

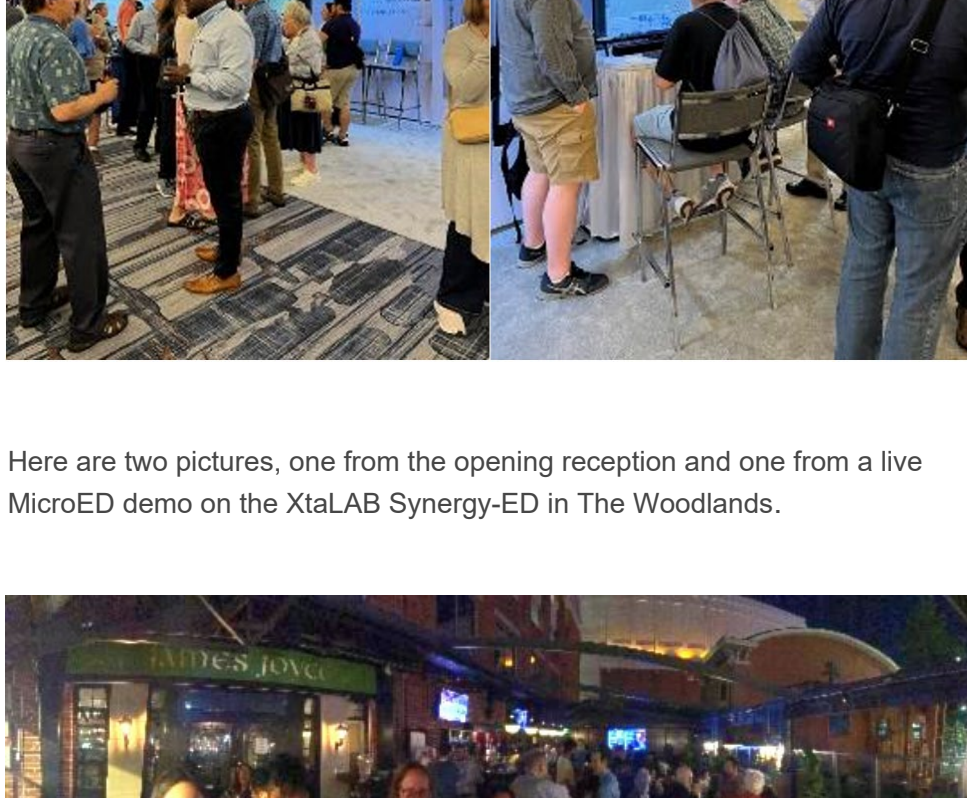


CRYSTALLOGRAPHY TIMES

Volume 15, No. 7, July 2023

WELCOME

The American Crystallographic Association's Annual Meeting just finished in Baltimore. It was great to see so many familiar faces at the booth, in the sessions and at the Rigaku mixer at the James Joyce Pub.



Here are two pictures, one from the opening reception and one from a live MicroED demo on the XtaLAB Synergy-ED in The Woodlands.



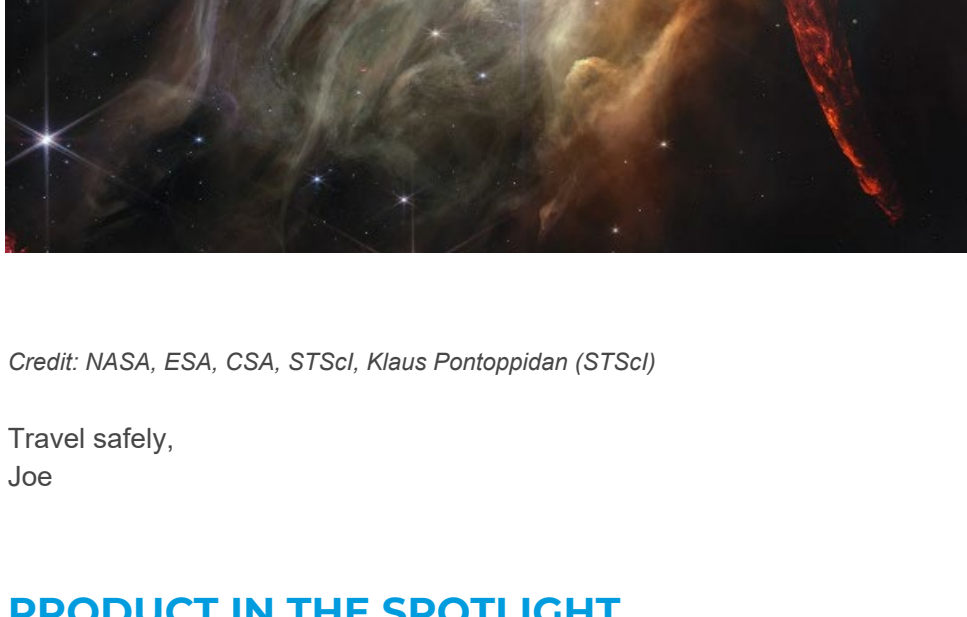
And here are three early career crystallographers with the President of the ACA, Cora Lind-Kovacs, at the Rigaku mixer at the James Joyce Pub.

We have the IUCr coming up in August in Melbourne. In an interesting coincidence, United Airlines' *Hemispheres* magazine for July has a "Three Perfect Days in Melbourne" feature. If you are not too busy sightseeing and going to sessions, please stop by our booth, where we will have live demos of the XtaLAB Synergy-ED. We are planning a fun night at the Melbourne Zoo on August 25, but seating is limited so come to the booth early for your ticket. Cora Lind-Kovacs is organizing a fun run and we will provide the T-shirts.

This month, we highlight the laboratory of Professor Jesper Bendix from the University of Copenhagen and the HyPix-Arc 150°. Jeanette reviews *Wonder Drug: The Secret History of Thalidomide in America and Its Hidden Victims*.

As part of Advancing Drug Discovery: A Webinar Series of the National Academies of Sciences, Engineering and Medicine, a session on Career Paths in Drug Discovery will be held on Thursday, July 20th, 2023 at noon (EDT). The 60-minute session will consist of a diverse panel of experts from a variety of industries and sectors in this field. The panelists will share their career trajectories and provide tips on how to launch a successful career path in drug discovery. This session is designed for early careers and those interested in pursuing a position/role in drug discovery.

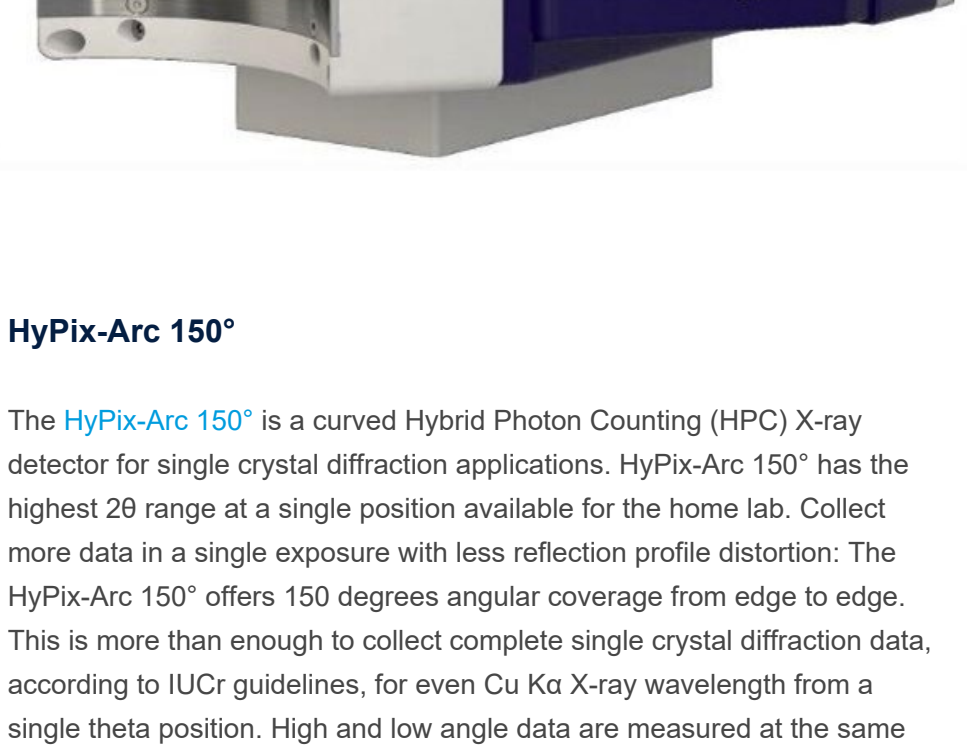
I was humbled to see this picture in *Nature*. The image is of a star nursery with 50 new stars, many of which are similar to the sun in size. It is 390 light years away. To put that in perspective, it would take about 4.5 months for the Enterprise-D to get there at Warp 8.



Credit: NASA, ESA, CSA, STScI, Klaus Pontoppidan (STScI)

Travel safely,
Joe

PRODUCT IN THE SPOTLIGHT



HyPix-Arc 150°

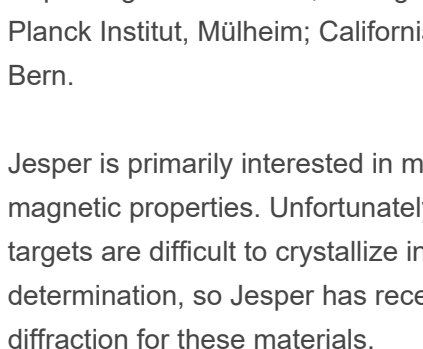
The HyPix-Arc 150° is a curved Hybrid Photon Counting (HPC) X-ray detector for single crystal diffraction applications. HyPix-Arc 150° has the highest 2θ range at a single position available for the home lab. Collect more data in a single exposure with less reflection profile distortion: The HyPix-Arc 150° offers 150 degrees angular coverage from edge to edge. This is more than enough to collect complete single crystal diffraction data, according to IUCr guidelines, for even Cu Kα X-ray wavelength from a single theta position. High and low angle data are measured at the same time, under the same conditions for better scaling, faster data and reduced dose time. A curved detector minimizes peak distortion by ensuring that, even at short crystal-to-detector distances, diffracted beams are closer to perpendicular than is possible with a flat geometry.

Like all HPC detectors, the HyPix-Arc 150° offers direct X-ray photon counting for every photon, single pixel top-hat point spread function with no readout noise and no dark noise. The 100 micron pixel size allows better resolution of reflections for long unit cells as well as improving reflection profile analysis. The HyPix-Arc 150° has a high frame rate of 100 Hz, as well as a Zero Dead Time mode providing the ultimate in error-free shutterless data collection.

The advantage of direct detection found in the HyPix-Arc 150° is that no phosphor is required and the size of the pixel determines the point spread function rather than the blooming that occurs on detectors with a phosphor. This means that reflections are sharper and more easily resolved. Profile analysis will not require incorporating additional pixels to compensate for phosphor blooming leading to less experimental noise, such as air scatter, being incorporated into a reflection. As opposed to monolithic detectors, such as CMOS-based CPADs, a hybrid detector separates the detection area from the read-out electronics. This means that the full area of a pixel is sensitive to incoming X-ray photons, with the charge being transmitted through an indium bump bond to a secondary readout pixel. In APS-CMOS/CPAD detectors, each pixel contains in-pixel readout electronics that come at the expense of light sensitive area. Monolithic detectors used in crystallography often have a 30% dead area or detection-gap per pixel that occurs through the whole detector.

The HyPix-Arc 150° is the perfect detector for measuring diffraction from small and poorly diffracting samples due to the extremely low noise characteristics: you can count as long as you need to the dark current or noise build up seen in other detectors. When your crystals diffract well, the high frame rate and Zero Dead Time mode mean that you can collect data extremely fast and accurately in a shutterless mode.

LAB IN THE SPOTLIGHT



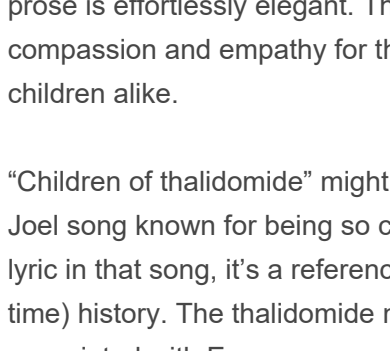
Professor Jesper Bendix

This month's featured scientist is Professor Jesper Bendix from the University of Copenhagen. Jesper has been at the University of Copenhagen since 2000, having completed postdoctoral positions at Max-Planck Institut, Mülheim; California Inst. of Technology; and University of Bern.

Jesper is primarily interested in materials with interesting electronic and magnetic properties. Unfortunately, many of the interesting research targets are difficult to crystallize in large enough sizes for the use of structure determination, so Jesper has recently been exploring the X-ray electron diffraction for these materials.

We are very pleased that, after receiving a grant from the Novo Nordisk Foundation, Jesper has joined the growing ranks of XtaLAB Synergy-ED owners. We look forward to seeing what he will do with it.

BOOK REVIEW



Review: *Wonder Drug: The Secret History of Thalidomide in America and Its Hidden Victims*

By Jennifer Vanderbes
ISBN 9780525512264

Jennifer Vanderbes' *Wonder Drug: The Secret History of Thalidomide in America and Its Hidden Victims* is simultaneously one of the hardest and easiest books to read. The subject matter is challenging emotionally, leaving readers with an overwhelming sense of confusion over the lack of moral clarity in the pharmaceutical industry and American government not only three decades ago, but also today. On the other hand, Vanderbes' prose is effortlessly elegant. The book is beautifully written, with compassion and empathy for the victims of thalidomide, mothers and children alike.

"Children of thalidomide" might seem like a throwaway lyric in an old Billy Joel song known for being so comically bad it's almost good but, like every lyric in that song, it's a reference to a significant moment in modern (at the time) history. The thalidomide medical scandal of the early 1960s is widely associated with European countries, namely Germany and Great Britain. Thousands of children whose mothers had taken the so-called morning sickness miracle pill—even as little as once in the earliest weeks of their pregnancies—were born with missing or malformed limbs.

France Kelsey, an MD/PhD pharmacologist who worked at the United States Federal Drug Administration in the 1960s, has been lauded as a hero who kept the dangerous drug out of American homes, whereas European governments were less successful. Vanderbes initially frames the narrative around Kelsey, her upbringing and career accomplishments, building to her greatest achievement—keeping thalidomide formally off the American market—for which she was awarded a President's Award for Distinguished Federal Civilian Service by John F. Kennedy.

However, *Wonder Drug* is by no means a Frances Kelsey biography, and nor should it be. The ultimate plot twist (although it's not really a plot twist, because this is a work of nonfiction) is that thousands of Americans were given thalidomide for free in the 1950s and 1960s as samples by their physicians. Many of those patients were pregnant women, and many of them had children born with severe limb deformities known as phocomelia. But because thalidomide was never approved for sale in the United States and all these drug samples were distributed free of charge—often in an undocumented fashion—none of these women nor their children have received any formal government reparations, making the United States the only country to this day to have victims of thalidomide that it refuses to formally acknowledge. The so-called icing on the proverbial cake is that there are actually two forms of thalidomide on the market today, actively used as treatment for certain cancers and AIDS.

Between each set of chapters are excerpts from interviews with American thalidomide survivors. Concise but compelling nonetheless, these interwoven excerpts provide *Wonder Drug* with both a profound sense of humanity and the gravitas of consequence. Alongside these first-person accounts, Vanderbes also includes the text of corporate memos from Chemie Grünenthal, the German pharmaceutical company that originally pushed the drug, as well as Richardson-Merrell, the American pharmaceutical company that lobbied to have the drug approved for use in the United States while freely distributing samples to physicians around the country, as well as official government documentation about the investigation into thalidomide pending its approval to bring to the American market. The juxtaposition of these incredibly personal narratives with the incredibly impersonal and insensitive corporate and government communications underlies the disconnect between victims of the pharmaceutical industry, the industry that doesn't care about them, and the bureaucracies meant to protect these people so they never become victims.

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 and electron diffraction, X-ray fluorescence and X-ray imaging. You can watch recordings of our past sessions [here](#).

UPCOMING EVENTS:
DXC 2023, Lombard, IL, August 7-11, 2023.

ACS Fall 2023, San Francisco, CA, August 13-17, 2023.

Rigaku European Single-Crystal Users' Meeting, Warwick University, UK, September 11-12, 2023.

IUCr 2023, 26th Congress and General Assembly of the International Union of Crystallography, Melbourne, Australia, August 22-29, 2023.

80th Pittsburgh Diffraction Conference, Pittsburgh, PA, October 15-17, 2023.

SERMACS 2023, Durham, NC, October 25-28, 2023.

Rayons X et Matière 2023, Bordeaux, France, November 21-24, 2023.

CRYSTALLOGRAPHY IN THE NEWS

June 21, 2023
Scientists from the US have determined the structure of [Lettuce, a 53 nucleotide DNA](#) with a four-way junction that supports GFP-based fluorophores.

June 22, 2023
Researchers from UCLA used 1,2,3-cyclohexatriene to [produce and characterize several compounds](#) through a novel pathway.

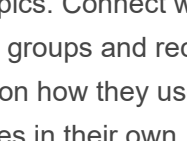
USEFUL LINKS

In addition to the war in Ukraine, we have another humanitarian crisis in Sudan. It seems that medical aid is the most critical need now. [Doctors without Borders](#) is a reputable organization and is providing aid in Sudan.

Here is a link that provides useful information regarding relief efforts for Ukraine: [Here's how you can help the people of Ukraine: NPR](#)

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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, follow our Twitter feed.

