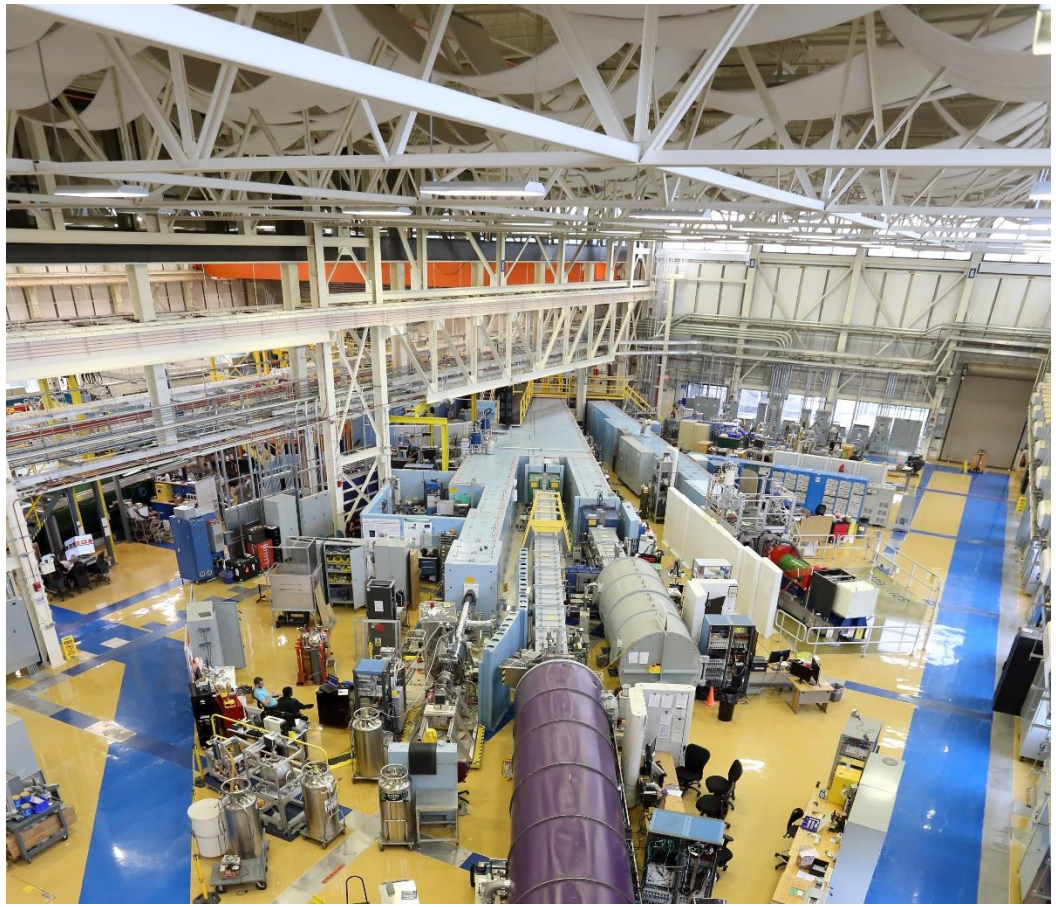
Obtaining beam time at the NCNR



Paul Butler

With many thanks to
Yamali Hernandez

Obtaining beam time at the NCNR

The plan

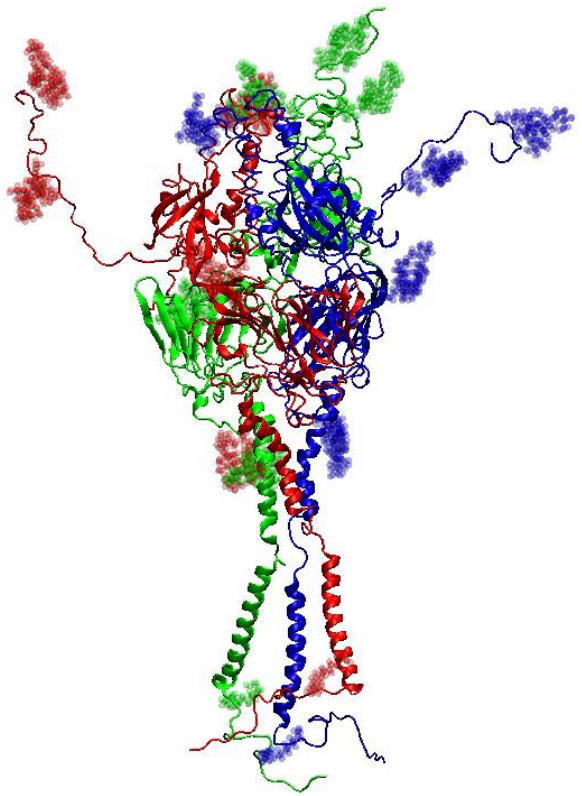


Image courtesy of Susan Krueger and Joseph Curtis
doi: 10.1021/acs.molpharmaceut.0c00986.

I. The Proposal Process

- First things first
- The NCNR proposal process

II. Writing a Competitive Proposal

- Understand the goal and Know your audience
- Motivation – Don't forget it but don't go overboard
- Exp Description
  - What, How and the Credibility tests
- Budget justification

III. Some Administrative Stuff

- Using the IMS and security requirements
- Types of access
- Class proposal notes
- Final thoughts

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The process: First things first

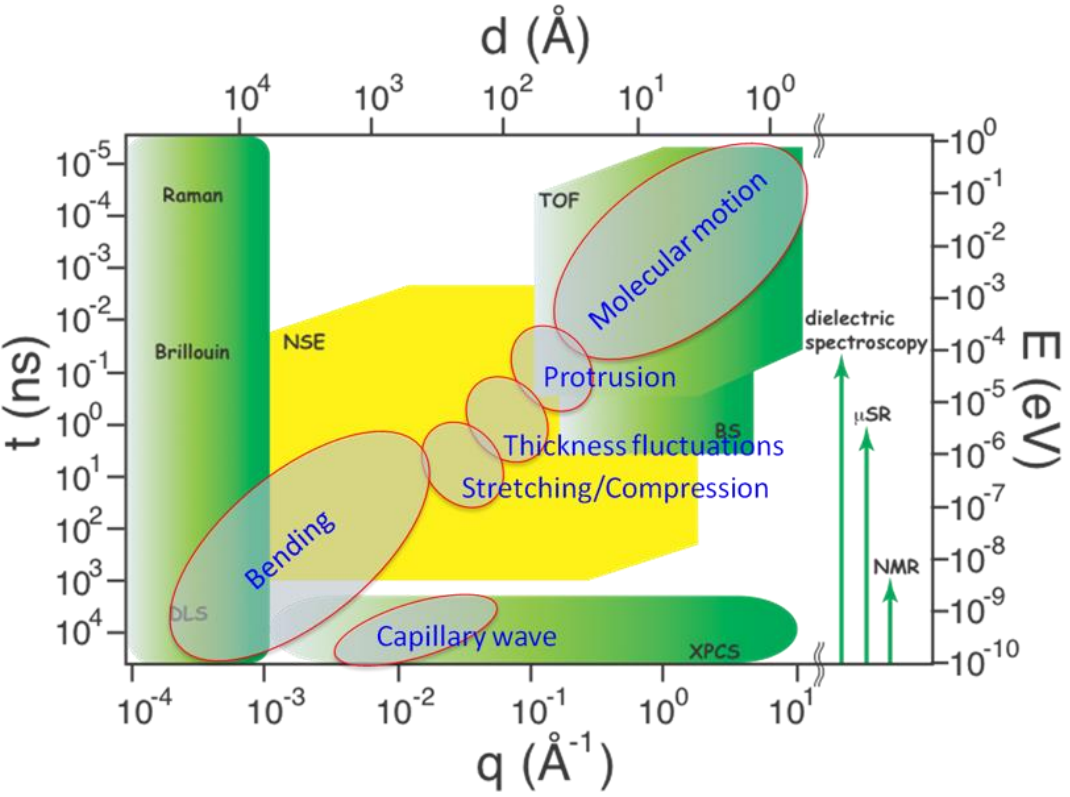

Image courtesy of Michihiro Nagao

Do you have questions?:

- Can neutrons help my project?
- Which instrument would be the right one?
- Which facility has what I need?
- ……. Can I do what I want to do?

- Literature search: How have others use neutrons in this field? Where has it been done? With whom?
- Facility web pages: What instruments do they have, what types of research is done there?
- What is the closest thing done to what I want to do?

Talk to the Instrument Scientists.
Don't be shy!

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The process: The NCNR proposal process

THE STEPS IN THE REVIEW PROCESS:

Step 1
Proposals are submitted by the deadline

Step 2
Proposals are batched into groups of 4-6 proposals

Step 3
Each batch is sent to external reviewers (internationally). A minimum of 3 reviews is REQUIRED but are sent to ~ 5 reviewers

Step 4
Each proposal is reviewed internally for safety and assigned an internal technical reviewer for feasibility: is the equipment available, will there be sufficient signal, are the time and size ranges correct for the instrument, is the time required appropriate? Too long? Too little? Has it already been done? etc.

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The process: The NCNR proposal process

THE STEPS IN THE REVIEW PROCESS (CONT):

Step 4
The Beam Time Allocation Committee (BTAC) meets to discuss. BTAC members are NOT the same reviewers as in Step 3! Each BTAC member is assigned 25-30 for which they are the primary read and the same again for which they are secondary readers. Their discussion makes use of ALL the reviews above plus their own reading and discussion at the meeting.

Step 5
Results with BTAC comments are sent to PI

A high score does not guarantee success nor does a bad review "kill" the proposal.

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Writing a Competitive Proposal: Know your audience

At the NCNR your proposal might be read by 7 reviewers and several NCNR staff

They are very busy, and they will not spend excessive time on your proposal.

They may not be an expert in your sub-field – but they also might be.

They may or may not have time to look at your references.

It is your responsibility to provide them with a clear plan and a clear proposal!

Reviewers shouldn't have to struggle to find information or make assumptions.

Your job is to make it **easy** for the reviewers to say "yes" in one quick read!

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Writing a Competitive Proposal: Know your goal

This is a proposal for ONE EXPERIMENT, it is not a 25-page multifaceted proposal to a funding body.

To that end be aware that there are strict limits on the length of your proposal.

- The PDF of your proposal must **not** be longer than 3 letter-size pages -including references and figures!
- The PDF of your proposal must **not** exceed 1500 kb!!
- You **can** use high resolution images - in fact it is highly recommended!

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Writing a Competitive Proposal: Part I – Motivation (Why?)
1-3 paragraphs

- ✓ What is the general problem and why it is important (We will cure cancer...)
- ✓ What is the particular aspect of the global problem being investigated by the team and how does it relate to that larger issue OR How is your project different from what has been done before? (We are developing monoclonal antibody [mAbs] therapies to target cancer cells ….)

- ✓ How will this ONE neutron scattering experiment help answer the problem you are investigating? (We believe [**hypothesize**] that internal mobility of mAbs is linked to their efficacy...)
- ✓ What are the expected outcomes? (Oh… a Nature paper you say?! How may we help?)
  (The result will allow for rational design of new therapeutic mAbs ….)

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Writing a Competitive Proposal: Part II – Experiment Description
2-4 paragraphs

Experiment plan, details and "credibility test"

Describe the samples and conditions for your experiment (shear, pressure, magnetic field, temperature). these should clearly relate to your hypothesis.

Are the sample available for the experiment immediately? Are there sample availability restrictions (Expense? Lifetime? Collaborator makes them?)

Include data from other techniques if appropriate (SAXS, LS, IR, density, suceptiblity, film thickness, transition temperature…)

Show data from preliminary results or from previously awarded beamtime if available (preferably analyzed)

If possible, model expected results (Analytically or using MD/MC techniques etc) accounting for contrast/isotopic content/magnetic moment etc.

Are neutrons and this instrument really the best way to answer the question posed here?

Explain the data analysis if non-standard. How will the data be able to answer the question?

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Writing a Competitive Proposal: Part III – Budget Justification
1-2 paragraphs

- ***the number of samples*** *- do you really need that many?*

- ***the number of experimental conditions, or instrument settings*** *- do you really need 30 temperatures to answer the question? Are the conditions appropriate to test the hypothesis? How have you selected the energy/time/Q-ranges*

- ***Time to collect data under each condition and total time****- do you really need to count that long? is it long enough? How did you estimate?*

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Writing a Competitive Proposal: Key points

- Can you clearly state your hypothesis or goal?
- Have you done sufficient 'pre-neutron' sample characterization?
- Have you considered contrast, SLD, concentration, magnetic moment … etc?
- Are there path-length, neutron adsorption or coherent vs incoherent signals issues?
- Can you have samples in hand by the time of the experiment?
- Can you predict/model expected data? If so, include it!
- Are your references suitable, but not a full literature review?

Other Things

If you have had prior beam time **at the NCNR** do you have your list of publications that emerged?

Don’t forget safety!

Let us know if your samples or experimental conditions pose any potential risk or hazard

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Writing a Competitive Proposal: Example Reviews - Scientific

"This project concerns PDMS copolymers for photonic bandgap materials. This is certainly an interesting topic, but I found the proposal a touch unsatisfying in a few respects. First, the main application is to measure the d-spacing of copolymer lamellae, which is fine but hardly exciting. Two other projects are only mentioned in passing "studying phase segregation thermodynamics in a controlled temperature cell" for 48 hours. What does this mean? What samples, what measurements, what information? I think (hope?) the authors mean that they will take a sample with an accessible ODT and study the disordered phase S(q) vs T to get chi, but they don't actually say. Then they say "we will study the effect of solvent environment" for 36 hours. What solvent? What effects are expected? What concentrations? Dilute, concentrated? What M? This is simply not a compelling proposal as written."

Issues with motivation, experimental description and justification

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Writing a Competitive Proposal: Example Reviews - Scientific

"I did not like this proposal at all; I think the science is completely muddled. First, the conformation of a block in a block copolymer is not related to its conformation in a blend. the former is a tethered chain, and will be stretched; the latter will be a coil. Second, SANS has already been used to measure the conformation of blocks in ordered block copolymers, first by Hashimoto and by Hadziiouannou, in the 1980s. Third, the blends will not be interesting. If the PB interpenetrates the PS coil, they will phase separate, ruining the experiment. If the PB does not penetrate, it will induce PS coil shrinkage, but that has already been measured by many groups over the years. (See Graessley's recent book for a thorough discussion)."

Issues with not doing an appropriate literature search and motivation

Obtaining beam time at the NCNR

Writing a Competitive Proposal: Example Reviews - Scientific

"Interactions between polymers and nanoparticles in nanocomposites are still not fully understood. This experiment proposes to study these interactions by probing changes to the centre of mass diffusion of a short chain polymer with and without nanoparticles using the NSE spectrometer. Data from molecular dynamics simulations show that the motion is in the window of the NSE spectrometer. To achieve 100ns will require long wavelength, 10-12Ang, so the counting times asked for look reasonable. I strongly support this experiment- good example of the importance of the simulation-neutron partnership."

Good motivation, good use of modeling data and good justification.

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Writing a Competitive Proposal: Example Reviews – Technical

Zero days recommended:

"Submission was for PBR, but the proposal describes work on ANDR. I cannot identify where the authors say exactly what they're going to do with the reflectometer. It may be a good experiment, but I cannot assess feasibility with the given information."

All days recommended:

"Measurement is plausible. The standard PBR displex is wired for application of voltages up to 300 V. 6 days is reasonable."

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Writing a Competitive Proposal: Example Reviews – BTAC

Zero days recommended

"Have structural changes in the protein been ruled out for the observed changes in the activity? Otherwise, hard to see how these measurements can be useful. Also, what pressures are going to be addressed? The dynamic range is too broad to be of use. Too much is being proposed for this type of study. Other types of measurements should be done to narrow the window of interest for HFBS."

"Proposal would be strengthened by including more magnetic characterization of multiple samples. If the reduced magnetization is due to interfacial effects, characterizing multiple samples of varying thicknesses would be an easier way to test this hypothesis."

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Writing a Competitive Proposal: Example Reviews – BTAC

Days recommended

" Experimental goal and plan. Topic of significant current interest. …first single crystal experiment and very large single crystal available."

"The BTAC recommends … days for the proposed experiment."

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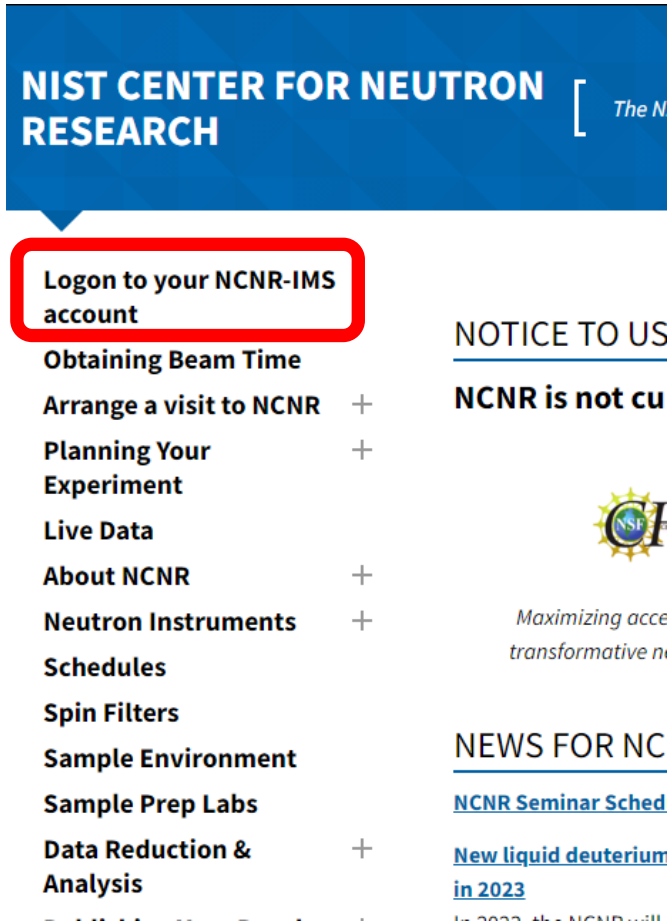
Administrative Stuff



The whole process is managed through the IMS

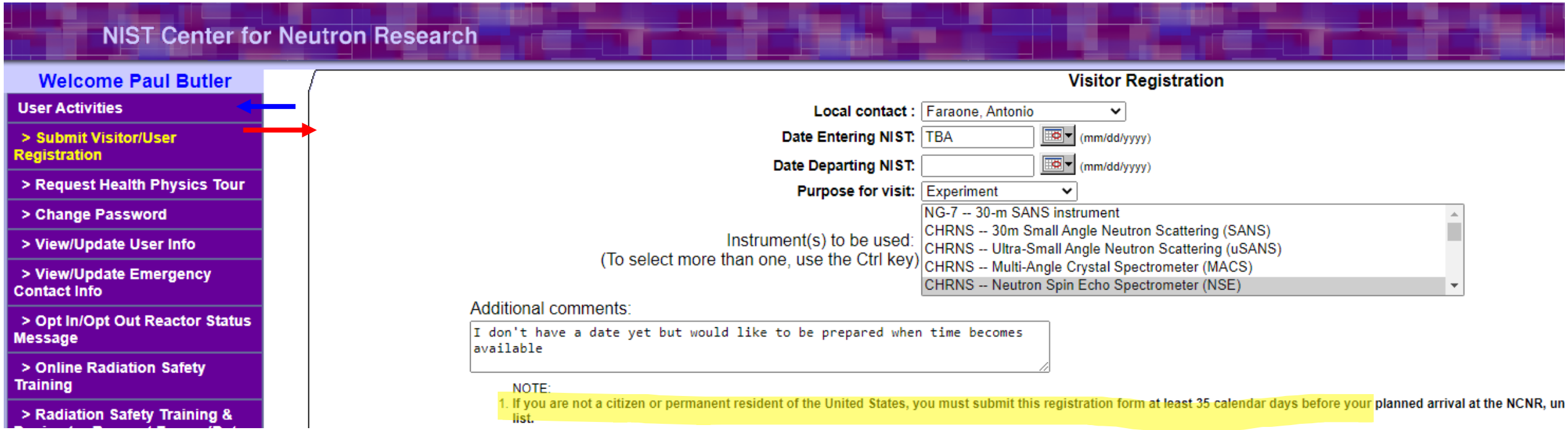
NOTE:

Next NIST call will likely be end of 2023 for time in 2024 and NSE will not be ready till late 2024

Other facilities with NSE:
SNS, ILL, J-PARC *(ILL down till the end of 2022)*
FRM-2 *(FRM-2 currently not operating)*

Obtaining beam time at the NCNR

Administrative Stuff – Security requirements

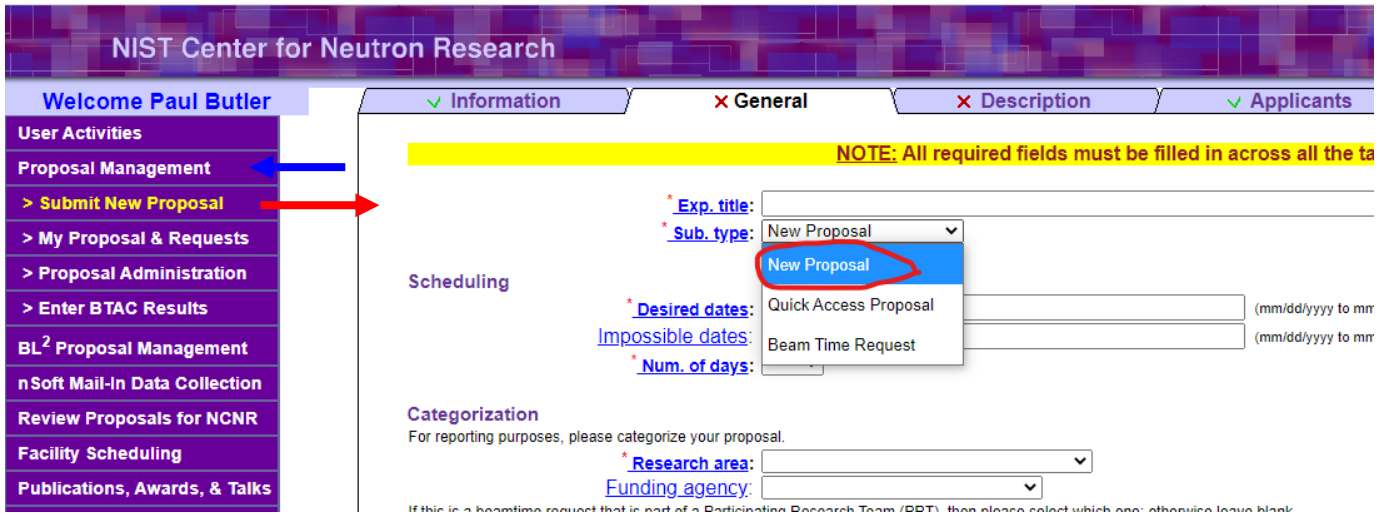


Making sure you can access the facility to DO the experiments

- VERY IMPORTANT. For first time FN users, or returning FN users who have not been back in many years, *35 calendar day requirement*!!
  - Submit a request to come with a TBA date = gets the clock started on the background check
- EVERYBODY – you need to REGISTER to come to the NCNR 3 BUSINSESS days in advance

Obtaining beam time at the NCNR

Administrative Stuff – Types of beamtime access at the NCNR



there are 4 ways to obtain beamtime

New Proposal: is a proposal for instrument time submitted when a call is announced. The proposals will be reviewed by scientific and technical reviewers, as well as by the Beam Time Allocation Committee (BTAC).

***Quick Access Proposal*:** a proposal submitted to ask for access to the instruments in the very near future for measurements that *cannot* be delayed. It will be reviewed by the BTAC and held to a much higher standard than regular proposals.

Beamtime request: this is not a proposal; it is a request. It is NIST internal time for NIST research programs. Under certain conditions (like feasibility time) external users can coordinate time with an instrument scientist.

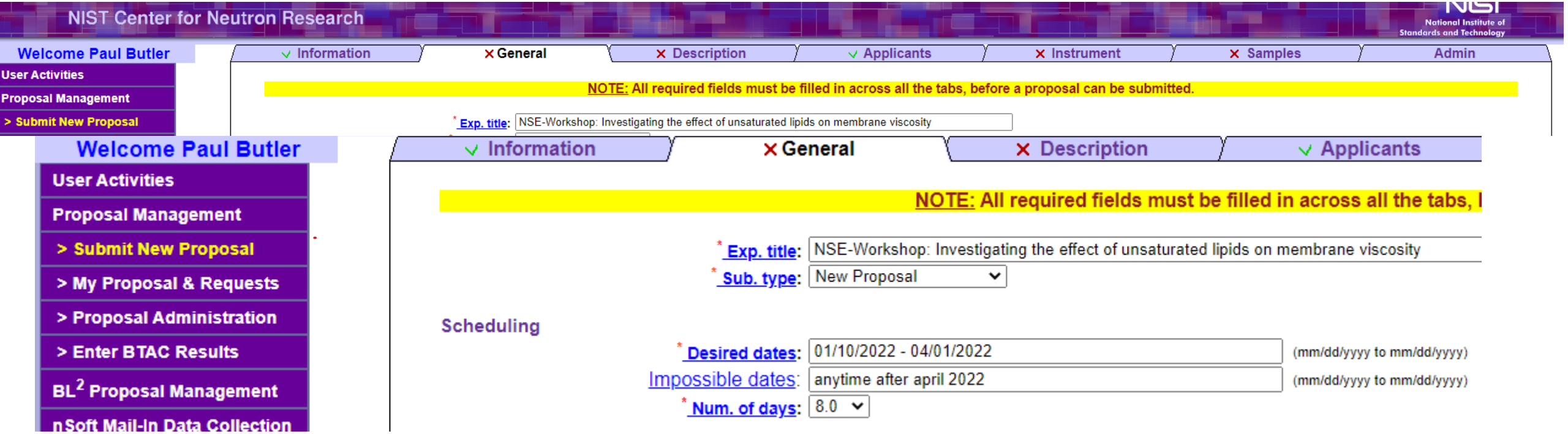
Proprietary research agreement: this is not a proposal; it is a request.

Obtaining beam time at the NCNR

Administrative Stuff – Proposal Exercise Option

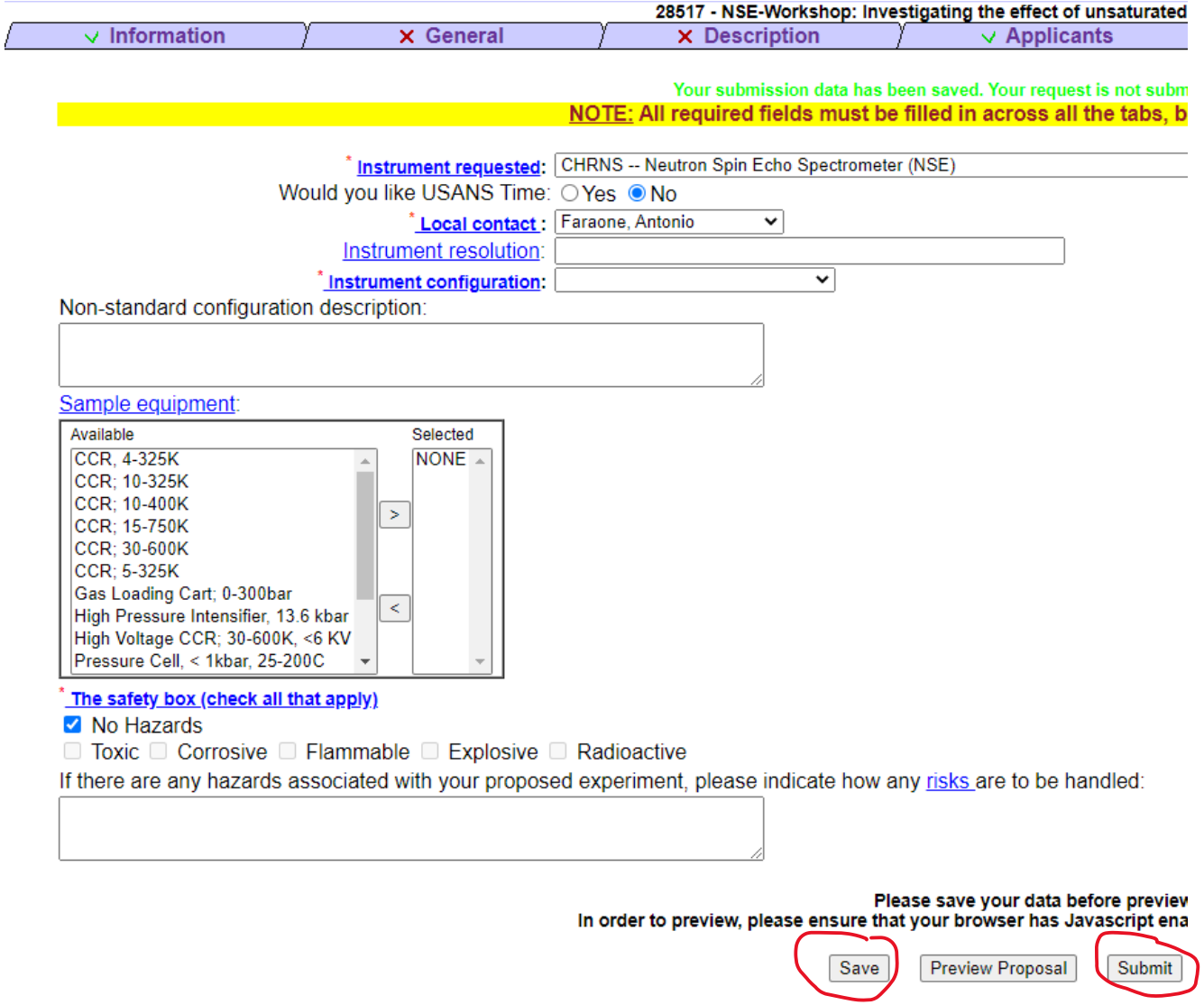
UPCOMING PROPOSAL REVIEW OPTION

- Written instructions will be provided after the workshop
- **Put "NSE-Workshop;Title" at the beginning of your abstract title (in the box)**
- Deadline for submitting your proposal is 11/21/2021 11:59pm EST
- Contact kuo-chigh.shih@nist.gov, Antonio.Faraone@nist.gov, or Michihiro.nagao@nist.gov if you have any questions about how to write your proposol



Obtaining beam time at the NCNR

Administrative Stuff – Proposal Exercise Option



UPCOMING PROPOSAL REVIEW OPTION

- Written instructions will be provided after the workshop
- Put "NSE-Workshop;Title" at the beginning of your abstract title (in the box)
- **Submit your proposal to NSE**
- **Choose Antonio Faraone or Michihiro Nagao as your local contact**
- Deadline for **submitting** your proposal is 11/21/2021 11:59pm EST
- Contact kuo-chigh.shih@nist.gov, Antonio.Faraone@nist.gov, or Michihiro.nagao@nist.gov if you have any questions about how to write your proposol

Obtaining beam time at the NCNR

Administrative Stuff – Some Final thoughts

Other things to consider when writing your proposal

Do make sure to read, revise, and re-read your proposal

Do make sure your grammar is correct and your sentences are clear

Do make sure if you copy and paste you update relevant information ★

Do make sure that your figures are clear and readable ★

Obtaining beam time at the NCNR

Administrative Stuff – Some Final thoughts

Other things to consider when writing your proposal

Do not wait until the last minute to write your proposal

Do not submit the wrong pdf! ★

Do not use flamboyant language - this is a scientific proposal

Do not tell the reviewers to contact you if they want more information! ★

Do not tell reviewers you would do great science without providing evidence!

Obtaining beam time at the NCNR

Administrative Stuff – Final Final Thoughts

UPCOMING PROPOSAL REVIEW OPTION

- Written instructions will be provided after the workshop
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