

**BOARD OF SUPERVISORS FOR THE  
UNIVERSITY OF LOUISIANA SYSTEM**

**ACADEMIC AND STUDENT AFFAIRS COMMITTEE**

**April 9, 2019**

**Item E.1.** Grambling State University's request for approval of a Memorandum of Understanding with the University of Alabama at Birmingham.

**EXECUTIVE SUMMARY**

Grambling State University (GSU) requests approval to enter into a Memorandum of Understanding (MOU) with the University of Alabama at Birmingham (UAB). The proposed agreement will allow GSU graduating seniors majoring in Biological Sciences, Chemistry, Computer Science, or Mathematics and Physics to enter the Master of Science in Biotechnology (BT) Program at UAB. The proposed MOU establishes terms and conditions specific to admission and eligibility requirements, curricula, etc. The term of the proposed MOU is three years with automatic renewal for a subsequent period, unless earlier terminated per language established in the agreement.

**RECOMMENDATION**

It is recommended that the following resolution be adopted:

***NOW, THEREFORE, BE IT RESOLVED,** that the Board of Supervisors for the University of Louisiana System hereby approves Grambling State University's request for approval of a Memorandum of Understanding with the University of Alabama at Birmingham.*



March 15, 2019

**MEMORANDUM TO THE BOARD OF SUPERVISORS  
OF THE UNIVERSITY OF LOUISIANA SYSTEM**

**SUBJECT: REQUEST FOR APPROVAL OF MEMORANDUM OF UNDERSTANDING  
BETWEEN GRAMBLING STATE UNIVERSITY AND  
UNIVERSITY OF ALABAMA AT BIRMINGHAM**

Grambling State University respectfully requests approval of a Memorandum of Understanding between Grambling State University (GSU) and the School of Health Professions at the University of Alabama at Birmingham (UAB). This agreement will allow graduating seniors majoring in Biological Sciences, Chemistry, Computer Science, and Mathematics and Physics at GSU to enter the Master of Science in Biotechnology (BT) program at UAB. Students will learn the science and business of technology and product development, and can complete the BT program within one year.

Your favorable consideration of this request is greatly appreciated.

Sincerely,



Richard J. Gallot, Jr., JD  
President

RJG:jc

Attachment

## MEMORANDUM OF UNDERSTANDING

**THIS MEMORANDUM OF UNDERSTANDING** (hereinafter “MOU” or “Agreement”) is made and entered into as of the February 19, 2019, by and between the Board of Trustees of the University of Alabama for the University of Alabama at Birmingham, a constitutionally created public corporation of the State of Alabama (hereinafter “UAB”) and Grambling State University (GSU). UAB is entering this MOU on behalf of its School of Health Professions, Biotechnology, M.S. program (hereinafter “BT Program”) and GSU is entering this MOU on behalf of its Biological Sciences, Chemistry, Computer Science and Mathematics and Physics Programs.

### WITNESSETH:

**WHEREAS**, GSU does not offer a graduate degree program in Biotechnology; and

**WHEREAS**, UAB offers a graduate degree program in Biotechnology, M.S.; and

**WHEREAS**, GSU and UAB are accredited by the Southern Association of Colleges and Schools (“SACS”); and

**WHEREAS**, UAB and GSU wish to assist certain qualified GSU students from the Biological Sciences, Chemistry, Computer Science and Mathematics and Physics programs in applying to the BT Program pursuant to the terms and conditions contained herein.

**NOW, THEREFORE**, in consideration of the mutual covenants contained herein, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

1. **Recitals.** The above recitals are true and correct and incorporated herein by reference.
2. **Description of the Program.** GSU and Biological Sciences, Chemistry, Computer Science and Mathematics and Physics programs students will take and complete core requirements and all prerequisite courses that would be necessary for entry into the BT Program during Years 1-4 and earn a baccalaureate degree at GSU. In the fall semester of Year 4, these GSU students may apply to UAB for admission into the BT Program.
3. **Required GPA for Admission to the Program.** UAB recommends that students applying to the BT Program have a minimum cumulative grade point average (GPA) of 3.0 (on a 4.0 scale).
4. **Graduate Record Examination.** UAB BT Program no longer requires that students applying to the BT Program take the Graduate Record Examination.
5. **Prerequisites.** UAB recommends that students who apply to the BT Program should have completed all UAB required prerequisites necessary to qualify for admission into

the BT Program under then applicable UAB admission standards, policies and procedures as required at the time of application for the BT Program with a GPA of 3.0 or better (based on a 4.0 scale) in each course. Students must submit an official transcript indicating the receipt of a B.S. degree before enrollment into the BT program.

6. **Computer Skills.** UAB recommends that students who apply to the BT Program possess and be able to demonstrate basic computer and word processing skills as required by then applicable UAB admission standards, policies and procedures as required at the time of application.
7. **Additional Requirements.** Students applying to the BT Program must also submit a completed online application form and with the requisite non-refundable application fee and all official transcripts from all undergraduate and graduate institutions attended (submitted by colleges and universities directly to UAB).
8. **Admission Standards.** GSU students applying to the BT Program for admission are responsible for ensuring that their applications are complete and submitted to meet then applicable UAB and BT Program related admission standards, policies and procedures as required at the time of application.
9. **Assistance.** The Program shall use its best efforts to assist GSU students with admission into the BT Program who meet all applicable UAB admission standards, policies and criteria. *It is expressly agreed by the Parties that UAB will admit into the Program the most qualified applicants to the BT Program as it determines in its sole discretion.*
10. **Changes to Prerequisites and Curriculum.** All applicable UAB and programmatic admission standards, policies and procedures are regularly published and updated on the UAB and BT Program websites located at: [www.uab.edu/biotech](http://www.uab.edu/biotech). On behalf of its students, GSU agrees to regularly familiarize itself with these admission standards, policies and procedures and contact UAB for any required clarification or interpretation of same.
11. **Notification by (Full name of Institution).** GSU will notify UAB in writing by January 15 of the names of their recommended students for admission to the Program.
12. **Liaisons.** Each party shall designate a representative to serve as its liaison in all matters arising under this MOU, and shall furnish in writing the name of each representative to the other party.
13. **Publicity.** GSU shall publicize the Program to its faculty, staff, and students. Any and all publicity naming UAB and/or the BT Program requires prior written approval by UAB.
14. **Term.** The term of this MOU shall commence on the date set forth above and shall expire on (February 20, 2022), and shall renew automatically for subsequent yearly periods, unless earlier terminated as provided for herein.

15. **Termination.** Either party may terminate this MOU for any reason or no reason within the Party's own discretion by providing written notice to the other party. Either party may terminate this MOU by written notice if the other party loses accreditation by SACS.
16. **Relationship; No Third Party Beneficiary.** Nothing contained herein shall create or be deemed to create an employer-employee, principal-agent, joint venture or partnership relationship between the parties. None of the provisions of this MOU are intended to benefit any third party including, without limitation, any student, any administrator, or any other university or student, or any other entity or person not a party to this MOU.
17. **Entire Agreement and Modification.** This MOU represents the entire agreement of the Parties with respect to the matters covered herein, and supersedes all prior and contemporaneous discussion, negotiations, representations, and agreements, whether written or oral. This MOU may only be altered, amended or modified by a written instrument duly executed by the parties.
18. **Governing Law, Release and Waiver.** This MOU shall be governed by and construed in accordance with the laws of the State of Alabama. UAB is a constitutionally created public corporation of the State of Alabama and cannot waive immunity conferred on it by *Ala. Const. Art. I § 14*. GSU hereby fully and unconditionally discharges and releases UAB, its Trustees, official representatives, employees, and agents from any and all past, present and future liability under this MOU contemporaneously with the execution of this MOU. GSU waives and expressly releases UAB from any and all liabilities whether based on breach of contract, negligence or any other legal theory.
19. **Assignment.** Neither party may assign its interest in this MOU without the prior written consent of the other party.
20. **Notices.** All Notices required or permitted to be given under this MOU shall be in writing and shall be deemed effective upon receipt, refusal of receipt or the date noted as uncollected when sent by certified or registered mail, return receipt requested, postage prepaid or the earlier of receipt or two (2) business days after deposit with a nationally recognized overnight courier, by the parties at the following addresses:

**If to UAB:**

**With copy to:**

**University Counsel  
UAB Office of Counsel  
1530 3<sup>rd</sup> Avenue, South, AB 820  
Birmingham, AL 35294-0108  
Attn: University Counsel**

**If to (Institution):**

**(Institution and address)  
Attn: Institution Representative**

[Signature pages to follow]

**IN WITNESS WHEREOF**, the parties hereto have duly executed this MOU as of the date set forth above.

**THE BOARD OF TRUSTEES OF THE  
UNIVERSITY OF ALABAMA FOR THE  
UNIVERSITY OF ALABAMA AT  
BIRMINGHAM**

By: \_\_\_\_\_  
Print Name: \_\_\_\_\_  
Title: \_\_\_\_\_

By: \_\_\_\_\_  
Print Name: \_\_\_\_\_  
Title: \_\_\_\_\_

**(Institution)**

By: \_\_\_\_\_  
Dean, General Education and Health Sciences

By: \_\_\_\_\_  
Vice President and Provost



**BOARD OF SUPERVISORS FOR THE  
UNIVERSITY OF LOUISIANA SYSTEM**

**ACADEMIC AND STUDENT AFFAIRS COMMITTEE**

**April 9, 2019**

- Item E.2.** Louisiana Tech University's request for conditional approval of the Center for Tissue Engineering and Regenerative Medicine (CTERM), a cross-institutional endeavor with LSU Health Sciences Center - Shreveport.

**EXECUTIVE SUMMARY**

Louisiana Tech University (LA Tech) is requesting conditional, one year approval to establish the Center for Tissue Engineering and Regenerative Medicine (CTERM). The Center proposes to bring together a multidisciplinary team of researchers from LA Tech and LSU Health Sciences Center - Shreveport (LSUHSC-S) to present research and education initiatives to prevent and combat tissue inflammation, trauma, and loss associated with complications of metabolic disease. The clinical and research arms of the Center pull together experts in biomedical engineering and biomechanics, human physiology, cellular and molecular biology, and translational research. This will be the first cross-institutional research center in Louisiana and will set a new example for collaborative research initiatives in the State. The Center's main goal is to produce clinically relevant stem cells and biomaterial scaffolds to generate useful cell and tissue-based therapies that can combat the loss of healthy tissue associated with chronic diseases such as diabetes, heart disease, and cancer.

The collaboration between LA Tech and LSUHSC-S spans the I-20 corridor and will utilize the expertise of the region to tackle a growing chronic disease epidemic affecting parishes across the state. The two institutions have a long history of successful collaborations in various areas of health-related research in the form of patents, publications, grants, and a joint MD/PhD academic program. With the combination of LA Tech's expertise in basic science, engineering, and technical areas and LSUHSC-S's clinical science and medical expertise, the Center hopes to attain four main objectives:

1. To establish an integrated core of clinicians and researchers focused on tissue engineering and regenerative medicine.
2. To promote research and tools in stem cell biology, tissue engineering, and regenerative medicine, including research opportunities for students in both universities and the improvement of grant writing skills for faculty.
3. To promote education in stem cells, tissue engineering, and regenerative medicine, including enhancing the training of undergraduates, graduates, medical students, and postdoctoral fellows, and to utilize LA Tech's visual communication center (VISTA) to educate the community on Center resources.

4. To work closely with community partners to address needs of patients suffering from symptoms of metabolic syndrome and/or tissue injury, and effectively communicate research to the community.

The rate of chronic disease in Louisiana is well above the national average, putting a significant burden on our healthcare system. In North Louisiana, the parishes along the I-20 corridor consistently indicate 35-40% of the adult population as obese with an increasing trend over the next ten years. The rates of heart disease, cancer, and diabetes all have links to obesity. Louisiana is also 8<sup>th</sup> in the U.S. for overweight children and adolescents.

As the only academic medical center in North Louisiana with a level I trauma center and the Feist Weiller Cancer Center, LSUHSC-S provides primary and specialty care to many patients suffering severe tissue loss following traumatic injury or removal of a progressive tumor. Collaboration is key to solving significant issues that the medical center faces, including the repair of critical-sized bone defects that cannot self-repair; lack of organ donors, lack of tissue grafts, and a low success rate of current therapies for cardiovascular disease; and the ability to stop or slow tissue inflammation before it leads to chronic disease. A multidisciplinary approach that integrates biology, engineering, and medicine is necessary to address these needs. In addition, the development of new tools and technologies to reproducibly manufacture high-quality cells and tissues for clinical and industrial use and the training of a diverse cell-manufacturing workforce is needed to overcome these limitations.

LA Tech and LSUHSC-S already have an agreement in place to allow access to facilities at both universities for researchers. The physical space for the Center will be housed in LSUHSC-S' Medical Education Building, and at LA Tech in the Biomedical Engineering Center. More than eleven labs and core facilities from both universities will be accessed by the Center. Approximately 23 faculty from both universities will collaborate with the Center, and all faculty will maintain their original department as an administrative home.

A board of directors, comprised of equal representation from both universities, will jointly oversee the activities of the Center. Additionally, CTERM will have equal shared administrative oversight from senior leadership at both universities. To guarantee the actions of the Center, an external advisory board will be established to provide guidance to the board of directors and faculty.

Each institution has committed \$50,000 for the initial year, totaling \$100,000. Detailed costs for the initial year have been parsed out per institution, including costs for symposia, workshops, webinars, administrative support, and intramural grants. A priority area for CTERM in the first year is the delivery of educational outreach to the community and K-12 students. Approximately \$7,000 will be used to implement and execute community educational outreach initiatives and auxiliary costs associated with this endeavor.

## RECOMMENDATION

It is recommended that the following resolution be adopted:

***NOW, THEREFORE, BE IT RESOLVED,** that the Board of Supervisors for the University of Louisiana System hereby approves Louisiana Tech University's request for conditional approval of the Center for Tissue Engineering and Regenerative Medicine (CTERM), a cross-institutional endeavor with LSU Health Sciences Center - Shreveport.*



E2

**LOUISIANA TECH**  
**UNIVERSITY**

OFFICE OF THE PRESIDENT

**RECEIVED**

APR 01 2019

March 29, 2019

UNIVERSITY OF  
LOUISIANA SYSTEM

LADIES AND GENTLEMEN OF THE BOARD OF SUPERVISORS FOR THE UNIVERSITY OF LOUISIANA SYSTEM:

Please find attached the request for conditional approval to establish the Center for Tissue Engineering and Regenerative Medicines (CTERM) as a new unit in collaboration with the Louisiana State University Health Science Center Shreveport (LSUHSCS).

Your approval of these contracts is very much appreciated.

Sincerely,

A handwritten signature in blue ink that reads "Leslie K. Guice".

Leslie K. Guice  
President

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Attachments



# LOUISIANA TECH UNIVERSITY

OFFICE OF THE PRESIDENT

Dr. James B. Henderson  
President  
University of Louisiana System  
1201 N. Third St., Suite 7-300  
Baton Rouge, LA 70802

Dear Dr. Henderson:

Louisiana Tech University requests conditional approval to establish the Center for Tissue Engineering and Regenerative Medicine (CTERM) as a new unit in collaboration with the Louisiana State University Health Sciences Center Shreveport (LSUHSCS). This proposed partnership focuses on research and education initiatives to address critical health issues in stem cell biology, tissue engineering, and regenerative medicine. The CTERM will continue a longstanding history of successful collaborations between the two institutions and will solidify a uniquely inter-institutional program of basic and translational research.

The CTERM, combining the academic, research, and expertise of two multidisciplinary and highly successful institutions will enhance the potential of research teams to seek, obtain, and perform critical research and develop key initiatives to serve health care needs in and beyond the State of Louisiana. The Center will leverage and enhance existing resources at both institutions to provide innovative and meaningful outcomes. It would distinctively position the two institutions to attract extramural support to advance their collaborative scientific pursuits within this emerging area of national interest.

Louisiana Tech's mission emphasizes our commitment to quality in teaching, research, and workforce/economic development. This proposal supports and enriches our mission by fostering interdisciplinary partnerships and innovative research. We pledge our support for the initiatives proposed in the Letter of Intent.

Please contact us if you need additional information.

Sincerely,

A handwritten signature in blue ink that reads "Leslie K. Guice".

Leslie K. Guice

A MEMBER OF THE UNIVERSITY OF LOUISIANA SYSTEM

P.O. BOX 3168 • RUSTON, LA 71272-0001 • TEL: (318) 257-3785 • FAX: (318) 257-2928

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Office of the Vice Chancellor  
for Research

Chris Kevill, PhD

1501 Kings Highway  
P.O. Box 33932  
Shreveport, LA 71130-3932

O 318-675-4101  
F 318-675-5244  
www.lsuhsctshreveport.edu

February 13, 2019

Dr. Karen Denby, Associate Commissioner for Academic Affairs  
Division of Academic and Student Affairs  
Louisiana Board of Regents  
1201 N. Third St., Suite 6-200  
Baton Rouge, LA 70802

Dear Dr. Denby,

On behalf of LSU Health Sciences Center Shreveport (LSUHSC-S) and Louisiana Tech University (LA Tech), we submit to the Louisiana Board of Regents Division of Academic and Student Affairs the attached Request for Conditional (One-Year) Approval of a cross-institutional collaborative New Research Center entitled "Center for Tissue Engineering and Regenerative Medicine (CTERM)". CTERM represents a novel and innovative research center focused on research and education initiative to prevent and combat tissue inflammation, trauma and loss associated with complications of the metabolic disease.

Title of the Proposal: Center for Tissue Engineering and Regenerative Medicine

Acronym of the Proposal: CTERM

Consortium Partners

- LSU Health Sciences Center Shreveport: Yufeng Dong, MD, PhD, Co-Director
- Louisiana Tech University: Mary Caldorera-Moore, PhD, Co-Director

Total Institutional Financial Commitment for Year 1: \$100,000

- Contribution from LSU Health Sciences Center Shreveport: \$50,000 (50%)
- Contribution from Louisiana Tech University: \$50,000 (50%)

CTERM Summary

The proposed Center for Tissue Engineering and Regenerative Medicine brings together a multidisciplinary team of researchers from Louisiana Tech University and LSU Health Sciences Center Shreveport. The clinical and research arms of CTERM pull together experts from biomedical engineering and biomechanics, human physiology, cellular and molecular biology, and clinicians engaged in translational research. This innovative interdisciplinary proposal represents the first such cross-institutional research center in Louisiana and will set a new example for collaborative research initiatives in our State. By combining the basic science, engineering and technical strengths of LA Tech with the bench science and medical expertise of LSUHSC-S, CTERM will be uniquely poised to extend the current state-of-the-art and successfully compete for extramural research funding that would be otherwise unattainable if each institution applied separately. The synergy created by the CTERM partners will contribute to the distinguished tradition of research excellence at LA Tech and LSUHSC-S by maximizing the resources available to each of the partnering institutions. In addition to research excellence, CTERM will address an unmet need in the education of future basic and clinician scientists by providing research and clinical opportunities in stem cell biology and tissue engineering. These professionals will make an immediate contribution to the biomedical workforce in Northwest Louisiana and will lead to the development of a skilled workforce to

Office of Research &  
Partnerships

Sumeet Dua, PhD

P.O. Box 8579  
Ruston, LA 71272

O 318-257-2871  
www.latech.edu

support the expanding biomedical economy of the State. Finally, CTERM fulfills the recommendations of both LSU and ULS systems, and the Board of Regents to engage in cross-institutional collaborations. In sum, the CTERM partnership will promote research building capacity at LSUHSC-S and LA Tech while simultaneously providing a unique ability for quality healthcare to the patients of the region.

In light of the above, the LSUHSC-S and LA Tech commit:

- To host the project activities, including providing all necessary equipment, facilities and technical functions for CTERM implementation and execution.
- Commit staff-time and effort for CTERM activities as outlined in the proposal.
- To fund the amount stipulated above (representing 50% of the Institution's share in the budget of the proposal).
- To submit to the Board of Regents financial and administrative reports as required.

Respectfully Submitted by:

LSU Health Sciences Center Shreveport

Louisiana Tech University



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Chris Kevil, PhD  
Vice Chancellor for Research

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Sumeet Dua, PhD  
Associate Vice President for  
Research and Partnerships

**Form A**

*Request for Conditional (One-Year) Approval of a New Academic/Research Unit*

PLEASE SUBMIT ONE PRINTED AND ONE ELECTRONIC COPY (Email attachment, Word/Word Perfect Document – no PDFs please) including:

- 1. Name of Institution:** LSUHSC Shreveport and Louisiana Tech University
- 2. Name of Proposed Unit:** Center for Tissue Engineering and Regenerative Medicine (CTERM)

**3. Name and Title of Administrator:**

LSUHSC Shreveport

Yufeng Dong, M.D., Ph.D.

ydong@lsuhsc.edu

Office: (318) 675-3252

Cell: (318) 550-6816

Louisiana Tech University

Mary Caldorera-Moore, Ph.D.

mcmoore@latech.edu

Office: (318) 275-2207

Cell: (512) 6737556

**4. Department or Academic Unit Responsible for the Unit**

LSUHSC Shreveport

Office of Research

Louisiana Tech University

Research and Partnerships

**5. Date to Be Implemented:** July 1, 2019

**6. Date Approved by Management Board**



## FORM A – PROPOSAL FORMAT

### Part I- Description

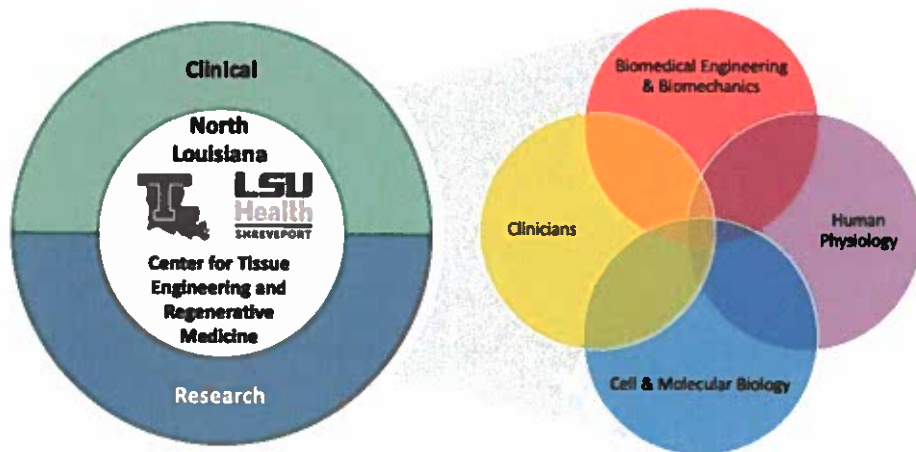
#### A. Provide a description and set of objectives for the proposed unit.

Louisiana's rate of chronic diseases: coronary heart disease, cancer, and diabetes, is well above the national average. Chronic diseases have links to metabolic syndrome/obesity, and therefore as our obesity rates continue to increase so will the rates of diabetes, heart disease, and cancer. The ever-growing problem is due to lack of:

- **Knowledge-** critical need for health and biology education and biomedical research
- **Effective treatment options** to combat tissue inflammation and degeneration that leads to chronic diseases

To address these needs, Louisiana State University Health Sciences Center at Shreveport (LSUHSC-S) and Louisiana Tech University (LA Tech) are committed to establishing the Center for Tissue Engineering and Regenerative Medicine (CTERM) to focus on research and education initiatives to prevent and combat tissue inflammation, trauma, and loss associated with complications of metabolic syndrome. Specifically, the goal of the proposed center is to produce clinically relevant stem cells and biomaterial scaffolds to generate useful cell and tissue-based therapies that can combat the loss of healthy tissue associated with chronic diseases.

The collaboration between LSUHSC-S and LA Tech University in Ruston spans the I-20 corridor and will utilize the expertise of the region to tackle a growing chronic disease epidemic affecting parishes across the state. A combination of basic science, biomedical engineering, and clinical expertise will allow the Center to address health issues from complimentary perspectives and offer an environment that trains future scientists, engineers, and clinicians for careers in stem cell biology, tissue engineering, and regenerative medicine (Figure 1). The two institutions have a long history of successful collaborations in various areas of health-related research in the form of patents, publications, grants, and a joint MD/PhD academic program. The creation of this Center will serve to



**Figure 1:** Proposed Center for Tissue Engineering and Regenerative Medicine (CTERM) brings together a multidisciplinary team of researchers from Louisiana Tech and LSUHSC-S. The proposed Center will have a clinical and research arm that pulls experts from biomedical engineering and biomechanics, human physiology, cell and molecular biology and clinicians.

solidify this on-going relationship and enhance opportunities in a critical area of basic and translational research.

The expertise, facilities, and resources offered by the two universities expands the possibilities and opportunities for success and impact in this area of research and health care. Specifically, our objectives are:

1. **To establish an integrated core of clinicians and researchers focused on tissue engineering and regenerative medicine.** Tissue engineering and regenerative medicine is a growing area of research both in the basic sciences and in translational medicine. The most effective methods of addressing the problems of tissue damage, inflammatory disease, and degenerative conditions lies in a collaborative effort where scientists, engineers, and clinicians work together to find novel approaches to therapeutic needs. The Center creates this type of integrated team of experts in stem cell biology, biomedical engineering, orthopedics, and translational medicine across two universities in order to provide the widest perspective and depth of knowledge for this region of Louisiana. The span across the 1-20 corridor of the state ensures an understanding of the patient population and allows for a more expansive collaborative core than could be achieved at a single university. The team will work closely with each other, members of the external advisory board, and regional health care providers to understand the needs of the area, remain at the forefront of tissue engineering and regenerative medicine research, and educate the community on developing research and opportunities.
  
2. **To promote research and tools in stem cell biology, tissue engineering, and regenerative medicine.**
  - a. *Develop research opportunities for students at LSU Health Sciences Center Shreveport and Louisiana Tech University.* LSUHSC-S offers medical and graduate degrees in a number of related areas including clinical practice and biomedical research, while LA Tech offers undergraduate and graduate degrees in the areas of Biomedical Engineering, Biology, Chemistry, and an interdisciplinary graduate degree in Molecular Science and Nanotechnology. All of these degree programs already offer students the opportunity to participate in research, but the opportunities are limited by the resources and expertise available on each individual campus. The collaboration of the universities through the Center will facilitate research opportunities between the campuses for undergraduates, graduate students, medical students, and post-doctoral fellows. In addition, the Center will apply for funding to support Research Experience for Undergraduates (REU) in order to provide a more formal summer training and research program to engage undergraduate students in interdisciplinary translational research.
  
  - b. *Improve faculty grant writing skills.* There is a current rise in funding for regenerative medicine and it is critical that the cooperative faculty are competitive for outside funding opportunities. Specifically, the National Institute of Health has recently issued a call for proposals through its Regenerative Medicine Program (RMP) to address the basic research and application of stem cells in the clinic. (For more information see: <https://www.nih.gov/research-training/medical-research-initiatives/rmi>.) To aid in achieving this goal both LSUHSC-S and LA Tech University will support grant writing workshops. This will include visits by program officers from the NIH and NSF, seminars, review by grant

writing experts, and team writing sessions to be held at a new collaborative work space located between the two universities at Louisiana Tech University's Academic Success Center in Bossier Parish, LA.

- c. *Encourage and promote multidisciplinary research teams to address areas of biological research, biomedical engineering, and translational medicine to pursue large collaborative research grants.* A primary goal of the Center is to continue building a multidisciplinary research team that can address the research and clinical needs in tissue engineering and regenerative medicine. The first step in the team building process will be to survey faculty at both institutions to identify existing areas of strength, assess needs, and determine areas of mutual research interest. This survey will be distributed in February 2019, and the results will be rapidly analyzed and applied toward the formation of research teams. To promote the goals of the Center and engage faculty from across disciplines at both universities the Center will sponsor regular seminars and hold informal meetings to learn from faculty across both campuses and identify novel approaches and ideas for projects and proposals. In addition, faculty from both campuses will continue to serve on graduate thesis and dissertation committees for colleagues at each institution to enhance student research projects and demonstrate to the next generation of scientists and clinicians the value of interdisciplinary collaborations.
- d. *Foster interdisciplinary partnerships.* To foster interdisciplinary partnerships and innovative research, CTERM will offer financial support for new interdisciplinary collaborative research projects. The CTERM seed grant program will award a total of \$60,000 (\$30,000 from each institution) to fund two projects focused on stem cells, regenerative medicine, tissue engineering, or other topic related to CTERM's goals and objectives. Seed grant applications must include a new collaboration between investigators from different disciplines working together in a new area of research or scientific inquiry. The goal of this program is to establish mutual areas of research between LSUHSC-S and LA Tech while building a foundation for future competitive extramural support. LSUHSC-S and LA Tech have a history of participating in the LSUHSC-S Center for Cardiovascular Diseases and Sciences "Partners Across Campuses" Seed Program (PAC). Applications submitted to CTERM will be reviewed and scored by the CTERM Board, or designated subject matter experts, and the two most meritorious applications will be funded for a 12-month period. Proposals will be evaluated using the following criteria: (1) Scientific quality of the research project; (2) Expertise and scientific diversity of the research team; (3) Relevance of proposed research to the mission of CTERM; (4) Originality and innovativeness of proposed research; and, (5) Evidence of sustainability.

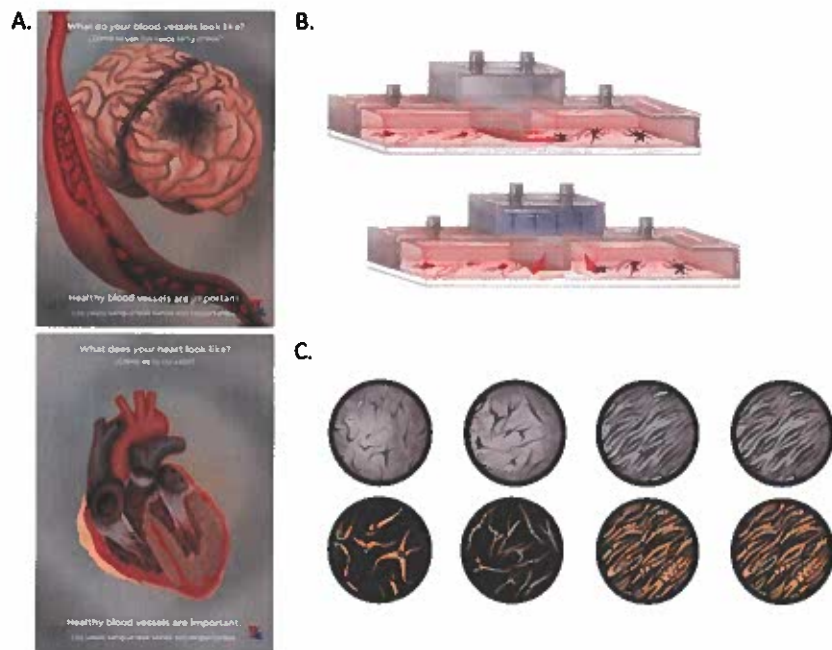
### **3. To promote education in stem cells, tissue engineering, and regenerative medicine**

- a. *Enhance the training of undergraduates, graduate students, medical students, and postdoctoral fellows.* Between the two universities there is a focused group of undergraduate, graduate students, medical students, and postdoctoral fellows who currently work in areas of tissue engineering and regenerative medicine. The Center will encourage and facilitate collaboration between these trainees, expanding their own knowledge and skill sets, through the intramural grants which will also support graduate and undergraduate students working on regenerative medicine projects. Trainees will participate in all seminars and symposia so

that they have the opportunity to learn from leaders in the field, build a professional network, and engage in collaboration with other research labs. The robust intramural grant program at LSUHSC-S currently supports innovative research projects from graduate students and postdoctoral fellows. This program will be expanded to encourage submissions focused on CTERM priority research areas and funds to support a minimum of two awards per application cycle will be dedicated from the existing annual budget.

b. *Partner with Louisiana Tech’s Visual Integration of Science Through Art (VISTA) Program to more effectively communicate research through visual communication.* An important part of the Centers objective requires better communication of tissue engineering and regenerative medicine research to the community. Louisiana Tech University encourages interdisciplinary education and the building of communication skills through programs that include a School of Communications, Technical Writing and Usability, and Visual Integration of Science Through Art (VISTA). Each of these academic programs engages students in the application of critical communication skills to the real world. These resources will be used by the Center to promote its mission, enhance visibility in proposals and publications, and educate the community about

Center activities. Undergraduates from Louisiana Tech already partner with the Lincoln Health Foundation (LHF) to promote health habits and illustrate the impacts of metabolic syndrome on the brain and heart and work closely with research faculty to illustrate research concepts for publications, presentations, and funding applications. The Center will serve as a client for these educational opportunities, not only enhancing the experiential learning opportunity of the students, but also



**Figure 2:** Examples of undergraduate art work used to communicate health and research information. A. Illustrations by Biology major, Anna Morris, currently being used in the Lincoln Parish Health Hut to communicate the effects of metabolic syndrome on brain and cardiovascular health. B. Illustration by Biomedical Engineering major, Joshua Haire, created for an NIH proposal being submitted by Louisiana Tech University faculty for the creation of microfluidic biological sensor. C. Illustration by Graphic Design major, Jessica Trinh, depicting the myogenic differentiation of human adipose derived stem cells for use in faculty research publications and presentations.

providing a critical resource in communication to the members of the Center. **Figure 2** shows images developed by students in the VISTA program to better communicate research and health information.

c. *Establish a social media presence to communicate with the public.* In order to promote the activities, research, and success of the Center we will engage social media and maintain a strong web presence. This will be critical for connecting the Center with the community, educating the population about stem cells, tissue engineering, and regenerative medicine, recruiting patients for clinical trials, recruiting trainees to participate in research, and will help to raise the profile of medical research taking place in North Louisiana.

d. *Encourage service in the community.* Educating the population about tissue engineering and regenerative medicine is a critical mission of the Center. People are generally uncomfortable when they do not understand something and so it is imperative that the Center works with the community to promote the message of the Center and be a resource to patients interested in learning more about stem cells, tissue engineering, regenerative medicine, and the therapeutic potential of these fields. Increasing the overall biomedical knowledge in our community, especially targeting K-12 level students, will in turn impact children's understanding of health-related issues associated with metabolic syndrome. LA Tech University's College of Education (COE) not only has strong relationships with the schools in the community but they also sponsor for a number of educational opportunities on LA Tech's campus for educators and have a history of receiving competitive funding awards to promote education and outreach in North Louisiana. The Center will work closely with Dr. Lindsey Keith-Vincent and other faculty and staff in the College of Education to identify and participate in opportunities to engage with the regional population. In addition, together, they will seek funding for outreach opportunities to not only engage the community but also participate in the recruitment and retention of students into STEM fields and careers. CTERM Co-Director Dr. Caldorera-Moore has a well-established history of working with Dr. Keith-Vincent on STEM outreach initiatives. Together they started a Science booth at the Ruston Farmers' Market to bring hands-on science experiments directly to children in the Ruston community (**Figure 3**).



**Figure 3:** Caldorera-Moore lab member Ben Sawyer providing hands-on STEM activities to kids visiting the Ruston Farmers' Market Science booth started by Dr. Caldorera-Moore.

**4. To work closely with community partners to address needs of patients suffering from symptoms of metabolic syndrome and/or tissue injury, and effectively communicate research to community.** The motivation of the Center to explore novel therapies for patients who suffer from tissue inflammation, damage, and loss associated with complications of metabolic syndrome came from health care providers in the region. The Center will continue to have regular meetings with health care providers by creating an advisory board made up of health foundations and clinicians who understand the patient population in North Louisiana. The Center

will also provide information, hold seminars, and talk with patients who visit these health care providers to make sure that they understand the research, clinical trials, and potential outcomes of the work being performed by members of the Center.

**B. Correlate objectives of the proposed unit with the role, scope, and mission of the institution.**

**1. Mission of LA Tech – Interdisciplinary Education and Research**

Louisiana Tech’s mission states that the University is “committed to quality in teaching, research, creative activity, public service, and workforce/economic development. Louisiana Tech maintains as its highest priority the education and development of its students in a challenging, yet safe and supportive, diverse community of learners.” An important component of Louisiana Tech University’s mission is to have an “unparalleled integrated educational experience.” In addition, as a University with a rich engineering heritage, Louisiana Tech has a special responsibility to integrate advanced technology into teaching and learning. At LA Tech, advanced technology supports quality teaching, research, administration, and service. To accomplish this overall mission the University is committed to:

- Providing its students with the advanced technological skills that will help to ensure their success both in the internal environment of the University and in the wider surrounding region.
- Supporting “creative exploration and discovery in health, energy, infrastructure, cyber business (including bioinformatics), technology and the arts” (Research Enterprise).

In addition, the opportunities have been created within the university for achieving and maintaining regional, national, or international standards of excellence and contributing to economic development. Louisiana Tech University has made great strides in commercializing technology to enhance economic development through the productivity of its faculty and students, coupled with a generous intellectual property (IP) policy that returns 40% of revenues generated through licensing back to the inventors. The economic impact of this can be seen in the dramatic growth in patenting and licensing activity that has occurred in just the past 5 years.

The Center for Tissue Engineering and Regenerative Medicine directly aligns with the education and research goals of the University to enhance interdisciplinary education, engage students in experiential learning at the cutting edge of biomedical research, and allow them to be part of a mission to positively impact their community.

**2. Mission of LSUHSC-S – Teach, Heal, and Discover**

The primary mission of LSUHSC-S is to teach, heal, and discover in order to advance the well-being of the region and beyond. LSUHSC-S encompasses the Schools of Medicine, Graduate Studies, and Allied Health Professions in Shreveport. In implementing its mission, LSUHSC-S is committed to:

- Educating physicians, basic scientists, residents, fellows and allied health professionals based on state-of-the-art curricula, methods, and facilities, to prepare graduates for distinguished careers in health care service (Teach).

- Providing state-of-the-art clinical care and research, including a range of tertiary special services, to an enlarging and diverse regional base of patients to improve the health of our citizens and our community (Heal).
- Endeavor to answer medicine's greatest questions and challenges through creative research, and to achieve distinction and international recognition for research programs that contribute to the body of knowledge and practice in science and medicine (Discover).
- Supporting the region and the State in economic growth and prosperity by utilizing research and knowledge to engage in productive partnerships with the private sector.
- Fostering a culture of diversity and inclusion that promotes mutual respect for all.

### **3. Mission of CTERM**

The Center for Tissue Engineering and Regenerative Medicine is focused on the development of cell-based and tissue-engineering therapies to combat tissue inflammation, damage, and loss associated with complications of metabolic syndrome or trauma injury. This research will change the way we are able to treat patients who suffer not only from metabolic syndrome or trauma, but also other chronic degenerative health conditions. In addition to research, there is a strong emphasis on educating and training the future basic and clinician scientists who will contribute to the biomedical workforce in our state. This mission directly aligns with LA Tech's mission of interdisciplinary education and research and LSUHSC-S mission to teach, heal and discover. These combined missions address the health care needs of the area, promote research, develop new tools, and educate undergraduate, graduate, and medical students in cutting edge, interdisciplinary methods of science, engineering, and translational medicine.

### **C. Address how the proposed unit will work with the local/regional economic development alliance to explore potential opportunities for collaboration.**

- 1. Hold annual symposium to discuss Center research in regenerative medicine that addresses health needs of region.** To promote the mission of the Center and engage with the population at the core of that mission, an annual symposium will be held that invites members of the community, specifically health care providers and local businesses, who will have an interest in the research and product development taking place at the Center. The symposium will allow for the presentation of research by students and faculty associated with the Center and will include presentations by leaders in tissue engineering and regenerative medicine who can speak to the developments in the field, needs of patients across the country, and offer insights in to critical areas of research the Center may participate in.
- 2. Train students/workforce in areas of regenerative medicine research.** A mission of both universities participating in the Center is the training of scientists and clinicians to serve the larger research and health care community. Through research opportunities from the undergraduate to post-doctoral level the faculty engaged in the Center will strive to create a strong workforce who can work in the areas of tissue engineering and regenerative medicine. The interdisciplinary nature of the work and the sensitive techniques required for stem cells with clinical application following Good Manufacturing Practices is not a skill set offered on

all campuses. The trainees participating in the Center's research program will learn technical and soft skills, preparing them to work across disciplines, communicate with scientists, clinicians and members of the community. In addition, these trainees will possess a skill set in sterile technique and tissue culture that prepares them for employment in research labs, pharmaceutical and drug development labs, biotechnology, and the creation of their own start-up companies.

3. **Perform clinical trial research to benefit local population.** Clinical trials are experiments or observations applied to human subjects. These types of studies using human participants are designed to answer specific questions about biomedical or behavioral interventions, including new treatments (such as novel vaccines, drugs, dietary choices, dietary supplements, cell transplantation, and medical devices) and known interventions that warrant further study and comparison. The Clinical Trials Office (CTO) at LSUHSC-S continues to facilitate access to the latest treatment advances to its unique and diverse patient population participating in clinical trials. The institution has over 32 years of experience in conducting clinical trials in the pharmaceutical and bio-technology field in 32 medical specialties and offers capabilities in over 100 therapeutic areas in Phase I-IV clinical trials and gene therapy trials. The Center will utilize the ability and the experience of the CTO at LSUHSC-S to design, apply for, and perform FDA approved clinical trials for testing stem cell products and biomaterials in patients from several affiliated Hospitals, including a large minority population and state-of-the-art Cancer Treatment Center.
4. **Partner with LifeShare to improve techniques for stem cell isolation.** In February 2019, LSU Health Sciences Center Shreveport and LifeShare Cellular Services engaged in a collaborative agreement to conduct research procedures involving the isolation of mesenchymal stem cells (MSCs) from biomedical waste, specifically the human placenta. LSUHSC-S personnel collect anonymous human bio-waste placentas post-delivery and transfer the material to LifeShare for use in isolating MSCs. Once the isolation of MSCs is complete, LifeShare returns vials of manufactured product (following Good Manufacturing Process [GMP] and Good Clinical Laboratory Practice [GCPL] guidelines) to LSUHSC-S for use in cooperative research projects. This agreement is expected to produce approximately 48 vials of manufactured product annually, with the potential for additional vials on a case-by-case basis for use in future/proposed collaborative research. This cooperative research agreement lays the foundation for future economic benefit and industry partnerships in stem cell technologies.
5. **Work with institutional tech transfer offices to market discoveries:** LA Tech and LSUHSC-S each have technology transfer offices that work with their University research community to facilitate the evaluation, protection, and licensing of intellectual property created on their campuses. This work maximizes the Universities' impact on the intellectual, economic, and social development of Louisiana and beyond. Both offices share a mission to advance innovation by serving faculty, supporting the research enterprise, and partnering with entrepreneurs and businesses to commercialize inventions that enhance the economy and benefit the public. LA Tech and LSUHSC-S tech transfer offices have successfully worked together for years to establish cooperative agreements, subcontracts, and inter-institutional agreements to facilitate faculty collaborations. Once CTERM has received Board of Regents approval, an inter-institutional agreement (IIA) establishing the processes and procedures for shared intellectual property will be negotiated and signed. The technology transfer offices at



both institutions are dedicated to building a solid support system for CTERM faculty entrepreneurs and strengthening ties within the business community of Northwest Louisiana and beyond.

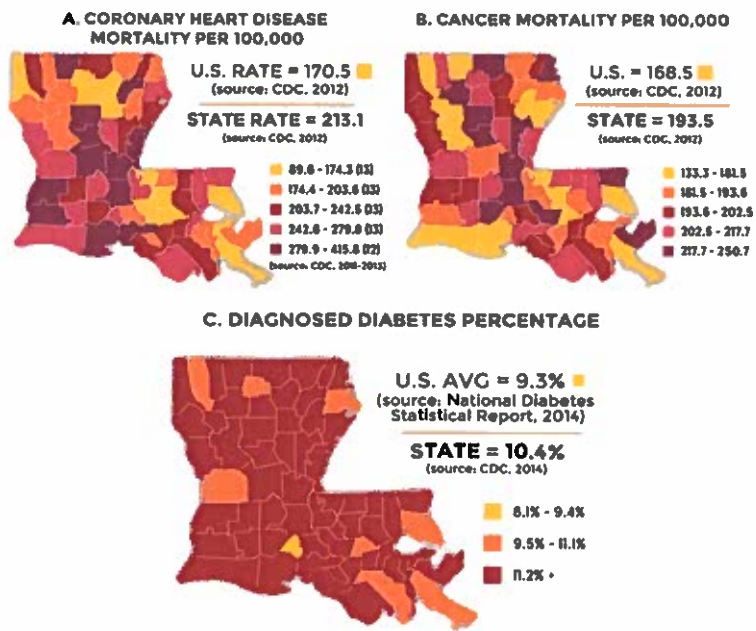
## Part II – Need

### A. Provide a rationale of need for the proposed unit.

#### Burden on Chronic Diseases in Louisiana

The rate of chronic disease in Louisiana (Figure 4) is well above the national average putting significant burden on our healthcare system. These rates of heart disease, cancer, and diabetes all have links to obesity.

Obesity affects over 35% of the adult population in Louisiana, ranking us 5th in the US, with this rate only increasing (having doubled in the last 20 years). Obesity contributes to the development of metabolic syndrome which is a concurring set of conditions that includes high blood pressure, elevated blood sugar, excess body fat around the waist, and abnormal cholesterol levels. While there are some genetic/epigenetic links to metabolic syndrome, it is mostly the result of poor diet, weight, and lifestyle choices (e.g. lack of exercise, excess drinking). Ultimately these conditions lead to diabetes, cardiovascular disease, cancer, kidney disease, and neuropathy all of which have their own set of health problems.



**Figure 4:** State of Louisiana rate of chronic disease: coronary heart disease mortality, cancer mortality, and diabetes by parish. All of diseases are results of metabolic syndrome.

A significant portion of Louisiana residents suffer from the complications associated with metabolic syndrome.<sup>1</sup> Specifically in North Louisiana, the parishes along the I-20 corridor consistently indicate 35-45% of the adult population as obese with the trend only increasing over the past 10 years. Based on these numbers, there is a community of obese Louisiana residents who are suffering from the complications associated with metabolic syndrome. In addition, there is a large population of overweight children and adolescents, a number that puts Louisiana 8th in the US for both categories. Although diet and exercise can lower these numbers before adulthood, these children also stand to suffer the consequences of metabolic syndrome as they age. The ever-growing problem is due to lack of:

- **Knowledge-** critical need for health and biology education and biomedical research

- **Effective treatment options** to combat tissue inflammation and degeneration that leads to chronic diseases

To address these needs, the proposed Center for Tissue Engineering and Regenerative Medicine (CTERM) will focus on research and education initiatives to prevent and combat tissue inflammation, damage, and loss associated with complications of metabolic syndrome. Specifically, the goal of the proposed center is to investigate and deploy clinically relevant stem cells and biomaterial scaffolds to generate useful cell and tissue-based therapies that can combat the loss of healthy tissue associated with chronic diseases.

As the only academic medical center in North Louisiana with a level I trauma center and the Feist Weiller Cancer Center, LSUHSC-S provides primary and specialty care to many patients suffering severe tissue loss following traumatic injury or removal of a progressive tumor. For example, the repair of critical-sized bone defects that cannot self-repair remains a significant problem in the clinic. In the United States, over 3 million surgeries are performed each year to address non-healing bone defects in the diverse fields of orthopedic, neurocranial, plastic, and oral surgery. The yearly cost for the care of fractures alone is estimated at \$23.9 billion. Larger bone defect surgeries often require devitalized bone allograft transplantations to replace missing host bone segments. However, the impaired osteogenic ability of the devitalized allograft and the delayed merge with host bone results in a ten-year post-implantation failure rate as high as 60%. One of the most exciting strategies to enhance allograft incorporation and bone defect healing involves seeding the patient's own multipotent stem cells onto devitalized allografts prior to transplantation. While this approach has demonstrated some success, problems still remain, including difficulties in maintaining mesenchymal stem cell (MSC) self-renewal and multipotency during expansion, inefficient cell seeding to allografts using cell culture approaches, and a rather slow transition of MSCs into vessel and bone-forming cells *in vivo*. Thus, there is an urgent need to identify more effective stem cell delivery methods for bone repair, which requires the collaboration between tissue engineering scientists and clinicians.

In the case of cardiovascular disease, numerous pathological conditions in the cardiovascular system involve damage and loss of cardiac muscle. Lack of organ donors, lack of tissue grafts, and a low success rate of current therapies provides a strong rationale for identifying new treatments for heart injuries. Advances in tissue engineering, materials science, and stem cell biology make the first clinical application of engineered cardiac tissues a realistic option for treatment of cardiovascular diseases. Progress in the field has led to over 1,300 clinical trials for the treatment of cardiovascular diseases involving stem cell therapies (only one of which involves the use of stem cells with a biomaterial scaffold). Despite this, cardiac tissue engineering has yet to enter the clinical setting.

Notwithstanding the compelling need and amount of research being conducted in the field of stem cell treatment and regenerative medicine, the ability to stop or slow tissue inflammation before it leads to chronic disease has yet to be achieved. This gap is due, in part to lack of standardization for large scale production (biomanufacturing) of tissue; which requires reliable and reproducible sources of clinically relevant stem cells and comprehensive understanding of environmental cues directing stem and progenitor cell fates. A multidisciplinary approach that integrates biology, engineering, and medicine is needed to address these needs. In addition, the development of new tools and technologies to reproducibly manufacture high-quality cells and tissues for clinical and industrial use and the training of a diverse cell-manufacturing workforce is needed to overcome these limitations.

## **Tissue Engineering and Regenerative Medicine**

Regenerative medicine is the process of using cells, biomaterials, and molecules to repair or replace tissue or organ function lost due to age, disease, damage, or congenital defects. This field holds the promise of regenerating damaged tissues and organs in the body by stimulating previously irreparable organs to heal themselves. Regenerative medicine also empowers scientists to grow tissues and organs in the laboratory and safely implant them when the body cannot heal itself. Importantly, regenerative medicine has the potential to solve the problem of the shortage of organs available through donation compared to the number of patients that require life-saving organ transplantation. Since stem cells have the ability to grow and differentiate into more than 200 cell types, they have been widely used for tissue engineering and regenerative medicine.

Stem cells have the unique ability to self-renew and differentiate down a number of developmental lineages. Adult stem cells, in particular, which are the focus of the Center, are multipotent, patient-derived stem cells that, in addition to self-renewal and differentiation potential, also possess immunomodulatory properties that allow for simpler cell-based therapies to have a significant impact. Clinically relevant adult stem cells can be isolated after the birth of a baby from both umbilical cord blood and tissue as well as from the placenta. Additionally, adult stem cells can be harvested from a patient's own bone marrow or adipose tissue. All of these cells are of the mesenchymal or hematopoietic cell lineage and so naturally give rise to bone, cartilage, muscle, fat, blood, and some cells of the immune system. The replicative potential of these cells in the lab allows for expansion. The differentiation potential of these cells allows for directing cell fate and generation of replacement cells. Finally, the immunomodulatory properties of these cells allows for direct cellular injection to suppress inflammation and aid in natural wound and injury repair. The full potential of these cells is still being discovered, but the current protocols already offer therapeutic value, while continued research is critical to enhance the clinical relevance and accessibility of these treatments.

The natural ability of stem cells to self-renew and differentiate is enhanced by a highly specific, 3D microenvironment that surrounds them in native tissue. These niches provide the structural, biochemical, mechanical, and stimulatory cues crucial for the appropriate functionality of the stem cells during homeostasis and in response to physiological changes. A significant challenge for the use of all stem cells in tissue engineering and regenerative medicine lies in providing the proper environmental cues to regulate the balance between self-renewal and differentiation. High throughput biomanufacturing and regenerative medicine applications require an understanding of how the niche controls stem cell function and developing technology that can synthetically mimic those environments in 3D.

Regenerative medicine and tissue engineering seek to address this need by creating biocompatible materials that facilitate the generation of clinically relevant tissues for therapeutic applications. The field, termed "tissue engineering," is a multidisciplinary field that focuses on the development of intelligent, biocompatible materials that can serve as a "scaffold" for repair and/or replacement of damaged tissue. Tissue engineering has the potential to improve the health and quality of life for millions of people by restoring and maintaining tissue and organ function. Scaffolds composed of materials with optimal chemical and physical properties, adequate cell sources, and appropriate biochemical or biophysical cues are the backbone of research in the tissue engineering field. For these constructs to be successful they need to be analogous to the natural environment of the extracellular matrix (ECM) of the niche in which they will be implanted. Current approaches in tissue engineering and regenerative medicine use a variety of cell types to determine the most efficient and effective therapy option. In all cases, the success depends not only on the cell, but the chemical and physical cues that direct the cells toward a particular cell fate. The main challenge is how to fully recreate the

stem cell's native extracellular environment, which supports maintenance of pluripotency and controls differentiation. This is due in part due to a lack of understanding of spatial and temporal mechanisms that specifically govern stem cell fate determination within their environments. The allure of regenerative medicine promises to redefine medical treatment, putting stem cells and biocompatible materials center stage in this revolution. Many breakthroughs have been reported and hailed in scientific journals and the media over the years. But despite these successes and the fact that scientists around the world are furiously working on new therapies, regenerative medicine treatments have not entered mainstream medical practice in most areas of medicine.

### **LSU Health Sciences Center Shreveport**

LSUHSC-S is a state funded research hospital with expertise in clinical and research areas related to the symptoms of metabolic syndrome. LSUHSC-S is home to four research centers including the Feist Weiller Cancer Center, the Center for Cardiovascular Diseases and Sciences, the Center for Excellence in Arthritis and Rheumatology, and the Center for Brain Health. As one of the only two LSU academic medical centers in the state, LSUHSC-S plays a key role in advancing novel scientific discoveries leading to new patents, technologies, and procedures that can be advanced to clinical practice. Recently, breakthroughs at LSUHSC-S have revealed methodologies for selecting, expanding and delivering large numbers of specific populations of placenta and bone marrow-derived stem cells that retain their original stem cell characteristics for tissue regeneration. However, the lack of expertise in biomaterials and engineering for developing novel stem cell scaffolds has significantly delayed the ability of LSUHSC-S to translate these stem cells from bench to bedside, especially for musculoskeletal tissue regeneration applications.

### **Louisiana Tech University**

Louisiana Tech University, located in Ruston, Louisiana, is a public university with a student population of ~12,000 undergraduate and graduate students. Louisiana Tech has a long history of developing interdisciplinary programs and collaborations with strong support from members of the Louisiana Tech and Ruston community. For example, LA Tech was one of first universities to establish an accredited Biomedical Engineering degree program. Recently, biomedical research at LA Tech has focused on the development of tailorable, biometric, material scaffolds for tissue regeneration applications. Using these tailorable biomaterial scaffolds is allowing researchers to investigate the role physical and chemical environments plays on stem cell fate. In addition, researchers in the School of Biological Sciences are focused on understanding regulation of cell state by investigating specific signaling pathways and transcriptional regulators that may be targets of future clinical manipulations. LA Tech has a number of on-going collaborations with other institutes and companies in Shreveport, demonstrating their commitment to not only their community but all of those who live in North Louisiana. Through the establishment of the Center for Tissue Engineering and Regenerative Medicine, core researchers and their students will be able to more seamlessly work with clinicians at LSUHSC-S. It is the hope of the Center that this interaction will result in more productive collaborative projects; which in turn will allow research advancements generated at LA Tech to reach the clinical setting faster.

### **The Center for Tissue Engineering and Regenerative Medicine:**

## **A Collaboration between Louisiana Tech University & LSU Health Shreveport**

The mission of CTERM is to build researcher-clinician collaborations and remove the barrier for translational medicine on both the LSUHSC-S and LA Tech University campuses. Scientists from LA Tech and clinicians from LSUHSC-S will work closely along with an external advisory board to ensure that the research is relevant to funding agencies and to the community. Collaborative formation of CTERM will accelerate research collaboration and discovery within LSUHSC-S and Louisiana Tech University while enhancing academic, clinical, and commercial growth in North Louisiana.

The Center will work on the development of cell-based and tissue engineering therapies that will change the way we are able to treat patients who suffer not only from metabolic syndrome but other degenerative health conditions. To accomplish this, the Center will bring together engineers and scientists from Louisiana Tech University with scientists and clinicians from LSUHSC-S to work as one research entity to improve therapeutic options for people who suffer from the complications of metabolic syndrome. The founding members of the Center share a passion for understanding human biology and disease and applying their knowledge and skills to improve the quality of life for members of their community. Together, the members of the Center will work towards solving problems related to bone mass loss, neurological degeneration, and muscle atrophy using clinically relevant stem cells and biomaterial scaffolds to generate useful cell and tissue-based therapies that can combat the loss of healthy tissue associated with metabolic syndrome. Specifically, the Center aims to solve clinical needs by supporting research in the areas of cell characterization, cellular reprogramming and differentiation, multiscale reverse engineering and modeling, and biomanufacturing. The Center will also have teams of experts to aid in accessing necessary clinical data, expedite IRB procedures, link with industrial partners, and train students at each of the partner universities.

### **Part III- Faculty**

- A. List the primary faculty members who will work directly within the proposed new unit. Please provide vitae (the abbreviated vita form required for a Support Fund Initiative proposal is acceptable).**

#### **Primary Faculty Working Directly within the Proposed Center**

<b>Name</b>	<b>Department</b>	<b>Primary</b>	<b>Institution</b>	<b>Research Interest</b>
Mary Caldorera-Moore	Biomedical Engineering	Research	LA Tech	Intelligent Biomaterials for Tissue Regeneration and Controlled Drug Release Muscle Regeneration Pro-active Wound Dressings
Jamie Newman	School of Biological Sciences	Research	LA Tech	Cell Signaling & Transcription
Patrick O'Neal	Biomedical Engineering	Research	LA Tech	Translational Research (bench to bedside)
Yufeng Dong	Orthopedic Surgery	Research	LSUHSC-S	Musculoskeletal tissue repair
Yuping Wang	Obstetrics and Gynecology	Research	LSUHSC-S	Stem cell biology

J. Steven Alexander	Molecular and Cellular Physiology	Research	LSUHSC-S	Wound healing and 3D printing
Chris Kevil	Pathology	Research	LSUHSC-S	Vessel reconstruction
G. E. Ghali	Oral & Maxillofacial Surgery	Clinical	LSUHSC-S	Maxillofacial regeneration

### Additional Potential CTERM Faculty

Name	Department	Primary	Institution	Research Interest
David Mills	School of Biological Sciences	Research	LA Tech	Biomaterials for Tissue Regeneration
Teresa Murray	Biomedical Engineering	Research	LA Tech	Neurology TBI
Mark DeCoster	Biomedical Engineering	Research	LA Tech	Neurology Nanobiotechnology
Prerna Dua	Health Informatics & Information Management	Research	LA Tech	Bioinformatics Health Analytics
Yuri Lvov	Chemistry	Research	LA Tech	Biomaterials Nanobiotechnology
Eric Sherer	Chemical Engineering	Research	LA Tech	Pharmacokinetics Population Data Analysis
Scott Poh	Chemistry	Research	LA Tech	Nanobiotechnology Targeted Drug Delivery
Josh Vandenbrink	School of Biological Sciences	Research	LA Tech	Bioinformatics
Yuri Voziyanov	School of Biological Sciences	Research	LA Tech	Cellular Reprogramming Genome Editing
Cherie-Ann Nathan	Otolaryngology – Head and Neck Surgery	Clinical	LSUHSC-S	Bone tissue repair
Shane Barton	Orthopedic surgery	Clinical	LSUHSC-S	Tendon and ligament repair
David F. Lewis	Obstetrics and Gynecology	Clinical	LSUHSC-S	Cell therapy
A. Wayne Orr	Pathology	Research	LSUHSC-S	Vascular Matrix
Giovanni Solitro	Orthopedic Surgery	Research	LSUHSC-S	Biomechanics
Gopi Kolluru	Pathology	Research	LSUHSC-S	Vascular remodeling

## **Part IV – Facilities and Equipment**

### **A. Briefly describe existing facilities (classrooms, laboratories, offices, etc.) available for the unit.**

The proposed Center collaboration between LSUHSC-S and LA Tech University, spanning the I-20 corridor, will utilize the expertise of the region to tackle a growing chronic disease epidemic affecting parishes across the state. A combination of basic science, biomedical engineering, and clinical expertise will allow the Center to address health issues from complimentary perspectives and offer an environment that trains future scientists, engineers, and clinicians for careers in stem cell biology, tissue engineering, and regenerative medicine. A collaborative agreement is already in place between LSUHSC-S and LA Tech to allow for access to facilities at both Universities to researchers. On the LSUHSC-S campus, the CTERM “footprint” will be located in the new Medical Education Building, 1501 Kings Hwy, Shreveport, LA 71130. At LA Tech, the Center will be localized in the Biomedical Engineering Center, 818 Nelson Ave. Ruston, LA 71272. The Center will be strongly supported by core facilities at Louisiana Tech University and Louisiana State University Health Shreveport (LSUHSC). Specific labs and core facilities include:

#### Louisiana Tech University

- Center for Biomedical Engineering Rehabilitation Science (CBERS) Core Facility
- Biological Sciences Shared Facilities
- Institute for Micromanufacturing (IfM) Measurements and Characterization Laboratory

#### Louisiana State University Health Science Center Shreveport (LSUHSC)

- Musculoskeletal Research Laboratory
- Stem Cell Biology Laboratory
- LSU Health Shreveport Research Core Facility
- Feist Weiller Cancer Center INLET Core Facility
- Small Animal Imaging Core
- 3D Printing Core Lab
- Center for Cardiovascular Diseases and Sciences Shared Resources
- COBRE Center for Redox Biology and Cardiovascular Disease Shared Resources

#### Louisiana Tech University

##### **Research Facilities:**

##### Center for Biomedical Engineering Rehabilitation Science (CBERS) Core Facility

CBERS is strategically located adjacent to the Institute for Micromanufacturing (IfM) with a connecting corridor between the ground floors of the two buildings. A common technical support team serves both buildings. The BEC includes administrative offices, research laboratories, core research support facilities, an animal care facility, faculty offices, classrooms, a business incubator, and high-speed local area network connections and wireless internet throughout the building. The BEC also has shared use core resource laboratories instructional and support facilities within the BEC that are not specific to individual faculty members include the animal resource center located on the first floor, shared-use core laboratories for level I cell culture and centralized refrigeration systems,

level II cell culture, bioimaging, gene and protein expression quantification equipment, analytical biotechnology/biochemistry, nano-surface modification, centrifuges and ADMET expert 2600 tensile testing system material. Dr. Caldorera-Moore also has her personal office and research laboratory in the BEC.

Instructional and support facilities within the BEC that are not specific to individual faculty members include the animal resource center located on the first floor, an instructional laboratory for teaching animal physiology, prototyping and 3D printing core, and six (6) shared-use core laboratories for level I cell culture and centralized refrigeration systems, level II cell culture, bioimaging, biomedical computation and visualization, analytical biotechnology/biochemistry, nano-surface modification and centrifuges.

*Animal resource facility:* Louisiana Tech University animal facility in the BEC is USDA approved for housing small mammals to rabbit size. The facility has 3 surgery suites for separate housing sections for mice and rats.

*Cell culture core laboratories:* The level I cell culture and centralized refrigeration systems core lab contains three cell culture incubators, four refrigerator-freezers, one general purpose refrigerator, two -20 °C freezers, one -80 °C freezer, two laminar flow hoods and an inverted microscope. The level II Cell Culture Core Laboratory contains one biosafety cabinet, one laminar flow hood, four cell culture incubators, a liquid nitrogen supply tank, one microscope and a vortex mixer.

*The bioimaging core laboratory:* The imaging contains an Olympus BX41 fluorescent microscope, an Olympus DP71 fluorescent microscope, a Nikon Eclipse TS 100 fluorescent microscope, and a Leica fluorescent microscope.

*Biomedical computation and visualization core laboratory:* This core laboratory contains an Olympus Fast Acquisition system equipped with epi-flourescent microscope, seven Dell workstations (operating in parallel) equipped with MATLAB and ImagePro, a Panasonic Plasma TV display system and a light microscope.

*The analytical biotechnology/biochemistry core laboratory:* The analytical biotechnology/ biochemistry lab contains a Denton vacuum evaporation system for deposition of thin metallic films, Instron tensile testing system, differential scanning calorimetry (DSC), an Agilent 2100 Bioanalyzer, a NanoDrop 2000c spectrophotometer, a Light Scanner 32 Real-time PCR/High-resolution melting analysis instrument, a UV Transilluminator, an Ependorf Vacuum Concentrator, a Lyophilizer, a vacuum oven, an Electrokinetic Analyzer, a BioRad Molecular Imager, a Milli-Q Synthesis water purification system, a pH meter, two shakers, a microbalance scale, a microscope, a Beckman Coulter Scintillation Counter, an Optima TLX ultracentrifuge, two cell culture centrifuges, a refrigerated mini centrifuge, two refrigerator-freezers, two Dell computer lab stations and a chemical fume hood.

### Biological Science Shared Facilities

School of Biological Sciences in Carson Talyor Hall houses a number of shared equipment rooms, including common labs well equipped with centrifuges, thermocyclers, and gel doc systems for imaging agarose gels and western blots. The School of Biological Sciences also has a large, modern computer lab that can be utilized by students and is supported by the University's computing center. Dr. Newman's personal office and research laboratory are located in Carson-Taylor. Specific shared facilities include:

*Cell Culture Labs:* BSL2 certified laboratories that contains a Biosafety cabinets, CO2 incubators, microscopes, full-size refrigerators, full size freezers, and water bath.

*EVOS FL Imaging System:* Through a Louisiana Board of Regents Enhancement Grant in 2015, the School of Biological Sciences was able to secure funds to upgrade current departmental upright microscopes with



fluorescent capabilities and was able to purchase a new EVOS FL Imaging System to allow for imaging of cell cultures in and out of the hood. The EVOS system is ideal of high-resolution phase-contrast imaging up to 100x magnification. It is also equipped with a DAPI, GFP, and RFP cube for fluorescent imaging.

*Countess Automated Cell Counter* ensures reliable cell counts and is also equipped with fluorescent capabilities to monitor labeled cells as experiments require.

*StepOne Plus Real Time PCR Machine* is a 96 well plate format quantitative PCR machine.

*Diagenode Pico Bioruptor Sonicator*: The Bioruptor Sonicator is optimized for use in chromatin-based experiments, including chromatin immunoprecipitations. This particular sonicator allows for smaller volume samples compared to the more conventional probe sonicators. The sonicator has a temperature controlled water bath to ensure sustained temperature in the absence of a cold room.

*BioTEK Cytation 5 Plate Reader, Take3 Plates, and Imaging System*: The BioTEK Cytation 5 plate reader can be utilized for high-throughput assays including alamarblue metabolic assays and protein assays. In addition to the plate reading capabilities, this equipment is also supplied with Take3 plates for reading RNA and DNA, similar to a nanodrop. The Take3 plates allow for 16 or 48 samples to be reported in a single read, making it more user friendly and efficient. Finally, a recent grant enabled the purchase of the imaging system upgrade. This allows for the high resolution imaging and analysis of multiwell fluorescent experiments.

#### Institute for Micromanufacturing (IfM) Measurements and Characterization Laboratory

The IfM consists of three components, totaling 65,000 sq. ft. of user facilities. These are the R & D user facility at LA Tech in Ruston, LA; the X-ray beam lines and lithography processing facility at the Center for Advanced Microstructures and Devices (CAMD) in Baton Rouge, LA; and the Technology Transfer Center in the Shreve Industrial Park in Shreveport, LA. The R & D user facility is housed in a modern 41,000 sq. ft. building, designed specifically for research and development in micro/nano scale technologies and systems. The R & D complex includes classroom and conference rooms, faculty and staff offices, research and instructional laboratories, and a 144-seat auditorium. Laboratories occupy 20,000 sq. ft. of environmentally controlled workspace, and contain 5,000 sq. ft. of modular clean rooms. The laboratory facilities provide a full suite of micro- and nanomanufacturing capabilities, and a comprehensive set of measurement and characterization tools, as well as modeling and simulation software.

The nanomanufacturing capabilities include, nanoassembly techniques (layer-by-layer assembly, molecular recognition-based self-assembly, self-assembled monolayers, nanoassembly by step-wise polymerization), nanopatterning techniques (X-ray lithography, E-beam lithography, nanoimprint lithography, molecular imprinting), electroless deposition techniques, and protein nanoengineering techniques (computer-aided peptide design, automated abiotic peptide synthesis, biotic peptide synthesis in host organism). The measurement and characterization tools include, TEM, SEM, AFM, wet-AFM XPS, confocal microscope, and various other tools.

The micromanufacturing capabilities include, lithographic techniques (optical lithography, X-ray lithography), material deposition techniques (LPCVD, PECVD, sputtering, e-beam evaporator, electro-deposition), material etching techniques (RIE, ICP, wet etching), material doping, oxidation and annealing techniques (thermal diffusion, thermal oxidation, rapid thermal annealing), and alternative microfabrication techniques (ink-jet printing, hot embossing, micro milling, and focused ion beam).

The modeling and simulation capabilities include computational hardware (e.g. Origin 2000, Origin 350, cluster of Xeon and Alpha processors), nanotechnology and biotechnology modeling and simulation software (e.g. Gaussian 03, NAMD, DLPOLY, InsightII, CHARMM, DeCipher, Ludi), microfabrication and microelectronics

TCAD (e.g. TSUPREM-4, MEDICI, TAURUS), and microsystems CAD (e.g. MEMCAD, ANSYS, FLUENT). The IfM services include, research and development, foundry services, testing and measurements, modeling and simulation, and educational and technical training.

### **Louisiana Tech Academic Success Center Facilities & Resources in Bossier, LA**

The Louisiana Tech Academic Success Center is located in Bossier, LA, 50 minutes from Louisiana Tech University and 20 minutes from LSU Health. The Center occupies two floors of a four-story building shared with Bossier Parish Community College Nursing program.

#### **Conference Room Space**

Located on the first floor, the Moran Room can hold up to 84 individuals and has Newline Interactive technology along with two projectors. This room can also split into two rooms, with room wall dividers. The first floor also has a total of four conference rooms, the Welcome Center (Kitchen area), a student study area, with computers, and the Cyber Training Center. The Cyber Training Center is equipped with a laptop kiosk for current and prospective students and was designed to promote education, research, training, and discovery in a broad range of cyber technologies, techniques, and procedures. There is an additional conference room located on the fourth floor that is 2,600 square feet and can be partitioned into two separate rooms or combined into one room to hold up to 86 individuals. Each space has a Newline Trutouch, a projector, two collaboration stations with monitors, and in-room mic and speakers. This room has both rectangular and round tables and is very versatile. A third, smaller conference room is equipped with a large wall monitor and on-board PC, conference table with seating for 20 and ports to feed laptop content to wall monitor, bar area with sink, and white board. The room's total capacity is 48 individuals.

#### **Classroom, Learning, & Collaboration Space**

There are two traditional classrooms each equipped with both rectangular and round tables, podium with desktop PC and internet, projector, Ladibug document projector, in-room mic and speakers, and white boards. These rooms differ slightly in size with one room capacity of 33 and a second room capacity of 49. There is a learning lab furnished with six huddle stations for collaboration. Each station seats five and is equipped with its own monitor that can show content from an in-room PC or the laptops plugged into the station. The in-room PC is a Newline Trutouch interactive display with on-board computer, projector, in-room mic and speakers, podium, and white board. The total capacity of this room is 31. Finally, there is a computer lab with four (5 person) huddle stations with monitors, four (2 person) screen divided tables, three additional round tables with seating for 12, an in-room Newline Trutouch interactive PC, projector, in-room mic and speakers, podium, and white boards. The total capacity of this room is 47.

Additional space for collaboration includes:

- Study nooks
- Administrative area
- Instructor workroom with 2 PCs and copier, space for 13 instructors
- Small break room
- Veterans Resource Center
- Men's and Women's restrooms

### **Institutional Capabilities**

Louisiana Tech University was established in 1894 and is now the leading institution of higher education in North Louisiana accredited by the Commission on Colleges of the Southern Association of Colleges and Schools (SACS) to award associate, baccalaureate, master's and doctoral degrees. The university operates on a quarter system with four terms, and students earn semester-hour credit. The total enrollment is currently 12,467 (Fall 2018). Undergraduate students account for 89.7% of enrollment. Of the current student body, approximately 50.6% are male and 49.4% are female. Approximately 22% of the total students are minorities, with 12% of the total enrollment being African-American.

LA Tech offers doctoral programs in nine areas,<sup>1</sup> and is classified as a "Doctoral II" institution by the Louisiana Board of Regents, (greater than 30 doctoral graduates per year). The total value of active research grants at LA Tech reached \$60M over the last five years. Research expenditures for 2012-14 were \$24M and have averaged \$24-25M for the past five years. The same publication also ranked LA Tech in the "Top 10" in the nation for graduating students with the least amount of debt and among the top 25 most affordable colleges and Universities based cost of attendance but also the earnings of graduates and other factors.

### **Louisiana State University Health Science Center Shreveport (LSUHSC-S)**

#### **Musculoskeletal Research Laboratory**

The Musculoskeletal Research Laboratory at LSUHSC-S represents the foundation of regenerative medicine for musculoskeletal tissues. The scientific environment within the labs of orthopedic research is highly interactive, where clinical and research faculty share scientific interests in understanding the development and pathogenesis of skeletal disease, as well as, skeletal repair following injury. A strong intellectual collaboration has been established between research Investigators and clinicians, which has its basis in weekly lab meetings, weekly faculty meetings, and impromptu discussions about stem cell biology and their use in tissue engineering and skeletal injury therapeutics. Additionally, the intellectual input from the diverse array of our faculty is invaluable and has been critical for the development of the research directions. The collaborative arrangement of these labs will lay the foundation for developing future research directions and ensure the success of research projects.

The lab includes a newly equipped stem cell biology lab, a histology lab, a biomaterials lab and a biomechanics lab. The labs are comprised of 2,500 square feet of laboratory space and 4 offices. Each member in the lab is provided with a computer (desktop and/or laptop), Laser printers, and assorted software. Each member in the lab has a 100 square foot office. The members in the lab share the services of a grants administrator as well as a business manager. One certified histopathology technologist provides the service in the histology lab. She has experience in special staining, immunocytochemistry, decalcified section preparation, and frozen sections.

The histology lab in Department of Orthopedics are equipped with A Sakura Tissue Tek VIP6 automated histoprocessor, a TBS paraffin embedding center, a paraffin oven, a microtomes, two VWR Vistavision compound light microscopes, one dual headed Olympus BX40 teaching microscope, an automated slide labeler, three Lab Line slide warmers, one Tissue Tek staining stations, two Scytek SlideMaster IHC staining modules, three Thermolyne multipurpose spin/hot plates, one fume hoods, one Boekel hybridization ovens, a Beckman LS-6500 scintillation counter, and two VWR water baths.

The stem cell biology lab are equipped with one EVOS visible light and fluorescent imaging system, assorted laboratory glassware and supplies, three centrifuges (a Beckman refrigerated centrifuges, and two

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<sup>1</sup> Business Administration (DBA), Counseling Psychology (PhD), I/O Psychology (PhD), Curriculum and Instruction (EdD), Education Leadership (EdD), Audiology (AuD), Biomedical Engineering (PhD), Computational Analysis and Modeling (PhD), and Engineering (PhD).

microcentrifuges), two refrigerator/freezers, two freezers (-20°C), a -86°C freezers, an exhaust hood, a Beckman LS -6500 scintillation counter, two shaking water baths, two water baths, two cell culture incubators, a bio safety cabinets, a laminar flow hood, two AO microscopes, an Olympus BH2 light and fluorescence microscope with a WPI minitron digital imaging camera, a MGM Instrument luminometer, a Beckman DU-640 spectrophotometer, a Perkin Elmer fluorimeter, a lyophilizer, a gel scanner, and one thermal cycler. For stem cell isolation, human bone marrow aspirates will be routinely collected by our Orthopedic surgeons in LSU Health Sciences Center, the largest medical center in north Louisiana.

Biomechanical Testing lab: Equipped with an Instron 8874 hydraulic biaxial testing System and an Instron 4202 single axis mechanical testing frame (1.0 KN nominal rating) with additional loading cells rated at 50N and 250 N for axial tensile/compressive and 3-point bending testing, EnduraTEC TestBench™ Torsion Testing system (2.8 N.m nominal capacity) and Low Capacity Torsion Cell (0.2 N.m). A full time technician is available. Lab website link:

<http://myhsc.lsuhealthshreveport.edu/OrthopaedicSurgery/OrthoBiomechanicsLab.aspx>

### Stem Cell Biology Laboratory

The Stem Cell Biology Laboratory includes: four incubators: one Forma CO2 incubator, one Sanyo CO2 incubator, and two VWR CO2 incubators; Two Forma Class II, Type A Biological Safety Cabinet; Two CBS 4000 Cryosystems; Three -80°C Freezers, Four -20°C Freezers, and Three Refrigerators; Three microscopes: An Olympus CK40 microscope is linked to a digital camera with computer software SPOT advanced; A Fluorescent Microscope (Olympus IX71) is connected to a digital camera with computer software PictureFrame (Optronics, Goleta, CA); and an Olympus CX31 microscope. Centrifuges: One Super T21 Superspeed Centrifuge (Sorvall); one Avanti-J-20xp Counterflow Centrifuge (Beckman Coulter); one Sorvall legend RT+ centrifuge (Thermo Scientific); One Refrigerated Eppendorf Centrifuge; Three Bench top Eppendorf Centrifuges; An Integrated SpeedVac System (ISS110, Savant); Cytospin 4 (Thermo Scientific). One UV Spectrophotometer (Pharmacia Biotech); One VERSAmax Microplate Reader (Molecular Devices); One FLUOstar Omega Fluorescent microplate reader (BMG); VersaDoc Imaging System (Bio-Rad); iCycler (Bio-Rad); C1000 Thermal Cycler (Bio-Rad); Four Gel electrophoresis systems and Power supplies (Three Power PAC 200, Power PAC 3000, Bio-Rad); Gen Pluser Xcell Electroporation system (Bio-Rad); UV Transilluminator; 820 Spencer Microtome; Tissue Float Bath; Slide Warmer; Five Water Baths and two with Shakers; Elnothern Oven (VWR); Shaking Incubator (VWR); Two Analytical balances-A160; Three pH meter; pipettes; Medical Film Processor (Konica)

### Basic Science Facilities and Equipment

LSU Health Shreveport embodies all of the organizational features and facilities typically associated with an academic medical center. Facilities available to investigators at LSU Health include well equipped and staffed animal housing and care facilities, electronic and machine shop facilities for custom instrument development and routine maintenance, a graphic arts facility, centralized computer facility and biometry department, a modern medical library, and centralized administrative (purchasing, personnel, etc.) services.

The LSU Health Research Core Facility: The Research Core Facility (RCF) at the LSU Health provides investigators with access to state-of-the-art biomedical technologies. These technologies include flow cytometry and cell sorting, confocal and fluorescence microscopy, laser-capture micro-dissection, next generation sequencing (NGS), real-time PCR, DNA array (gene chip) analysis, mass spectrometry, and small

animal imaging. Each of these technologies is fully supported by a Research Specialist and is overseen by a designated faculty member with appropriate expertise. The RCF provides assistance with all aspects of these technologies including operation of instrumentation, experimental design and protocols, as well as data analysis and interpretation. Investigators associated with other campuses within the LSU system are welcome to use these technologies as well. Other individuals wishing access to these services, who are associated with universities, hospitals and corporations within the state and region are encouraged to contact us. Details of the equipment you may find from our website:

<http://www.lsuhschshreveport.edu/Research/researchresources/researchcorefacility/index>

## I. LSU Health Shreveport Core Research Technologies

### 1. Flow Cytometry:

**BD Biosciences FACS Aria III:** The FACS Aria III cell sorter is capable of 17-parameter (Forward Scatter, Side Scatter, and 15 fluorescence detectors) analysis and cell sorting. It has four solid-state lasers for excitation at wavelengths of 405 nm, 488 nm, 561 nm and 633 nm. This is a digital high-speed sorter, capable of sorting up to 70,000 events per second. It is capable of standard "bulk" sorting of up to four user-defined cell populations simultaneously or can be used for direct deposition of a counted number of cells directly into tissue culture plates for cloning, frequency response assays, or other single cell analyses. This instrument uses BD Biosciences FACS Diva software for acquisition and analysis.

**BD Biosciences FACS Calibur:** The RCF maintains a FACS Calibur flow cytometer available for investigator use. Documented training by staff is required for its use. The FACS Calibur is an ultra-sensitive flow cytometer, capable of six parameter (two laser light scatter and up to four fluorescent colors) analysis. It uses two lasers for fluorochrome excitation: an Argon ion laser for 488 nm excitation and a Red Diode laser for 635 nm excitation. This instrument uses CellQuest Pro software for acquisition and analysis.

**BD Biosciences LSR II-UV:** This LSR II is capable detecting up to 14 parameters (Forward Scatter, Side Scatter, and twelve fluorescence detectors). It has four solid-state lasers for excitation at wavelengths of 355 nm, 405 nm, 488 nm, and 633 nm. This instrument uses BD Biosciences FACS Diva software for acquisition and analysis.

**BD Biosciences LSR II-SORP:** This LSR II is capable of detecting up to 17 parameters (Forward Scatter, Side Scatter, and fifteen fluorescence detectors). It has four solid-state lasers for excitation at wavelengths of 405 nm, 488 nm, 561 nm and 633 nm. This instrument uses BD Biosciences FACS Diva software for acquisition and analysis.

**Workstations and Software:** There is one Macintosh MacPro and two Dell PCs for off-line analysis of data. The off-line Macintosh computer is loaded with Cellquest Pro, while the off-line PCs are loaded with the latest version of FACS Diva software and FCS Express for data analysis. In addition, FlowJo is available on the Macintosh and Dell workstations for specific data analysis needs. For the analysis of cell cycle data, ModFit LT is available on both the Macintosh and PC workstations.

### 2. Laser Capture Microdissection

**Arcturus XT:** The Arcturus XT instrument performs Laser Capture Microdissection from heterogeneous tissue samples simply, quickly, and precisely. In minutes the investigator can locate a single cell or large groups of cells and, using a simple aim-and-shoot method, extract them for subsequent molecular analysis.

LCM preserves the exact morphologies of both the captured cells and the surrounding tissue. The Arcturus XT transfers cells from paraffin-embedded and frozen tissue sample stained slides. The entire process can be monitored and documented, and the images stored in an archiving workstation. Research applications include genomics (differential gene profiling, loss of heterozygosity, microsatellite instability, and gene quantification) and proteomics (two-dimensional protein gels, Western blotting, and immunoprecipitation of proteins).

**3. Microscopy:** The RCF microscopes are open to all members at LSUHSC-Shreveport and outside users.

**Nikon AIR Confocal & SIM Super Resolution System:** This is a high-speed Nikon AIR confocal microscope combined with a SIM (Structured Illumination Microscopy) super resolution system for fixed and live sample- imaging. The Nikon Eclipse Ti-E inverted microscope is built with fully automated objectives, stage, and filter turrets. The 5 objectives range from 10X to 100X. The confocal components include 5 detectors and 4 lasers: 405nm, 488nm, 561nm, and 640nm in wavelength. The SIM components include a Hamamatsu camera and 3 LED lasers: 488nm, 561nm, and 640nm in wavelength. DAPI images can still be taken under SIM mode. The microscope is capable for bright-field imaging, multichannel fluorescence imaging, large image stitching, multipoint acquisition, time-lapse acquisition, FRAP, FRET imaging, and 2D/3D deconvolution. The resolution for conventional confocal reaches 200-250nm, while the resolution for super resolution system reaches 85-100nm. To allow long hour live cell-imaging, the microscope is housed in an incubator with CO<sub>2</sub>, O<sub>2</sub>, and humidity controls.

**Leica TCS SP5 Confocal Microscope:** This is a very flexible and fast confocal system for fixed or living samples. The system includes a Leica DMI 6000 CS fully automated inverted microscope with motorized stage, condenser, objective, and filter turrets. The microscope is housed in a Ludin full enclosure incubator with an internal Ludin Cube2 with CO<sub>2</sub>, O<sub>2</sub>, and humidity controls. It is equipped with 5 lasers for excitation: violet diode (405 nm), multi-line Argon (458, 476, 488, 496, and 514 nm), green HeNe (543 nm), orange HeNe (594 nm), and red HeNe (633 nm); visualization is done using a mercury arc lamp. The spectral beam splitter has freely adjustable bandwidths for the collection of signals in 5 separate detectors simultaneously or sequentially. There is also a transmitted light detector for DIC. There are 9 available objectives, ranging from a 2.5x to a Plan Apo 100x1.46 NA oil objective. The system runs on the newest version of LAS AF software (LAS AF 2.6.3), with FRAP, FRET, Mark & Find, 3D Visualization, Colocalization, and Live Data Modes.

**Zeiss AxioObserver/Apotome Microscope:** The system is built around a Zeiss AxioObserver Z1 inverted fluorescent microscope, fully automated, with component recognition to minimize errors. System components include mercury arc lamp excitation, a Zeiss AxioCamMRm CCD camera with 12-bit dynamic range, extended sensitivity in the near infrared, a fully automated XYZ stage, a complement of objectives ranging from 10x to 100x, and five installed filter sets for DAPI, FITC, narrow band GFP, Rhodamine, and Far Red. The Apotome attachment is designed for precise optical sectioning. The Apotome slides easily into the optical path and projects a grid onto the image plane, which is shifted laterally in three defined steps, with an image collected at each step. A software algorithm then removes any out-of-focus signal. The acquisition software is AxioVision v.4.8, including plug-in options for Inside 4D, 3D Deconvolution, Colocalization, Mark & Find, Mosaic, and more.

**Nikon Widefield Microscope:** The system is built around a Nikon Eclipse TE300 inverted microscope with a range of objectives for phase, DIC, and high resolution epifluorescent imaging. The software package controls a Prior Optiscan™ XYZ stage with a full complement of stage inserts and a Prior filter wheel containing excitation filters from the Chroma 83000 filter set. This set includes single and multiband

excitation filters for DAPI, FITC, GFP, Texas Red, Rhodamine, or PI. Fluorescent images are acquired with a black and white ANDOR Neo/Zyla camera; high resolution color images may also be acquired with the DS Fi2 color camera. The stage, filters, shutters, and camera are controlled by the NIS Elements software from Nikon.

**Zeiss LSM 510 NLO Confocal/Multiphoton Microscope:** The Zeiss LSM 510 NLO system is configured to enhance living tissue research. The scanning system is connected to an upright Axioskop 2 FS MOT microscope equipped with a set of objectives selected for physiological measurements and live animal studies. The stage remains in a fixed position, and the objectives have motorized focus control. It is equipped with the following lasers and laser lines for excitation: Argon (458,477,488, 514 nm), HeNe (543 nm), HeNe (633 nm), and the Coherent Chameleon-XR Ti: Sapphire laser (tunable from 705 to 980 nm). The ultrafast-pulsed Chameleon laser emitting NIR radiation allows imaging up to 500  $\mu$ m deep within tissue. There are three PMTs for visible wavelength detection, a transmitted light detector, and two non-descanned detectors for multiphoton imaging. The LSM 510 ZEN operating software includes the Physiology v3.5 and Image Visart v3.5 options that permit 2D, 3D, and 4D image collection and processing, 3D/4D animation, calibration and measurement of ion concentrations, time series analysis, and graphical mean-of-ROI analysis.

**Off-line Image Analysis Stations:** There are two computer stations in the Core Facility Computer Lab reserved for microscope users, which are loaded with specialized imaging software. The RCFoffline2 system (Fujitsu/Siemens Celsius R650) has two processors, four terabyte hard drives, and an ATI Fire GL V7350 video card with 1 GB of on-board memory. It runs on Windows XP Professional (32 bit) and is loaded with Media Cybernetics' AutoQuant AutoDeblur deconvolution software (AutoQuant X3), including the AutoVisualize option, and full off-line versions of Zeiss LSM 510 AIM (confocal) and Zeiss Axiovision 4.8.2 (AxioObserver with Apotome) software. RCFoffline1, a Dell Optiplex 3010, runs on Windows 7 Professional (64 bit) and is loaded With Leica LAS AF 2.6.3, NIS Elements AR 4.13.04, and Zeiss LSM 510 ZEN 2009.

#### 4. Genomic technologies provide state-of-the-art genomics services to the LSU Health and local scientific communities in an economical and timely manner:

**DNA Array - Affymetrix GeneChip System:** This system is suitable for global gene expression studies using the Affymetrix GeneChip Probe arrays, which consists of the following components: 1) A GeneChip Hybridization Oven 640 for automated control of hybridization to the GeneChip arrays; 2) A GeneChip Fluidics Station 450 for automated washing of chips and labeling of hybridized probes. This station can wash and stain four arrays simultaneously; 3) A GeneChip Scanner 3000 7G for obtaining high-resolution images of hybridization signals. The scanner can scan 64 arrays simultaneously; 4) A GeneChip Workstation that controls the operation of the system, data collection, and processing of initial raw data, and 5) A bioinformatics system, including Expression Console, Transcriptome Analysis Console, and Ingenuity Pathway Analysis.

#### **Next-Generation Sequencing (NGS) - Illumina MiSeq and Illumina NextSeq 550 Next Generation Sequencers**

**The Illumina MiSeq** is a next-generation DNA sequencer with a single-lane flow cell. It is capable of generating up to 25 million reads with up to 15GB of output in a single run. It can produce 2 x 300 paired end reads. It has the output to accommodate targeted gene sequencing, metagenomics, small genome sequencing, targeted gene expression and amplicon sequencing. Sample libraries are loaded directly onto

the MiSeq where amplified clusters are generated on the flow cell, followed by sequencing by synthesis. Samples can be barcoded and multiplexed or pooled together in the same lane.

The Illumina NextSeq 550 is a high-throughput sequencer that uses sequencing by synthesis technology, a highly accurate reversible-terminator technology. This technology uses fluorescently labeled nucleotides to sequence hundreds of millions of clusters on a flow cell surface in parallel. This method greatly reduces the number of errors and missed calls associated with homopolymers. The NextSeq 550 integrates cluster generation and sequencing into a single instrument, generating base calls and quality metrics in real time. Data are automatically transferred to the BaseSpace environment for simplified analysis, storage, and sharing. The NextSeq 550 is flexible, offering tunable read lengths and output options to support individual research needs. This system has a maximum output of up to 120GB with up to 400 million sequencing reads. Applications include genomic DNA sequencing, exome sequencing, mRNA sequencing, small RNA/microRNA sequencing, epigenetics, small genome sequencing and targeted resequencing.

#### Real-Time Quantitative PCR -ABI 7900HT Fast and Bio-Rad CFX96 Fast Real-Time PCR Instruments:

AB/ 7900HT Fast Real-Time PCR System: The Applied Biosystems 7900HT Fast Real-Time PCR System is the only real-time quantitative PCR system that combines 96- and 384-well plate compatibility and the TaqMan® Low Density Array, with optional Fast Real-Time PCR capability, this system reduces run time to about 35 minutes in a standard 96 well plate, or about 55minutes in a 384-well plate. Key applications include gene expression quantification and the detection of single nucleotide polymorphisms (SNPs) using the fluorogenic 5' nuclease assay. The system is compatible with FAM/SYBR Green I, VIC/JOE, NED/TAMRA/ Cy3, ROX/Texas Red, and Cy5 fluorescent dyes. The Sequence Detection Software for the 7900HT system runs on the Windows XP operating system and is used for instrument control, data collection, and data analysis. The software includes a plate set-up wizard for easy experimental design.

Bio-Rad CFX96: The RCF currently houses three Bio-Rad CFX96 instruments. The CFX96 is a six-channel real-time PCR system that combines advanced optical technology with precise thermal control to deliver sensitive, reliable detection. The system's solid-state optical technology (six filtered LEDs, each with a corresponding filtered photodiode) maximizes fluorescence detection for specific dyes in specific channels, providing sensitive detection for quantification and target discrimination. Data are collected from all wells during data acquisition. At every position and with every scan, the optics shuttle is reproducibly centered above each well, so the light path is always optimal and there is no need to sacrifice data collection on one of the channels to normalize to a passive reference. Users can select multiple data acquisition modes, including a one-color fast scan for SYBR green. Thermal gradient features can be used to optimize reactions in a single run. The new CFX Manager software has advanced analysis tools for performing normalized gene expression. In addition, this system does not require fluorescein or ROX for instrument normalization.

Bio-Rad CFX384: The Bio-Rad CFX384 Real-Time PCR System with solid-state optical technology (5 filtered LEDs and 5 filtered photodiodes) provides precise quantification and multiplex target discrimination. All other acquisition and analysis parameters are identical to the CFX96 Fast System.

## 5. Mass Spectrometry

Waters SYNAPT High-Resolution Mass Spectrometer This instrument is capable of operating in both quadrupole time-of-flight (Q-TOF) and ion mobility mode and is primarily used for unbiased detection of peptides and metabolites for proteomics and metabolomics applications, respectively. A NanoAcquity UPLC system with 2D technology is directly interfaced to nanospray ionization source of SYNAPT HOMS



for proteomics applications. An Acquity UPLC system is interfaced to ESI/atmospheric pressure chemical ionization (APCI) source for metabolomics applications. An atmospheric pressure photoionization (APPI) source is also available for Synapt.

**Waters Q-TOF Micro** This is a quadrupole/time-of-flight mass spectrometer for MS/MS-based sequencing of peptides with a mass resolving power of 8,000FWHM. The Q-TOF is interfaced to a Waters CapLC HPLC system with integrated auto sampler for automated unattended nLC-MS/MS. Determination of peptide sequences from MS/MS spectra will be through a suite of software tools including ProteinLynx Global Server (2.2), SEQUEST and MASCOT.

**Thermo Finnigan Deca XP Max Nanospray LC/MS Mass Spectrometer:** This ion trap mass spectrometer is capable of extremely rapid MS/MS experiments. Ultra-high sensitivity coupled with high resolution and fast scan speeds allows for exceptional peptide sequence coverage and metabolites quantification. This instrument is utilized for sensitive bio molecular identification and experiments requiring Msn. It is coupled to a Michrom Paradigm MG4 multidimensional LC system with integrated auto sampler.

- II. **Vertebrate Animals:** LSU Health Shreveport animal facility is a fully equipped animal care facility located on the 9th floor of Biomedical Research Institute (BRI) with >40,000 sq. ft. The facility is fully accredited by AAALAC and by Animal Welfare Assurance with the NIHOLAW. The LSUHSC-S animal facility is centralized and directed by two full time veterinarians with over 40 years of experience in laboratory animal medicine. The facility follows procedures outlined in the NIH Guide for the Care and Use of Laboratory Animals. A health assessment is performed and documented for all animals 7 days per week. LSUHSC-S fully complies with the Guide for the Care and Use of Laboratory Animals (The Guide), the Public Health Service Policy on the Humane Care and Use of Laboratory Animals (PHS Policy) and all U.S. Animal Welfare Act Regulations. The small animal facility provides state-of-the-art equipment technique services to the LSU System and local scientific communities in an economical and timely manner. All animal protocols will be reviewed both by IACUC and DOD/ACURO before any work is initiated. All animal samples processed in the LSUHSC-S laboratories will involve proper precautionary measures and standard personal protective procedures as approved by the local Biosafety Committee.

**Small Animal Imaging Facility (SAIF)** provides a comprehensive suite of imaging modalities for pre-clinical studies, including:

**MicroPET:** The Siemens CTI MicroPET R4 scanner has the highest resolution of 1.8mm and greatest absolute sensitivity of >4% due to exclusive LSO detector blocks. MicroPET® performs whole body biodistribution imaging with an effective axial FOV of 12cm using continuous bed motion acquisition. Current radioisotopes used include: FDG, F-dopa, F-pencyclovir, F-gancyclovir, FMT, and F-18.

**MicroCAT:** The Siemens CTI microCAT® scanner has an ultra-high resolution down to 75 microns. The detectors are 1024 x 1024, 2048 x 2048, or 4096 x 4096 element CCD array coupled to a phosphor screen via a fiber-optic taper. Key application for microCST includes cardiovascular, respiratory, neurology, oncology, skeletal biology and disease, and joint degeneration, etc.

**FLEX triumph:** The FLEX Triumph multi-modality pre-clinical platform combines three different imaging modalities (PET, SPECT, CT) in a single platform, with a unique user interface controls all modalities.

**Xenogen IVIS imaging system:** The IVIS® optical imaging system allows the user to quantify and detect anatomical changes associated with disease progression *in vivo*. The IVIS system has fluorescence imaging options for both *in vivo* and *in vitro* imaging options. Filters are available for GFP, Cy5.5, and DSred.

- III. The IncuCyte 53 Live-Cell Analysis System (INLET): INLET is a flexible assay platform that automatically acquires and analyzes HD phase and fluorescent images of living cells around the clock, for days, weeks, or months. IncuCyte ZOOM® consists of a microscope that resides in the cell incubator, and a networked external controller hard drive that collects and processes image data. Software applications offer quantifiable analysis of a variety of cell processes including proliferation, apoptosis, cell motility and cell invasion.

#### Molecular and Cellular Physiology 3D Printing Core Lab

The Physiology department maintains a full lab suite of 3D scanning and printing devices in room 4-327. These include 3 fused-layer deposition 3D printers including one Makerbot Replicator, (Brooklyn, NY), a Monoprice Maker Select 2, (Cucamonga, CA) and a Lulzbot Taz 6, (Loveland, CO). We also have a FormLabs Form2 resin 3D printer, (Somerville, MA) and a Wanhao Duplicator 7, (Jinhua, Zhejiang, China). We have a R3bel Mini 3D Bioprinter (Santa Clara, CA) for printing cells and synthetic tissues. This lab also has a Pocket NC V2, (Bozeman, MT) which is a 5-Axis Subtractive Milling device for reverse-sculpting frozen 3D bone replicants. In addition to these printing devices, we also have plastic Processing and recycling equipment and can make custom filaments using our Filabot Plastic Extruder, (Barre, VT). We can recycle and mix filament compounds using our Shini Plastics Granulator, (Willoughby, OH). Lastly, we have extensive post-print processing capabilities including a FormLabs Form Wash and FormLabs Form Cure (Somerville, MA) and an ultraviolet crosslinker, the Hoefer UVC 500, (Holliston, MA).

#### Center for Cardiovascular Diseases and Sciences Shared Resources –LSUHSC-S

Histology and genotyping core: Key equipment in the histology component includes a Leica TP 1020 Tissue Processor and Leica EG 1160 Tissue Embedding Station, Leica RM2245 Rotary Microtome, Leica CM3050S Cryostat, Leica SM2000R Sliding Microtome, Leica VT1000S Vibratome, and Reichert-Jung Ultracut Ultra-Microtome, and an Olympus BX43 Upright Microscope with a DP72 color camera. The cardiovascular phenotyping core: 1) Perimed PeriCam PSI System with PimSoft for data analysis. This is a laser speckle imaging system allowing real time imaging with a resolution of 20 um/pixel in an area 540 mm<sup>2</sup> (20 mm x 27 mm), to which members have full access, no fee. 2) VisualSonics Vevo 3100 Ultra High Frequency Ultrasound for study of cardiac function. 3) Two TSE Stellar telemetry systems to continuously record blood pressure, activity, temperature, and biopotentials (ECG, EEG, EMG, EOG, heart rate). Units are housed in individual rooms, and each room has a surgical set-up. Surgical set up includes dissecting microscopes (Nikon SMZ745; one of which is also equipped with a Nikon Digital Sight camera and screen for training purposes), fiber optic illumination, heating lamps/pads, temperature monitors and anesthetic vaporizers with scavenging for delivery of isoflurane (VAPOR19.1). The telemetry room also contains two cage racks to house animals being monitored by telemetry.

#### COBRE Center for Redox Biology and Cardiovascular Disease Shared Resources

The newly formed COBRE Center for Redox Biology and Cardiovascular Disease is run by the COBRE Director, Dr. Christopher Kevil. The COBRE Core Facilities include:

Redox Molecular Signaling Core: The Redox Molecular Signaling Core occupies 3,375 sq. ft. of laboratory space on the 3rd floor of the Medical School building and on the 6th floor of the adjacent

Biomedical Research Institute. As part of the COBRE Center for Redox Biology and Cardiovascular Disease, this core is able to offer services at a significantly reduced rate to facilitate the study of redox regulation of cardiovascular disease at LSU Health – Shreveport. Currently, this core is divided functionally and spatially into two distinct sub-cores: the Analytic Redox Biology Sub-Core and the Molecular Signaling Sub-Core.

*Analytical Redox Biology Sub-Core:* The Analytic Redox Biology Sub-Core occupies space in Room F6-12 (690 sq. ft.) of the Biomedical Research Institute and Room 3-449 (1,074 sq. ft) in the adjacent Medical School Building. This core facility provides high quality, accurate measurements of reactive oxygen species, reactive nitrogen species, and reactive sulfide species in cell culture and tissue samples. High performance liquid chromatography (HPLC) systems coupled with UVvis and fluorescence detectors are used to specifically quantify cellular and mitochondrial superoxide production, hydrogen sulfide pools (free sulfide, sulfide bound to transitional metals, and sulfane sulfur), and thiols (glutathione, GSH/GSSG, cysteine, cystine, homocysteine, persulfides, and glutathionylation). In addition, this core facility employs a versatile and highly sensitive Sievers NO Analyzer (NOA 280i, GE) capable of measuring nitric oxide, nitrite, nitrate, nitrosoheme, and nitrosothiols in a variety of biological samples. Lastly, this core utilizes a collection of mass spectrometry equipment, including a SYNAPT HDMS (Waters Corp.), an LCQ-DECA XP (Thermo), and a Q-TOF micro (Waters Corp.), to facilitate protein identification, identify posttranslational modifications, and quantify fatty acid oxidation products.

*Molecular Signaling Sub-Core:* The Molecular Signaling Sub-Core is located on the 3rd floor of the Medical School Building in a bank of adjacent laboratories (3-236, 3-324, 3-326, 3-328, 3-330, 3-332, 3-334) occupying approximately 1,612 sq. ft. of laboratory space. The facility offers services for molecular cloning and site-directed mutagenesis, as well as design and production of vectors for CRISPR/Cas9 modification of vascular cells. Through the use of three dedicated cell culture rooms, this core provides services for endothelial, smooth muscle, and cardiac myocyte cell isolation, for generation of vascular cell lines, and for adenovirus and lentivirus production for transient or stable modification of cardiovascular cells. In addition, this core provides access to equipment and expertise for exposing vascular cells to hemodynamic forces using parallel plate flow chambers and access to equipment for the study of cellular effects of hypoxia/reoxygenation injury (Coy Hypoxic Chamber). As part of the ongoing COBRE grant, this core will purchase a hypoxia-capable CLARIOstar spectrofluorometer in 2020 to allow investigators to assess the cellular redox state over an extended, uninterrupted time course, including assessment of redox signaling during hypoxia and reoxygenation. In addition, this facility will purchase a ProteinSimple Wes Simple Western system in 2021 to provide investigators with an automated, high throughput analysis of changes in protein expression and function with reduced variability and improved quantitation compared to typical methods of manual Western blotting.

**Animal Models and Histology Core:** This Core encompasses several technologies and services necessary for in vivo investigations regarding redox regulation of cardiovascular pathophysiology and is directed by Dr. Karen Stokes, an expert in cardiovascular animal models. This core is split into two subcores as described below. The genotyping subcore is used to manage diverse mutant animal models, and is overseen by Dr. Hugh Price, Director of the Animal Resource Facility at LSU Health Shreveport. Dr. Price is trained in lab animal pathology and oversees the histology component in this sub-core that provides various histopathological services. His combined expertise will allow genotyping and histology services for the COBRE that will save investigators both time and money in accomplishing their studies. The Cardiovascular (CV) Phenotyping subcore is run by Mr. Ronald

Maloney and overseen by Dr. Shenu Bhiuyan. Dr. Bhiuyan's research expertise in non-invasive imaging and cardiovascular models along with Mr. Maloney's expertise in rodent surgery, blood flow imaging, power doppler ultrasound, and telemetry provides a strong asset for the LSUHSC-S research programs.

*Histology and Genotyping Sub-Core A:* The genotyping component of this Sub-Core is located in 3-330 with the Molecular Signaling Sub-Core, whereas the centralized histology service is located on the 8th floor of the Medical School Building in Room 8-303, occupying approximately 1,200 sq. ft. of laboratory space. The centralized histology core facility contains a Leica TP 1020 Tissue Processor, a Leica EG 1160 Tissue Embedding Station, a Leica RM2245 Rotary Microtome, a Leica CM3050S Cryostat, a Leica SM2000R Sliding Microtome, a Leica VT1000S Vibratome, and a Reichert-Jung Ultracut Ultra-Microtome. In addition, the Sub-Core allows access to an Olympus BX43 Upright Microscope with a DP72 color camera for imaging histology stains. This core facility provides access to several histological stains used to phenotype cardiovascular tissue, including H&E, Masson Trichrome, Picrosirius Red, Movat Pentachrome, Verhoff-Van Gieson, Oil Red O, and Alizarin Red staining.

*Cardiovascular Phenotyping Sub-Core B:* This Sub-Core is housed in a dedicated suite (825 sq. ft.) of 4 rooms located on the 4th floor of the Medical School Building. The current modalities (VisualSonics Vevo 3100 Ultra High-Frequency Ultrasound Imaging System, Perimed PeriCam PSI System with PimSoft for data analysis, and TSE Telemetry System) are housed in separate rooms of the suite. As part of the COBRE grant, renovations are currently underway to allow the inclusion of analysis workstations. Animal resources supplies biosafety cage change stations, cages, autoclaves, and cage washer facilities as well as husbandry staff and veterinarian support. The freight elevator outside the suite of the Cardiovascular Phenotyping Sub-Core provides easy access for animal transport and movement of husbandry supplies from the Animal Resources Facility to the Sub-Core and back to housing rooms/cage wash facility on the 9th floor of the Medical School. In coming years, this Sub-Core will add to its capabilities. For example, already underway is the addition of linear contrast imaging to the VEVO 3100, and future plans include the purchase of equipment to perform Pressure-Volume Loop measurements.

#### The Feist-Weiller Cancer Center- Center for Precision Medicine-Genomics Laboratory

The Feist-Weiller Cancer Center for Precision Medicine- Genomics Laboratory, established in 2017, is a CAP certified laboratory offering Next Generation Sequencing (NGS) for clinical purposes. The lab currently performs testing on solid tumors using a gene panel consisting of 435 cancer associated genes. The test also determines microsatellite instability (MMSI-H), tumor mutation burden (TMB) and EBV and HPV viral integration. A comprehensive physician report, usually no more than 3-5 pages, is returned to the physician which includes actionable mutations and potential clinical trials information. Additional tests are expected to be added to the laboratory in 2019.

## Part V – Administration

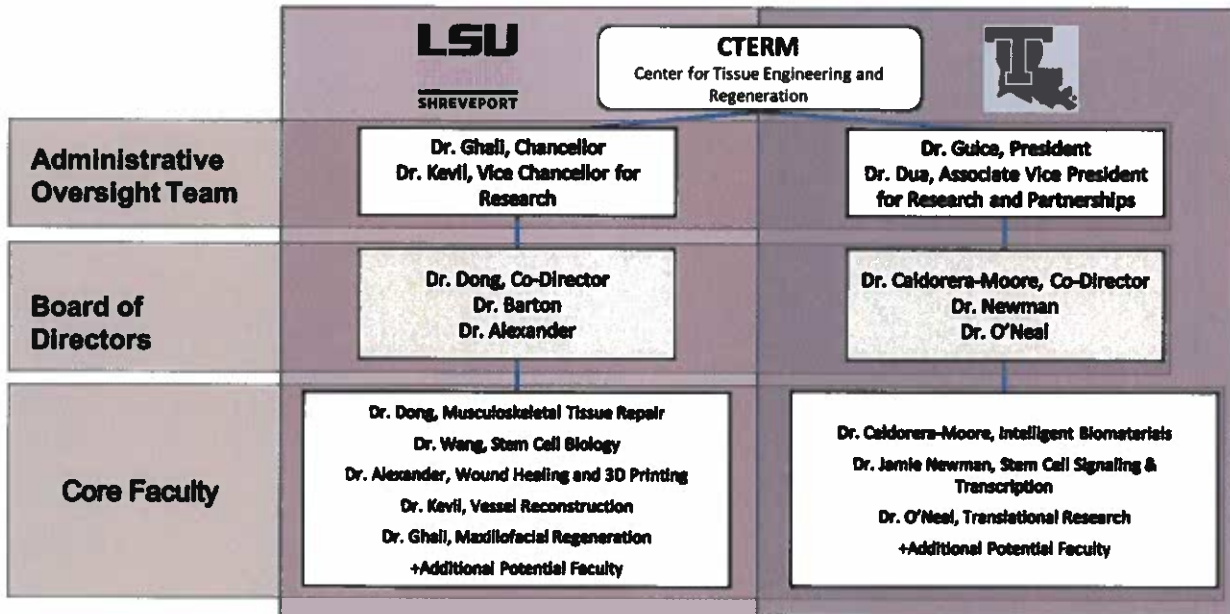
A. Provide an administrative structure for the proposed unit, including reporting lines. A flow chart or diagram may be included.

A board of directors, comprised of equal representation from both Universities, will jointly oversee the activities of the Center. The Table below summarizes the founding board of directors from each University. The board of directors' key objective is to ensure the Center's success by collectively directing the Center's undertakings, at the same time meeting the appropriate interests of both Universities and other invested partners.

**Table #1: Board of Directors**

LSUHSC Shreveport	Louisiana Tech University
Yufeng Dong, MD, Ph.D., Co-Director Dept. of Orthopedic Surgery	Mary Caldorera-Moore, Ph.D., Co-Director Biomedical Engineering
Shane Barton, MD. Chair, Dept. of Orthopedic Surgery	Jamie Newman, Ph.D. Biological Sciences
J. Steven Alexander, Ph.D. Dept. of Molecular and Cellular Physiology	Patrick O'Neal, Ph.D. Biomedical Engineering

Additionally, the CTERM will have equal shared administrative oversight from senior leadership at LSUHSC Shreveport (Chancellor Dr. Ghali Ghali and Vice Chancellor for Research Dr. Chris Kevil) and Louisiana Tech University (President Dr. Les Guice and Associate Vice President for Research Dr. Sumeet Dua) as illustrated in the provided organizational chart.



The Co-Directors will work with the Chairs of the following committees to oversee Center operations:

1. The CTERM Board of Directors oversees the Center and the utilization of center funds. The Board monitors progress, troubleshoots barriers, evaluates available technological opportunities, reports the needs of Center investigators, and reviews usage and effectiveness of the Center's Core Facilities and services. The CTERM Board reports to the Research Advisory Council, which consists of at least 2 experts from successful centers outside LSUHSC-S and LA TECH, as well as CTERM Board members. The Research Advisory Council reports to Dr. Christopher Kevil, the Vice Chancellor for Research at LSUHSC-S and Sumeet Dua, Ph.D. Associate Vice President for Research and Partnerships at LA TECH.

2. The User Group will:

a). Organize a monthly CTERM seminar series including identifying and contacting interesting clinical/translational speakers, interacting with private industry to fund some of these events and setting up Continuing Medical Education (CME) accreditation. The CTERM seminar series will be directed by Dr. Yufeng Dong and Dr. Mary Caldorera-Moore. It will be held monthly from September to June. All speakers will be internationally recognized experts in biomedical engineering and stem cell research. Both the faculty and trainees will attend the seminar series.

b). Organize monthly center-wide lunchtime webinar where individual labs from LSUHSC-S and LA TECH present their research findings to help people get to know each other and keep abreast of new developments.

c). Organize the annual retreat including keynote speaker, discussion of needs and priorities, team building activities, and design and initiate a social media program. This committee will also organize quarterly center-wide administrative meetings.

d). Identify areas of research strengths and areas of need across departments and institutions related to initiating and funding investigator-initiated research. The CTERM will offer intramural collaborative grants to faculty teams from both institutions to drive viable research proposals, enhance collaboration between institutions, and facilitate translational regenerative research. Through the support from LSUHSC-S (\$30,000) and matching fund from LA TECH (\$30,000), CTERM will be able to support pilot research projects (2-3 per year) to enhance competitiveness for extramural funding from agencies such as NIH, DOD, VA and NSF. Funding decisions will be made by the Board and will require unanimous majority vote.

e). Identify strengths and areas of need across departments and institutions related to attracting and performing clinical trials. With this information we will devise strategies to match our unique abilities with the funding goals of companies testing stem cells, biomaterials and tissue regenerative drugs. This committee will develop a strategy for interacting with local business and will work with the Office of Sponsored Programs and Technology Transfer in both LSUHSC-S and LA TECH.

**B. Will the proposed unit significantly affect the present administrative structure of the campus? If so, explain.**

The unit will not significantly affect the present administrative structure of the campus. All faculty will maintain their original department as an administrative home.

To guarantee the actions of the Center align with the Center's mission, an external advisory board will be established. The external advisory board will provide guidance to the board of directors and faculty research team in the organization and execution of the Institute research thrust. The advisory

board will provide advice and feedback on the Institute's performance but will have no administrative or governing authority. External advisory board members will be selected by the board of directors and LA Tech and LSUHSC leaders.

**Part VI – Budget**

A. Please provide a projected one-year budget, including sources and amounts of funding/revenue and costs/expenditures on the budget form (separate attachment).

<b>REVENUE</b> (Example: State/Institutional Appropriations, State Grants, Federal Grants, etc.)	<b>Year 1</b> <b>AY</b> <b>(2019-2020)</b>	<b>Year 2</b> <b>AY</b> <b>(20xx-20xx)</b>	<b>Year 3</b> <b>AY</b> <b>(20xx-20xx)</b>
Institutional: Louisiana Tech University	\$50,000		
Institutional: LSUHSC-S	\$50,000		
<b>Total Revenue</b>	\$100,000		

**Revenue:**

**A. Louisiana Tech University**

- 1. Faculty Support:** The University will provide for a reduced course load for the CTERM co-director (valued at \$15,000) Dr. Mary Caldorera-Moore.
- 2. Supportive Expenses:** Louisiana Tech University will provide funding (\$5,000) to aid in the launch event and hosting of guests and seminar speakers who support the mission of the Center. Additionally, \$30,000 will be provided for the CTERM intramural grants program.

**B. LSUHSC-S**

**Supportive Expenses:** will provide funding (\$50,000/year) to aid in the execution of CTERM goals and objectives, including the seminar series, intramural awards and administrative costs.

**Pending Revenue:** NONE



**Estimated Costs: \$100,000**

A. Please provide a projected one-year budget, including sources and amounts of funding/revenue and costs/expenditures on the budget form (separate attachment).

<b>ESTIMATED COSTS</b> (Example: Administration, Faculty, and Support Salaries, Travel, Graduate Assistantships, Equipment, Supplies, Other, etc.)	<b>Year 1</b> <b>AY</b> <b>(2019-2020)</b>	<b>Year 2</b> <b>AY</b> <b>(2020-2021)</b>	<b>Year 3</b> <b>AY</b> <b>(2021-2022)</b>
Administrative/Research Support Salary	\$20,000		
Center Retreat	\$3,000		
Center Inaugural Symposium	\$1,000		
Monthly Lunch Webinar	\$2,500		
Website Development and Support	\$1,500		
Grant Writing Workshop	\$5,000		
Intramural Grants	\$60,000		
Educational Outreach Initiatives	\$7,000		
<b>Total Costs</b>	<b>\$100,000</b>		

**Budget Justification:**

1. A part-time administrative and research support person from each institution (\$5,000) will work together to assist with the scheduling and execution of Center events, contacting and scheduling speakers for the annual retreat, implementing the community outreach program, and assisting with website maintenance. LA Tech will provide for reduced course load for the CTERM co-director Dr. Mary Calderera-Moore (\$15,000).
2. We will implement a Center retreat (\$3,000) at the Louisiana Tech University Academic Success Center to increase collaboration across traditional departmental and administrative lines.

3. Upon approval, we will host a Center Inaugural Symposium (\$1,000) at the Louisiana Tech University Academic Success Center. Funds will be used for advertisements and food for the event.
4. The monthly lunch webinars (\$2,500) are designed to raise awareness of research going on within the CTERM. Every month a lab will presents their findings to CTERM faculty, staff and trainees. Funds are requested to provide lunch in order to maximize attendance.
5. Funds in the amount of \$1,500 will be used to develop, host and maintain the CTERM website and social media content.
6. The grant writing workshop (\$5,000) funds are will be used to pay experts to assist in the review of grants prior to their submission. These will be allocated to individual faculty and research collaboration as is necessary to increase their funding success.
7. Intramural Grants (\$60,000) will be used to support Center faculty to generate data for large grant applications related to Tissue Engineering and Regenerative Medicine. The CTERM seed grant program will award a total of \$60,000 (\$30,000 from each institution) to fund two projects focused on stem cells, regenerative medicine, tissue engineering or a topic related to CTERM goals and objectives. The goal of this program is to establish mutual areas of research between LSUHSC-S and LA Tech while building a foundation for future competitive extramural support.
8. A priority area for CTERM in year 1 is the delivery of educational outreach to the community and K-12 students. Funds (\$7,000) will be used to implement and execute community educational outreach initiatives and will support costs such as food, travel, promotional materials, facility fees, supplies, rental charges, etc.

**BOARD OF SUPERVISORS FOR THE  
UNIVERSITY OF LOUISIANA SYSTEM**

**ACADEMIC AND STUDENT AFFAIRS COMMITTEE**

**April 9, 2019**

**Item E.3.**     **Nicholls State University's** request for approval to award an Honorary Doctorate of Science to Craig Michael Walker, M.D. at the 2019 Spring Commencement Exercises.

**EXECUTIVE SUMMARY**

Nicholls State University requests approval to award an Honorary Doctorate of Science to Craig Michael Walker, M.D. at the 2019 Spring Commencement Exercises. Dr. Walker earned a Bachelor of Science in Biology from Nicholls in 1973; he completed his pre-med degree in two years and received the Pre-Medicine Award. After finishing medical school at LSU in New Orleans, Dr. Walker completed subsequent training in Louisiana and further afield at Harvard Medical School, he returned to Houma to practice as an interventional cardiologist. Through his founding and development of the Cardiovascular Institute of the South (CIS), Dr. Walker has helped countless people throughout Louisiana. The Cardiovascular Institute of the South is now a world-renowned practice with more than 60 physicians and 800 team members throughout Louisiana and Mississippi.

In addition to his medical practice, Dr. Walker has benefitted the field of medicine in many additional ways. In 1999 Dr. Walker established New Cardiovascular Horizons which has grown into one of the largest cardiovascular conferences in the nation. He holds the title of Clinical Professor of Medicine at both Tulane University School of Medicine and LSU School of Medicine in New Orleans. As the Medical Director of the CIS Cardiovascular Fellowship Training Program Dr. Walker imparts his knowledge and expertise to other physicians. He also serves as the editor of Vascular Disease Management and Global Vascular Digest and is on the editorial boards of Endovascular Today and the Journal of Endovascular Therapy. Dr. Walker is the author or co-author of more than 300 published articles and more than 30 book chapters.

Dr. Walker has devoted his career to improving the health and saving the lives of patients through expert clinical care, research and development, and the teaching of interventional cardiovascular and peripheral vascular disease. Through his distinguished career as a physician, inventor, author, entrepreneur, and teacher, Dr. Walker has positively impacted the lives of those throughout the Bayou Region and far beyond. Nicholls State University would like to recognize the exceptional accomplishments of the University's alumnus by bestowing an Honorary Doctorate of Science at the May 2019 Commencement Exercises.

## RECOMMENDATION

It is recommended that the following resolution be adopted:

***NOW, THEREFORE, BE IT RESOLVED,** that the Board of Supervisors for the University of Louisiana System hereby approves Nicholls State University's request for approval to award an Honorary Doctorate of Science to Craig Michael Walker, M.D. at the 2019 Spring Commencement Exercises.*



**Office of the President**

P.O. Box 2001 | Thibodaux, LA 70310 | 985.448.4003 | 985.448.4920 [F]

E 3

March 18, 2019

Dr. Jim Henderson  
System President  
University of Louisiana System  
1201 North Third Street, Suite 7-300  
Baton Rouge, LA 70802

Dear Dr. Henderson:

Nicholls State University requests consideration and approval of the following to be placed on the agenda for the April 9, 2019 meeting of the Board of Supervisors for the University of Louisiana System:

*Honorary Doctorate of Science to Craig Michael Walker, M.D. at the Spring Commencement Ceremony on May 18, 2019*

Thank you for your assistance in this matter.

Sincerely,

John Clune  
President

JC/jms

Enclosures

pc: Mr. Alex Arceneaux, Executive Vice President  
Dr. Sue Westbrook, Provost and Vice President for Academic and Student Affairs  
Dr. Todd Keller, Associate Vice President for Academic Affairs  
Dr. Michele Caruso, Associate Vice President for Student Affairs  
Mr. Terry Braud, Vice President for Finance and Administration  
Mrs. Paulette Mayon, Internal Auditor  
Dr. David Whitney, Faculty Senate President/ Faculty Association Representative  
Mrs. Renee Hicks, Executive Director of Planning and Institutional Effectiveness

**Provost/Vice President for Academic Affairs**

P.O. Box 2002  
Thibodaux, LA 70310  
985.448.4011  
Fax: 985.448.4026

**NICHOLLS**  
**STATE UNIVERSITY**  
A MEMBER OF THE UNIVERSITY OF LOUISIANA SYSTEM

**MEMORANDUM**

**TO:** Dr. Jay Clune, President

**FROM:** Dr. Sue Westbrook



Provost and Vice President for Academic and Student Affairs


**DATE:** February 21, 2019

**RE:** Honorary Doctorate Recommendation

One nomination was submitted this semester for an honorary doctorate. A meeting of the Honorary Degree Committee was held on February 19, 2019, and they voted unanimously to recommend Dr. Craig Walker for an Honorary Doctorate of Science (D. Sc.).

I concur with the Committee's recommendation. A copy of the Committee's action is attached, along with the nomination packet and resume', for your consideration.

**APPROVED / DENIED**



**President**  
**Nicholls State University**



**Director of University Graduate Studies**

P.O. Box 2071 | Thibodaux, LA 70310 | 985.448.4438

## **M E M O R A N D U M**

**TO:** Dr. Sue Westbrook, Provost and Vice President for Academic Affairs  
**FROM:** Dr. DesLey Plaisance, Chair, Honorary Degree Committee  
**DATE:** February 20, 2019  
**SUBJECT:** Honorary Degree Committee Spring 2019 Nomination

The Honorary Degree Committee met on February 19, 2019, and recommends Dr. Craig Walker to receive an Honorary Doctorate of Science (D. Sc.) from Nicholls State University at the May, 2019, graduation ceremony.

### **Comments from Committee and Nominator:**

The selection committee strongly endorses the naming of Dr. Craig Walker as this semester's recipient of an honorary doctorate. Dr. Walker has had an impressive career and is currently President of the Cardiovascular Institute of the South. He is a Fellow for numerous groups including the American College of Cardiology, American Society of Cardiovascular Interventionists, and The American Heart Association Council on Clinical Cardiology. Nominator Dr. Mary Z. Jackson stated, "Though his work as a physician, inventor, author, and teacher, Dr. Walker has improved the health and lives of the citizens of the Bayou Region and far beyond."



Mary (Mitzi) Jackson, M. D.  
Development Faculty Fellow  
Office of Development  
Nicholls State University  
[mary.jackson@nicholls.edu](mailto:mary.jackson@nicholls.edu)  
Office (985) 448 - 4234

February 8, 2019

Sue Westbrook, DNS  
Provost and Vice President for Academic and Student Affairs  
Nicholls State University

RE: Nomination for the award of an Honorary Degree

Dear Dr. Westbrook,

Please accept this nomination of Craig Walker, MD for the Spring 2019 Honorary Degree.

Dr. Walker graduated from Nicholls in 1973 with a Bachelor of Science in Biology. After finishing medical school at LSU New Orleans and subsequent training here in Louisiana and further afield at Harvard Medical School, he returned to Houma and started the Cardiovascular Institute of the South.

Through his work as a physician, inventor, author, and teacher, Dr. Walker has improved the health and lives of the citizens of the Bayou Region and far beyond. He has impacted the economy of south Louisiana through the Cardiovascular Institute of the South, which has over 60 physicians and more than 800 team members.

Craig Walker is a Fellow of the American College of Cardiology, Fellow of the American College of Physicians, the American Society of Cardiovascular Interventionists, Fellow of the International College of Angiology, Fellow of the Society for Cardiac Angiography and Interventions, Fellow of the American College of Chest Physicians, Fellow of the American Society for Laser Medicine and Surgery, and Fellow of the American Heart Association Council on Clinical Cardiology.

The list of his accomplishments is prodigious and more thoroughly covered within the Honorary Degree Nomination Form and his Curriculum Vitae.

Sincerely,

*Mary Z. Jackson, M.D.*



# NICHOLLS STATE UNIVERSITY

OFFICE OF THE PRESIDENT

Form Rev. 1-23-2018

## Nomination for the award of an Honorary Degree

The Honorary Doctorate is the highest form of recognition offered by Nicholls State University and is awarded for demonstrated excellence in the fields of public affairs, the sciences, arts, humanities, business, and philanthropy. Recipients of Honorary Doctorates must be distinguished, with achievements both relevant and appropriate to the University. Eligibility for nomination is restricted to persons of state, national or international stature. Nominees who have made extraordinary contributions to the University will be welcomed, but must also have made significant contributions beyond the University and its local region. Notwithstanding this policy, the Honorary Doctor of Letters may be awarded as recognition for exemplary and distinguished community service, including service to Nicholls State University. Nominees shall not be current members of the Board of Supervisors for the University of Louisiana System, employees of the University, or individuals who have direct political, legal or budgetary authority over the University. (For the full policy, see Policy 5.7.12. Honorary Degrees.)

1. Name of nominee: Craig Walker
2. Professional title: M.D.
3. Name of nominator: Mary (Mitzi) Jackson, M.D.
4. The relevant college should be consulted about the title of the degree. This candidate is nominated for the degree, Honorary Doctor of Science (D.Sc.), for contribution to and achievement in a field of science. (per John P. Doucet, Ph.D., Dean, College of Arts and Sciences)
5. Please provide the information requested below. Attach additional sheets if required:
6. Describe the nominee's achievements:
  - Clinical Professor of Medicine – LSU School of Medicine, New Orleans, LA
  - Clinical Professor of Medicine – Tulane University School of Medicine, New Orleans, LA
  - Founder and President, Cardiovascular Institute of the South
  - Founder and Chairman, New Cardiovascular Horizons Annual Conference
  - Founder and Chairman Emeritus, Horizons International Peripheral Group
  - Chairman, New Cardiovascular Horizons Regional Meetings
  - Clinical Editorial Board Member, HIPG Global Vascular Digest
  
  - Medical Director of the Cardiac Catheterization Laboratory at Terrebonne General Medical Center
  
  - Principal Investigator many cardiovascular medical device clinical trails
  - serves on numerous medical and scientific boards
  
  - author and co-author of more than 300 published articles
  - author and co-author of more than 30 book chapters
  - co-author with Chef John Folse of book "Something Old and Something New, Louisiana Cooking With a Change of Heart"

7. Explain the humanitarian value or contribution to society of the nominee.

Explain the humanitarian value or contribution to society of the nominee.

As a practicing interventional cardiologist in Houma, Dr. Craig Walker improves the health and often saves the lives of his patients. However, his accomplishments reach much further than touching the lives of his patients. Through his founding and development of the Cardiovascular Institute of the South, he has help countless people throughout Louisiana. The Cardiovascular Institute of the South is now a world-renowned practice with more than 60 physicians and 800 team members throughout Louisiana and Mississippi. Through his founding and development of the New Cardiovascular Horizons, one of the largest cardiovascular conferences in the nation, he has influenced the lives of people around the globe. Besides lecturing throughout the United States, Dr. Walker has presented to medical professionals in Europe, South America, and Asia. This global influence is furthered through is roll as principal investigator for over 40 cardiovascular and peripheral vascular devices.

Dr. Walker also fulfills the role of teacher and mentor. He holds the title of Clinical Professor of Medicine at both Tulane University School of Medicine and LSU School of Medicine in New Orleans. As the Medical Director of the CIS Cardiovascular Fellowship Training Program he imparts his knowledge and expertise to other physicians.

Craig Walker is the editor of Vascular Disease Management and Global Vascular Digest. He is on the editorial boards of Endovascular Today and the Journal of Endovascular Therapy. Dr. Walker is the author or co-author of more than 300 published articles and more than 30 book chapters.

Dr. Walker has devoted his career to improving the health and saving the lives of patients through expert clinical care, research and development, and the teaching of interventional cardiovascular and peripheral vascular disease.

8. Explain the relevance of the nominee's work to Nicholls State University.

Dr. Walker graduated from Nicholls in 1973 with a Bachelor of Science in Biology. Through his distinguished career as physician, inventor, author, entrepreneur, and teacher, Dr. Walker's accomplishments have help to better the lives of those throughout the Bayou Region and far beyond. In the first sentence of Dr. Walkers profile on his company's website states, "Dr. Craig Walker, a native of Bourg, Louisiana, is a graduate of Nicholls State University in Thibodaux, Louisiana, completing his pre-med degree in two years and receiving the Pre-Medicine Award." Craig Walker proudly claims Nicholls as his alma mater.

9. Summarize of the honors and distinctions received by the nominee previously, including honorary degrees.

--Honorary Doctorate of Nursing Practice Degree: College of Nursing and Allied Health Professions at University of Louisiana at Lafayette

--Health Care Hero: New Orleans CityBusiness

--James J. Buquet Jr. Award: Terrebonne Foundation of Academic Excellence (TFAE)

-- one of the U.S. Junior Chamber of Commerce's Ten Outstanding Young Americans

--Pre-Medicine Award: Department of Biology at Nicholls State University

--certified by the American Board of Internal Medicine

--certified by the American Society of Cardiovascular Interventionists  
--certified by the American College of Physicians  
--certified by the American Board of Internal Medicine -- Subspecialty of Cardiovascular Diseases  
--certified by the American Heart Association Council on Clinical Cardiology  
--certified by the American College of Angiology  
--certified by the American Society for Laser Medicine and Surgery and Diplomate in Interventional Cardiology

--Fellow of the American College of Cardiology  
--Fellow of the American College of Physicians, the American Society of Cardiovascular Interventionists  
--Fellow of the International College of Angiology  
--Fellow of the Society for Cardiac Angiography and Interventions  
--Fellow of the American College of Chest Physicians  
--Fellow of the American Society for Laser Medicine and Surgery  
--Fellow of the American Heart Association Council on Clinical Cardiology

10. Indicate, if possible, for the nominee (this may be part of the C.V. in item 13):

- a) date of birth                    October 2, 1953  
b) educational background    B.S., Nicholls State University  
   M.D., LSU School of Medicine, New Orleans  
   Residency, Lafayette Charity Hospital  
   Fellowship, Ochsner Foundation Hospital  
   Research Fellowship, Harvard Medical School  
c) employment history         1983 – present: President, Cardiovascular Institute of the South

11. Additional comments:

For a comprehensive record of Dr. Walkers accomplishments, please refer to his extensive Curriculum Vitae.

12. Contact information for the nominee:

Name:                                Craig Walker, M.D.  
Postal address:                    225 Dunn Street, Houma, LA 70360  
Phone number:                    (985) 876-0300  
Email address:                    craig.walker@cardio.com

13. Other documents to attach to this form:

- a) A cover letter summarizing significant achievements and accomplishments  
b) Curriculum Vitae/Resumé  
c) Any other relevant documentation

**BOARD OF SUPERVISORS FOR THE  
UNIVERSITY OF LOUISIANA SYSTEM**

**ACADEMIC AND STUDENT AFFAIRS COMMITTEE**

**April 9, 2019**

**Item E.4.**     **Southeastern Louisiana University's** request for approval to award an Honorary Doctorate of Humanities to former Senator Ben Nevers at the 2019 Spring Commencement Exercises.

**EXECUTIVE SUMMARY**

Southeastern Louisiana University (SLU) requests approval to award an Honorary Doctorate of Humanities to former Senator Ben Nevers at the 2019 Spring Commencement Exercises. Senator Nevers, a U.S. Army Veteran and Louisiana Technical College - Sullivan Campus graduate, served in the Louisiana Legislature from 2000 to 2016, first as a member of the Louisiana House of Representatives and later as a member of the Louisiana Legislature. Prior to his time in the legislature, Senator Nevers served on the Bogalusa School Board. At Governor John Bel Edwards' request, Senator Nevers accepted the role of Chief of Staff to lead the Governor's team in its first year, having just retired from the Senate. He served in this position until retiring again in 2017.

Senator Nevers has been a tremendous champion for education in Louisiana and improving student's access through improved transfer opportunities between two and four-year institutions. During his tenure, he served as chair of the Senate Education Committee and chair of the Postsecondary Education Review Commission (PERC), which was tasked with reviewing and analyzing Louisiana's higher education needs with a goal of streamlining operations. He also served as a member of various statewide educational committees, including the Louisiana Tuition Trust Authority, the Louisiana High School Redesign Committee, and the Blue Ribbon Commission for Educational Excellence.

Senator Nevers is active in his community and serves as President and CEO of Nevers Electrical and Contracting Company, which he established in 1980. His substantial achievements, decades of public service, and unerring support to Southeastern Louisiana University and to the State of Louisiana clearly warrant the granting of an honorary doctorate from the University.

**RECOMMENDATION**

It is recommended that the following resolution be adopted:

***NOW, THEREFORE, BE IT RESOLVED,** that the Board of Supervisors for the University of Louisiana System hereby approves Southeastern Louisiana University's request for approval to award an Honorary Doctorate of Humanities to former Senator Ben Nevers at the 2019 Spring Commencement Exercises.*

March 21, 2019

Dr. James B. Henderson  
President, University of Louisiana System  
1201 N. Third Street, Suite 7-300  
Baton Rouge, LA 70801

Dear Dr. Henderson:

Southeastern Louisiana University respectfully requests permission of the Board of Supervisors to award the honorary Doctor of Humanities (LHD) degree to former Senator Ben Nevers at the University's Spring Commencement exercises on May 18, 2019.

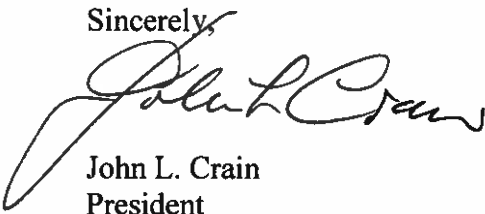
Senator Nevers, a U.S. Army Veteran and Louisiana Technical College-Sullivan Campus graduate, served in the Louisiana Legislature from 2000 to 2016, first as a member of the Louisiana House of Representatives, then as a member of the Louisiana Senate. Prior to his time in the legislature, he served on the Bogalusa School Board. At Governor John Bel Edwards' request, he accepted the role of Chief of Staff to lead the Governor's team in its first year, having just retired from the Senate. He served in that position until retiring again in 2017.

Senator Nevers has been a tremendous champion for education in Louisiana and improving students' access through improved transfer opportunities between two and four-year institutions. He served as chair of the Senate Education Committee and as chair of the Postsecondary Education Review Commission tasked with reviewing and analyzing Louisiana's higher education needs with a goal of streamlining operations.

Senator Nevers is active in his community and is the President and CEO of Nevers Electrical and Contracting Company, which he established in 1980. Senator Nevers' substantial achievements, decades of public service, and his unerring support to the University and to the State of Louisiana clearly warrant the granting of the honorary doctorate from Southeastern Louisiana University.

Please place this request on the agenda of the April 2019 meeting of the Board of Supervisors.

Sincerely,



John L. Crain  
President

**BOARD OF SUPERVISORS FOR THE  
UNIVERSITY OF LOUISIANA SYSTEM**

**ACADEMIC AND STUDENT AFFAIRS COMMITTEE**

**April 9, 2019**

**Item E.5.** Southeastern Louisiana University's request for approval to enter into a Memorandum of Understanding and a student exchange program with Jordan University of Science and Technology, Irbid, Jordan.

**EXECUTIVE SUMMARY**

Southeastern Louisiana University (SLU) requests approval to enter into a Memorandum of Understanding (MOU) and a student exchange program with Jordan University of Science and Technology (JUST). Founded in 1986, JUST is located on the outskirts of Irbid, Jordan and is considered to be one of the premier institutions of higher education for engineering and medicine in the country; it has an enrollment of approximately 22,000 students. The proposed MOU establishes the framework through which the two universities can foster and develop cooperative endeavors related to joint research activities; mobility of faculty and/or staff; mobility of graduate and/or undergraduate students; participation in seminars and academic meetings; exchange of academic materials and other information; and special short-term academic programs. The term of the proposed MOU is for a period of five (5) years from the date of signature with the possibility for renewal. A Supplemental Letter of Agreement associated with the proposed MOU, if approved, would create a student exchange program for the educational and cultural enrichment of both universities.

**RECOMMENDATION**

It is recommended that the following resolution be adopted:

***NOW, THEREFORE, BE IT RESOLVED,** that the Board of Supervisors for the University of Louisiana System hereby approves Southeastern Louisiana University's request for approval to enter into a Memorandum of Understanding and a student exchange program with Jordan University of Science and Technology, Irbid, Jordan.*

March 21, 2019

Dr. James B. Henderson  
President, University of Louisiana System  
1201 North Third Street, Suite 7-300  
Baton Rouge, LA 70802

Re: Collaborative agreements between Southeastern Louisiana University and  
Jordan University of Science and Technology

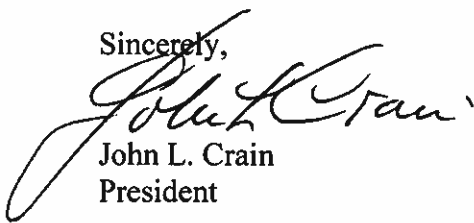
Dear Dr. Henderson:

Southeastern Louisiana University requests approval to enter into a Memorandum of Understanding (MOU) and a student exchange program with Jordan University of Science and Technology (JUST), Irbid, Jordan.

The MOU establishes the basis for cooperation in the promotion of scholarly activities of mutual interest, including the development of academic and cultural exchange in education. The Supplemental Letter of Agreement creates a student exchange program in which exchange students pay tuition and fees at the Home University and shall be exempt from paying tuition and mandatory fees to the Host University. Each university may send up to five students per year (including graduate students) to be enrolled at the other university. The goal is to maintain an approximate balance in the number of exchange students between the two universities.

I respectfully request that you place these items on the agenda for the February 2019 meeting of the Board of Supervisors.

Sincerely,



John L. Crain  
President

Attachments



## **MEMORANDUM OF UNDERSTANDING**

**BETWEEN**

**SOUTHEASTERN LOUISIANA UNIVERSITY, USA**

**AND**

**JORDAN UNIVERSITY OF SCIENCE AND TECHNOLOGY (JUST), IRBID, JORDAN**

1. Recognizing the mutual benefits to be gained through a cooperative program promoting scholarly activities and international understanding, Southeastern Louisiana University (Southeastern), USA and Jordan University of Science and Technology (JUST) have agreed to enter into this non-binding memorandum of understanding (“MoU”) that enables them to work together in the pursuit of the objectives set out herein;
2. This MoU establishes the framework through which the parties can foster and develop a cooperative relationship between them through such activities as:
  - Mobility of faculty and/or staff;
  - Mobility of graduate and/or undergraduate students;
  - Joint research activities and publications;
  - Participation in seminars and academic meetings;
  - Exchange of academic materials and other information; and
  - Special short-term academic programs.
3. The development and implementation of specific activities and projects based on this Memorandum of Understanding will be negotiated separately between faculties, schools or institutes that carry out the specific activities and projects. Prior to commencement of any such activity or project, a specific agreement identifying all the terms and conditions will be drawn up and signed by both parties. Each party agrees to carry out the specific activities and projects in accordance with the laws and regulations of the respective countries after full consultation and approval.
4. It is understood that development and implementation of any type of specific activities and projects, as outlined in Clause 2, shall depend upon the availability of resources and financial support of the parties concerned.
5. This Memorandum of Understanding may only be amended or modified by a written agreement signed by the representatives of each party.
6. This Memorandum of Understanding is valid for a period of five (5) years from the date of signing by the authorized signatories of each party. Each party shall review the status of the



Memorandum of Understanding at the end of the five-year period to determine whether it wishes the Memorandum of Understanding to continue, and if so, any modifications that might be necessary. The period of validity of this Memorandum of Understanding may only be extended by the mutual written consent of both parties.

7. This Memorandum of Understanding may, at any time during its period of validity, be amended or terminated by one of the parties upon prior notice in writing not later than six months before the date of termination or amendment.
8. Any amendment or termination of the Memorandum of Understanding shall not have an effect on any specific activities or projects that are in accordance with Clause 3 and are already in place at the time that the notice is provided, unless it is agreed upon otherwise by both parties.
9. The parties may disclose certain confidential information to the other party in relation to any future proposal made under this Memorandum of Understanding. Each party therefore agrees that the content of this Memorandum of Understanding and the negotiations in relation to any future proposal remains strictly confidential and each party hereby undertakes not to disclose the same to any third party, save for its professional advisers, without prior written consent of the other party except where such disclosure is required by law (including, without limitation, under applicable freedom of information legislation).
10. This Memorandum of Understanding is concluded in duplicate in English with all the texts having equal legal force.

**On behalf of:**  
**Southeastern Louisiana University**  
**(Southeastern), USA**

**On behalf of:**  
**Jordan University of Science and Technology**  
**(JUST), Jordan**

  
\_\_\_\_\_  
**John L. Crain, President**

\_\_\_\_\_  
**Sa'eb A. Khresat, President**

**Date:** 1/29/19

**Date:** \_\_\_\_\_



**Supplemental Letter of Agreement:  
Student Exchange Program  
between  
Jordan University of Science and  
Technology  
and  
Southeastern Louisiana University**



Pursuant to the Memorandum of Understanding between Southeastern Louisiana University (hereafter referred to as “Southeastern”) and Jordan University of Science and Technology (hereafter referred to as “JUST”), the Parties hereby agree to establish a student exchange program (hereafter referred to as “Exchange”) for the educational and cultural enrichment of both universities under the following terms:

**1. DEFINITIONS**

In this Student Exchange program Agreement:

- a) “Home University” means the university from which a student intends to graduate.
- b) “Host University” means the university that has agreed to host exchange students.
- c) “Unit of Exchange” means one student participating in the Exchange for one academic session/semester.

**2. COORDINATION**

Each university shall appoint a Coordinator with responsibility for the development and conduct of the Exchange.

**3. ELIGIBILITY**

The Exchange shall be open to both undergraduate and graduate students.

Subject to limited exceptions, participating students will be selected by their home university on the basis of the following criteria.

The students shall:

- a) have completed at least one year of full-time study at the home university
- b) have GPA  $\geq$  2.50 (or equivalent)
- c) meet all specific admissions requirements set down by the host university, including language proficiency

**4. DURATION OF EXCHANGES**

Students shall register full-time at the Host University for one academic session/semester or for a maximum of one academic year. An academic year at (JUST) includes the fall semester (September-January) and spring semester (February-May) . An academic year at (Southeastern) includes the fall semester (mid August - early December) and spring semester (mid January - mid May).

**5. NUMBER OF STUDENTS EXCHANGED**

Each university may send up to 5 (five) students per year (including graduate students) to be enrolled at the other university. The goal is to maintain an approximate balance in the

number of exchange students between the two universities.

In assessing balance, two students each participating in the Exchange for one academic session/semester shall be regarded as equivalent to one student participating in the Exchange for two academic sessions/semesters.

**6. TUITION and FEES**

Exchange students pay tuition and fees at the Home University and shall be exempt from paying tuition and mandatory fees to the Host University.

**7. OTHER EXPENSES**

Each university will reserve space in a residential facility, pending availability. If space is not available, each university shall make a reasonable effort to assist participating students in finding suitable housing. Payment for all travel, accommodation, medical insurance, medical costs not covered by insurance, food, subsistence costs, books and other educational materials, shall be the sole responsibility of the individual students participating in the program.

Note: Obtaining and maintaining appropriate visa status is the responsibility of the student. However, the Host University will provide all necessary documentation and forms.

**8. SELECTION**

The universities will make every effort to forward applications for exchange at least four months before the start of the academic term. Each university reserves the right to reject candidates, in which case alternative candidates may be proposed by the Home University. The exact program of study will be determined by the student with the approval of academic advisers at both the Home and Host Universities.

**9. ACADEMIC STATUS**

Exchange students may apply to any academic program offered at the Host University, but the Host University reserves the right to exclude students from programs with restricted enrollment. All students will remain enrolled as regular degree candidates at their Home University and will not be enrolled as candidates for degrees at the Host University. Credits towards the students' degrees will be awarded by the Home University.

**10. EVALUATION**

At the completion of each exchange student's stay, the Host University will provide the Home University with adequate information on the student's performance, including a transcript (or its equivalent) as soon as it is practical.

**11. RIGHTS & RESPONSIBILITIES**

Exchange students will have the same rights and privileges enjoyed by other students on the host campus. Students participating under the terms of this agreement shall be subject to the rules, regulations, and code of conduct of the Host University. The Host University reserves the right to terminate a student's exchange program if that student violates any rules or policies of the host university.

**12. MODIFICATION**

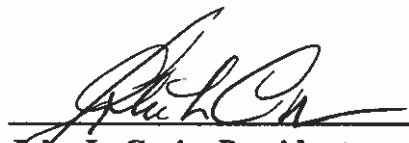
This agreement may be modified at any time if done in writing and signed by both parties. Notwithstanding this, any students who have commenced their exchange at either university before the date of termination will be allowed to complete their courses of study.

**13. TERM OF CONTRACT**

This agreement is in effect from the date of signature for a period of five years and will be automatically renewed for the same period unless either university gives notification to the contrary no later than six months before the termination of this agreement.

As witness to their subscription to the above articles, the representatives of (JUST) and (Southeastern) here provide their endorsement.

**On behalf of:  
Southeastern Louisiana University  
(Southeastern), USA**

  
\_\_\_\_\_  
**John L. Crain, President**

**Date :** 1/29/19

**On behalf of  
Jordan University of Science & Technology  
(JUST), Jordan**

\_\_\_\_\_  
**Sa'eb A. Khresat, President**

**Date :** \_\_\_\_\_

**BOARD OF SUPERVISORS FOR THE  
UNIVERSITY OF LOUISIANA SYSTEM**

**ACADEMIC AND STUDENT AFFAIRS COMMITTEE**

**April 9, 2019**

**Item E.6.** Southeastern Louisiana University's request for approval of *Vision 2025*.

**EXECUTIVE SUMMARY**

Southeastern Louisiana University (SLU) engages in an ongoing strategic planning process which provides an overarching framework that guides the activities and initiatives of the University. While the strategic plan is routinely monitored to ensure relevancy, every three to five years the plan is subjected to a comprehensive review. *Vision 2025* is the outcome of such a comprehensive review process which was conducted by the University Planning Council. The work on *Vision 2025* unfolded through a set of very collaborative and transparent processes, incorporating significant input from surveys and focus groups of students, faculty, staff, alumni and community leaders from across the region. Also incorporated into the planning process and considered by the University Planning Council were the Southeastern Campus Master Plan, Historical Institution and Peer Data, IPEDS Data Feedback Report, Southeastern Market and Brand Research Report, National Survey of Student Engagement, Louisiana Higher Education Plan, Louisiana Performance Based Funding Formula, and the University of Louisiana System Strategic Framework.

The mission statement, core values, and six strategic priorities that constitute *Vision 2025* provide the framework for establishing programmatic priorities, making resource allocation decisions, and conducting assessment of institutional effectiveness. The six strategic priorities and goals are as follows:

1. To engage a diverse population of undergraduate and graduate learners with powerful experiences.
2. To enrich and strengthen faculty and staff support and morale.
3. To increase and manage resources effectively.
4. To advance Southeastern's brand, strengths, and value to all audiences.
5. To expand Southeastern's distance education offerings in response to student and programmatic needs.
6. To foster a physical environment and efficiently allocate space in a way that directly affects higher rates of recruitment and retention of students, faculty, and staff.

*Vision 2025* is consistent with SLU's Institutional Role, Scope and Mission as confirmed by the Louisiana Board of Regents' most recent Master Plan. In accordance with SACSCOC Principles of Accreditation, the management board must review and approve the institution's mission. As a result, consideration of *Vision 2025* is requested by SLU at this time.

## **RECOMMENDATION**

It is recommended that the following resolution be adopted:

***NOW, THEREFORE, BE IT RESOLVED, that the Board of Supervisors for the University of Louisiana System hereby approves Southeastern Louisiana University's request for approval of Vision 2025.***



March 21, 2109

Dr. James B. Henderson  
President, University of Louisiana System  
1201 North Third Street, Suite 7-300  
Baton Rouge, LA 70802

Dear Dr. Henderson:

Southeastern engages in an ongoing strategic planning process which provides an overarching framework that guides the activities and initiatives of the university. While the strategic plan is routinely monitored to ensure relevancy, every three to five years the plan is subjected to a comprehensive review.

The attached Vision 2025 for Southeastern Louisiana University is the result of a comprehensive review process conducted by our University Planning Council. Members of the Planning Council include representatives from all parts of campus, including representatives elected by the faculty and student body. The work on Vision 2025 unfolded through a set of very collaborative and transparent processes, incorporating significant input from surveys and focus groups of students, faculty, staff, alumni and community leaders from across the region.

Also incorporated into the planning process and considered by the University Planning Council were the Southeastern Campus Master Plan, Historical Institution and Peer Data, IPEDS Data Feedback Report, Southeastern Market and Brand Research Report, National Survey of Student Engagement, Louisiana Higher Education Plan, Louisiana Performance Based Funding Formula, and the University of Louisiana System Strategic Framework.

Throughout the planning process, all of the data and information utilized by the Planning Council were placed on a "Planning Portal" website. The entire campus community was routinely updated on the work of the Planning Council through email messages which included links to the Planning website, and feedback from stakeholders was solicited and incorporated into the planning process.

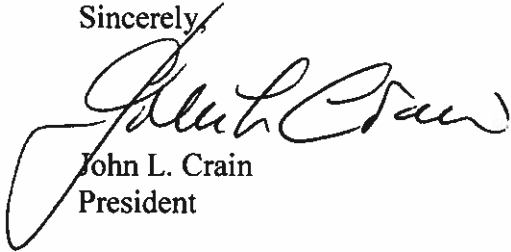
The mission statement, core values and six strategic priorities that constitute Vision 2025 provide the framework for establishing programmatic priorities, making resource allocation decisions and conducting assessment of institutional effectiveness. Vision 2025 is consistent with our Institutional Role, Scope and Mission as confirmed by the Louisiana Board of Regents in its most recent Master Plan.

Dr. James B. Henderson  
March 21, 2019  
Page 2

As you know, SACSCOC Principles of Accreditation require that the management board review and approve the institution's mission. Accordingly, I respectfully request that this item be placed on the agenda for the April meeting of the Board of Supervisors.

Please let me know if there are any questions, or if any additional information is desired.

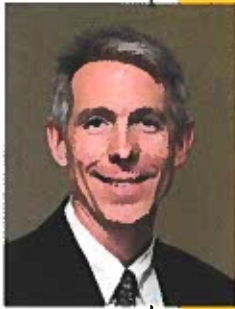
Sincerely,

A handwritten signature in cursive script, appearing to read "John L. Crain".

John L. Crain  
President

Attachment





## FROM THE PRESIDENT

Southeastern engages in ongoing, research-based strategic planning. The resulting strategic plan provides a roadmap for university initiatives, activities and resource allocation. Specifically, Division Heads establish goals for their respective divisions consistent with the priorities outlined in the strategic plan, and annual performance evaluations include review of progress toward accomplishing these goals. Likewise, the annual budget planning process utilized by budget unit heads and Division Heads ensures the allocation of institutional resources in support of the strategic priorities.

Over this past year, our University Planning Council worked diligently to create Vision 2025, a new Strategic Plan for Southeastern. Members of the Planning Council include representatives from all parts of campus, including representatives elected by the faculty and student body. The work on Vision 2025 unfolded through a set of very collaborative and transparent processes, incorporating significant input from surveys and focus groups of students, faculty, staff, alumni and community leaders from across the region.

Also incorporated into the planning process and considered by the University Planning Council were the Southeastern Campus Master Plan, Historical Institution and Peer Data, IPEDS Data Feedback Report, Southeastern Market and Brand Research Report, National Survey of Student Engagement, Louisiana Higher Education Master Plan, Louisiana Performance Based Funding Formula and the University of Louisiana System Strategic Framework.

Throughout the planning process, all of the data and information utilized by the Planning Council was placed on a "Planning Portal" website. The entire campus community was routinely updated on the work of the Planning Council through email messages which included links to the Planning website, and feedback from stakeholders was solicited and incorporated into the planning process.

Vision 2025, the final work product of the University Planning Council, includes six strategic priorities. Some of these priorities look very familiar, focusing on such issues as student success and financial stewardship. Other priorities are very new, such as one that will guide the university in the pursuit of more aggressive but focused efforts in the area of distance education.

Strategic plans are essential for guiding the activities of large and complex organizations. In order to be most effective, they must be living and evolving tools that are regularly revisited, evaluated and updated.

I invite you to take a look at Vision 2025 to see where the future will take Southeastern Louisiana University.

### MISSION STATEMENT

The mission of Southeastern Louisiana University is to lead the educational, economic and cultural development of southeast Louisiana.

### CORE VALUES

Core Values are the underpinning of a university's culture and character, and serve as the foundation on which everything else is built. Southeastern Louisiana University's core values of Excellence and Caring reflect who we are and what you can expect from us.

#### EXCELLENCE

Continually striving for the highest level of achievement; overcoming challenges with reflection, improvement, innovation and reinvention.

#### CARING

Serving the needs of others with respect, understanding and compassion; affirming the differences among individuals, values and ideas.

# VISION 2025 STRATEGIC PRIORITIES AND GOALS

## 1 To engage a diverse population of undergraduate and graduate learners with powerful experiences.

- 1.1 – The University will expand an aggressive and effective recruiting program that attracts and enrolls highly qualified and diverse students.
- 1.2 – The University will provide relevant curricula, emphasizing scholarship and an innovative, engaging pedagogy that creates an intellectually stimulating environment.
- 1.3 – The University will pursue non-traditional markets and non-traditional delivery methods.
- 1.4 – The University will provide programs, services, resources and infrastructure that maximize student success.
- 1.5 – The University will create an academic environment supported by well-qualified and diverse faculty and staff.
- 1.6 – The University will create an environment that promotes accessibility and safety, and supports understanding and acceptance of individual differences.
- 1.7 – The University will offer a broad array of non-degree, mission-appropriate activities that meet the needs of the region.

## 2 To enrich and strengthen faculty and staff support and morale.

- 2.1 – The University will provide programs, services, resources and infrastructure that support professional development.
- 2.2 – The University will recognize and reward efforts to recruit, support and engage students.
- 2.3 – The University will enhance collaborative university governance.
- 2.4 – The University will promote open and interactive communication.

## 3 To increase and manage resources effectively.

- 3.1 – The University will increase the number of external relationships and explore various opportunities for private philanthropic support.
- 3.2 – The University will pursue new markets and funding sources.
- 3.3 – The University will expand sustainability efforts as a means of reducing costs and enhancing educational opportunities.

## 4 To advance Southeastern's brand, strengths and value to all audiences.

- 4.1 – The University will engage in ongoing assessment and validation of its brand identity.
- 4.2 – The University will enhance efforts to gather narratives from the campus community to better illuminate Southeastern's brand.
- 4.3 – The University will evolve and expand its digital presence.
- 4.4 – The University will develop and launch brand advertising to targeted audiences and markets.
- 4.5 – The University will ensure consistency among all external and internal marketing and communications.
- 4.6 – The University will use innovative relationship building to enhance stakeholders' engagement.

## 5 To expand Southeastern's distance education offerings in response to student and programmatic needs.

- 5.1 – The University will promote and market distance education offerings.
- 5.2 – The University will increase access to and participation in distance education.
- 5.3 – The University will establish a comprehensive centralized center to support distance delivery.
- 5.4 – The University will implement focused strategies to strengthen the foundation for quality distance education.
- 5.5 – The University will increase distance learning programs for working adults.

## 6 To foster a physical environment and efficiently allocate space in a way that directly affects higher rates of recruitment and retention of students, faculty, and staff.

- 6.1 – The University will enhance the appearance and usability of campus.
- 6.2 – The University will expand and/or upgrade access to technology.
- 6.3 – The University will develop and implement a strategy for optimizing use of facilities.

**BOARD OF SUPERVISORS FOR THE  
UNIVERSITY OF LOUISIANA SYSTEM**

**ACADEMIC AND STUDENT AFFAIRS COMMITTEE**

**April 9, 2019**

**Item E.7. University of New Orleans' request for approval to offer six new Undergraduate Certificates.**

**EXECUTIVE SUMMARY**

At the February 2019 meeting of the Louisiana Board of Regents (BoR) the need for a university-level undergraduate certificate (UC) that would include a blend of foundation courses and a number of upper-level courses to add depth in a particular focus area was recognized. While the two-year system offers incremental credentials with multiple exit points, students who begin at a university have no options for interim credentials other than completing the full 120-credit bachelor's degree, making it difficult for a university to respond to more immediate needs of students, working adults, and area industry. The demand for focused, incremental university education has been brought to the forefront as universities have coordinated with LA Economic Development and companies such as CenturyLink, DXC, and IBM to provide a pipeline of students with industry-aligned skills regardless of major. Based on this reasoning, the BoR established the UC as an approved academic offering option, to be composed of at least 18 credit hours with at least half of the required hours at the upper level.

In response to workforce needs of the greater New Orleans and surrounding areas, the University of New Orleans (UNO) would like approval to offer the following: UC in Communications and Network Engineering, UC in Corporate and Nonprofit Communication, UC in Data Analytics, UC in Data Engineering, UC in Power and Energy Systems, and a UC in Software Engineering. Information about each proposed UC is noted below.

**UC in Communications and Network Engineering**

The purpose of the proposed UC is to teach students about communications, and also data and computer networks. Courses required of the proposed 18 credit hour UC include: Engineering Software Tools, Continuous and Discrete Signals and Systems, Communications System Design, Data and Computer Communications, Modern Wireless Communications, and Special Topics in Electrical Engineering (which leads to CCNA certification). Courses required of the proposed UC are already offered by the Department of Electrical Engineering. Program implementation will be minimal with UNO anticipating only a small additional instructional cost in YRS 3 and 4.

It is expected that the proposed UC will touch on different types of jobs such as Network and Computer Systems Administrator and Communications Engineer, among others. Jobs of this nature are estimated to grow by 6% nationwide and by 28% in Louisiana from 2016 to 2026 per CareerOneStop.org, which is sponsored by the U.S. Department of Labor. Louisiana is among the

first three states in the U.S. in terms of job percent growth in this field. A UC like the one proposed by UNO will help to provide a talent pipeline for positions in this specific area.

### **UC in Corporate and Nonprofit Communication**

The proposed 18 credit hour UC will utilize existing courses offered by the Department of English and Foreign Languages, the Department of Management and Marketing, and the Department of Film and Theatre. Courses required of the proposed UC will teach students forms and techniques of writing and editing and the interpersonal communication skills valued in a variety of professions. Students will learn and practice the editing, reporting, copyediting, and proofreading conventions that are necessary to any professional skillset. And, they will also learn the document design conventions used in many journalistic, corporate, nonprofit, academic, and commercial fields, as well as the oral and interpersonal communication skills required of workforce-ready communications in their respective professions.

Students who complete the proposed curriculum will be credentialed as well prepared professional communicators and will be able to market themselves as such when they enter the labor market. There is local and regional demand for employees who possess excellent communication skills be it nonprofits or the industry sectors of digital media, advanced manufacturing, energy, international trade, biosciences or environmental management. Since UNO is utilizing existing courses and faculty, the proposed UC can be offered at minimal cost; one adjunct instructor with expertise in advanced technical writing and editing is anticipated in YR2 of implementation.

### **UC in Data Analytics**

The curriculum required of the proposed UC has been designed to provide students with the tools to meet the increased demand for professionals who can interpret, explain, and present large quantities of data for decision-making. Courses required of the proposed 18 credit hour UC include: Elementary Statistical Methods, Analysis of Variance and Experimental Design, Introduction to Regression Analysis, Data Analysis, and Statistical Learning. For the final course students will be able to select among three options based on their specific interest and need (Introduction to Mathematical Statistics, Financial Math I or Introduction to Optimization). Each option corresponds to an area of anticipated workforce demand in the metropolitan New Orleans area. Courses required of the proposed UC are already offered by UNO; only a small marketing budget of \$5K for YR1 is anticipated.

Increased access to data means that organizations have a greater need to turn data into valuable information for decision-making. According to the Bureau of Labor Statistics Occupational Outlook Handbook, employment of research analysts is projected to grow 27% from 2016 to 2026. The May 2017 Occupational Employment Statistics study found 450 positions in the State of Louisiana for data analysts, of which 310 were in the greater New Orleans area which is the region served by UNO. Due to the interdisciplinary nature of the field and the emphasis on applied options, the proposed UC could be easily adapted to serve the needs in the five sectors identified by GNO, Inc., as key industries: Digital Media, Health Sciences, Advanced Manufacturing, Water Management Industry, and Energy Industry.

### **UC in Data Engineering**

The data science field is incredibly broad, encompassing everything from cleaning data to deploying predictive models. The proposed UC will provide knowledge and skills about communications, data and computer networks, and cloud services and architecture design. Course requirements of the proposed UC include: Engineering Software Tools, Electrical Engineering Software Tools, Introduction to Mathematical Statistics, Data Models and Database Systems, Special Topics in Electrical Engineering (Data Engineering), and Introduction to Deep Neural Networks. Five of the six courses required of the proposed UC are already offered by the Department of Electrical Engineering (EE). The EE Department offers a graduate course in Neural Networks, which can easily be revamped into an undergraduate course.

According to a recent Forbes article, machine learning engineers, data scientists, and big data engineers have been among the fastest growing jobs. More specifically, machine learning engineering jobs increased 9.8 times between 2012 and 2017. The proposed UC concentrates specifically on these popular fields including deep neural networks (which will also include concepts from machine learning, in addition to the general data engineering course). It is expected that individuals who complete the proposed UC will be qualified to pursue these fast growing jobs.

### **UC in Power and Energy Systems**

The University has organized six existing courses and one lab into a 19 credit hour proposed UC that will teach students how to perform analysis, modeling, design, and planning of electric power systems, as well as the principles of electromechanical energy conservation and their application to electric machines. The proposed UC curriculum includes the following: Circuits I & II, Electric Machinery, Energy Conversion Lab, Electrical Power Systems, Power Systems Planning and Design, and Protective Relaying of Power Systems. Since the University is taking advantage of existing courses and faculty, only a small amount of additional instructional cost may be required in the case that enrollment in the required courses exceeds capacity.

The U.S. Bureau of Labor Statistics indicates that Electrical Engineering (EE) jobs will grow by 9% nationwide and by 18% in Louisiana from 2016 to 2026. When drilling down further, in 2016, the electrical power generation, transmission and distribution industry accounted for a significant portion (9.7%) of the EE employment nationwide. The expectation is that percentage will continue to increase through 2026. Graduates of the Power and Energy Systems UC will have the new skills which will provide them with the opportunity to find employment in this type of industry.

### **UC in Software Engineering**

The purpose of the proposed UC is to teach students how to apply the principles of software engineering to the design, development, maintenance, testing, and maintenance of software systems. To complete the proposed UC a student will need to have fulfilled prerequisite requirements, complete five specific required courses, and two courses that the student will choose from a pool of four 3-credit hour courses. The proposed UC encompasses 19 credit hours with core coursework as follows: Software Design and Development I & II, Software Design and Development Laboratory I&II, Data Structures, Data Models and Database Systems, and Introduction to Software Engineering. Additional costs for program implementation would be

minimal since all of the courses are already offered by the Department of Computer Science at UNO.

Given the very healthy projected employment in software engineering and related jobs, UNO is proactively finding ways to reach more students and deepen their skills in this field. The proposed UC is the culmination for a need to meet the workforce demand for software engineers in the greater New Orleans region. Unfortunately, the number of computer science graduates alone have not been able to meet the regional employer demand for software engineers. Creating this UC is a way to directly tap into UNO's broad pool of talented students in other disciplines and arming them with the skill set necessary to meet industry needs.

### **RECOMMENDATION**

It is recommended that the following resolution be adopted:

***NOW, THEREFORE, BE IT RESOLVED,** that the Board of Supervisors for the University of Louisiana System hereby approves the University of New Orleans' request for approval of six Undergraduate Certificates.*



E7

THE UNIVERSITY *of*  
**NEW ORLEANS**  
**OFFICE OF THE PRESIDENT**

March 19, 2019

Dr. Jim Henderson  
President  
The University of Louisiana System  
1201 North Third Street  
Baton Rouge, LA 70802

Dear Dr. Henderson,

The University of New Orleans requests approval for the attached Letter of Intent for an Undergraduate Certificate in Communications and Network Engineering. The purpose of this certificate program is designed to teach students about communications, and also data and computer networks.

Thank you for your consideration of this request. Please do not hesitate to contact me should you have any questions.

Sincerely,

John W. Nicklow  
President

**PROPOSAL to DEVELOP a NEW ACADEMIC CERTIFICATE PROGRAM**  
(CAS, PAC, UC, PBC, GC, PMC, PPC)

**Date: 3/18/19**

Campus: The University of New Orleans	Program: <u>CIP, Certificate Designation, Title</u> 140999, Undergraduate Certificate in Communications and Network Engineering
<p>Institutional Contact Person &amp; Contact Info (if clarification is needed)</p> <p><i>Dr. Tina Chang, AVP of Professional and Continuing Education</i> The University of New Orleans 2000 Lakeshore Drive New Orleans, LA 70148 504-280-1024 <a href="mailto:tchang@uno.edu">tchang@uno.edu</a></p> <p><i>Dr. Taskin Kocak, Dean, College of Engineering</i> <a href="mailto:tkocak@uno.edu">tkocak@uno.edu</a></p> <p><i>Dr. Dimitrios Charalampidis, Department Chair, Electrical Engineering</i> <a href="mailto:dcharala@uno.edu">dcharala@uno.edu</a></p>	

**1. Certificate Description**

Describe the program concept: purpose and objectives; proposed curriculum; mode of delivery (on-site/hybrid/on-line). Indicate which courses are new; describe plan for rolling out new courses.

**\*\* Attach catalog descriptions for the required and elective courses, including prerequisites and LCCN, when applicable. \*\***

The University of New Orleans proposes to introduce an undergraduate certificate in Communications and Network Engineering. The proposed curriculum is based on five existing departmental courses and two new courses, and has been designed to teach students about communications, and also data and computer networks.

The certificate will require 6 existing courses ENEE 1530, 3530, 3535, 4575, 4595 and ENEE 4097. ENEE 1530 provides a foundation in computer programming and other software, which are needed for programming in computer networks, but also for system simulation and modeling. ENEE 3530 and 3535 provide the foundation on basic signals, systems, and telecommunications, while ENEE 4595 teaches modern wireless communications. Then, ENEE 4575 teaches computer communications and computer networks, and the new course, ENEE 4098, will culminate the topic of networks with some advanced topics and also CCNA certification.

Requirement	Hours
ENEE 1530: Engineering Software Tools	3
ENEE 3530: Continuous and Discrete Signals and Systems	3
ENEE 3535: Communications System Design	3
ENEE 4575: Data and Computer Communications	3
ENEE 4595: Modern Wireless Communications	3
ENEE 4097: Special Topics in Electrical Engineering (Advanced Networks (CCNA certification)	3

Students with limited background in mathematics may be required to complete some additional prerequisites such as MATH 2114 (4 credits), MATH 2124 (4 credits), MATH 2221 (3 credits), MATH 3511 (3 credits).

Catalog Descriptions:

Required

**ENEE-1530 Engineering Software Tools**

Pre-requisites: Math 1125 or higher. The course teaches the use of contemporary software tools for computer aided analysis, simulation, and design, and their application in different areas of Engineering.



**ENEE 3530      Continuous and Discrete Signal and System Analysis**

Prerequisite: Credit in ENEE 2551 with C or better, MATH 3511 and MATH 2221. Fundamental techniques for the analysis of electrical and electronic signals and systems are introduced and include: signal representation, Fourier series, Fourier transform, Laplace transform, discrete Fourier transform, and the Z-transform. Emphasis will be placed on the application of the above techniques to engineering problems.

**ENEE 3535      Communication System Design**

Prerequisites: ENEE 3530 with C or better. Design, characterization, and selection of communication methods and systems.

**ENEE 4575      Data & Computer Communications**

Prerequisites for ENEE 4575: CSCI 1201 and MATH 2108 or MATH 2111. Fundamental concepts of data and computer communications are presented including the open system interconnection (OSI) model, modems, local, metropolitan, and wide area networks (LAN, MAN, WAN), and high speed LANs, packets switching, broadband ISDN, frame relay, asynchronous transfer mode(ATM), and the Internet protocol.

**ENEE 4595      Modern Wireless Communications**

Prerequisite for ENEE 4595: ENEE 3530 with C or better. Technical concepts relating to the design and implementation of modern wireless communication systems with emphasis on mobile, cellular and LTE.

**ENEE 4097      Special Topics in Electrical Engineering**

Prerequisite: Consent of department. Special lectures on subjects of current interest in the various fields of electrical engineering. Courses may be taken for credit three times. No student may earn more than nine hours degree credit in courses ENEE 4096 and 4097.

**2. Need**

Outline how this program is deemed essential for the wellbeing of the state, region, or academy (e.g., how is it relevant, how does it contribute to economic development or relate to current/evolving needs). Identify similar programs in the state and explain why the proposed certificate is needed.

It is expected that this certificate will touch on different types of jobs such as Network and Computer Systems Administrator, Communications Engineer, among others. For example, according to <https://www.careeronestop.org/>, which is sponsored by the US Department of Labor) and in particular according to the following more specific web site: <https://www.careeronestop.org/Toolkit/StateAndLocal/ProjectedEmployment.aspx?soccode=151143&location=louisiana>, Network and Computer Systems Administrator jobs are estimated to grow by 6% nationwide and by 28% in Louisiana from 2016 to 2026.

	Employment 2016	Employment 2026	Percent Change	Projected Annual Job Openings*
United States	391,300	415,300	6%	27,000
Louisiana	2,950	3,770	28%	290

\*Projected Annual Job Openings refers to the average annual job openings due to growth and net replacement.

Louisiana is among the first three states in US in terms of job percent growth in this field. The median network and computer system administrator salary was \$81,100 in 2017. This position opens a myriad of career advancement opportunities including management and leadership responsibilities with titles such as Director or Vice President of Information Technology and Chief Information Officer.

Quick Facts: Network and Computer Systems Administrators	
2017 Median Pay ?	\$81,100 per year \$38.99 per hour
Typical Entry-Level Education ?	Bachelor's degree
Work Experience in a Related Occupation ?	None
On-the-job Training ?	None
Number of Jobs, 2016 ?	391,300
Job Outlook, 2016-26 ?	6% (As fast as average)
Employment Change, 2016-26 ?	24,000

We are not currently aware of another similar undergraduate certificate offered in the state of Louisiana. Although computer network certification is available in various forms, the proposed certificate teaches students material at a higher academic (university) level. The certificate will not only be available to students who are currently pursuing an undergraduate Electrical Engineering or Computer Engineering degree, but to graduates with a different background. In particular, the undergraduate nature of the certificate facilitates its availability to larger groups of potential students.

### 3. Students

Describe student interest. Project enrollment and productivity for the first 5 years; justify projections.

Our department is currently in the process of expanding from Electrical Engineering to Electrical and Computer Engineering. Currently, we only offer a concentration in Computer Engineering. Students pursuing this concentration account for about 15% of the total enrollment in the program (which is about 200 students). Introduction of this certificate will facilitate our efforts to expand our capabilities in the Computer Engineering field. Successful accomplishment of this goal could help us increase our enrollment by 25% in the first few years.

### 4. Accreditation

Describe plan for achieving program accreditation.

The College of Engineering, Electrical Engineering Department and its programs are fully accredited by ABET.

### 5. Faculty, Administration, & Other Resources

How will instructional needs be met: will additional faculty, facilities, equipment, or library resources be required? What department will deliver and oversee the proposed program?

The Department of Electrical Engineering will deliver the courses but there will be oversight of undergraduate certificates through the Division of Professional and Continuing Education.

### 6. Cost

Summarize additional costs to offer the program. On separate budget sheet, estimate costs and revenues for the projected program for the first five years, indicating need for additional appropriations (if any).

There will be no additional cost required. The revenue was computed based on SCH generated by each student, based on current fees and tuition.

**CERTIFICATIONS:**

*Tina Chang*

3/27/2019

\_\_\_\_\_  
Primary Administrator for Proposed Certificate

\_\_\_\_\_  
Date

*Mahyar Amazejan*

3/27/2019

\_\_\_\_\_  
Provost/Chief Academic Officer

\_\_\_\_\_  
Date

\_\_\_\_\_  
Management Board/System Office

\_\_\_\_\_  
Date





THE UNIVERSITY *of*  
**NEW ORLEANS**  
**OFFICE OF THE PRESIDENT**

March 19, 2019

Dr. Jim Henderson  
President  
The University of Louisiana System  
1201 North Third Street  
Baton Rouge, LA 70802

Dear Dr. Henderson,

The University of New Orleans requests approval for the attached Letter of Intent for an Undergraduate Certificate in Corporate and Nonprofit Communication. This certificate program is designed to teach students forms and techniques of writing and editing and the interpersonal communication skills valued in a variety of professions.

Thank you for your consideration of this request. Please do not hesitate to contact me should you have any questions.

Sincerely,

John W. Nicklow  
President

**PROPOSAL to DEVELOP a NEW ACADEMIC CERTIFICATE PROGRAM**  
(CAS, PAC, UC, PBC, GC, PMC, PPC)

**Date: 3/18/2019**

<p>Campus: The University of New Orleans</p>	<p>Program: <u>CIP, Certificate Designation, Title</u> 23.0101, Undergraduate Certificate in Corporate and Nonprofit Communication</p>
<p>Institutional Contact Person &amp; Contact Info (if clarification is needed)</p> <p><i>Dr. Tina Chang, AVP of Professional and Continuing Education</i> <i>The University of New Orleans</i> <i>2000 Lakeshore Drive</i> <i>New Orleans, LA 70148</i> <i>504-280-1024</i> <a href="mailto:tchang@uno.edu">tchang@uno.edu</a></p> <p><i>Dr. Kim Martin Long, Dean, College of Liberal Arts, Education and Human Development</i> <a href="mailto:kmlong@uno.edu">kmlong@uno.edu</a></p> <p><i>Dr. Peter Schock, Chair, Department of English and Foreign Languages</i> <a href="mailto:pschock@uno.edu">pschock@uno.edu</a></p> <p><i>Dr. Elaine Brooks, Chair, Department of English and Foreign Languages</i> <a href="mailto:esbrooks@uno.edu">esbrooks@uno.edu</a> (beginning Fall 2019)</p> <p><i>Reggie Poché, Associate Chair, Department of English and Foreign Languages</i> <a href="mailto:rjpoche3@uno.edu">rjpoche3@uno.edu</a></p>	

**1. Certificate Description**

Describe the program concept: purpose and objectives; proposed curriculum; mode of delivery (on-site/hybrid/on-line). Indicate which courses are new; describe plan for rolling out new courses.

**\*\* Attach catalog descriptions for the required and elective courses, including prerequisites and LCCN, when applicable. \*\***

The University of New Orleans proposes to introduce an undergraduate certificate in Corporate and Nonprofit Communications. The program will be delivered on-site. The proposed curriculum, which is based on existing courses offered by the Department of English and Foreign Languages, the Department of Management and Marketing, and the Department of Film and Theatre, will teach students forms and techniques of writing and editing and the interpersonal communication skills valued in a variety of professions. They will learn and practice the editing, reporting, copyediting, and proofreading conventions that are necessary to any professional skillset. They will also learn the document design conventions used in many journalistic, corporate, nonprofit, academic, and commercial fields, as well as the oral and interpersonal communication skills required of workforce-ready communicators in their respective professions. Upon completing the certificate, students will be credentialed as well-prepared professional communicators and can market themselves as such when they enter the labor market.

The following 18-hour curriculum will be flexible enough to allow students in a variety of majors to customize the certificate to their needs. Some of the courses in the proposed certificate curriculum are already required in certain undergraduate majors. For example, undergraduates majoring in Business Administration are required to take MANG 2790 (Business Communication). Business Administration students may use this course as a foundation for obtaining the certificate by subsequently choosing electives, such as ENGL 2155 (Introduction to Professional Writing) from the following certificate program

menu. Other students whose departments do not currently require any of the coursework in this menu may still complete a certificate in Corporate and Nonprofit Communications by strategically choosing 18 hours of elective coursework allowed in their degree programs.

Required Courses	Hours
ENGL 2155-Introduction to Professional Writing	3
ENGL 2152-Technical Writing or MANG 2790-Business Communication	3
FTA 2650-Oral Communication or MANG 2472-Business Communication Oral	3
ENGL 4155-Professional Editing and Writing	3
ENGL 4152-Technical Editing and Writing	3
ENGL 4190-Special Topics in Professional Writing or ENGL 4398-Internship in English	3

**ENGL 2155 - Introduction to Professional Writing**

**LCCN: CENL 2513 Foundations of Pro. Writing (Lower Level)**

An introduction to the basic forms and techniques of professional writing disciplines (such as technical writing, journalism, business writing, technical and professional editing) as well as basic rhetorical principles. Enrollment requirement: Credit for ENGL 1158/1159 (First-Year Writing) with C or better.

**ENGL 2152 - Technical Writing**

**LCCN: CENL 2513 Foundations of Pro. Writing (Lower Level)**

A course that introduces students to various forms of expository writing and professional communication with special emphasis on the preparation of reports or technical papers. Enrollment requirement: Credit for ENGL 1158/1159 (First-Year Writing) with C or better.

**MANG 2790 - Business Communication**

A course that introduces students to the interaction of business communications and information technology in the 21st-century workplace. Students will learn how to use computer networks to facilitate the following tasks: compose and submit routine business messages; interact with peers on problem-solving teams; research, draft, format, and submit hypermedia reports; create and deliver business presentations; seek and maximize job-search resources. Enrollment requirement: Must have credit for BA 2780 (Application Software for Business) and ENGL 1158.

**FTA 2650 - Oral Communications**

**LCCN: CCOM 2013 Public Speaking**

An introductory course in oral communications. Chief emphasis is on communication to a small group. Attention is given to public speaking, interpersonal communication, interviewing, and group discussion. No prerequisite.

**MANG 2472 - Business Communication Oral**

An extensive study of oral business communication techniques, including use of visual aids. Students make oral presentations individually and in groups relating to a variety of business problems (e.g., analysis of quarterly, annual, and other financial reports; results of feasibility studies or of surveys; conducting directive and non-directive interviews; dictating skills etc.). Enrollment requirement: Sophomore standing

required.

**ENGL 4155 - Professional Editing & Writing**

A course that teaches students the basic forms and techniques of professional editing and writing as well as the various roles professional editors and writers serve throughout the production of print and digital publications. Students develop their skills as grammarians and prose stylists and learn copy marking, copy editing, and proofreading conventions used in a variety of genres, such as corporate, scholarly, literary, commercial, public relations, advertising, and nonprofit writing. Enrollment requirement: Credit for ENGL 1158/1159 (First-Year Writing) with C or better and more than 44 credit hours, at least 6 hours of literature courses from 2000-2999 is required.

**ENGL 4152 - Technical Editing and Writing**

A course that introduces students to the profession of technical editing and writing: the basics of editing, including levels of edit and digital editing; document design; and editing and writing in a variety of technical modes, such as memos, proposals, reports, instructions, charts, tables, and figures. Enrollment requirement: Credit for ENGL 1158/1159 (First-Year Writing) with C or better and more than 44 credit hours, at least 6 hours of literature courses from 2000-2999 is required.

**ENGL 4190 - Special Topics in Professional Writing**

Advanced work in specific area of professional writing. Topics will vary each semester so that students may receive specialized instruction in a particular area of professional communication that fits their needs or interests. Possible topics include, but are not limited to, grant writing, corporate communications, public relations writing, advertising writing, and public policy communications. ENGL 4190 topics will be advertised a year in advance so that students may choose the topic that most closely aligns with their needs and interests. Students are encouraged, but not required, to take ENGL 2155, ENGL 2152, or JOUR 2700 before taking ENGL 4190. \*This is a newly approved course scheduled to be offered in the spring of 2020.

**ENGL 4398 - Internship in English**

Prerequisite: consent of department. This is a course emphasizing writing skills in internships in local industrial, business, and government agencies. Students will gain practical experience as professional communicators under the guidance of an employer-mentor. Enrollment requirement: Departmental consent and credit for ENGL 1158/1159 (First-Year Writing).

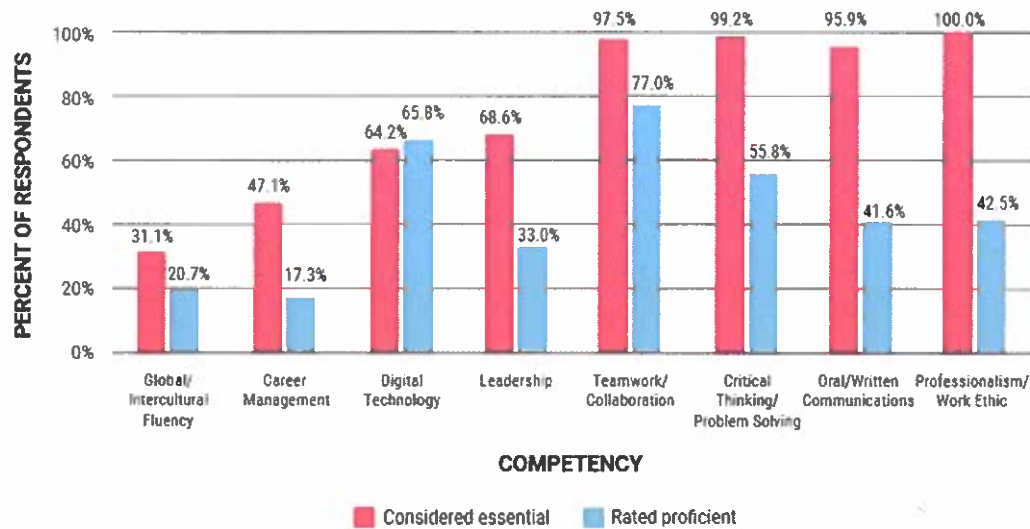
**2. Need**

Outline how this program is deemed essential for the wellbeing of the state, region, or academy (e.g., how is it relevant, how does it contribute to economic development or relate to current/evolving needs). Identify similar programs in the state and explain why the proposed certificate is needed.

In its "Job Outlook 2018" survey, the National Association of Colleges and Employers (NACE) provides "a forecast of hiring intentions of employers as they relate to new college graduates." Eighty percent of NACE member-respondents ranked written communications skills as the most desirable attribute employers seek in applicants, followed by verbal communications skills at 67%. Of NACE's eight Career Readiness Competencies, "Oral/Written Communications" ranks among the most valued by employers, who also recognize skills gaps in this area among new hires. The Department of English and Foreign Languages would like to offer students the opportunity to bridge this gap. There is no similar program in the state that currently trains students in this regard.



### Need vs. Proficiency on Career Readiness Competencies, by Percent of Respondents



\* The percentages corresponding to “considered essential” represent, among all responding employers, the percentage who, on a five-point scale, indicated that the respective competency was either “essential” (4) or “absolutely essential” (5) for college graduates to enter their workforce. The percentages corresponding to “rated proficient” represent, among all responding employers, the percentage who, on a five-point scale, rated recent graduates either “very” (4) or “extremely” (5) proficient in the respective competency.

**Source: The National Association of Colleges and Employers**

The expertise offered by a student possessing a certificate in Corporate and Nonprofit Communication will be particularly useful to nonprofits in the Greater New Orleans region. It is well known, of course, that cultural organizations like the New Orleans Museum of Art, the New Orleans Philharmonic, the Audubon Institute, and various historical museums make use of grant writers, copywriters, and editors—professionals who have honed the skillset this certificate program will nurture. In addition to these organizations, there are literally hundreds of other nonprofit organizations in the Greater New Orleans area that not only provide an array of services to the community, but help with economic development. Roughly half of all these nonprofit organizations use grant writers. A profile distributed by the Urban Institute in November of 2012 reported that: (1) 73 percent of revenues *for community and economic development* organizations in the Greater New Orleans area come from government grants; that (2) Government grants account for nearly half (46 percent) of the revenue of *nonprofit health and human services providers* in the New Orleans metropolitan area; and that (3) *multipurpose, emergency assistance and homeless services, and physical and mental health organizations* all have government grants accounting for 50 percent or more of their total revenue. Of all these nonprofit organizations, 45 percent made use of a paid grant writer (employee or contractor). Hence, since the technical writing and grant writing courses offered by the certificate program will help prepare grant writers, the certificate will potentially help Greater New Orleans to find funds for economic development and both community and social well-being.

Additionally, students credentialed with a certificate in Corporate and Nonprofit Communication will be well-positioned as professional communicators who are able to work effectively throughout the state’s industrial centers. Our skilled graduates will pursue careers not only as technical writers, but as medical writers and grant writers, especially needed in a region where the economy concentrates activity in engineering, petroleum services, geomatics, medical research, and hospitality.

Our department's mission supports that of UNO, providing excellence in academic programs and serving the needs of our urban community. In recent years, we have sought to establish new strategic objectives that align with specific goals set forth in *UNO2020*, the current institutional strategic plan. In that document, Goal One commits the university to ensuring that we offer "high-quality academic programs which will prepare students for success in a globally competitive, multicultural, and changing environment."

This proposed certificate program will also allow the University to meet Outcome Nine, which calls for "*program growth (including interdisciplinary and cross-disciplinary programs) in areas that meet local workforce development needs, as well as those program areas that foster the intellectual and cultural development of the community and region (supporting the 'cultural economy')*."

Through this proposed certificate, current UNO students will have an opportunity to expand a skillset of writing, speaking, and communication tools that will be applicable to whatever career path they choose.

### 3. Students

Describe student interest. Project enrollment and productivity for the first 5 years; justify projections.

The Department of English and Foreign Languages currently offers its undergraduate majors a degree concentration in Professional Writing and Journalism. Student who take this concentration enroll in several of the courses described in this proposal, such as ENGL 2155 and 4152, which are part of the concentration's curriculum. Graduates with this concentration have gone on to work as professional communicators in a variety of fields. For example, recent graduates work as technical writers at local oil refineries, as medical journal editors at regional hospitals, and as editors and copyeditors at local publishing companies. An undergraduate certificate in Corporate and Nonprofit Communication will offer non-English majors an opportunity to develop a skillset similar to these English majors, which will enable them to pursue the same opportunities or enhance their marketability in various fields.

There is local and regional corporate demand for employees who possess excellent communications skills. These companies have reached out to the Department of English and Foreign Languages in the past for assistance in providing continuing education in business and technical writing to its employees. For example, Eurofins Central Analytical Laboratories, which offers analytical support and food safety consulting to a wide range of local, regional, and international clients, previously asked if the Department of English and Foreign Languages was in a position to host writing workshops for its employees so that they may be trained in the best practices of corporate and technical writing. At the time, we were not able to accommodate their request but have since enhanced our course offerings in professional and technical writing and have hired additional faculty with the requisite expertise in these fields.

The proposed certificate program will also be an attractive option for many non-English majors whose degree programs already require that they take at least one of the courses listed in the proposed certificate curriculum. ENGL 2152, for example, is a technical writing course required of every Engineering and Computer Science major at the University of New Orleans. In the last three semesters, 412 students have enrolled in this course. Under the proposed certificate curriculum, if these students also have credit for FTA 2650, which is a General Education humanities elective, they would have already completed one-third of the certificate program. Since FTA 2650 is a General Education elective that any student in any major can take toward satisfying his or her undergraduate degree requirements, it can serve as an entry point into the proposed certificate program for any student in any major.

Aggregate enrollments in the component certificate courses over the last three semesters (or in the most recent two semesters the courses were offered) are as follows. In a single academic year, we anticipate

that approximately 600 students will have taken at least one of the following courses as part of their degree program curricula. This will give them a convenient head start and an incentive to continue the coursework required of a certificate in corporate and nonprofit communication.

Course	Enrollment
ENGL 2152	412
ENGL 2155	32
ENGL 4152	16
ENGL 4155	12
ENGL 4190	Newly approved course – scheduled for Spring 2020
FTA 2650	219
MANG 2472	55
MANG 2490	388

The Department of English and Foreign Languages projects that at least 15 students, six of whom are already concentrating in Professional Writing as English majors, will enroll in the proposed certificate program in the first year and that enrollment will grow as more students from other departments learn of the program. We anticipate an initial enrollment of 9 in the first two years with an increase to 12 and 14 in years 3 to 4 respectively.

#### 4. Accreditation

Describe plan for achieving program accreditation.

The Department of English and Foreign Languages is accredited by the Southern Association of Colleges and Schools (SACS).

#### 5. Faculty, Administration, & Other Resources

How will instructional needs be met: will additional faculty, facilities, equipment, or library resources be required? What department will deliver and oversee the proposed program?

The proposed certificate program will be delivered by the Department of English and Foreign Languages and overseen by Dr. Rhiannon Goad, Visiting Assistant Professor of Professional Writing. The Department of English and Foreign Languages recently hired Dr. Goad, who brings much-needed expertise in corporate, nonprofit, governmental, and public policy communication and rhetoric.

In the first year, all instructional needs will be met by existing departmental resources. Should the enrollment grow quickly in the program's second year, the Department of English and Foreign Languages may need to hire one adjunct instructor with experience in teaching advanced technical and professional writing. This adjunct hire would offset faculty attrition due to the upcoming retirement of the Department's expert in technical writing and technical editing.

#### 6. Cost

Summarize additional costs to offer the program. On separate budget sheet, estimate costs and revenues for the projected program for the first five years, indicating need for additional appropriations (if any).

Because we anticipate that courses will be taught by full-time faculty members on load, the proposed certificate program can be implemented in the first year at no additional cost. Should the program's enrollment grow in the second year and beyond, the Department of English and Foreign Languages anticipates needing one adjunct instructor with expertise in advanced technical writing and editing to teach 4000-level courses. The revenue was computed based on SCH generated by each student, based on current fees and tuition.

**CERTIFICATIONS:**

*Tina Chang*

3/27/2019

\_\_\_\_\_  
Primary Administrator for Proposed Certificate

\_\_\_\_\_  
Date

*Mahyar Amazezar*

3/27/2019

\_\_\_\_\_  
Provost/Chief Academic Officer

\_\_\_\_\_  
Date

\_\_\_\_\_  
Management Board/System Office

\_\_\_\_\_  
Date

**SUMMARY OF ESTIMATED ADDITIONAL COSTS/INCOME FOR PROPOSED CERTIFICATE**

**Institution: The University of New Orleans**

**Date: 03/28/2019**

**Certificate Program, Unit:** Undergraduate Certificate in Corporate and Nonprofit Communication, Department of English and Foreign Languages

FTE = Full Time Equivalent (use the institution's standard definition and provide that definition).

<b>EXPENDITURES</b>								
	<b>FIRST YEAR</b>		<b>SECOND YEAR</b>		<b>THIRD YEAR</b>		<b>FOURTH YEAR</b>	
	<b>AMOUNT</b>	<b>FTE</b>	<b>Amount</b>	<b>FTE</b>	<b>AMOUNT</b>	<b>FTE</b>	<b>AMOUNT</b>	<b>FTE</b>
Faculty (Adjunct)	\$0		\$4000	.125	\$4000	.125	\$4000	.125
Graduate Assistants	0		0		0		0	
Support Personnel	0		0		0		0	
Fellowships and Scholarships	0		0		0		0	
<b>SUB-TOTAL EXPENSES</b>	<b>\$0</b>	<b>.0</b>	<b>\$4000</b>	<b>.125</b>	<b>\$4000</b>	<b>.125</b>	<b>\$4000</b>	<b>.125</b>
	<b>AMOUNT</b>		<b>AMOUNT</b>		<b>AMOUNT</b>		<b>AMOUNT</b>	
Facilities	\$0		\$0		\$0		\$0	
Equipment	0		0		0		0	
Travel	0		0		0		0	
Supplies	0		0		0		0	
<b>SUB-TOTAL</b>	<b>\$0</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>	
<b>GRAND TOTAL EXPENSES</b>	<b>\$0</b>		<b>\$4000</b>		<b>\$4000</b>		<b>\$4000</b>	
<b>REVENUES</b>								
Amount & Percentage of Total Anticipated From:	<b>AMOUNT</b>	<b>%</b>	<b>AMOUNT</b>	<b>%</b>	<b>AMOUNT</b>	<b>%</b>	<b>AMOUNT</b>	<b>%</b>
State Appropriations	\$0		\$0		\$0		\$0	
Federal Grants/Contracts	0		0		0		0	
State Grants/Contracts	0		0		0		0	
Private Grants/Contracts	0		0		0		0	
Tuition	\$8,659	71.3	\$8,659	71.3	\$11,545	71.3	\$12,469	71.3
Fees	\$3,482.	28.7	\$3,482.	28.7	\$4,643	28.7	\$5,416	28.7
Other (specify)	0		0		0		0	
<b>TOTAL</b>	<b>\$12,141</b>		<b>\$12,141</b>		<b>\$16,188</b>		<b>\$17,885</b>	



THE UNIVERSITY *of*  
**NEW ORLEANS**  

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**OFFICE OF THE PRESIDENT**

March 19, 2019

Dr. Jim Henderson  
President  
The University of Louisiana System  
1201 North Third Street  
Baton Rouge, LA 70802

Dear Dr. Henderson,

The University of New Orleans requests approval for the attached Letter of Intent for an Undergraduate Certificate in Data Analytics. This certificate program is designed to provide students with the tools to meet the increased demand for professionals who can interpret, explain and present large quantities of data for decision-making.

Thank you for your consideration of this request. Please do not hesitate to contact me should you have any questions.

Sincerely,

John W. Nicklow  
President

**PROPOSAL to DEVELOP a NEW ACADEMIC CERTIFICATE PROGRAM**  
(CAS, PAC, UC, PBC, GC, PMC, PPC)

**Date: 3/18/19**

Campus: The University of New Orleans	Program: <u>CIP, Certificate Designation, Title</u> 52.1301- Management Science , Undergraduate Certificate in Data Analytics
Institutional Contact Person & Contact Info (if clarification is needed)	
<p><i>Dr. Tina Chang, J.D., Ph.D.</i> Associate Vice President for Professional and Continuing Education University of New Orleans 2000 Lakeshore Drive New Orleans, LA 70148 504-280-1024 <a href="mailto:tchang@uno.edu">tchang@uno.edu</a></p> <p><i>Dr. Tumulesh Solanky, Department Chair, Mathematics</i> <a href="mailto:tsolanky@uno.edu">tsolanky@uno.edu</a></p>	

**1. Certificate Description**

Describe the program concept: purpose and objectives; proposed curriculum; mode of delivery (on-site/hybrid/on-line). Indicate which courses are new; describe plan for rolling out new courses.

**\*\* Attach catalog descriptions for the required and elective courses, including prerequisites and LCCN, when applicable. \*\***

The University of New Orleans proposes to introduce an undergraduate certificate in Data Analytics. The proposed curriculum has been designed to provide students with the tools to meet the increased demand for professionals who can interpret, explain and present large quantities of data for decision-making.

The certificate will require 6 courses in the field of data analytics. The first course (Math 2314) introduces the field of statistics and data analytics. The next two courses, Math 4301 and Math 4304, will expose students to experimental design and two most commonly applicable tools in data analytics, namely analysis of variance and regression modelling. The next two courses, Math 4373 and Math 4385, will focus on commonly used skills in data analytics and statistical learning. These course provides an introduction both to the concept of data analytics and to the statistical principles required to successfully collect, review, organize and visualize data. The classes also focus on big data and the area of data mining. The six class in the course requirements will provide students with three options based on student's area of interest. The option 1 will be Math 4311 that focuses on the fundamental concepts of various data analytics methodologies. The option 2 will be in the area of financial mathematics that relies heavily on data-driven decision-making. The option 3 will focus on operations research to train students with the applications of advanced analytical methods to help make better decisions. Students will be able to select among the three options based on their specific interest and need. Courses will be available sequentially in the Fall and Spring terms. Entry into the program will be open to undergraduate students in current programs as well as to students who only want to pursue the certificate.

Requirement	Hours
MATH 2314 Elementary Statistical Methods	3
MATH 4301 Analysis of Variance and Experimental Design	3
MATH 4304 Introduction to Regression Analysis	3
MATH 4373 Data Analytics	3
MATH 4385 Statistical Learning	3
Options: One course from the list below	
Option 1: MATH 4311 Introduction to Mathematical Statistics	3

Option 2: MATH 4803 Financial Math I	3
Option 3: MATH 4270 Introduction to Optimization	3

The core courses have been designed for sequential progression through the requirements. Coursework will involve examples and applications in the fields of business, computer science, statistics and economics. Statistical packages/languages SAS, R and Python will be used for data analytics in the classes listed above. All the courses listed above have been previously offered as a regular course or as a special topics course to the undergraduate students in mathematics, business, engineering and other disciplines.

Math 2314 course is conceived as an entry point for students from science and non-Science backgrounds. The class has Applied Algebra as the prerequisite. For the next four classes, Math 4301, 4304, 4373 and 4385, the Math 2314 serves as the prerequisite. For the various courses listed under options, the prerequisites are Calculus-I for Math 4803, Calculus-II for Math 4311 and Calculus-III for Math 4270. The calculus classes serve as prerequisites for a number of classes in various majors.

Each option corresponds to an area of anticipated workforce demand in the metropolitan New Orleans area.

Catalog Descriptions:

Required Courses:

**MATH 2314 Elementary Statistical Methods**

Prerequisite: MATH 1115 or higher or six hours of mathematics courses numbered at least 1000. Introduction to statistical methods. Topics include data analysis, frequency distributions, probability, inference, estimation, hypothesis testing, regression and correlation. Technology is required to explore and solve problems. Credit will not be allowed in both MATH 2314 and MATH 2785.

**MATH 4301 Analysis of Variance and Experimental Design**

Prerequisite: MATH 2314 or MATH 2785 or PSYC 1310 or SOC 2707. An introduction to the SAS statistical computer package. Basic analysis of variance with fixed and random effects models, multifactor analysis of variance, analysis of covariance. Experimental designs including completely randomized designs, randomized block designs, nested designs, and Latin squares. Only one of MATH 5301 or 6301 may be counted toward a master's degree in Mathematics.

**MATH 4304 Introduction to Regression Analysis**

Prerequisite: MATH 2314 or MATH 2785 or PSYC 1310 or SOC 2707. Linear regression, inferences in regression analysis, aptness of model and remedial measures, matrices, multiple and polynomial regression, indicator variables, multi-collinearity, selection of independent variables, nonlinear regression. SAS will be used for data analysis. Only one of MATH 5304 or 6304 may be counted toward a master's degree in Mathematics.

**MATH 4373 Data Analytics**

Prerequisites: Math 2314 with a grade of C or better. Introduction to data analytics, data collection, data preparation, and data cleaning, data visualization, data Management, data mining, Fundamental concepts from statistics: Uncertainty, probability, variance, sampling, randomness, describing and displaying data, correlation, joint probability distribution, conditional probability distribution, Bayes theorem, prior and posterior probability distribution, verification and testing, significance testing, confidence intervals, sensitivity, specificity, ROC curves, calibration, Supervised and unsupervised learning, generalization, over-fitting, over-fitting avoidance, cross-validation. The focus of the class will be on in-depth instruction of the statistical concepts and the related statistical analysis. The programming aspects of the statistical topics covered in this class are discussed in CSCI 4587 and CSCI 4588.

**MATH 4385 Statistical Learning**

Prerequisites: MATH 2314 with grade C or better. This course covers major statistical learning methods and application to modern problems in science, industry and society. Major topics include multiple linear regression, classification, resampling methods, model selection and regularization, non-linear models, tree methods, support vector machines, and unsupervised machine learning. The focus of the class will be on in-depth instruction of the statistical concepts and the related statistical analysis. The programming aspects of the statistical topics covered in



this class are discussed in CSCI 4587 and CSCI 4588.

Required Elective: (one out of three)

**MATH 4311 - Introduction to Mathematical Statistics**

Prerequisite: MATH 2124. Axiomatic probability, discrete and continuous distributions, expectation, estimation, central limit theorem, confidence intervals and tests of hypotheses, regression, Bayesian statistics, other topics. Only one of MATH 5311 or 6311 may be counted toward a master's degree in Mathematics.

**MATH 4803 Financial Math I**

Prerequisites: MATH 2314 or MATH 2785, and MATH 2114. The Measurement of Interest, problems in interest, elementary annuities, yield rates, amortization schedules and sinking funds, bond and other securities, practical applications, more advanced financial analysis, a stochastic approach to interest. This is the material covered on Exam FM (Financial Mathematics) and Exam 2 administered by the Society of Actuaries and the Casualty Actuarial Society, respectively. This course requires the use of a financial calculator.

**MATH 4270 Introduction to Optimization**

Prerequisites: MATH 2134 and 3511 or consent of department. Methods for optimization of physical, economic, and business systems. Convex sets; methods for solving linear programming problems; review of classical methods of optimization; network flow analysis.

**2. Need**

Outline how this program is deemed essential for the wellbeing of the state, region, or academy (e.g., how is it relevant, how does it contribute to economic development or relate to current/evolving needs). Identify similar programs in the state and explain why the proposed certificate is needed.

Increased access to data means that organizations have a greater need to turn data into valuable information for decision-making.

According to the Bureau of Labor Statistics Occupational Outlook Handbook, employment of research analysts is projected to grow 27 percent from 2016 to 2026, much faster than the average for all occupations, with a median annual wage of \$81,390. The May 2017 Occupational Employment Statistics study found 450 positions in the state of Louisiana for data analysts, of which 310 were in the greater New Orleans area.

For Louisiana the Labor Market Information projects a 30% increase in job openings for analysts from 2014-2024. Due to the interdisciplinary nature of the field and the emphasis on applied options, the certificate could be easily adapted to serve the needs in the 5 sectors identified by GNO, Inc. as key industries: Digital Media, Health Sciences, Advanced Manufacturing, Water Management Industry, and Energy Industry. Noteworthy to the University of New Orleans is the anticipated growth in occupations requiring advanced training in GIS. A combination of coursework in our new GIS certificate and the Data Analytics certificate will give students a competitive advantage locally.

Based on BLS and McKinsey Global Institute projections the demand for "deep analytical positions" will exceed supply nationally.

Current programs offered in the state include:

- Graduate Certificate in Data Analytics in the College of Sciences at University of New Orleans
- M.S. in Analytics in the College of Business at Louisiana State University – Baton Rouge
- Online Graduate Certificate in Analytics in the College of Business at Louisiana State University-Baton Rouge

These programs offer broad preparation in the field of business analytics but not for application in disciplines beyond finance. The proposed certificate emphasizes application of data analytics in fields specific to workforce demand for the greater New Orleans region as befits the mission of the University of New Orleans.

An assessment of demand for employees with a undergraduate certificate in Data Analytics and related skills (analysis, teamwork, project management) in the metropolitan New Orleans area in Burning Glass Labor Insights

projects growth through 2020 with a salary above average for the area. Highest demand for these skills locally is expected in occupations associated with healthcare management, K-12 education, marketing, IT management and civil engineering. Each of these are areas in which the University is currently providing education and training for local students and the proposed certificate will offer an enhancement for students to advance in their field.

In addition, each of the courses offered in the proposed certificate will provide exposure to current applications and tools that are in high demand for employment. For example, the required courses will provide students with training in open-access statistical software, such as R, as well as Power BI and SAS. An assessment of the current labor market demand in Burning Glass Labor Insights indicates that the demand for employees with programming skills in R is expected to grow by 22%, in SAS by 10%, and in Python by 27%.

### 3. Students

Describe student interest. Project enrollment and productivity for the first 5 years; justify projections.

Enrollment in the currently offered courses is provided below:

Term	Subject	Students Enrolled
Spring/Fall 2018-19	Math 2314	Over 300 each year
Spring 2019	Math 4373 and Math 4385 (offered as special topics)	18 and 24 students
2018-19	Math 4301 and 4304	15 students in each
2018-19	Math 4803	Over 20 students
2017-18/2018-19	Math 4311 and Math 4270	About 15 students

Assuming that one third of current students enrolling in the required courses will also choose to complete the certificate, enrollment in the undergraduate certificate in data analytics would be expected to start with 10 in the first year. After one full year of marketing and awareness in the community, we would expect to double the number of enrollments from working professionals to 20, with 30% annual increases thereafter.

### 4. Accreditation

Describe plan for achieving program accreditation.

### 5. Faculty, Administration, & Other Resources

How will instructional needs be met: will additional faculty, facilities, equipment, or library resources be required? What department will deliver and oversee the proposed program?

The Department of Mathematics will deliver the courses but there will be oversight of undergraduate certificates through the Division of Professional and Continuing Education.

### 6. Cost

Summarize additional costs to offer the program. On separate budget sheet, estimate costs and revenues for the projected program for the first five years, indicating need for additional appropriations (if any).

Additional costs would be minimal for immediate implementation as this will leverage existing courses and faculty. Over time, it is anticipated that the enrollment growth may necessitate the need to hire adjunct faculty. Accordingly, in Year 3, it is projected that there would be a need to hire an adjunct or pay overload who would be able to teach one course and in Year 4, it is projected that there would be a need to hire an adjunct/pay overload compensation to someone who could teach two courses. The revenue was computed based on SCH generated by each student, based on current fees and tuition.

**CERTIFICATIONS:**

*Tina Chang*

3/27/2019

\_\_\_\_\_  
Primary Administrator for Proposed Certificate

\_\_\_\_\_  
Date

*Mahyar Amazejan*

3/27/2019

\_\_\_\_\_  
Provost/Chief Academic Officer

\_\_\_\_\_  
Date

\_\_\_\_\_  
Management Board/System Office

\_\_\_\_\_  
Date





THE UNIVERSITY *of*  
**NEW ORLEANS**  

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**OFFICE OF THE PRESIDENT**

March 19, 2019

Dr. Jim Henderson  
President  
The University of Louisiana System  
1201 North Third Street  
Baton Rouge, LA 70802

Dear Dr. Henderson,

The University of New Orleans requests approval for the attached Letter of Intent for an Undergraduate Certificate in Data Engineering. This certificate program is designed to teach students about communications, data and computer networks, and cloud services and architecture design.

Thank you for your consideration of this request. Please do not hesitate to contact me should you have any questions.

Sincerely,

John W. Nicklow  
President

**PROPOSAL to DEVELOP a NEW ACADEMIC CERTIFICATE PROGRAM**  
(CAS, PAC, UC, PBC, GC, PMC, PPC)

**Date: 3/18/19**

Campus: The University of New Orleans	Program: <u>CIP, Certificate Designation, Title</u> 140999, Undergraduate Certificate in Data Engineering
Institutional Contact Person & Contact Info (if clarification is needed)  <i>Dr. Tina Chang, AVP of Professional and Continuing Education</i> <i>The University of New Orleans</i> <i>2000 Lakeshore Drive</i> <i>New Orleans, LA 70148</i> <i>504-280-1024</i> <a href="mailto:tchang@uno.edu">tchang@uno.edu</a>  <i>Dr. Taskin Kocak, Dean, College of Engineering</i> <a href="mailto:tkocak@uno.edu">tkocak@uno.edu</a>  <i>Dr. Dimitrios Charalampidis, Department Chair, Electrical Engineering</i> <a href="mailto:dcharala@uno.edu">dcharala@uno.edu</a>	

**1. Certificate Description**

Describe the program concept: purpose and objectives; proposed curriculum; mode of delivery (on-site/hybrid/on-line). Indicate which courses are new; describe plan for rolling out new courses.

**\*\* Attach catalog descriptions for the required and elective courses, including prerequisites and LCCN, when applicable. \*\***

The University of New Orleans proposes to introduce an undergraduate certificate in Data Engineering. The proposed curriculum is based on four existing departmental courses and two new courses, and has been designed to teach students about communications, data and computer networks, and cloud services and architecture design.

The certificate will require 5 existing courses ENEE 1530, 2530, MATH 4311, ENEE 4097, and CSCI 4125 and one new courses ENEE4xxx. ENEE 1530 and 2530 provide a foundation in computer programming and data processing. MATH 4311 provides the statistical background required for data engineering. CSCI 4125 provides the knowledge needed to understand and process large data bases and management systems. The new course, ENEE 4097, will teach students basic data engineering and processing. Finally, the new course ENEE 4098 will introduce Deep Neural Networks. Regarding the latter, the EE department already offers a graduate course in Neural Networks, which can be easily revamped into an undergraduate course.

Requirement	Hours
ENEE 1530: Engineering Software Tools	3
ENEE 2530: Electrical Engineering Software Tools	3
MATH 4311: Introduction to Mathematical Statistics	3
CSCI 4125: Data Models and Database Systems	3
ENEE 4097: Special Topics in Electrical Engineering (Data Engineering)	3
ENEE 4xxx: Introduction to Deep Neural Networks	3

Catalog Descriptions:

Required

**ENEE-1530 Engineering Software Tools**

Pre-requisites: Math 1125 or higher. The course teaches the use of contemporary software tools for computer aided analysis, simulation, and design, and their application in different areas of Engineering.

**ENEE-2530 Electrical Engineering Software Tools**

Prerequisite: Credit in (CSCI 1205 or ENEE 1530) and Credit or Registration in ENEE 2550. The course teaches the use of contemporary software tools in computer aided analysis and design applications for different areas of Electrical Engineering.

**MATH 4311 - Introduction to Mathematical Statistics**

Prerequisite: MATH 2124. Axiomatic probability, discrete and continuous distributions, expectation, estimation, central limit theorem, confidence intervals and tests of hypotheses, regression, Bayesian statistics, other topics. Only one of MATH 5311 or 6311 may be counted toward a master's degree in Mathematics.

**CSCI 4125 Data Models and Database Systems**

Prerequisite: CSCI 2125. Methods, structures, and algorithms used for the organization, representation, and manipulation of large data bases; design and implementation of data base management systems. Students will be required to develop a large project in a team setting.

**ENEE-4097 Special Topics in Electrical Engineering**

Prerequisite: Consent of department. Special lectures on subjects of current interest in the various fields of electrical engineering. Courses may be taken for credit three times. No student may earn more than nine hours degree credit in courses ENEE 4096 and 4097.

**ENEE 4xxx: Introduction to Deep Neural Networks (in development)****2. Need**

Outline how this program is deemed essential for the wellbeing of the state, region, or academy (e.g., how is it relevant, how does it contribute to economic development or relate to current/evolving needs). Identify similar programs in the state and explain why the proposed certificate is needed.

According to a Forbes article from about 15 months ago found at the following web site, <https://www.forbes.com/sites/louiscolombus/2017/12/11/linkedin-fastest-growing-jobs-today-are-in-data-science-machine-learning/#798439c451bd>, machine learning engineers, data scientists, and big data engineers rank have been among the fastest growing jobs. More specifically, according to this article, machine learning engineering jobs increased 9.8 times in the period 2012 to 2017.

The proposed certificate concentrates exactly on these popular fields including deep neural networks (which will also include concepts from machine learning), in addition to the general data engineering course. It is expected that the proposed certificate will provide the skills necessary so that graduates of the program will be eligible to apply for these fast growing jobs.

We are not currently aware of another similar undergraduate certificate offered in the state of Louisiana. Although data engineering certification is available in various forms, the proposed certificate teaches students material at a higher academic (university) level. The certificate will not only be available to students who are currently pursuing an undergraduate Electrical Engineering or Computer Engineering degree, but to graduates with a different background. In particular, the undergraduate nature of the certificate facilitates its availability to larger groups of potential students.

**3. Students**

Describe student interest. Project enrollment and productivity for the first 5 years; justify projections.

Our department is currently in the process of expanding from Electrical Engineering to Electrical and Computer Engineering. Currently, we only offer a concentration in Computer Engineering. Students pursuing this concentration

account for about 15% of the total enrollment in the program (which is about 200 students). Introduction of this certificate will facilitate our efforts to expand our capabilities in the Computer Engineering field. Successful accomplishment of this goal could help us increase our enrollment by 25% in the first few years.

#### 4. Accreditation

Describe plan for achieving program accreditation.

The College of Engineering, Electrical Engineering Department and its programs, and computer science and its programs are fully accredited by ABET

#### 5. Faculty, Administration, & Other Resources

How will instructional needs be met: will additional faculty, facilities, equipment, or library resources be required? What department will deliver and oversee the proposed program?

The Departments of Electrical Engineering, Mathematics, and Computer Science will deliver the courses but there will be oversight of undergraduate certificates through the Division of Professional and Continuing Education.

#### 6. Cost

Summarize additional costs to offer the program. On separate budget sheet, estimate costs and revenues for the projected program for the first five years, indicating need for additional appropriations (if any).

There will be no additional cost in the first three years but in year four it is expected that there would be a need for a .125 FTE to teach an additional section. The revenue was computed based on SCH generated by each student, based on current fees and tuition.

#### CERTIFICATIONS:

Tina Chang

3/27/2019

Primary Administrator for Proposed Certificate

Date

Mahyar Amazejar

3/27/2019

Provost/Chief Academic Officer

Date

Management Board/System Office

Date



**SUMMARY OF ESTIMATED ADDITIONAL COSTS/INCOME FOR PROPOSED CERTIFICATE**

Institution:                                  **UNO**                                 

Date:                                  **3/18/19**                                 

Certificate Program, Unit:                                  *Data Engineering*                                 

FTE = Full Time Equivalent (use the institution's standard definition and provide that definition).

<b>EXPENDITURES</b>								
	FIRST YEAR		SECOND YEAR		THIRD YEAR		FOURTH YEAR	
	AMOUNT	FTE	Amount	FTE	AMOUNT	FTE	AMOUNT	FTE
Faculty (Adjunct)	\$		\$		\$		\$4,500.00	.125
Graduate Assistants								
Support Personnel								
Fellowships and Scholarships								
<b>SUB-TOTAL EXPENSES</b>	\$		\$		\$		\$4,500	.125
	AMOUNT		AMOUNT		AMOUNT		AMOUNT	
Facilities	\$		\$		\$		\$	
Equipment								
Travel								
Supplies								
<b>SUB-TOTAL</b>	\$		\$		\$		\$	
<b>GRAND TOTAL EXPENSES</b>	\$0		\$0		\$0		\$4,500.00	
<b>REVENUES</b>								
Amount & Percentage of Total Anticipated From:	AMOUNT	%	AMOUNT	%	AMOUNT	%	AMOUNT	%
State Appropriations	\$		\$		\$		\$	
Federal Grants/Contracts								
State Grants/Contracts								
Private Grants/Contracts								
Tuition	\$13,257.37		\$24,620.83		\$34,090.38		\$47,347.75	
Fees	\$5,278.63		\$9,803.17		\$13,573.62		\$18,852.25	
Other (specify)								
<b>TOTAL</b>	\$ 18,536		\$ 34,424		\$ 47,664		\$66,200	



THE UNIVERSITY *of*  
**NEW ORLEANS**  

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**OFFICE OF THE PRESIDENT**

March 19, 2019

Dr. Jim Henderson  
President  
The University of Louisiana System  
1201 North Third Street  
Baton Rouge, LA 70802

Dear Dr. Henderson,

The University of New Orleans requests approval for the attached Letter of Intent for an Undergraduate Certificate in Power and Energy Systems. This certificate program is designed to teach students how to perform analysis, modeling, design, and planning of electric power systems, as well as the principles of electromechanical energy conversion and their application to electric machines.

Thank you for your consideration of this request. Please do not hesitate to contact me should you have any questions.

Sincerely,

John W. Nicklow  
President

**PROPOSAL to DEVELOP a NEW ACADEMIC CERTIFICATE PROGRAM**  
(CAS, PAC, UC, PBC, GC, PMC, PPC)

**Date: 3/18/19**

Campus: The University of New Orleans	Program: <u>CIP, Certificate Designation, Title</u> 141001, Undergraduate Certificate in Power and Energy Systems
Institutional Contact Person & Contact Info (if clarification is needed) <i>Dr. Tina Chang, AVP of Professional and Continuing Education</i> <i>The University of New Orleans</i> <i>2000 Lakeshore Drive</i> <i>New Orleans, LA 70148</i> <i>504-280-1024</i> <a href="mailto:tchang@uno.edu">tchang@uno.edu</a>  <i>Dr. Taskin Kocak, Dean, College of Engineering</i> <a href="mailto:tkocak@uno.edu">tkocak@uno.edu</a>  <i>Dr. Dimitrios Charalampidis, Department Chair, Electrical Engineering</i> <a href="mailto:dcharala@uno.edu">dcharala@uno.edu</a>	

**1. Certificate Description**

Describe the program concept: purpose and objectives; proposed curriculum; mode of delivery (on-site/hybrid/on-line). Indicate which courses are new; describe plan for rolling out new courses.

**\*\* Attach catalog descriptions for the required and elective courses, including prerequisites and LCCN, when applicable. \*\***

The University of New Orleans proposes to introduce an undergraduate certificate in Power and Energy Systems. The proposed curriculum is based on existing departmental courses, and has been designed to teach students how to perform analysis, modeling, design, and planning of electric power systems, as well as the principles of electromechanical energy conversion and their application to electric machines.

The certificate will require 6 courses and a lab in ENEE 2550, 2551, 3521, 3511, 3522, 4522, 4526. ENEE 2550 and 2551 provide a foundation in electricity and circuit analysis, and teach basic concepts in transformers and power systems. ENEE 3522 provides a more in-depth introduction to electric power systems, while ENEE 4522 concentrates on the modeling, analysis, and planning of power systems. ENEE 3521 teaches the principles of electromechanical energy conversion associated with power system components, and mainly electric machines. The lab, ENEE 3511, provides hands on experience with energy conversion equipment including various types of transformers, generators, and motors. ENEE 4526 teaches about the protection of power system components such as transmission lines, generators, and motors from faults.

Requirement	Hours
ENEE 2550: Circuits I	3
ENEE 2551: Circuits II	3
ENEE 3521: Electric Machinery	3
ENEE 3511: Energy Conversion Lab	1
ENEE 3522: Electrical Power Systems	3
ENEE 4522: Power Systems Planning and Design	3
ENEE 4526: Protective Relaying of Power Systems	3

Students with limited background in mathematics and physics may be required to complete some additional prerequisites such as MATH 2114 (4 credits), MATH 2124 (4 credits), PHYS 1061 (3 credits), PHYS 1062 (3 credits).

Catalog Descriptions:

Required

**ENEE 2550      Circuits I**

Prerequisites: MATH 2111 or 2114 (or MATH 2108). Introduction to linear, time-invariant, and lumped circuits. Kirchhoff's laws, DC analysis of resistive circuits, and transient analysis of RLC circuits.

**ENEE 2551      Circuits II**

Prerequisite: ENEE 2550 with C or better, and PHYS 1062 and concurrent registration in ENEE 2510. AC steady-state analysis of RLC circuits and frequency response; three-phase circuits and transformers; Laplace transform methods.

**ENEE 3521      Electric Machinery**

Prerequisite: ENEE 2551 with C or better. Introduction to the theory of electromechanical energy conversion with special application to the theory and operation of electrical machines and machine control systems.

**ENEE 3511      Energy Conversion Laboratory**

Prerequisite: Credit or registration in ENEE 3521. Introduction to energy conversion equipment, single and three phase power transformers, DC and AC machines. Three hours of laboratory.

**ENEE 3522      Electrical Power Systems**

Prerequisite: ENEE 2551 with C or better. Introduction to industrial and utilities electric power systems, poly-phase systems, fault conditions, per-unit values, and the method of symmetrical components.

**ENEE 4522      Power System Planning and Design**

Prerequisite for ENEE 4522: ENEE 3522. Theory and techniques for modeling and analyzing large power systems, including per unit system matrix methods, load flow methods, and optimal economic dispatch determination. Practical planning, design, and operational studies of large power systems. Transmission network design and generator dispatching considerations in large power systems. A design project with written and oral report will be required.

**ENEE 4526      Protective Relaying of Power Systems**

Prerequisite for ENEE 4526: ENEE 3522. Protection of power system components like transmission lines, transformers, radial feeders, generators, and motors from faults and lightning. Differential protection of transformers, generator windings, and transmission lines. Distance protection of transmission lines. Relay coordination for radial feeders. Carrier protection. Use of current and voltage transformers.

**2. Need**

Outline how this program is deemed essential for the wellbeing of the state, region, or academy (e.g., how is it relevant, how does it contribute to economic development or relate to current/evolving needs). Identify similar programs in the state and explain why the proposed certificate is needed.

According to <https://www.careeronestop.org/>, and in particular according to the following web site: <https://www.careeronestop.org/Toolkit/StateAndLocal/ProjectedEmployment.aspx?soccode=172071&location=louisiana>, Electrical Engineering jobs are estimated to grow by 9% nationwide and by 18% in Louisiana from 2016 to 2026.

	Employment 2016	Employment 2026	Percent Change	Projected Annual Job Openings*
United States	188,300	204,500	9%	13,900
Louisiana	1,560	1,830	18%	130

\*Projected Annual Job Openings refers to the average annual job openings due to growth and net replacement.

According to a more detailed table which can be found at the Bureau of Labor Statistics (<https://www.bls.gov/emp/ind-occ-matrix/occ-xlsx/occ-17-2071.xlsx>), in 2016, the Electric power generation, transmission and distribution industry accounted for a significant portion (9.7%) of the Electrical Engineering employment nationwide with 18,300 jobs, and is expected to grow to 19,200 jobs by 2026, which is a percent increase of 4.9%. Therefore, graduates of the Power and Energy Systems certificate will acquire new skills which will provide them with the opportunity to find employment in this type of industry.

We are not currently aware of another similar undergraduate certificate offered in the state of Louisiana. The certificate will not only be available to students who are currently pursuing an undergraduate Electrical Engineering degree, but to graduates with a different background. In particular, the undergraduate nature of the certificate

facilitates its availability to larger groups of potential students.

### 3. Students

Describe student interest. Project enrollment and productivity for the first 5 years; justify projections.

One of the best indications that this certificate may attract a large interest is that electives in the area of Power and Energy Systems offered by the Electrical Engineering department at the University of New Orleans attract a large number of students.

For example, ENEE 3521 and 3522, two of the core courses in the certificate, were the electives with the highest enrollment in the Electrical Engineering department in Fall 2018. In particular, they had an enrollment of 33 students each. On the other hand, the other three Electrical Engineering electives offered in Fall 2018 had less than 20 students enrolled.

Similarly, ENEE 3521 and 3522 were the electives with the highest enrollment in the Electrical Engineering department in Fall 2017, with 28 students each. Of the other two electives, one had an enrollment of 19, and the other was cancelled due to low enrollment.

In fact, the reason why a large percentage of electives are offered in the area of Power and Energy Systems is exactly because students are interested in this area. Part of the reason is that several of our graduates find internships and full time jobs in this field, especially around the New Orleans area and in Louisiana.

### 4. Accreditation

Describe plan for achieving program accreditation.

The College of Engineering, Electrical Engineering Department and its programs are fully accredited by ABET

### 5. Faculty, Administration, & Other Resources

How will instructional needs be met: will additional faculty, facilities, equipment, or library resources be required? What department will deliver and oversee the proposed program?

The Department of Electrical Engineering will deliver the courses but there will be oversight of undergraduate certificates through the Division of Professional and Continuing Education.

### 6. Cost

Summarize additional costs to offer the program. On separate budget sheet, estimate costs and revenues for the projected program for the first five years, indicating need for additional appropriations (if any).

No additional cost is required for the initial implementation of the certificate, because all courses currently exist in the Department of Electrical Engineering. The revenue was computed based on SCH generated by each student, based on current fees and tuition.

CERTIFICATIONS:

*Tina Chang*

3/27/2019

\_\_\_\_\_  
Primary Administrator for Proposed Certificate

\_\_\_\_\_  
Date

*Mahyar Amazejar*

3/27/2019

\_\_\_\_\_  
Provost/Chief Academic Officer

\_\_\_\_\_  
Date

\_\_\_\_\_  
Management Board/System Office

\_\_\_\_\_  
Date

**SUMMARY OF ESTIMATED ADDITIONAL COSTS/INCOME FOR PROPOSED CERTIFICATE**

Institution: UNO

Date:

3/18/2019

Certificate Program, Unit: Power and Energy Systems

FTE = Full Time Equivalent (use the institution's standard definition and provide that definition).

EXPENDITURES								
	FIRST YEAR		SECOND YEAR		THIRD YEAR		FOURTH YEAR	
	AMOUNT	FTE	Amount	FTE	AMOUNT	FTE	AMOUNT	FTE
Faculty (adjunct)	\$		\$		\$		\$	
Graduate Assistants								
Support Personnel								
Fellowships and Scholarships								
<b>SUB-TOTAL EXPENSES</b>	\$		\$		\$		\$	
REVENUES								
	AMOUNT		AMOUNT		AMOUNT		AMOUNT	
Facilities	\$		\$		\$		\$	
Equipment								
Travel								
Supplies								
<b>SUB-TOTAL</b>	\$		\$		\$		\$	
<b>GRAND TOTAL EXPENSES</b>	\$0		\$		\$		\$	
Amount & Percentage of Total Anticipated From:	AMOUNT	%	AMOUNT	%	AMOUNT	%	AMOUNT	%
State Appropriations	\$		\$		\$		\$	
Federal Grants/Contracts								
State Grants/Contracts								
Private Grants/Contracts								
Tuition	\$ 11,363.46		\$ 18,939.10		\$ 26,514.74		\$ 30,302.56	
Fees	\$ 4,524.54		\$ 7,540.90		\$ 10,557.26		\$ 12,065.44	
Other (specify)								
<b>TOTAL</b>	\$ 15,888		\$ 26,480		\$37,072		\$ 42,368	



THE UNIVERSITY *of*  
**NEW ORLEANS**  

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**OFFICE OF THE PRESIDENT**

March 18, 2019

Dr. Jim Henderson  
President  
The University of Louisiana System  
1201 North Third Street  
Baton Rouge, LA 70802

Dear Dr. Henderson,

The University of New Orleans requests approval for the attached Letter of Intent for an Undergraduate Certificate in Software Engineering. The purpose of the certificate program is designed to teach students how to apply the principles of software engineering to the design, development, maintenance, testing, and maintenance of software systems.

Thank you for your consideration of this request. Please do not hesitate to contact me should you have any questions.

Sincerely,

John W. Nicklow  
President

**PROPOSAL to DEVELOP a NEW ACADEMIC CERTIFICATE PROGRAM**  
(CAS, PAC, UC, PBC, GC, PMC, PPC)

**Date: 3/18/19**

Campus: The University of New Orleans	Program: CIP, Certificate Designation, Title 14.0903 Undergraduate Certificate in Software Engineering
Institutional Contact Person & Contact Info (if clarification is needed)	
<p><i>Dr. Tina Chang, AVP of Professional and Continuing Education</i> The University of New Orleans 2000 Lakeshore Drive New Orleans, LA 70148 504-280-1024 <a href="mailto:tchang@uno.edu">tchang@uno.edu</a></p> <p><i>Dr. Steven G. Johnson, Dean- College of Sciences</i> <a href="mailto:sjohnso@uno.edu">sjohnso@uno.edu</a></p> <p><i>Dr. Mahdi Abdelguerfi, Department Chair, Computer Science</i> <a href="mailto:mahdi@cs.uno.edu">mahdi@cs.uno.edu</a></p>	

**1. Certificate Description**

Describe the program concept: purpose and objectives; proposed curriculum; mode of delivery (on-site/hybrid/on-line). Indicate which courses are new; describe plan for rolling out new courses.

**\*\* Attach catalog descriptions for the required and elective courses, including prerequisites and LCCN, when applicable. \*\***

The University of New Orleans proposes to introduce an undergraduate certificate in Software Engineering. The proposed curriculum based on existing departmental courses has been designed to teach students how to apply the principles of software engineering to the design, development, maintenance, testing, and maintenance of software systems.

To achieve a certificate, a student will have to meet prerequisite, complete a set five of required courses and two courses that the students will choose from a pool of four 3-credit courses. This certificate will be a total of 19 credit hours plus two prerequisite courses, for 4 credit hours.

	Courses	Credit Hours
Prerequisites	CSCI 1581: Software Design and Development I Laboratory	1
	CSCI 1583: Software Design and Development I	3
Required	CSCI 2120: Software Design and Development II	3
	CSCI 2121: Software Design and Development II Laboratory	1
	CSCI 2125: Data Structures	3
	CSCI 4125: Data Models and Database Systems	3
	CSCI 4210: Intro to Software Engineering	3
Choose two	CSCI 4208: Developing Advanced Web Applications	3
	CSCI 4661: Topics in Mobile Applications Development	3
	CSCI 4990: Special Topics in Computer Science	3
	CSCI 3097: Problems in Computer Science (internship)	3

**Prerequisites:**

CSCI 1583 and its associated lab (CSCI 1581). These courses teach the fundamentals of programming concepts and introduces the student to popular programming languages.



**Required courses:**

Students must complete a sequence of five courses CSCI 2120 (and its associated lab CSCI 2121), CSCI 2125, CSCI 4125, and CSCI 4210, which have been designed for sequential progression in learning. CSCI 2120 along with the associated lab (CSCI 2121) introduces students to writing programs using a popular programming language. CSCI 2125 emphasizes the design and implementation of structured in-memory data objects and their efficient manipulation. CSCI 4125 introduces database concepts and techniques for persistent storage and retrieval of data. CSCI 4210 will cover software architecture, design principles, software life cycles, software process activities from requirement elicitation to implementation and maintenance.

**Choice of Two out of Four:**

Students will choose two out of four 3-credit courses (CSCI 4208, CSCI 4661, CSCI 4990, CSCI 3097). CSCI 4208 will introduce techniques and tools for developing web applications. CSCI 4661 will teach the development of software applications for mobile platforms such as Android and iOS. CSCI 4990 offers special computer science topics aligned with recent advancements and technological trends. CSCI 4990 will be acceptable for credit when a topic particularly relevant to software engineering will be offered. CSCI 3097 enables students to obtain hands-on experience in software engineering through internships in software industry. With departmental prior approval, upon completion of the internships, a student can get credits for CSCI 3097. To claim credits, students must submit a technical report, make a departmental presentation, in addition to their performance evaluation obtained from their host organization/company.

**Catalog Descriptions:**

**Prerequisites**

**CSCI-1581 Software Design and Development I Laboratory**

Prerequisite: Concurrent registration in CSCI 1583 is required. Two hours of laboratory each week to accompany CSCI 1583. Applications, exercises, and explorations in methodologies, software design, and development.

**CSCI-1583 Software Design and Development I**

Prerequisite: MATH 1115 or higher with a grade of C or better; Eligibility for Math 1125 or higher, concurrent registration in CSCI 1581 is required. An introduction to software design and development using an object-oriented approach. Topics include designing specifying implementing and testing elementary classes; developing simple algorithms in an object-oriented programming language; programming-by-contract; implementing fundamental structural relations between classes. Intended primarily for Computer Science majors. Except as provided for in individual college policies a student may receive credit in only one of CSCI 1060, 1201, 1203, 1205, and 1583.

**Required**

**CSCI-2120 Software Design and Development II**

Prerequisites: CSCI 1583 and 1581; concurrent registration in CSCI 2121 is required. (The successor course CSCI 2125 has MATH 3721 as a co-requisite; credit or concurrent registration in MATH 1116 or MATH 1126, which are prerequisites for MATH 3721, is therefore recommended). A continuation of CSCI 1583 and 1581 with emphasis on algorithmic techniques and the structuring of larger systems. Topics include sorting and searching, recursion, inheritance and polymorphism, composition, abstract classes and interfaces, exception handling, and the model-view-controller structure.

**CSCI-2121 Software Design and Development II Laboratory**

Prerequisite: Concurrent registration in CSCI 2120 is required. Two hours of laboratory each week to accompany CSCI 2120. Applications, exercises, and explorations in methodologies for software design and development.

**CSCI-2125 Data Structures**

Prerequisites: CSCI 2120 and 2121. Credit or concurrent registration in MATH 3721 is required. A continuation of CSCI 2120 and 2121 with emphasis on the design and implementation of structured data objects such as lists, stacks, queues, trees, and graphs; storage allocation for structured data objects.

**CSCI-4125 Data Models and Database Systems**

Prerequisite: CSCI 2125. Methods, structures, and algorithms used for the organization, representation, and manipulation of large data bases; design and implementation of data base management systems. Students will be required to develop a large project in a team setting.

**CSCI-4210 Introduction to Software Engineering**

Prerequisite: CSCI 2125. Study of the software life-cycle that different applications go through, from conception to release and maintenance. Topics include: discovery of appropriate software life cycle for a given project: analysis, design and testing methods; risk management; tool support; process and product management; discussion of CMM and ISO-9003. Students will be required to develop a large project in a team setting.

Choose two**CSCI-4208 Developing Advanced Web Applications**

Prerequisite: CSCI 2125 or CSCI 2467. Design and implementation of advanced web-based applications. Topics covered typically include: HTTP protocol, multi-tier architectures, technologies for server-side and client-side implementation, database connectivity, XML, session handling, web services, scalability and security in the web context. Substantial programming project involving the development of a database-backed web application.

**CSCI-4661 Topics in Mobile Applications Development**

Prerequisites for CSCI 4661: Credit or concurrent registration in CSCI 2125. Development of program applications for a current widely available mobile platform. Key concepts of applications programming for a mobile platform including the UI system, activity lifecycle, sensors, networking, threading, and application compatibility. May be taken 2 times for a maximum of 6 credit hours.

**CSCI-4990 Special Topics in Computer Science**

Prerequisite: Consent of department. This is an advanced course whose topic changes from semester to semester. The prerequisites change as dictated by the topic. This course may be taken twice for a total of 6 credit hours.

**CSCI-3097 Problems in Computer Science**

Prerequisites: CSCI 2467, an average of B in all CSCI courses attempted, and the consent of the department. May be repeated up to a maximum of six credits. Directed effort on some relatively complex computer science projects.

**2. Need**

Outline how this program is deemed essential for the wellbeing of the state, region, or academy (e.g., how is it relevant, how does it contribute to economic development or relate to current/evolving needs). Identify similar programs in the state and explain why the proposed certificate is needed.

According to the Bureau of Labor Statistics Occupational Outlook Handbook, employment of software developers is projected to grow much faster than the average for all occupations. Employment of applications developers is projected to grow 31 percent, and employment of systems developers is projected to grow 11 percent. The main reason for the growth in both applications developers and systems developers is a large increase in demand for computer software. The need for new applications on smart phones and tablets will help increase the demand for

applications software developers. The health and medical insurance and reinsurance carriers industry will need innovative software to manage new healthcare policy enrollments and administer existing policies digitally.

More specifically, the projected employment for applications developers in the State of Louisiana is significantly higher than across the United States. There is a projected 64 percent change from 2016 to 2026 in [Louisiana](#) compared to a 31 percent change in the same time period across the United States. (Career One Stop Sponsored by the US Dept. of Labor).

### Projected Employment for Software Developers, Applications in NEW ORLEANS, LA

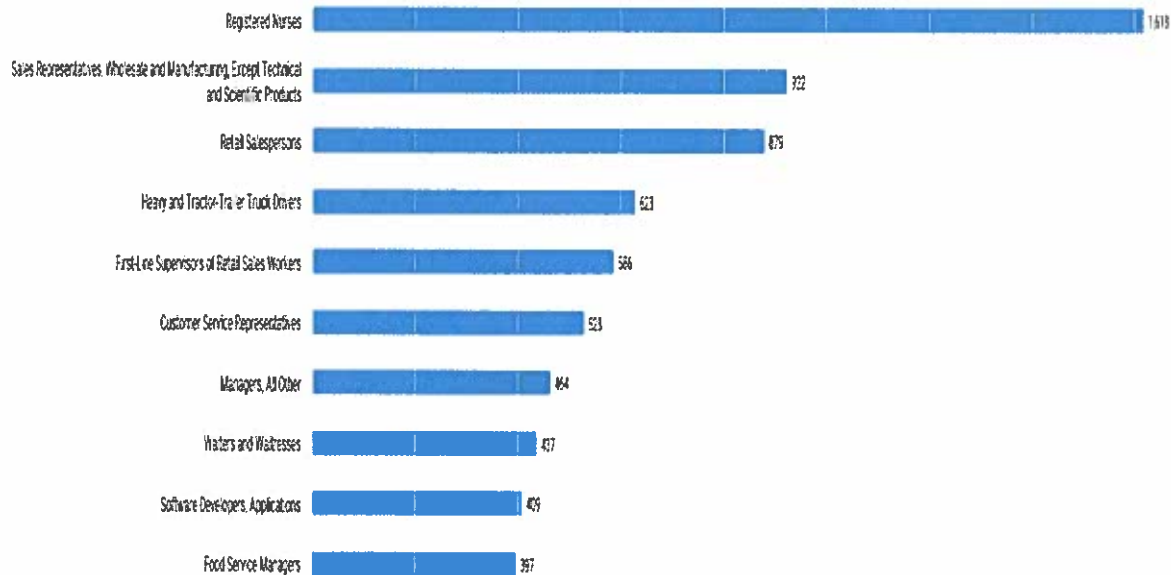
[View National Data](#)

[View Table](#) : [View Chart](#) : [View Map](#)

National	Employment		Percent Change	Projected Annual Job Openings*
	2016	2026		
United States	831,300	1,086,600	31%	85,700

State	Employment		Percent Change	Projected Annual Job Openings*
	2016	2026		
Louisiana	1,410	2,310	+64%	210

An assessment of demand for jobs reveals that software applications developers is ranked in the top ten in the New Orleans area. There were 28,791 jobs posted Dec. 14, 2018- Mar. 13, 2019.



Given the very healthy projected employment in software engineering and related jobs, UNO is proactively finding ways to reach more students and deepen their skills in this field. In doing so, this certificate will also be open to matriculated students who are non-computer science majors who have an interest and affinity towards software engineering. Computer science professors will have the added benefit of teaching in demand technical skills to students from other degree programs who have a background in agile methods, data analysis, problem solving, and storytelling to thrive in software engineering work post-graduation.

Current offerings in the state include:

- Software Engineering Concentration, LSU Baton Rouge, Louisiana
- Software Engineering Emphasis, Southern University

These programs offer preparation in the field of software engineering but are only open to computer science majors at the above-noted institutions. This proposed certificate is the culmination for a need to meet the workforce demand for software engineers in the greater New Orleans region. Unfortunately, the number of computer science graduates alone has not been able to meet the regional employer demand for software engineers. Consequently, more recently, employers like GE and DXC Technology have worked with for-profit tech boot camp enterprises to hire software engineers and full stack coders coming out of these programs. Many of these students do not possess a CS degree but did receive the technical training required to thrive at these companies. Creating this undergraduate certificate is a way to directly tap into UNO's broad pool of talented students who also possess essential skills such as agile methods, data analysis, problem solving, and storytelling which can be similar to the well-rounded students graduating from these boot camp programs according to our industry counterparts.

### 3. Students

Describe student interest. Project enrollment and productivity for the first 5 years; justify projections.

Enrollment in the currently offered courses in Computer Science, Management and Engineering Management is below:

Term	Subject	Students
Spring/Fall 2018	Computer Science	51
Fall 2018	Management	27
Spring 2018	Engineering Management	16

Potentially, this certificate may appeal to students in a myriad of degree programs outside of the Computer Science degree beyond the natural programmatic fits above. If 5-10% of students across the university enrolled in this certificate, UNO would go a long way to thoughtfully creating a pathway for high talent students that possess the essential (soft) and technical skills to thrive in a high demand job area.

### 4. Accreditation

Describe plan for achieving program accreditation.

Computer Science Department and its programs are fully accredited by ABET

### 5. Faculty, Administration, & Other Resources

How will instructional needs be met: will additional faculty, facilities, equipment, or library resources be required? What department will deliver and oversee the proposed program?

The Department of Computer Science will deliver the courses but there will be oversight of undergraduate certificates through the Division of Professional and Continuing Education.

### 6. Cost

Summarize additional costs to offer the program. On separate budget sheet, estimate costs and revenues for the projected program for the first five years, indicating need for additional appropriations (if any).

Additional costs would be minimal for immediate implementation, as all the courses already exist in the Dept. of Computer Science.

A small initial budget of \$5,000 to market the program for the first year to potential students in the greater New Orleans region would be the greatest anticipated expense. Some of this may be used for student coaching if it is determined necessary to ensure that UNO develops a thriving cohort in line with regional employer demands. In year 2, it is projected that there would be an adjunct salary of \$9,000 to account for teaching two courses. In years 3 and 4, it is projected that there would be adjunct salary of \$18,000 for four courses respectively. The revenue was computed based on SCH generated by each student, based on current fees and tuition.

**CERTIFICATIONS:**

*Tina Chang*

3/27/2019

\_\_\_\_\_  
Primary Administrator for Proposed Certificate

\_\_\_\_\_  
Date

*Mahyar Amazejan*

3/27/2019

\_\_\_\_\_  
Provost/Chief Academic Officer

\_\_\_\_\_  
Date

\_\_\_\_\_  
Management Board/System Office

\_\_\_\_\_  
Date

