Commonwealth Campuses Research Collaboration Development Program

Purpose:
To encourage and support both independent and collaborative research projects between Penn State Commonwealth Campuses and core multi-user faculty and research facility staff at the Interdisciplinary Institutes at University Park and at the College of Medicine, the Office of the Vice President of Research (OVPR), in collaboration with the Provost’s Office, the Office of the Vice President for Commonwealth Campuses (OVPC), the College of Medicine, the College of Earth and Mineral Sciences, the College of Engineering, the Eberly College of Science, and the College of Health and Human Development is piloting the Commonwealth Campuses Research Collaboration Development Program. Through this program, Commonwealth Campus faculty are provided the opportunity to submit research proposals that will require access to Penn State’s shared facilities (equipment, instruments, capabilities, and/or expertise). In 2018, it is expected that 20 awards of up to $10,000 will be made through competitive selection process.

The goals of this program are:
- Build the foundation for collaborative research environment
- Build relationships between researchers at UP and CoM facilities/institutes and faculty and students at Commonwealth Campuses
- Accelerate research and strengthen opportunities for submission of high-quality publications and proposals
- Increase opportunities for engaging with funding agencies and industry

This program requires a two-phase process for submitting a proposal:
1. Phase 1 concept paper (Submission window is from October 26, 2018 to March 1, 2019 and will be reviewed on a rolling basis)
2. Phase 2 Proposal (Different processes for Huck/IEE/Nanofab/MCL; SSRI; ICS; CoM) (Submission window is from December 1, 2018 to May 1, 2019 and will be reviewed on a rolling basis)

Institutes/facilities participating in this pilot:
- Huck Institutes of the Life Sciences (Huck)
- Institutes of Energy and the Environment (IEE)
  - The Energy and Environmental Sustainability Laboratories (EESL)
- Materials Research Institute
  - Materials Characterization Lab (MCL)
  - Nanofabrication Lab (Nanofab)
- Institute for CyberScience (ICS)
- Social Science Research Institute (SSRI)
- College of Medicine (CoM)

The phase 1 concept papers will be reviewed by institute/facility researchers based upon the following criteria:
- Scientific merit
- Availability of the required resources and/or other research supports
- Approach, including technical feasibility and research methods
- Qualifications of the applicant
- Likelihood of external funding
Phase 2 Proposal Review Criteria:
- Proposals will be evaluated by the Institute/Facility Leadership.
- The evaluation criteria specific to each institute/faculty are listed on the application sites.

Funding and Allowable Costs:
In 2018, it is expected that awards of up to $10,000 each will be made, with total number of awards not to exceed 20.
The program will consist of two types of support for the Commonwealth Campus Faculty:
- Equipment use time and facility staff time
- Travel expenses to and from campuses and Interdisciplinary Institutes
In addition, for SSRI applications, $500 will be provided for the UP mentor.

Eligibility:
All full-time tenured or tenure-track faculty members at Penn State’s Commonwealth Campuses are eligible to apply. [*Waivers for non-tenured faculty may be requested when petitioned by the faculty member’s Associate Dean of Research in advance of the Full Proposal.]

Project Duration:
All projects must be completed within one year of the start date. Any unspent funds remaining at the end of one year must be returned to the program / OVPR.

Reporting Requirements:
Within 3 months of the end date of the project, the Commonwealth Campus faculty member/facility staff will submit an initial report to the OVPR.
The Commonwealth Campus faculty member /facility staff should participate in the Commonwealth Campus Grant Writing Workshop in May.
Within 1 year, a follow-up report is required and should include quantitative outcome measures:
- # Publications
- # Grant proposals
- # Presentations (At UP, CoM, and Commonwealth Campuses)

Application and Review Process:
This program requires a two-phase application process, consisting of a pre-proposal concept paper and a proposal.

Phase 1 (Link to InfoReady) (For ALL applications)

Concept Paper: Submission window is from October 26th to March 1st and will be reviewed on a rolling basis.
1. Faculty must submit a concept paper specifying the main scientific question(s) to be addressed (maximum of two paragraphs). If known, please identify the institute or core facility and any required capabilities/expertise.
2. For SSRI, faculty should suggest potential UP mentors.
3. Concept papers will be reviewed by facility/institute staff and matched with an internal Subject Matter Expert (SME). A response will be provided within 10 days of submission.

4. Preliminary Discussion. A conversation between the faculty and SME will occur to explore/develop the concept. If required, the program will provide “pre-proposal” funding to
determine feasibility (e.g. cover up to ~1 day of staff time + instrument time for ~$1000). The
decision to provide the pre-proposal funding will be made by the facility directors/faculty in
conjunction with facility technical staff.
5. The outcome of the pre-proposal work will be reviewed by the faculty member, SME, and core
   facility/institute leadership. The faculty member will be encouraged to submit a proposal if the
   results are positive.
Phase 2 for EESL, Huck, Nanofab, MCL: (InfoReady link) (Submission window is from December 1, 2018 to May 1, 2019 and will be reviewed on a rolling basis)

Phase 2 Proposal:

A maximum of 1000 words total can be used to respond to the numbered questions below. The faculty member will consult with the SME to complete the full proposal.

1. What are the main scientific or technological question(s) that will be addressed in this proposal?

2. Outline the proposed overall technical approach required to address Q1. above. This section must provide the context for research tasks as described below in sections (2a) home campus activities and (2b) University Park Institute core facility research.
   
   a. What research tasks will be carried out at your home campus or elsewhere outside of the University Park core facilities? Include any preliminary work that has been/will be performed in preparation for the proposed research within University Park core facilities.

   b. Describe very clearly and specifically the research tasks to be carried out at the University Park core facilities and the expected outcomes from these tasks. Include any technical milestones that must be met for the research to be successful.

3. Provide an overall timeline (PI must work with facility staff to develop the overall timeline) for the University Park core facility tasks, and describe how each facility/instrument that is selected in the ‘Facilities List” will be used and include an estimated of number of samples.

4. Budget should include:
   
   a. Equipment use time and facility staff time. PI is encouraged to work with the core facility to determine the budget.

   b. Travel expenses to and from campuses and Interdisciplinary Institutes.

5. Identification of Sample Hazards: Provide a brief description of all materials/samples that you plan to bring for analyses and/or fabrication, as applicable. Check any boxes below that apply to this project: no major safety issues, flammable, carcinogenic, biological material, corrosive, radioactive, biohazardous, toxic, explosive, cryogenic, high pressure, other.

Review Criteria:

The Phase 2 proposals will be reviewed based upon the following criterion:

- Scientific merit
- Technical feasibility
- Time required to complete the proposed tasks
- Capabilities of the core facility
- Availability of the required resources
Facilities List (EESL, Huck, Nanfab, MCL)

The Description of Proposed Research section must include information related to how each of the capabilities selected will be used (if this is a seed proposal to explore a technique, please state “preliminary exploration” in the research description section). Proposers should contact Institute core facility staff in EESL, MCL, Nanofab, and Huck for assistance in selecting the best capabilities.

Huck Institutes of the Life Sciences Core Facilities

Genomics
- Sanger sequencing
- Real time PCR
- Short read (Illumina) genome scale sequencing
- Long read (PacBIO) genome scale sequencing
- Epigenetics
- Metagenomics
- Genotyping

Proteomics and Mass Spectrometry
- Proteomics
- Quantitative proteomics
- Post translational modifications
- Accurate mass determinations
- Microbial identification (biotyping)

Metabolomics
- Targeted metabolomics (LC-MS)
- Untargeted (comprehensive) metabolomics (GC-MS/LC-MS)
- Quantitative analyses (GC-MS/LC-MS)

Microscopy
- Light microscopy (confocal, live cell etc)
- Scanning electron microscopy
- Transmission light microscopy
- Histology and sample preparation

Flow Cytometry
- Flow cytometry
  - Fluorescence-activated cell sorting

Cryo-Electron Microscopy
- Single particle analysis
- Cryo-tomography
- Electron diffraction cryo-EM

X Ray Crystallography
- Protein characterization (dynamic light scattering, bio-layer interferometry, circular dichroism)
- Robotic crystallization
- Structure determination
- Small angle X ray scattering

Automated Biological Calorimetry
- Isothermal titration calorimetry
Differential scanning calorimetry

**CSL Behring Fermentation Facility**
Microbial bioprocessing (growth, isolation, purification)
Biomass pre-treatment

**High Field Magnetic Resonance Imaging**
In vivo and ex vivo magnetic resonance microscopy

**Transgenic Mouse**
Design and production of transgenics
Re-derivations
Animal husbandry and surgeries

**Institute for Energy and the Environment**
**Energy and Environmental Sustainability Laboratories**

**Radiocarbon Laboratory**
Accelerator Mass Spectrometer

**Center for Quantitative Imaging**
MicroCT Scanner

**Laboratory for Isotopes and Metals in the Environment**
ICP-AES
ICP-MS
MC-ICP-MS
TIMS
EA-IRMS
GC

**SEESL Labs**
GC/MS
SFS
LC/MS (expected availability later in 2018)

**Solar Energy Laboratory**
(Expected availability later in 2018)

**Water Quality Laboratory**
AAS-Flame and Furnace
Mercury Analyzer
IC
Conductivity Meter
Stable Isotopes Water Analyzer
Total Organic Carbon Analyzer
Radiometer
Turbidimeter
pH

**Materials Research Institute**
**Materials Characterization Laboratory**

**Electron & Ion Microscopy**
TEM (S/TEM, EELS, EDS, in situ (liquid, heating, electrical biasing)
SEM (FESEM, EDS, EBSD)
FIB
EPMA

Surface Analysis
Auger
ToF-SIMS
XPS
AFM (topography, mechanical, electrical, magnetic, other)
Optical Profilometry

Molecular Spectroscopy
FTIR (micro-FTIR, ATR, DRIFTS, reflection, transmission, variable temp)
Micro-Raman
UV-Vis-NIR (diffuse reflection, specular reflection, transmission)

X-Ray Scattering
WAXS (powder, high resolution, micro-focus, high temp)
SAXS

Particle Analysis
Laser Diffraction (Malvern Mastersizer 3000)
Zeta Potential (Malvern Zetasizer Nano ZS)
Image based analysis (Malvern Morphologi G3)

Thermal Analysis
TGA
TGA-MS
DSC
SDT

Electrical / Dielectric Characterization

Materials Processing
Furnaces
Grinding/milling
Dicing / sawing

Other
Nanoindentation
Surface Area
Porosity
Density
Contact Angle
Optical Microscopy

Nanofabrication Lab
Deposition and Growth
Atomic Layer Deposition (ALD)
Chemical Vapor Deposition (CVD)
Evaporation (Thermal or Electron Beam)
Electroplating
Oxidation and Annealing
Sol-gel Complex Oxide
Sputtering
Etching
- Dry Etching (Plasma Based)
- Wet Etching
- Vapor Etching (XeF2 release)

Lithography
- Resist Coating Benches (Spinner/Hotplate)
- Track Coater
- Spray Coater
- Contact Print Lithography
- Electron Beam Lithography
- Laser Writer Direct Write
- Photomask Fabrication
- Projection/Stepper Lithography
- Soft Lithography (PDMS)
- 3D nanoscale printer (Nanoscribe)
- L-Edit CAD Software
- Lithography Modeling Software
- Surface Modification (HMDS, adhesion promoters)
- Deep UV Flood

Characterization (In Cleanroom)
- Optical Microscopy
- Field Emission Scanning Electron Microscopy
- Ellipsometry/Reflectometry
- Four-Point Probe Resistivity
- Profilometry
Phase 2 Proposal for the Social Sciences Research Institute (SSRI): [InfoReady link] (Submission window is from December 1, 2018 to May 1, 2019 and will be reviewed on a rolling basis)

SSRI Phase 2 Purpose:
The purpose of the Research Collaboration Fellowship is to initiate and foster research collaborations between Penn State social science faculty at University Park (UP) and those at campuses across the Commonwealth. The objective is to cultivate long term research collaborations that will attract external research funds. The fellowship provides seed money to the campus faculty member to support the development of collaborative research relationships. The Program will award up to $10,000 to the Fellow, and SSRI will provide $500 for the UP mentor.

Eligibility:
Tenure-track and tenured faculty members at Commonwealth campuses are eligible to apply. The UP mentor should be a tenured or tenure-track faculty member in the social/behavioral sciences with a record of external funding.

Phase 2 Program Overview:
1. Tenure-track and tenured faculty members at the campuses will identify a UP mentor. Those who have been awarded a fellowship in the past will not be considered for further proposals.
2. The Fellows will begin working with their UP mentor during the summer semester. All Fellows are expected to make a full summer commitment to collaboration on the proposed research projects.
3. Awardees will provide a progress report at the end of the year-long funding period, highlighting progress made, tangible outcomes (e.g. papers, presentations), and the plan and timeline for an external grant proposal. Follow-ups will be requested until targeted external funding is secured or the project is closed.

Phase 2 Application Format:
All applications should include the following components: The application should be no more than three single-spaced pages, not including items 4 and 5 below. Items 1-5 should be saved in a single PDF document.

1. Title of project, and the names and departments of each proposed Fellow. The mentor/mentorship team should also be listed.
2. Goals for the Faculty Fellowship
   • Describe the research area and its significance.
   • Explain how the Fellowship will play a significant role in advancing the Fellow(s) research program.
3. Activity Plan
   • Describe the activities that will be undertaken during the Fellowship period, including how these activities will advance the goals of the Fellowship, and a timeline for their accomplishment.
   • Describe the qualifications of the Fellow and mentor.
   • Explain how the Fellowship will lead to a proposal for external funding, incorporating a plan and timeline for an external grant proposal
4. Attach statements of support from Department Head(s) and mentor(s)/Fellow Collaborator(s) other than the PI.
5. Attach NSF or NIH biosketches of investigators and mentors. (If an NIH biosketch, please use the new version.)

Proposal Review Process:
Proposals will be evaluated by the SSRI Executive Committee.

Review Criteria:
- Merits of the proposal, including its innovation, significance and relevance to the SSRI’s interdisciplinary mission and strategic aims
- Qualifications, commitment, and clarity of roles for the Fellow and mentor
- Clarity, rigor, and feasibility of the work plan
- Likelihood of an external proposal resulting from Fellowship

Budget Explanatory Notes:
The $10,000 project-related expenses may be used for the following purposes:
1. Travel expenses to UP or Hershey to work with the collaborator.
2. Housing and food expenses while traveling as a Fellow.
3. Purchase of equipment/software/materials that are directly related to the approved research project.
4. Service expenses that are directly related to the approved research project (e.g. facility/computing user fees, student wages, etc.)

These funds may NOT be used for the following purposes:
   a. Domestic and/or international travel to conferences or meetings.
   b. Publication page charges.
   c. Any expenses that are not directly related to the approved research project.
Phase 2 for Institute for CyberScience (ICS): (InfoReady link) (Submission window is from December 1, 2018 to May 1, 2019 and will be reviewed on a rolling basis)

ICS Advanced CyberInfrastructure (ICS-ACI) & ICS High Performance Research Cloud

Researchers participating in the program and utilizing facilities of the Penn State Institute for CyberScience (ICS) are eligible for assistance from ICS Advanced Technical Services (ATS). ICS ATS staff and graduate students combine knowledge of a particular domain with software engineering and High-Performance Computing (HPC). Domains currently include Chemistry and Materials Science, Digital Visualization, Engineering, Meteorology, Earth Sciences, and Science Gateways for Big Data Research. ICS ATS staff and graduate students can assist researchers with various things such as: optimizing and parallelizing codes, building science gateways, visualizing data effectively, or consulting on methodology.

ICS Phase 2 Process:
ICS will assist the PI with their preparation of a Phase 2 proposal:

a. The proposal will serve as a contract. The bounds of the research and the details of support provided by ICS-ACI will be defined.
b. Any time spent by ICS personnel will be allocated against the grant.
c. Resources provided by ICS will be similar to those offered with Explore Grants:
   i. Jobs associated with the proposal will need to allow for being preempted.
   ii. Jobs will run on the open queue
   iii. Core ICS-ACI resources will not be cordoned-off to support these projects.

Upon mutually-agreed success of this project, PI is encouraged to apply for a follow-on ICS Explore compute-only grant to refine proof-of-concept in the process of writing an external proposal.

ICS Phase 2 Proposal Requirements:
1. Abstract or executive summary (1 page)
2. Proposed project/concept (4 pages maximum)
   a. Project/Concept title
   b. Commonwealth Campus faculty member name and affiliations (campus, department/program, college/school, institute)
   c. Total amount requested
   d. Project duration (if less than 1 year)
   e. Project Start Date
   f. Projected outcome or impact, for example:
      i. Modes of student involvement
   g. List of external funding bodies and/or programs to which application(s) for further funding will be sent after seed grant work is completed
3. One-page biography

ICS Review Criteria: Proposals will be ranked on how they address the following:
1. Research Strengths
   a. What is the scientific impact of the proposed research?
   b. Are the expected research results important and worth funding?
2. Potential/Sustainability
   a. What is the probability that the research will lead to the expected results?
b. What is the likelihood that the project will lead to further substantial funding from outside the University?
Phase 2 proposal for the Shared Facilities and Services at the College of Medicine (CoM): (InfoReady link) (Submission window is from December 1, 2018 to May 1, 2019 and will be reviewed on a rolling basis)

Purpose:

The Vice Dean for Research and Graduate Studies seeks to encourage use of our research core facilities, and potential collaborations between College of Medicine investigators and investigators at Penn State Commonwealth Campuses that may attract external research funding. This funding mechanism will provide up to $10,000 to be used across the CoM Shared Facilities and Resources. https://med.psu.edu/core-facilities

Eligibility:

Full-time faculty members at Penn State’s Commonwealth Campuses desiring to use shared facilities at the College of Medicine in Hershey.

Program Overview:

1. Approved Phase 1 applicants will consult with the Director of the Section of Research Resources, Dr. Bruce Stanley, and individual Core Directors to refine the approach of the proposed research and make the most of the resources available. (Applicants are encouraged to make theses connections prior to submission of the Phase 1 application.)
2. Although the application may include more than one core site, applications must utilize at least one of the CoM Core laboratories.
3. Awardee will provide a progress report at the end of the year-long funding period, highlighting progress made, tangible outcomes (e.g. papers, presentations), and the plan and timeline for an external grant proposal.

Application Format:

All applications should include the following components: The application should be no more than three single-spaced pages, not including items 4, 5 & 6.

1. Title of project, and names and departments of the primary investigator and each collaborator.
2. Goals for project:
   a. Describe the research area and its significance.
   b. Explain how the project will play a significant role in advancing the awardee’s research program.
3. Activity Plan:
   a. Describe the activities that will be undertaken during the project period, including how these activities will advance the goals of the project, and a timeline for their accomplishment.
   b. Describe the qualifications of the applicant.
   c. Explain how the project will lead to a proposal for external funding, incorporating a projected timeline for an external grant proposal.
4. Proposed budget with justification for the scale and scope of the required services.
5. Description of other costs related to the project with disclosure of the source of support for these other costs, e.g., costs related to the generation of samples on the front end, and analysis of data on the back end.
6. Completion of the CoM Commonwealth Campuses Research Project Application Cover Sheet.
**Review Criteria:**

- Applications will be reviewed for scientific merit in consideration of significance, innovation, approach, and potential impact, by a committee designated by the Director, Research Development at the College of Medicine. Meritorious proposals will be prioritized and approved by Vice Dean for Research and Graduate Studies at the College of Medicine based on the existing demands for the specific core facility, the potential for collaborations with College of Medicine investigators, and the potential for external funding.

**Award usage restrictions:**

The $10,000 award can be used for service expenses that are directly related to the approved research project:

1. Consulting fees with our Core lab director or Core research staff.
2. Equipment usage fees at the standard Core lab usage rate (can include sample preparation, laboratory consumables, etc.).

No funds will be released until all research oversight review has been completed and approved protocol numbers provided.
CoM Services to offer for Commonwealth Campus Research Initiative

Genomics
- DNA/RNA Extraction Robotics and Library Prep
- Illumina, IonTorrent, and BioNano genome and exome scale sequencing
- Transcriptomics/RNA Sequencing
- Digital PCR and TaqMan assays
- Epigenetic Analyses
- Sanger sequencing

Zebrafish Functional Genomics
- State-of-the-art Pentair Aquatic Habitats recirculating aquaria
- Maintenance of multiple wildtype zebrafish
- Design and microinjection to create mutant zebrafish strains
- Leica, Zeiss, and Olympus Fluorescence microscopes

Macromolecular Synthesis
- Oligonucleotide and modified oligonucleotide design & synthesis up to 140 bases length
- Peptide, heavy isotope peptide, and modified peptide synthesis up to 45 amino acid length

Proteomics and Small Molecule Mass Spectrometry
- Discovery and targeted Proteomics
- Quantitative proteomics – SILAC, isobaric tagging, label-free, and DIA/SWATH quantitative proteomics
- Post-translational modifications and stoichiometry
- Bioinformatics and Biostatistics analyses of quantitative proteomics results
- Targeted Assay development for quantitation of drugs and metabolites, PD/PK studies

Advanced Light Microscopy
- Live-Cell and Whole animal Multiphoton Microscopy
- Live-Cell Deconvolution Microscopy
- Second Harmonic Generation Imaging of Cellular Structures

Flow Cytometry
- Flow cytometry (multiple 4-, 10-, and 16-color Becton-Dickinson FACS Analyzers)
- Cell sorting: 17-color BD FACS Aria SORP high-performance 4-way cell sorter

Transmission (TEM) and Cryo-Electron Microscopy
- Sample sectioning, embedding for TEM
- Single particle analysis by CryoEM
- Tomography by CryoEM