Core Facilities Report

Spring 2016. Spring 2016 was a strong semester for the USF Core Facilities Committee, as we provided support for key facilities, edited our committee role within CAS governance, and worked to enhance the web presence of CAS Core facilities.

1. CAS Equipment grants - Although we faced reduced funding, we were pleased to fund awards in natural sciences and humanities for $50K of equipment acquisition, enhancement and 'break/fix'. We hope to have the full $60K for next year's Equipment Grant competition.

- NES 231 UPS Connection to Generator Power A&A Prop Update
- Cryomagnet Instrument Service Request
- X-ray Tube in Single Crystal X-ray Diffractometer
- QToF Mass Spectrometer: APCI ionization Source
- Nitrogen Generator for QToF/QqQ LC – Mass Spectrometer
- Equipment Warrant Support: Verification and Validation Kits
- SANYO growth chambers used to grow host-plants for spider mite colonies
- Electronic database of classical Jewish texts called the Bar Ilan Responsa Project

2. Governance language revised and submitted for consideration to the CAS Faculty Council (see below)

6. Core Facilities Committee.

This Committee consists of at least one Faculty member and/or Core Facility Director/ Manager from each department with established core facilities. Departments without an established core facility may volunteer a faculty participant to serve on the Committee, but are not required to do so. The Committee is also supported by one staff liaison and may include the participation of one graduate student. The Committee membership will consist of no less than seven (7) voting members.

Core facilities, for the purpose of this document, are defined within the College of Arts and Sciences as fundamental research facilities that generate revenue and support the research mission of the College.

Term limits for CAS Core Facility members are two years and include an elected Chair who serves for two years as well. To allow institutional knowledge transfer, the renewal of membership is allowed without term limits.

The Core Facilities Committee makes recommendations regarding the development and maintenance of an effective research infrastructure, particularly with regard to major shared equipment, laboratories, instrumentation and technical staff. This Committee is also charged with providing peer review for equipment and infrastructure funding opportunities, internally and externally (e.g. NSF Major Research Instrumentation limited submission funding).

(NOTE: Departments with current core facilities include Cell Biology, Microbiology and Molecular Biology; Psychology; Physics; Geosciences; Chemistry; Integrative Biology; and Anthropology.)

3. Web resources: Descriptions and links to the CAS Core Facilities have been developed and will be posted on the new CAS Office of Research and Scholarship website. The goal is to help incorporate core facilities in the extramural proposals, and hopefully, recognize the core facilities in reports/publications when these analysis play a key role in moving the research forward.

Core Facilities

Nuclear Magnetic Resonance (NMR)

CAS NMR
The NMR facility specializes in measuring the magnetic properties of atomic nuclei, which make up the molecules that can become the drugs of the future. The Department of Chemistry at the College of Arts and Sciences, offers NMR spectrometers from low to intermediate fields, and from manual to high throughput operation modes. These magnet labs support the research of over thirty USF principal investigators from a variety of scientific disciplines, including organic chemistry, inorganic chemistry, natural products, drug discovery, pharmacy, physics and geology.

Center for Drug Discovery and Innovation (CDDI)
The Center for Drug Discovery and Innovation offers state-of-the-art ultra-high field NMR instrumentation for the structural studies, especially in metabolomics, and biomacromolecular structural biology, etc. NMR core laboratory enables researchers to characterize protein structure at atomic resolution. The facility includes NMR spectrometers operating at 14 and 18 Tesla with associated HCN triple resonance cold probes that have carbon-enhanced and salt tolerant capabilities, which supply the highest possible 1H and 13C sensitivity for all applications. Technical support and training are available for all aspects of project development including feasibility studies as well as advanced protein-ligand interaction studies. Major Equipment includes Agilent VNMRS 600 and 800 MHz spectrometers with cold probes.

USF Mass Spectrometry/Peptide Facility (USFMASP)

Chemodiversity Facility
The Chemodiversity facility offers libraries of natural product-derived crude extracts, fractions and pure compounds for screening as well as medicinal chemistry and hit-to-lead synthetic capabilities. Small molecules high resolution mass measurement, quantification and metabolomics (GC/MS QToF), mass targeted chromatographic separation (LC/MS SQ) and screening for anthelmintic, antimicrobial, permeability and drug solubility evaluation are provided. The services also include general chromatography (MPLC, HPLC) and spectroscopic characterization (UV, IR) as well as microbiology workspace (biosafety cabinets), training and synthesis activities.

Major Equipment and Instrumentation includes Teledyne-Isco MPLC (UV) and Shimadzu HPLC (UV, ELSD, RID) systems, TECAN Freedom EVO 150 liquid handling automated workstation, Tecan Infinite/ M-1000 multimode plate reader, Heidolph control valve rotary evaporators, Savant SC210A speedvacuum concentrators, Labconco 4.5 Liters freeze dryer and SP Scientific general purpose 35 Liters freeze dryer, Agilent 7890 GC/ 7200 MS QToF, Agilent preparative 1200 LC/ 6120B MS SQ, Anton-Paar monowave reactor 300 for assisted microwave synthesis, Agilent Cary FTIR 630 spectrometer and Cary 60 UV/Vis spectrophotometer, Labconco synthetic fume hoods and Thermo scientific biosafety hoods, Innovative Technologies Pure Solv Micro solvent purification system for anhydrous solvent preparation.

Solid State Structure
Single crystal x-ray diffractometer, Powder x-ray diffractometer, UV/Visible spectrometer, FT-IR spectrometer, Differential Scanning Calorimeter, Thermogravimetric analyzer, Sorption balances

Center for Drug Discovery and Invention (CDDI)

The cell biology core provides researchers access to cell sorting and analysis for target characterization and validation. Major equipment and instrumentation include BD-FACSaria II cell sorter (BSL2 capable) and BD Canto II analytical flow cytometers, Zeiss Axiovert 100 deconvolution and Lecia DM 6000 laser capture fluorescent microscopes, and ABI 7900 real time PCR and Agilent model 2100 bioanalyzer.

Cell Biology, Microbiology, and Molecular Biology (CMMB)

The CMMB Core Facility offers a wide range of resources providing products, education, services and support that assist scientists, companies and students in solving research problems. We are sustainable and non-profit. It is our goal solely to offer the highest quality service available at the lowest possible prices. Our main focus is to continue to be a valuable and responsive resource for helping investigators obtain their research objectives. Equipment includes Microarray, Flow Cytometry, Mass Spectrometry, Tissue Culture, Microscopy, Multiple Systems, Cryogenic Repository.

Stable Isotope

The University of South Florida Stable Isotope Lab (USFSIL) provides stable C, H, O, N, and S isotope analyses of both organic and inorganic samples to researchers from geology, anthropology, biology, geography, and more. We commonly analyze:

- $\delta^{13}C$ and $\delta^{18}O$ of carbonates (including shells, corals, limestone, speleothems, soil carbonates, and bioapatite)
- $\delta^{18}O$ and δD of waters
- $\delta^{13}C$ of dissolved inorganic carbon (DIC)
- $\delta^{13}C$ of atmospheric and soil CO_2
- $\delta^{13}C$, $\delta^{15}N$, %C, and %N of organics (including collagen, tissue, soil, and plant material)
- $\delta^{34}S$ of sulfates (solid and solution)
- $\delta^{34}S$ of sulfides
- $\delta^{18}O$ of enamel phosphate