

KINSC

NEWSLETTER-MAY 2008

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**KINSC
Director- Rob
Fairman**

The KINSC Steering Committee has been hard at work this semester putting together a draft of program funding starting July 1, 2008. Because of the timing of the receipt of the endowment funds, we will only be working with a fraction of our expected budget (\$220,000) in the upcoming fiscal year, so our programming will be limited. The programming has been reviewed by the other two Centers and by Linda Bell and we are now looking for feedback from KINSC faculty to help us fine-tune the budgets for the various initiatives. You should look forward to receiving (or will have received) an email from me providing

detailed descriptions of the envisioned programming and we look forward to your comments and continued conversation about providing resources for faculty from the KINSC.

Briefly, there will be programming elements designed for: (1) enhancing faculty scholarship; (2) supporting student externships and travel; (3) and special faculty/student scholarship projects.

There are some initiatives that we can start spending out as soon as July 1, 2008 comes around so we strongly encourage you to reply with particular parts of the program that you find most

appealing and ideas that you might have for specific projects.

Also note the innovative elements for faculty and student funding in our new HHMI grant. Kate Heston has provided a blurb describing our new HHMI programming in this newsletter. One of the specific projects that will now be enhanced in funding is the construction of the new machine room. Please read Peter Love's delightful introduction to what the machine room will do for the community in the near future. Please take a moment to thank Peter for his contributions in moving this project forward.

**MACHINE
ROOM
UPDATE**



According to Landauer's principle, any irreversible computer must generate an amount of entropy equal to $k \ln 2$ for every bit of information it erases. This means an amount of energy equal to $kT \ln 2$ (about $0.7kT$) must be emitted to the environment as heat. This is a familiar effect - computers get hot and need noisy fans to cool them down. What is remarkable is how far modern computers are from this ultimate thermodynamic limit - modern transistors dissipate about 100 million times as much heat as $kT \ln 2$.

Naturally, everything gets much worse when one takes 50 or 100 processors and crams them into a small rack to make a parallel computer (also called a Beowulf cluster). So the process of doing large scientific computations, like all science, involves the production of large quantities of hot air. Two of our new colleagues Beth Willman (Astronomy) and Joshua Schrier (Chemistry) have interests in high-performance scientific computing, and we will be expanding the present KINSC babbage cluster from 24 CPU's to 48, and we anticipate further expansion in the future. This will help Beth and Josh with calculations of large-scale structure formation in the universe, and electronic structure calculations for photovoltaic materials, respectively. In order to make

this possible without incinerating the KINSC we are converting part of the old Physics storage room L010, into a machine room. This will have power, HVAC, networking and fire protection for up to 25 kW of power and will mean that scientific computing can continue to expand at Haverford for the foreseeable future. This conversion has a target completion date of July 1st. Many people deserve recognition for making this possible, including the HHMI grant writers Rob Fairman, Suzanne Amador Kane and Kate Heston, the facilities team Ron Tola, Joe Curtin, Joe Hudgins and Bob Harper, the physics department for their help in relocating materials from L010, in particular Jerry Gollub, Nick Oullette and Walter Smith, and (cont. 1st column next page)

(Mach. Room, cont. from pg. 1)

the networking folks Matt Nocifore, Aaron Smith and last but not least Joe Cammisa. KINSC faculty interested in making use of the existing or expanded babbage cluster either in courses or for research should contact Joe Cammisa (jcammisa@haverford.edu) and myself (plove@haverford.edu).

In March, we were thrilled to learn that Haverford has received a 4-year grant from the Howard Hughes Medical Institute, totaling \$1.4 million. Thanks to all the faculty of the KINSC who contributed to this proposal. Highlights of our 2008 HHMI grant include:

Student Research and Broadening Access

We will continue to fund summer research positions for the Interdisciplinary Science Scholars, including new support for two sophomores per year and for two students pursuing research abroad, and for the Multicultural Science Scholars, including two positions for international students who otherwise cannot obtain funding.

Current and Future Faculty Development

We will continue to support HHMI Postdoctoral/Predocctoral Teaching Fellows, who will teach either a one or two courses a year at Haverford

under close mentorship by our faculty members. We will also expand the postdoctoral fellows program in new programmatic ways in collaboration with Bryn Mawr. We plan to support a workshop, geared to all postdocs in the Philadelphia area, exploring the integration of teaching and scholarship at liberal arts colleges.

Curriculum Development

We will create new half-credit courses or modules in math-based molecular modeling and systems biology. As we move to create a new minor in Scientific Computing, we will restructure our two scientific computing courses, the 100-level Computing Across the Sciences and the 200-level Scientific Computing Math course. One course will be redesigned to focus primarily on discrete topics most applicable for Biology majors. The other course will emphasize continuous methods appropriate for students in computational chemistry or physics. We will explore how premedical mathematics requirements might evolve to include a computing component. We will devise a statistics program for the natural sciences focusing on interdisciplinary applications of statistical tools. We will develop new courses in this area, as well as new versions of introductory statistics, and design a half-credit course for senior science majors focusing

on the quantitative and statistical aspects of their senior research.

Pre-College & Outreach

Haverford has agreed to fund the Mentoring and Student Teaching (MAST) Program, an outreach effort for students from local area middle and high schools. Our newest outreach program is the Summer Institute for K-12 teachers, held in conjunction with Bryn Mawr. (Program web site: <http://serendip.brynmawr.edu/local/suminst/>).

In 2007, John Dougherty and Steven Lindell organized a one-week Institute on "Virtual Thinking: Explorations into the Role of Computing in Education," attended by 15 teachers from 13 schools. J.D. will present his Virtual Thinking workshop again this June. We envision 1-2 week sessions such as this each summer.

Administration, Assessment and Dissemination

Kate Heston will continue as Coordinator of the HHMI programs at Haverford, focusing additional efforts on assessment and dissemination of curricula and programs we create. We can also provide support for the hiring of a staff member to manage newly-developed databases and surveys.

"I heard the college closes down for the summer, will there be any students around?" There will be approximately 90 research students working this summer.

"Is there going to be anyone in the office?" There will be 2 full time staff members in addition to Kay Warner in the L204 office. They are Karla Alfaro-Urias and Laura Aboyan. Please stop by and say hello.

"What's with the new coffee machines?" A "Grand Opening" of the Keurig coffee service system was held Wednesday, April 30th. 400 Munchins and 400 cookies were consumed before closing and considerable cups of coffee/cocoa/tea. All reports from students were very positive-"thought for some time there should have been coffee available in the Zubrow Commons;" "very excited;" "great idea," etc., etc. The coffee is \$.75 per cup. Admissions tours will highlight this when they pass through Zubrow Commons.

HHMI GRANT NEWS

ASK K and A KORNER?

