User Training for Synchrotron Experiments at SSRL in the Remote World

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January 2021

Remote Access Working Group

BOLD PEOPLE. VISIONARY SCIENCE. REAL IMPACT.

U.S. DEPARTMENT OF ENERGY
Stanford University
SLAC NATIONAL ACCELERATOR LABORATORY

Training —

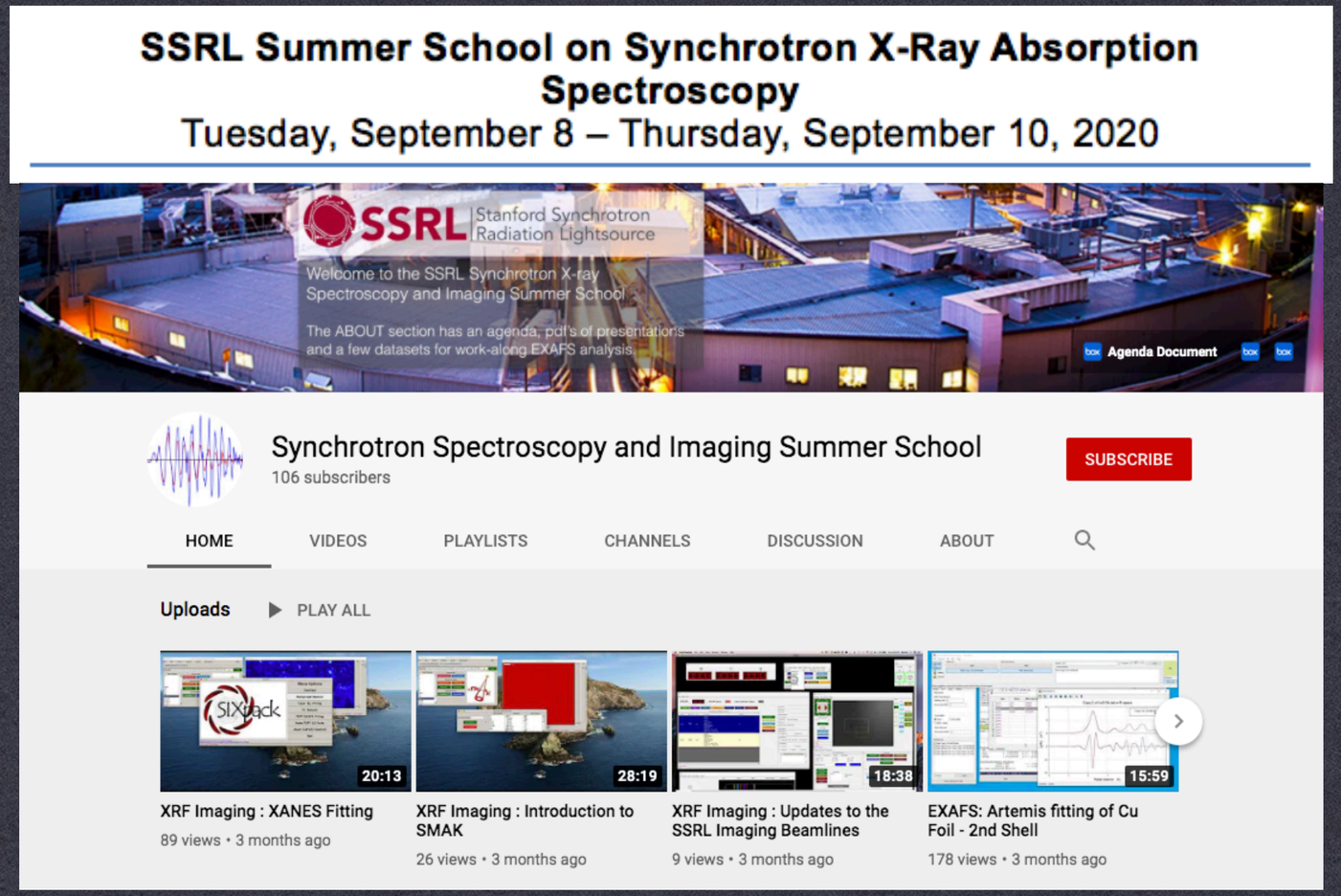
- Training users (data collection and analysis) has always been important
- Remote access brings new challenges (opportunities)

2019	
17-21 June 2019	Ultrafast X-ray School (UXSS) (CFEL)
17-28 June 2019	US Particle Accelerator School (U New Mexico)
3-4 June 2019	Time- and Space-Resolved X-ray Absorption Spectroscopy (XAS) at SSRL: Analysis of Large Data Sets
5-10 May 2019	RapiData 2019
20-22 Feb 2019	SSRL Resonant Inelastic X-ray Scattering with Hard X-rays Workshop
2018	
13-17 August 2018	SSRL EXAFS School
16-18 July 2018	SSRL X-ray Scattering School
24-28 June 2018	Ultrafast X-ray School (UXSS)
22-27 Apr 2018	RapiData 2018
21 Mar 2018	Sample Environments for X-ray Photon Science
2017	
11-15 Sep 2017	7th International Conferences on Hard X-ray Photoelectron Spectroscopy
19-23 Jun 2017	SSRL EXAFS/Imaging Summer School
12-15 Jun 2017	Ultrafast X-ray Summer School in Hamburg
5-7 Jun 2017	canSAS-IX meeting, San Francisco
16-21 Apr 2017	RapiData 2017 at SSRL
2016	
26-27 Sep 2016	Scientific Opportunities for Ultrafast Hard X-rays at High Repetition Rate: An Energy Upgrade of LCLS-II
21-24 Aug 2016	12th International Conference on Biology and Synchrotron Radiation (BSR)
18-22 Jul 2016	EXAFS 2016 - SSRL Summer School on Synchrotron X-Ray Absorption Spectroscopy
21-23 Jun 2016	SSRL X-ray Scattering School
16-17 Jun 2016	Research Opportunities in Photochemistry, Solar Energy & Advanced X-ray Methods
12-16 Jun 2016	Ultrafast X-ray Summer School (UXSS)
24-29 Apr 2016	RapiData Course on Data Collection and Structure Solution
19-22 Apr 2016	Crystallization: Focus on Micro and Nano Crystals and High Throughput Methods
28-30 Mar 2016	Small-Angle X-ray Scattering and Diffraction Studies

- In person, lightsource sponsored “schools” and “short courses” have a long history at many institutions
- Benefit of combining in-person lectures with hands-on sessions to give users real-life synchrotron experiences

“Summer Schools”

Traditional method of instruction and dissemination of knowledge



SSRL First Virtual Summer School:

- 800 registrations!
- Parallel data analysis sessions had 250-300 each.
- YouTube channel has 100+ subscribers

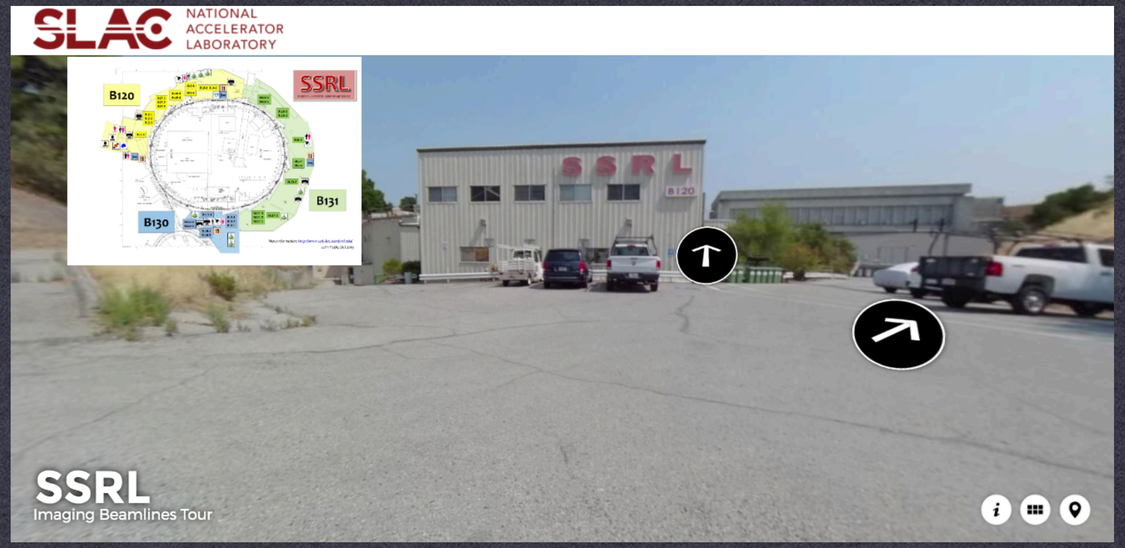
5 hours of lecture materials, ~8 hours of video content on data analysis covering both XAS and XRF Imaging, including sample preparation.

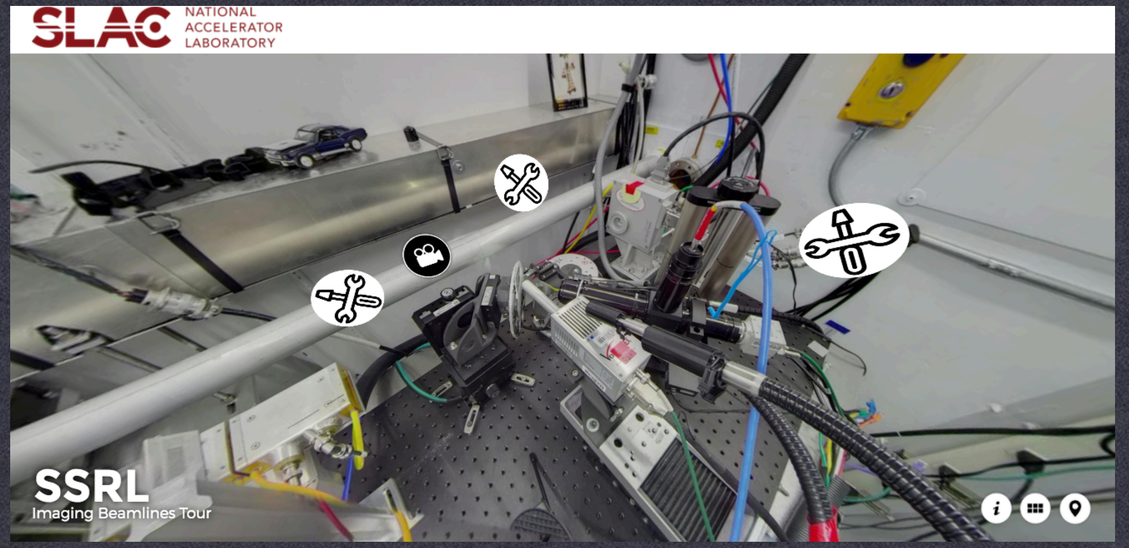
- Content from 6 lecturers, 7 data analysis experts

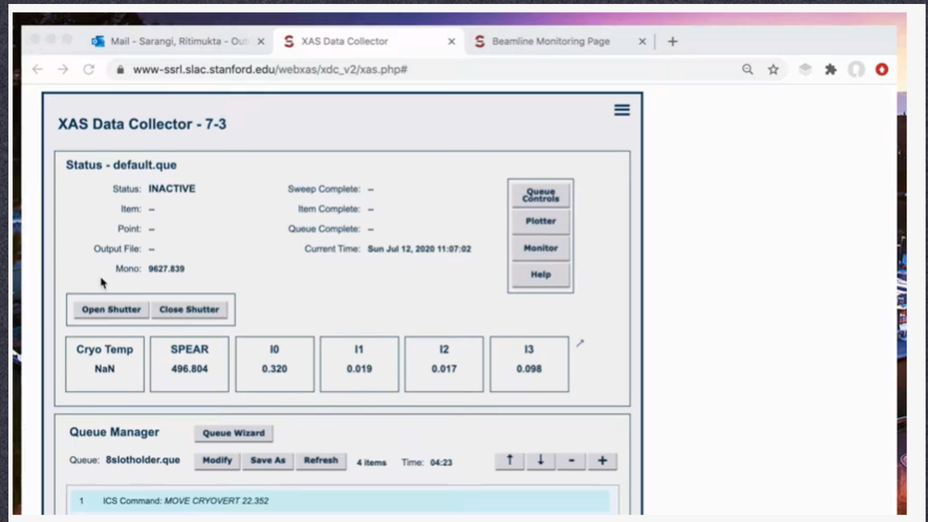
Open zoom meetings for hands-on discussion of user's data in 4 parallel topical sessions

"Summer Schools"

Shift to a virtual lecture series and hands-on sessions







WebXAS Demonstration on BL 7-3

“Virtual Hands On”

Give participants the feeling of the facility

https://www-ssrl.slac.stanford.edu/~swebb/tour

- Tutorial information for users is not just limited to lightsource sponsored classes
- Reach a wide variety of user audiences, and target experimental and data analysis needs to a group - from highly specific to very general, or beginner to advanced
- Can include short courses, workshops, tutorials, seminars, group meetings…
- “No longer” limited by the need to travel - shift to remote media can enable a wider reach

“Other Venues”

Tailor-made presentations/content for targeted audiences

SSRL XrayWiki

Useful Links

Experiment Support
Group SLACSpace Site
SPEAR Status
X-Ray Trouble Shooting
VUV Beam Lines
Online Equipment
Manuals

X-ray Data Booklet Online
Center for X-Ray Optics
Super Manual

Beam Lines

2-1	2-2	2-3
5-4	6-2	8-1
8-2	10-1	10-2
13-1	13-2	13-3
14-3	SLM	

Beam Line Documentation

options

The microbeam setup at BL 2-3 has a unique set of software interfaces for the user to collect and process data. The following guides will help first time users get started with many of the most common tasks.

Beam Line 2-3 Guide
A beam line specific quick start reference for setting things up, taking data, frequent questions, and the old troubleshooting page

BL2-3 Troubleshooting
Fixes (hopefully) to common problems

Microprobe Analysis Toolkit (SMAK)
Software to visualize your XRF imaging data and XAS queue builder.

XAS Data Collection
X-ray absorption data collection is performed by uXAS.

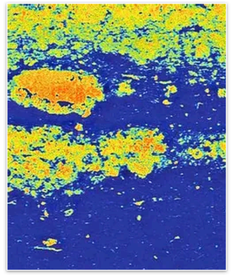
XRD Data Collection
Data collection for XRD on the CCD camera is done with a combination of PI-XRD and WinView/32

XmapGUI - XRF Collection
XMAPGUI is used for fluorescence spectrum acquisition and is used to set up the SCA windows (regions of interest) for XRF mapping o
collection

Getting your data from the T: Drive
This is directions on how to download your data from the T: drive on any computer

- Wiki's were a great idea — but not many users added content…
- Use webpages accessible by the community, and include a variety of content (text, pictures, videos…)

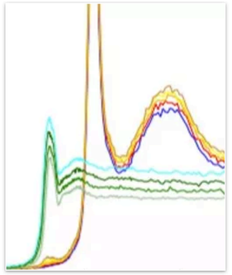
Follow the links below for useful information on how to use SMAK and SIXPACK



SMAK

Contains sections on:
SMAK Basics (at the beam line)
MCA data (import & fitting)
Quantitative Analysis
Principle Component Analysis
Particle Statistics
XANES Fitting

Get help >



SIXPACK

Contains sections on:
SIXPACK Basics
Normalization
Aligning
Principle Component Analysis

Get help >

2-3
Hard x-ray microfocus imaging and XAS
4.9 - 23 keV
3 micron ⌀ focused beam
25 x 25mm scan range

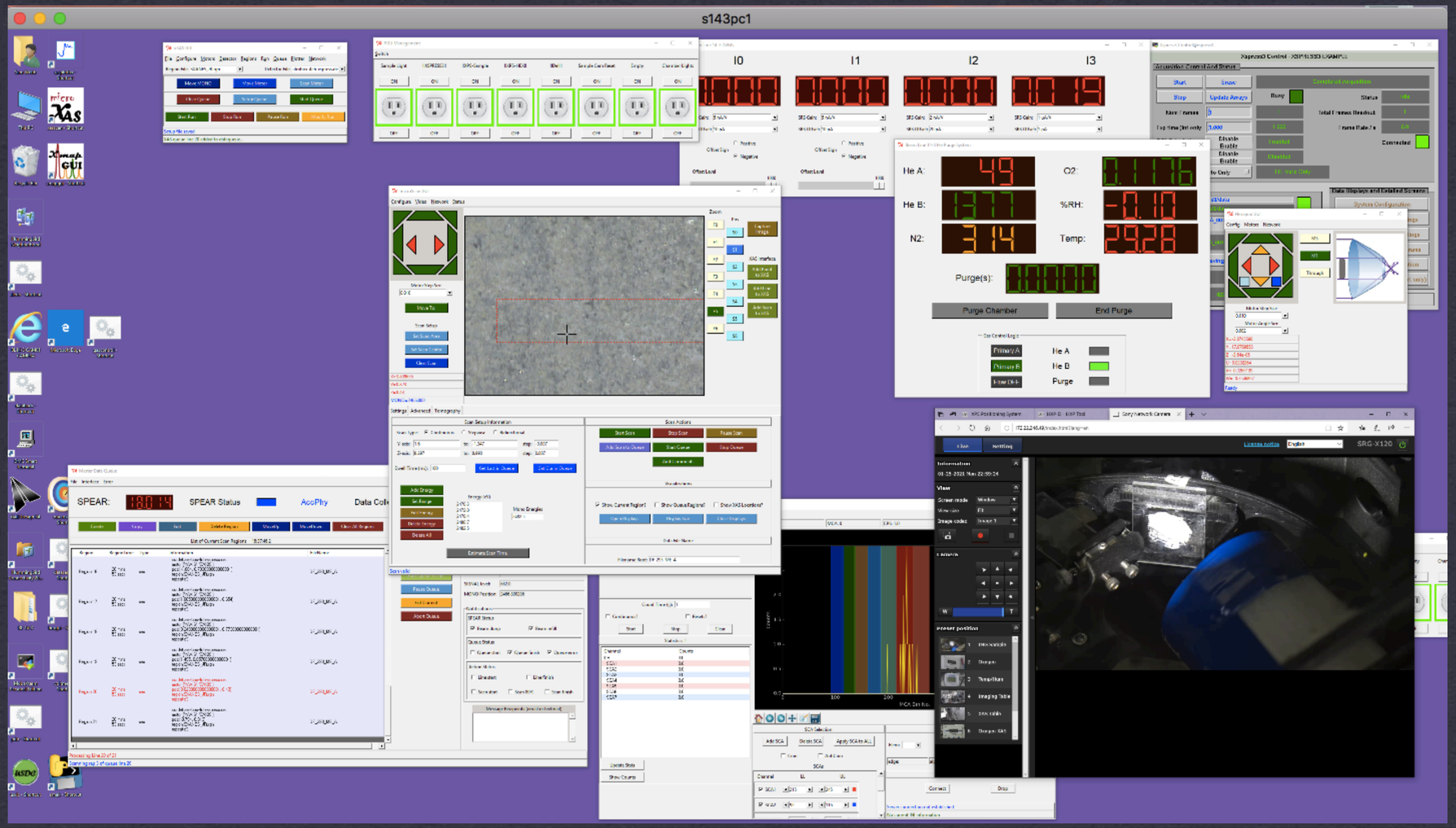
6-2
Tender/hard x-ray macro-imaging and XAS
2.2 - 15 keV
25, 35, 50 & 100 micron ⌀ pinhole beam
1m x 30cm scan range

10-2
Hard x-ray macro-imaging, XAS and HERFD
5 - 22 keV
25, 50, 100 & 150 micron ⌀ pinhole beam
60 x 30cm scan range

14-3
Tender x-ray microfocus imaging and XAS
2.1 - 5 keV
3 micron ⌀ focused beam
25 x 25mm scan range

Online Documentation

It is amazing how useful a manual can be…



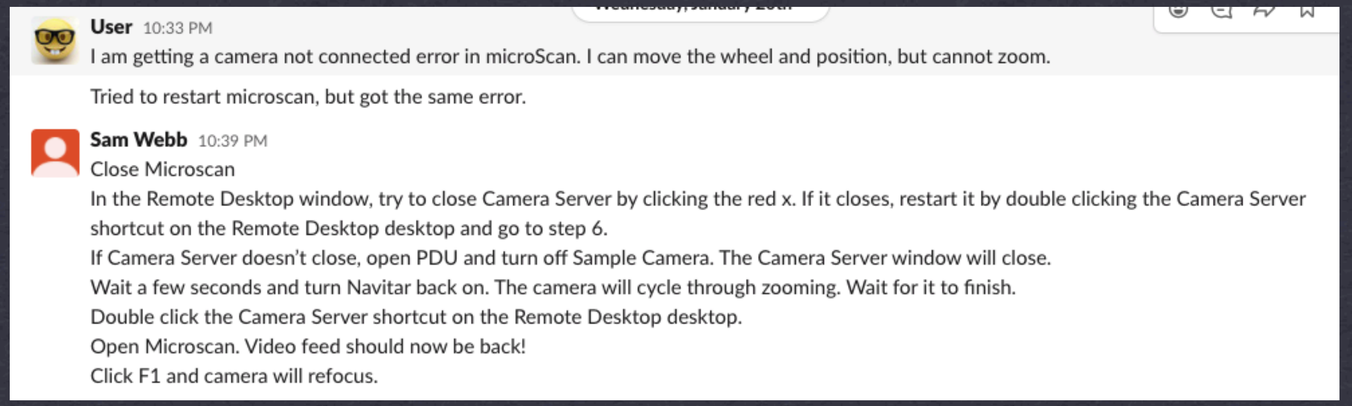
- Tools for dual conferencing-BL activity
- Tools for visualization and control of the entire BL

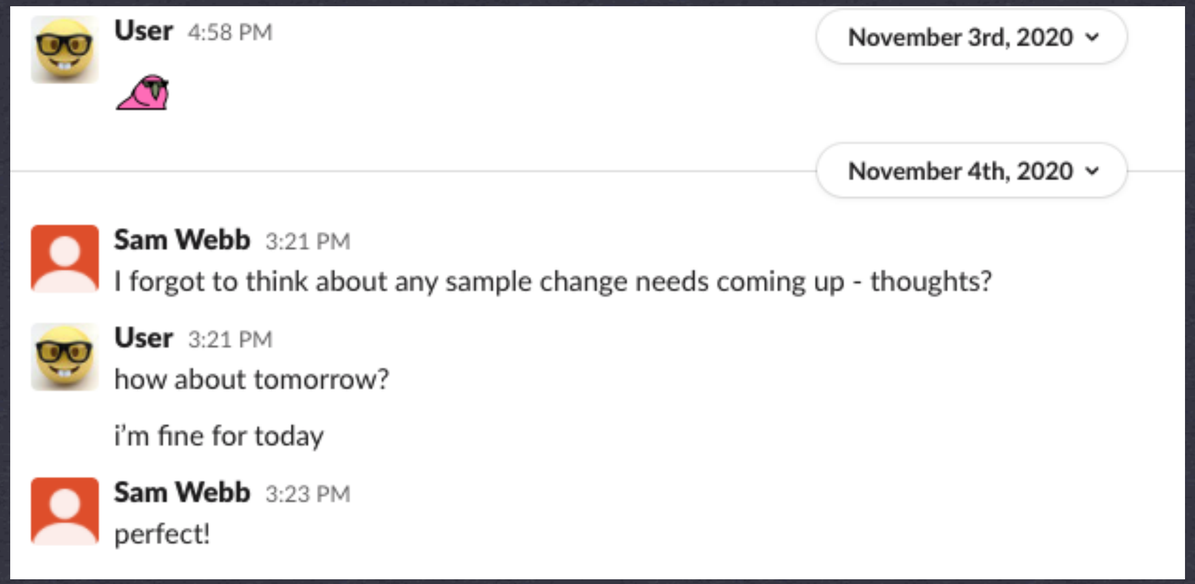
Virtual on-line training sessions

Simulate the "at the facility" side-by-side learning

SSRL Imaging Support
ssrlimagingsupport.slack.com

- Initially implemented for on-site users who had limited access to phone/text communication — rapidly transitioned to use for remote access
- Handle training issues
- Handle user communication for remote access issues
- Centralize responses to users from experimental support teams, rather than phone calls/texts/emails





Online assistance

Handle situations that training missed (or users have forgotten)