CCT Strategic Plan

2006-2010

Dr. Edward Seidel

CCT Director

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1 Members of the Planning Committee

Name	Area Represented	Term
Dr. Edward Seidel	CCT, Director	Indefinite
Dr. Gabrielle Allen	CCT Focus Areas	Indefinite
Dr. Stacey Simmons	CCT Strategic Advancement	Indefinite
Dr. Stephen D. Beck	Visualization, Interaction & Digital Art	Indefinite
Dr. Jorge Pullin	Coast to Cosmos/Material World	Indefinite
Dr. Rudy Hirschheim	Business, Medical & Social Informatics	Indefinite
Joel G. Williams	CCT Operations	Indefinite
Dr. Daniel S. Katz	Scientific Computing Systems and Software	Indefinite
Brian Ropers-Huilman	LSU/CCT High-Performance Computing	Indefinite
Charlie McMahon	LSU Information Technology Services	2005
Brian Voss	LSU Information Technology Services	2005
Dr. Harold Silverman	LSU Research & Graduate Studies	2005
Dr. James Firnberg	LSU System	2005

2   Strategic Planning Process

Founded in 2003, the Center for Computation & Technology (CCT) at LSU was initial established under the implementation and short-term operation plan developed by Dr. Seidel, Dr. Gabrielle Allen, and their collegue John Towns from the National Center for Supercomputing Applications (NCSA). The short-term operation plan formed the foundation for the Center's initial facility, personnel, and program development strategies, and this foundation provided a strong model for future, long-term strategic planning.

In the fall of 2004, CCT's long-term strategic planning process was initiated during the Center's first, annual research retreat. At this time, CCT faculty, research staff, and administration met to begin to formulate the Center's mission statement, its vision, and the goals and objectives that would serve to bring the Center's mission to fruition. This meeting was followed by a campus-wide planning session in early 2005, which brought together various LSU academic leaders/faculty and attempted to explore and integrate the Center's mission, goals, and objectives with the suggestions, opportunities, and issues presented by the broader LSU community.

By the summer of 2005, CCT had expanded dynamically, growing from only a handful of employees to a team of approximately 50 fulltime faculty and staff as well as several dozen graduate and undergraduate students. The initial long-term planning activities were productive, and the information gathered through these processes was ready for final review and refinement. To facilitate the refinement and finalization process, CCT brought in Dr. James Firnberg (Chancellor Emeritus at LSUA and Professor Emeritus at LSUBR) to conduct campus-wide interviews, soliciting continued feedback from the LSU community, and to guide the Center in the formulation of its first, five-year strategic plan.

As the refinement process progressed into the early fall of 2005, CCT formed the CCT Strategic Planning Committee as well as the CCT Executive Committee. Each of these groups served an important role in evaluating and refining the final drafts of the Center's 2006-2010 plan. The review process was concluded in January of 2006, and the Center's first five-year strategic plan was released. While the Center will continue to refine this plan and to enhance it through the development of research plans with CCT Focus Areas, the 2006-2010 plan serves as the framework for the Center's vision for growth, accomplishment, and contribution.

Measurement data related to the action strategies listed in the strategic plan will be collected annually and will be posted on the CCT web site each July-August.

3 Mission Statement

The Center for Computation Technology at Louisiana State University is an innovative and interdisciplinary research environment, advancing computational sciences, technologies, and the disciplines they touch. The Center serves Louisiana through international collaboration, leading progress through revolutionary advancement in academia and industry.

In supporting the Flagship Agenda of Louisiana State University , the Center for Computation Technology:

- Conducts and promotes research through active development programs, providing internal, competitive funding for faculty development, seeding the development of interdisciplinary research relationships at LSU, and for general research development, providing essential tools and resources to accelerate discovery;

- Provides leadership, advanced infrastructures and support to invigorate computational science and technology on the LSU campus and across Louisiana;

- Provides partnership and support for joint faculty appointments in LSU academic departments, building areas of excellence in computational science and technology across disciplines and creating opportunities for new curricula development in scientific computing;

- Affiliates with business and industry to help drive economic growth in Louisiana by building connections between research and applications for emerging tools and techniques in computational science and technology and by establishing research agreements that facilitate knowledge creation and application in industry;

- Offers programs to stimulate and expand interdisciplinary, computational and technology driven research activity at LSU and beyond, including active visitor, travel, event, distinguished postdoctoral fellow and graduate student programs that provide new sources of support for collaboration, research, discovery and development;

- Offers educational programs on scientific computing and emerging technology, encouraging the development of knowledge and skill in the computational tools and techniques available to undergraduate and graduate students as well as to research faculty and staff;

- Joins other computational science and technology driven research centers, nationally and internationally, in advancing knowledge in and leading the evolution of scientific computing tools and techniques that facilitate scientific discovery.

4 Introduction

> *Computational Science is now indispensable to the solution of complex problems in every sector, from traditional science and engineering domains to such key areas as national security, public health, and economic innovation. Advances in computing and connectivity make it possible to develop computational models and capture and analyze unprecedented amounts of experimental and observational data to address problems previously deemed intractable or beyond imagination (from the President's Information Technology Advisory Committee 2005).*

The CCT Strategic Plan has very simple but visionary and far-sighted goals. The goals themselves are visionary and far-sighted. Data-driven discovery demands intensive, multidisciplinary partnerships, and the goal of the CCT is to drive its research enterprise through collaborations that enable extraordinary discovery at LSU and beyond.

The community of exploration and discovery is currently at a crossroads. In repeated studies around the country, recommendations are being made to assist universities, federal funding agencies and government research and development offices to foster a change in the dynamics of research and to encourage communities to build large-scale, interdisciplinary research associations that come together to collaborate on grand-challenge problems.

The CCT is committed to the spirit of collaboration and innovation both in terms of the discoveries themselves and the manner in which breakthroughs are achieved. We welcome all those who wish to join us on this journey. We are eager to share expertise and resources and to help innovate and advance every discipline that can be touched by advances in technology and computation. We want to learn from others while helping to solve problems for the benefit of all disciplines and for the world we endeavor to make better through our efforts.

4.1 Background

In 2001, the Louisiana legislature approved funding for a major higher education information technology initiative, formally known as the Governor's Information Technology (IT) Initiative. This initiative is aimed at driving economic development throughout the state by advancing the innovative and strategic use of information technology in higher education and scientific research. As the state policy-making and coordinating board for higher education, the Louisiana Board of Regents holds the responsibility of directing the investment of the Governor's IT Initiative funds. The majority of the funds were split among the state's five, designated research universities, including Louisiana State University, Louisiana Tech University, University of New Orleans, University of Louisiana in Lafayette and Southern University.

4.2 Funding

CCT represents LSU's investment in the Governor's IT Initiative, and the Center receives $9 million annually to invest in computational and technology related activities at LSU that support higher education, research and economic development in Louisiana.

4.3   Focus Areas

Under the leadership of the Center Director, Dr. Edward Seidel, research activities within the CCT are organized into broad interdisciplinary focus areas, each led by a faculty member. Focus Areas are challenged to develop research agendas that share expertise and technologies across LSU departments and lead to federal grant procurement.

5 CCT Strategic Goals

5.1 Research Goal

To be among the world's leaders in conducting, developing, and evolving visionary, interdisciplinary research through computational sciences and advanced technologies (Supporting Objectives 1, 2 and 6 of the LSU National Flagship Agenda).

Research Objective 1

To create an innovative, multidisciplinary environment that encourages collaboration towards discoveries in, and through, scientific computing

Research Actions Supporting Objective 1

1. Recruit and retain internationally competitive faculty with expertise in key IT focus areas
2. Develop strong and active, interdisciplinary research teams, focus areas and research support groups
3. Increase knowledge and use of CCT tools that support computational science research

Research Objective 2

To develop and strengthen research partnerships with academic departments at LSU, LONI partners across the state, and peer research centers nationally and internationally to stimulate positive, long-term opportunity for scientific discovery

Research Actions Supporting Objective 2

1. Increase the level of joint, interdisciplinary research activity on campus through close interaction with academic departments at LSU
2. Increase utilization and development of LONI through active partnerships with other LONI institutions
3. Increase participation in the implementation and development of national and international partnerships that develop relevant technologies and applications and that extend high-performance computing resources to the broader research community

Research Objective 3

To increase external funding levels

Research Actions Supporting Objective 3

1. Increase the number of joint research projects proposed through partnerships with academic departments at LSU
2. Increase the number of joint research projects proposed through partnerships with other LONI institutions
3. Increase the number of joint research projects proposed through partnerships with peer institutions and/or cooperative ventures with business and industry
4. Increase the use of the CCT General Development Program to seed project concept development

5.2 Education Goal

To cultivate the next generation of leaders in Louisiana's knowledge-based economy, creating a highly skilled, diverse workforce (Supporting Objectives 2 and 3 of the LSU National Flagship Agenda).

Education Objective 1

To assist in developing curricula and educational opportunities that support research in computational and technology-driven disciplines

Education Actions Supporting Objective 1

1. Recruit and retain internationally competitive faculty with expertise in key IT focus areas
2. Develop new course offerings that explore scientific computing and that utilize CCT computational resources
3. Hire talented undergraduate and graduate students to work within CCT focus areas on issues relevant to their academic focus

Education Objective 2

To collaborate with academic departments at LSU in hiring leading faculty who support an interdisciplinary, integrated effort to incorporate computational science and technology into the curricula

Education Actions Supporting Objective 2

1. Increase the number of jointly hired faculty at CCT
2. Increase the use of CCT's Visitor Program and Lecture Series Program to advance LSU's presence in the high-performance computing community and to encourage connections with potential faculty hires and/or exposure to evolving concepts in scientific computing and information technology
3. Increase the knowledge and use of CCT's Faculty Residency Program

Education Objective 3

To offer programs that stimulate interest in and support the advancement of knowledge and activity in scientific computing and information technology

Education Actions Supporting Objective 3

1. Conduct lectures and forums that expose attendees to current and emerging tools and techniques in computational science and other information technologies
2. Sponsor conferences and workshops that build communities and encourage interest in information technology research, tools and applications
3. Increase exposure to the lecture, forum, conference and workshop programs through the use of video conferencing and Internet distribution

Education Objective 4

To attract and retain internationally competitive students at both the graduate and undergraduate levels

Education Actions Supporting Objective 4

1. Increase number of internationally competitive undergraduate and graduate students involved with CCT research activities at LSU

Education Objective 5

To continue to advance opportunities for women and minorities in the Science, Technology, Engineering and Math (STEM) disciplines

Education Actions Supporting Objective 5

1. Participate in the campus-wide task forces and committees on women and minority hiring.
2. Continue to actively seek and recruit qualified minority and women scholars

5.3 Service Goal

To lead broad collaborations across the LSU community, as well as national and international research communities, that advance the impact of information technology tools, techniques, infrastructure and applications (Supporting Objectives 1 and 5 of the LSU National Flagship Agenda).

Service Objective 1

To increase the use and advancement of scientific computing at LSU

Service Actions Supporting Objective 1

1. Recruit and retain internationally competitive faculty with expertise in scientific computing and key IT focus areas
2. Increase the use of CCT's Visitor Program and Lecture Series Program
3. Sponsor conferences and workshops that build communities and encourage interest in information technology research, tools and applications
4. Hire talented undergraduate and graduate students to work within CCT focus areas on issues relevant to their academic focus

Service Objective 2

To provide opportunities for education, outreach and exploration in high-performance computing and the disciplines it serves, including those disciplines actively engaged as well as those disciplines less integrated in computational science

Service Actions Supporting Objective 2

1. Conduct computational workshops for under-represented groups
2. Develop strong and active, interdisciplinary research teams, focus areas and research support groups
3. Increase presence of women and minority groups in stem disciplines within the CCT

Service Objective 3

Work with local and international collaborators to facilitate development and greater use of HPC resources

Service Actions Supporting Objective 3

1. Increase utilization and development of LONI through active partnerships with other LONI institutions
2. Increase participation in the implementation and development of national and international partnerships that develop relevant technologies and applications and that extend high-performance computing resources to the broader research community

5.4 Infrastructure Goal

To advance the capability and capacity of scientific and high-end computing on the LSU campus and to enhance these advances through state, national and international initiatives (Supporting Objectives 1 and 6 of the LSU National Flagship Agenda).

Infrastructure Objective 1

To enhance and grow LSU's HPC infrastructure through strategic investments that expand capacity and capability of current systems and that implement new scientific computing systems and software.

Infrastructure Actions Supporting Objective 1

1. Maintain and upgrade existing infrastructures utilized by the computational science research community at LSU
2. Invest in and implement new infrastructures utilized by the computational science research community, expanding computationally driven research at LSU
3. Increase the number of users and the number of research jobs performed on LSU's HPC resources
4. Partner with LSU Information Technology Services (ITS) to enhance HPC infrastructure development, operation and support

Infrastructure Objective 2

To participate in national and international collaborations and partnerships that promote the development and utilization of a robust grid computing environment.

Infrastructure Actions Supporting Objective 2

1. Participate in the successful deployment of LONI
2. Participate in the TeraGrid project
3. Participate in national and/or international management, planning and oversight activities related to the growth and use of high-performance and distributed computing environments

5.5 Economic Development Goal

To be a catalyst for economic development in Louisiana, leveraging our research and technologies to develop strategic partnerships with industry, increasing the potential for economic opportunity and growth (Supporting Objectives 1 and 6 of the LSU National Flagship Agenda).

Economic Development Objective 1

To work with LSU researchers, the LSU Office of Research & Economic Development, the LSU Office of Intellectual Property, the Louisiana Business & Technology Center and others to advance, promote and eliminate barriers to technology transfer opportunities at LSU

Economic Development Actions Supporting Objective 1

1. Increase the level of technology transfer activity involving CCT faculty and staff
2. Increase the level of contact with new business and industry considering location or expansion in Louisiana
3. Increase the level of contact with entrepreneurs

Economic Development Objective 2

To engage with technology and application related industries to forge cooperative arrangements that foster benefit in areas of mutual research and development interest

Economic Development Actions Supporting Objective 2

1. Increase the number of cooperative agreements with business and industry
2. Increase the level of industry contributions and discounts supporting scientific computing at LSU

Economic Development Objective 3

To development new technologies and enhance existing technologies that facilitate the creation of new companies, jobs and wealth

Economic Development Actions Supporting Objective 3

1. Participate in exposing and encouraging the use of new and improved technologies in the marketplace