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|  | CNMS USE ONLY  Proposal Number:  NEW |
| Date Received: |

# CENTER FOR NANOPHASE MATERIALS SCIENCES RESEARCH PROPOSAL

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| Submit complete proposal package to: CNMS User Coordinator, Oak Ridge National Laboratory, Email: [cnmsuser@ornl.gov](mailto:cnmsuser@ornl.gov)  Your proposal package must include:   (1) Completed proposal form;   (2) Two-page CV (NSF-style or similar) for the Principal Investigator only; and   (3) Appendix for use of neutron scattering at the SNS or HFIR (if applicable).  Do not include any proprietary or sensitive information in your proposal. |

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| **Title of Proposal**: | Date Submitted: |

**Principal Investigator -** Responsible for progress of the project and primary point of contact for all correspondence from CNMS.

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| **Name of PI**: | Check if PI will participate on-site at ORNL |
| Institution/Employer: | Phone: |
| Dept: | Fax: |
| Street Address or P.O. Box: | Email: |
| City       State/Prov.       Country       Postal Code |  |

**Collaborators -** List everyone else who will participate in this project, including students, postdocs, etc.  
 *Only the PI and participants named below will be eligible for an ORNL badge authorized through this project.*

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| **Name of Collaborator**  **(attach additional sheet if necessary)** | Institution/Employer and Address | **Email** | **Please**  **Check If**  **Participating On-Site** |
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| **CNMS Facilities Requested**  Next to each CNMS facility below that you plan to use, indicate the number of days that you are requesting. **NOTE: CNMS reserves the right to refuse access to any facility that is not marked on this page.** The Research Description section must describe how each of the selected facilities will be used, including estimates of the quantities of materials/samples to be synthesized or characterized and the estimated time required in each facility. Users are encouraged to [contact CNMS staff](https://www.ornl.gov/facility/cnms/subpage/important-contacts) for assistance in estimating the appropriate times and quantities. | | | | |
| **MACROMOLECULAR NANOMATERIALS**      Polymer synthesis (Anionic, radical, cationic, and step growth polymerizations; composite materials)       Synthesis of novel monomers and precursors       Deuterated monomers, polymers, and specialty molecules  CHARACTERIZATION       500 MHz Solution NMR Spectroscopy       Macromolecular characterization- molecular weight, spectroscopy, scattering, thermal analysis, MALDI-TOF, broadband dielectric spectroscopy (details on [website](https://www.ornl.gov/facility/cnms/output/macromolecular-nanomaterials))       Thin Film Characterization- ellipsometry, FTIR-ATR, FTIR microscopy, contact angle goniometer (details on [website](https://www.ornl.gov/node/25270/#macro))  **FUNCTIONAL HYBRID NANOMATERIALS**       Synthesis of Nanomaterials by CVD, PLD with in situ diagnostics – 2D TMCs, graphene; 1D SWNTs, NT Arrays, NWs; NPs, SWNHs       Oxide Thin Film PLD with high-pressure RHEED – films, complex heterostructures, PLD with RF sputtering and laser heating       Laser Material Interactions and Processing with in situ diagnostics – heating, patterning, thinning, structuring, transfer, with XY scanning       Wet/Dry Assembly of Organic/Inorganic/Hybrid Films and Devices – dual glovebox evaporator, Sonospray, 2D stamping, perovskite PV  CHARACTERIZATION       Optical Characterization and Laser Spectroscopy – ultrafast dynamics, microRaman, PL lifetime, UV-VIS-NIR, fluorometry, PLE       Electrical/Optoelectronic Characterization in Controlled Environments – Sensors, R-T, AC impedance, PV and OLED efficiency (details on [website](https://www.ornl.gov/facility/cnms/output/nanomaterials-characterization))       Physical Property Measurement System (PPMS)       Catalysis and *Operando* Spectroscopy: gas phase, electro- and photo-chemistry **NANOMATERIALS THEORY INSTITUTE**       K cpu-hours NTI Computational Cluster, capacity computing        K cpu-hours Facilitation of access to NERSC, high-performance        K cpu-hours Facilitation of access to NCCS, leadership class        days NTI staff support, experimental project        days NTI staff support, theoretical project  **NEUTRON SCATTERING & X-RAY CAPABILITIES**       X-ray diffraction and small-angle scattering       Neutron Scattering - attach Neutron Scattering appx. | | **SCANNING PROBE MICROSCOPY**      Advanced SPM: air, liquid, glove box (cAFM, PFM, ESM, MFM, cKPFM, Raman)       AFM: topography       Laser MBE with in situ RHEED, AFM/STM, electron spectroscopies       Magnetic Property Measurement System       Ultrahigh Vacuum 4-probe STM       Ultrahigh Vacuum AFM       Ultrahigh Vacuum STM/STS  **NANOFABRICATION RESEARCH LABORATORY**       Process Design for Cleanroom Processes       E-beam Lithography       Dual-beam SEM/FIB       3D Direct-Write Fabrication       FirstNano Rapid Thermal Processing Tool       Plasma Atomic Layer Deposition       Advanced SEM with EDS (Zeiss Merlin)       General Cleanroom Use (see website for details)  CHEMICAL IMAGING       AFM/FIB-ToF-SIMS       AFM-MS       AFM-NanoIR2-s       Helium-Ion Milling, Imaging and SIMS (Zeiss Orion NanoFab)       MALDI-ToF Imaging BIO-INSPIRED NANOMATERIALS      Multimodality live-cell imaging       DC-PECVD synthesis of VACNFs or CNSs **ELECTRON & ATOM PROBE MICROSCOPY**      Low-voltage (60-100kV) aberration-corrected STEM/EELS  (Nion UltraSTEM)      Low-voltage (60-100kV) monochromated, aberration-corrected   (MAC)-STEM/EELS (Nion Hermes)       300kV aberration-corrected STEM/EELS (FEI Titan)       TEM Specimen Preparation (FIB, microtome, ion mill, etc.)       Atom Probe Tomography (Cameca LEAP 4000X HR)       FIB-preparation of atom probe needles (FEI Nova200) **DISCONTINUED**: Zeiss Libra & Hitachi HF3300 (details on [website](https://www.ornl.gov/facility/cnms/output/electron-and-atom-probe-microscopy)) *Coming in Spring Cycle!* JEOL NEOARM TEM/STEM | | |
| **OTHER FACILITIES-** If you have identified other facilities not listed above that you want to use, *you must first contact a CNMS Staff Member to discuss availability* then provide their name and facility description below. CNMS cannot pay any costs associated with use of other ORNL facilities.CNMS Staff Member(s):       Facility Description: | | | | |
| **Scheduling Considerations** Propose a specific date to begin work at CNMS:      (Optional)  **Samples and Identification of Hazards**  Research samples used in this project will be:  Synthesized at CNMS   Supplied by user with additional processing at CNMS  Wholly supplied by user, only characterized at CNMS   I have special sample handling requirements (e.g., air- or light-sensitive materials, etc.) (specify):  Provide a brief description of ALL materials (samples, supplies, and equipment) that you plan to bring to CNMS. Materials and equipment that are not specifically listed here will not be allowed into CNMS. Include common name and chemical formula if applicable. Check any boxes below that apply to these materials. | | | | |
| No major safety issues Flammable Material Carcinogenic Human subjects or human bodily Materials | Corrosive Material Radioactive Material Biohazardous Toxic Material | | Explosive Material  Lasers Cryogenic hazard  High Pressure | Electrical/Electronic Equipment  Other: specify |

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| **User Access Mode**:  General User  Partner User (for development of specialized facilities or methods) (*For definitions of User Access Modes see* <https://www.ornl.gov/facility/cnms/subpage/proposal-types>.) | | |
| **State in your own words the reasons that led you to propose performing this research at the CNMS as opposed to some other facility, i.e., why are CNMS facilities or expertise needed? (limit to 2 lines).**         **How did you first learn about CNMS?** | | |
| **Have you contacted a CNMS staff member to discuss the feasibility of your project?**   Yes  No  Contact Name(s): | | |
| **Suggestions for capabilities that CNMS may consider acquiring that would benefit your research:** | | |
| **Please Categorize Your Proposal (Required for DOE reporting purposes)** | | |
| **Subject of this Project (check all that apply)** | | **Sources of Support (check all that apply)** |
| Materials Sciences (including condensed matter physics, materials chemistry)  Physics (excluding condensed matter physics)  Chemistry (excluding materials chemistry)  Polymers  Medical Applications  Biological, Life Sciences (excluding medical applications) | Earth Sciences  Environmental Sciences  Optics  Engineering  Instrumentation or technique development related to user facilities  Purchase of specialty services or materials  Other: specify | DOE, Basic Energy Sciences  DOE, Biological & Environmental Res.  DOE, Other: specify  DOD: specify  NSF  NIH  NASA  USDA  Other US Govt: specify  Industry  Foreign: specify  Other: specify |
| **Status of Funding for Proposed Research**  Occasionally, an approved CNMS user may not be able to utilize their full time allocation because they do not have sufficient funding in place. The information requested below will be used only to help us anticipate how much potential unclaimed time may become available to support additional user projects. It will not affect the outcome of the review process. Please check the box that applies.  Proposal team members have research grant(s) already in place that is/are sufficient to support their participation in this project.  We have submitted proposal(s) to the following agencies to request funding that will be needed to support our participation:  Funding agency      ; Expected decision date | | |
| **SUGGESTED REVIEWERS** (Optional) – You may suggest up to 5 of the most suitable reviewers from the current CNMS Proposal Review Committee listed at <https://www.ornl.gov/facility/cnms/subpage/proposal-review-committee>. In addition, you may also list up to 3 individuals who are not on the CNMS Review Committee. Do not include anyone affiliated with ORNL, CNMS, or your home institution, recent collaborators, or anyone else who may have “Potentially Disqualifying Conflicts of Interest” as defined by the *National Science Foundation*, (see <http://www.nsf.gov/pubs/gpg/nsf04_23/appb.jsp>). **From the CNMS Proposal Review Committee**: 1.       2.       3.       4.       5. | | |
| **Optional- Additional reviewers NOT from the CNMS Review Committee (provide institutional affiliation)**: 6. Name:       Institution        7. Name:        Institution        8. Name:        Institution | | |
| **Optional- Please EXCLUDE the following members of the CNMS Proposal Review Committee due to a potential conflict of interest:**  **Keywords:** list a few keywords here to help in matching potential reviewers  **PRINCIPAL INVESTIGATOR'S AGREEMENT**: *Signature is not required if the proposal is transmitted by email from the PI.*  By signing or by electronic submission, I certify that the information provided herein is correct to the best of my knowledge and that I intend to publish the results of this research. I also agree to (1) acknowledge the CNMS in all publications resulting from the use of the facility; (2) send a timely draft of all manuscripts to all ORNL co-authors for review prior to submission; and (3) send a copy of resulting publications to the CNMS User Coordinator.  **Signature of PI: Printed Name:** type name of PI here **Date:** | | |

**DESCRIPTION OF PROPOSED RESEARCH**

The description must be limited to a maximum of 2 pages, including text and figures. PIs are encouraged to consult the Review Criteria for CNMS Research Proposals at <https://www.ornl.gov/facility/cnms/subpage/user-policies>.

Note: If you plan to use figures, it is best to copy/paste pre-formatted figures with text into this form.

**ADDRESS EACH OF THE FOLLOWING QUESTIONS IN A SEPARATE SECTION.**A maximum of 2 pages can be used to respond to the 6 numbered questions below; Proposers may determine the amount of space used for each question.

1. **What is/are the main scientific or technological question(s) that you plan to address?**
2. **Outline the overall technical approach that you plan to use to address the above questions. This section should provide the context for research tasks described below in sections (3), home institution activities, and (4), CNMS research.**
3. **What research tasks will be carried out at the users’ home institution or elsewhere outside of the CNMS? Include any preliminary syntheses, measurements, or tests that have been/will be performed in preparation for the proposed research at the CNMS.**
4. **Describe very clearly and specifically the research tasks to be carried out at the CNMS and the expected outcomes from the CNMS tasks. Include any technical milestones that must be met and the need for specialized capabilities and/or expertise at the CNMS for the research to be successful.** (This should be the longest and most detailed section in the proposal)
5. **Provide an overall timeline for the CNMS tasks and describe how each facility/instrument that is checked on p. 2 will be used, including estimates of the number/quantities of samples, instrument time, CPU time, etc.**
6. **What is your team’s specific experience and expertise relevant to this research project?**

**PUBLICATION RECORD: Have you had any previous CNMS project(s), including SHaRE? YES \_\_\_NO\_\_\_ (response required)**  **If yes, list publications resulting from your past project(s) – maximum of 10:** (not included in the 2 page limit)

**LITERATURE CITED ABOVE - if any** (not included in the 2 page limit)

***The section below is for PARTNER USER proposals only*** *(half page or less - not included in the 2 page limit)*

**PARTNER USER proposals only: What unique, new capabilities will be developed at the CNMS as a result of this approach? How will these contribute to future research by other CNMS users?**