

New Mathematical Topographies — Extended Report (2005 - 2006 Academic Year)

Synopsis. The third and final year of the Peter Canisius (Oishei) project *New Mathematical Topographies* consisted of six one-week one-credit courses that were taught by renowned visiting professors¹ to Canisius College, together with seven high profile public lectures that were affiliated with the one-week courses (and generally delivered by the same visiting professors) and a piano recital by Per Enflo. Three of the one-week courses, dedicated to the theme of Mathematical Biology, were given during the Fall of 2005. The other three one-week courses, dedicated to the theme of Theoretical Computer Science, were given during the Spring of 2006. Each course was taken for credit by between ten and fifteen* Canisius College students, with the most popular course being *Statistical Analysis of Neuronal Data* by Drs Kass and Ventura of Carnegie Mellon University. Each one-week course was, moreover, attended by several faculty and numerous visitors, making for unusual and exceptionally conducive (to learning) environments for our registered students. Attached with this document are two additional reports that describe each of the six one-week 05/06 courses in depth. The public lectures (again) proved to be highly popular, generally attracting diverse audiences that varied between thirty to ninety people. Abstracts of the seven public lectures may be found online: <http://www.canisius.edu/topos/events.asp> — including a special guest lecture by Canisius College 2002 mathematics graduate Jeffrey Liebner!

Student Conference Presentations. Outgrowth from the one-week courses included three conference presentations by Canisius College students at the 13th Hudson River Undergraduate Mathematics Conference. This conference is the premier venue for such undergraduates in the Northeast of the USA. It was held at Westfield State College on 8 April 2006. Detailed abstracts of these NMT-student talks may be found online: <http://www.canisius.edu/topos/hrumcxiii.asp>.

Piano Recital. A major highlight of the third year of NMT was a piano recital by internationally renowned mathematician and concert pianist Per Enflo: *Two Beethoven Sonatas*, Christ the King Chapel, Canisius College, 29 September 2005. This recital was given in conjunction with his public lecture and one week NMT course on mathematical biology and anthropology.

Robert Marciniak Graduate Award. Through direct contact with Drs Peters and Sitharam of the University of Florida — by taking their one week courses in the Spring of 2006 — and on account of his excellent academic record at Canisius College, Robert Marciniak (2006) was awarded a University of Florida Alumni Graduate Award in computer engineering. Considered one of the University of

- (1) Dr Eduardo Mercado III, SUNY Buffalo, New York.
- (2) Dr Per Enflo, Kent State University, Ohio.
- (3) Drs Robert Kass and Valerie Ventura, Carnegie Mellon University, Pennsylvania.
- (4) Dr Meera Sitharam, University of Florida, Florida.
- (5) Dr Willem Fouche, University of South Africa, RSA.
- (6) Dr Jorg Peters, University of Florida, Florida.

Florida's most prestigious incoming graduate awards, the four year award provides an annual stipend of \$17, 000 together with additional benefits such as tuition waivers.

Sitharam Lecture to Science Majors. At the request of the physics department, Dr Sitharam (CISE, University of Florida) repeated her public lecture — *Geometric Complexity in Nanoscience* — for Canisius College science majors on 03 March 2006 (Horan O'Donnell at 11:30am). This lecture was hugely successful! Approximately 90 science majors attended Dr Sitharam's extra NMT-lecture.

Website. NMT maintains a detailed website: <http://www.canisius.edu/topos>. This website has recently been enhanced considerably to include a Picture Gallery and Course Archives. Much of the photography on the gallery page² was done by local artist and photographer Molly Jarboe. Ms Jarboe photographs for NMT pro bono and we are extremely thankful for her contribution to the project. The archives³ are intended to leave a rich trace of NMT courses (for future generations of students) wherever possible. For example, all of Dr Watson's powerpoint presentations on astronomy* — that is, his entire course and public lecture — can be downloaded from the archives page, and so on. It is a remarkable page. Chuck Pustelnec has been constantly helpful in maintaining and upgrading the NMT website, and we owe him a great deal of thanks.

Progress Towards Objectives — Pros & Cons. From the NMT website: “A central aim of the project [NMT] is to expose young undergraduates to research experiences and opportunities beyond the ordinary via direct contact with leading researchers from stellar tertiary institutions around the world.” In this, the third year of NMT has been an unmitigated success, as can be seen — in part — by the visitors and their affiliations listed in Footnote 1, but also by the student conference presentations discussed above, and by the general high level of interest in NMT events. A hallmark of the NMT courses is their non-traditional aspect; namely, the attempt to bring advanced — *current* — research trends (in the mathematical sciences and related fields) to our undergraduates in an understandable format. The third year of NMT featured courses that ranged from statistical analysis of neuronal data to graphics, modeling and animation. These are areas of great contemporary interest and importance. Access to leading academics in such fields has been an enduring hallmark of NMT and one of its greatest strengths.

Student placement in elite graduate programs has also been a hallmark of NMT. This year, for example, NMT played an important role in placing students Robert Marciniak, Drew Crossett and David Covert in graduate programs at the University of Florida, Carnegie Mellon University and the University of Missouri (respectively).

Another success of NMT can be ascertained from the rising enrollment levels in the one-week courses, and from the diversity of majors represented therein. The third year of NMT saw students from bioinformatics, computer science, mathematics, and other majors, take one-week NMT courses for credit. Moreover, evaluation

²<http://www.canisius.edu/topos/gallery.asp>

³<http://www.canisius.edu/topos/archives.asp>

data (to date) from third year NMT courses has been *very* encouraging. We see evaluation means for the NMT courses almost always in the high fours (meaning 4.40 and above out of a maximum possible 5.00) on all key questions. Please note a number of student testimonials about the NMT programme that are attached with this report. The students prepared these testimonials at my request and are compelling as to NMT's impact on our general student body at Canisius College.

It has been common for Canisius College faculty (other than myself) — such as Drs Alif, Burhans, Huard, Khinkis, Kinsey, and Prassidis — to sit in on some of the NMT courses, and to interact in various ways with the visiting scholars. Such interactions suggest that NMT directly aids faculty enrichment at Canisius College. Please note Dr Burhans' attached letter in this respect. Dr Burhans wrote this letter at my request.

Moreover, and finally in this paragraph, we note that the NMT public lectures have been very popular with students, staff, faculty and visitors (alike) to Canisius College. The public lectures, particularly, have reached out to the wider community in Western New York in a most successful way.

Budget & External Support. For the third year running, despite one international visiting professor and some awkward airfares, NMT effectively came in on budget. It was the case that two of the visiting professors (Drs Peters and Sitharam) stayed in Dr Anthony Weston's apartment, thereby dramatically reducing (to zero) their accommodation costs in Buffalo. Being from SUNY Buffalo, Dr Mercado had no local accommodation expenses. In such ways, NMT project costs were kept in check. There were no unusual NMT expenditures during the 04/05 academic year. The over-riding expenses were honoraria (\$3000.00 per course), airfares and accommodation (where applicable). Occasionally Canisius faculty were treated to dinners with NMT speakers when such were seen to be particularly relevant to faculty interests and college goals. All NMT receipts are kept on file and are available for inspection at any time.

Respectfully submitted by Dr Anthony Weston, 06-06-06.