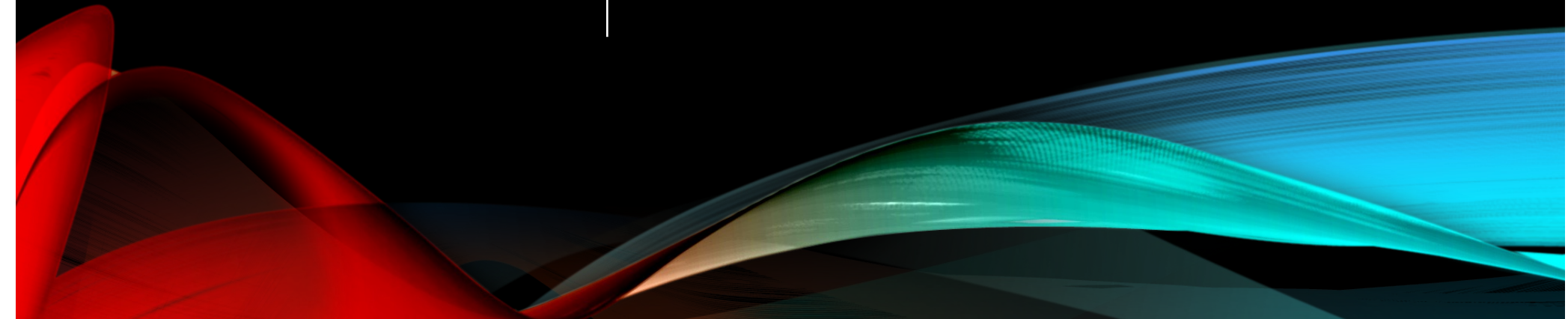


SO YOU WANT TO GET BEAMTIME...

Jessica McChesney

HOW TO WRITE A PROPOSAL





THE PROCESS

- Identify beamline - reach out to beamline/instrument scientists
- Look up proposal deadlines
- Register as a user
- Write the proposal - reach out to beamline/instrument scientists
- Submit proposal
- Proposals are reviewed and scored
- Beamtime allocated
- Plan for beamtime - reach out to beamline/instrument scientists
- Conduct the experiment
- Analyze the data
- Write the paper

LIST OF FACILITIES

<https://www.iucr.org/resources/commissions/neutron-scattering/where-neutrons>

<https://lightsources.org/lightsources-of-the-world/>

The screenshot shows the website for the Commission on Neutron Scattering. The header includes the IUCR logo and navigation menus for 'The IUCr', 'NEWS', 'PUBLICATIONS', 'PEOPLE', 'RESOURCES', 'EDUCATION', and 'OUTREACH'. The main content area is titled 'COMMISSION ON NEUTRON SCATTERING' and features a molecular structure graphic. Below this, a breadcrumb trail reads 'iucr > resources > commissions > neutron scattering > where neutrons'. The main heading is 'NEUTRON SCATTERING FACILITIES'. The facilities are categorized into three regions: ASIA AND AUSTRALIA, EUROPE, and North and South America. Each region lists several facilities with their names and locations.

NEUTRON SCATTERING FACILITIES

ASIA AND AUSTRALIA

- [J-Parc](#) (Japan)
- [KENS](#) (Tsukuba, Japan)
- [JAERI](#) (Japan)
- [KUR-RI](#) (Kyoto, Japan)
- [ISSP](#) (Tokyo, Japan)
- [KAERI](#) (Hanaro, Korea)
- [OPAL at ANSTO](#) (at Lucas Heights, Australia)

EUROPE

- [ILL](#) (Grenoble, France)
- [ISIS](#) (Oxford, UK)
- [GKSS](#) (Geestach, Germany)
- [BENSCH \(HZB\)](#) (Berlin, Germany)
- [FRM II at Garching](#) (T.U.Munich, Germany)
- [TUDelft](#) (Delft, The Netherlands)
- [SINQ](#) (at PSI Zürich, Switzerland)
- [BNC](#) (Budapest, Hungary)
- [FLNP](#) (Dubna, Russia)
- [PNPI](#) (Gatchina, Russia)
- [JEEP-II \(Kjeller\)](#) (Norway)

North and South America

- [SNS and HFIR at Oak Ridge](#) (USA)
- [LANSCE](#) (Los Alamos, USA)
- [NIST](#) (USA)
- [McMaster University](#) (Canada)
- [Chalk River](#) (Canada)

<https://neutronsources.org/>

The screenshot shows the website for Lightsources.org. The header includes the Lightsources.org logo and navigation menus for 'Home', 'About Lightsources.org', '75 Years of Synchrotron Science', 'For Users', and 'Careers'. The main content area is titled 'Light sources of the world' and features a grid of synchrotron facilities. The facilities are categorized into 'Synchrotron facilities' and 'FEL facilities'. Each facility is represented by its logo and name.

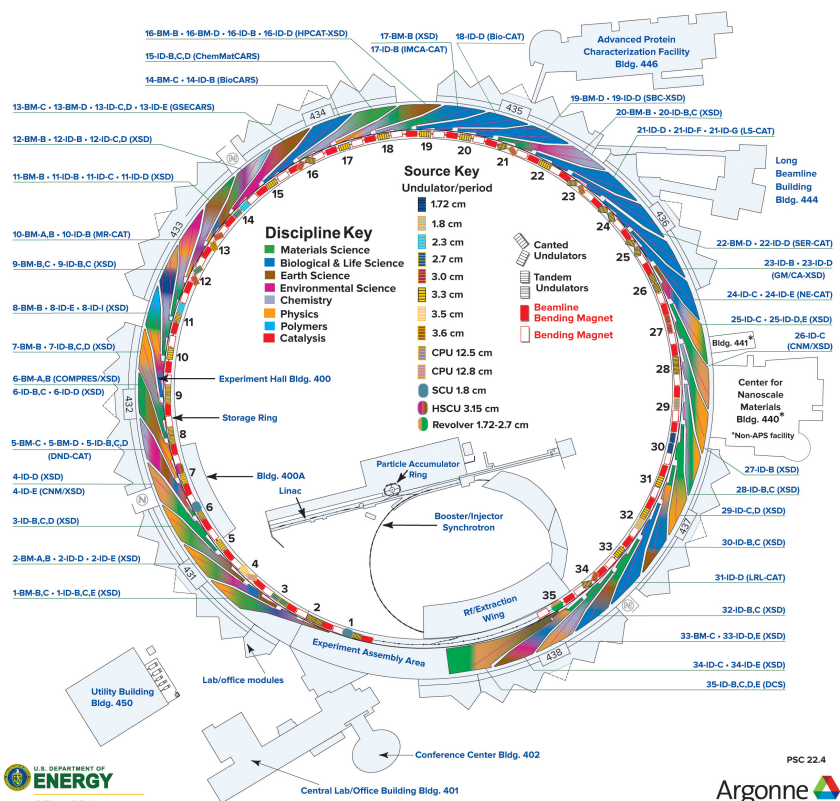
Synchrotron facilities

African Light Source Project (Honorary Member)	ALBA	ALS ADVANCED LIGHT SOURCE	Argonne NATIONAL LABORATORY APS at Argonne National Laboratory	Australian Synchrotron
HZB BESSY II Light Source BESSY II at HZB	Canadian Light Source Centre canadien de rayonnement synchrotron	CHESS CORNELL HIGH ENERGY SYNCHROTRON SOURCE	diamond	Elettra Sincrotrone Trieste
ESRF	LNLS	MAXIV	Brookhaven National Laboratory National Synchrotron Light Source II	NSRRC
PAL POHANG ACCELERATOR LABORATORY Pohang Light Source-II	DESY PETRA III at DESY	Photon Factory High Energy Accelerator Research Organization (KEK)	HZDR HELMHOLTZ ZENTRUM DRESDEN ROSENDOERF HZE Beamline at ESRF (HZDR)	SESAME (Honorary Member)
SOLARIS NATIONAL SYNCHROTRON RADIATION CENTRE	SLAC NATIONAL ACCELERATOR LABORATORY SSRL at SLAC	PAUL SCHERRER INSTITUT PSI Swiss Light Source at PSI		

FEL facilities

European XFEL	HZDR HELMHOLTZ ZENTRUM DRESDEN ROSENDOERF FELBE / TELBE at HZDR	Elettra Sincrotrone Trieste FEMM at ELETTRA	DESY FLASH at DESY	SLAC NATIONAL ACCELERATOR LABORATORY LCLS at SLAC
PAL POHANG ACCELERATOR LABORATORY PAL-XFEL	PAUL SCHERRER INSTITUT PSI Swiss FEL at PSI			

ARGONNE NATIONAL LABORATORY 400-AREA FACILITIES
ADVANCED PHOTON SOURCE
 (Beamlines, Disciplines, and Sources)
ADVANCED PROTEIN CHARACTERIZATION FACILITY
CENTER FOR NANOSCALE MATERIALS



PICK A BEAMLINE

Beamlines Directory

Beamlines Directory

Beamline Disciplines	Techniques	Energy Range	Access	Operator	Status
1-BM-B,C	<ul style="list-style-type: none"> Materials Science Physics 	<ul style="list-style-type: none"> 6-30 keV 50-120 keV 	<ul style="list-style-type: none"> On-site Remote Mail-in Beamline Staff 	XSD	⊕

- Reach out to beamline/instrument staff
- know the strengths and weakness of beamlines all over the world
 - can help you design a better experiment

BECOME A USER

- Register
- Learn the lingo

Beamline: a beam of particles, such as photons, electrons, or neutrons emitted from a particle accelerator – Merriam-Webster. Everything from shield wall to the measurement instruments

Beamtime: time during which you have access to the beamline and x-rays/neutrons are available

Note - allocated beamtime only includes the access to photon/neutrons, plan on additional time for sample preparation and clean up

Cycle: Review periods, typically 2-3 cycles per year depending on facility

Shift: Continuous 8-hour chunk by which beamtime is scheduled

Principle Investigator: (PI) typically advisor

Spokesperson: member of research team to receives communications

MODES OF ACCESS

- General User Proposals (GU/GUP/Standard Proposals)
 - Proposal call each cycle typically valid for several cycles
 - Peer reviewed
 - Typical access mode
 - Single or multiple cycles
- Rapid Access Proposals (RA/RAP/Quick)
 - Within a given cycle only valid for that cycle
 - Reviewed
 - Not available at all facilities or all beamlines within a facility
 - Short experiments - feasibility/new sample/data needed for publication
- Collaborative
 - Partner/approved user programs
 - Beamline personnel



REVIEWERS

- Peer review: Each proposal is typically review by 2-3 reviewers
- Reviewers: Typically, other users or experts in the field
 - Might be familiar with the technique
 - Might be familiar with the topic
 - Review multiple proposal
- Reviewers: Want the best user program for the facility as a whole
 - Interesting science
 - Good use of resources (technical and personnel)
 - Chance of success
 - Feasible



REVIEW PANEL

- Review Panels
 - Look at many more proposals
 - Topical and consider the overall portfolio of the user program
 - Address discrepancies between reviewers



SCORING

- Each proposal is scored/rated on its scientific and technical merit
- Time is allocated to proposals with the top ratings
- After allocation, score resets

RATINGS

Rating Criteria for General User Proposals

1 - Extraordinary

The proposal involves highly innovative research of great scientific or technological importance. Proposed research will significantly advance knowledge in a specific scientific discipline/field or create a new technological area. Considerable societal relevance is demonstrated. The radiation characteristics of the APS are highly desirable for the success of the proposed work.

2 - Excellent

The proposed research is of high quality and has potential for making an important contribution to a specific field, scientific discipline, or technical development project. The work is cutting edge and likely to be published in a leading scientific journal or lead to advances in a technological area. The radiation characteristics of the APS are important to the success of the proposed work.

3 - Good

The proposed research is near cutting-edge and likely to produce publishable results or incremental technological advances. Impact on a specific field, scientific discipline, or technological area is likely. Synchrotron radiation is essential to accomplish the intended goals of the research. The proposed work will greatly benefit from access to the APS.

4 - Fair

The proposed research is interesting but may not significantly impact a specific field, scientific discipline, or technological area. Publication may or may not result from this research. Synchrotron radiation is required, but the proposed work could be performed at other facilities.

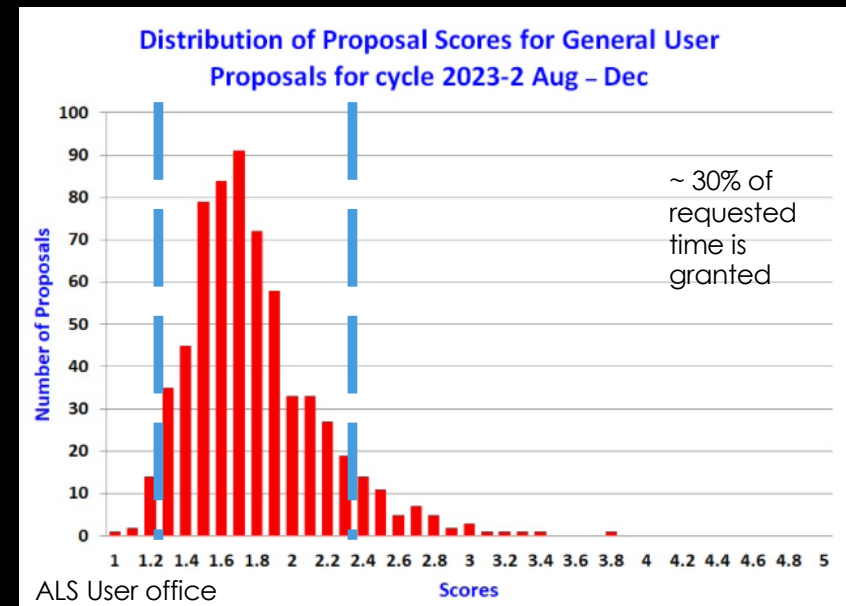
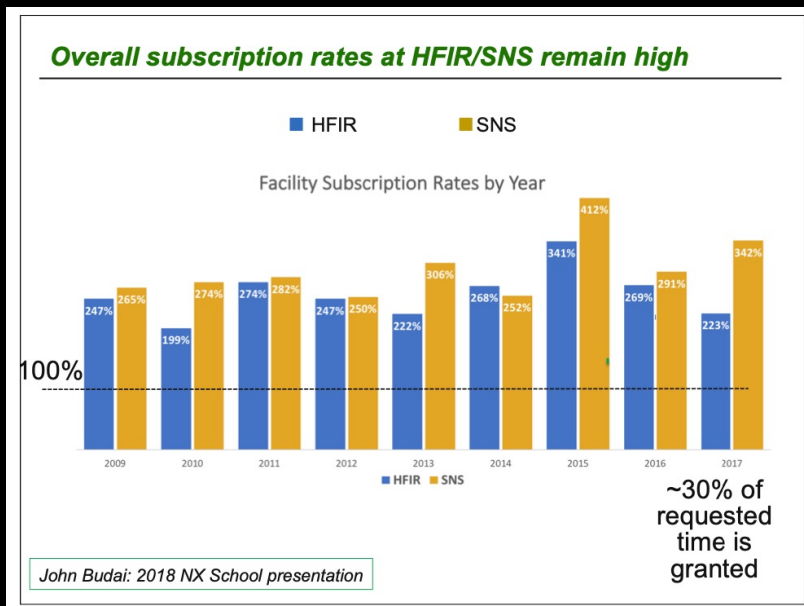
5 - Poor

The proposed research is not well planned or is not feasible. Results would not make important contributions to fundamental or applied understanding, and work is not likely to result in publication. The need for synchrotron radiation is not clear.

<https://www.aps.anl.gov/Users-Information/About-Proposals/Review-Criteria-for-General-User-Proposals>

CUT-OFF SCORES

- Beamtime can be very competitive and varies significantly between techniques and beamlines





LIFETIME AND AGING

- Proposal lifetimes: typically 2 years for GUPs
 - Beamtime Request (BTR) are required each cycle
- Aging: process by which proposal score improves if time was not allocated
 - Varies by facility
 - Designed to help proposals right at the cut-off get time



PROPOSAL STRUCTURE

- Varies from facility to facility:
 - free form narrative
 - Individual question
- Required Content (fairly universal)
 - Abstract – Summary of scientific case, methods and expected outcomes
 - Science Case
 - Experimental Methods
 - Safety Concerns
 - Facility/Beamline Justification
 - Prior Experience
 - References



TITLE & ABSTRACT

- Title: informative but short (summary of proposal)
- Abstract: Stand alone summary of your proposal addressing:
 - **What** do you plan to do?
 - **How** do you plan to do it?
 - **Why** are you doing it?



SCIENCE CASE

- Experimental background
 - What scientific questions are you trying to answer and why does it matter?
 - Are you trying to answer a fundamental science questions?
 - Are you looking to improve a technology?
 - Can you settle a long-standing debate?
 - How will the results impact the field?
 - What communities will be interested?
 - Where will you publish?
 - How does this build on the existing knowledge?
 - Cite the literature including preprints
 - Include preliminary data and predictive modeling



EXPERIMENTAL METHODS

- What are you planning on measuring/experimental strategy?
 - Technique and setup: special requirements
 - Samples: details and quantity (how have you already characterized them)
 - Experimental conditions
- Show the reviewers that you are ready and prepared
 - How will the data you obtain answer your science questions?
 - What does a positive result look like and what does it mean?
 - What does a null result look like and what does it mean?
 - What is required for data analysis?

SAFETY

- Clearly state any potential safety concerns
 - Are your samples hazardous?
 - Toxic
 - Radioactive
 - Nanomaterials
 - Do you need some processing or a specific sample environment? What are the associated hazards?
 - Use of chem lab
 - High/low temperatures
 - Applied fields
 - High/low pressures
 - Do you plan to bring your own equipment? Details



JUSTIFICATION

- Why do you need a synchrotron/neutron facility?
 - Sample environments and extreme conditions
 - Cross-sections
- Why do you need this specific beamline?
 - Flux/Coherence/Resolution
 - Sample Environment
 - Energy range
- Is this experiment technically feasible at the beamline?
- Rational for requested time, reference experimental details?



PRIOR EXPERIENCE

- Within the scientific field
- Familiarity with synchrotron/neutron techniques

REFERENCES

- Pick a few of the most relevant
 - Provides motivation: review articles or high-profile papers
 - Justify the technique if nonstandard
 - Shows level of your research
 - Do NOT expect reviewers to read all reference – include all essential information within the text of your proposal.



ADDITIONAL TIPS

- Tell a story: help the reviewer imagine the beamtime and resulting publication
- Proposal must be self-contained - it's your job to tell them what's important
- Proofread and follow the template format
- Show preliminary data and/or theory
- Figures – a picture is worth a thousand words
- Point out any weak points and address them (they'll figure it out anyway)
- Avoid being vague and overly broad or use too much jargon
- Don't expect beamline staff to read your proposal the week of the deadline, contact them well ahead of time

ALLOCATION

- Talk to beamline staff about
 - Logistics
 - Sample handling
 - Scheduling
- Complete required training



BEAMTIME

- Come prepared
 - Have a plan and backup plans
 - Have enough samples
 - Have enough people
 - Plan for sample preparation, training, set-up before beamtime
 - Plan for clean-up and data transfer after beamtime
 - Do your training
- Conduct your experiment
- Have a plan for data analysis and publication



TAKE HOME MESSAGE

- Contact beamline/instrument staff – they are your allies
- Reviewers want you to succeed - show them:
 - You have a plan - from sample to publication
 - It's scientifically interesting and important
 - What you want to measure will tell you what you want to know
 - You've done your homework
 - You have samples and understand them
 - You know the field and are up on the literature
- What annoys reviewers
 - Typos and inconsistencies
 - Having to read between the lines or check references to infer what they think you're saying



ADDITIONAL INFORMATION

- ESRF → Applying for beamtime → Advice on writing a good proposal
- CLS → How to write your best proposal
- ALS User Meeting – Light sources 101 workshop



BEAMLINe SCIENTISTS

- Experts in the field – known science and technical capabilities
- Want the best science
 - know the strengths and weaknesses of beamlines all over the world and can point you in best direction
 - can help you design a better experiment
- Know what review panels typically are looking for
- Be open and talk to them early

Please provide your feedback
Proposal Writing – Jessica McChesney

Thank you for your attention

QUESTIONS?

