SIU Cross-System Growth in Research and Creative Activities

Executive Summary

Between April and July 2020, the following representatives of the SIU campuses met as the Research Working Group (RWG) to develop this report on the current state of research and creative activities (R/CA) across the System and opportunities for growth in R/CA:

- SIU System
  - Rob Patino, Director of the Office of Technology Transfer
- SIUE
  - Jerry Weinberg, Associate Provost for Research and Dean of the Graduate School
  - Susan Morgan, Associate Dean for Research and Graduate Studies
  - Kristine Hildebrandt, Professor of English Language and Literature
- SIUC
  - Gary Kinsel, Interim Vice Chancellor for Research
  - Boyd Goodson, Acting Associate Dean for the College of Science and Professor of Chemistry and Biochemistry
- SOM
  - Don Torry, Associate Dean for Research
  - Erin Hascup, Director of the Center for Alzheimer's Disease and Related Disorders and Associate Professor of Neurology and Pharmacology.

The RWG identified three areas that could benefit from system support:

- collaborative R/CA projects, particularly
  - industrial hemp
  - digital humanities
  - biomedical imaging
  - public health.
- R/CA infrastructure support for
  - information technology resources
  - Research Enabled
  - new internal research funding
  - non-financial compliance requirements
  - pursuing national and international awards
  - R/CA product tracking
  - exemption from the Grant Accountability and Transparency Act (GATA) and its implementation by the Grant Accountability and Transparency Unit (GATU)
- R/CA outreach/public relations, particularly
  - integrative, deliberative marketing of R/CA
  - Tech Expo support
  - coordination of economic development initiatives.

Research and Creative Activities Overview

Faculty driven research and creative activity (R/CA) is fundamental to the missions of each campus in Southern Illinois University. In the broadest sense these activities encompass all scholarly work outside of assigned teaching and service responsibilities. R/CA includes many activities, including basic and applied science and engineering research; clinical/translation research; research in educational pedagogy; community outreach and support; and creative activities that include authorship, musical performance, theatrical performance, artistic expression and presentation.

There is intellectual value to R/CA, which fundamentally advances and allows for the sharing of knowledge across disciplines, within and beyond university laboratory environments, and informs and advances clinical medicine. Research also intersects meaningfully with teaching excellence as students benefit from involvement in faculty projects, from the posing of research questions, to the formulation of hypotheses and methodological design, to the organization of data and interpretation of results, to the application to their disciplinary interests and collaboration on outputs. Research also matters in the community context, where R/CA can offer practical solutions to real-world problems that have local, national, and international scope.

These activities in turn translate into a prestige factor that enhances (1) both faculty and student recruitment and retention and (2) contributes to the prestige and national/international reputations of the campuses and the system.

In the recruitment arena, name recognition and the opportunities for students to participate in faculty-mentored R/CA are powerful recruiting and learning tools and can absolutely make the difference in a student's selection of which institution to attend. These experiential opportunities can assist students with finding employment and residencies upon graduation. R/CA, of course, is a key component of faculty responsibilities and satisfaction, and strong support assists with recruiting and retaining high quality faculty.

Examples of prestige indicators include numerous grants from federal agencies (such as the National Endowment for the Humanities, National Institutes of Health (including R01 awards), National Science Foundation (including CAREER grants), and U.S. Department of Agriculture) as well as honors (such as the Spokane Prize for short fiction and the Pushcart Prize for poetry, the Foundation Ipsen Longevity Prize, the Distinguished Scientist Award from the Society for Experimental Biology and Medicine, and the Natalie Stukas Hearing Conservation Award).

In addition, investment in R/CA returns dollars to the communities that SIU serves and brings products to the market that improves people's lives. There are direct dollars as measured by the sponsored research and programs offices and those direct dollars that are derived as services due to the unique skills and equipment owned by SIU. There are also indirect dollars that contribute to the economic impact that the university has on its community. In 2011, an Economic Impact study was performed on the SIUC campus that showed a nearly 1:3 impact on the community for every dollar the university received in external funding (see pages 11 and 12 of https://cslv.siu.edu/_common/documents/aplu-docs/siuc-economic-impact-study2011.pdf).

There is also obvious and pragmatic value to these activities. They bring in dollars over and above state appropriations and tuition revenue. (Appendix 1 provides a four-year history of submissions and awards for each campus and activities through the Office of Technology Transfer.

However, the statements above fail to reveal the extensive enterprise that must be engaged in to support the broad spectrum of R/CA. A foundation of institutional staff, administrators, service facilities, center leadership, and funding base must be in place to support and advance these efforts. This foundation of support includes the following. (Appendices 2 and 3 provide an overview of the research administrative support by campus.)

- Sponsored projects administration: This office on each campus is responsible for pre-award review, proposal submission, and post award grant management. There are ever increasing burdens to ensure that all applications are compliant with federal and state requirements and that all post-award activities are appropriate and auditable. These offices may also offer training for faculty on proposal submission, funding availability, grant management.
- Research compliance: All research involving human participants and animals is subject to strict federal requirements that include training, approval of protocols, recordkeeping, annual animal facility inspections, and annual reporting. To ensure compliance, each campus uses central staff and faculty committees. Committees and offices are also required for management of chemical safety, biological safety and radiological safety. Campuses are subjected to various inspections, including by FDA, USDA, EPA, and OSHA. Violations can lead to significant institutional fines.
- Research Integrity: Federal scrutiny of research activities continues to increase. The current focus is conflict of interest and conflict of commitment, particularly associated with foreign-government sponsored programs. Reviews are to be conducted prior to submission of proposals and throughout the lifetime of an award to combat fraud and funding misuse, unreported and compensated research conducted in other countries, etc. Allegations of research misconduct, including plagiarism and data falsification, must be investigated. Violations can lead to substantial fines and prohibitions against receipt of funding from specific agencies. Training is also a component of this effort, including agency required responsible conduct of research (RCR) training for students paid from grants.
- Export Control: Export control is a term used to describe a set of federal laws and regulations that govern the movement and sharing of data, technologies, materials and activities in general with specified foreign entities and foreign states. SIU's Office of Export Control is responsible for setting up internal policies and procedures to ensure compliance. These activities are complemented with required educational programs, continued monitoring of foreign travel activities, continued review of international students and visiting scholars, and having protocols to capture technologies and materials that might need to be tagged and tracked for proper use and security measures to protect from any unauthorized use or activity.
- Intellectual property and technology transfer: Intellectual property affects roughly 45% of the world's commerce and much of the intellectual property owned by the Board of Trustees of SIU is managed by the Office of Technology Transfer and the Office of the General Counsel. Discoveries, technologies, creative works, branding marks and data are developed on our campuses through the use of SIU-owned assets, developed on SIU time or as a result of SIU personnel interactions with third parties. These intellectual property assets must be evaluated to determine the best means of protection. They are frequently monetized through license agreements and are leveraged to enhance the profile of SIU and its faculty with the community

through public and private partnerships. These relationships help bring in research dollars, find employment for students, and enhance the knowledge and experience of those participating faculty and students. See Appendix 2 for a table of technology transfer activity on each campus.

- Research centers – Each campus also supports a variety of centers which typically comprise a group of faculty with overlapping R/CA interests, a director and staffing support. See Appendix 4 for a partial list of centers. These centers span a broad spectrum of faculty interests, such as from the Center for Archaeological Investigation, to the Center for Clinical Research, to the Center for Autism Spectrum Research, to the Advanced Coal and Energy Research Center, to the Interdisciplinary Research and Informatics Scholarship (IRIS Digital Humanities) Center. Many of these centers are directly integrated with one or more academic programs, and many have long histories of significant external funding support. These centers often have internal and/or external advisory boards and are engaged in partnerships with private sector entities. Centers that are officially recognized by the IBHE are required to provide annual reports and periodic review, all of which must be administered and tracked.
- Research support facilities – Faculty driven R/CA also requires support facilities, which can range from glass shops to performance venues to state-of the-art instrumentation facilities. While many of these facilities are tightly integrated with specific academic programs, others are operated as support facilities across campus and even as revenue generating sites providing service to external users. These facilities must be staffed with individuals who have sufficient expertise in the area to be able to maintain the equipment and offer support to faculty who wish to use the equipment. The equipment itself can be expensive (>$1M) and may need to be upgraded or replaced on a regular basis through significant investment by the institution. Regular maintenance of the equipment and/or the investment in expensive service contracts with outside vendors is necessary for the facility equipment to be available for use when needed.

While the above listing would seem to be an intimidating spectrum of commitments that must be supported in order to provide the needed infrastructure for faculty-driven R/CA to prosper, the benefits derived from these efforts discussed above far exceed the investment.

Based on these needs and benefits, the Research Working Group developed three areas that could benefit from system support:

- collaborative R/CA projects
- R/CA infrastructure
- R/CA outreach/public relations.

System Support for Collaborative R/CA

Funding agencies are placing an emphasis on multidisciplinary areas of R/CA. Program solicitations are increasingly being issued from multiple funding agencies and directorates cooperating to create funding opportunities for large R/CA agendas addressing issues that require multiple areas of expertise. Two examples are NSF's INFEWS (Innovation at the Nexus of Food, Energy, and Water Systems) and National Artificial Intelligence Research Institutes. Because of the benefits that can come from multi-institutional collaborations, many of these funding programs value such collaborations, which increases the potential of a successful proposal submission.

The Research Administrators recognize the value of faculty collaborations across the three campuses and have worked together to initiate them, such as networking events and funding the system-wide SIU Collaborative Grant for Healthcare Fields. While our efforts are general across the faculties of the three campuses, we have identified the following targeted collaboration opportunities that could grow R/CA with system support:

- industrial hemp
- digital humanities
- biomedical imaging
- public health.

Details of each can be found in Appendix 5.

System Support for R/CA Infrastructure

System support for R/CA infrastructure would allow for smoother collaborations between campuses for faculty and the sponsored projects offices, easier reporting for internal and external audiences, improved compliance with sponsor requirements, and broader highlighting of our faculty achievements. The following seven areas would benefit from system-level support and/or leadership. They are listed in order of most to least estimated new resource needs.

- System-level information technology resources (specifically sub-ledgering within AIS, better oversight of p-card system expenses, timely internal billing, implementation of an export control management module in Kuali Research, implementation of grants management software, implementation of a data warehouse for grants data, and creation of a budget/expenditure dashboard for grant fiscal officers) will improve compliance, improve tracking and reporting on externally funded awards and expenditures, decrease the need for shadow systems, and free R/CA staff time to provide improved service to principal investigators. This investment could be substantial in terms of financial resources and time commitment, although pieces (such as sub-ledgering and a dashboard) may be able to use existing resources if appropriate personnel expertise were available.
- Continued support for and promotion of Research Enabled will provide opportunities for SIU faculty to find collaborators (inside and external to SIU) plus submit proposals for industry projects. The portal also provides an opportunity for all sizes of organizations to reach out for SIU expertise. The cost is estimated to be $42,000 annually and will need system personnel time for continued participation.
- System-level support for internal research funding, specifically for (1) an internal collaborative grant funding program to support non-healthcare projects similar to the current collaborative grant funding program for healthcare projects (maximum $10,000 per campus) and (2) travel to meet face-to-face for exploring collaborative opportunities, would increase collaborative research. The current program awards one proposal (sometimes two if the second ranks highly), so $20,000 (one proposal, two campuses) to $60,000 (two proposals, each three campuses) would be needed. A travel fund of $2,000 would support at least 10 trips per year between the campuses based on the current mileage rate of $0.575/mile.
- System-level support for understanding new ethical (non-financial) compliance requirements, such as for foreign influence and cannabis, and then developing and maintaining required compliance processes would assist with standardizing responses and reducing costs across

campuses. This responsibility would likely be best served in University Counsel due to the nature of these types of requirements. The ability of current staff to take on this responsibility would depend on the frequency and complexity of new requirements.

- System-level support to identify and disseminate relevant prestigious national and international awards for faculty and staff and assist with encouraging applications would increase visibility of the research conducted at SIU. The University of Nebraska-Lincoln created a full-time position to promote, coordinate, and track awards. It may be possible for a new system-wide committee to oversee more modest efforts.
- System-level support to identify and implement easier and more accurate methods of tracking R/CA products and participation that are consistent across campuses would assist with reporting. For example, currently collecting dissemination data (such as publications) is inconsistent if it is even done. Potential solutions are using Digital Measures to obtain dissemination data and a student researcher designation through Student Employment to obtain more accurate student participation data.
- Continued assistance with Illinois legislators to reduce the substantial administrative burdens associated with the Grant Accountability and Transparency Act (GATA) and its implementation by the Grant Accountability and Transparency Unit (GATU) are important to reduce costs. This responsibility would lie with the Office of Governmental and Public Affairs and the President. Early June 2020 information indicates that legislation has been introduced to exempt public universities from GATA. The System needs to coordinate with other Illinois public universities to ensure its passage.

System Support for R/CA Outreach/Public Relations

System support for developing an integrated, thoughtful marketing plan of R/CA for the System and the campuses to various constituencies (e.g., legislators, potential students, and the general public) using various methods (including social media) would more widely and consistently promote our achievements. Examples of current activities are included in Appendix 3.

One event that needs continued support is the Tech Expo coordinated through the Office of Technology Transfer. Coordination of various economic development initiatives would also provide additional opportunities to leverage resources and expertise across campuses.

These activities would need system-level staff time.

Appendices

1. Overview of research and creative activities by campus
2. Research support organizational charts by campus
3. List of research and creative activity support and infrastructure by campus
4. List of selected centers and laboratories by campus
5. Collaborative research opportunities
    1. Industrial Hemp
    2. Digital Humanities and Social Sciences
    3. Biomedical Imaging
    4. Public Health

Appendix 1: Overview of research and creative activities by campus

External Funding

Campus	FY16	FY17	FY18	FY19
SIUE				
Total number of submissions	162	196	152	165
Monetary value of awards ($)	24,414,689	19,896,900	24,228,814	24,552,503
Number of tenured/tenure-track faculty	493	479	469	441
Monetary value of awards per T/TT*	49,523	41,538	51,661	55,675
SOM**				
Total number of submissions	184	144	118	131
Monetary value of awards ($)	15,367,873	15,094,790	16,608,593	16,403,258
Number of tenured/tenure-track faculty	98	102	98	88
Monetary value of awards per T/TT	156,815	147,988	169,475	186,401
SIUC***				
Total number of submissions	336	335	328	324
Monetary value of awards ($)	50,213,289	34,828,817	40,657,354	34,994,705
Number of tenured/tenure-track faculty	558	542	508	464
Monetary value of awards per T/TT	89,988	64,260	80,034	75,420

*Other categories of faculty (e.g., clinical) and staff submit proposals and receive awards.

**Includes SIUC SOM for award value and faculty numbers, but not submissions

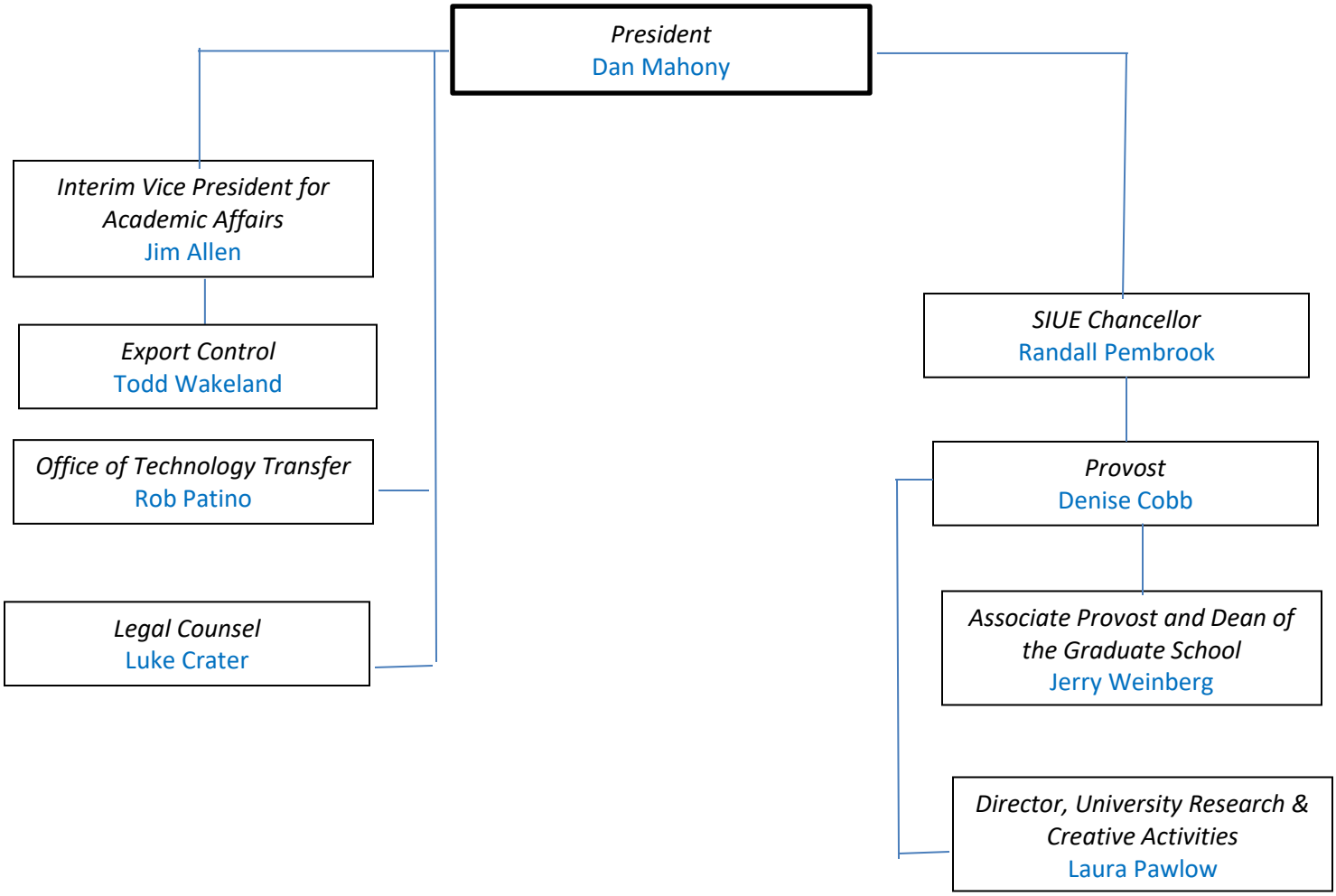
***Submissions include SIUC SOM but the award value and faculty do not

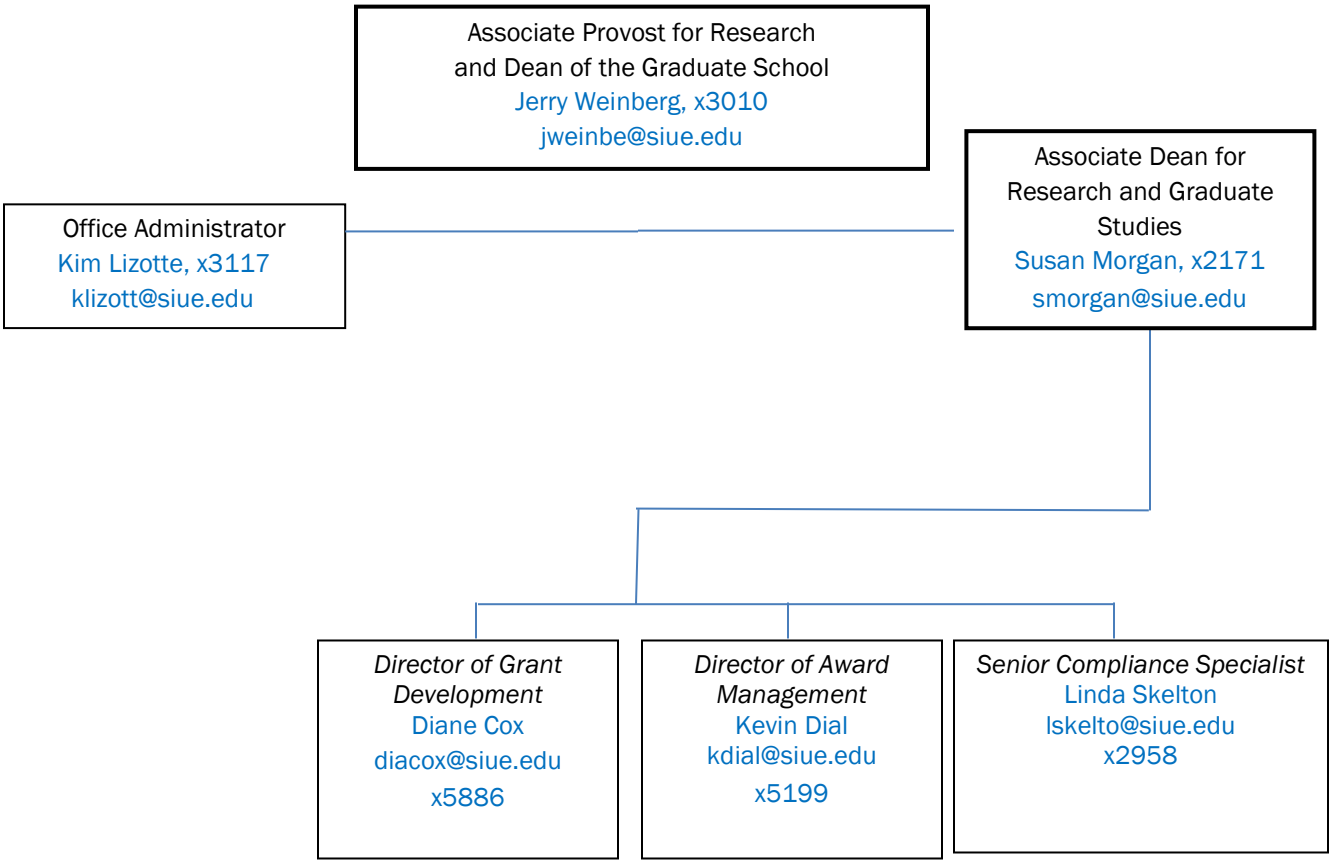
SIU Office of Technology Transfer (FY2010-2019)

	SIUC	SIUE	SOM	System Total
Disclosures	99	40	92	231
Total U.S. Patent Applications Filed	112	24	45	181
U.S. Provisional	57	14	26	97
U.S. Nonprovisional	55	10	19	84
U.S. Patents Issued	33	4	13	50
Options/Licenses Executed	23	2	13	38
Licensing Revenue	$1,326,192	$19,905	$8,309,999	$9,656,096

Appendix 2: R/CA Support Organizational Charts

SIUE Organizational Chart for Research and Creative Activity Support

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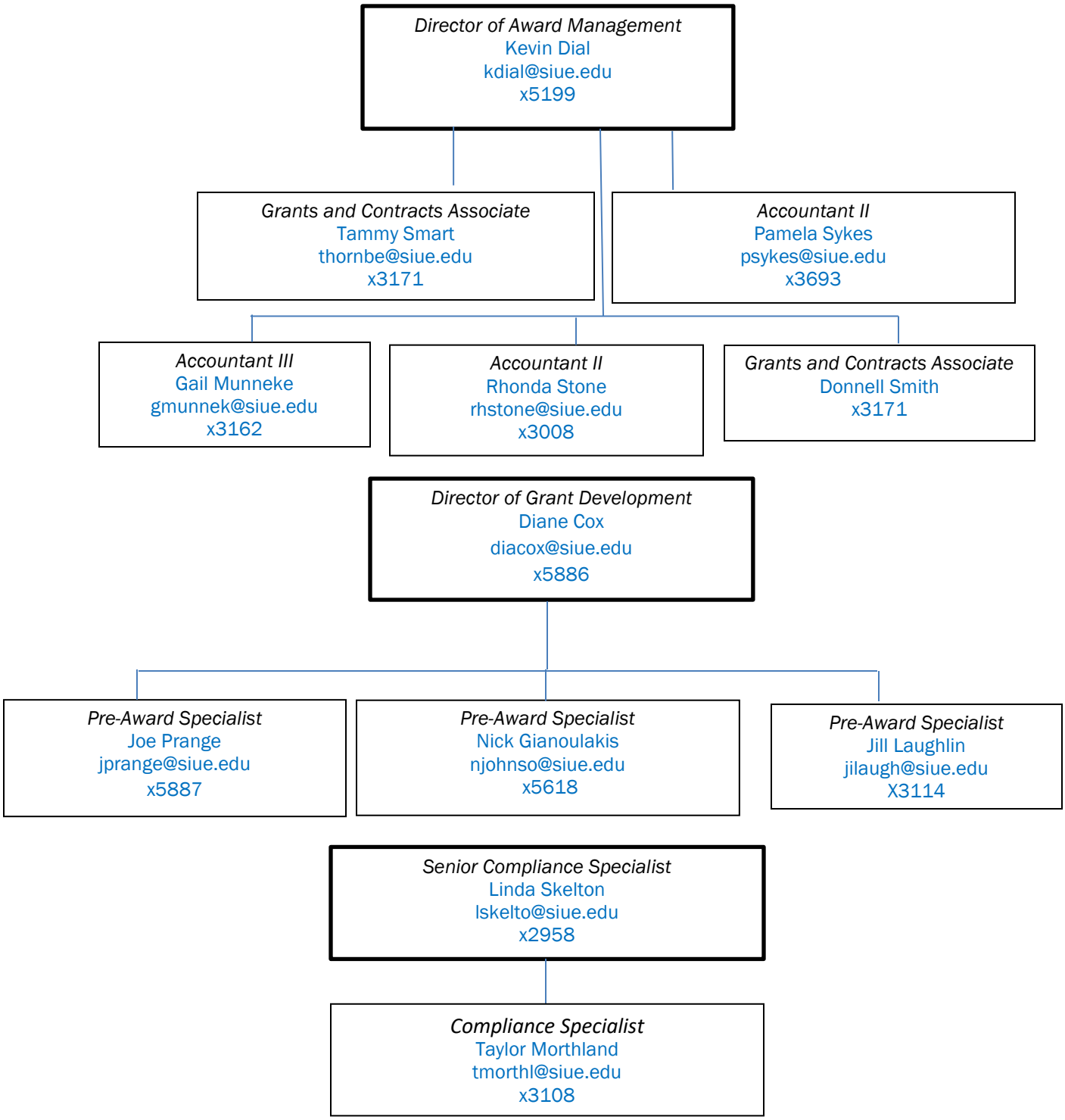
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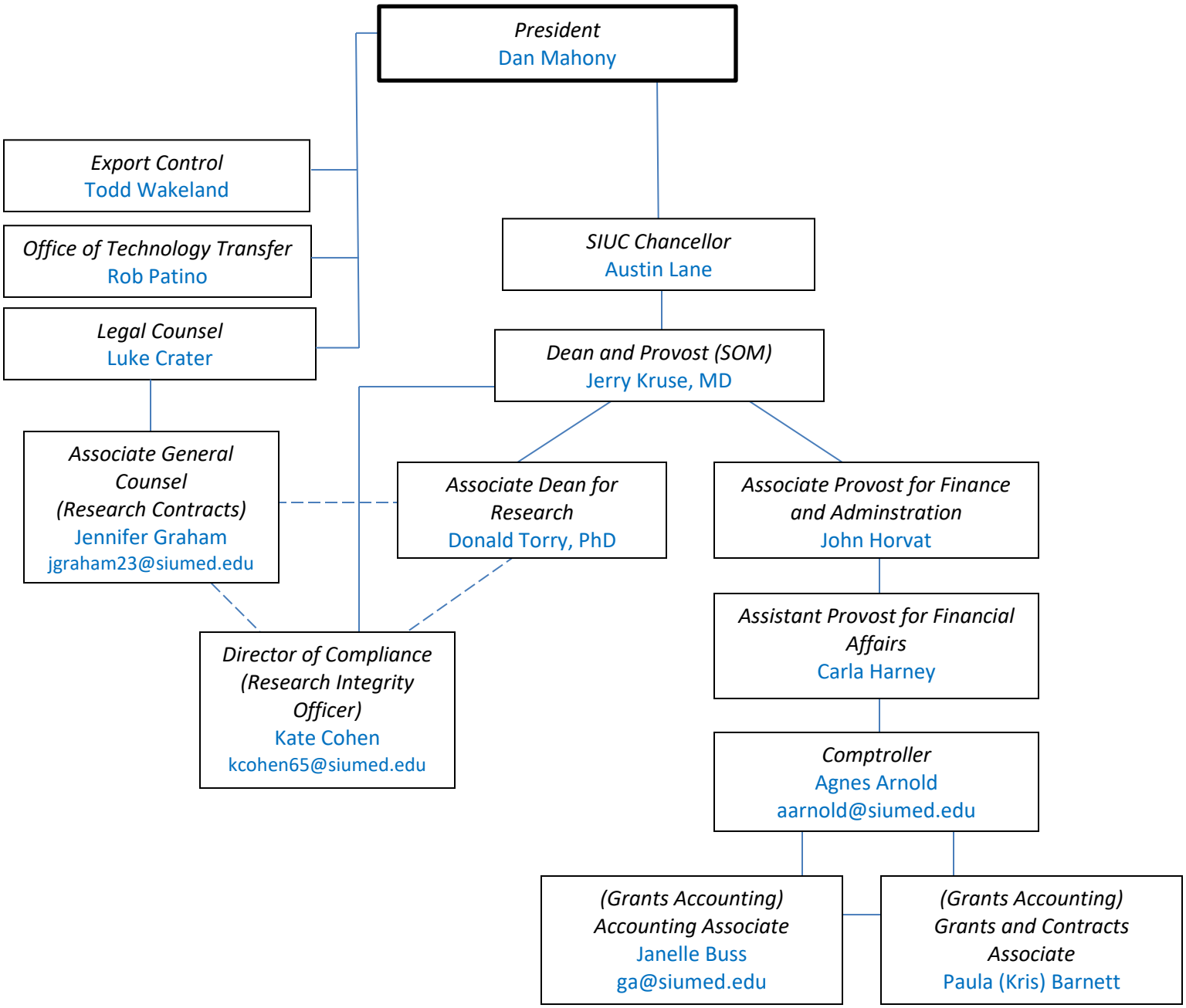
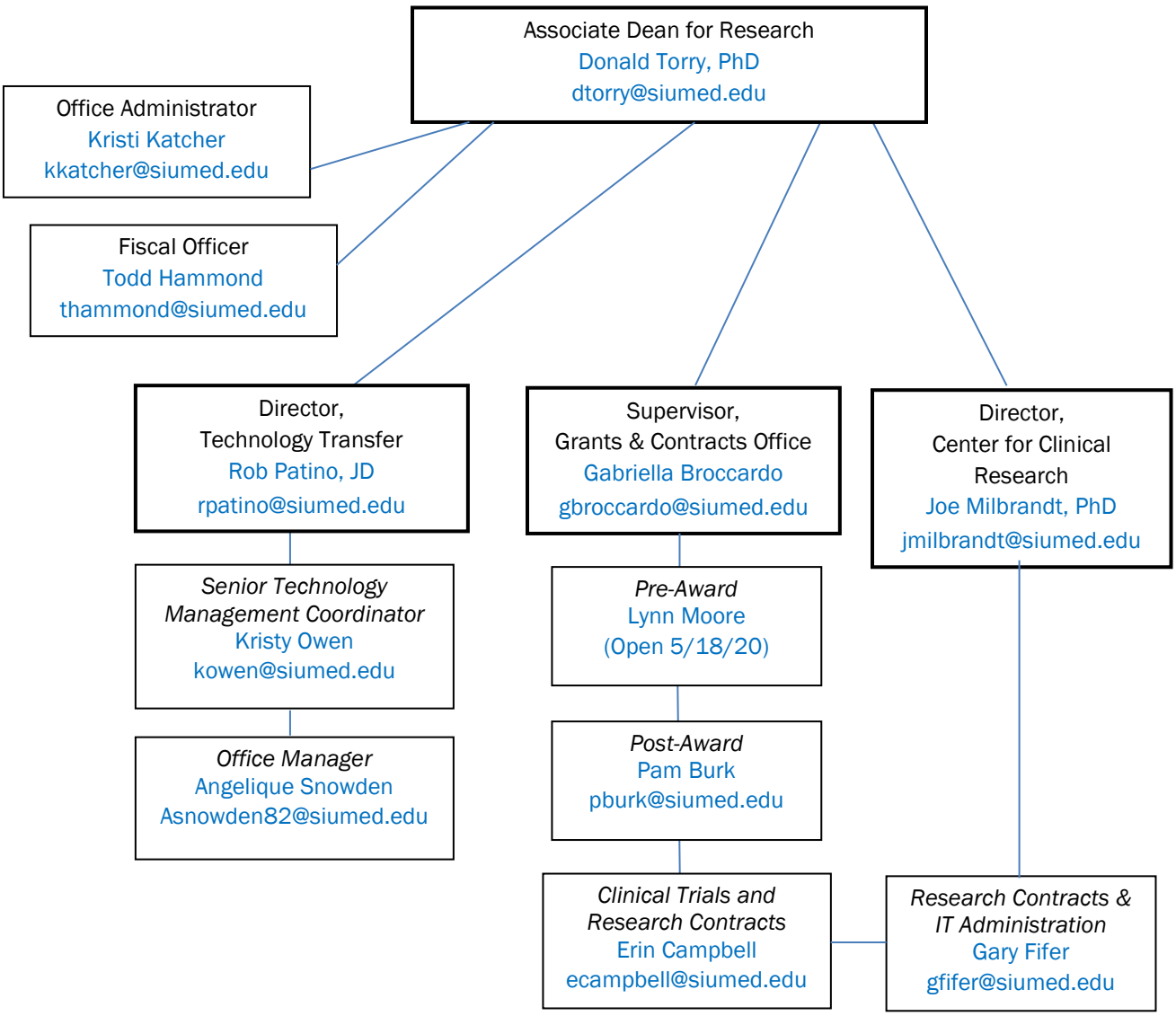
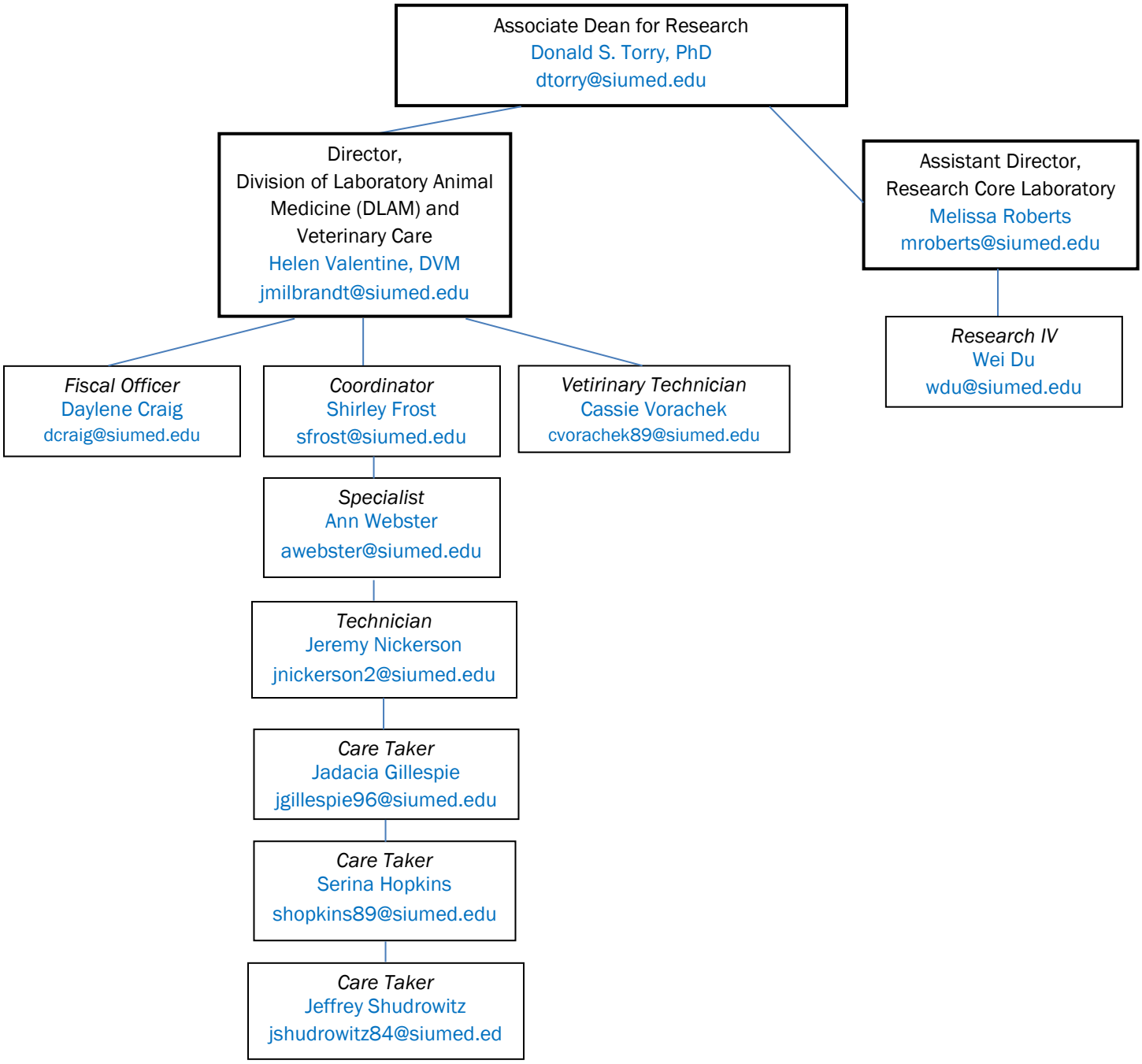
SIUSOM Organizational Chart for Research and Creative Activity Support



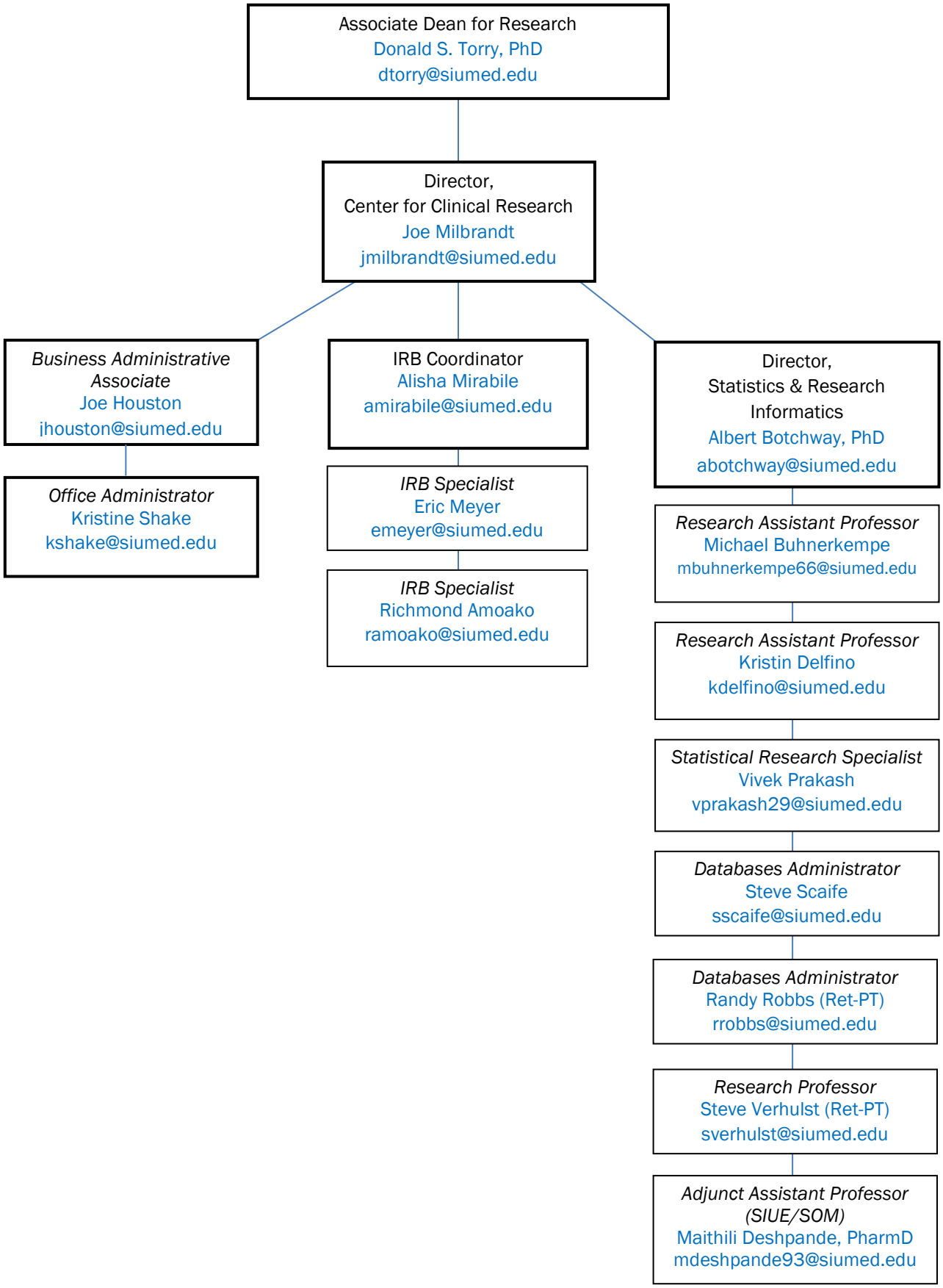
SIUSOM Organizational Chart for Research and Creative Activity Support Administration, Technology Transfer, Grants and Contracts



SIUSOM Organizational Chart for Research and Creative Activity Support
Research Facilities and Equipment



SIUSOM Organizational Chart for Research and Creative Activity Support
Center for Clinical Research (Administration, SCRIHS, Stats)



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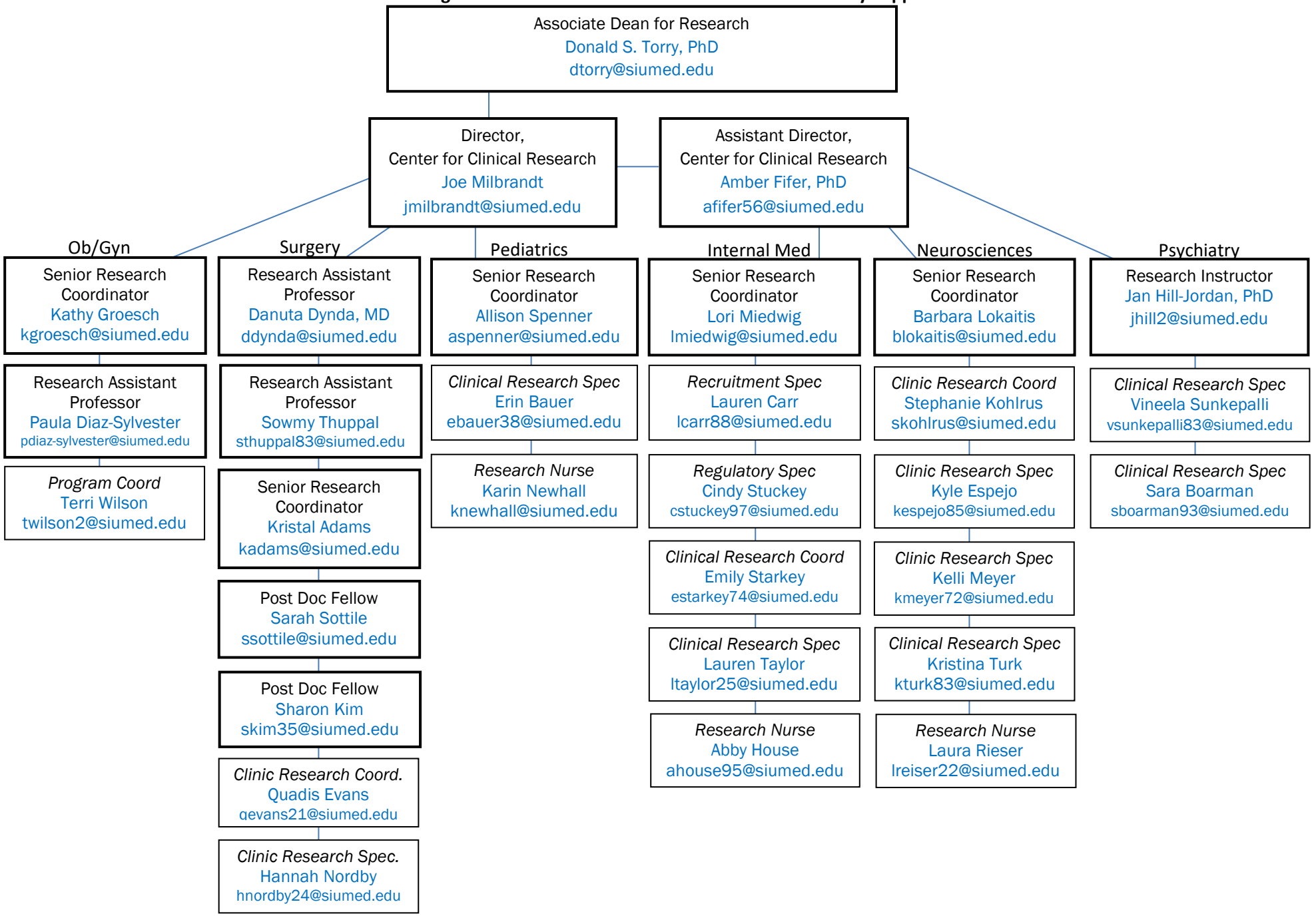
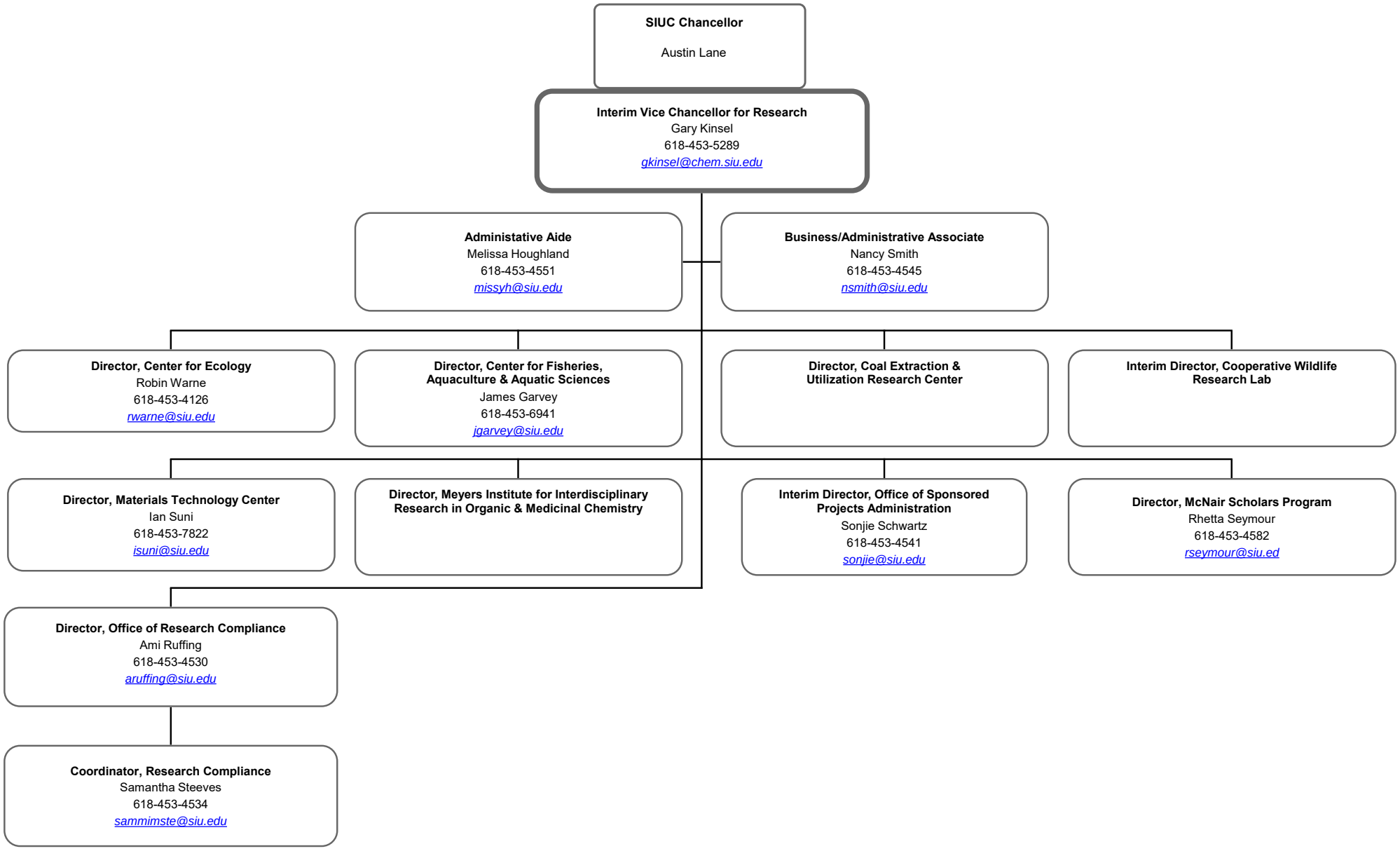


SIUC Organizational Chart for Research and Creative Activity Support



Appendix 3: R/CA Support and Infrastructure by Campus

System-Wide Research & Creative Activities Support and Infrastructure

Type	Description
Internal Funding Support – Faculty and Staff	
SIU System collaborative Grant for Healthcare Fields	Funding up to $10,000 per campus to increase collaborations
Infrastructure	
ResearchEnabled	Online portal for industry projects in collaboration with University of Missouri System

SIUE Research & Creative Activities Support and Infrastructure

Type	Description
Internal Funding Support – Students	
Undergraduate Research & Creative Activities	Provide students opportunities to work with faculty for course credit and a small stipend
Competitive Graduate Awards	Provide new students opportunities to work with faculty for a stipend and tuition waiver
Research Grants for Graduate Students & for Research Doctoral Students	Small funds to support graduate student scholarly activities
Graduate Student Travel Grants	Small grant to support graduate student dissemination of their projects
Internal Funding Support – Faculty and Staff	
Seed Grants for Transitional & Exploratory Projects	Seed grants up to $16,000
Concept Commercialization Award	Funding up to $15,000 to commercialize a disclosed technology
Competitive Applications Resubmission Incentive	Funding up to $6,000 to address reviewer comments for resubmission of an external proposal that was highly rated
New Faculty Incentive Program	Funding up to $2,000 for new faculty who submit a proposal for external funding
Publication and Production Costs Program	Funding up to $1,000 to cover part of the costs of dissemination
Conference and Workshop Award	Funding up to $6,000 to support research-focused conferences held at SIUE
Proposal Editing Services	Support for proofreading and editing services on external proposals
Meridian Awards	Support programs that include community outreach
Internal Recognition Programs	
Outstanding Thesis & Dissertation Awards	Graduate student recognition
Paul Simoon Outstanding Teacher-Scholar Award	Faculty member recognition of the integration of teaching and scholarly activities

Distinguished Research Professor Award	Promotion to DRP rank for up to two professors who have remained research active
Visualizing Research Impacts	Small awards for images that best show the results and impacts of research
Hoppe Research Professor Award	Recognize and support faculty whose scholarly activities have the promise of making significant contribution to their fields of study
Vaughnie Lindsay New Investigator Award	Recognize and support faculty whose scholarly activities have the promise of making significant contribution to their fields of study and SIUE
First e Award	Recognize first-time principal investigators on external proposals
Graduate School Symposium	Provide opportunity for graduate students to present their work
Undergraduate Research & Creative Activities Showcase	Provide opportunity for URCA students to present their work
Infrastructure	
Kuali Research	Research administration software for proposal preparation and approvals, compliance approvals, contract negotiations, sub-award preparation, and grant award approvals
CITI training	Software for required compliance training
Kuali Build	Software to manage internal funding programs
GrantForward	Software to find funding opportunities
SIUE Institutional Repository (SPARK)	Repository to meet open access requirements
Public Outreach	
Research & Creative Activities	Annual magazine highlighting activities and awards
Graduate School LinkedIn Profile	Showcase faculty and students' scholarly activities
ırketing & Communication news releases	News releases highlighting specific projects, new centers, etc.

Appendix 4: Selected Centers and Laboratories by Campus

SIUC
Research Centers
Research Support Facilities

SOM

Center	Mission/Description
Center for Alzheimer's Disease & Related Disorders	Mission: To integrate patient care, education, and research to better understand the biological aspects of aging, cognition, and neurodegenerative disorders allowing us to design innovative personalized care that addresses both the underlying symptoms and the disease leading to improved patient, family, and community outcomes
Neuroscience Institute at SIU	Neuroscience Institute is the only state-approved, academically-based neuroscience institute in central and southern Illinois and combines the breadth of experience from those within the departments of neurology, neurosurgery and psychiatry to understand and treat neurological diseases.
Simmons Cancer Institute at SIU	Simmons Cancer Institute at SIU brings "the team approach" to understanding and treating cancer. Surgeons, radiologists, oncologists, genetic counselors, therapists, clinical trial coordinators and researchers from all departments constitute the SCI.
SIU Center for Clinical Research	The Center for Clinical Research was established to increase clinical and translational research infrastructure, capacity and productivity. A centralized administrative infrastructure is an efficient and responsive means to provide clinical research support.
Academy for Scholarship in Education	The mission of the Academy is: • To advance SIUSOM to the forefront of the nation in medical education, innovation, and research, • To foster the collaboration of faculty from all disciplines to the benefit of the organization, as well as providing a support network for people who choose to work in medical education, • To provide evidence-based information that will inform and improve SIU's medical school curriculum, and

	• To recognize and reward excellence in teaching and evaluation, educational research, educational leadership, and the development of enduring educational materials.
Center for Rural Health and Social Service Development	The Center for Rural Health aims to strengthen rural health infrastructure and to promote opportunities for enhancing health primarily in rural communities. Its mission is to enhance the health and well-being of communities and to reduce health disparities.

SIUE

Center	Mission/Description
Center for STEM Research, Education, and Outreach (STEM Center)	The STEM Center at SIUE is dedicated to building a community of researchers and educators who together innovate ways to engage students and the public in STEM.
National Corn to Ethanol Research Center (NCERC)	The NCERC at SIUE is a nationally recognized research center dedicated to the development and commercialization of biofuels, specialty chemicals and other renewable compounds. The Center's fully functional dry grind pilot plant and laboratories are equipped with advanced biofuels capabilities including corn fractionation, pretreatment, and a fermentation suite with 5, 30, 150 and 1500L scale-up. Clients and collaborators benefit from the ability to take their process from the lab to intermediate scale to pilot scale, all in the convenience of one state-of-the-art facility.
Interdisciplinary Research & Informatics Scholarship Center (IRIS)	The IRIS Center at SIUE is an interdisciplinary facility designed to support individual and collaborative scholarship (at faculty and student levels) that applies digital content as a primary methodology.
Center for Predictive Analytics (C-PAN)	The primary objective of the C-PAN is to foster multidisciplinary and multi-institutional collaborations that lead to the use and development of state of the art mathematical, statistical, computational, and machine learning techniques that, in turn, lead to better predictions, a more reliable assessment of the probability of future events, and meaningful recommendations for community and corporate stakeholders.

Laboratory for Applied Spatial Analysis (LASA)	The Laboratory for Applied Spatial Analysis (LASA) is a university-based group that is involved in advanced research and development related to Geographic Information Systems (GIS) and other spatial technologies (remote sensing, drone imagery application, and web-based mapping). Recent research and development partners include Bayer Crop Science (US and Germany), the Illinois Department of Natural Resources, the Illinois State Library System, and other state and local government agencies
Computer Vision and Image Processing Laboratory (CVIP)	CVIP is a state-of-the-art facility with 13 workstations as well as an LCD projector, scanners, cameras and controlled lighting image digitizing stations. A major research tool of the CVIP Lab is CVIPtools, a program with over 20 years of development history and thousands of users around the world. It offers experienced and new users alike the opportunity to experiment with computer imaging in an easy-to-use GUI-based environment.
Shimazdu Innovation Laboratory at SIUE	Shimadzu is a global, leading manufacturer of analytical instrumentation. Shimadzu offers a unique program for academic institutions known as the Shimadzu Partnership for Academic Research and Quality of Life (SPARQ). SPARQ offers resources that focus on big-picture, high visibility research impacting the biofuels and biomaterials industries, with interdisciplinary themes such as food, energy and water leading to joint grant proposals, publications, research presentation and intellectual property.
Center for Drug Design and Discovery	The Center for Drug Design and Discovery provides faculty and students access to the latest technologies and scientific instruments needed for pharmaceutical research.

Appendix 5: Collaborative Research Opportunities

HEMP/CANNIBIS RESEARCH AND CANNIBIS SCIENCE CENTER

See Feature Partnership 1 in Partnership Working Group Report

DIGITAL HUMANITIES AND SOCIAL SCIENCES

Potential Collaborators

Dr. Jessica DeSpain, Professor, Department of English Language & Literature and Co-director, IRIS DH Center, SIUE
Dr. Kristine Hildebrandt, Professor, Department of English Language & Literature and Co-director, IRIS DH Center, SIUE
Dr. Sara Collini, Research Assistant Professor, IRIS DH Center, SIUE
Dr. Joseph Sramek, Associate Professor, Department of History, SIUC
Dr. Pinckney Benedict, Professor, Department of English/Creative Writing (Fiction), SIUC
Dr. Rebekah Frumkin, Assistant Professor, Department of English, SIUC

Mission and Background

IRIS supports Southern Illinois University Edwardsville's mission as "a student-centered educational community dedicated to communicating, expanding and integrating knowledge. In a spirit of collaboration enriched by diverse ideas, our comprehensive and unique array of undergraduate and graduate programs develop professionals, scholars and leaders who shape a changing world." Additionally, IRIS develops scholarship and programming that complement the University's strategic plan, including: (1) optimized enrollment of diverse and prepared students; (2) innovative high quality programs to engage and retain students; (3) dedicated faculty and staff; (4) student-centered and supportive campus community; (5) outreach, partnerships, and reputation; and (6) physical and financial sustainability.

Since its founding in 2009, the IRIS Center's mission has been to:

1. Facilitate cross-disciplinary and collaborative projects that involve innovative uses of technology in the humanities and social sciences.
2. Support these projects via access to physical facilities, equipment, and human resources.
3. Foster active mentorship and collaboration between faculty and students at undergraduate and graduate levels.
4. Encourage the development of curricular innovation that makes significant use of digital applications and resources.
5. Promote digital endeavors that intersect with community initiatives and organizations.

Founded in 2009, IRIS facilitates faculty, staff, and student collaboration across a variety of units. IRIS has worked with scholars from Anthropology, Computer Science, English Language and Literature, Geography, Environmental Sciences, Historical Studies, Library and Information Services, Philosophy, Mass Communication, Theatre and Dance, Sociology, and the STEM Center. In addition to its extensive work on campus, the IRIS Center has connections with a variety of community organizations with whom they collaborate on incorporating digital humanities into community engagement programs. Faculty and staff in the IRIS Center have also worked closely with the Mannie Jackson Center for the Humanities and the Illinois Humanities Council to bring digital humanities programming to Madison County and larger groups of Illinois residents. Through these programs, IRIS has also become close partners with Madison

County's Regional Office of Education and strives to promote state education standards by teaching students and teachers about digital tools and methodologies. Digital humanities, by the nature of its scope, aligns with the in the College of Arts and Sciences at SIUE, and the pedagogical components of IRIS are oriented toward undergraduate and graduate students; therefore, IRIS is administratively housed in CAS and reports to the CAS Associate Dean for Research.

By the time of submission of the RME for probationary IBHE Center status, IRIS had served more than 50 faculty and 331 students. The Center has actively worked towards cultivating a community of digital humanities scholars on-campus and community-wide. We support faculty-led digital humanities and social sciences research that has generated grant funding, totaling $2,097,738. Funders have included the National Science Foundation (NSF), the National Endowment for the Humanities (NEH), and partners in the for-profit and non-profit sectors. The Center and its programs help prepare students with 21st-century skills through partnerships with the community. We also develop initiatives to address the digital divide, which manifests as a lack of access and training for particular student populations, including African American and first-generation students.

Along with research initiatives, the IRIS Center is invested in designing innovative curricular models to support the retention and success of underserved students. With the support of an NEH Humanities Connections Grant, the IRIS Center is currently planning the Digital Community Engagement Pathway, an alternative to the honors program in which student cohorts will work with faculty members and community partners to address large-scale social problems using methods central to the digital humanities. By combining the digital humanities with service-learning practices, IRIS will increase the SIU System commitment to community engagement.

Faculty associated with the IRIS Center have also received several university-level awards for their digital humanities work, including Johanna Schmitz (Hoppe Fellowship, 2018-2020), Kristine Hildebrandt (Paul Simon Teacher Scholar Award, 2017-2018; Vaughnie Lindsay New Investigator Award, 2011-2012), Jessica DeSpain (Going Award, 2018), and Greg Fields (Hoppe Fellowship, 2013-2014; Distinguished Research Award, 2017-2018).

Opportunities to grow collaborative research:
Via System Partnerships and collaboration, we anticipate funding to provide updated spatial and physical resources, as well as to provide stable funds to retain the co-directors and staff. We would particularly welcome investment that allows for collaborative research and instruction in digital humanities and social sciences projects across campuses.

Required Investment:

1. **Faculty Infrastructure**

IRIS has already become an established hub for research and curricular innovation in areas of digital humanities and social sciences. System investment at this time would be aimed a sustainability and growth, especially via collaboration and partnerships across the System campuses and units.

IRIS is currently funded through a combination of grants, contracts, independent cost recovery, and state allocations. The co-directors would each supported with one month of summer salary to support the continuing benefits the Center brings to the University in the form of grant funding and innovative curricular programming and two course releases per year. By splitting the work between two co-

directors, this limits the need for fully funding a director who devotes 100% of her time to Center operations and allows for the co-directors to be more directly engaged in the curriculum. However, the coverage of summer salary will be a substantial support for the Center's grant writing needs. The co-directors will also buy out one course per academic year. Their single course release will support the administration of the IRIS Center's research and curricular initiatives in addition to teaching classes. Salary for the assistant research professor is paid out of state accounts, grant money, and ICR at variable rates.

2. **Staff Infrastructure**

Due to IRIS's many grants, the Center requires the support of an Administrative Assistant to manage hiring and pay certification forms for project-affiliated students and to process the different manifestations of post-award reporting. This would require support for 10 hours per week.

Potential ROI:

Since its inception, the IRIS Center has supported numerous faculty who pursued external funding for their research in the humanities and social sciences. These grants and community contracts have brought a total of $2,097,738 to the university, supporting a variety of resources including faculty salaries, IRIS Center staff, technical equipment, and student workers. Funders have included the National Science Foundation (NSF), the National Endowment for the Humanities (NEH), and partners in the for-profit and non-profit sectors. Grants include indirect cost return (ICR) funds that support the SIUE graduate school, the College of Arts and Sciences, and discretionary funds for the IRIS Center. While writing grants and assisting faculty with grant writing is a key part of the IRIS Center's mission, the lack of support until recently for Co-Director course releases and summer salary mean the Co-Directors have limited time to devote to grant writing and support. Further investment in the Center's directors and staff will enable the IRIS Center to support a greater amount of external funding for the university.

Via System Partnership and Collaboration, we would anticipate our served cohorts and populations to expand dramatically across the campuses and throughout the region. We would also expect our success rate for internal and external funding proposals to grow, as well as prestige indicators for involved faculty and students.

BIOMEDICAL IMAGING: RESEARCH & TRAINING

Initial idea: MRI Research and Training Center proposed by Drs. Gregory Rose and Michael Gray (2014). Revised and updated (2020) by Drs. Rich Clough, SIU School of Medicine, Dr. Boyd Goodson, Acting Associate Dean, College of Science, SIUC and Dr. Gary Kinsel, Vice Chancellor for Research, SIUC.

Note: A "Core Council" (advisory council) for the MRI Center has been established with members that represent all "Partnership" Colleges, Schools, Departments, Student Health and Saluki Athletics.

Background

Biomedical imaging is a recognized area of significant interest, expertise, research, and opportunity across all three SIU campuses. First and foremost, there is strong interest in magnetic resonance imaging, MRI. SIU and School of Medicine (SOM) undergraduate and graduate students, athletes, clinicians and research faculty, including students seeking careers in biomedical imaging, and the people of Southern Illinois would significantly benefit with establishment of a state-of-the art *MRI Research, Imaging and Training Center* (MRI Center) on the SIUC campus. An MRI Center would provide value-added partnerships between SIU Student Health, SIU Athletics, SIU-SOM, SIU College of Science, and the SIU School of Health Sciences, Radiologic Sciences training program. Potential community partners in this initiative (for research purposes and patient recruitment) would include Brehm Preparatory School (already a partner), Carbondale Neurorestorative, the Carbondale Gateway Foundation (addiction rehabilitation), the Center for Rural Health, and others. The MRI Center would include a dedicated facility, a 3-Tesla MRI machine, recording equipment, complementary computer analysis, and subject/patient interview suites. Such collaborations would be accretive to a markedly expanded niche in imaging research for SIU. A Center would also substantially enhance SIUC's Radiology training programs in the School of Health Sciences on the Carbondale campus; an MRI Center would make SIUC a preferred choice for undergraduate students seeking training for a career in imaging since few other baccalaureate MRI training programs are available in Illinois. Lastly, establishment of an MRI Center would allow additional, more timely, and more cost-effective clinical and research imaging for SIU students. Imaging for our student athletes has been problematic over the years and an MRI Center would alleviate this problem by providing cost-effective and ready access. Outside of this proposed Center (and MRI in general), there is also significant interest in other forms of biomedical imaging across various programs and colleges within the three SIU campuses, with areas of active investigation including optical imaging (e.g. for dermatological and ophthalmological applications), thermographic imaging, ultrasound imaging (e.g. for cardiovascular applications), digital tomosynthesis (a digital x-ray imaging technique akin to CT, but with less ionizing radiation), and in the context of many different imaging modalities, the application of machine learning / deep learning for image analysis and diagnosis.

Opportunities for Growth

First, new MRI technologies used in a dedicated MRI Research and Training facility would provide an unparalleled opportunity for new and important (and highly fundable) research at SIU. Establishment of an MRI center would provide a unique resource to expand ongoing neuroscientific and neuropsychological research at SIU. Research in chemistry and of development of MRI "contrast" agents (presently ongoing) would also benefit from an MRI Center. Moreover, a functioning MRI Center would

allow for significantly expanded collaboration with other research centers in the United States including a new Center at the University of Illinois in Champaign, Washington University in St. Louis, and Stanford University in California (partnership now exists) in particular. Such collaborations would be accretive to an expanded and potentially lucrative niche in imaging research for SIU. Such a center would also offer opportunity for neuroscience faculty (many struggling to get research grant dollars), to re-direct their research into a new and highly funded area. SIUC and SIU-SOM faculty in Carbondale have a history of MRI research that is presently made possible through a cooperative agreement with nearby Southern Illinois Healthcare's (SIH) Memorial Hospital of Carbondale. However, faculty now have to schedule their MRI research studies around SIH imaging services for patients and are restricted to a 4-hour window on Sunday afternoons to conduct their research. Research and Clinical applications for MRI have expanded quite considerably in recent years with the development of improved methods to observe, for examples: neural substrates of cognitive processing; the integrity of brain networks necessary for complex functions; noninvasive assessment of brain chemistry using magnetic resonance spectroscopy (MRS); discovery of patient-personalized neural circuitry involved in mental health disorders; and with that, offering a new possibility of patient-personalized neurotherapeutics (i.e., for novel treatments of psychological / psychiatric disorders and brain injury, etc.). An MRI facility would provide opportunity to engage more SIU faculty from traditional (e.g., brain imaging, psychology, etc.) and nontraditional usage (e.g., materials science, architecture, chemistry, image analysis with deep learning, etc.), and bring forth new funding opportunities in research on the SIUC campus.

In addition to bringing new research dollars to SIU, such a facility would serve as an attractive recruiting tool for undergraduate and graduate students. MRI is an intricate and highly technical imaging modality and thus requires education and training. For example, an important component of SIUC's mission, is student training in MRI technology by the Radiologic Sciences Division, School of Allied Health. SIUC's undergraduate and graduate training programs in MRI technology are unique in the State of Illinois. These programs train MRI technologists and imaging specialists who gain employment in Southern Illinois and beyond. An MRI Center on the SIUC campus would provide for enhanced and comprehensive training in MRI technology and a lucrative path for SIUC students. An important part of the training program involves hands-on experience with MRI equipment. Having an on-site MRI Center would indeed make SIUC the preferred choice for individuals seeking training in this field. In addition, undergraduate and graduate students in multiple disciplinary fields (e.g., physics, chemistry and engineering, etc.) would similarly benefit from on-site MRI research and imaging facilities. Lastly, it is anticipated that use of the MRI Center would be on a fee-for-service arrangement for users that would be more cost effective than current practices.

Return on Investment

By establishing an MRI Center, increased availability of "magnet time" for research would allow for significantly increased submission of grant applications, indirect cost recovery, and scholarly works at SIU. An MRI Center at SIUC would eliminate the primary problem of limited access to an MRI machine and analysis system for research faculty. This limited time frame severely restricts research and the number of research subjects in any study and draws the duration of a study to inordinate lengths of time. Often, research subjects must travel long distances to participate in research studies, and this time

frame is not accommodating to research participation. It is expected that the annual revenue acquired by the MRI Center will eventually offset the annual operating costs and build-out. Grant and Foundation sources are available through the State of Illinois, NSF, NIH, several foundations, crowd-source funding and Capital Campaigns that will be sought to support the build-out as well as pilot MRI and associated research "seed-grant" initiatives. Lastly, partnerships with research-relevant or health-care related industries will be sought to reimburse or otherwise offset operating and build-out costs. The Center would also provide improved access and more-cost effective clinical imaging for SIUC college students as arranged through negotiations between Student Health Services and the student health insurance plan at SIU now provided by United Health Care. A mutually beneficial arrangement for imaging services will be afforded by an established MRI Center. Finally, it is anticipated that an MRI center would attract an increased number of undergraduate, graduate, and post-graduate level students. The Return on Interest of such a center would be appreciable in terms of monetary capital, workforce development, student services, research productivity, and importantly the advance and progress of the SIU system overall.

An MRI Research and Training Center, and the opportunities afforded by its establishment, would support a key element in an overarching effort to: keep SIU competitive with its peer institutions; allow SIUC to refine a research niche unique to this University; and to help the University maintain its High Research Status Carnegie classification. The Illinois Public Agenda encourages initiatives and programs that advance 21st century technologies with a corresponding intellectual framework, research, pedagogies, resources, and a cutting-edge workforce. These goals are also in accord with the key elements of SIU's long-term strategic plan and the Strategic Plans of the SOM.

Timeline, Metrics and Goals

Goals: Develop, Research, Learn, Provide, Collaborate

1. Develop: a state-of-the-art dedicated MRI Research, Imaging and Training Center.
2. Research: greatly expand clinical and research imaging (e.g., personalized neurotherapeutics for psychiatric disorders – ongoing, mapping functional neurocircuitry, ongoing) and MRI 'contrast' chemistry (ongoing).
3. Learn: in a "living classroom" for MRI training where lectures and hands-on-the-machine experiences can be achieved, improving SIUC student recruitment and retention.
4. Provide: researchers, undergraduate and graduate students opportunity to work or expand research in MRI imaging & chemistry; and to facilitate MRI imaging for Student Health Services and Saluki Athletics.
5. Collaborate: in an environment to enhance interdisciplinary and multidisciplinary research both within SIU and with faculty at other national and international institutions.

Proposed timeline of facility development:

1. Development of an MRI Center could begin in FY-21 with space identification and renovation approx. 6 mo.
2. Once space is determined, the MRI Center could be completed and operational within an additional 6 months.

Proposed metrics of facility income: Sources include clinical and research imaging

1. MRI Scanner usage charges (for researchers) @ $200-400/hr (research usage averaging 4 hours/day, 5 days/week for 48 weeks): $384,000
2. Indirect cost recoveries from extramurally funded research typical IDC/$1.5 million grant = about

$700,000).

3. Number of Clinical MRI sessions for SIUC Students and Athletes (Student health insurance, proposed

$400/scan, anticipate 5 scans per week/48 weeks ~ $96,000)

Proposed metrics of facility effectiveness in research and scholarly activity:

Number of grant applications, research papers, abstracts and memorandums of understanding agreements between SIU and external Partners/year developed with the MRI Center.

Required Investment and Sources of Revenue Estimates

Build-out estimates

1. Renovation of existing space ($350 foot2): $700,000 (2,000 feet2).
2. 3.0 Tesla MRI machine: $1,500,000***** one scanner to be purchased initially
3. Finishing: includes MRI shielding, antechamber, office and waiting room furniture, computers, video and communication equipment, ancillary and disposables: $350,000

Total build-out investment: $2,550,000*

Operating cost estimates

1. Staff salaries (quarter-time Director and full-time MRI technologist who would oversee imaging and handle scheduling and billing: total salary cost approximately $100,000 per year
2. Service contract for the MRI scanner: approximately $155,000 per year
3. Utilities: approximately $40,000 per year

Total Operating cost estimates: $295,000/year

Facility Income Estimate

$400,000/year (does not include IDC from grants)

PUBLIC HEALTH

Collaboration Entities and Infrastructure
SIU School of Medicine Department of Population Science and Policy
SIU School of Medicine Center for Rural Health and Social Service Development
SIU School of Medicine Public Health Laboratory Sciences Graduate Program
SIU Carbondale School of Human Sciences (Public Health Program)
SIU Edwardsville Department of Public Health

The Research Working Group has identified Public Health as a discipline to increase the research stature of SIU. Various and notable expertise and resources are available among the campuses, but capitalizing on these strengths requires enhanced communication and thoughtful interactions. More frequent and purposeful discussions can foster more competitive grant proposals and an enhanced regional, statewide, and national reputation. SIU System public health leaders are uniquely able to collaborate with faculty in programs outside of their expertise to include computer science, clinical medicine, biomedical science, mathematics, engineering, nutrition, environmental science and agricultural science. Such interdisciplinary collaborations enhance the translational aspects of public health research and enable better outcomes for the public-at-large. Industrial and entrepreneurial partnerships can enhance the translational opportunities for commercial applications that enhance employment and create new wealth generating vehicles to improve the overall quality of life for citizens in our region. Due to the geographical locations and demographics of SIU's campuses, it is important that our public health collaboration initiatives remain focused predominantly on rural and small city health. Rural and small city health remains an important area of research to our local constituents and to our nation as a whole. With appropriate resources and support, the rural and small city health research enterprise of the SIU System can enhance the university's reputation as a healthcare leader while becoming a model program providing tangible benefits to our region.

Building a Collaborative Research Program in Public Health
We propose a focus that capitalizes on existing strengths of the collective public health programs to build research initiatives to catalyze collaborative and sustained cooperation across the system. *Infectious disease*, *cancer*, *substance abuse*, and *mental health* are prime fields for collaborative research across the SIU campuses that leverage some of these existing strengths. To nurture this collaboration, certain infrastructural components are needed – elements such as enhanced communication, partnership tools, initial financial resources, greater laboratory capacity, and marketing.

***Enhanced Communication**:* The first step in communicating collaboration opportunities includes understanding the research interests of the faculty across the campuses. We believe that coordinated and recurring *grand rounds* and *multi-disciplinary seminars* are effective activities for communicating those interests to faculty. The chairs/coordinators of the units listed above stand behind this initiative and commit to formulating a schedule that accommodates and sustains participation of each campus.

Partnership Tools: Traditionally, emails have been sent to solicit partnership requests for grant funding and research proposals; however, this targeting is limited to those that might already be known in various research circles. Leveraging www.researchenabled.org allows our faculty to solicit collaboration opportunities from and with other disciplines and organizations, including industry partners.

Financial Resources: Making SIU faculty competitive for federal public health grants through federal agencies, most particularly the National Institutes of Health (NIH), is a goal of the system's public health

programs. Two proposals are advanced as requests from the Public Health Research Working Group that are anticipated to help make the SIU System competitive for a Clinical and Translational Science Award (CTSA) by the NIH Center for Advancing Translational Sciences:

- Noting that CTSAs are typically awarded to tier 1 research programs, we recommend the hiring of a consultant to review and analyze the present programs on the SIU System campuses for input on how collaborating entities might best work to develop a portfolio of complementary research to facilitate the system's competitiveness for a CTSA. We estimate this cost to be $25,000 for a review of approximately one year in duration. Additional, targeted investments are anticipated as recommendations from that review occur.
- To become competitive for these awards, expertise and collaborations need to be established and recognized through joint-authorship on peer reviewed publications and as co-investigators on grant applications. To meet this need, we propose dollars be allocated for a multi-campus grant with a rural and/or small city health focus that obliges inter-campus collaboration. We ask for an annual $20,000 per campus grant (for a maximum of $60,000) to support collaborative proposals that are vigorously reviewed for merit. We assess this support as an aid to building the level and scope of capacity for a system-wide public health-focused research program, ultimately resulting in substantive external funding.

Increased Laboratory Capacity: Support for an on-site Clinical Laboratory Improvement Amendments (CLIA)-certified laboratory that is fully equipped with molecular and serology testing capabilities will support the training of students and professionals, as well as provide support to our public health and hospital colleagues in times of need. Such a laboratory also could be used to conduct ancillary studies for SIU investigator initiated clinical trials. CLIA-certification enables tests ordered by clinicians to be revenue-generating, and thus, a contribution to the sustained maintenance of facilities and other related infrastructure.

Marketing: Making contact with residents of rural communities for impact studies is challenging even under ideal scenarios. High-speed Internet connections are not readily available in many communities and participation can be challenging. Support from the system in marketing and outreach to the rural population is imperative to communicate the effective and credible importance of SIU to the region's rural and small city health.

Endowment Positions: We request the system assist with the development of one or more competitive, endowed positions dedicated to Public Health Research. The recruitment of emerging, established, and senior scholars to an attractive Public Health Research enterprise focused on rural health further enables long-term and sustained extramural funding capability. Therefore, we propose that efforts to solicit philanthropic donations to make named, endowed faculty positions across the system be prioritized.

Potential Return on Investment

Investments in the Collaborative Research Program for Public Health are expected to yield increased external funding into the SIU System, generate a more educated workforce for the state and region, and provide better health outcomes for the rural communities that SIU serves. The concept is supported by the mechanism that smaller successes lead to moderate successes which lead to grander successes. A collaborative R21 grant application within 2 years, and 5 R21- to R01-level applications by the end of 5 years are deemed reasonable outcomes, and are consistent with our targeting of the NIH as an extramural source. A competitive CTSA application should be submitted within 5 years. Awarded grants provide resources back to the SIU System, with ~$1.5 million in direct costs associated with two R21*s* and one R01

(plus an additional ~48% as negotiated indirect costs). The influx of indirect monies help build additional capacity that can be leveraged to improve the internal grant management programs, provide funding for marketing, and assist with offsetting costs associated with the CLIA-certified laboratory and other facilities.