

NMR: the all-seeing technique



University of Massachusetts Lowell's NMR Spectroscopy Facility Manager, Wendy Gavin, discusses the importance of an NMR vendor that supports the constant challenge to be innovative.

With over 13 years spent working in industry, 11 in a large pharmaceutical company, it is safe to say that Wendy Gavin knows the secret to successful nuclear magnetic resonance (NMR). Wendy has worked at the university for over six years and, as well as being the NMR Core Research Facility Manager, she also manages the University's Analytical Chemistry lab.

Her experience working in industry has provided unique insights into a customer's requirements and enables her to ensure that the NMR facility at the University of Massachusetts Lowell is providing high quality data. Here, she explains the difference it makes to have an instrumentation vendor that goes the extra mile to support all users.



Olney Science Center at the University of Massachusetts Lowell.

As part of the core research facilities at the University, the NMR lab has a solution state JEOL 400 MHz NMR and a JEOL ROYAL Probe. NMR is one of the most reliable techniques available, it doesn't give false data and provides definitive proof of synthesis for a paper or patent. Our training covers ^1H and ^{13}C NMR techniques, but we are also able to provide guidance for advanced NMR experiments including kinetic studies, 2D techniques, and variable temperature studies.

“ NMR software can be very expensive and as a non-profit University, we are very conscious of managing our expenses. We use JEOL's advanced processing software, Delta 5.3, which is free for everyone. Most NMR software is command driven, making tasks such as finding J-coupling tables incredibly complicated, but with Delta, it's easy to extract answers because it's fully automated. ”

Inside the NMR lab

Staffed by highly trained technicians, the primary purpose of our research lab is providing expert advice and training in solution state NMR spectroscopy to the University's researchers, but we are also able to extend that offering to industry clients. We have a diverse set of users undertaking varied research, all with different needs, so we offer three levels of service: self-use, running samples as a CRO-like service, and training users to be self-sufficient. Their research covers a broad range of disciplines, from chemical engineering and chemistry, to physics and biology.

Intuition and automation

One of the major advantages of JEOL's instruments is that they are practically fool-proof – the majority of users can use the NMR after minimal training with no errors. The JEOL 400 has cut our training time in half because it's so intuitive. Most of my experience is with manual, demand-driven NMR systems, so the fact that JEOL's instrument is so automated makes my work a lot easier.





A scientist in the University of Massachusetts Lowell laboratory.

One of our students had been running samples on our other NMR instrument, but he was having difficulty finding the product that he had synthesized. When we ran it on the JEOL 400, he was finally able to identify that he did have product in his sample but only in small quantities. He was very pleased to know that his synthesis was working and he could move forward with his research. It was the increased sensitivity and resolution on the JEOL 400 instrument that enabled this greater level of analysis and provided the answers.

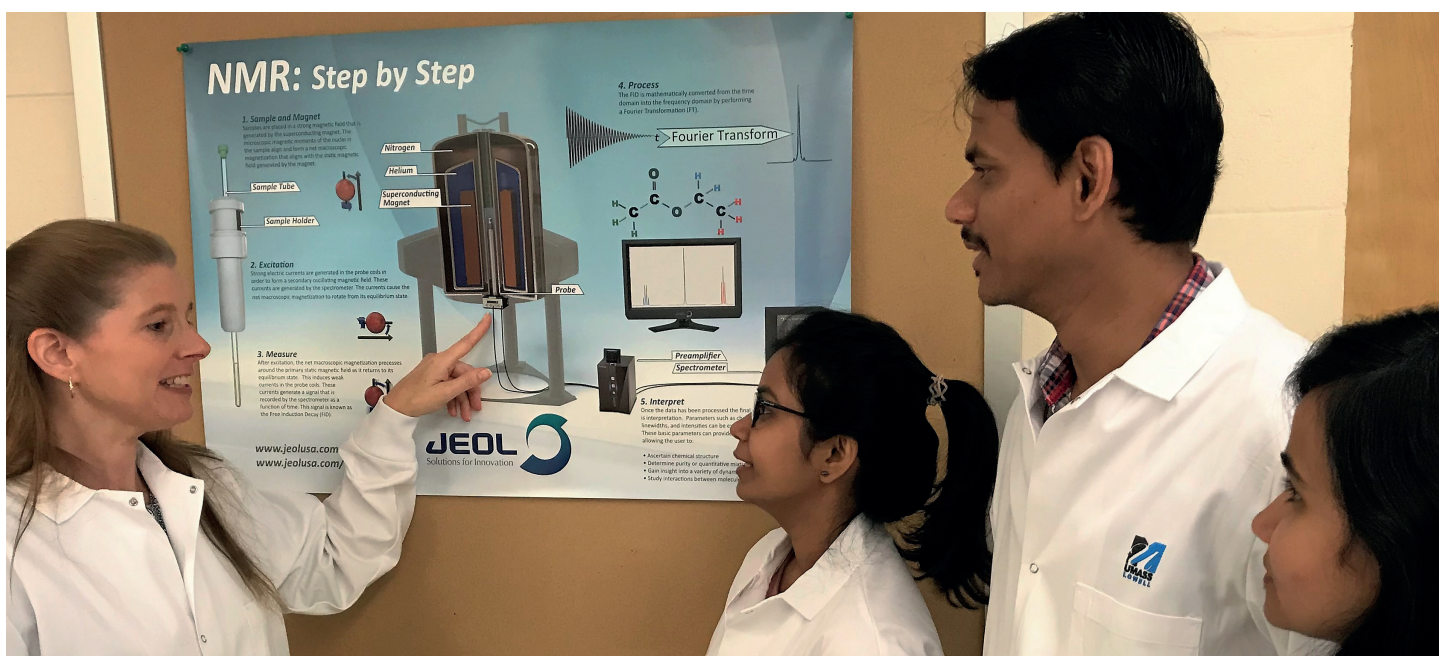
Other users have commented on how impressed they are by the ease of use – one user with experience using NMR instruments from other vendors had to memorize different commands and their input order. This introduced a larger window for error while adding additional work to his research.

“ What I love about JEOL’s NMR is that, although there is a relatively small number of functions that can be changed, if there is anything you would like to add or a function you’d like to perform, you can contact them and they will work with you. ”

Try before you buy

As a Core Facility Manager, one of my goals is to assist users and provide them with the answers they need for their research.

We own a JEOL scanning electron microscope (SEM) at UMass Lowell so we knew that level of service with our NMR would be outstanding. We are very privileged to have JEOL’s Peabody, MA site so close to us, where we were able to test their systems to check capabilities before investing in an instrument. For example, we have sometimes struggled with solvent suppression on our other NMR instruments; if you have a large peak hiding or in the way of your sample peaks, it’s important to knock it down and see what’s behind it. When evaluating the JEOL 400, I took some of my users’ samples with me and one student found peaks he didn’t know were there. He was excited to get this important data.



Wendy Gavin explaining the JEOL 400 NMR to her students.





In summary

Cutting-edge research is being done every day at the University and that is why we put such careful consideration into choosing our instruments. User needs are at the center of that, and very important to me. To have an open invitation to go to JEOL's lab and get hands-on experience with their systems is absolutely invaluable.

It's a well-known fact that NMR instruments are expensive to run, but when you are processing samples and delivering results in less than half the time it usually takes, you're realizing crucial savings in time and money. We have also significantly reduced user error, which means there is less demand on my time for troubleshooting.

“ Here at UMass Lowell, we are constantly being challenged to help our users be more innovative and, with JEOL's 400 NMR, we can exceed expectations. ”

The Nuclear Magnetic Resonance Spectroscopy Facility is part of the Core Research Facilities at the University of Massachusetts Lowell.

It offers a solution state JEOL 400 MHz NMR:

- 1960s – FT-NMR
- JEOL ECZ 400 MHz NMR with Royal Probe
- Capable of observing ^1H , ^{13}C , ^{11}B , ^{19}F , ^{29}Si , and ^{31}P nuclei in solution
- Great for 2D Experiments including: COSY, HSQC, HMBC, NOESY, ROESY, & TOCSY
- Variable Temperature capabilities from -100°C to 150°C
- 24 Carousel Autosampler
- Automatic Tuning and Matching
- Delta 5.3 software.

Contact details

For more information on JEOL's NMR instruments, please visit <https://www.jeolusa.com/PRODUCTS/Nuclear-Magnetic-Resonance>.

“ This has been by far the best customer service I've ever experienced with any vendor, and it makes a big difference. JEOL has helped at every stage from instrument evaluation, to purchase, to installation and beyond. ”

Wendy Gavin and her student with the JEOL 400 NMR.

Customer support is always a big consideration when choosing a vendor because it's not just me, the facility manager, they are serving, it's also the customers and their challenges that we try to help them solve. As well as inviting me to visit them, JEOL staff have also come to the University to troubleshoot directly with students and users, answering any queries and demonstrating solutions. JEOL also came on campus to provide software training to students and external users, as well as troubleshooting some user issues, such as external referencing.