

**Proposal for Renaming the Center for Materials Research to the  
WSU Materials Research Institute (WSU-MRI)**  
*An integrated education, infrastructure, and research paradigm for advanced materials  
development and external engagement*

*Kelvin Lynn*, Regents Professor, Director - Center for Materials Research, [kgl@wsu.edu](mailto:kgl@wsu.edu)  
John M. McCloy, Director Materials Science and Engineering PhD Program,  
[john.mccloy@wsu.edu](mailto:john.mccloy@wsu.edu)  
*Aurora E. Clark*, Past Director - Materials Science and Engineering PhD Program,  
[auclark@wsu.edu](mailto:auclark@wsu.edu)

POC: John M. McCloy, Director Materials Science and Engineering PhD Program,  
[john.mccloy@wsu.edu](mailto:john.mccloy@wsu.edu)

## **I. Executive Summary**

Materials Science research and education is at a crossroads. Within the last five years, the PhD population at WSU has plateaued while our peer institutions have flourished; the ranking of the Materials Science and Engineering PhD program has not yet broken the top 40; we have not yet been able to create long-standing and sustained interactions with Industry; and despite strong individual PI research programs, faculty within this field have been unsuccessful at securing large multi-institution interdisciplinary grants. Given the future prospect of flat or decreasing federal funding levels, and the expectation amongst our peers of interdisciplinary collaborative research, we must adopt a new paradigm for growing and ensuring excellence. Based upon analysis of the top 25 Materials Science programs throughout the US, we propose that the future of materials research at WSU depends vitally upon the expansion and diversification of our research portfolio, investment into well-maintained and shared research infrastructure, and growth of the graduate workforce that supports large research programs. Toward that end, the existing facilities found in the Center for Materials Research (CMR) will be leveraged alongside a recently acquired central F&A contribution, to change CMR's vision and goals to support research diversification, a large shared instrumentation facility with engineering support staff, and growth of the PhD student population. This proposal outlines this process and the concomitant renaming of CMR into the **Materials Research Institute (MRI)**.

The refocus and renaming of CMR into the MRI is based upon the confluence of several factors that will ensure success of the key objectives of the Institute, which include, growth of industrial funding, growth of the Materials Science and Engineering PhD program, and diversification of the materials research portfolio supported by a large shared instrumentation facility. As outlined below, Clark and Lynn have recently obtained a \$1.7Mil X-Radia X-ray nano-computed tomography microscope (X-Radia nano-CT) that will be the flagship instrument of the shared facility, will diversify the materials research that can be performed at WSU, and will greatly increase industrial collaboration and funding. The instrument, funded by the Joint Center for Research in Earth Abundant Materials, and the Murdock Charitable Trust, is the first at an academic user facility in the US. Commensurate with this acquisition, we have secured a 21% F&A cost-return from the Central administration. The approved cost return does not impact the F&A distribution to Colleges or Departments, and will go toward supporting the ongoing maintenance of the nano-CT microscope, investment in the shared instrumentation facility, a permanent engineering lab manager position, and research assistantships for recruiting new PhD students into the MSE PhD program. The Central support of the MRI will allow it to become the primary administrative unit for materials

research, providing focus and a cohesive infrastructure for materials science and engineering research and education on throughout the WSU system.

## **II. Rationale for the Name Change**

Within this section we demonstrate the historical evidence for research growth and interdisciplinarity that is enabled by a central F&A return that does not impact Colleges or Departments. This is based upon the analysis of the history of the Center for Materials Research (CMR), and provides justification for the change in vision and mission that will be adopted in the Materials Research Institute (MRI).

### ***II.a History of Center for Materials Research***

The Center for Materials Research (CMR) was established in 1996, to “better position the University in attracting and conducting research in materials related areas and strengthen the educational capabilities of the University.” Its primary goals were to:

- “Provide a forum which promotes and encourages interaction between interested researchers. In particular, it is the intention to foster strong interdisciplinary ties between various faculties in the Division of Sciences and the College of Engineering that would lead to joint projects and strong joint proposals.
- Provide mechanisms to improve educational programs in materials science, with a strong emphasis on interdisciplinary education and training in the basic and applied sciences.
- Provide a focal point for the purchase and construction of shared equipment and the development of other resources such as computer software. In this way, the Center could help coordinate efforts to expand and modernize the University's resources.
- Provide the University with heightened visibility to agencies and Government Laboratories outside the University.

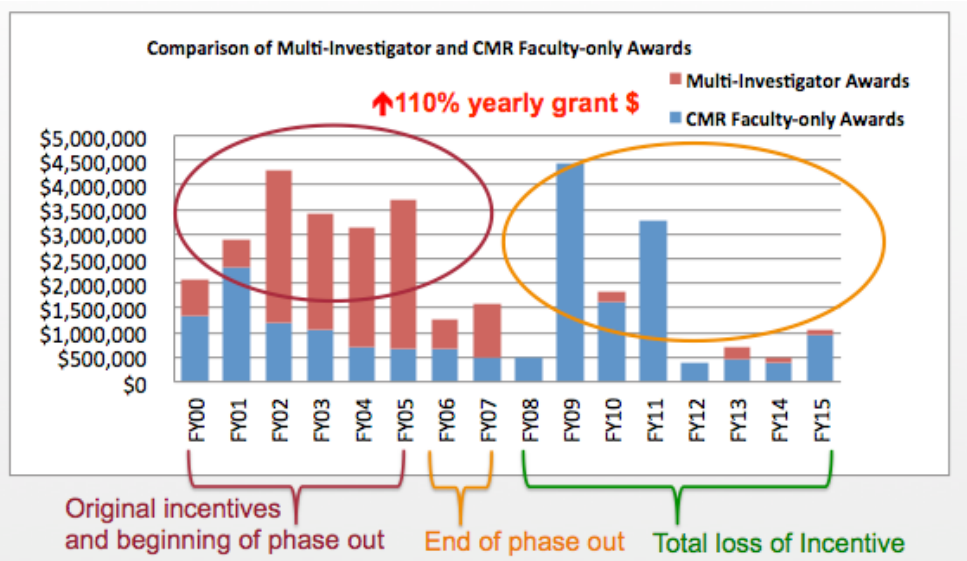
The initial financial model employed by CMR was one of 21% cost matching of all indirect funds brought in the Center from the Central administration. As observed in Figure 1, the cost match from Central incentivized interdisciplinary multi-PI funded grants and CMR could consistently bring in ~\$4 M in federally funded awards annually. However, due to changes in this structure the cost matching structure imposed by subsequent Provosts, the research portfolio within the CMR vision began to change to a single PI. Changes in the distribution of F&A began in FY06 wherein the cost match began to be taken directly from the F&A return to the departments, thus dis-incentivizing multi-PI grants because of negative economic impact to the departments of the co-PI's. As observed in Figure 1, the cost-match provided by Central led to 110% increase in annual funded dollars relative to when no cost-match was enacted. This change in F&A distribution back to CMR effectively ended the multiuser phase of CMR by FY08. Due to the disincentives, CMR became largely funded by the Director's grants and limited F&A return by the colleges and departments. This issue was brought up during the repeat reviews and meetings.

Little shared use has occurred within CMR due to institutional methods of F&A fund sharing and no funds were ever captured from the User Facilities. Given the highly specialized nature of CMR instrumentation, the user fee associated with the CMR Cleanroom has proven to be too financially

burdensome to support most of the faculty users who would otherwise benefit. Thus, this facility has suffered from a lack of general use, despite significant investment and subsidy (by equipment maintenance and engineering support) by the Director's grant funds.

In combination, the user fee data and the historical grant expenditure records provide strong historical evidence of the economic power that incentivizing interdisciplinary research can have within the University, and it is this model for the MRI that the current Provost has approved. The prior investments in the CMR facilities will serve as the perfect starting point for expansion into a larger shared instrumentation facility that has the X-Radia nano-CT as a capstone instrument from which larger industrial partnerships and interdisciplinary teams of research can be based.

**Figure 1.** Change in grant dollars associated with multi-investigator vs. single investigator awards as a function of the extent of incentivization of interdisciplinary research from cost matching from Central for CMR.



**II.b Growth of Materials Research at WSU.**

At the same time that CMR has become less interdisciplinary (as it would hurt the individual Departments, as no F&A would be recaptured on any grants through the CMR), other areas of materials research have been flourishing across the WSU system. Individual researchers have grown their programs, cohorts of faculty have emerged with expertise in strategic areas like battery science and nuclear materials, and the Materials Science and Engineering PhD program has grown over the last decade from ~25 students to 65.

Because of these successes, it is the ideal time to reanalyze materials research to integrate strengths to be able to strategically invest and grow infrastructure capabilities and education as an integrated unit.

The WSU MSE PhD program is currently ranked 46<sup>th</sup> in the nation. Given the intertwined nature of research expenditures and focused PhD programs, much can be learned from analysis of the top 25 PhD programs as it pertains to creating a path toward institutional excellence. The top 25 PhD programs in MSE have the same average number of faculty, but more than double the number of

students (65 vs. 144) and several support staff to manage labs and equipment. These institutions have extensive industrial collaborations with more than triple the subcontracts that MSE faculty currently have, which in turn provides industrial internships and high placement of the PhD students. Large, multi-institutional transformative grants are also a hallmark of a top 25 institution, including Materials Research Science and Engineering Centers from the National Science Foundation (NSF-MRSEC), Centers for Chemical Innovation (NSF-CCI), Department of Energy funded Energy Frontier Research Centers (DOE-EFRC's), and Department of Defense funded Multidisciplinary University Research Initiatives (DOD-MURI). Out of all the MRSEC and EFRC grants led by academic institutions – over half of them have been awarded to a top 25 school (ranking for MSE according to US News and World Report). In order to support these activities, those institutions have developed an extensive shared instrumentation infrastructure that enables modern materials research. They also invest in instrumentation support via permanent engineering positions. These staff manage and maintain the equipment but also train and guide graduate students. While students come and go, research equipment can last for several decades. Having a permanent employee to support the equipment ensures that working knowledge of the instruments and research-specific processes are not lost. Furthermore, consistent support and training minimizes down time and increases research productivity. In turn, these top 25 facilities have increased the degree opportunities for PhD students (enabling degree specializations and certificates), which also helps to grow the student body.

The aim of this proposal is to leverage the existing facilities found in the Center for Materials Research with central F&A contribution, and **rebrand the Center into the Materials Research Institute** – a unit that will adhere to the original principles of CMR and work to address the two fundamental stop-gaps toward WSU becoming a top 25 university in the area of materials science and engineering. These stop-gaps are:

*Growth of the PhD program.* Funding students during their first year students is the single most important element of growth in the MSE PhD program. In large PhD programs at WSU, for example Chemistry (which has 120 PhD students and is the largest single degree PhD Dept.), a massive service teaching load for general education supports teaching assistantships such that 25-30 incoming PhD students can be supported prior to moving onto grant funded positions their second year. The current funding mechanisms for first year MSE students does not support any growth beyond the existing 65 student PhD's (~10-15 incoming students each year). It is essential that an alternative pathway be developed to support first year students. This path must be based upon research success and grantsmanship to ensure that students can also be supported beyond their first year.

*Broadly shared state-of-the-art instrumentation.* The instrumentation capabilities at WSU within materials science are varied and heterogeneous, and they are not leveraged for educational purposes that could enhance graduate research and increase recruitment and retention. A lack of integration represents a major limitation for both faculty and students. Faculty are not easily able to access **all** MSE instrumentation as disparate pricing structures make instrument usage financially burdensome, which in turn limits the research scope within MSE.

*Engineering support position.* While CMR has supported an engineering lab manager, individual faculty in the MSE program do not have this resource. Engineering support in CMR has enabled safety training, maintaining equipment, rapid design modifications, and process optimization which have all proven to be a great benefit to students and research. This support has also allowed CMR to operate **without maintenance contracts** from manufacturing vendors, saving time and money. The integration of instrumentation with

CMR will require a permanent position for support, maintenance, management, training, and safety. Having this support will alleviate pressure on faculty and allow them to focus their efforts on other research activities, mentoring, publications, future funding, etc.

This proposal seeks to address these shortcomings, by cohesively integrating the existing research, education and instrumentation by renaming and rebranding the vision of the Center for Materials Research into the Materials Research Institute (MRI). The MRI will maintain a interactive relationship with the interdisciplinary PhD program in MSEP (under the Graduate School) that will help support research assistantships for graduate students and increase training opportunities via industrial collaborations depending on funding of large grants. Other MSE-related centers, institutes, laboratories, and groups may also be included in the MRI as agreed to by the relevant directors and PIs.

The combined resources of the MRI will advance science and technology focused on finding creative solutions to develop new materials and improved existing materials for national challenges within important fields of national defense, alternative energy supply, and US infrastructure. The scope of activities conducted by the institute will include (but is not limited to):

- Conducting fundamental research, aligned with the broader faculty in materials science and engineering focused on functional and responsive materials for energy production, sustainable energy, enhanced national security, and a safe US infrastructure.
- Providing hands-on education, safety instruction, and training opportunities for future materials scientists and engineers, a recognized national shortage and priority.
- Engaging in effective partnerships with U.S. Departments of Energy, Defense, Homeland Security, national laboratories (PNNL and others), industry, and other entities.
- Facilitating the transfer of intellectual property into practical solutions in materials creation and production.

***II.c Vision and Mission.*** The mission of the WSU Materials Research Institute is to ensure that WSU achieves excellence in research in the expanding field of materials science and engineering across Departments and Colleges. Recognizing the existing limitations of our research and education efforts, the MRI will create a natural path to invest in human capital and in shared research infrastructure. The role of MRI is to help foster and provide focus for materials science and engineering research and education on throughout the WSU system. It will provide the much-needed **cohesive infrastructure** to expand and grow materials research, increasing the student body, increasing industrial contracts, creating new opportunities for faculty and students, and enabling truly interdisciplinary research without imposing the limitations or boundaries inherent to departmental structures.

The MRI will:

- 1) Provide faculty and students on the WSU Pullman campus with the necessary case of providing instrumentation, associated infrastructure, and staff support needed to conduct present materials research. Since its inception in 1996, the CMR has become a world-class facility focused upon the synthesis and characterization of crystalline materials. This includes a current inventory of a Class 1000 Cleanroom, a positron spectroscopy laboratory, high temperature growth facilities and equipment for synthesis of crystal materials, and an array of laboratory and equipment for materials characterization (defect engineering). Nearly all instruments have been funded through grants awarded to the Director (via federal agencies, Keck, and some private industry) and have been supported by engineering staff. The MRI will work with MSEP to enable **formal courses that leverage the combined CMR**

- with other WSU facilities for training** and student certificates, as well as the growth of MRI in a **broader user facility** that will encompass the full breadth of materials research performed by existing MSEP faculty. This will occur via instrumentation grants submitted through MRI, including NSF Major Research Instrumentation (NSF-MRI) grants and the Murdock Charitable Trust. This has been recently shown with the acquisition using a combination of funds to purchase of a \$1.7 Mil Xradia microscope.
- 2) Promote interdisciplinary research in materials at WSU and help **coordinate well balanced materials research and education** with MSEP and among the participating departments. For example, the MRI Director(s) and the MSEP Director will submit NSF Research Traineeship grants (NRT's), Department of Education Graduate Assistantships in Areas of National Needs (GAAN), and NSF Science Technology Center (STC) grants.
  - 3) Work with the College Deans and Department Chairs to ensure a well balanced hiring strategy that will include one faculty from all Colleges participating in the hiring process for a person involved in the MRI (i.e. an interdisciplinary search committee in the spirit of interdisciplinary materials science research). This is a needed departure from previous hiring practices but is needed to supplement our needs across Departments and Colleges.
  - 4) Serve as the primary administrative unit for materials research and to provide the necessary infrastructure for those faculty who could use the needed facilities and engineering support. The MRI will evaluate instrumentation needs by usage for the associated faculty across departments and colleges, using this data to support our needs as well as NSF, Murdock, and other large instrumentation proposals. The MRI will have an online instrumentation time reservation system and will coordinate student training. The MRI will standardize these practices to enhance efficiency, safety, and optimize instrument usage for maximum research impact and economic benefit.
  - 5) Collect indirect/cost matching on all multi-PI grants (WSU or other Universities or other entities including National Laboratories) submitted through the MRI and reinvest those funds into equipment reserves that support a shared instrumentation infrastructure and graduate education to grow the graduate program so as to be competitive for large multidisciplinary multi-PI grants (See Table 1, Section IV). The indirect cost-match has been approved by the Provost and Joan King (appendix VI.c) and does not affect the normal F&A return to a College, Department, or other unit.

The MRI will support graduate education and expansion of the MSEP PhD program by:

- 1) Using indirect returns from MRI grants to financially assist graduate recruitment by providing additional RA's for first year students, through signing bonuses of talented students for which WSU would not normally compete. Additionally, industrial collaborations will be used as a means to develop internship programs for PhD students, and provide unique training opportunities on state-of-the-art equipment enabled by the shared instrumentation facility. This strategy will increase the student population to support larger materials science and engineering research efforts and expanded degree opportunities within MSEP (e.g. certificates in nanotechnology or other specializations).

Through these activities, the MRI will be able to achieve three major goals:

- 1) To double the enrollment of the MSEP PhD program within a 10 year period, from the current value of ~65 to ~120 PhD students, commensurate with the top 25 PhD programs across the country – an activity that will benefit all new faculty hires and aid in recruitment and retention of exceptional new faculty and students,
- 2) To increase the level of industrial engagement, formalized internships, and professional development opportunities for students (also in-line with a top 25 PhD MSE Program), and

- 3) To create teams of faculty across departments to collaborate on large multi-institutional research grants that are focused upon the design, synthesis, characterization and manufacturing of materials in areas of national need.

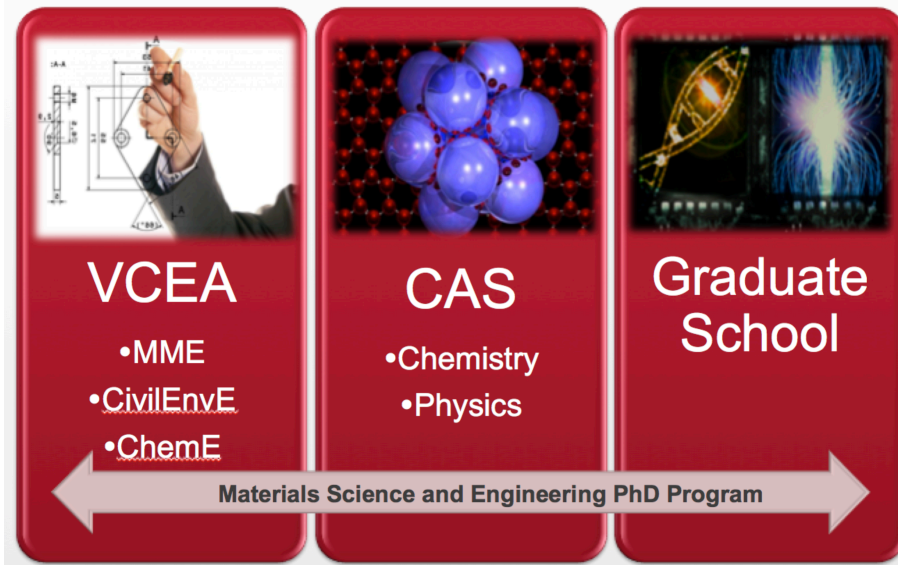
#### ***II.d Expansion of Instrumentation Facilities***

Through indirect cost recovery mechanisms and major research instrumentation proposals, the MRI will be able to reinvest in the facilities associated with the CMR to expand its synthesis, materials characterization, and in-situ probes for developing new and improved materials and material manufacturing methods critical for the Nation. PI's Lynn and Clark have already begun this path by acquiring an XRadia Ultra nanoscale X-Ray microscope, a revolutionary research tool that crosscuts many disciplines. It provides non-destructive 3D imaging with full 3-dimensional rendering of the microstructure of a material, including virtual cross sectioning, multiscale and correlative imaging, quantitative analysis of 3D volumes, where measured microstructures can be used as input for numerical modeling. Nanoscale 3D X-ray imaging has been previously only available at national and international high-energy synchrotron user facilities, and the Zeiss XRadia Ultra is the first lab-based instrument to enable near "nanofocus synchrotron" resolution, down to 50 nm. The XRadia microscope will be a cornerstone in the expanded shared user facility within the MRI, which is already leveraging current infrastructure and support by CMR's engineering lab manager.

#### ***II.e Relationship of MRI and the Interdisciplinary Materials Science and Engineering PhD Program***

Despite the research funding success of the original CMR implementation, there has never been a connection with these research units and the training of PhD students – a feature that is incredible in light of the potential impact that this could have in the context of expansion of degree options for MSEP and specialization/certifications of high value to a PhD. With the MRI, we seek to tightly couple these two university functions, education and research.

Toward this end, it is pertinent to understand the existing organizational structure of MSEP. The interdisciplinary PhD program in Materials Science and Engineering has academic homes in the Voiland College of Engineering and Architecture and the College of Arts and Sciences. As an interdisciplinary graduate program, it is administered through the Graduate School. Through the most recent MOU, each of the Colleges helps to support the Program by providing a total of 6 teaching assistantships each semester, along with modest operating costs (\$40,000 per year), and paying for the ADR for the Director of MSEP. The graduate school supports the Program by providing 6 research assistantships each semester that are primarily used to support first year graduate students, and are implemented as a recruiting tool to attract the highest quality incoming student body. After the first year of support provided by MSEP, individual faculty advisors are responsible for the support of their students.

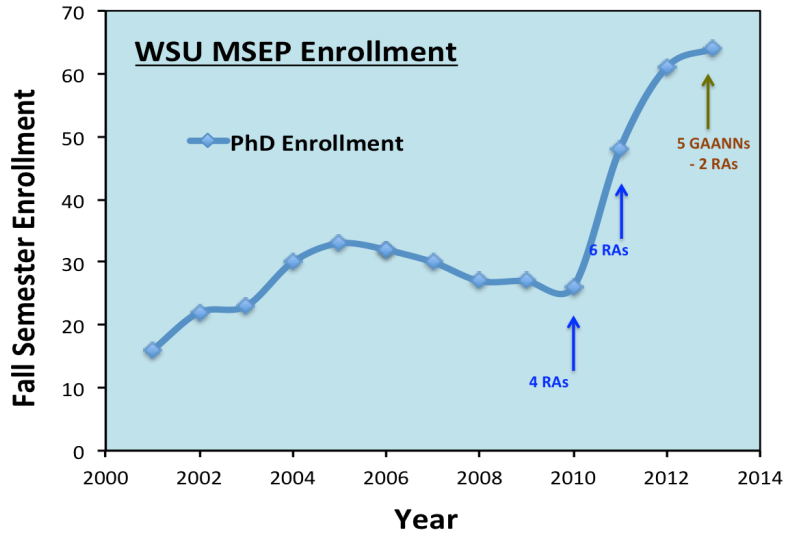


The size of the student body associated with MSEP is directly correlated with the availability of financial support for incoming PhD students. In general, the MSEP affiliated faculties are well-funded and have few issues supporting PhD students beyond their first year; however, faculty are generally hesitant to pay for 1<sup>st</sup> year students off grants. Thus, the incoming student body dictates the total size of the program, which is in turn dictated by the level of support that the Program can provide for 1<sup>st</sup> year students. With the TA's and RA's described above, the incoming class is limited to a size of 12-15 students per year, which results in a total enrollment of the PhD program at ~65 students. This is demonstrated in Figure 5, which shows the increase in enrollment of PhD students with increases in support for 1<sup>st</sup> year PhD students. The enrollment was steady at ~25 students prior to any funds invested in the program, then with the support provided by the graduate school (initially 4-6 RA's each semester) the enrollment jumped to ~50 students. A GAAN grant was obtained by previous Director Indranath Dutta and the MOU was renegotiated to enable more TA support from the Colleges, which helped increase the enrollment to the current steady value of ~65 students. We routinely reject some 1<sup>st</sup> year students that faculty would like in their groups as a consequence of our limited funding, and thus a new financial model that helped to grow the support for 1<sup>st</sup> year students would allow us to grow our student body in accordance with a top 25 PhD program.

Students who graduate from MSEP with a PhD are well-employed, with 44% going directly into industry, 18% going directly into tenure track academic positions and approximately 10% each going into national laboratories, post-docs and as research faculty. Our alumni are currently an untapped resource for development and donation, professional opportunities for existing students, and continued engagement in research activities. It is a best practice within top 25 PhD programs to utilize alumni to create relationships that lead to professional development programs for students (internships). Further, alumni also serve as a conduit for engaging industry to learn what industries needs are and for enhancing potential faculty contracts with those companies. The existing financial model and infrastructure does not allow us to currently pursue these opportunities.



**Figure 2.** Change in enrollment in the MSE PhD program as a function of time and with increases in student support for 1<sup>st</sup> year PhD students.



Analysis of the top 25 PhD programs in MSE reveals a consistent set of statistics.

- Avg # PhD students: 144
- Highly interdisciplinary – on average 34% and up to 50% of faculty are joint appointments across departments and colleges
- Extensive shared facilities for faculty and students
- Engineering Lab Manager for safety, training, and support
- Provide PhD specializations and training certificates
- Extensive industrial engagement/sponsorship with formalized internship programs, industrial relations, external industrial advisory committees and professional development opportunities for students

Growth of the PhD program is synergistic with the ability to grow the research enterprise in MSE, CMR and now the MRI at WSU. We must have the coordinated manpower and carefully selected new hires to be able to fulfill research needs within large interdisciplinary and multi-institution grants and joint search efforts for new hires into the MSE. We have sufficient evidence to show that the PhD program can and will grow according to the ability to support students in their first year of their PhD. Thus, a new financial model that allows the MRI to reinvest in the MSE PhD program, according the grant successes of the faculty, would allow a rational strategy for growth (see Section IV).

### III. Administration and Membership Within MRI

#### III.a Initial Membership

The reporting structure of MRI will be unchanged relative to CMR, where the Director reports to Voiland College of Engineering and Architecture (VCEA) and the College of Arts and Sciences (CAS). The Graduate School will continue to oversee the interdisciplinary PhD program in Materials Science and Engineering with the bylaws of the MSE PhD program being unchanged. All initial

members will be comprised of the MSEP faculty and those faculty that currently participate in CMR (see Appendix VI.e).

### III.b MRI External Advisory Board

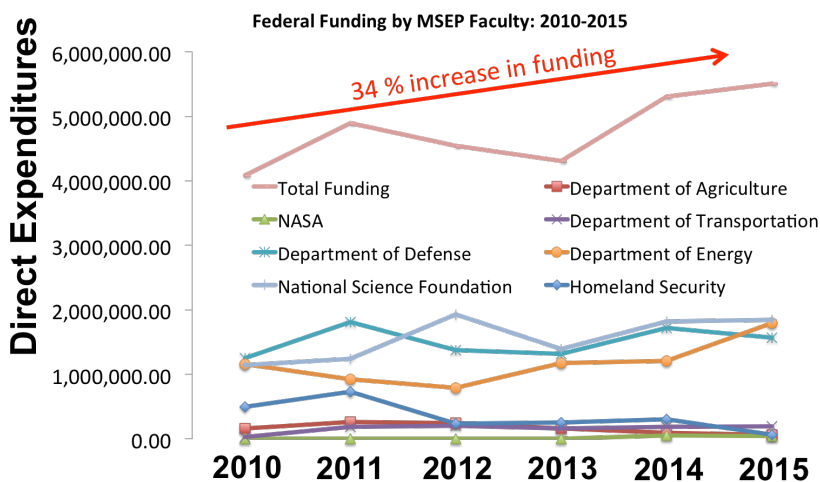
An advisory council will serve as a conduit for keeping MRI apprised of the most pressing needs within materials research from an industrial perspective, and from a US infrastructure and global demand perspective. It will be composed of at least two staff from industry, and at least 2 staff from national laboratories.

- a. Appointment to the advisory council will be for a renewable three-year term (max 2 terms).
- b. Names for advisory council members will be solicited from the MRI and MSE membership.
- c. MRI members will vote on the selection of individuals for the advisory council by a simple majority vote.
- d. Duties of the advisory council will include (but are not limited to):
  - i. Provide guidance about industrial engagement of the Institute
  - ii. Provide feedback and perspective regarding large collaborative proposals deriving from the Institute
  - iii. Help ensure the success of the Institute through feedback and internal assessment regarding the composition of MRI– helping to address potential deficiencies in the research portfolio.

## IV. Implementation

The economic impact associated with the MRI is dependent upon the external grant funding brought about by multi-PI multi-institution grants. Between the years of 2010 and 2015, the MSEP faculty direct expenditures increased by 34% (Figure 5).

**Figure 3.** Change in federal funding direct expenditures of the MSEP faculty from 2010 to 2015.



Now, let us assume a modest impact of the MRI where the Institute is able increase external grants an additional 10% per year. Using the 5-year average F&A from all current MSEP faculties we can

project the net increase in F&A that is brought to the Colleges, Departments and to the Central Administration as a result of the formation of MRI (Table 1). A cost match model has been approved by the Provost and Joan King in Table 1, where the MRI will have matching F&A from Central for the purposes of reinvestment in both the graduate education and instrumentation infrastructure of the MRI. In Year 1, Central will match 21% of the F&A, in Year 2 Central will match 21%, then in years 3-5 Central will match 12%. Up to 50% of the recovered funds will go to the Graduate School for reinvestment of RA's for the MSE PhD program. The GS will maintain its continued support of MSEP with RA's each semester. The graduate school will also support the MSEP through tuition waivers, both "all but dissertation" (ABD) waivers and flexible waivers. The other 50% of the matched F&A will go to the MRI for instrumentation and lab management. This budget model has been approved by the Provost and Joan King, as described in Appendix VI.c.



**Table 1.** Change in F&A to units upon creation of MRI with a scaled cost match over a 5-year period from Central. This assumes that MSEP faculty will continue to have their average 6% increase in F&A expenditures per year (totaling 34% over 5 years), and that MRI will cause an additional 4% per year increase in FA expenditures.

	Yr1	Yr2	Yr3	Yr4	Yr5
% Match from Central for MRI	21%	21%	11.67%	11.67%	11.6%
Central F&A (Δ)	1,501,380 (-200,719)	1,651,518 (-152,707)	1,859,693 (-52,786)	2,045,662 (18,434)	11,250,228 (101,366)
Colleges F&A (Δ)	183,514 (6,673)	201,866 (14,414)	222,052 (23,353)	244,258 (33,637)	268,684 (45,425)
Dept. F&A (Δ)	344,090 (12,512)	378,499 (27,026)	416,349 (43,788)	457,984 (63,069)	503,782 (85,173)
VPR F&A (Δ)	91,757 (3,336)	100,933 (7,207)	111,026 (11,676)	122,129 (16,818)	134,342 (22,712)
MRI Budget	264,494	291,444	277,566	305,322	335,855
# Added RA's to MSEP	10	12	11	10	10
Instrumentation and lab management	100,000	100,000	100,000	150,000	175,000



The timeline the coordination of training and educational activities is presented in Table 2.

**Table 2.** Timeline associated with the MRI integration of CMR.

<b>Activity/Yr</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Work with other University Centers, including the Composite Materials Engineering Center to create single pricing structure	✓				
Deploy online software reservation system for all instruments and website describing all services	✓				
Streamline and create shared training activities for instrument “bundle” model		✓			
MRI faculty will submit NSF Major Research Instrumentation proposals and indirect cost returns will be invested in instrumentation and MSEP PhD RA’s	✓	✓	✓	✓	✓
Streamline hiring of engineering lab manager position to minimize cost and maximize usage of equipment	✓				
Create shared instrument reserve budget for reinvestment and maintenance	✓				
Work with MSEP PhD program to create new courses				✓	✓

**VI. Assessment Plan**

An annual report document will be assembled that collates a variety of metrics for assessment of the success of the Institute. These metrics include

- i. Collaborative publications amongst Institute participants
- ii. Number of external funding opportunities proposed through the Institute (funded and unfunded)
- iii. Number of Institutional partnerships with National Laboratories, other Universities, and Industry.
- iv. Number of trainees mentored through Institute activities.
- v. Other service activities of the participants that are enabled through the existence of the Institute.

The annual reports, which will be disseminated to all participants and the Advisory Council, will be used to assess the success of the Institute 5 years from its approval by the Faculty Senate (est. Spr 2019). The same metrics of performance for the annual review document will be used for the 5-year review (est. Spring 2024).

**VI. Appendices**

***VI.a Letter of Support from Dean of College of Arts and Sciences and Dean of Voiland College of Engineering and Architecture***

***VI.b Letter of Support from Dean of the Graduate School***

***VI.c Provost Memo for F&A cost recapture***

***VI.d Participating faculty***

MEMORANDUM

To: Joan King, Associate Vice President and Chief Budget Officer

From: Daniel J. Bernardo, Provost and Executive Vice President

Subject: Materials Science Institute F&A Allocation

Date: April 18, 2017

The purpose of this memo is to request the implementation of a diversion of 21% of the central portion of F&A from the newly formed WSU Materials Science Institute (MSI) for Fiscal Years 2019 & 2020, followed by a 11.67% diversion for years 3-5. At the end of year 5, the program will be reviewed to ensure it is meeting its goals. The MSI is being led by Dr. Aurora Clark and represents a significant advancement in one of WSU's key programs for advancing the Research Grand Challenges and the Drive to 25. This portion of F&A is required to operate a very expensive piece of equipment (Xradia Ultra 810 3D imaging platform) that Aurora and her colleagues have secured \$1.75 million to purchase from the Murdock Charitable Trust, JCDREAM, and other sources.

Dr. Clark has developed a pro forma budget that clearly shows the fiscal benefit to all parties (including the WSU Central Budget) as a result of launching the MSI and purchasing the equipment. Even with a modest growth rate of 10 percent in grant awards, positive returns to all parties (central budget, colleges, department and the VPR) will be realized. Pending proposals from the MSI total \$2 million, with over \$40 million in requests currently in preparation.

Chris Keane, Vice President for Research, joins me in endorsing this proposal which is clearly a low-risk, high-return proposition. We need to move on the purchase of this equipment immediately; therefore, agreement on this F&A distribution is required as soon as possible.

Thank you for your cooperation.

*21% 21% 11.67% 11.67% 11.67% per note above*

	Yr1	Yr2	Yr3	Yr4	Yr5
% Match from Central for MSI	18%	18%	10%	10%	10%
Central F&A (Δ)	1,501,380 (-200,719)	1,651,518 (-152,707)	1,859,693 (-52,786)	2,045,662 (18,434)	2,250,228 (101,366)
Colleges F&A (Δ)	183,514 (6,673)	201,866 (14,414)	222,052 (23,353)	244,258 (33,637)	268,684 (45,425)
Dept. F&A (Δ)	344,090 (12,512)	378,499 (27,026)	416,349 (43,788)	457,984 (63,069)	503,782 (85,173)
VPR F&A (Δ)	91,757 (3,336)	100,933 (7,207)	111,026 (11,676)	122,129 (16,818)	134,342 (22,712)
MSI Budget	264,494	291,444	277,566	305,322	335,855
# Added RA's	10	12	11	10	10
Instrumentation	100,000	100,000	100,000	150,000	175,000

Cc: Kirk Schulz, President  
Stacy Pearson, Vice President, Finance and Administration  
Christopher Keane, Vice President, Research



TO: Dan Bernardo, Provost and Executive Vice President

FROM: Daryll B. DeWald, Dean *Daryll B. DeWald*  
College of Arts and Sciences

Mary Rezac, Dean *Mary E. Rezac*  
Voiland College of Engineering and Architecture

DATE: November 3, 2017

SUBJECT: Support for the proposed Materials Research Institute

Please accept this letter as my strong support for the proposed Materials Research Institute (MRI), as a name change to the existing Center for Materials Research (CMR). The MRI is a concept whose time has come for Washington State University (WSU), as it will be an expansion of CMR to become a larger shared instrumentation facility with enhanced industrial engagement.

The MRI unites disparate areas of materials science, provides both faculty and students a more understandable organizational structure, and leverages funds for shared facilities and research equipment between our Colleges. It will expand and solidify WSU's reputation in advanced materials, renewable energy materials, and materials for national defense. The MRI will meet and enhance the intent of WSU's Drive to 25.

In my discussions with Aurora Clark and Kelvin Lynn, I have pledged that I support the Central F&A return for the MRI. It would start at 21% in years 1-2, then go to 11.67% in years 3-5, then have a sustained 7% return thereafter. This represents my belief in the proposed MRI. I also support a replacement position and a national search for the Director of MRI when Kelvin Lynn retires in the future.

April 11, 2018

Daniel Bernardo  
Provost and Executive Vice President  
Washington State University

Letter of Support for the Materials Research Institute and associated Materials Science & Engineering PhD program

Dear Provost Bernardo:

I am writing this letter to express support for the proposed Materials Research Institute (MRI). As a rebranding of the WSU Center for Materials Research (CMR), the proposed MRI includes the vision of an expansion of CMR into a larger shared instrumentation facility with enhanced industrial engagement, coupled to the fiscal support necessary to grow the existing interdisciplinary Material Sciences & Engineering Ph.D. program (MSEP), currently managed through the Graduate School.

The proposed MRI will bring together currently disconnected areas of materials science and engineering research across the WSU system. By facilitating these interactions, the MRI can provide the necessary synergy and enhanced interdisciplinary connections that are essential to create a sustainable organizational structure for materials research at WSU. The MRI can leverage resources for shared facilities and equipment that will benefit research programs in multiple colleges and provide a platform to enhance WSU's research productivity, reputation and training of graduate students in key areas that align with the Grand Challenges. The vision of the MRI supports several metrics targeted by the WSU Drive to 25.

Based on my discussions with Dr. John McCloy and Dr. Aurora Clark (current and past MSEP directors, respectively), I am in favor of the proposed model for F&A return to support the MRI. The proposed model will provide key incentives for faculty collaboration across academic units and colleges, while minimizing disincentives to departments and schools. It is my understanding that the F&A funds will be used for equipment and lab manager support, as well as 50% of the returned F&A will be managed by the Graduate School to provide RA support for MSEP (Ph.D.) students. In the short term, to sustain the momentum for growth of the MSEP, the GS will continue to provide state-funded RA's. Furthermore, the Graduate School will provide support in the form of tuition waivers as partial matches to assistantships supported by MRI-related grants, including flex waivers to junior students and all-but-dissertation (ABD) waivers for qualified, advanced students.

Sincerely,



Lisa M. Gloss  
Interim Dean of the Graduate School

Materials Science & Engineering Program (MSEP) faculty: Jan 2018

<b>Name</b>	<b>College</b>	<b>Dept</b>
Brozik, Jim	CAS	Chemistry
Clark, Aurora	CAS	Chemistry
Hipps, Kerry	CAS	Chemistry
Lee, David	CAS	Chemistry
Mazur, Ursula	CAS	Chemistry
Yoo, Choong-Shik	CAS	Chemistry, ISP
Zhang, Qiang	CAS	Chemistry
Collins, Brian	CAS	Physics
Dexheimer, Sue	CAS	Physics
Lynn, Kelvin	CAS, VCEA	Physics, MME, CMR
McCluskey, Matt	CAS	Physics
Gupta, Yogi	CAS	Physics, ISP
Gu, Yi	CAS	Physics
Bandyopadhyay, Amit	VCEA	MME
Banerjee, Soumik	VCEA	MME
Beckman, Scott	VCEA	MME
Bose, Susmita	VCEA	MME
Field, Dave	VCEA	MME
Leachman, Jake	VCEA	MME
Li, Qizhen (Katherine)	VCEA	MME
Li, Lei	VCEA	MME
Lin, Yuehe	VCEA	MME
McCloy, John	VCEA	MME, Chemistry
Mesarovic, Sinisa	VCEA	MME
Norton, Grant	VCEA	MME
Song, Min-Kyu	VCEA	MME
Zbib, Hussein	VCEA	MME
Zhang, Jinwen	VCEA	MME, CMEC
Zhong, Weihong (Katie)	VCEA	MME, CMEC
Dutta, Indranath	VCEA	MME
Englund, Karl	VCEA	CEE, CMEC
Wolcott, Michael	VCEA	CEE, CMEC
Yadama, Vikram	VCEA	CEE, CMEC
Wu, Di	VCEA	ChemE
Liu, Hang	CAHNRS	AMDT, CMEC