

LEVEL II MEMORANDUM

DATE: May 2014

TO: Chief Academic Officers, Montana University System

FROM: Neil Moisey, Interim Deputy Commissioner for Academic, Research, & Student Affairs
John Cech, Deputy Commissioner for Two-Year & Community College Education

RE: Level II Submission Items

The campuses of the Montana University System have proposed new academic programs or changes under the Level II approval process authorized by the Montana Board of Regents. The Level II proposals are being sent to you for your review and approval. If you have concerns about a particular proposal, you should share those concerns with your colleagues at that institution and try to come to some understanding. If you cannot resolve your concerns, you need to raise those concerns at the Chief Academic Officer's conference call on **April 30th**. Issues not resolved at that meeting should be submitted in writing to OCHE by noon on **Friday, May 2nd**. That notification should be directed to Amber Dullum, Assistant to the Deputy Commissioners. If Amber does not hear from you, in writing, by **noon on May 2nd**, OCHE will assume that the proposals have your approval.

The Level II submissions are as follows:

Montana State University-Bozeman:

- Request for Authorization to Establish a Center for Mental Health Research and Recovery
[ITEM # 163-2005-R0514 | Level II Request Form](#)

Montana State University-Northern:

- Request for Authorization to Establish a Bio- Energy Center
[ITEM # 163-2801-R0514 | Level II Request Form | Attachment #1](#) | [Attachment #2](#)

May 22-23, 2014

ITEM 163-2005-R0514

Request to Establish a Center for Mental Health Research and Recovery - MSU

THAT

Montana State University will establish a new center titled the Center for Mental Health Research and Recovery (CMHRR).

EXPLANATION

This is a request to establish a new center called the Center for Mental Health Research and Recovery (CMHRR). This Center will combine the best basic, translational, behavioral and clinical science and be centered at Montana State University with collaborating institutions and organizations statewide including outreach/public awareness groups and clinical mental health care units. The Center is congruent with the mission of the Montana Office of Rural Health (MORH) which was established at Montana State University in 1987. The mission of the MORH is *"to serve its communities through: (1) collecting and disseminating information within the state, (2) improving recruitment and retention of health professionals into rural areas, (3) providing technical assistance to attract more federal, state, and foundation funding for rural health, and (4) coordinating rural health interests and activities across the state."* With this Center, we complement our mission with research and outreach specifically intended to improve mental health outcomes in line with the MSU Strategic Plan and Mission as the state's land grant institution which is to "create knowledge....and serve communities by integrating learning, discovery and engagement."

ATTACHMENTS

Level II Request Form

Montana Board of Regents
LEVEL II REQUEST FORM

Item Number: 163-2005-R0514 Meeting Date: May 22-23, 2014
Institution: Montana State University CIP Code: _____
Program Title: Center for Mental Health Research and Recovery

Level II proposals require approval by the Board of Regents.

Level II action requested (place an X for all that apply and submit with completed Curriculum Proposals Form):

Level II proposals entail substantive additions to, alterations in, or termination of programs, structures, or administrative or academic entities typically characterized by the (a) addition, reassignment, or elimination of personnel, facilities, or courses of instruction; (b) rearrangement of budgets, cost centers, funding sources; and (c) changes which by implication could impact other campuses within the Montana University System and community colleges. Board policy 303.1 indicates the curricular proposals in this category:

1. Change names of degrees (e.g. from B.A. to B.F.A.)
2. Implement a new minor or certificate where there is no major or no option in a major;
3. Establish new degrees and add majors to existing degrees; and
4. Any other changes in governance and organization as described in Board of Regents' Policy 218, such as formation, elimination or consolidation of a college, division, school, department, institute, bureau, center, station, laboratory, or similar unit.

Specific request:

This is a request to establish a new center called the Center for Mental Health Research and Recovery (CMHRR). This Center will combine the best basic, translational, behavioral and clinical science and be centered at Montana State University with collaborating institutions and organizations statewide including outreach/public awareness groups and clinical mental health care units. The Center is congruent with the mission of the Montana Office of Rural Health (MORH) which was established at Montana State University in 1987. The mission of the MORH is "to serve its communities through: (1) collecting and disseminating information within the state, (2) improving recruitment and retention of health professionals into rural areas, (3) providing technical assistance to attract more federal, state, and foundation funding for rural health, and (4) coordinating rural health interests and activities across the state." With this Center, we complement our mission with research and outreach specifically intended to improve mental health outcomes in line with the MSU Strategic Plan and Mission as the state's land grant institution which is to "create knowledge....and serve communities by integrating learning, discovery and engagement."

We note recent data from 2010, 2011 and 2012 indicate that at least 227, 225 and 226 Montanans killed themselves. Indeed, each day on average 15 Montanans attempt suicide, bringing the number of documented attempts to 5,500 annually¹. Our University students are not exempt from these statistics. According to the

¹ http://billingsgazette.com/news/local/finding-causes-of-state-s-high-suicide-rate-has-become/article_567d4e7e-0d0c-5f2b-a09f-743f59fa5702.html

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American College Health Association (ACHA) the suicide rate among young adults, ages 15-24, has tripled since the 1950s and suicide is currently the second most common cause of death among college students. Indeed, each year in the Montana University System, we lose 1-2 students to suicide. In light of these numbers, in November of 2013, Governor Bullock appointed members to a Suicide Review Board to begin to examine the underlying causes and methods of suicide in the State of Montana¹. Indeed, collaborators associated with our Center have provided input to the Suicide Review Board.

Goals of the requested CMHRR:

Here we outline how Montana State University seeks to respond to specific challenges associated with diagnosing and treating serious mental illnesses such as major depression, bipolar disorder and schizophrenia that severely restrict quality of life and are often a prequel to suicide. We propose a Center that combines interdisciplinary health and research specifically to improve the process of diagnosing and treating serious mental illness through collaborative efforts between some of the State of Montana's best neuroscientists, social scientists, clinicians, engineers, and those affected by mental illness, and their families. **The specific goals of this Center are to:**

- 1) Insure that Montanans have access within the state to cutting-edge, research-driven techniques for diagnosing and treating mental illness.** We will champion basic and applied science to increase our understanding of human mental illness, focusing on depression, schizophrenia, bipolar and related disorders.
- 2) Focus research efforts on the specific challenges presented when accessing treatment in isolated rural communities with limited treatment providers.** Accompanying cutting-edge research on underlying causes and correlates of mental illness, we will insure that benefits are not restricted to the population centers of Montana via extensive translational research and dissemination of treatments broadly throughout the state.
- 3) Serve as an information hub for the understanding and treatment of psychiatric conditions that lead to suicidal behavior.** We will provide much-needed information to families and clinics to assist in dealing with mental illness before, during and after diagnosis. Our partnerships with key Montana mental health organizations, and our service throughout the state via Extension offices insures our success in geographical distribution of information.
- 4) Create educational opportunities and jobs through the development of a regional "innovation cluster" based upon the revolutions in neuroscience and psychiatric treatment.** We have the talent within the State of Montana to extend our basic, translational, and applied work beyond the State of Montana via establishment of innovative start-up companies that insure products reach the public.

Background:

It has been decades since the last major break through in recovery from serious mental illnesses (SMI), such as schizophrenia, bipolar disorder, and major depression. In comparison to other branches of medicine, we have only a poor understanding of the basic mechanisms that cause these conditions. The desperate need for a revolution in this field is clear in Montana where the traditional methods of diagnosing and treating these conditions have not been able to overcome geographic challenges, provider shortages, cultural biases, and funding constraints. With the goal of addressing these critical challenges, Montana State University has formed a collaboration with the National Alliance on Mental Illness for Montana (NAMI Montana) to establish an interdisciplinary health and research center with the mission of improving the process of diagnosing and treating serious mental

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illness through collaborative efforts between neuroscientists, social and behavioral scientists, clinicians, engineers, people affected by mental illness, and their families. The Interim Report of the National Institute of Health's Brain Research Through Advancing Innovative Neurotechnologies (BRAIN) Working Group highlighted the need for interdisciplinary collaboration such as what we propose here to help advance brain science and technology. The Working Group specifically stated, "No single researcher or discovery will crack the brain's code. The most exciting approaches will bridge fields, linking experiment to theory, biology to engineering, tool development to experimental application, human neuroscience to non-human models, and more, in innovative ways."²

NAMI Montana asked Montana State University to establish this program, not only because this type of innovative research is important, but, also because the location where this innovative research occurs is also important. Conducting research on mental illness in Montana is the only way to ensure that innovations in this field consider the specific geographic and cultural challenges involved with Montana's mental illness treatment system. Further, a research hub within the State of Montana will likely speed the process of implementing new diagnostic and treatment protocols within the state by several years. The logistics and cost benefits of rolling a program out across Montana, following initial development in Bozeman, are substantial in comparison to rolling out a similar program developed remotely in a research institution hundreds of miles away.

Impact on students and other affected constituencies served by the proposed program:

Research on serious mental illness and suicidality, conducted at the Center, will strengthen awareness and resources for the students affected by serious mental illness and suicidal thinking. According to the American College Health Association (ACHA) the suicide rate among young adults, ages 15-24, has tripled since the 1950s and suicide is currently the second most common cause of death among college students. According to an ACHA study in 2002, one in twelve college students has actually made a suicide plan at some point and one point five out of every one hundred have actually attempted it. According to another study in the *Journal of Professional Psychology* from 2009, fifteen percent of graduate and eighteen percent of undergraduate students have seriously considered attempting suicide in their lifetimes. Between forty and fifty percent of these same students report multiple episodes of serious suicidal thoughts, suggesting substantial prior experience with suicidal ideation). Students with family members affected by serious mental illness will also benefit. According to the World Health Organization, one in four families is affected by serious mental illness and suicide rates are particularly high in senior populations in isolated, rural areas of Montana.

The relationship of the Center with NAMI Montana will ensure capabilities extend to treatment providers across the state. NAMI Montana has already secured the interest of executives of Western Montana Mental Health Center, the largest provider of adult mental health services in the state, and AWARE, Inc., the largest provider of children mental health services in the state. NAMI Montana views the Center at MSU as critical to improving Montana's mental illness treatment system "from Libby to Baker and everywhere in between." We intend to work closely with MSU Extension, who already have established and extensive networks across the state. Most importantly, MSU Extension are a trusted and respected source of health-related information to rural communities (e.g. MONT

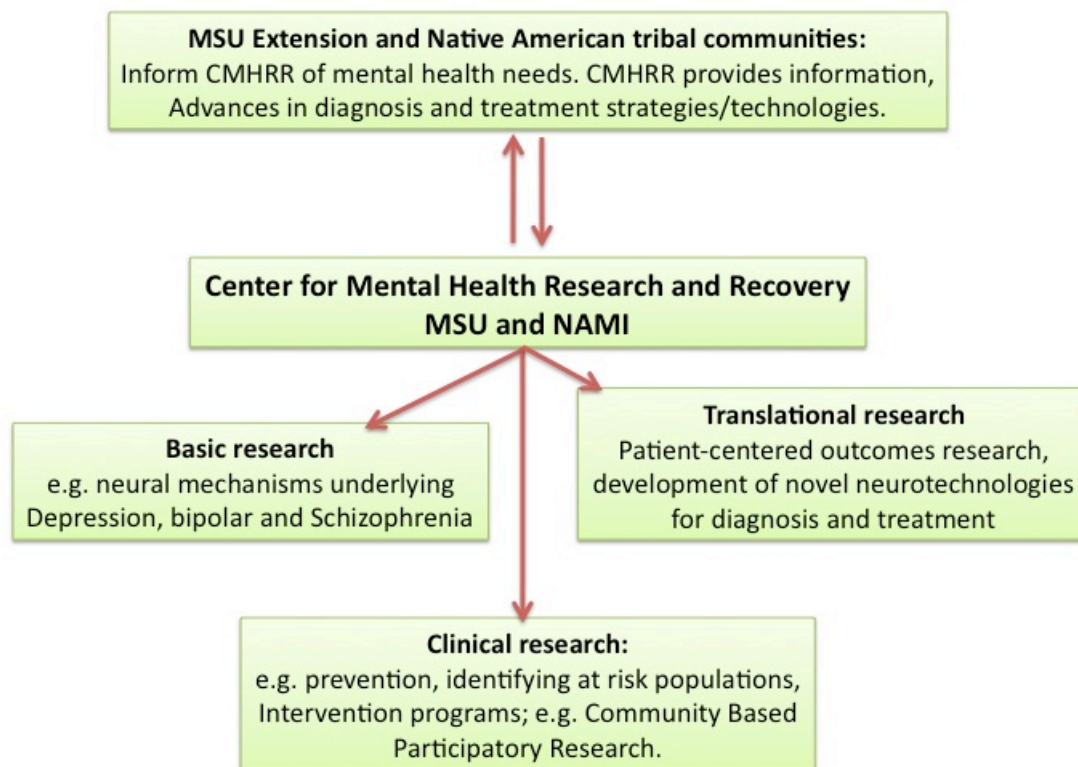
² The Interim Report of National Institute of Health's Brain Research Through Advancing Innovative Neurotechnologies Working Group. September 16, 2013. See, http://www.nih.gov/science/brain/09162013-Interim%20Report_Final%20Composite.pdf.

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guides) and critically, will convey the much needed local input back to the CMHRR to insure we are aware of the local needs on the ground. We intend to work closely with the Native American communities to determine the best methods and approaches for addressing mental health issues in their communities and insuring their needs are addressed. For example, faculty within the Department of Health and Human Development have demonstrated the power of Community Based Participatory Research (CBPR) to identify local community issues, including family, societal and environmental influences, and to effectively engage those communities in addressing their own health needs.



Technical tools such as cutting-edge brain scanning technology that the Center will bring to Montana will be critical in boosting the value of existing private research institutions across the Big Sky such as the McLaughlin Institute. This is the same model that the MagnetoEncephaloGraphy (MEG) Lab at the Massachusetts Institute of Technology uses to increase the viability of private neuroscience researchers in Boston. These analytical tools will also be a valuable tool for medical providers from

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across Montana who need a closer look at the functioning of their patients' brains.

Anticipated demand for the proposed program:

The demand for this program is demonstrated by a simple fact: NAMI Montana contacted MSU in the summer of 2013 and asked MSU to develop a research center focused on diagnosis and treatment of serious mental illness. NAMI Montana is the Montana chapter of the National Alliance on Mental Illness (NAMI). NAMI is the nation's largest grassroots organization for people with mental illnesses and their families. Founded in 1979, NAMI has affiliates in every state and in more than 1,100 local communities across the country. NAMI Montana works with people who live with serious mental illness and their families. NAMI Montana also works with local, state and federal policy makers who grapple for solutions to help address the serious, long-term problems caused by serious mental illness. The lack of programs focused on mental health in Montana is a serious concern; indeed, recent developments further portray the seriousness of inconsistent diagnosis. There is an ACLU lawsuit against the Montana State Prison system, in part due to problems with consistent diagnosis of serious mental illness.

Institution and system fit:

As stated above, the Interim Report of the National Institute of Health's Brain Research Through Advancing Innovative Neurotechnologies Working Groups highlighted the need for interdisciplinary collaborations to help advance brain science and technology. This is the direction of mental illness research on the national and international levels. The Center will provide a structured entity for this type of collaborative research among the variety of specialized programs at Montana State University that are in a position to add value to multi-disciplinary teams investing mental illness diagnosis and treatment methods.

These programs include:

- The Department of Cell Biology and Neurosciences
- Office of Rural Health
- Department of Psychology
- Department of Native American Studies
- Department of Sociology and Anthropology
- Department of Agricultural Economics and Economics
- Department of Mathematical Sciences
- Department of Electrical and Computer Engineering
- Department of Computer Science
- Department of Chemistry and Biochemistry
- Western Transportation Institute
- MSU Extension
- Department of Microbiology and Immunology
- Department of Health and Human Development
- College of Nursing
- The Graduate School
- MSU Agriculture Extension Network
- WWAMI Medical Education Program
- Student Health Services at MSU
- McLaughlin Research Institute at Great Falls
- MSU – Billings, Master of Science in Rehabilitation and Mental Health Counseling

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- MSU – Northern (Havre) - Nursing Program

Differentiation of this program from other, closely related programs at the institution:

There are no programs at Montana State University that focus on multi-disciplinary research into serious mental illness diagnostics and treatment. In addition, there are no programs that focus on translational research in serious mental illness in the State of Montana.

Fit with strategic plan of Montana State University:

This Center is completely congruent with the MSU Strategic Plan as outlined below. The CMHRR is focused on learning and discovery as noted in the first two goals of the strategic plan. And the last two goals, Engagement and Integration, perhaps best encapsulate the vision of this center: to work together as a community of neuroscientists, engineers, social and behavioral scientists, clinicians, and citizens, using the most creative and innovative approaches to help solve one of our society's major scourges.

Strategic Plan Learning Goal: MSU prepares students to graduate equipped for careers and further education. Classroom learning has its limits; this Center will provide a hands-on, real-life learning incubator for undergraduates and graduate students interested in careers in the health and social sciences. By doing internships in the Center, working with various clinicians and scientists in the Center, students will develop critical career skills essential to their future success. Most importantly, they will have the opportunity to help solve problems not only vital to the well being of Montana, but on a global scale. Additional internships will be available through collaborations with private universities such as Stanford University and the private sector in Montana and in technology centers such as Silicon Valley.

Strategic Plan Discovery Goal: MSU will raise its national and international prominence in research, creativity, innovation and scholarly achievement, and thereby fortify the university's standing as one of the nation's leading public research universities. This Center will be composed of some of the best neuroscientists, social and behavioral scientists and engineers in the country, working in an innovative, interactive, interdisciplinary center focused on scientific problems of global importance. The combination of the quality of the scholarship, technological innovations, fueled by federal grant support will bring a level of unprecedented international stature to MSU.

Strategic Plan Engagement Goal: The Montana State University community will be leaders, scholars and engaged citizens of their local, national and global communities, working together with community partners to exchange and apply knowledge and resources to improve the human prospect. This is the central tenant of the proposed CMHRR.

Strategic Plan Integration Goal: By integrating learning, discovery and engagement, and by working across disciplines, the MSU community will improve the world. We hope that a measureable improvement in mental health would be realized via "the stories of those who survive." Access to informed mental health information and assistance should decrease attempted and successful suicides.

Further considerations regarding fit with MSU Strategic Plan:

Montana State University's Strategic Plan from 2012 (Strategic Plan) included a vision statement that described the institution as being "distinguished by its commitment to address the world's greatest challenges." By any measure, serious mental illness qualifies as one of "the world's greatest

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challenges.” Dr. Francis Collins, NIH director, noted that such disorders "collectively affect 100 million Americans and cost us \$500 billion each year in terms of health-care costs." The World Health Organization (WHO) has reported that four of the ten leading causes of disability in the United States and other developed countries are mental disorders. By 2020, WHO estimates that major depression will be the leading cause of disability in the world for women and children.

In 2013, the United States and Europe both launched massive campaigns to unlock the secrets of brain functioning and mental illness. The United States' plan targeted \$100 million in federal spending in the first year alone. The European Commission pledged 500 million euros to advance their research. The effort to understand the workings of the human brain and mental illness promises to be one of the most exciting scientific efforts of the 21st century. A focused effort to compete in the race to understand serious mental illness is exactly the kind of scientific effort that will help achieve the Strategic Plan's goal of raising MSU's "national and international prominence in research, creativity, innovation and scholarly achievement, and thereby fortifying the university's standing as one of the nation's leading public research universities."

The Center's interdisciplinary vision to address a major world challenge is the perfect embodiment of the Strategic Plan's goal, "By integrating learning, discovery and engagement, and by working across disciplines, the MSU community will improve the world." Similarly, MSU's partnership with NAMI Montana to develop this Center also aligns with the Strategic Plan goal that "Members of Montana State University community will be leaders, scholars and engaged citizens of their local, national and global communities, working together with community partners to exchange and apply knowledge and resources to improve the human prospect."

Differentiation of this program from other, closely related programs within Montana:

This multi-disciplinary focus on serious mental illness is different from anything else within the Montana University System or anything that has been tried before. The Montana University System holds a wealth of possible collaborations, but there does not appear to be any specific program duplication. The Center's focus on serious mental illnesses and the technical challenges involved with improving the methods of diagnosing and treating these conditions are very different from other activities occurring in throughout the Montana University System. What makes this facility unique is its multi-disciplinary focuses on: (1) a technical understanding of the brain; (2) how the physiology of the brain is impacted by genetics, environmental stressors, positive environmental factors, forms of treatment, etc.; and (3) how technology can be most effectively utilized to understand/address these brain conditions.

The Montana Neuroscience Institute (MNI; University of Montana) may have some similarities to the Center, but the Institute does not conduct research on serious mental illness. The Institute's primary focus is on brain injuries. The MNI also does some research in other neurological areas including stroke, chronic pain, M.S., brain tumor, ALS, sleep, memory, epilepsy, spinal problems, Parkinson's disease, and neurological devices; but not serious mental illness. The University of Montana's proposed Neural Injury Center also focuses on traumatic brain injuries, not mental illness.

We distinguish our Center by our emphasis specifically on serious mental illness with a focus on basic science, translational research and outreach, including through the Extension centers affiliated with Montana State University.

The Montana University System does have psychological researchers that work with serious mental illness, but they do not have the means to conduct the types of highly technical biological analyses of

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model neural systems, neurological sensor development, and massive data analyses of mental illness treatment outcome measures that will be available through the Center. These existing psychological programs will only be strengthened by the addition of the Center as a potential collaborator.

Planned implementation and resources:

We seek to phase this program in during late spring to early summer, 2014. The program will initially be housed in Vice President of Research space at MSU. Initial steps will include establishing a web presence, coordinating meetings of principal investigators and neighboring clinicians, establishing guidelines for Extension outreach, and launching a public forum statewide. The Center possesses \$300,000 in seed funding, an Interim Director (Dr Frances Lefcort), Manager (Mr. Ben Angulo) and multiple NIH and other federal grants including research expenditures of \$2,158,519 to Cell Biology/Neurosciences with a focus on imaging and neural circuitries, \$314,226 including funding to image adolescents and prospectively track outcomes, \$3,497,510 to Nursing for the Area Health Education Center for outreach to rural communities, \$1,460,488 to establish an interdisciplinary research framework, and funding for MSU Extension which will allow us to reach a broad community through an already-established network of MSU stations.

The Center will meet with NAMI Montana and other potential local collaborators by May, 2014, to prioritize initial research partnerships with clinicians, including Gallatin Mental Health Center and AWARE, Inc. In late July of 2014, the Center's Scientific Advisory Board will hold its initial meetings. A number of top-level researchers from institutions across the country have expressed interest in serving on the board. The Scientific Advisory Board will help ensure that the Center's research efforts and strategies are targeted towards important, achievable goals that take advantage of MSU's existing strengths. It is expected that the Center will begin receiving new research funding for Center-specific programs in the winter of 2014-2015. Additional faculty, researchers and equipment will be acquired based upon these funded tasks. These projects are also expected to increase the number of graduate students in a variety of disciplines.

Other resources to be procured:

To succeed, the Center will require support for existing and new faculty to provide expertise in cognitive neuroscience, clinical psychology, psychiatry, human neurophysiology and psychopharmacology. These additional faculty resources will be developed through a combination of research grants and private funding. Finding answers to the mysteries of serious mental illness is a key focus for the federal government and private foundations. MSU will work with NAMI Montana and other outside collaborators to ensure that additional outside resources are utilized in the most effective manner possible.

May 22-23, 2014

ITEM 163-2801-R0514

Request for Authorization to establish a Bio-Energy Center

THAT

The Bio-Energy Center at MSU-Northern is seeking approval for "Center" designation through the Montana Board of Regents.

EXPLANATION

The Bio-Energy Center has grown from a single grant-funded program to a research entity with labs, facilities, full-time personnel, and most recently, its own Advanced Fuels building. During a recent Strategic Planning session, it was recommended we pursue BOR "Center" status to add to our creditability and sustainability.

Background:

The Bio-Energy Center was established with the opening of the Applied Technology Center (ATC) in 2006. MSUN was successful in receiving funds through the Workforce Innovation Regional Economic Development (WIRED) grant that assisted us in securing personnel and instrumentation needed to do scientific research and testing of bio-derived fuels. Emphasis was placed on economic revitalization of the northern plains of Montana through value added agriculture that would lead to local production facilities capable of producing high quality bio-derived "drop in" fuels. Four (4) key positions makeup the Center: a director, a lead scientist, a research associate, and an operations engineer. Since 2006, the Center has grown into a proof-of-concept Center with the capability to develop, test, and research today's technology and to collaborate with industry on tomorrow's "advanced fuels." The Center has been successful in receiving numerous grants to help support unique and innovative research in a broad range of topics related to bio-fuel technology. With the continual goal of developing technology that will assist in state-wide economic development, the Center recognizes the need for value-added agricultural and livable wage jobs. Our work has concentrated on cutting edge biofuels and feed stocks that will work in our region.

The Center's capabilities are unique to the Montana University System and this region. We have carefully built our capabilities with the ability to control feedstock quality, produce fuel (both bio-diesel and bio-jet fuel), test the fuel chemical properties at ASTM standards, and evaluate the fuel's performance properties through world class engine testing and emissions measurement instrumentation.

At every step of development, the Center has remembered that core to our mission are educational opportunities for students attending MSUN. To this end, the Center's research staff teaches and assists with higher level sciences and has actually taken over special topic research classes. The Center also employs student workers and trains them in the role of student research assistants. This results in under-graduate students working in a research environment comparable to what graduate students would see.

The BOR recognition of the "Center" is a stepping stone to continual improvement and expansion. The Center has an ambitious growth plan for the next five (5) years and in order for our growth to continue, the Center needs to be recognized and supported as a necessary fixture of MSU-Northern and the state of Montana.

ATTACHMENTS

- Level II Request Form
- Attachment # 1-Bio Energy Center Background
- Attachment # 2-Bio Energy Organizational Chart

Montana Board of Regents
LEVEL II REQUEST FORM

Item Number: 163-2801-R0514 Meeting Date: May 22-23, 2014
Institution: MSU-NORTHERN CIP Code: _____
Program Title: Bio-Energy Center

Level II proposals require approval by the Board of Regents.

Level II action requested (place an X for all that apply and submit with completed Curriculum Proposals Form):

Level II proposals entail substantive additions to, alterations in, or termination of programs, structures, or administrative or academic entities typically characterized by the (a) addition, reassignment, or elimination of personnel, facilities, or courses of instruction; (b) rearrangement of budgets, cost centers, funding sources; and (c) changes which by implication could impact other campuses within the Montana University System and community colleges. Board policy 303.1 indicates the curricular proposals in this category:

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- 2. Implement a new minor or certificate where there is no major or no option in a major;
- 3. Establish new degrees and add majors to existing degrees; and
- 4. Any other changes in governance and organization as described in Board of Regents' Policy 218, such as formation, elimination or consolidation of a college, division, school, department, institute, bureau, center, station, laboratory, or similar unit.

Specify Request:

The Bio-Energy Center at MSU-Northern is seeking approval for "Center" designation through the Montana Board of Regents. The Bio-Energy Center has grown from a single grant-funded program to a research entity with labs, facilities, full-time personnel, and most recently, its own Advanced Fuels building. During a recent Strategic Planning session, it was recommended we pursue BOR "Center" status to add to our credibility and sustainability.

Bio-Energy Center (BEC) at Montana State University-Northern

1. Purpose:

- The Bio-Energy Center (BEC) at Montana State University-Northern, located in Havre, Montana, is an innovative, unique research proof-of-concept facility that supports agricultural and renewable energy development in Montana. Since its inception, the Bio-Energy Center has focused on pulling together the facilities necessary to support fundamental research and testing on the development of biofuels from Montana-produced feedstock and to promote product development and commercialization. Our purpose is fundamentally tied to developing a sustainable economic future for agriculture as well as other Montana businesses through the integration of culinary oil, biodiesel, oil seed meal and glycerin industries. Our Center is also in the forefront in the development of future aviation fuels, using locally available feedstocks. Our goal is that our efforts will help provide future energy security for the United States.

2. Objectives:

- To be the premier regional/state leader in bio-energy and bio-products research, development, testing, education, and outreach;
- To help Montana be at the forefront in the quest to meet the bio-based fuel needs of the transportation industry;
- To enhance Montana's economic and environmental sustainability while reducing dependence on imported fossil fuels through research, development, testing, education, and outreach on bioenergy and bio-based energy sources;
- To enhance workforce development through targeted educational programs that will train the future bio-energy workforce;
- To develop partnerships with the private sector in order to leverage resources and build relationships.
 - Research potential markets and uses for oilseed meal;
- To be responsive to the needs of the bio-based Industry in order to enhance the understanding of, the use of, and the confidence in the Center;
- To develop a strategy to become or partner with a National Laboratory;
- To provide the Center's staff with education opportunities and training that will address new bio-energy technologies and well as management effectiveness;
- To model logistics needed to build both small and large scale bio-operations using actual conditions of rural Montana;
- To work with Extension Service and Ag Research Stations to promote crop diversification by introducing oilseeds into crop rotations; and
- To develop one new technology every five (5) years.

3. Anticipated Activities:

- Develop bio-based aviation fuel with a priority on bio-jet fuel derived from oilseeds such as Camelina and Carinata as well as woody biomass;
- Investigate the viability of using raw plant oils as fuel for agricultural operations;
- Work with bio-based industries to provide technical assistance in the commercialization of green energy products such as bio-lubricants and new bio-based fuels (not bio-diesel).

- Provide access to quality testing services for product development;
- Utilize our chemical analysis laboratory to perform biodiesel certification according to ASTM standards.
 - Promote fuel testing services as a profit center;
- ICP - Oil analysis using our ICP unit to determine the condition of engine components;
- Emissions testing using our SESAM and FTIR.
 - Study the effects of off-spec biodiesel on engine exhaust emissions;
- Provide services to the bio-energy industry including independent fuel, performance, efficiency, and emission testing for all bio-fuels, additives and bio-lubricants in both automotive and diesel engine applications using our dynamometer;
- Using our reactors in the biomass conversation labs, provide optimization studies and process engineering for Montana produced oilseed crops such as Camelina, Safflower, Sunflower and Canola; and
- Develop testing methodologies and protocols for advanced and future fuels as well as the development of prototypes for tomorrow's engines.

4. Agencies, organizations and institutions which will be involved:

- University of Georgia
 - Performance of chicken fat Bio-Oil
- Montana State University
 - Bio-Energy Alliance Network (BANR)
 - Biological biofuels research (Algae project and Fungus project)
- North Carolina State University
 - Camelina derived aviation fuel
- NREL
 - Biodiesel durability and emission study
 - ReFUEL Lab
 - Technical Advisory Support/Co-research on performance and emissions
- Department of Energy
 - Developing jet fuel from Camelina
 - EERE—Energy Efficiency and Renewable Energy
 - Camelina feedstock
- Economic Development Administration
 - Proof of Concept Center—Technology Commercialization
- GTA
 - Studying the effects of bio-diesel on engines, engine performance, and engine emissions
- National Science Foundation
 - Basic Research on novel jet fuel (JP-10)
- Alpha Naturals
 - Performance and emissions related to fuel enhancement

5. Organizational Chart

- Please See attachment

6. Describe the interrelationships between the Bio-Energy Center and the institutional mission, including information about which departments on campus will be involved and how the center or institute will contribute to the academic programs of the institution:

- The mission of MSU-Northern is as follows: Montana State University-Northern, a teaching institution, serves a diverse student population by providing liberal arts, professional and technical education programs ranging from certificates through master's degrees. The university promotes a student centered and culturally enriched environment endorsing lifelong learning, personal growth and responsible citizenship. The university partners with a variety of community and external entities to enhance collaborative learning, provide applied research opportunities, stimulate economic development and expand student learning experiences.
- The Bio-Energy Center clearly supports the components of the mission statement related to applied research, economic development, and student learning experiences. The Center is generating new opportunities for the students at MSUN through collaborations between and among staff of the Bio-Energy Center and faculty of the Automotive and Diesel programs to expand student learning and research opportunities in fuels testing, engine performance testing, and emissions testing. There are also discussions of developing new programs in Chemistry as well as graduate certificates of study at MSUN utilizing the Center's world class equipment and staff. In support of economic development, The Center's plan to promotion of an area-wide bio-energy industry is having an impact on several fronts. We are working with local farmers to develop oil-seeds as a preferred rotational crop. We are collaborating with two (2) local businesses that are crushing oil-seed and refining bio-diesel. Additionally, the Center has developed many regional and national partnership entities through its activities. Foremost, the Center brings a positive energy to the campus which emanates from the attention and publicity generated by its cutting edge research and new facilities. These public accolades help create a more positive perception towards MSUN which ultimately affects recruitment and retention in an affirmative manner.

7. Identify 1st year financing and continuing financing necessary to support the Center, and what will be the sources of this funding:

- FUNDING REQUIREMENTS:
 - Year 1
 - Salaries and benefits: \$387,951.39
 - Supplies, maintenance, etc: \$85,000
 - Total Year 1: **\$472,951.39**
 - Continuing financing
 - The Center has grown every year through grant funding. We expect this trend to continue.
- SOURCES OF FUNDING:
 - Federal grants
 - EDA--\$687,000
 - Department of Energy--\$2,250,000
 - National Science Foundation--\$300,000 (pending)
 - Private company sponsored research
 - Elevance Inc.--\$80,000, with potential to renew at \$60,000 annual

- State appropriations
 - Office of Higher Education : \$400,000
 - Montana State University-Northern: provision of space, utilities, maintenance support
- Private donations
 - Various farmers for oilseed
- Services for a fee
 - Fuel testing services as a profit center
 - lubricant testing
 - training
 - performance/emissions testing
- Licensing fees and royalties from our intellectual properties

8. Describe other similar programs in the state and surrounding region;

The Bio-Energy Center is a very unique facility. Currently there are no other facilities that focus on research in renewable transportation fuels and emissions studies similar to the Bio-Energy Center in the State, let alone the region. The closest institution to the Bio-Energy Center that performs similar research is University of North Dakota Energy and Environmental Research Center (EERC). Although UD's EERC performs fuel research, they do not perform any engine studies, emissions or oil pressing. The only other University that has capabilities that are very similar to the Center is University of Houston, located in Houston, Texas, which is well outside of our region.

9. Identify faculty expertise available for participation in its activities;

- Dr. Joynal Abedin (full-time Research Associate)
- Dr. Randy Maglinao (full-time Research Associate)
- Dr. Gary Succaw (Associate Professor of Chemistry)
- Dr. Carol Reifschneider (Professor of Water Quality)
- Dr. Darrin Boss (NARS Director (MSU-Bozeman))

10. State the internal campus review and approval process which has occurred prior to submission to the commissioner's office.

The proposal submitted to the following entities in the following order:

- Request made from Bio-Energy Center Director and Dean of College of Technical Sciences;
- Dean and College of Technical Sciences review and approval;
 - Forwarded to faculty Senate for review and approval;
 - Forwarded to Provost for review and approval; and
- Final approval granted by Chancellor.

