

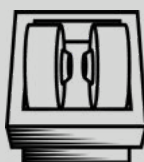
[SIF Newsletter]

March 2021

In This Issue ...



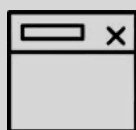
SIF Renovations and
Instrument Installs



Instrument Spotlight:
EPR Spectrometer



Which NMR
Spectrometer to Use



SIF Website
Redesign



Meet the Staff

A Letter of Thanks ...

It has been almost a year since the start of the COVID-19 pandemic and during that time we have gone through some difficult changes in our daily routine. Hopefully after a year these adjustments are now routine and are not as tedious as in the beginning. We at the Shared Instrumentation Facility would like to thank all the users for their efforts in keeping the facility a safe environment to continue to work in. Without your help and support the facility would not be functioning as well as it has been during the past year. Please stay strong and continue to fight the virus, we will be back to normal in no time. As a reminder the facility is still under COVID safety operations. Please visit the SIF website for proper [safety protocols](#) when using the instruments.

Dr. Chin Lin

Dr. Chunhua Hu

Dr. Trinanjana Mandal

Dr. Joel Tang



SIF Renovations and Instrument Installation

Over the past year we have seen some changes within the SIF. Brown 357 has been completely gutted and renovated. We have also added new spectrometers to our fleet of instruments.

NMR Room, Brown 353A/357

Excuse the mess. Although the room renovation is complete, there is still more to come. This year there will be a **helium recovery, storage and liquefier system installed** to recapture our helium boiloff from the NMR magnets and reused within the facility. **The 500 MHz NMR spectrometer will be upgraded** to an Avance NEO console with a 60 position automatic sample changer and broadband cryoprobe.

[Click on image \(interactive slideshow\)](#)



Bruker AVANCE NEO 800 MHz NMR Spectrometer

The 800 MHz NMR spectrometer was installed in January 2021, and is **located in Brown 353A**. The system is **equipped with new technology that enhances your NMR experience**. Bruker's new 'transceiver' boards improves configuration flexibility and allows for multi-receive experiments.

Features include:

- *5mm TCI 1H & 19F Cryoprobe*: 1H observe and simultaneous 13C, 15N decoupling. 19F tunable on the 1H coil of the probe.
- *1.6mm HXY MAS probe**: used for solid-state triple and double resonance CPMAS experiments. (*To be installed in 2021)

ThermoScientific LCMS-TSQ Fortis Spectrometer

This instrument, **located in the Silver 720 Annex**, provides numerous benefits including **robust performance, high sensitivity, ultrafast selected monitoring capabilities** and easy to use software for increased productivity.

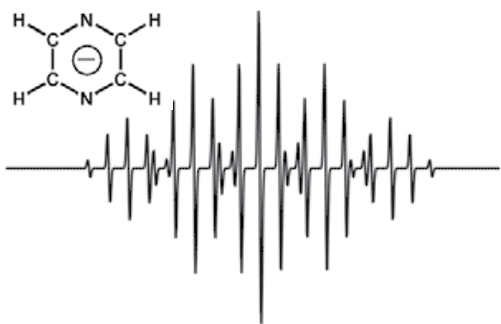
Features include:

- *Mass Range*: m/z 5 - 3000
- *Resolution*: Q1 adjustable to 0.4 Da peak width
- *Scan Rate*: 15000 amu/s at resolution 2Da, up to 600 SRMs/sec for resolution between 0.4 and 2.0 FWHM
- *Mass Stability*: Mass assignments within +/- 0.1 Da





Instrument Spotlight: EPR Spectrometer

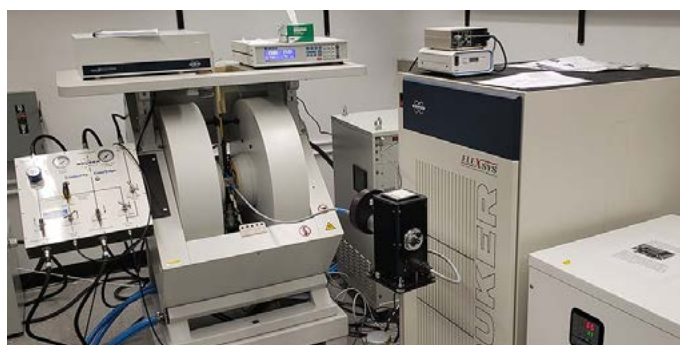


Pyrazine radical anion EPR spectrum

EPR Spectroscopy is similar to NMR spectroscopy in that it relies on the gyromagnetic properties except that the **magnetic moments of electron spins are observed instead of the nuclear spins**. It is a nondestructive analytical technique used for various applications in biology, medicine, chemistry, and physics including the **analysis of oxidation and reduction processes, detection and identification of free radicals, and reaction kinetics**. If you are working with paramagnetic systems or radicals this might be a helpful spectrometer for your research.

The EPR spectrometer, located in Waverly 968, is equipped with numerous accessories:

- **super high sensitivity probe** for routine analysis
- **dual mode resonator** for parallel mode experiments
- **cryogen free variable temperature system** that can accurately control the temperature between 4 to 250 K
- **UV irradiation system** with a 100W Hg lamp, shutter, light chopper and 400-700 band-pass filter accessories.



For more information about the instrument or access/training contact Dr. Joel Tang.

Which NMR Spectrometer Should I Use?!?!?



As you walk into the NMR room and look at the beasts that are in front of you, do ever wonder which spectrometer is best for your needs? We provide a handy [probehead guide](#) that details what nuclei can be observed, the sensitivity of specific nuclei, and the temperature range for each spectrometer.

Magnetic fields range from 400 to 800 MHz. Which one should I use?

It is generally true that with a higher magnetic field there is improved sensitivity and better resolution. However, it is not always best to use or even needed. **Routine 1D ¹H or ¹³C experiments should be done on the 400 or 500 MHz spectrometers. The resolution and sensitivity will be sufficient enough for general analysis. For cases where better 1D and 2D spectra are required the 600 MHz should be your next choice. 800 MHz NMR spectrometer should be reserved for NMR research and specialized multidimensional (2D, 3D, 4D) experiments.** For more details, please speak with Dr. Chin Lin or Dr. Joel Tang.

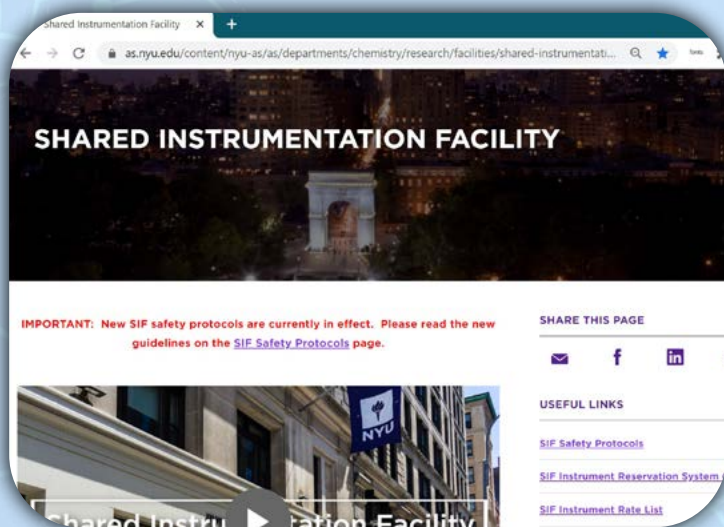
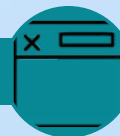
Which NMR spectrometers can run ¹⁹F and ³¹P experiments?

Currently, ¹⁹F NMR experiments can be run on the AVIII-400 spectrometer in Brown 252 (Orgo teaching lab). For ³¹P experiments, you can use either the AVIII-400 or the AVIIIHD-400 in Silver 714.

Image from Bruker.com



New SIF Website



Have you checked out the SIF website lately? If it's been a while you should come back and have a look. It has been updated and re-organized. There are now links to [instrument information](#) that will provide details about their location and capabilities. There is a new [Software and Resources](#) page where we provide links to software that could be useful for analyzing and processing your data, websites to instrument theory that will be helpful for new users, and user manuals for some instruments in case you need a refresher. Check back frequently for updates to these pages.



Meet the Staff



Dr. Joel Tang joined the SIF staff in January 2020. He has a PhD in Chemistry specializing in Solid-State NMR spectroscopy. He has extensive knowledge and years of experience in operating, maintaining and managing research instrumentation as well as computer maintenance and support working at the University of Toronto and Johns Hopkins University. He is gradually learning the ins and outs of the SIF's operation but is ready to help you in anyway with your research. Stop by Brown 357C and say 'Hi' when you get a chance.

Find out more about Dr. Tang at:



We are here to help. Feel free to contact us if you have any questions.

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