduates returned to their home country for work or additional schooling. During the same period, Montana Tech had 13 graduate students registered in the campus M.S.

Industrial Hygiene (IH) degree program. Eight were NIOSH supported trainees. Both students awarded their M.S. during Year 4 of this cycle received NIOSH support and are working as IHS in private industry. Montana Tech had 118 M.S. IH Distance Learning/Professional Track students enrolled in Year 4. Of the six awarded an M.S. in Industrial Hygiene Distance Learning/Professional Track in the current cycle, all are working in IH positions in private industry or government.

#### *Engaging in Research*

Professor Birkenbuel and Dr. Autenrieth were successful in securing Montana Tech faculty seed and faculty development grants, respectively. Dr. Autenrieth is studying muscle loading associated with head protection use, while Professor Birkenbuel is studying filter cassette wall losses associated with total and respirable mineral dust sampling.

Dr. Hart began a collaboration with researchers at the NIOSH Pittsburgh Mining Research Division for IH graduate students to field-test an end-of-shift, on-filter, Fourier transform infrared spectroscopy method in metal/non-metal mines in Montana.

The following papers were published during Year 4 of the current cycle by SHIH Department faculty acknowledging NIOSH TPG support:

- Autenrieth, D, Brazile, W, Douphrate, D, Roman-Muniz, IN, and Reynolds, S. (2016). Comparing OHSMS Programming with Injury Rates in Poultry Production. *Journal of Agromedicine: Practice, Policy, and Research*. 21:4, 364-372
- Jensen, Roger, and Terrence Stobbe. Safe Distance for Machinery Actuators: Is After-Reach Speed a Constant? *Advances in Safety Management and Human Factors*. Springer International Publishing, 2016. 321-331.

#### *ASAC/ABET Accreditation*

All members of the Montana Tech SHIH Department contributed to the three program self-study reports for the re-accreditation site visit that occurred in fall 2016. The process was successful and all three programs received a renewal of their accreditation.

#### *Additional Accolades and Achievements*

For our MS IH graduate program, Drs. Hart and Autenrieth completed the COSMOS Indigenous Mentoring Program cohort in 2016/17. The objective of the IMP program is to transform graduate education for American Indian/Alaska Native students in STEM fields, including those studying to complete graduate degrees in STEM education. The cohort was comprised of faculty, staff and administrators from the University of Montana, Montana State University, Montana Tech and Salish Kootenai College. The training provided information related to mentoring, resources, cultural humility, and culturally attuned research practices. Drs. Hart and Autenrieth have served as faculty mentors for three Native American students.