

Results from AMMSI funding

From: Carol Shubin

To: African Mathematics Millennium Science Initiative (AMMSI)

CC: Rector, Vice-Rector, Vice Rector of Finance, Dean of Science, Head of Department of Mathematics

Results from AMMSI funding

I requested support to return to the Kigali Institute of Science and Technology (KIST) in Rwanda (December 2008- January 2009) as a follow-up to my visit as Fulbright Scholar at KIST (January 2007- June 2007). The accomplishments from my visit were

- \* setting up a pilot program for five KIST 4th year undergraduate mathematics majors
- \* start to build an applied mathematics research program
- \*strengthen teaching and learning math and its applications using technology
- \*establish collaborations with US universities

These online courses posted on my Moodle site <http://www.carolshubin.com/moodle> were originally developed for the NASA CSUN/JPL PAIR program. They explore several math modeling problems using diverse data sets of “real data” using Matlab, Excel, JPL software or in-house software. Very briefly, in these courses we used

- statistical modeling to determine unknown proteins from electrophoresis gel data.
- Fourier analysis and statistics to create a program that can distinguish one person’s voice from some else’s.
- orbital elements and NASA satellite data to determine various satellite trajectories.

The five students will be working through these courses over the next 6 months. They will have weekly assignments and each course will have a final project. At the end of each semester, they will give presentations on their work to a committee of faculty from their math department.

I believe that my visit will lead to future work.

We initiated discussions about common research interests. There was some interest in looking at modeling with remote sensing data or some ecological or biological data. These discussions need to continue and a long-range research plan needs to be developed.

I was recently contacted by a Cornell math faculty member who wanted to know who to contact at KIST as that he could spend his Spring 2009 sabbatical there. Several other post-docs expressed an interest in teaching over the summer. So I believe that there is an interest in starting exchanges and collaborations. We have invited faculty to apply for grants (through Fulbright) to visit us at CSUN. I would like to see if we could develop some plan for exchanges in a more coordinated manner.

Although headway is slow due to infrastructure and organizational issues, I initiated a

1. Discussion of possible research directions
2. Overview of my free math materials
3. Advisement for five 4th year undergraduate math majors

4. Wrote an MOU between KIST and CSUN some connections with US universities
5. Student exchange between KIST and CSUN (including arranging for a KIST student to take the GRE and Toefl)

It was wonderful to have the opportunity to collaborate with the math faculty, staff, and students at KIST. I am very grateful to AMMSI for travel support and to KIST for being a very kind host. Special thanks to the Rector, Vice Rector of Academic, Vice Rector of Academic Finance, Dean of the College of Science and Mathematics Désiré Karangwa, Head of the Math Department, Amritasu Sinha and Murangira. I also appreciate the support of my own department, in particular, to my chair Werner Horn for arranging for a graduate assistant to take over my classes and grade my finals so that I could get to KIST before our semester had ended. I'd also like to thank Jan Moller for suggesting alternative free software for some of my NASA PAIR classes.