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MEMORANDUM

To: Julio Frenk, President

From: Tomás A. Salerno
Chair, Faculty Senate

A handwritten signature in blue ink, appearing to read 'TAS', is written over the 'From:' field.

Date: March 1, 2019

Subject: Faculty Senate Legislation #2018-46(B) – Establishment of the Miami Integrative Metabolomics Research Center (MIMRC) at the Miller School of Medicine

The Faculty Senate, at its February 27, 2019 meeting, unanimously approved the proposal to establish the Miami Integrative Metabolomics Research Center (MIMRC) at that Miller School of Medicine. This Center will bring together quality investigators generating high impact research using the common platform, reagents, know-how and expertise, in an attempt to enable full service metabolomics for research.


This legislation is now forwarded to you for your action.

TAS/rh

Enclosure

cc: Jeffrey Duerk, Provost and Executive Vice President for Academic Affairs
Henri Ford, Dean, Miller School of Medicine
Sanjoy Bhattacharya, Professor, Department of Ophthalmology

CAPSULE: Legislation #2018-46(B) – Establishment of the Miami Integrative Metabolomics Research Center (MIMRC) at the Miller School of Medicine

APPROVED:  DATE: 3/29/19
(President's Signature)

OFFICE OR INDIVIDUAL TO IMPLEMENT: Dean Henri Ford

EFFECTIVE DATE OF LEGISLATION: IMMEDIATELY
(pending any additional approval by the Board of Trustees)

NOT APPROVED AND REFERRED TO: _____

REMARKS (IF NOT APPROVED): _____



**UNIVERSITY
OF MIAMI**

Proposal Submission Checklist

Proposals are to be submitted to the Office of Assessment and Accreditation (OAA), if applicable, the Graduate Council (for graduate programs excluding Law and Medical), if applicable, and the Faculty Senate. Refer to the [Procedures for Program Changes](#) document for information on the approvals and notifications needed for program changes and the [Proposal Submissions Specifications](#) document for an explanation of the process and a list of the materials required.

(Please note that change approvals can take 2 semesters to complete.)

Include this checklist at the beginning of each proposal.

(Complete the information below, save the form as a pdf, and insert it with the background materials that are specified, in the order listed, and send the package electronically as noted above.)

KEY CONTACT PERSONNEL INFORMATION

First Name

Sanjoy

Last Name

Bhattacharya

Proponent's Title

Professor

Department, if applicable

Ophthalmology

School/College

Miller School of Medicine

E-mail

sbhattacharya@med.miami.edu

Phone

3054824103

Title of Proposal

Miami Integrative Metabolomics Research Center (MIMRC) at Miller of School of Medicine

(-continue to next page-)

MANDATORY MEMORANDA AND FORMAT

Please check that each item listed below is included in the proposal package of materials, in the ORDER as listed. The applicable title (i.e. Letter of Explanation, Memo from the Dean, etc.) is to precede each section in the materials.

Only proposals conforming to this format will be accepted.

1. This completed checklist.

2. Letter of explanation. (2-3 pages only, double spaced, 12 pt font)

Yes No

If no, explain why:

3. A memo from the dean(s) signifying approval of the faculty of the relevant School(s) / Colleges(s).

Yes No

If no, explain why:

4. A memo that all affected or relevant School / College Council(s) have approved.

Yes No

If no, explain why:

5. A memo from the department chair(s) signifying approval of the faculty of the relevant department(s).

Yes No

If no, explain why:

6. A memo from the Office of Accreditation and Assessment (OAA) if the proposal involves academic programs (degrees, certificates, majors, minors, concentrations, specializations, tracks, etc.) such as new programs, closing programs, or program changes (such as changes in requirements, program length, modality, name, location).

(To be submitted by OAA to the Graduate Council or the Faculty Senate, as appropriate.)

Applicable Not applicable.

If not, explain why:

Not a academic course curriculum program. It is a center to provide research services and help in assembly of research faculty not a certification or degree program.

7. A memo from the Graduate School Dean signifying approval of the Graduate Council (for graduate programs only).

(To be submitted to the Faculty Senate by the Graduate Council.)

Applicable Not applicable.

If not, explain why:

Not a degree or certification program.

8. Academic Deans Policy Council (ADPC) approval, for interdisciplinary issues and as appropriate. Please consult with the Dean of the Graduate School or the Secretary of the Faculty Senate to check if this is needed.

Yes No

If no, explain why:

It is not a degree or certification program.

9. Additional required documents as listed on the "Proposal Submissions Specifications," i.e. market analysis, budget information, assessment of library collections, etc. as specified.

List additional documents included:

Executive summary, detail proposal, support letters.

Please click on the "Save Form" button below to save this form, then e-mail to facsen@miami.edu.
To print the form, click "Print Form."

Save Form

Print Form

End form.



SANJOY K. BHATTACHARYA, M. TECH, PH.D.
PROFESSOR

Tomas Salerno

Chair, Faculty Senate

University of Miami

Ashe Building, Suite #325, 252 Memorial Drive

Coral Gables FL 33146

February 19, 2019

Dear Prof. Salerno,

Please find attached a revised proposal for **Miami Integrative Metabolomics Research Center (MIMRC) at the Miller School of Medicine for consideration of review and approval by the Faculty Senate.** MIMRC is an attempt to enable full service metabolomics for research. This proposal was presented and was approved on October 17, 2018 by General Welfare Committee (GWC) of the Faculty Senate and was provisionally approved by Faculty Senate on October 31st, 2018. We were advised to discuss this proposal with Dr. John Bixby and Ms. Barbara Cole. Please find attached a support letter from Dr. Bixby attached herewith and also an email response from Ms. Cole. We have clarified in the executive summary (highlighted in blue) that there is no change in the charge center.

We now have 14 analytical instruments in room 727 McKnight Building, medical campus, which includes four existing Ophthalmology mass spectrometry core facility. The Ophthalmic mass spectrometry core will be subsumed in MIMRC. These are further detailed in the proposal. A core grant from National Eye Institute, NIH partially supports the annual maintenance of one of the mass spec bundles (Q-exactive bundle) whereas the maintenance of other instruments are supported by user fee and my funded grants.

For two reasons MIMRC is important: 1) Federal grant funding posts a premium on a center much more than on core facility; 2) A center brings cross-disciplinary individuals to collaborate whether loosely yielding papers or tightly which enables joint grant application. These cannot be obtained without having a center. The other benefits are attracting unique philanthropic support for specific instruments. Both procurements and long-term maintenance are candidates for seeking philanthropic donations. MIMRC is envisaged to support projects beyond the immediate interest of Ophthalmology and Vision Research and bring greater number of funded and impactful interdisciplinary research harnessing the potential of clinical research resources of the medical school. Whereas Ophthalmology core facility will continue to provide fee based service, MIMRC is expected to bring together quality investigators generating high impact research using the common platform, reagents, know-how and expertise. The personnel and instrument maintenance supported by fee, direct and indirect cost sharing. Several interdisciplinary individuals who are already being supported by these instruments has expressed their support. . Pertinent to note are two points-1) during the council voting Dr. Adrien Eshraghi, Vice Speaker 2) presided over the council segment that voted this proposal due to its conflict with current Speaker. 2) The legislative oversight committee (LOC) of the council recused all its members that had any involvement with MIMRC.

Although I am the main proposer but Dr. Daniel Pelaez from Department of Ophthalmology and Dr. Santanu Banerjee from Department of Surgery will be co-proposer of MIMRC. These individuals are involved in the scientific and administrative aspects of MIMRC. I am happy to further address any question or concern that may arise during a scrutiny at Senate or General Welfare Committee. I hope the proposal and documents will be found suitable for your consideration. We are seeking the name and not any financial support from the administration at this point.

Thank you.

Sincerely,



Sanjoy K. Bhattacharya

Professor of Ophthalmology

Director of Ophthalmology Shared Instrument (Mass spectrometry) facility

Executive Summary: We propose to create and name a center Miami Integrative Metabolomics Research Center (MIMRC). The center will house several instruments including the mass spectrometers that pertain to Ophthalmology mass spectrometry facility (see details below) as well as other instruments (total 9) transferred from US Department of Justice. The center will subsume the current ophthalmology mass spectrometry core. In essence, it will encompass the ophthalmology mass spectrometry core without change of function or scope of that core but add-on other functions as detailed in the proposal. **Current charge center will continue. All instrument user fee will be charged only through the current approved charge center.** The objective of MIMRC is to bring additional imaging mass spectrometry, super resolution structured illumination and asymmetric ion mobility instruments enabling full service proteomics, lipidomics and metabolomics. The MIMRC intends to combine a service platform (core facility) with intellect in order to offer extended service to investigators, selected industry and integrate trainees in the process. In the initial phase other than core facility type services MIMRC will support 5-7 core projects encompassing basic lipid, metabolomics questions with neurosciences (cluster 1), general metabolomics/endocrinology/microbiome related to human metabolism (cluster 2), cancer (cluster 3) and training related to NIH training grants (cluster 4). The investigators and clusters will be added and deleted based on utility, the ability of payment and scientific viability of projects. The operators of instruments are currently paid from the grants of Dr. Sanjoy Bhattacharya. The current service fees only partly cover the maintenance of the instruments and a significant part is paid by the NEI core facility grant for Ophthalmology investigators awarded to Dr. Vittorio Porciatti. As the project and services are added the need based operators will be recruited and trained supported by direct salary support from the grants. The indirect cost of some of the grants (external to the department of Ophthalmology) will be used for instrument maintenance and future expansion. As of now operator, salary is entirely Dr. Bhattacharya's responsibility and operator is paid from Department of Defense grants. MIMRC will aim to provide service beyond the routine services and intellectual input for projects, which is the big difference in perception and necessitates this name. Having this center will also enable writing different grant proposals by a group of interdisciplinary investigators, collaborate across different disciplines, bring different platform and technologies for common use. It will provide a venue for different volunteer trainees to collaborate with different principal investigators, industry and acquire skills. Eventually it will allow dynamic addition of instrument, maintenance and their addition/deletion based on need and acquired resources: Philanthropic and grant funding.

Aims:

- 1) To convey the grant reviewer that a serious facility exists, which is more than a mere core facility. Core facilities do only a few routine analysis repeatedly. Whereas a center assist in designing experiments besides doing routine experiments.
- 2) To convey the colleagues that a serious facility exists where routine analysis can be done but it is also a networking place where there is a possibility to find colleagues with cross-disciplinary expertise and ideas. MIMRC is envisaged to be a breeding ground of cross-disciplinary developmental platform uniting researchers from diverse fields bound by usage of common analytical platform, reagents and methods. MIMRC thus will facilitate cross-investigation of multidisciplinary problems based on usage of common platforms.

- 3) Addition of new developing instruments, ensuring their operation and effective usage. Developing a usage based model with other aids to render them sustainable over their good usage lifetime and beyond.
- 4) Evolve the financial sustainability by a group of users seeking suitable aids in steps. The important driver of sustainability are academic user-leaders and users.
- 5) Most important aim is to generate greater impact of scientific research by combining strengths of multidisciplinary science with cutting edge instruments and collaborative users.

Miami Integrative Metabolomics Research Center

Housed in McKnight Vision Research Building room 727 and directed by a member of faculty Miami Integrative Metabolomics Research Center aims to identify therapeutic intervention strategies by unveiling metabolic and lipidomic differences between control and disease states. The center has state of the art orbitrap, triple quadrupole coupled with direct infusion or liquid chromatography and gas-chromatography-mass spectrometry as well as high throughput capillary electrophoresis, currently a total of 11 high end instruments for comprehensive proteomic, metabolomic and lipidomic analyses. Aligned with ocular pathology services and Lions Eye Bank the center is equipped to compressively catalyze discovery across an array of eye diseases encompassing anterior, posterior eye and beyond. The center is also aligned with researchers in Miami Project addressing the critical elements in generation of neurons in central nervous system. A joint project of this nature is funded by National Eye Institutes Audacious Goal Initiative.

The center also aims to serve the needs of integrative metabolic discoveries in medical sciences. Some of its current contributions are in Rheumatoid Arthritis-Associated Interstitial Lung Disease (PMID: 27448590), Pharmacokinetics and Pharmacodynamics in cancer, in pathologic infectious diseases in humans. A number of grants pertaining to innovative discoveries in cancer are pending review that has benefited from analytical capabilities of the center as are a few training grants from Department of Surgery, Neurology and Ophthalmology (K08) grants.

The center also supports infectious pathology of rare important non-laboratory animals that are of high veterinary importance. In recent times it has assisted in analyses of rare fungal infections in Dolphins sought by veterinary pathologists.

The center is aiming to procure a comprehensive imaging mass spectrometry to enhance its capability and offer a full range investigation capability. The goal of the center is to help investigators in perform quality high impact generating research and to attract extramural funding for support. The center seeks active philanthropic support to procure instruments, name instruments after supporters and initiate a named seminar series where world renowned metabolomic researchers such as Sarah Spiegel, James M. Ntambi, Marcus R. Wenk, Alfred H. Merrill, Michael J. O. Wakelam to help energetic and vigorous research in this area all across the biomedical and natural sciences at University of Miami.

The potential need, Science and advantages of the center: The DNA carries the central information in all biological cells. The secrets of a multicellular body including that of humans lies largely in the secrets of cells. The human DNA has been sequenced and so is a number of other organisms. However, that is just a tip of the iceberg. Though the information is contained in DNA but

it is usually carried out by interaction with proteins and a number of other molecules. Most molecules smaller than 4 kilodaltons are collectively often referred to as metabolites. Though biomedical scientists often regard molecules ~1000 dalton or less as metabolites. Lipids are a special group of metabolites that are generally not water soluble. While nucleic acids chemistry (DNA and RNA) is based on four purine/pyrimidines bases [Adenine, thymidine (or uracil for RNAs) guanine, cytosine], proteins are composed of 20 amino acids (not counting occasional unusual amino acids). Current thinking is that there are about 10,000 metabolites and 100, 000 lipids that belongs to about 78 classes of lipids.

Due to four bases the chemistry of nucleic acids is relatively simple and methods for detection and quantification relatively straightforward, easy to implement. There is also an advantage of faithful in vitro amplification available only for nucleic acids whereby an exact replica of a macromolecule can be made in vitro. Such amplification cannot be done for any other of the above. In absence of amplification step, the sensitivity of the instrument for detection and quantification has to be increased. This renders them much more expensive.

The highthroughput methods and bioinformatics approaches are also completely different for analysis of proteins, lipids and metabolites. There is no cross talk between methods or analytical instruments for proteins, lipids metabolites with nucleic acids.

The frontier for analysis of DNA and RNA is more than four decades old. The lipids and metabolites analytical methods are still being perfected and so are software and algorithms to integrate all these data. NIH has made a metabolomics common fund about 5 years ago that is picking up. At University of Miami, there is no institutional effort to have a concerted effort to procure or build highthroughput analytical instruments or centers to support and complement individual efforts of investigators despite Miami being resource rich in diversity of diseases as well as in patient population and their numbers. MIMRC aims to fulfil this void. Florida International University (FIU), a local state supported University has a history of investigators with analytical instrument strength and have invested in such capacities. However, their medical researcher is relatively weaker and they are for obvious reasons not going to put UM researcher tasks a priority. UM medical School has a larger base of researchers for whom MIMRC will be more fulfilling. Local facility has a number of other advantages, training of personnel, allowing labile sample experimental planning, better priorities for our researchers and of course collective growth for UM researchers. The key to find new translational molecules and ability to alter course of high complexity progressive diseases reside with integrative analysis of lipids and metabolites and further integrating that information with genomic information. Proteomics is an intermediary and important step. MIMRC fulfils the analytical gap for proteomics, lipidomics and metabolities. Advantage of the center are analytical costs, personal training, creating better scientific environment and rendering our research high priority thus effective on a time scale. Each of these can be detailed with several examples from medical school as well as from College of Arts and Sciences should that be necessary.

Some definitions:

Proteomics refers to identification of all proteins or a number of proteins simultaneously. There are several methods that can identify proteins in a "highthroughput" manner. Highthroughput means capturing several proteins simultaneously and all proteins associated with a given state of cell or tissue will be ideal. Mass spectrometric sequencing is the most high confidence, time and cost effective method. It is often thought to be synonymous with proteomics. However, there are other approaches such as protein array, phage display etc. Again the mass spectrometry enables best

coverage and most confident sequenced dataset. It also enables simultaneous determination of protein modifications. There are two approaches in mass spectrometry, top down and bottom up. Top down refers to identification of intact protein and then determining its parts, bottom up refers to identification and quantification of proteins based on sequencing of its constituent parts or peptides (produced by proteolysis, most commonly with trypsin).

Lipidomics and **Metabolomics** refers to identification and quantification of all (or most) lipids and metabolites respectively in a cell/tissue/biological fluid simultaneously. Again mass spectrometry is now the easiest and time effective method. Another upcoming method is NMR. However, NMR is much more complex and at present can capture only a tiny fraction of either lipids or metabolites. Whereas mass spec is great for complex mixtures, NMR has big time problem with complex mixtures. Even as of now it can only perform a handful of lipids or metabolites for which standardized NMR spectra has been obtained (that too varies with interfering metabolites in the mixtures). Lipidomics and metabolomics necessitate very different mass spec experiments, bioinformatics and software systems than proteomics. MIMRC has both softwares. The softwares costs \$20K-\$35K and has a yearly licensing fee that need to be paid and maintained. These softwares are also updated almost every 3-6 months due to new advancements.

Knowledge of Proteomics, Lipidomics and Metabolomics complement that in genomics. These analysis are different spectrum of a continuum. Lipidomics and Metabolomics arguably is the lower functional end and proteomics being an intermediate end. Thus they complement information obtained by other approaches, say genomics. Arguably, Lipidomics and Metabolomics are new frontiers and help biomedical researchers identify targets and help in translational aspects to find and fine tune new intervention strategies.

Advantage for the users:

- 1) Local training and help in design of experiments. An example is a PI and a grad student at Interdisciplinary stem cell institute (ISCI). Dr. Bhattacharya spent time at bench level to help them design the experiment after 3-rounds of oral explanation or paper sketches failed. The issue was a two-step gel fractionation followed by a mass spectrometry. Dr. Bhattacharya's services were charity. He is not a co-author or never received any percent effort for his help. However, without his help at the bench level the fractionation may not have happened in correct manner and subsequent experiments would have been garbage-in-garbage-out. Another example is Dr. Vazquez-Padron's work. Three core facilities had simply refused to undertake the work. Without constant back and forth Dr. Diana Hernandez, his postdoc could not have solved the issues on-hand and no core facility would undertake this kind of work, which is non-routine. Yet another example is Dr. Dana Ascherman. Sometimes he needs help from Dr. Bhattacharya and his graduate student Anddre Valdivia to assist in some steps of wet processing. Again a core facility will not provide such assistance and sometimes whole experiment is under jeopardy for want of very simple assistance. Often they also result in enormous delay.
- 2) The ability to time the labile samples. Labile samples need to be analyzed in a time effective manner and without local facility and expertise this would not happen.

- 3) Priority for users. Often we perform services for users, whose own core facility has long backlogs. We have twice served University of Florida (UF) users because they have six months wait period.
- 4) Cost effectiveness: OSU and Case Western Reserve University utilizes our facility because it comes 1/10th to 1/5th times cheaper for them. Cost advantage is not trivial in performing such experiment particularly if the goal is to publish high impact papers.
- 5) The assistance in study design and subsequent interpretation of data is the biggest advantage for users. This helps them save time and effective utilization of resources. An example is isotopic ratio outlier analysis (IROA) for identification and quantification of metabolites. We adopted IROA analysis from IROA technologies. Once this has been done Dr. Santanu Banerjee has gained considerable expertise in the back end bioinformatics analysis. This is not trivial. He has agreed to help at least a few other investigators to make a broader base of expertise.

Ophthalmology Mass spectrometry Core Facility Instruments: Q-exactive, TSQ Quantum Access Max, Acela HPLC, Easy nLC nano LC system and Triversa Nanomate.

Other Instruments/USDOJ transferred instruments: Agilent 7100 CE Capillary Electrophoresis System, a Thermo Scientific Nicolet 380 FT-IR Spectrometer, two Agilent 7890A / 5975C Gas Chromatograph / Mass Selective Detector coupled units, four Agilent 7890A Gas Chromatograph units and an ASAP IRD II Infrared Detector and Agilent 6890N Gas Chromatograph unit.

Current mode of operation: Currently for Ophthalmology mass spectrometry core facility, a modest fee is charged. The fee has not been revised in last 5 years. The idea is to popularize the services. The operator is paid by the grants of Dr. Bhattacharya and a significant maintenance fee is covered by NEI core grant that is to promote vision research. At present the fee covers consumables and a modest part of maintenance of instruments. The utilization of the services has improved in the last year. We need to determine at the end of this year the financial performance and revision of fee necessary.

Operator salary: The operator salary used to be 100% paid from Dr. Bhattacharya's grants. From May 2018 the utilization of fee-based service has tremendously increased and thus about 70% operator salary is now being contributed from fee-based services. The operator is currently paid below market price, even with a 15% jump in salary provided to her since April 2018. With enhanced services, we expect to cover majority portion of salary covered by services. It should be noted that now we are serving Cleveland Clinic Foundation, Ohio, Columbia University, New York, Ohio State University, Columbus, Ohio and a number of small start up industry at Cambridge Innovation Center. Also, there has been a 50% jump in utilization of fee-based service in the medical campus. At the same time as expected there has been a 90% fall in fee-based services from College of Arts and Sciences. In any event, the fee-based service of College of Arts and Sciences always had been less than 5% of total fee-based service. Also, it must be noted that the operator has been trained at our facility and her salary is about 15-30% less compared to current market value. For larger grants with dedicated instrument time, we expect the investigator to put some direct and indirect support which will help towards salary and also build reserves towards future instrument upgrade or purchases.

May and June has seen a big jump in fee-based services. Dr. Bhattacharya also had presented the service option at a research think tank meeting in New York in June, which led an increase in outside services. A 75% growth in services will provide operators salary but will cover only a fraction of maintenance costs. Currently maintenance cost of the most expensive instrument is covered by a NEI core grant from NIH to support ophthalmology researchers. Philanthropic donations and expanding user base and IDC can eventually results in sustainability. A complete service mix of instruments may result in that kind of cost structure. As stated above, we have noted a 50% increased user utilization from medical campus. All these will help being completely sustainable. Our six years of OMSC experience suggests that there is now better awareness and with outside users awareness we will be able to maintain and sustain the facilities and make MIMRC sustain.

We see no problem of Ophthalmology chair agreeable to shared IDC coming to OMSC (or MIMRC) account towards maintenance of instrument or operator salary. As noted above, we have changed from 0 to 70% salary support from OMSC account for the operator this year. Also due to greater utilization we needed constant supply of Nitrogen gas. With 50% assistance from Research and Innovation Management (RIM) office we have now procured a nitrogen generator (Genius 3022 from Peak Scientific for approximately \$36K) supporting 24/7 operation of Q-exactive and TSQ Quantum Access Max.

Consumables: We encourage the wet lab processing by the end users. This is a common practice in all core facilities and mass spectrometry collaborating laboratory unless necessary due to nature of work. However, despite processing there are other consumables necessary, for example, high purity solvents to run HPLC, gases such as high purity Helium, Argon and Nitrogen to run mass spectrometers.

Repairs/maintenance: Current repair and maintenance is covered by NEI core grant/ Dr. Bhattacharya's DOD or other grants. Only a fraction is covered by the user fee. As noted with greater utilization the sustainability and proper salary aspect of the operator is rapidly changing.

The nitrogen supply used to be a tremendous problem. Against weekly need of 14 cylinders, we used to get only 8 at the max. This is a medical campus wide problem. As the services grew, with help from Dr. Richard Lee (50% of the generator cost paid from an endowment grant that supports Dr. Lee's research) and from our RIM office we procured Genius 3022 Nitrogen generator (Peak Scientific). This generator has made us not only able to serve 24/7 but our maintenance of Q-exactive has significantly improved due to this generator. Without the appropriate service need level, we did not had a case for procurement of Nitrogen generator. One can always understand that there is never institutional support with a long range planning for this sort of instrument. In other words there is lack of institutional support from day one with long-range vision/support in mind. However, with current service utilization from internal and external users it appears likely that both operator salary and maintenance will be eventually covered by user fees alone.

Current routine core services: The routine core services are profiling for proteins, quantitative protein estimation, routine profiling of lipids.

Current fee structure: The protein profiling is \$150 per samples (with trypsin and processing reagents shared), per mass spec run+ one bioinformatics analysis against an organism stated, the

iTRAQ 8-plex with iTRAQ reagent provided plus one mass spectrometry plus one bioinformatics analysis against one organism stated is \$1500 (8-plex). Per sample run of extracted lipid samples is \$50. For lipids and metabolites the instrument has to run either in positive or in negative or in both modes. Two to three runs are needed to align peaks to get confident results. We charge \$50 for each run (whether positive or negative ion mode). In the per run fee we accommodate a range of collision energy thus maximizing identification of compounds. A bioinformatics analysis with Lipidsearch per sample is \$50. We have started a isotopic ratio outlier analysis for metabolites. This is about \$150 per sample after an initial method development. Similarly, we analyze various small molecules. The method development is charged on a mutually agreeable basis based on work and utilization of the instruments. We also train people on GC-MS. Training on GC-MS is going to be charged \$800 (it is \$1250 in FIU) for training. GC-MS sample analysis will be charged \$30 per sample.

Non-core services: We perform various types of non-core services. We provide consultation as gratis. However, now we provide free but indemnified consultation. We perform pan lipidomic services, isotopic ration outlier analysis for metabolomics, We have recently helped laboratories with protein cross linking analysis. Several similar non routine modified analysis is done as non-core services.

We help in grant writing, provide support letters, assist in study design.

Current supported projects: K08 grant of Luis Vazquez, U01 Kevin Park, Sanjoy Bhattacharya, Vance Lemmon, DOD grant of Dr. Rammohan Kottill, DOD grants of Sanjoy Bhattacharya, W. H. Wallace Coulter Center grant of Dr. Bhattacharya, Ross Chair Professorship Grant of Dr. Richard K. Lee.

Other grants/applications that has been supported: R01 Grant of Dr. Roberto Vazquez-Padron, R01 grant of Dr. Dana Ascherman, R01 grant application of Dr. Santanu Banerjee, R01 application of Dr. Sulagna Banerjee. Planned K08 applications for Drs. Robert Starke and Roberta Soares.

Budget: At this point we are not seeking any separate budget or any support. We may seek support for partial cost of instrument repair or accessory purchase or procurement via SAC mechanisms involving RIM office. These applications will follow the standard procedures. Budget for MIMRC in its stable phase (when it becomes a stable operating entity)

Proposed initial projects:

Basic lipid, metabolomics questions with neurosciences (**Cluster 1**): R01 grant pertaining to role of flippase, floppase and scramblases of Dr. Sanjoy Bhattacharya, Cell Division related lipidomic changes of Dr. Bhattacharya. The lipid related projects in optic nerve neuroregeneration (Kevin Park, Sanjoy Bhattacharya), The mitochondria lipid projects (Dr. Antonio Barrientos), A planned R21 application of Drs. Sanjoy Bhattacharya, Abigail Hackam and Richard Lee.

General metabolomics/endocrinology/microbiome related to human metabolism (**Cluster 2**): RA-ILD related work of Dr. Dana Ascherman, Isotopic ratio outlier analysis (IROA) project of Dr. Santanu Banerjee,

Cancer (**Cluster 3**): The lipid rafts of cancer cells project R01: Sulagna Banerjee, DG project of Dr. Jonathan Trent.

NIH training grants (**Cluster4**): Planned K08 applications for Drs. Robert Starke, Luis Vazquez and Roberta Soares.

How a center is different than core facility services: The core facilities do the routine services, they do not provide investigation tailored to grant or research work. When such services are provided it need several changes in analysis, software and often need new accessories. Tailoring methods to analysis is beyond core services, which is often what is provided to the investigators. Consultation for specific experimental design is not part of any core services which will be provided by MIMRC.

Summary: We are seeking a name, which is Miami Integrative Metabolomics Research Center (MIMRC). This center will help attracting interdisciplinary research, acquire and maintain instrumentation for metabolomics research in biomedical sciences. No budgetary resources are sought. Naming the center will enable formal grouping. The Ophthalmology Mass Spectrometry Core Facility existing charge center will continue be the charge center. Formal grouping will help attract/put together applications metabolomic common fund grants. It will enable harnessing existing instruments and build future upgrade/maintenance funds for the instruments.

Carl I. Schulman, MD
Professor of Surgery
Executive Dean for Research

Sanjoy K. Bhattacharya, Ph D
Bascom Palmer Eye Institute
University of Miami Miller School of Medicine

May 4, 2018

Dear Sanjoy,

This letter is to confirm my support for the **Miami Integrative Metabolomics Research Center (MIMRC)**. MIMRC is expected to support interdisciplinary projects pertinent to Neuroscience, Medicine, Cancer, Surgery, Ophthalmology/Vision Science and others that will use proteomics/lipidomics and metabolomics approaches. The MIMRC is expected to bring a greater number of funded and impactful interdisciplinary research projects. This will enable optimal utilization and maintenance of common instrumental platforms, and cross-fertilization of ideas. The MIMRC is envisioned to enable harnessing the potential of clinical research resources of the medical school. This Ophthalmology core facility will continue to operate on the model of fee-based services and will be subsumed in MIMRC.

Instruments that will be housed in MIMRC are Q-exactive-nanoLC bundle, TSQ-Quantum Access Max-Acela HPLC/Triversa Nanomate bundle (Ophthalmology Core Facility Instruments) as well as nine other instruments donated/transferred by the US Department of Justice (USDOJ). These instruments are: Agilent 7100 CE Capillary Electrophoresis System, a Thermo Scientific Nicolet 380 FT-IR Spectrometer, two Agilent 7890A / 5975C Gas Chromatograph / Mass Selective Detector coupled units, four Agilent 7890A Gas Chromatograph units and an ASAP IRD II Infrared Detector and Agilent 6890N Gas Chromatograph units.

I support your plan to use the currently operational finance model of supporting maintenance of Q-exactive with the NEI/NIH core grant, including the partial operator salary with fee-based services and building funds for the maintenance of other instruments that are supported by user fees and your/others funded grants. In addition, I support your plan to add new instruments based on utilization by the projects, writing extramural grants and aiming to attract philanthropic support. For minor repairs or emergencies, you can utilize the research, research education and innovative medicine support mechanism.

I am aware of the hard work that is being put into this endeavor. Your instruments have been used by several individuals from different academic units such as Drs. Dana Ascherman and Alessia Fornoni (Medicine), Drs. Roberto Vazquez-Padron and Santanu Banerjee (Surgery) who are supportive of MIMRC. The aim of MIMRC is to create an interdisciplinary group of "Involved Participants" rather than just "passive" users.

This letter is to express my strong support for MIMRC.

Sincerely,



Carl I. Schulman, MD, Ph.D., MSPH, FACS
Executive Dean for Research and Research Education
Professor of Surgery
Eunice Bernhard Endowed Chair in Burns
Director, William Lehman Injury Research Center

Eduardo C. Alfonso, M.D.
Professor of Ophthalmology
Kathleen and Stanley J. Glaser in Ophthalmology
Chairman, Bascom Palmer Eye Institute

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Please respond to: P.O. Box 016880, Miami, FL 33101-6880

February 20, 2019

Sanjoy K. Bhattacharya, Ph D
Bascom Palmer Eye Institute
University of Miami Miller School of Medicine

Dear Sanjoy

This letter is to confirm my enthusiasm and support for **Miami Integrative Metabolomics Research Center (MIMRC)**. We have allocated room 727, which will house existing Ophthalmology mass spectrometry core facility and will be subsumed in MIMRC.

Instruments that will be housed in MIMRC are Q-exactive-nanoLC bundle, TSQ-Quantum Access Max-Acela HPLC/Triversa Nanomate bundle (Ophthalmology Core Facility Instruments) as well as 9 other instruments that has been donated/transferred by US Department of Justice (USDOJ). These instruments are: Agilent 7100 CE Capillary Electrophoresis System, a Thermo Scientific Nicolet 380 FT-IR Spectrometer, two Agilent 7890A / 5975C Gas Chromatograph / Mass Selective Detector coupled units, four Agilent 7890A Gas Chromatograph units and a ASAP IRD II Infrared Detector and Agilent 6890N Gas Chromatograph units.

The NEI core grant from National Eye Institute, NIH partially supports the annual maintenance of one of the mass spec bundles (Q-exactive bundle) whereas the maintenance of other instruments are supported by user fee and your funded grants.

MIMRC is envisaged to support projects beyond the immediate interest of Ophthalmology and Vision Research and foster interdisciplinary research harnessing the potential of clinical research resources of the medical school. Whereas Ophthalmology core facility will continue to provide fee based service, you envision that MIMRC will bring together quality interdisciplinary investigators helping generate high impact research while using the common platform, reagents, know-how and expertise while the personnel and instrument maintenance supported by fee, direct and indirect cost sharing.

I am aware of hard work that is being put into this endeavor. In all of last decade you have put at least one major instrument grant every year. That is substantial. You have now assembled a team of over 12 interdisciplinary individuals who are already being supported by these instruments. The faculty of our department are supportive of this endeavor.

Ophthalmology and Vision research will also benefit from having such platform, resources and expertise. You have my support in this endeavor.

Sincerely,


Eduardo Alfonso, MD



Please respond to:

P.O. Box 016880, Miami, FL 33101-6880

www.bascompalmer.org
Phone 800-329-7000

Sanjoy K. Bhattacharya, Ph D
Bascom Palmer Eye Institute
University of Miami Miller School of Medicine

May 2, 2018

Dear Sanjoy,

This letter is to confirm my enthusiastic support for **Miami Integrative Metabolomics Research Center (MIMRC)**. You have been allocated room 727 on the 7th floor of McKnight building that has larger space than current room 710 where the most of the instruments are currently housed. You will move instruments from room 710 and house the existing Ophthalmology mass spectrometry core facility which will be subsumed in MIMRC. The Ophthalmology core facility will continue to serve as core facility with the existing charge center.

Instruments that will be housed in MIMRC are Q-exactive-nanoLC bundle, TSQ-Quantum Access Max-Acela HPLC/Triversa Nanomate bundle (Ophthalmology Core Facility Instruments) as well as 9 other instruments that has been donated/transferred by US Department of Justice (USDOJ). These instruments are: Agilent 7100 CE Capillary Electrophoresis System, a Thermo Scientific Nicolet 380 FT-IR Spectrometer, two Agilent 7890A / 5975C Gas Chromatograph / Mass Selective Detector coupled units, four Agilent 7890A Gas Chromatograph units and a ASAP IRD II Infrared Detector and Agilent 6890N Gas Chromatograph units.

I am the PI of the NEI/NIH core grant (EY14801) that partially supports the annual maintenance of one of the mass spec bundles (Q-exactive bundle) whereas the maintenance of other instruments are supported by user fee and your funded grants.

MIMRC is envisaged to support projects of the immediate interests of Ophthalmology and Vision Research as well as several that are beyond Ophthalmology but supports proteomic, metabolomics analytical platforms (instruments, reagents, resources, and expertise). We recognize that it will bring greater number of funded and impactful interdisciplinary research harnessing the potential of clinical research resources of the medical school.

Ophthalmology core facility will continue to provide fee based service. The MIMRC will bring interdisciplinary investigators to generate high impact research to use instruments, reagents, and expertise helping with the remuneration of the personnel and instrument maintenance supported by fee, direct and indirect cost sharing of the funded projects by all user investigators.

I am aware that you have put a lot of hard work to arrive at this point. I am also aware that a number of prominent investigators from outside the department has agreed to utilize and support the services and form a group of interactive faculty.

Ophthalmology and Vision research will also benefit from having such platform, resources and expertise. You have my enthusiastic support in this endeavor.

Sincerely,



Vittorio Porciatti DSc, FARVO
James L. Knight Professor of Ophthalmology
Director, Vice Chair of Research
Bascom Palmer Eye Institute
University of Miami Miller School of Medicine
Phone 305-326-6050, E-mail vporciatti@med.miami.edu

MILLER
SCHOOL OF MEDICINE
UNIVERSITY OF MIAMI

Sanjoy K. Bhattacharya, PhD
Bascom Palmer Eye Institute
University of Miami Miller School of Medicine

May 2, 2018

Dear Sanjoy,

I am pleased to enthusiastically express my support for the Miami Integrative Metabolomics Research Center (MIMRC).

As you know, one of our major research efforts focuses on defining biologically meaningful biomarkers of Rheumatoid Arthritis-related interstitial lung disease (RA-ILD). In particular, we are interested in establishing biomarkers of early disease (derived from serum and other biological specimens such as bronchoalveolar lavage fluid) that will enable us to predict which patients with RA are most at risk of developing progressive interstitial lung abnormalities contributing to the significant morbidity and mortality of this disorder. At present, there is no consensus screening strategy for RA patients with incipient ILD (via imaging or other conventional modalities), highlighting the unmet need addressed by our novel approaches to biomarker discovery.

Towards this end, we have been extensively using Q-exactive-nanoLC bundle to identify deiminated proteins as potential biomarkers in RA-ILD patients. As a complement to these studies, we are also trying to define post-translationally modified proteins that are linked to both cigarette smoking and RA-ILD, as smoking tremendously exacerbates this disease.

We have worked with your facility extensively in last 3 years. Often the investigative analysis extends well beyond what is normally provided by a fee-based core facility, as evidenced by the role that you and your technician have played in designing experiments, troubleshooting, or interpreting data over this time period. For me, the discussions surrounding this work are very helpful in understanding different dimensions of the analytical process. These collaborative interactions have contributed to several co-publications, including an important manuscript published in the *Journal of Immunology* (Travers T. S. et al. *J Immunol.* 2016 Sep 1;197(5):1926-36. doi: 10.4049/jimmunol.1600162. Epub 2016 Jul 22, PMID: 27448590f). Equally important, this interdisciplinary effort will help to support one of our existing NIH grants as well as a pending R01 that includes budget allocations for mass spectrometry services.

Overall, I have found our collaborative interactions extraordinarily helpful, and my understanding is that with the MIMRC, we will be able to incorporate new analytical tools and become collective "shoppers/bargainers" for new technologies related to full spectrum metabolomics analysis.

In short, I strongly support the MIMRC that will help foster such interdisciplinary research efforts. With the ability to attract federal grants by collaborators such as myself, I do foresee fee-based service or allocated percent efforts partly supporting analytical platforms, reagents, technical help, and expertise by the MIMRC—all critical components in making future advancements.

Sincerely,



Dana Ascherman, MD
Associate Professor of Medicine

MILLER
SCHOOL OF MEDICINE

May 2, 2018
Bascom Palmer Eye Institute
University of Miami Miller School of Medicine

Dear Sanjoy

This letter is to express my support for Miami Integrative Metabolomics Research Center (MIMRC). We have been using your mass spec facility utilizing both TSQ Quantum Access Max and Q-exactive instruments. Diana Hernandez, my postdoc received training on TSQ and extensively utilized it for analysis of small molecule drug for our pharmacokinetic analysis.

Very recently Dr. Hernandez did analyze the normal degradation of cross-linked proteins using high-resolution Q-exactive instrument. These results are useful and constitute part of my R01 application. I am happy to attest that such experiments cannot be easily performed in core facilities. Three of the four core facility that we had approached had turned us down for their inability to assist in this experiments. Locally available expertise enabled faster analysis without waiting for a long queue. It also has the advantage of my postdoc performing the experiments and labile samples are analyzed right away.

The proposed MIMRC is expected to bring platform, reagents, help and expertise together. Particularly, it aims to create an interdisciplinary group of "Involved participants" rather than just "passive" users.

We are here to use fee-based services but we will also participate in grant applications in both ways. That is MIMRC on ours and, we on MIMRC's as needed.

I must mention that for last few years you have been putting together a S10 grant to procure a Imaging Mass Spectrometer (IMS) and I have been consistently a participant. We have also published a peer-reviewed book chapter on the same. You have facilitated analysis of tissues for our chapter with vendors of the IMS instrument.

This letter is to state my strong support for creation of MIMRC.

Sincerely,

Roberto Vazquez-Padron, PhD



Roberto Vazquez-Padron, PhD
Professor of Surgery and Molecular Pharmacology,
University of Miami, Miller School of Medicine,
1600NW 10th Avenue, RMSB 7147A,
Miami FL 33136
P: 305-243-1154



To

Prof. Tatjana Rundek, MD
Chair, LOC
University of Miami Miller School of Medicine.

July 8, 2018

Dear Dr. Rundek,

Please find attached a copy of our revised proposal, a copy with track-changes, support letters (single pdf document) and supporting tables in Excel. I sincerely thank you and the reviewers for helpful comments/suggestions, which has helped improve our MIMRC proposal. We have made an earnest attempt to revise our proposal in light of reviewers comments. Our response to reviewer's comments, highlighted in blue is provided below. In light of reviewers comments/suggestions we have incorporated changes in the proposal. A copy of proposal with "track-on" changes left as is have been provided herewith as a supplemental document to facilitate the review process along with support letters as a single pdf copy.

I hope the revised proposal will be found suitable for consideration by LOC. Please feel free to contact me should additional materials need to be provided.

I shall look forward to communication for LOC.

Thank you.

Sincerely,

Sanjoy Bhattacharya, M. Tech., Ph.D.
Professor of Ophthalmology
Proposer of MIMRC

Response to LOC/reviewers comments:

Proposal:

To name a center Miami Integrative Metabolomics Research Center (MIMRC)

LOC Committee review:

This is a request to change the name of a departmental facility to a school-wide center. As such it is more than a mere name change. This proposal represents the creation of a new center and the LOC suggest to appropriately entitling the proposal.

The proposer is thankful to the reviewers. Indeed the idea is not a name change but rather subsuming the core and leave the core functions intact and expand services and bring in additional instrument, facilities and individuals working together to share platform, resources, reagents in a more effective manner. The idea is to put a functional center that works to serve enabling impactful science and expand our collective ability to increase collaborative grant funding.

The Ophthalmology "omics" facility is really the only one in the campus. Therefore, the possibility of expanding it to technical capabilities and services, while making it more self-sustainable, it is of great importance for our Medical school. Dr. Bhattacharya should be commended for growing the current facility from his own grant support and contributions from other sources. His expertise in the field, along with his demonstrated leadership to build this Core demonstrates his unique position to accomplish the proposed creation of MIMRC.

We thank the reviewers for their encouraging comments.

There are several strengths in the current facility that will provide the foundation for the proposed new MIMRC:

- It already has space and state-of-the-art equipment
- It already has a well-trained operator
- Dr. Bhattacharya has already established a track record of funding for himself, which support the facility, as well as local collaborators, either funded or well-positioned to get funding in the near future.
- Likewise, Dr. Bhattacharya has a solid record of fruitful collaborations resulting in publications and funding.
- There are extramural collaborations as well as prestige at the national level to attract possible external users of this facility.
- The facility will be organized in dynamic clusters of projects grouped by scientific interests. This is a clever approach because it will better focus the priorities for equipment acquisition and maintenance, as well as training for the operators and users.

The proposal puts forth an interesting growth model with very little or no upfront investment. This model has some potential disadvantages, stated below. However, if appropriately developed it may serve as a paradigm for future similar core facilities. As such is viewed by the LOC with great

interest, considering that missing or underdeveloped core facilities have been recognized as a major hindrance for our research enterprise, faculty recruitment and retention, and ability to successfully secure extramural funding.

Again, we thank the reviewer's and LOC for their encouraging comments.

Despite these numerous strengths, the LOC also recognized several weaknesses.

The major weakness of the proposal is that it is sketchy. Considering that it will have to be approved by other internal bodies (e.g., The Medical School Council and the UM Faculty Senate) by individuals not necessarily versed in leading-edge biochemical procedures and their possible applications, the project will be best served by a much more detailed description of both the science, the potential need, and advantages of this Center for the institution, the faculty, and the mission of UMMSOM (and the UM).

We thank the reviewers for their guidance.

Also, the financial aspects of the proposal and a growth plan leading to a self-sustainable facility should present with more details. Finally, if indeed the plan includes changes in the structure of IDC reimbursement, letters of support from the department chair and major collaborators will be necessary.

We thank the reviewers for these comments too. Since the first submission of MIMRC application, the services of the Ophthalmology mass spectrometry core (OMSC) has changed substantially. This has resulted in changing the percentage salary contribution of the operator from 100% on Dr. Bhattacharya's grant to about 30% on his grant. OMSC has started accepting more fee-based service inquiries from outside academic as well as industries. This has increased the work load but well within manageable bounds. We see the development of collaborative work in steps with IDC sharing. Chair of Ophthalmology is open to charging IDC and transferring them to OMSC/MIMRC accounts. As the center serves more and investigators from different units start using it effectively we see no problem to get such financial planning done. For last three years, the financial cushion for operator salary was Dr. Bhattacharya's grants and instrument maintenance on a NEI, NIH core grant. As the use is changing, the fee-based revenue is changing (being generated) and again we do not foresee any problem to capture IDC charges being negotiated. The hard part will be convincing the user investigators to acknowledge efforts and be ready to share some IDC.

The LOC has also consulted Dr. Carl Schulman, our Executive Dean for Research, who confirmed that Centers/Institutes can be founded on soft money if the Council and Senate feel the funding sources are sufficient and sustainable. In addition, in the new IDC centralized scheme, the Centers/Institutes might request and get between 5-10% of IDC's back, but that may not be sufficient for this new MIMRC.

The following suggestions are intended to help Dr. Bhattacharya in writing a more granular proposal.

- 1- Define proteomics, lipidomics, and metabolomics for lay individuals. Indicate the significance of the information that can be obtained with these techniques.

We thank the reviewer for his/her comments. We have incorporated this in the revised proposal.

- 2- Clearly state objectives ("specific aims") of the new center. As currently presented, the proposal may be interpreted, as it will be more of the same. Examples may be: Enable setting accounts independent from Ophthalmology; enable IDC sharing (if still possible); applications for extramural funding; etc. What will be the advantages for Dr. Bhattacharya, the department of Ophthalmology, UMMSOM researchers, and the school/university to have this expanded core facility?

My personal thanks are due to this reviewer. It has helped develop clarity in my mind to write the proposal. In response to reviewers comment, I have put aims. We expect the users to find seriousness in efforts and in dedicated instrument usage. We will discuss with these users about IDC sharing. The user's thought process is biggest impediment not the department of Ophthalmology. The department of Ophthalmology will be willing to park IDC with the mass spec account should the users are up to a stage to do so.

- 3- When describing the present facility, make a list of the equipment available, approximate cost to maintain and replace, and, more importantly, what are the applications each piece of equipment can fulfil.

Provided in summary Table 1 attached herewith. This can be further detailed if the LOC so advises.

- 4- Provide a table of the currently available extramural grants made possible by the existence of this facility, and how much they contribute to the maintenance and salary support of the technician. Information about direct and indirect costs as well as the funded period would be helpful. Pending applications would be also informative to list.

A list has been provided in attached table 2. The pending grants are rapidly expanding. We have included repeat users as major users. There are several other one time users not included in the list.

- 5- Proteomic facilities are available for fee elsewhere. It is essential to articulate what are the advantages for the institution and local researchers of having a facility here, as opposed to outsourcing the service. This is possibly the most common critique to this type of core. Biochemical samples can be submitted via FedEx to anywhere in the world. What is unique of having this facility in our institution?

The FedEx service does not support much beyond routine services. Core facilities fail to perform when study design needs deviation from routine. Also, core facility works when users exactly knows what is needed. Mass spec experiments has front end fractionation plus design of experiments. The user knowledge is lacking in all our campuses with respect to mass spec. Examples of help needed (that could not have been provided by a core) are experiments performed by Drs. Lina Shehadeh, Roberto Vazquez-Padron, Naresh Kumar, Tekin Mustafa, Ashok Saluja, Nicholas Acquavella, Joseph Duffrairie, Carolyn Cray, Santanu Banerjee, Daniela Frasca and for assistance and modification of methods: Dr. Dana Ascherman. The list is longer for other users who had needed simple help which needed personal interaction.

- 6- There is a brief mention of tailoring services to users' needs, and providing training and intellectual support to users. This is certainly a unique feature of the facility and to a large extent, justifies the need for a local service. However, it is stated that this aspect is gratis. Dr. Bhattacharya's time is valuable and finite. How (and who) will be providing this services as the facility grows? Training user's personnel may be key to free time of the operator and would solve the technical aspects of

sample preparation. Is there any possibility that project planning and tailoring may be also delegated? Large facilities have PhD- faculty-level full time directors advising users.

The reviewer has captured the essence. We are a campus who are largely ignorant of instrument, services and our utilization is sub par. Both go hand in hand. We will not be able to afford a full time PhD person. Not even with current rate of growth. Dr. Bhattacharya has been spending 20-30% of his time advising people as gratis. This has now prepared a user base. Dr. Santanu Banerjee, Dr. Roberto Mendez, Dr. Diana Hernandez, Dr. Hong Yu are people who have developed considerable expertise in wet sample processing, IROA methods etc. These trained people often provide assistance as gratis. For example, Drs. Banerjee and Mendez on IROA and GC-MS analysis. The idea is to have a hybrid model: part gratis, part fee-based analysis. Whereas instrument utilization service is always via dedicated operator but help can be availed under MIMRC umbrella for wet processing, sample prep, bioinformatics analysis. As we move we evolve and develop cost effective strategies. Some of the aspects need to be provided as gratis. MIMRC is expected to enhance those services and distribute the gratis part on a few other people. Hope is that some of them will become collaborators despite working in different disciplines.

- 7- Related to the previous point, it is important to define the possible demand here, as well as to identify other similar facilities in South Florida (FIU?). How many investigators can benefit from this facility in campus, or in Miami?

Local demand is increasing. Outside demand is increasing. We have observed 70% increased demand starting May 2018. We perform a workshop and a 2-hour seminar in the month of June every year. That has been helpful in increasing awareness. The workshop requires a payment of \$100. Lunch is included in this pay. We have found quality participation ever since this fee was incorporated some four years ago. Also, the 2-hour Metabolomics-MIMRC seminar is invitation only to keep the group accommodated in a small seminar room plus participation of only deeply interested people. Dean Prof. Henri Ford and Associate Dean of Research Dr. Dushyantha Jayaweera attended this year's seminar. These events are resulting in serious increase in utilization. FIU has some instruments but not for proteomic analysis. Their services are more expensive (about 30 to 50% more than us in most cases). Their training is never free. When we plan to institute a fee for training on instruments it will be 25-50% less than FIU for at least next 5 years. We also waive the training charges on a case by case basis through creative arrangement. Our first goal is to provide training when we encounter a serious user. The consideration of fee comes later.

- 8- Can the core attract outside users? How many? How would this core be competitive with similar facilities in the country?

Table 2 provides a list. We have slowly opened ourselves. We are superbly competitive compared to outside cores. Our Lipidomics services on a head to head basis is much better qualitatively and quantitatively compared to University of Virginia (Dr. Sara Spiegel's group) and University of Texas (Dr. McDonald group). We and others have compared it. My postdoc Dr. Trzeciecka utilized these core facilities for a head to head comparison and we came far above on all aspects. Now a metabolomics society has also compared our technical services (not cost), we have performed within top 3 for all technical aspects in a list of total 1 to 50 ranking. This has not been made public

but if and when done we will capitalize on this. The society has recognized some problems in making these details public due to opposition from participants. The initial agreement was to keep the information limited among participants and the groups will only know their numbers but not how others fared just to have this information masked. Thus we know our standing but not that of our colleagues (other participating core facilities).

- 9- The financial plan is humble and realistic. However, it may not be sustainable. In the first phase, the facility will aim to support 25% of the operator salary. That is feasible. What will happen if Dr. Bhattacharya has a gap in funding? There is a need for a growth plan to achieve 50% and then 100% of the operator support, as well as support for equipment maintenance (service contracts?). At some point the project describes multiple operators. How does the facility plan to get there?

Very humbly, it has taken Dr. Bhattacharya nearly 12 years with relentless effort to reach there. He does not have all answers. If he has a gap in funding, he is not entirely clear what happens. So is if NEI core grant which has to be renewed by August 2019 ever expires. Currently 70% of operator salary is supported by user fees. Hopefully we will reach a plane where 100% of one operator will be entirely supported by user fees. A single operator now operates three instruments (Q-exactive, TSQ Quantum Access Max-Triversa configuration and GC-MS). With user growth and shared instrument use in grants providing some IDC this may be solved.

- 10- Considering the new schedule of IDC redistribution, 10% of IDCs may not fully cover the needs described above. For local users, what will be the cost? IDC share and fees? Only fees? How will the facility categorize and charge heavy users versus light sporadic users? At this time, proposed changes in IDC redistribution will require a written consent from the Department chair, and the support of key users. Likewise, what would be the fees for external users? Are those fees competitive with fees from other similar facilities in South Florida and beyond?

Currently local users are paying the fees only. The only individual to ever come close to sharing IDC is Prof. Mary Lou King. She extensively used the mass spec to generate preliminary data to get funded a R21 and R01 grant with consent to put percent effort and IDC share. Once funded, her funding scenario considerably changed. She also made retirement plans (which itself changed several times). She requested taking back both percent effort and IDC. Considering her plea both Dr. Bhattacharya and his chair agreed not to take or revert back IDC. This case and others illustrate the flexibility in IDC needed. However, yes IDC and external users are way to go. With external users, our current fee is the same as with internal users. Our aim to seek percent efforts and IDC consortium agreements based on their need of our expertise rather than simple user fee. This has motivated us to serve relatively small number of users. I must mention this was not the only reason. Right in the beginning, Dr. Jenifer McCafferty-Cepharo tried to discourage us to serve outside users. This had been key factor not to accept outside users readily. However, we have begun performing service and will continue to do so. Outside service acceptance comes with some risks. For example, someone can misuse data. Someone can blame for data not fitting their paradigm. These are the reasons why even as of now we are careful to accept any and every one. However, we are expanding with an eye to have consortium arrangement in addition to being a fee-based service provider with distinction in both services.

- 11- Dr. Bhattacharya should provide an ideal scenario and a worst-case scenario for income and expenses in the facility for the time period expected to elapse until the facility is self-sustainable.

The salary of the operator below market value is an additional problem to address. The investigator may have to consider some kind of subsidy from the institution, but, in that case, a letter of support from the appropriate budget authorities will be necessary as well.

The worst case scenario being the use drops to 25% level. The best case scenario being use becomes 100% and we are also able to increase the fee by 25% at some time point in next 2 years. We hope to achieve more than 100% (based on today's utilization base) use. However, I am not a marketing genius so any projection I make may have a tendency to be proven wrong.

12- The facility is currently supported by the NEI core grant. Will that support continue as the core becomes more independent from the department and less focused on eye research? Clusters 2 - 4 described cannot be under the NEI umbrella. For example, this is critically important for equipment maintenance. It is stated that it is currently covered by the NEI core grant, and that only a fraction will come from fees. As the core moves toward several non-eye related research this distribution of maintenance expenses will not be viable, or even unacceptable for NEI. A description of the transition is necessary.

NEI core grant have not differentiated the use. It pays \$40K for Q-exactive maintenance. The chair have been generous to contribute to repairs. This is also because the repairs theoretically have been paid from Dr. Bhattacharya's indirect costs. As long as 3 eye related users utilize the facility we do not foresee these problems. Realize that operator salary is not provided by the core grant since its inception. So the largest subsidy has come at the expense of Dr. Bhattacharya's grants and indirect costs in some way. The NEI core expires in August 2019. We hope to have renewal. I must add that in general Ophthalmology has liberally contributed in refurbishing the space and with ancillary needs. Dr. Richard Lee, from his research endowment provided \$18K as alms for procuring Genius 3022 Nitrogen Generator, when we discovered that despite having money core account cannot accrue capital instrument procurement charges. RIM office paid 50% and on Dr. Bhattacharya's approach Dr. Richard Lee generously paid from his endowment research support another \$18K (total cost of the generator is about \$36K). This is a net savings of \$19 K in Nitrogen cylinder charges (\$26K in theoretical costs -\$7K in maintenance charges for the generator beyond year 1). Also having Nitrogen generator enables smooth functioning of instrument with pressure and heat being maintained much better saving the instruments (Q-exactive's, TSQ Quantum Access Max's) life and enabling 24/7 operation. The extended operation (24/7) is enabling on time delivery of services.

13- The project hints at the possibility of obtaining philanthropic support. This notion needs further elaboration.

It is possible that one of the critical users of instrument be he/she an ophthalmologist or another physician can bring it to a wealthy donor and we may succeed getting a philanthropic support. I would rather like the addition of following instruments:

- 1) An UltraFAIMS asymmetric ion mobility fractionator at the front end (\$70K),
- 2) AAP-MALDI front end for Imaging Mass Spec on Q-exactive (\$150K)
- 3) If possible, a dedicated Imaging Mass spec (\$780K).
- 4) Having a cushion of operator salary will also be good.

The LOC committee is very enthusiastic about this new Center and would like to support it given the appropriate responses to our main points before recommending it to the Medical School Council for approval. Thank you.

I personally thank the LOC and the reviewers for taking time and providing guidance and constructive criticism. On advice of LOC I look forward to the day that it can be brought forth in the Medical School Council for discussion and for voting. Thank you.



UNIVERSITY OF MIAMI
MILLER SCHOOL
of MEDICINE

August 22, 2018

Tomas Salerno, M.D.
Chair, Faculty Senate
University of Miami
Ashe Building, Suite #325
252 Memorial Drive
Coral Gables, FL 33146

Re: Council Approved a Proposal to Create and Name a Center – Miami Integrative Metabolomics Research Center (MIMRC)

Dear Dr. Tomas Salerno,

This is to inform the Faculty Senate that the Medical School Faculty Council met on August 14, 2018 to review the **Proposal to Create and Name a Center – Miami Integrative Metabolomics Research Center (MIMRC)**.

The council members voted to *approve* the proposal.

Respectfully Submitted,

Sanjoy Bhattacharya, M.Tech, Ph.D.
Speaker, Medical Faculty

Medical School Faculty Council

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John L. Bixby, Ph.D.
Vice Provost for Research

February 11, 2019

Sanjoy Bhattacharya, PhD
Professor, Dept of Ophthalmology
University of Miami Miller School of Medicine

Re: Miami Integrative Metabolomics Research Center (MIMRC)

Dear Sanjoy,

It was helpful to discuss the proposed center (MIMRC) with you. My understanding is that you will be developing this center to foster collaboration among researchers interested in taking advantage of metabolomics techniques to strengthen their respective research programs. The idea of the MIMRC is to share reagents and protocols, and to facilitate cross-fertilization of ideas. Beyond fee-based usage of the associated Core, formation of the MIMRC will enable the organization of formal seminar and workshop programs to showcase the latest metabolomics techniques and to invite discussion on the scientific advances possible by virtue of various metabolomics platforms. Further, it is plausible that formation of the center will make us more competitive for multi-disciplinary grants such as those from the Common Fund Metabolomics Program, as well as enabling targeted philanthropy. I am aware that all user charges originating from the MIMRC will be collected as an activity of the currently approved mass spectrometry Core.

This letter is to express my support for this center; I wish you the best of luck in this endeavor.

Sincerely,

John L. Bixby, PhD
Professor, Vice Provost for Research

From: [Cole, Barbara A](#)
To: [Bhattacharya, Sanjoy K](#)
Cc: [Senate Chair](#); [Faculty Senate Office](#); [Vera, Lionel Jesus](#)
Subject: RE: Miami Integrative Metabolomics Research Center (MIMRC)
Date: Wednesday, February 13, 2019 12:46:56 PM
Attachments: [image002.png](#)
[image004.png](#)
[image005.png](#)

Dr. Bhattacharya,

The pleasure was mine. We enjoyed seeing your facility and learning about it. Lionel Vera will stay in contact to assist you when your additional efforts and scope increases to the point you are ready to move to the next step. Thank you.

Cordially,

Barbara A. Cole

Associate Vice President

Tel: (305) 284-3965 **Cell:** (305) 798-8511

bacole@miami.edu

Office of Research Administration

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From: Bhattacharya, Sanjoy K <SBhattacharya@med.miami.edu>
Sent: Tuesday, February 12, 2019 10:21 AM
To: Cole, Barbara A <bacole@med.miami.edu>
Cc: Senate Chair <senate.chair@miami.edu>; Faculty Senate Office <facsen@miami.edu>
Subject: Miami Integrative Metabolomics Research Center (MIMRC)

Dear Ms. Cole,

Thank you very much for stopping by and having discussions about MIMRC. This email complements



August 28, 2018

Sanjoy K. Bhattacharya, Ph.D
Bascom Palmer Eye Institute
University of Miami Miller School of Medicine

Dear Sanjoy,

This letter is to confirm my support for **Miami Integrative Metabolomics Research Center (MIMRC)**. This center is to promote collaboration of a group of interdisciplinary researchers and clinician-scientists. It is expected to support interdisciplinary projects pertinent to Neuroscience, Medicine, Cancer, Surgery, Ophthalmology/Vision Science and others that will use proteomics/lipidomics and metabolomics approaches.

The collaboration is expected to bring greater number of funded and impactful interdisciplinary research. This will be facilitated by optimal utilization of common instrumental platforms, their maintenance and cross-fertilization of ideas. Ophthalmology core facility will continue to operate on the model of fee-based services and will be subsumed in MIMRC. You are building this center with procured and donated instruments. I am glad that you have met with some success from U. S. Department of Justice/Drug Enforcement Administration to receive donation of instruments and some more are likely to be obtained as your detailed in medical school council presentation.

Some of these instruments maintenance are supported by NEI/NIH core grant. The partial operator salary are covered with fee-based services. You also aim to build funds for the maintenance of other instruments are supported by user fee and your/others funded grants. You plan to add new instruments using extramural grants. You also aim to attract philanthropic support as possible. For minor repair or emergencies, you utilize the research, research education and innovative medicine support mechanism.

Your instruments have been used by several individuals from different academic units such as Drs. Dana Ascherman and Alessia Fornoni (Medicine), Drs. Roberto Vazquez-Padron and Santanu Banerjee (Surgery) who are supportive of MIMRC. The aim of MIMRC is to create an interdisciplinary group of "Involved participants" rather than just "passive" users. I am aware of the efforts put into this work and express my strong support for MIMRC.

Sincerely,

Henri R. Ford, M.D., M.H.A.

*Henri R. Ford, M.D., MHA
Dean and Chief Academic Officer
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