Center for Interdisciplinary Scientific Computation

(CISC)

July 13th, 2017

**Background**

Modern science has been profoundly influenced by the development and use of computational methods for research and discovery. This includes both large-scale simulation and the analysis of massive amounts of data. Illinois Tech’s expertise in scientific computation lies in all College of Science Departments: computer science, the life sciences, the physical sciences, and mathematics as well as in other Illinois Tech units. Following a long term discussion, CISC was established in May of 2017 to leverage this expertise for greater impact.

**Vision**

CISC will be a national and international center of excellence in scientific computation underpinning and catalyzing multiple research and educational activities at Illinois Tech within the university, in Chicago, and beyond.

**Mission**

To intensify computationally-driven scholarship and education, across the College of Science, Illinois Tech as a whole, and in greater Chicagoland. This may lead to major scientific advances not otherwise possible.

**Goals**

To fulfill its mission, CISC will initiate and promote programs to enhance research, education, and community engagement. Our goals are the following:

* *Attract substantial external funding to support major research initiatives.* To increase the impact of our scientific computation research, we will form teams of experts comprised of multiple research groups inside and outside Illinois Tech. On an annual basis one-year seed grants will be awarded to teams deemed to have the greatest potential for attracting major new external funding. Regular seminars where research groups highlight their expertise and agendas will promote the matchmaking of these multidisciplinary teams. Eventually, we expect to have a handful of externally funded major research programs at any time, with the particular themes depending our expertise and on the priorities of funding agencies.
* *Strengthen Illinois Tech’s research computing infrastructure.* We will partner with Illinois Tech’s Office of Technology Services (OTS) and sister institutions to provide access to the computing environments required for quality scientific computation research and education. This includes promoting the efficient use and sharing of available computer resources beyond single-user machines, such as the new College of Science von Neumann cluster, GridIIT, the Open Science Grid, and XSEDE. We will identify or sponsor training opportunities for scientific computation researchers who want to take advantage of high performance computing. We will work with OTS and the university administration to acquire additional needed resources.
* *Develop a comprehensive scientific computation curriculum.* We will support Illinois Tech’s degree programs that have a scientific computation component and establish new multidisciplinary scientific computation programs. We will consider development of an undergraduate major or minor in Scientific Computation as well as a Professional Science Masters program linking disciplinary computational knowledge with the business and entrepreneurial skills necessary in the tech start-up world. We will also consider a PhD in Scientific Computation. Our efforts will be directed towards both timely content and effective teaching methods.
* *Engage the community.* Organizations outside academia, including companies and non-profit entities need scientific computation to accomplish their missions. We will partner with these organizations through research collaborations, providing consulting, and placing our students for short-term internships and long term career opportunities. We will make Illinois Tech a recognized source of expertise in scientific computation.

**Organization**

The first Director of CISC is Fred Hickernell, Professor of Applied Mathematics. Professor Hickernell’s expertise is computational mathematics and statistics, and his research has been funded by the National Science Foundation and the Department of Energy. Eventually we intend to have an endowed chair, which will be used to recruit the next director.

Initially. CISC will not have a formal membership. Membership implies benefits and responsibilities. It also implies inclusion and exclusion. At the start, we want to encourage participation from a wide spectrum of faculty involved in scientific computation, including those outside the College of Science and outside of Illinois Tech. In the future when the criteria defining membership become clear, we will have members.

The CISC website will highlight ongoing research and education at Illinois Tech. It will also serve as a resource for computing environments, relevant conferences, and available training opportunities.

**Space**

CISC will be housed in the Pritzker Science Center Office Suite 106. This will include office space for the director, the assistant, visitors, and students. There will also be a conference room and a common area. The von Neumann cluster consisting of 32 nodes, each with 16 cores, is being housed in RE 214. There is a long term need for Illinois Tech to identify and potentially renovate space to house the computer clusters acquired by faculty members and the Center.

**Budget**

The Center’s budget will be directed at accomplishing the goals outlined above. The initial annual operating budget is $50K, to grow as funds become available. At full strength, CISC will require funding for both start-up and operating costs. It is hoped that these needs can be met through expendable gifts and/or endowment plus external grants and perhaps some part of the indirect cost recovery from these grants.