



# CRYSTALLOGRAPHY TIMES

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## WELCOME

I've just returned from meetings in Poland, Italy and Germany. This trip included my first international conference since January 2020 and the first time I saw, in person, colleagues I had not seen since early 2020. Except for using carry-on luggage for the 12-day trip and strange masking rules for flights into Germany, it seemed to be a perfectly normal trip.

While I was at the International Conference on Coordination Chemistry in Rimini, Italy, I missed an exciting event at Rigaku Europe on September 2: the ribbon cutting ceremony for the [XtaLAB Synergy-ED](#). Below is a picture of the instrument with (left to right) Mark Benson (General Manager of the Single Crystal Business Unit, Global Sales and Marketing), Toshiyuki Ikeda (Rigaku President and CEO), Robert Bucker (Product Manager, Electron Diffraction) and Hiroyuki Kanda (Head of Single Crystal Business Unit) doing the honors. The XtaLAB Synergy-ED is now available for demonstrations, service work and applications development.



In other news, I am happy to report that Lee Daniels will be returning to the application laboratory here at Rigaku America to support us as we move forward with our own XtaLAB Synergy-ED.

The summer rush of meetings is over, but there are still several meetings in the fall. See the Upcoming Events listing. We hope to see you at some of them.

Be safe,

Joe Ferrara

## RESEARCHER IN THE SPOTLIGHT

### Leemor Joshua-Tor

Professor & HHMI Investigator  
W.M. Keck Professor of Structural Biology  
Cancer Center Program Co-Leader



**Prof. Joshua-Tor (center) and her group with the newly installed XtaLAB Synergy-R at CSHL**

Professor Leemor Joshua-Tor's lab studies the molecular basis of nucleic acid regulatory processes using structural biology and biochemistry. One such regulatory process is RNA interference (RNAi), in which a small, double-stranded RNA triggers gene silencing. Joshua-Tor and her team offered critical insight when they solved the crystal structure of the Argonaute protein and identified it as the long-sought Slicer. They then went on to explore the mechanism of the slicing event. The structure of human Argonaute 2 (hAgo2) bound to a microRNA (miRNA) guide allowed Joshua-Tor and her colleagues to understand how mRNA is cleaved during RNAi.

More recently, members of the Joshua-Tor lab explored the function of a very similar protein, called Argonaute 1, which has no slicing ability even though it is almost identical in structure to the slicing hAgo2. Using biochemical methods and mutational analysis, they were able to identify key parts of the protein that are required for slicing activity.

The lab also studies the generation of PIWI-interacting RNAs (piRNAs), which serve to protect the genome of germ cells. With colleagues in the Hannon lab, Professor Joshua-Tor's team also determined the structure and function of Zucchini, a key nuclease in the initial generation of piRNAs in fruit flies. In other work, the lab is exploring the mechanisms of heterochromatin formation and gene silencing through the study of a protein complex called RNA-induced initiation of transcriptional gene silencing (RITS). Professor Joshua-Tor is also well known for her work on the E1 helicase enzyme, which acts to unwind DNA strands during the DNA replication process.

## PRODUCT IN THE SPOTLIGHT

### XtaLAB Synergy Flow

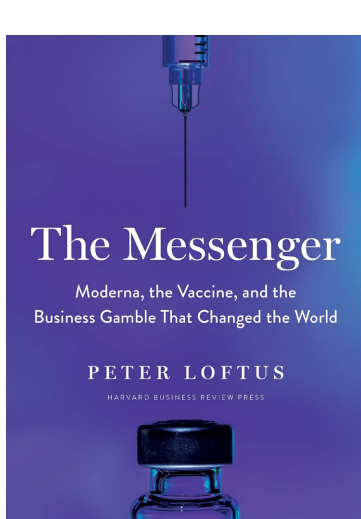


The [XtaLAB Synergy Flow](#) system allows you to take full advantage of the performance of your system by incorporating a 6-axis UR3 Universal Robot, which provides unattended data acquisition, enhanced productivity and standardized workflow for your research environment. The [XtaLAB Synergy Flow](#) can be configured with the [XtaLAB Synergy-S](#), [XtaLAB Synergy-R](#), and [XtaLAB Synergy-DW](#) models, giving you flexibility to choose the performance level you require.

A XtaLAB Synergy Flow system can be used as part of a sample submission protocol that minimizes human contact. With automated sample mounting, potential contamination of the diffractometer by human contact is eliminated. A crystal capacity of 48 samples means that unattended data collection can be easily performed, thus minimizing the time required to be in the X-ray laboratory.

Automation should mean the system continues to work as long as there are samples available. To ensure it never runs out, the XtaLAB Synergy Flow features a unique drawer design to allow you to maintain the integrity of the X-ray safety enclosure while exchanging sample pucks. That means the diffractometer can run uninterrupted as long as you have samples to study.

## BOOK REVIEW



### [The Messenger: Moderna, the Vaccine, and the Business Gamble That Changed the World](#)

By Peter Loftus

ISBN: 9781647823191

Peter Loftus' *The Messenger: Moderna, the Vaccine, and the Business Gamble That Changed the World* is a deep dive into the history of the company whose revolutionary mRNA vaccine technology helped change the course of the Covid-19 pandemic.

Loftus, a reporter covering the pharmaceutical industry for *The Wall Street Journal*, is no stranger to dedicated and objective journalism. In his note at the beginning, he reveals that this book is based on close to 300 interviews with over 150 people, ranging from Moderna employees and members of the board to people outside the company across a broad range of careers and industries who may have crossed paths with the company over the course of its history.

The book reads more like a very well-written and well-researched long form feature for *The Wall Street Journal* than a book, but that seems to be Loftus's intent. It is also more about Moderna's rise as a company in the midst of the coronavirus pandemic than it is about the scientific research and development of their vaccine.

He starts with brief biographical profiles of the company's founders, including Derrick Rossi and Timothy Springer, as well as the company's current CEO, Stéphane Bancel. He traces the company's history from a unicorn biotech startup to a biotech giant, largely spurred by its development of a vaccine in the midst of a global pandemic.

Loftus takes the time to dig into Moderna's business strategies and decisions that helped it turn a global catastrophe into a great corporate success. It may not necessarily be a repeatable blueprint for other biotech startups, but it is certainly an intriguing portrait of success in an industry driven by constant innovation and volatility.

Jeanette S. Ferrara, MFA

## RIGAKU TOPIQ WEBINARS

Rigaku has developed a series of 20-30 minute webinars that cover a broad range of topics in the fields of X-ray diffraction, X-ray fluorescence and X-ray imaging. You can register [here](#) and also watch recordings if you cannot attend live sessions.

## UPCOMING EVENTS:

[The Pittsburgh Diffraction Conference](#), Lemont, IL, October 2-4.

[European Single-Crystal Users Meeting](#), Neu-Isenburg, Germany, October 11-12, 2022.

[RÉCIPROCS](#) (Diffraction électronique pour la cristallographie structurale), Aussois, France, October 17-21, 2022.

[73<sup>rd</sup> Southeastern Regional ACS Meeting \(SERMACS 2022\)](#), San Juan, Puerto Rico, October 19-22, 2022.

[AsCA 2022](#) (Asian Crystallographic Association), Jeju, South Korea, October 30, 2022 - November 2, 2022.

[2022 SoCal Cryo-EM Symposium](#), Los Angeles, CA, December 5, 2022.

## CRYSTALLOGRAPHY IN THE NEWS

### July 18, 2022

Researchers in the US have characterized a [tetraether lipid synthase](#) from an archeobacter and suggest a mechanism for the formation of dibiphytanyl glycerol tetraether.

### August 16, 2022

Scientists in China and the US have synthesized a [borane-capped Ni\(0\) imido complex](#) that behave like an early transition metal complex in terms of C-H bond activation.

### September 12, 2022

Chemists from Columbia University have synthesized and characterized [crystals of a highly strained azobenzene ligand complex that roll in sunlight](#).

### September 12, 2022

Chemists from Germany have synthesized and characterized the [first transition metal complex of perfluoro-Cp\\*](#).

## USEFUL LINKS

**Here are links to organizations helping Ukrainians survive the ongoing war in their homeland:**

- [Help Humanitarian Efforts in Ukraine](#)
- [Donate to Children of Ukraine](#)
- [Nova Ukraine](#)
- [Razom for Ukraine](#)
- [World Central Kitchen](#)
- [Global Giving](#)
- [International Committee of the Red Cross](#).

## VIDEO OF THE MONTH

Here is a link to one of the [videos mentioned](#) in the azobenzene paper showing a crystal rolling 500,000 times.

## JOIN US ON LINKEDIN

Our [LinkedIn group](#) shares information and fosters discussion about X-ray crystallography and SAXS topics. Connect with other research groups and receive updates on how they use these techniques in their own laboratories. You can also catch up on the latest newsletter or *Rigaku Journal* issue. We also hope that you will share information about your own research and laboratory groups.

[JOIN HERE](#)

## RIGAKU X-RAY FORUM

At [rigakuxrayforum.com](#) you can find discussions about software, general crystallography issues and more. It's also the place to download the latest version of Rigaku Oxford Diffraction's CrysAlis<sup>Pro</sup> software for single crystal data processing.

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