About the Program

Support from the National Science Foundation enables the ASEP project at Michigan Tech to offer Research Experiences for Undergraduate (REU) scholarships to KBOCC students who wish to participate in research for their Capstone Projects or Internships. The Michigan Tech ASEP project studies how humans regulate and are impacted by a class of chemicals (atmosphere-surfaceexchangeable pollutants or ASEPs) that have been released to the environment. These pollutants disproportionately affect Native Americans and others who catch and eat a lot of fish. Effects of ASEPs are often felt long distances from where they were manufactured or used. Because the physical, cultural, and spiritual health of KBIC members depends on the region's wild foods and other ecosystem services, they are at risk of harm from ASEPs.

The NSF supplement enables Michigan Tech to offer \$4,000 scholarships to participants in the program. The program enables students to conduct a research project and receive mentoring from Michigan Tech researchers as well as a faculty/ advisor mentor at KBOCC. Funding is also available for travel support to enable participants to attend local and regional conferences related to their research in the ASEP Project.





Application Process

Eligibility requirements:

• Must be U.S. citizens or permanent resident enrolled full- or part-time at KBOCC.

A complete application package consists of:

- Completed application form;
- 1-page Resume (copied/pasted into the application form as indicated);
- Transcript (unofficial transcript preferred);
- Two letters of recommendation.

Supply the items including letters of recommendation to Ms. Angela Keranen at least one month prior to the term in which you wish to begin your REU project (e.g., August 1 for September 1 start; December 1 for January 1 start; April 1 for May 1 start). Send application materials to:

Angela Keranen, REU Coordinator Michigan Technological University 1400 Townsend Dr. Houghton, MI 49931 e-mail: <u>amkerane@mtu.edu</u> fax: 906-487-2943, phone number: 906-487-2474

Email submissions of applications, transcripts, and recommendation letters are preferred, but

U.S. mail or fax is also acceptable. Applicants must arrange for two letters of recommendation to be sent. If you have any questions about your application or the program in general, consult the web pages (asep.mtu.edu) or contact the REU coordinator. **Scholar expectations:** Scholarships are contingent upon submission of a completed contract signed by the scholar, the primary mentor at his or her home college, and the primary ASEP project investigator mentor. The contract specifies the time period for carrying out the project and its completion, goals of the REU project, modifications relative to the posted project description, a tentative list of tasks, plans for regular meetings, and anticipated outcomes and deliverables. Scholars are expected to complete 300 hours of research and will be paid a Michigan Tech stipend over the scholarship time period stated in the contract. To request funding for travel, an application is submitted to the ASEP Project Director.

Sample Research Project Descriptions:

Sources of Atmosphere-surface exchangeable pollutants (ASEPs) to the Laurentian Great Lakes: Atmospheresurface exchangeable pollutants (ASEPs) such as mercury, polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs) have adverse effects on humans and ecosystems. Once emitted, these compounds are transported and deposited on natural surfaces such as water, soil, and vegetation from where frequent reemission and deposition occur. The goal of this project is to determine the source of ASEP-polluted air masses to the Great Lakes over the past decade. A Lagrangian particle dispersion model FLEXPART is used for this purpose. Thousands of imaginary air parcels or "particles" are released from grid boxes in the Great Lakes and advected backwards in time. Using known meteorological conditions of the past, FLEXPART computes so-called "retroplumes" of pollutants, a statistical representation of polluted air mass distribution over potential source regions for a defined period back in time. These retroplumes are then coupled with emission inventories of ASEPs to determine the most frequent geographical sources and most heavily loaded contaminants. Computations can be carried out remotely.

Biomagnification of Contaminants in Lake Foodwebs: Why is one lake different from another? Nearby lakes often differ tremendously in concentrations of contaminants in fish. Ideally, we could predict which lakes would have high concentrations. Characteristics of the lake and of the watershed affect contaminant concentrations in fish. In this project, you will use a mathematical model of a food web to determine which characteristics of the food web influence the contaminant concentrations in fish. You will compare predicted contaminant concentrations in fish from different lakes, and you will use the model to conduct "experiments" to determine what factors cause high concentrations in fish. This project will involve reading of scientific literature, gathering of data from reports and published papers, learning to use a mathematical model, conducting "experiments" with the model, and using statistics to compare the results of those "experiments".







Anthropological Research on ASEPs: This project is of interest to students who would like to focus on social sciences research or include a social sciences component in natural sciences research. This research experience will focus on utilizing qualitative research methodologies within a specified community (or particular sub-set), or within one organization (an ASEP Partner such as Keweenaw Bay Indian Community Natural Resources Dept., Trout Unlimited, or GLIFWC, to name just a few). Data collection will include ethnography (participant observation), conducting oral histories, and/ or semi-structured interviewing. Processing data will include detailed fieldnotes and reflections, as well as oral history and interview transcription, utilizing the latest transcription software. The student will engage in qualitative data analysis such as thematic coding, and again, engage with qualitative data analysis software.



Michigan Tech -KBOCC Research Experiences for Undergrads Program

Did you ever wonder

- Why do they say you should not eat too much fish?
- Who causes that problem?
- How long will that problem persist?

Open this brochure if you would like to participate in discovering new answers to these and related questions.



