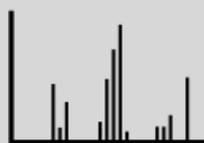


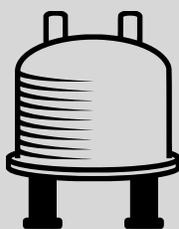
[SIF Newsletter]

March 2022

In This Issue ...



**Facility Update:
MALDI Upgrade**



**New Accessory:
PhotoNMR**



**Instrument Spotlight:
Zetasizer**

SIF Shuffle

Happy Spring! Hope you all have a wonderful semester thus far. With the semester in full swing, we are starting to get ready for some changes that will happen this summer.

To accommodate dedicated research instruments for one of our new faculty in the Department of Chemistry, the Silver 7 Annex (room 720) will require some renovations. Before construction begins, the SIF instruments currently there will be temporarily re-distributed between locations on the 3rd and 9th floors of Brown and Waverly buildings, respectively. As the time nears, we will keep you informed about location and timeline as decisions are finalized.

Also remember to check out the SIF website for instrument information and useful resources. The site is frequently updated with new content and SIF news.

Dr. Chin Lin, Dr. Chunhua Hu,
Dr. Trinanjana Mandal, and Dr. Joel Tang



Bruker autoFlex Max MALDI-TOF/TOF MS

In December 2021, the new Bruker autoflex maX MALDI-TOF/TOF mass spectrometer was successfully installed. This could not have come at a better time as our aged Bruker ultrafleXtreme MALDI-TOF/TOF MS has finally run its course and broke down in February 2022.

The new MALDI-TOF, currently located in Brown 353, has innovative MALDI-TOF and TOF/TOF technology optimized for robustness enabling reliable and detailed **protein/peptide characterization, polymer analysis, MALDI tissue imaging, glycan analysis, and high-throughput biochemical screening.**

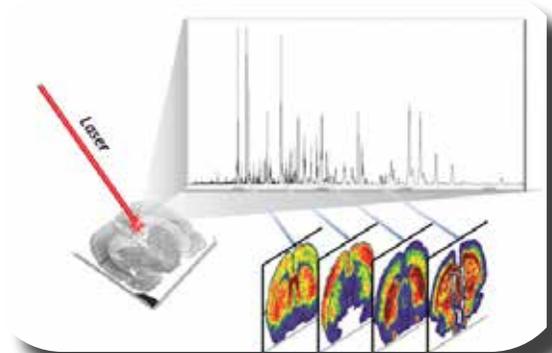
The autoflex maX uses Bruker's proprietary smartbeam-II solid state laser. With repetition rates up to 2kHz, higher throughput workflows including product integrity screening or thin layer chromatography coupled to MALDI are rapidly executed. The smartbeam II solid state laser also provides **best-in class ionization efficiency and low sample consumption promoting high spot capacity for complex samples.**

Key Specifications:

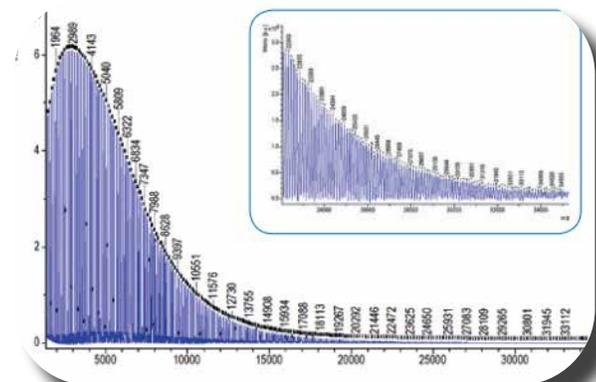
- Positive and Negative ion modes
- Resolution: 26,000
- Mass range: up to 500,000
- Mass Accuracy: 2 ppm
- Laser Frequency: 2,000 (MS), 200 (TOF/TOF)

Users of the ultrafleXtreme MALDI will have no problem transitioning to this instrument since the same flexControl software is used to operate the system. New users can contact Drs. Chin Lin or Joel Tang to arrange a training session to gain access to the instrument.

This upgrade could not have been possible without the support of New York University.



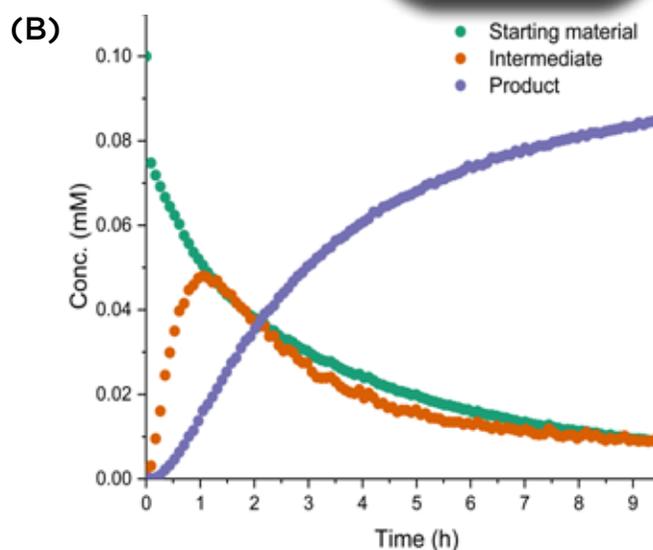
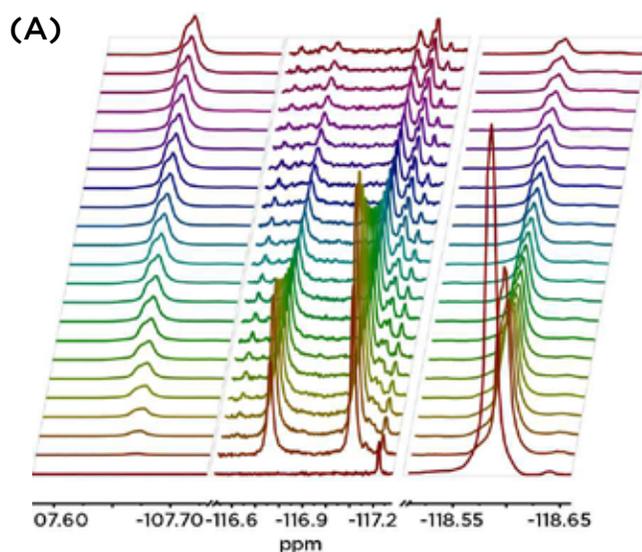
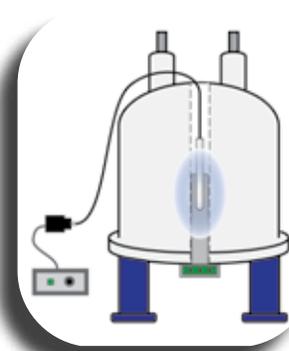
MALDI Imaging. Image: [Bruker.com](https://www.bruker.com)



Analysis of polymer chain distribution. Image: [Bruker Autoflex Max Brochure](#)



The SIF is now capable of performing in situ photoNMR experiments. **PhotoNMR uses a fiber optic cable placed inside an NMR tube to irradiate the sample with a specific wavelength of light while down in the NMR probe/magnet.** This method can be used to study light-activated reactions in situ such as observing molecular switches, monitor photodegradation, or observe photocatalyzed reactions and photochemical signal enhancements.



Dan Wise from the Parasram Lab has used photoNMR to follow a photoinduced oxygen transfer from a nitroarene to an alkene. ^{19}F NMR spectra (Figure A) were collected at -20°C on our Bruker 400MHz Avance III NMR spectrometer over a 9-hour period while continuously irradiating with a 390 nm light (lamp borrowed from the Trauner lab). They were able to **detect an elusive intermediate at low temperature and monitor its formation and decay.** Change in concentration (Figure B) of the starting material (green), intermediate (orange) and product (purple) as the reaction progressed (right) was also determined.



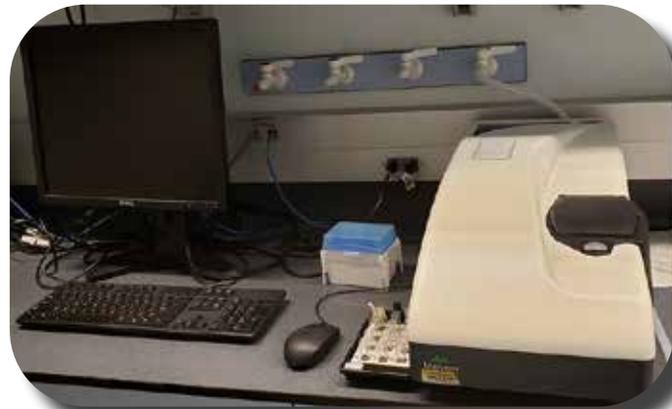
Standard (left) and air sensitive (right) photoNMR tube assemblies.
Image: [New Era](#)

Our setup includes a **395 and 455 nm high power LED lamps, 6m fiber optic cable and a benchtop LED power supply.** Users are responsible for their own sample tube assembly. The assembly consists of an outer 5mm NMR tube for the sample and a coaxial inner tube to guide the fiber optic cable. Standard and air sensitive assemblies can be purchased from [New Era](#). The accessory can be used on most of the NMR instruments located in the SIF. Contact Dr. Joel Tang for more information about the setup.

Instrument Spotlight: Malvern Zetasizer Nano



The Malvern Zetasizer Nano is a very versatile instrument to measure size, Zeta potential, molecular weight, and A_2 for colloid, nanoparticle and macromolecule characterization. Its simplistic operation with high optical quality and temperature control will help produce robust results and is highly sensitive.



The Zetasizer Nano incorporates numerous technologies all-in-one including Dual angle Dynamic Light Scattering (DLS), Non-Invasive Back Scatter (NIBS), Static Light Scattering (SLS) Electrophoretic Light Scattering (ELS), Mixed Mode Measurement-Phase Analysis Light Scattering (M3-PALS).

Specifications:

General Parameters Measured	
Temperature Range	0 to 90 °C
Standard Laser	4 mW, 633 nm
Correlator	25 ns to 8000 s, max 4000 channels

Size Experiments	
Absolute Sensitivity (Toluene kcps)	150
Range	0.3 nm to 10 microns
Min Sample Volume	12 μ L
Min Concentration, protein	0.1 mg/mL, 15 kDa protein
Min Concentration, forward angle	10 mg/mL, 66 kDa protein
Measurement Angles	13° + 173°

Zeta Potential Experiments	
Sensitivity	10 mg/mL, 66 kDa protein
Zeta Potential Range	> +/-500 mV
Mobility Range	> +/- 20 μ .cm/V.s
Max Concentration	40% w/v
Min Sample Volume	20 μ L
Max Sample Conductivity	200 mS/cm

Molecular Weight Experiments	
M.W. Range (estimated from DLS)	< 1000 Da - 2×10^7 Da
M.W. Range (Debye plot)	< 1000 Da - 2×10^7 Da

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

Dr. Chin Lin, PhD
Instrumentation Facility Manager

✉ : chin.lin@nyu.edu

☎ : 212-998-8393

📍 : Brown Building, Room 357B

Dr. Trinanjana Mandal, PhD
Clinical Associate Professor and
Electron Microscope Manager

✉ : tm1454@nyu.edu

☎ : 212-998-8434

📍 : Waverly Building, Room 438B

Dr. Joel Tang, PhD
Instrumentation Specialist

✉ : joelatang@nyu.edu

☎ : 212-998-8370

📍 : Brown Building, Room 357C

Dr. Chunhua Hu, PhD
Research Professor and
X-ray Crystallographer

✉ : chunhua.hu@nyu.edu

☎ : 212-998-8769

📍 : Brown Building, Room 357A