University of Illinois | School of Chemical Sciences

CORESUPDATE

Center of Research & Educational Support Newsletter

Jan/Feb. 2022

Meet the New Director of the High Throughput Screening Facility

Please join me in welcoming Vishnu Krishnamurthy to the SCS. Vishnu is the new Director of the HTSF and we look forward to his contributions to the SCS. - Danielle Gray

Hi, my name is Vishnu and I hail from the city of Chennai in South India. After completing my Bachelors and Masters in Biotechnology in coastal cities in India, I joined the University of Illinois for my doctoral program in 2012. I transferred from MCB to Biochemistry in 2014 and joined the lab of Dr. Kai Zhang. My principal focus was building Optogenetic tools composed of proteins engineered with light-responsive modules with the goal of activating specific signaling pathways in mammalian cells and frog embryos using visible light pulses. I obtained my PhD in 2019 and continued as a postdoctoral researcher in the Zhang lab where I designed luminescence and fluorescence-based assays to decipher an unconventional protein degradation system using lentiviral gene knockout libraries. I got introduced to HTSF during a collaborative screening project and took an interest in the facility. The former director Dr. Chen Zhang trained me on equipment here and allowed me to shadow her on one of her projects during the summer of 2021. I managed the operations of the facility part-time after Dr. Zhang's departure and started a full-time position this January.

For recreation, I enjoy walking, indoor rock climbing and badminton.

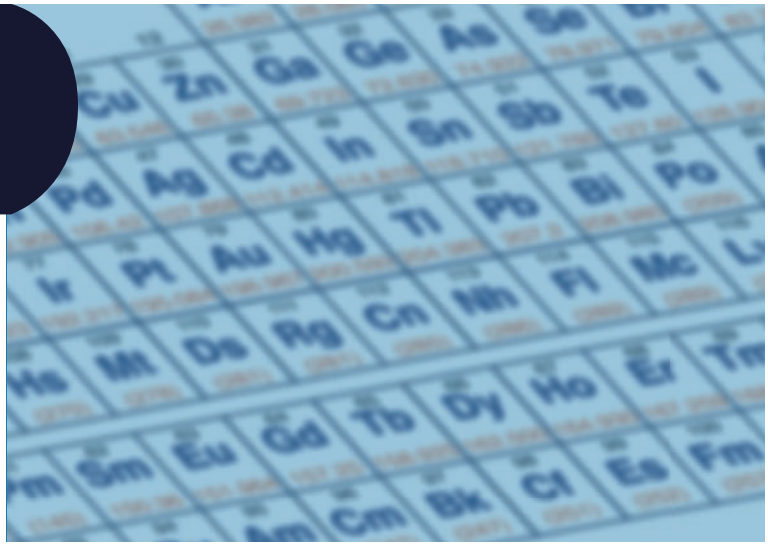
I am excited in being part of the SCS and look forward to working with all of you. Any suggestions, ideas or tips for HTSF are warmly welcome! Please feel free to stop by for a chat at my office in 363 Noyes Lab.

New Equipment Coming to the X-Ray Laboratory

The X-Ray Laboratory has ordered a new circular dichroism spectrophotometer. This new instrument will be able to measure both liquid and solid-state samples. Measurements can be obtained in both the vacuum-UV and NIR spectral regions using the standard PMT detector (163 – 950 nm). Researchers will be a ble to optimize their parameter specifications in order to obtain data with the highest resolution and S/N performance for a specific application set.

An announcement will be sent out once the instrument arrives and is up and running.

9 Things You Might Not Know About Elemental Analysis and the MicroLab requirements!



1 Elemental analysis can be helpful at any stage of your research!

Confirming that your starting materials are pure, looking for impurities, confirming your compound and purity for publishing are all ways elemental analysis can help your research.

2 Elemental analysis is 'garbage in, garbage out.'

The Microanalysis Laboratory doesn't do any processing of your sample besides preparing it for analysis. We don't dry off water or solvents that are on your compounds. Thus, the results that you receive are based on the individual aliquot of your compound that you submitted in your vial.

3 Even small amounts of contaminants can make your results be out of spec.

Even just as little as 0.05 moles of excess water clinging to your sample can drive your sample results to be out of spec from journal requirements. Solvents stick around so care must be taken to remove the solvents from your sample. A "dry" sample is not necessarily a solvent free sample. Thick viscous goos can trap air bubbles, throwing off nitrogen results.

4 Your theoretical doesn't have to be accurate, but we do ask for them to be within an order of magnitude.

How much sample is required and how the sample is prepared can be dependent on your theoretical. Additionally, running a 'trace' analysis, when the actual result is a large % of that element can hurt instrumentation; conversely, running a large % element then the actual turns out to be trace can end up being below the detection limits.

5 If your sample is in a solution, understand how concentration affects your theoretical.

We run the solution as a whole, not just the compound; with a few exceptions, each elemental analysis starts with an aliquot of your sample, with the weight recorded and used in the elemental calculation. Your research compound may be X weight-percent of an element, but that may end up being 0.0X weight-percent when in the solution or even less.

6 The amount of sample needed is 'recoverable' amount of sample.

Recoverable means what can be obtained from the inside of the vial. If your sample is a film, recovery from the bottom of a 20ml scintillation vial will be impractical. A sample that is fluffy/easily static-charged or a goo in a large vial may not be well-recovered.

7 If you are looking for trace amounts of an element, you need to supply more sample than usual.

Looking for a small amount of an element needs more sample to be analyzed, if it is available. This is a way to combat the limit of detection for the instruments. Microanalysis does not = micro amounts of sample.

8 Homogeneous samples are more helpful for analysis.

Elemental analysis may use only a few milligrams of your sample for the analysis. So if your sample isn't homogeneous, we may select an aliquot from your vial that has that one crystal with an impurity, thus giving an inaccurate look at your compound.

We don't always have the ability to cut or grind large sample chunks into more manageable weights. So we may need to give the sample back for you to break it down for us.

For samples that are biological/not synthetically produced, a lack of precision between aliquots can be expected.

9 We can return your excess sample!

All of the elemental analyses we perform are destructive. But any excess sample can be picked up by the client once we are done; just let us know that you want the remaining sample back!