

MATRIX VI: Campus STEM Research Priorities Report

Categories Aligned with FIRST Louisiana High Growth Target Industries

Digital Media - DRAFT

	Research Priorities Aligned with High Growth Target Industries	Specific Research Foci/Strengths
LSUBR	- Core Computing/High Performance Computing - Individual Behavior & Community Context - Communication & Expression	- Enable breakthroughs in computational science and its applications in various areas in science, engineering & arts - Appointment of a new director of CCT - CCT is the focal point for research in core computing/high performance computing cluster and interacts with other clusters - Hiring plan to recruit 4 computational modelers to LSU to strengthen modeling expertise and revise strength in preparing for and analyzing disaster-related phenomena - Substantial investment in new Supercomputer with ongoing funds for upgrades - Louisiana Digital Media Center – new building on the LSU campus to jointly house CCT and EA Sports - Success Stories: - Partnership with LED to grow workforce and support IBM Services Center in Baton Rouge - SuperMike II supercomputer - Louisiana Digital Media Center as home to CCT and resource for private-sector companies involved in digital media - Partnership with EA for a global quality assurance center - Research on individual behavior and cognitive aspects of varied social phenomena such as health, crime, developmental trajectories over the life course, and socioeconomic attainment, and how historical and community contexts produce differential outcomes - Baton Rouge Area Violence Elimination Program (BRAVE) and resulting grant to study the Group Violence Reduction Strategy in Baton Rouge - Several research groups, with one focused on health behaviors and health communication - Supportive research infrastructure includes the Office of Social Service Research and Development and the Public Policy Research Lab - Success Stories - BRAVE partnership - Division of Economic Development partnership with/contract work for LED and other State agencies - The scientific, humanistic and artistic dimension of the human communicative experience and how they intersect with and augment in novel ways the process of discovery - Key cluster in political science - Media Effects Lab - Participation in the Alliance for the Arts in Research Universities - Focal area in Cultural Computing - Success Stories - Swine Palace Theatre - Language Development and Disorders Lab research in child language development and disorders
LA Tech	Cyber & Information Systems	- Cutting-edge research in Computer Science, Computer Information Systems, Cyber Engineering, Geographic Information Systems, and Health Informatics. - Research agenda includes cybersecurity, cybernetics, data mining, sensor fusion, information assurance, biomedical informatics, data analytics, and communications design - Center for Secure Cyberspace - Center for Entrepreneurship and Information Technology - Center for Information Assurance - Success Stories: - National Center of Academic Excellence in Information Assurance Research & Education - B.S. in Cyber Engineering

	• Matter, Materials & Multiscale Systems • STEM Education, Entrepreneurship & Innovation	• Disciplines of engineering, computer science, chemistry, physics & mathematics • Research topics include micro/nanotechnology for energy, security, and sustainability applications, microfabrication and materials characterization, nuclear and high energy physics, computational electromagnetics and metamaterials, computational materials science & advanced materials and manufacturing • Institute for Micromanufacturing • Center for Applied Physics Studies • Louisiana Alliance for Simulation-Guided Materials Applications (LA-SiGMA) • Success Stories: • NSF CAREER Award (Dr. Leland Weiss: new methods to capture and use solar thermal energy using small-scale devices) • Particle Physics image (a summary figure of “inclusive jet production”) selected as international standard • Support FIRST LA framework as a whole by educating post-secondary and post-graduate students in all foundational sciences • Facilitate innovations in core domains, and ultimately contribute to all target industries • Integrated STEM Education Research Center • Science and Technology Education Center • Center for Entrepreneurship and Information Technology • Proof of Concept Center • Success Stories • US Department of Homeland Security funding for Cyber Discovery Camp • US Economic Development Administration funding for “i6 green energy challenge”
	• Materials Science and Spectroscopic Analysis	• Includes systems and novel analysis of systems • Novel measurement of transport properties • Crystallography of isometric organic cations with extraordinary structures • Cavity ring-down spectroscopy • Success Stories • Dr. Patrick Garrity discovered a way to decouple heat flow from electrical currents and apply the technique to thermoelectric power generation • Dr. Lynn Koplitz published five articles on the crystallography of compounds containing isomeric organic cations
PBRC		
SUBR	• Advanced Materials & Nanotechnology	• Vision: to build materials research center; to develop methods and tools to study and design nanoscale systems; to reach the control of electrons and photons inside nanostructures for new nanoelectric and nanophotonic devices; to develop functionally graded materials, morphing structures based on shape memory polymers, carbon nanotubes based on gas/chemical/bio sensors, solar cells, and other devices containing sensors and active materials • Neutrino Physics • Advanced Materials & Energy Production • Electron Transport & Magnetic Properties of Materials • Superconductivity of Materials • Surface Science & Solid State Ionics • Neutrino Physics • SU Computer Automated Virtual Environment (CAVE) • Success Stories • IceCube South Pole Neutrino Observatory (SU partnership) • Next Generations CREST Composite Center

	• Health & Biological Sciences	• Vision: To advance public health research, policy, practices and education by fostering collaboration across disciplines for the improvement of the public's health and wellbeing; to strengthen the University's capacity to address strategically and effectively complex public health issues • Nurse-managed clinic • Center for Social Research • Success Stories • School of Nursing's Family Health Care Center • Louisiana Biomedical Research Network (LBRN) collaboration with LSUBR
Tulane	• Materials Science	• Internationally recognized programs in nanotechnology, polymer science and engineering, electronic materials, energy storage & materials simulations • Major focus areas of microemulsion systems, polymer physics, polymeric drug carriers, thin films and coating & nanomanufacturing • Center for Computational Science • Coordinated Instrumentation Facility • Polymer Reaction Monitoring & Characterization (PolyRMC) • Louisiana Alliance for Simulation-Guided Materials (LASiGMA) • Success Stories: Dr. Vijay John; Dr. Wayne Reed; Dr. Doug Chrisey; Dr. Scott Grayson
ULL	• Computing, Digital Media & Software • Life Science, Healthcare & Wellness	• Research foci: System Technology, Software Development, Information Analysis and Visualization & Digital Media & Society • NSF/UCR Center for Visual & Decision Informatics • Center for Business and Information Technologies (CBIT) • Center for Louisiana Studies • Center for Innovative Learning and Assessment Technologies (CILAT) • Regional Application Center • Success Stories • NSF/UCR Center for Visual & Decision Informatics (only NSF center with "big data" focus) • HydroViz educational tool to support active learning in Engineering Hydrology • K-12 learning modules for virtual learning and math • Research agenda: pharmaceuticals; health information technology; biomedical sciences; nursing & allied health; physical health; mental health; school health infrastructure • New Iberia Research Center • Center for Business & Information Technologies (CBIT) • Picard Center for Child Development and Lifelong Learning • Success Stories • New Iberia Research Center – primate research and industrial partnerships • Picard Center – research focused on informing policy • CBIT support for economic development related to applied research • Lafayette's designation as a "Living Lab for Health Innovation" by the US Ignite Partnership provides a community-scale testbed for healthcare innovations • Lafayette as a regional medical "hub city"
UNO	• Information Assurance & Cyber Security	• Greater New Orleans Center for Information Assurance (GNOCIA) • Success Stories • Participation of UNO faculty in GNOCIA federal awards through SPAWAR Systems Command Atlantic • Strongest information assurance program in the region; designated a National Center of Academic Excellence in Information Assurance Education and Research by the US NSA and DHS