A Brief Guide to Writing Synchrotron User Proposals for XAFS

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inspired by a talk by Matthew Newville
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General User Access to Synchrotrons

Beamlines tend to give at least 25% of the beamtime – often much more – for General Users, i.e. open access to any researcher:

- Beamtime allocated by peer-review and open competition.
- The process is designed to bring in new people, while keeping access open to all researchers.
- General User Beamtime can go to "local experts"
- Many beamlines give much more than 50% General User time

Synchrotron calendars include "run cyles" with specific deadlines for proposal submission. Always check the synchrotron website for the submission calendar.

Proposals are usually due around the middle of the preceding run.

Example: XAFS Beamlines at the Advanced Photon Source in the U.S.

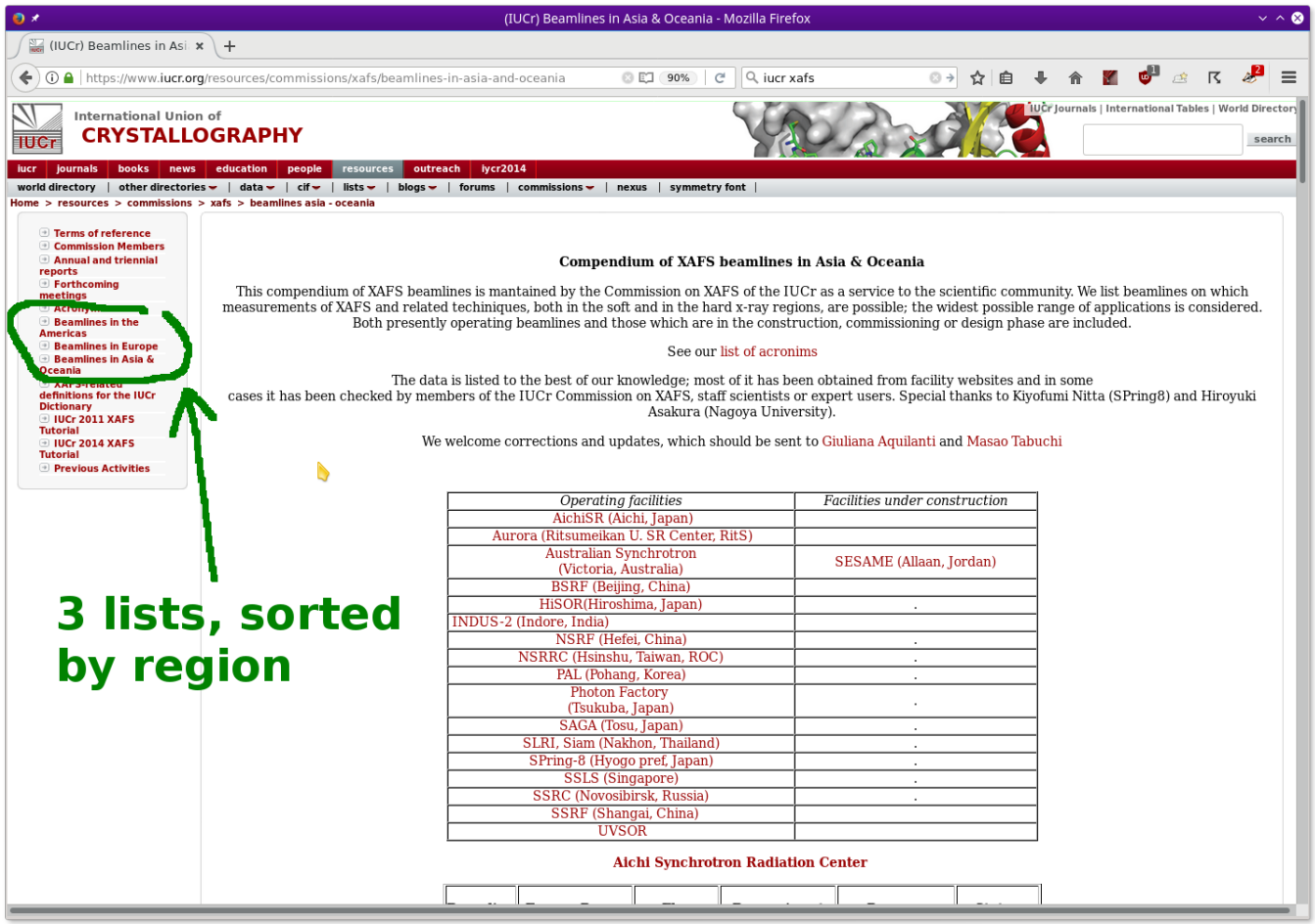
Beamline	% GUP	% XAFS	Notes
2-ID (XOR)	$> 50\%$	1/4	x-ray microprobe, XANES
4-ID (XOR)	$> 50\%$	1/2	XMCD, magnetic XAFS
5-BM (DNDCAT)	$= 25\%$	1/2	catalysis, enviro
9-BM (XOR)	$> 50\%$	all	can do S and Cl!
10-ID (MRCAT)	$= 25\%$	most	Catalysis, enviro, actinides.
11-ID (XOR)	$= 25\%$	some	time-resolved.
12-BM (XOR)	$> 50\%$	most	Catalysis, enviro, actinides.
13-BM (GSECARS)	$> 50\%$	1/4	geo / enviro
13-ID (GSECARS)	$> 50\%$	1/4	x-ray microprobe, geo / enviro
18-ID (BioCAT)	$= 25\%$	some	biological systems
20-BM (XOR/PNC)	$> 50\%$	all	general purpose XAFS
20-ID (XOR/PNC)	$> 50\%$	most	x-ray microprobe, geo / enviro, time-resolved.

CAT A beamline operated by an outside team

XOR A beamline operated by the APS

Finding the right XAFS beamline

The IUCr XAFS Commission maintains a lovely compilation of the world's beamlines. (Thanks to Giuliana Aquilanti and Masao Tabuchi!)



https://www.iucr.org/resources/commissions/xafs

Proposal Contents

The bottom line

Will this experiment result in a publication?

At most synchrotrons, the proposals are rated by panels of volunteers who may read as many as 20-30 proposals at a time. (The workload varies by synchrotron, but assume your reader is an over-worked volunteer **and** a peer.)

Key Points for Successful Beamtime Proposals:

- 2-3 pages: Take the time to make it short
- Describe the importance of your science in terms any scientist can understand
- Aim broadly, proposals are read by physicists, chemists, biologists, etc....
- Describe your experiment well. Include details of samples to be measured and of experimental setup if non-standard. Account for the time you request and make clear that the time will be well-used.
- Consult with a beamline scientist and/or your collaborators before submitting proposal.

More hints on proposal writing

- Describe the "Societal Impact" in the Abstract – reviewers love this.
- Describe other measurements that have been made on these samples.
- Be specific and explicit about:
  - Element(s) and edge(s) to be studied
  - Concentrations of elements to be studied.
  - Transmission, fluorescence, multi-element detector
- Give literature references. (**Don't** attach your CV. **Don't** attach PDFs of published papers.)
- Say you've taken this or a similar training class! (Really!)
- If you're a student or postdoc (most reviewers love this, too):
  - say so.
  - list yourself as Spokesperson, not your advisor.
  - write the proposal yourself, with help from advisor / senior students.
- If you've had some beamtime and "need a bit more time", include a plot of any data collected so far.
- List a 2nd choice beamline.

Proposal Scoring, Lifetime and Aging

Proposal Scores Many sycnhrotrons use a system of 1 (best) to 5 (worst) – like golf!

Proposal Shifts number of 8-hour shifts required for next run and for the lifetime of the proposal

- The synchrotron usually published the average Score for successful proposals
- Proposals that don't get time often "age up" as a reward for patience
- Proposals usually live for up to 2 years or until the allocated shifts are used
- To get beamtime in more than 1 run for a proposal, you will make a "Beamtime Request" for time in later cycles – not a new proposal
- To continue work, you can copy-and-paste an old proposal to start a "new" proposal

Caution!

The aging systems at different synchrotrons work differently. Check each synchrotron's web site for details.

After you've submitted a proposal

- Most beamlines are oversubscribed – many by $2\times$ to $3\times$.
  oversubscription = (requested days) / (available days)
- It may take one or more run cycles to get beamtime.
- You may get less time than you ask for.

- – it will become easier.
- Once you are in the system, everyone involved wants you to succeed (i.e. publish!).
- Most of these hints work for getting beamtime at other facilities and for other techniques.