

Fellowship Profile

IAEA PROGRAMS
AT ARGONNE NATIONAL LABORATORY

Capacity Building, Human Resources &
knowledge management

TRAINING SUMMARY

I participated in a two week training on Stable Isotope Organic Chemistry, with the opportunity to train at two different institutes. The stable isotope laboratories at Indiana University and USGS National Center are world leaders in the development of instrumentation, analytical protocols, and determination and distribution of international reference materials. At Indiana University, I was able to learn practical skills in sample handling and processing, to best ensure sample integrity and reduce stable isotope fractionation of target molecules. Specifically, I practiced precise pipetting, glass blowing, and gas purification techniques that have been refined by Arndt Schimmelmann over the last decades, as he has provided this service to create and distribute stable isotope reference materials for the international community.

We worked in the lab to prepare volatile fatty acid standards as part of an ongoing interlaboratory comparison exercise between Indiana University (Arndt Schimmelmann), USGS (Tyler Coplen), and California Institute of Technology (Alex Sessions). At USGS-RSIL, I learned how the research team has partitioned tasks to streamline sample throughout and ensure best analytical accuracy and precision in determining the stable isotope compositions of water, carbon dioxide, and other atmospheric gases. I also gained knowledge of both historical and modern approaches for the development of stable isotope instrumentation and analytical techniques. During my visits, both hosts were actively involved and informed me of their perspectives in the current scientific debates with atmospheric scientists regarding the use and modification of international reference scales for reporting stable isotope data.

WHATS NEXT?

The skills and information learned during the fellowship will be applied to improve stable isotope analyses, quality control/assurance protocols, and data processing and interpretation at the SoWa Stable Isotope Facility at ISBB BC-CAS (Ceske Budejovice, Czechia). My laboratory is now participating in an inter-laboratory calibration exercise for stable isotope reference materials ($2/1\text{H}$ and $18/16\text{O}$ ratios in organics) using the techniques learned at USGS RSIL during the fellowship. We also plan to install a vacuum line for sample purification following the schematic and guidelines practiced in the Schimmelmann lab at Indiana University. Overall, the experience advanced my practical skills and has opened lines of communication that will enhance scientific rigor at my home lab in Czechia.



"During the fellowship I was able to network with experts who pioneered the field of stable isotope research and to identify opportunities to improve instrumentation, analytical protocols, and data processing at my home laboratory in South Bohemia, Czechia."

Travis B. Meador - Czech Republic

January 8th - January 19th 2024

Hosted by: Indiana University & U.S Geological
Survey