

## WORKSHOP #7

The HRD Beamline, the Future of High-Resolution Powder Diffraction at NSLS-II

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Thomas Caswell (NSLS-II, BNL)*

HRD is a new beamline at NSLS-II, to be constructed as part of the NEXT-III project. First light is scheduled for 2029. This workshop will introduce the broader user community to this exciting new high resolution powder diffraction instrumentation, presenting details of its overall mission, technical design, and expected capabilities. The combination of high resolution and high throughput capabilities of HRD will be augmented by extensive in situ and in operando capabilities, optimized via a modular design to facilitate rapid changeovers between sample environments, as well as facilitating long duration experiments, covering up to several months. Automated data handling and analysis are important to ensuring the beamline delivers to its full capability from its high data production rate. The first half of the workshop will focus on the design and hardware of the beamline with exemplar science cases highlighting key envisaged capabilities, including sample environments and design specifications. The second half of the workshop will focus on the software, AI and ML integration and forward-looking data management. Both sessions will include panel discussions to allow ample opportunity for user input, questions and feedback. This workshop is meant to engage the user community and have PI's weigh in on the future focus and day-one capabilities of the beamline and brainstorm some day-one projects.

*\*This workshop is separated into two parts that will be held over two days. Part 1 will be held on Tuesday afternoon, and Part 2 will be held on Wednesday morning.*

### Tuesday Afternoon (29<sup>th</sup> April)

Start Time (ET)	Title	Speaker (Affiliation)
12:00	<i>Lunch Break (travel to/from Berkner Hall)</i>	
1:00	Introduction to HRD & introduction to BET and BAT members	Dave Billing (University of Witwatersrand)
1:30	HRD Beamline design and capabilities	Dan Olds (NSLS-II)
2:00	Growing Insights: The Role of In Situ Diffraction in the Formation of Single-Crystalline Quantum Materials	Julia Chan (Baylor University)
2:45	Resolution, Speed and Intensity – Synchrotron Powder Diffraction to Analyze Materials	Cora Lind-Kovacs (University of Toledo)
3:30	<i>Break</i>	
4:00	Harnessing Static and Dynamic Disorder in Solid-State Energy Materials	Annalise Maughan (Colorado School of Mines)
4:45	Panel Discussion: Q&A	Dan / Dave to Chair Panel Members: BAT
5:00	Adjourn for Users' Meeting Banquet	

### Wednesday Morning (30<sup>th</sup> April)

Start Time (ET)	Title	Speaker (Affiliation)
9:00	Beamline 2.0 : HRD Software Mission	Thomas Caswell
9:30	Lessons from Synchrotron HR-PXRD: Details, hurdles and opportunities learned from beamline 11-BM	Saul Lapidus (Argonne National Laboratory)
10:15	The European Commercial High Energy, High-Throughput X-ray Scattering Service, an update	Bernd Hinrichsen (Momentum Transfer)
10:30	Introducing PSED: The Platform for Sample Environment Development	Dan Olds
10:45	Software Discussion: What tools does the community want?	Chaired by Thomas Caswell
11:00	Panel Discussion: Q&A	Chaired by Dan / Dave Panel Members: BAT
11:45	Closing comments	Dave Billing
12:00	<i>Lunch Break (travel to/from Berkner Hall)</i>	

#### Beamline Advisory Team (BAT) Members in Attendance for Panels / Q&A:

David Billing - University of Witwatersrand (Chair of the BAT)

Eric Dooryhee – Neel Institute CRNS

Bernd Hinrichsen – Momentum Transfer

Tyrel McQueen – John Hopkins University

Katharine Page – University of Tennessee Knoxville

Kevin Stone – SLAC