

GUSTAVUS PHYSICS

What's New in Olin

Inside this Issue:

Fullers Return from China	3
Study Abroad for Physics	3
J Term in Australia?	4
Student Assistants	5
Faculty Summer Activities	6
Chuck is Promoted!	7
Student Internships	8
Class of 2000	9
Lab Computer Upgrades	11
AAPT Summer Meeting	12

There are a number of changes in the responsibilities of the faculty members in the physics department this year.

Dennis Henry will be on sabbatical leave for academic year 2000-2001. In addition to pursuing research and scholarship on his own, he hopes to do some consulting work, possibly in the Twin Cities.

Steve Mellema became Chair in January, a job he will have for three years. Please contact him with any inquiries or if problems are

encountered. He also continues as Assistant Radiation Safety Officer for Gustavus.



Chuck Niederriter will continue the role of Physics Computer Network Manager and will manage the Olin

Observatory and its evening observing sessions for the Gustavus community and other organizations. He also takes over as faculty advisor of the department's chapter of the Society of Physics Students (SPS).

(Continued on page 2)

Fall Semester 2000

Dates to Remember

- Sep. 6 Classes begin
- Oct. 3-4 Nobel Conference
- Oct. 9-13 January Term Travel Course Registration
- Oct. 20-23 Fall Break
- Nov. 7-9 January Term and Spring Registration
- Nov. 23-26 Thanksgiving Break
- Dec. 15-19 Final Exams

New Faculty Member

Julie Talbot joins the physics faculty as Visiting Assistant Professor. Julie comes to us from Clemson University where she recently completed her Ph.D. Julie writes:

"I grew up in Western Pennsyl-

vania, in the suburbs of the suburbs of Pittsburgh. I went to Allegheny College—a small, liberal arts college in the northwest corner of the state. There, I majored in physics, minored in math, and participated in track, wind symphony, and church

(Continued on page 2)

All full-time faculty in the department share advising responsibilities for physics majors.

In addition to their teaching and research responsibilities, physics faculty carry out additional assignments within the department and on campus.

Faculty Assignments

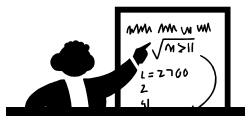
(Continued from page 1)

Tom Huber continues as coordinator of off-campus research and internship information, and as the department's Library and Teacher Education liaisons. He also supervises the department's World Wide Web presence, and takes over this year as the advisor for pre-engineering majors.

Paul Saulnier takes over this year as the coordinator of the department's colloquium and outside speakers program.



All students majoring in physics should choose a faculty advisor in the department by sometime in their second year. All first-year students who indicate an interest in physics and who are enrolled in Classical Physics I and II receive information about the physics program in class, and will be invited to establish an early informal advising relationship with one of the instructors of these courses or with another member of the department. The prospective majors should meet with this informal advisor before registration periods to review the plan of courses as part of the exploration of the major or pre-professional program. These informal advisors will monitor student progress in physics and math courses and will offer encouragement and suggestions for avoiding pitfalls.



New Faculty Member

(Continued from page 1)

“Three sections of eighth grade math were enough to convince me that this wasn’t what I wanted to do for the rest of my life.”

choir, among other things. After graduation, I taught high school for two years, teaching physics and chemistry to high school students the first year, and teaching math to students from seventh to twelfth grade the year after.

Three sections of eighth grade math were enough to convince me that this wasn’t what I wanted to do for the rest of my life, and so I decided to go to graduate school for physics, at Clem-

son University. For the past six years, I have lived in South Carolina, where I have learned to appreciate good barbecue, but still don’t understand grits. My graduate research was in the area of quantum field theory, studying the theoretical anomalous magnetic moment of vector mesons.”

Julie will be teaching General Physics, one lab section for Classical Physics III, and Physics Senior Seminar this fall.

Editor’s Note: This Newsletter is issued at the beginning of the fall semester for the benefit of current and prospective students, alumni, faculty and others interested in the physics program. Students enrolled in the major course sequence will also be receiving copies of the current physics curriculum and advising guide, the fall activity calendar, and a user’s guide to the physics software on the computer network. Juniors and seniors will be offered copies of the department’s guide to graduate school planning, and the AAPT brochure "Planning for Graduate Studies in Physics and Related Fields", written by Professor Henry.

Fullers Return from China

Professor Emeritus **Richard Fuller** and his wife Judith returned this summer from a year in China, where both were teaching at the Ocean University of Qingdao. Dick writes:



“The year in China was both challenging and rewarding. I taught graduate students in science, engineering, and economics and management. I gave lectures in English and the students had to write papers and give oral reports based on my topics. Topics I chose to lecture on included my favorites from Gustavus such as : The Legacy of Bohr (Complementarity); The Manhattan Project; Global Warming; Thermodynamics, Economics, and the Environment; Renewable Energy Resources; Science and Human Values (J. Bronowski); Quantum Reality

(Bohr-Einstein Debate); The Age of Newton ; Models and Metaphors in Physics; and The Unreasonable Success of Mathematics in Physics. It was a good year--but

I had more students (200 in the fall and 160 in the spring) and papers to grade than I ever had in my 31 years at Gustavus! My lasting impression is one of great respect for my Chinese students--when they become leaders in China, the world will be a much better place! Greetings to all of the Gustavus physics community, I hope to visit the department and get to know the "new" Gusties this year.”

Dick can be reached through his Gustavus e-mail:
rfuller@gustavus.edu



“My lasting impression is one of great respect for my Chinese students--when they become leaders in China, the world will be a much better place!”

New Study-Abroad Opportunities

The range of study-abroad opportunities for Gustavus physics majors is increasing, with the addition of a program of study in cooperation with the physics department at the University of Wollongong in Australia. This semester, three current Gusties are studying there. Due to calendar differences,

Corey Bishman ('02), **Raegan Johnson** ('01), and **Andrew Ohrt** ('02), began their “fall” semester in Australia in July.

Andrew writes:

“Life here is great. Everyone here is very nice, and the weather is pretty good. It is about 65° F every day and

Study Abroad Opportunities



"It is about 65° F every day and this is the dead of winter."

(Continued from page 3)

this is the dead of winter. In a few weeks we are going to go to Cairns and tour down the east coast and see the Great Barrier Reef. Then we are going to head to the Olympics. We got some good tickets. Then hopefully Melbourne for a week and then back to school for a while. Corey and I live about a 5 minute walk from the beach and we are learning to surf.

The residential staff and the physics department have been taking excellent care of us. Quantum Mechanics is at the level we are and is not giving us more trouble than it should. The intermediate project in physics is going well. Corey and I are working with one professor on studying the photoluminescence of semiconductors in a magnetic field when there are two lasers shining on them. It is some good physics. Raegan is working with a different professor on a different project."

Study abroad for physics majors has traditionally been difficult, given the



tightly sequential nature of the courses required for the major. However, the physics department at the University of Wollongong offers a full range of physics courses, making it possible to design a semester of study there that will complement the physics major at Gustavus.

Other study-abroad possibilities for physics majors include a program in Lancaster, England and (for those looking for a more exotic experience) the Gustavus exchange program with the Science University of Malaysia. None of these programs requires any knowledge of a foreign language, and courses may be taken to fulfill both major and general education requirements at Gustavus.

For more information on these programs, contact your faculty advisor, Dr. Mellema, or Carol Moline, the Study Abroad Advisor in the Office of International Education (x7545).



Travel course registration for January Term takes place Oct. 9-13.

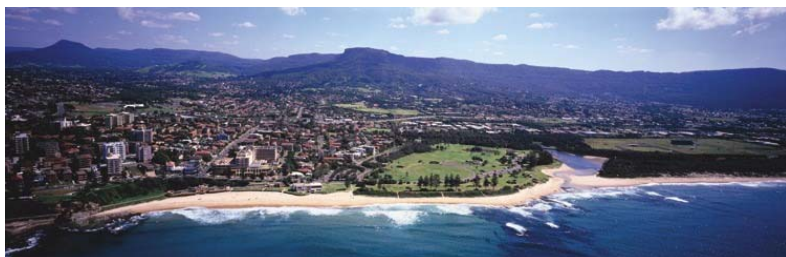
J-Term Course to be Offered in Australia

Chuck Niederriter and his wife Debbie are team-teaching a course for January Term, 2001, entitled "Astronomy of the Southern Skies". The course will utilize faculty and facilities at the University of Wollongong, and will also include visits to Australian observatories.

Designed for non-science students, this course will cover two basic and related topics. The first will acquaint the students with the methods of observational astronomy and the use of small astronomical telescopes. The second topic is concerned with the astrophysical evidence which forms the basis for

(Continued on page 5)

J Term in Australia



One of Australia's most attractive and highly regarded universities, the University of Wollongong is located on the coast about 60 km south of Sydney.

(Continued from page 4)

cosmological theories of the nature and origin of the solar system, galaxies, and the universe. Included are discussions of intelligent life in the universe, general relativity, space travel, quasars, and pulsars.

This course counts for Curriculum I

general education area LD (laboratory science), and has no course prerequisites. Travel dates are from Dec. 31, 2000 to Jan. 29, 2001, and the estimated cost is \$3,650, which includes airfare, all ground transportation, accommodations and food.

For further information, contact Professor Niederriter.

Student Assistants

At the close of the spring semester the department collected schedules and work preferences from all students who expressed an interest in working for the department in some capacity.



On the Friday before classes begin, we will be assigning students as lab assistants, group assistants, tutors, and graders in selected courses. We also have some other jobs that benefit the program and students. These include machine shop work, electronics maintenance, WWW assistance, software testing, and other technical tasks.

If you are a returning physics major

with special skills who does not qualify for work-study, but who would still like to earn some money as a physics assistant and perhaps receive office space, we

may also be able to hire you.

Under a new College policy effective this year, the department is not restricted in the number of hours of employment it can offer non-work-study students to help in critical areas. If you have not already done so, please see Dr. Mellema to register your interest in any type of departmental work, specifying the number of hours per week you would be willing to put in as well as the times you are available.

The physics department makes office space available to students working in the department as assistants or in research. Students who are working with us as paid assistants or in active faculty-student research will have first priority. Students wishing office space should see Dr. Mellema, who will make assignments, distribute keys and issue appropriate passes.

How I Spent My Summer (by the Physics Faculty)

A. Jennings Ellis writes:

"I visited my farm three times in June, July and August. I also attended a National ELCA conference on the Vocation of a Lutheran College held at Dana College (it rhymes with banana) in Blair Nebraska. Dana has 650 students and nearby Midland Lutheran has about 1000. Neither has a physics major. There are 28 ELCA liberal arts colleges around the country. Most were represented along with Valparaiso, the Cinderella team in the NCAA basketball tournament a few years back. I learned a lot about the theological basis of ELCA schools. More specifically, however, I figured out that Gustavus is definitely the real McCoy on all of the criteria mentioned. If you want a real Lutheran, liberal arts education Gustavus is the place to be. Other attendees were astounded by the number of physics and chemistry majors that we have."



"If you want a real Lutheran, liberal arts education Gustavus is the place to be."

Dennis Henry wrote an invited autobiographical article ("Were they really for amusement only?") for the Pin Game Journal, highlighting his early days as a pinball mechanic and tinkerer. His more academic projects included acceptance of a paper by The American Journal of Physics, and a commission to write a second edition of the AAPT booklet *Planning for Graduate Studies in Physics and Related Fields*. He enjoyed a two-week vacation at familiar Lake Le Homme Dieu near Alexandria, fishing, reading, snorkeling, and boating. In late August he visited **Pete Hultgren** ('91) at his workplace in Hudson, Wisconsin, where Pete designs railroad signal systems for Twin City Signal Co. The summer concluded with the start of various sabbatical-leave projects. "DC" will be operating out of his home of-

fice, when not doing industrial research in the Twin Cities.

Tom Huber was busy with several projects this summer. He had a Gustavus Research, Scholarship and Creativity grant to study the use of Computational Fluid Dynamics (CFD) programs for use in his research program on the physics of organ pipes as well as other applications in the physics curriculum. He was also working on developing and refining the 3-D simulations of hydrogen orbitals and electric fields. He used this in a presentation "Visualization in 3-D Using Chromatek Coloration" at the American Association of Physics Teachers meeting in Guelph, Ontario. (Check out the demos on www.gac.edu/~huber/chromatek especially with the 3D glasses outside of his office). He has also been busy learning LabVIEW in preparation for its use in Experimental Modern Physics this fall.

Steve Mellema basically spent summer mornings at the office and afternoons at home with his family. He wrote two articles for the journal *Physics Education*, and began work on a series of html-based "physlet" illustrations to complement the study guide of an introductory physics textbook written by James Walker and published by the Prentice Hall company. Summer highlights included family trips to Duluth and to a cabin on Woman Lake, and were capped off by the two-and-a-half week journey with the Niederriters around the Great Lakes (all five) to attend the AAPT meeting. They saw Door County (Wisconsin and Lake Michigan), Michigan's upper peninsula

(Continued on page 7)

Faculty Summer Activities

(Continued from page 6)

(including Whitefish Bay on Lake Superior), took a ferry across Georgian Bay in Ontario (Lake Huron) and got all the way to Niagara Falls (Lakes Ontario and Erie).

Chuck Niederriter had a busy summer working on an addition to his house, attending workshops and conferences, teaching Astronomy Summer Camp, and updating computer equipment within the department. The summer began with the preparation of a grant proposal to the National Science Foundation for new telescopes, CCD cameras, and spectrometers for the Olin Observatory. Before attending the First-Term Seminar workshop he was able to finish the demolition of the back porch in preparation for the new addition. Before traveling to Pennsylvania for the Fourth of July, there was time to build an addition to the garage and register a few first-year students. With the help of **Susan Sultvedt** ('01), Chuck taught nine high school students a little astronomy during a week in July before heading out on a Great Lakes tour and the American Association of Physics Teachers meeting in Guelph, Ontario. In August, work on the addition finally took off and Chuck was busy masquerading as an electrician, plumber, and

sheet metal worker. Hopefully, all of the windows will be in soon so the rest of the inside work can get started. Look for announcements of the grand opening sometime this fall.

Paul Saulnier reports:

"The summer of 2000 was the fastest summer of my life! Where did it all go??? I guess I am getting old which will come as no surprise to students who play football with me.

The summer of 2000 was filled with research, class prep, housework, and a family vacation. The research consisted of two projects, time-resolved photon correlation spectroscopy and total transmitted intensity measurements. The first of these projects involves studying the behavior of small particles suspended in a fluid while the second dealt with investigating the transition from ballistic to diffusive transport in a highly scattering medium. **Jonathan Skovholt** ('01) and I had fun and even managed to fry some equipment (that was actually Jonathan's doing of course).

Work on the house consisted mostly of painting (of which there is more to do) and yard work. We went to New England for our family vacation. I must say that it is nice to be in an area that has a real football team!"



"I must say that it is nice to be in an area that has a real football team!"

You Can Call Him "Professor" Niederriter

Please join his faculty colleagues in a hearty wish of congratulations to **Chuck Niederriter**, who this year has been promoted to the rank of "Professor". As prescribed in the Gustavus Faculty Manual, this promotion is based upon "continuing excellence and growth as a teacher; an established record of professional accomplish-

ments; and an established record of leadership in the governance of the College, the department, in the faculty and its committees."

We can think of no one more deserving, and the Faculty Personnel Committee, the Dean and the President have unanimously concurred!



"F = ma and you can't push a rope!"

Student Summer Internships

A number of Gustavus physics majors spent their summertime in internship positions across the country.

For the second consecutive summer, **Tim Andeen** ('01) had an internship position at the Fermilab National Accelerator Laboratory in Batavia, Illinois.

David Anderson ('01) had an internship position at the Indiana University Cyclotron facility in Bloomington, Indiana.

Jason Haaheim ('01) was chosen to be one of 16 students in the University of Minnesota Electrical Engineering Department's NSF-REU summer program. Jason writes:

"My advisor, Dr. Anand Gopinath, guided my efforts on two projects. The first sought to eliminate shadowing problems in planar waveguides using Reactive Ion Etching (RIE); the second endeavored to fabricate a buried planar waveguide amplifier using an Erbium doped PSG guiding layer. I am gratified to know that my work aided the efforts of our research group; evidence of our progress is to be published imminently (and my name will be on the paper!). I became certified in the operation of much of the equipment in the University of Minnesota's renowned Microtechnology laboratory. My experience working with Dr. Gopinath and his team of incredibly talented and skilled graduate students was invaluable. (I worked closely with **Ross Schermer** ('99) throughout the summer). I enjoyed the graduate school atmosphere. I presented my research to our summer REU group, wrote a paper on the research, and presented a poster at the REU poster symposium. These challenges helped me strengthen my skills in effectively

communicating my research and findings. Most importantly, I was exposed to the research in microelectronics which I want to pursue in graduate school."

Jonathan Jennings ('02) had an internship in an NSF-REU program at the University of Nebraska-Lincoln. Jon was part of an interdisciplinary program on nanostructured materials that involved faculty from physics, chemistry, and several engineering disciplines.

Todd Johnson ('02) was in another REU program in geophysics at Purdue University in West Lafayette, Indiana.

Todd writes:

"Basically we were using seismic pulses to make an image of a gas/liquid distribution in a fracture. The goal of the project was to try to recreate results that a lab group from Lawrence Berkeley National Lab found in a field study. They used transducers placed in wells approximately 80 meters apart that spanned a known fracture containing groundwater, and also a set that transmitted along the fracture. They then sent seismic pulses through the fracture and measured transmission and reflection coefficients for the normal cases, and the amplitude of the interface wave for the case along the fracture. They used pumps to remove the groundwater from the fracture and then remeasured the coefficients, which were different than before air injection. Some areas showed more change than others, and the LBNL group hypothesized that this was a result of pockets of air and water in the Fracture. In our lab, two leaded glass blocks were used to recreate the fracture. This allowed a clear view of the fracture's gas/liquid content

(Continued on page 9)



"Most importantly, I was exposed to the research in microelectronics which I want to pursue in graduate school."

How I Spent My Summer (by the Physics Students)

(Continued from page 8)

to see if the seismic results matched the actual distribution. We did find that we could map out the distribution quite well with the seismic data. We had a problem matching the field results, however. Although we did get changes in the coefficients and interface wave amplitudes, they didn't always change in a similar manner to the field results. The summer ended too quickly to dig into what caused these differences."

Arno Merkle ('01) writes:

"My summer REU was spent at the University of Chicago's Materials Research Science and Engineering Center. My work took place in the low temperature physics department. My adviser, Woowon Kang, assigned a project for me to investigate quantum Hall states of GaAs samples. This required work with refrigerators attaining a base temperature of 30 mK and superconducting magnets that reached 15 Tesla. Although the main experiment I ran only lasted two-and-a-half weeks, we saw some very interesting results. This work is being continued by my advisor in the hopes of pinpointing the cause of the effects we are seeing. Other than research regarding the Quantum Hall Effect, I took a machine shop course which should prove to be very practical for work in the future. Other topics I was introduced to, but didn't thoroughly pursue, included organic superconductors and infrared microscopy. Most importantly, the experience gave me insight into what research is all about and what it will be like to be a grad student!"

Jonathan Skovholt ('01) spent this summer in St. Peter being a research assistant for **Paul Saulnier** in the optics research lab doing various research projects. According to Jon:

"Most of our time was divided between two projects: Time Resolved

Photon Correlation Spectroscopy (TRPCS), and Total Transmitted Intensity. The TRPCS project involved measuring the fluctuations of light scattered by spheres in water. This project was plagued with breaking equipment and realigning the apparatus. Needless to say, we are still working on the TRPCS project. The Total Transmitted Intensity project has been going much better. It involves varying the thickness of a scattering fluid to measure the transition from random scattering to ballistic scattering. We have taken some data for this project, but have yet to analyze it. It was a good experience and has allowed me to keep Paul paranoid all summer long."

Susan Sultvedt ('01) writes:

"I had an internship at Aspen Research Corporation (ARC), which is a company owned by Andersen Window. The ARC motto is "Turning Questions into Answers." ARC does quality control testing, and research and development for Andersen Windows. They also answer questions for other companies such as TORO®. I spent most of my time working on a project to characterize distortion seen in IG units, which are a type of double paneled glass unit. I worked to develop a process to measure the amplitude of deviation in the surface of the glass. With this data we were able to make a 3D model of the surface. Then we compared the 'bumps' in the model to the area in which the distortion was seen in the glass. These areas correlated very well, which leads us to believe that the 'bumps' cause the visible distortion we see. The next step in this process is to make new specifications for the glass manufacturers so that they can correct this distortion problem. In the end this work will result in a higher quality window for everyone to look through."



"It was a good experience and has allowed me to keep Paul paranoid all summer long."

Graduating Class of 2000



On May 28, 2000 thirteen physics majors and one natural science teaching major graduated from Gustavus and our department. Here's an update on their plans.

Ann Augustine is attending the Pharmacy School at the University of Nebraska.

Dan Bowar is in the dual degree program in Civil Engineering at the University of Minnesota.

Douglass Branton, after a summer trip to visit Africa, will take up an intern position at the Fermi National Accelerator Laboratory in Batavia, Illinois.

Larry Engelhardt has a graduate research assistantship in Mechanical Engineering at Iowa State University. He writes:

"I've been at Iowa State since the be-

ginning of July working in the Virtual Reality Applications Center. I'm working on a project that's being funded by John Deere, developing a VR assembly application that incorporates haptics."

Lauren Fry has a fellowship and is doing Environmental Engineering at Michigan Technological University. The program there is unique, as she will earn a Master's degree and, as part of her degree work, join the Peace Corps as an overseas volunteer. She writes:

"I'm here at Michigan Tech, catching up on some undergraduate environmental engineering courses. I should be able to enter the Peace Corps by January, 2002."

Chris Holstrom is in the graduate program in Technical Writing at the University of Washington, in Seattle.

(Continued on page 11)



"I should be able to enter the Peace Corps by January, 2002."

Where Are Our Graduates?

(Continued from page 10)

Matt Hubbard writes:

"I got married this summer, the end of July in fact. I'm attending Montana State University in Bozeman this fall. I'll be completing a BS in civil engineering and an MS in structural and transportation engineering in three years. The program is relatively new and will be 'seamless'. I'll be doing both the undergraduate and graduate work at the same time for most likely a good portion of the second year."

Adam Karnofski is in graduate school at Georgia Tech. He writes:

"I am in Atlanta now and am just finishing up with my first week of classes. I am going to attend the Institute of Paper Science and Technology and get my masters and then work for two years or so before going back to Rice to get my MBA."

Nelson Kottke has a graduate fellowship in Acoustical and Electrical Engineering at Penn State University.

Jessica Midgarden is pursuing a dual degree in Electrical Engineering at the University of Minnesota.

Katharine O'Connell has a teaching job in the Boston, Massachusetts area.

She writes:

"I do have a job, working at a day/

boarding school geared towards students with language-based learning disabilities (dyslexia- not the emotional and behavioral sorts of things). I went out and spent the day at the school a few weeks ago, and it seems to be a pretty nice place. It's got a beautiful view of the ocean out behind the cafeteria, and the people I'll be working with seem to be great. It seems to be a real team effort to get these kids reading and doing things for themselves. Pay isn't great, but benefits are okay, and they pay for graduate classes to be taught on their campus which would eventually lead to a Master's (after 3-4 years) and special ed certification in the state."

Peter Scherbring has entered the Master of Arts in Instruction program at St. Mary's University in Winona, and hopes to obtain his M.A. and teacher certification within a year.

Colin Sehnert has a fellowship in the graduate school of Mechanical Engineering at the University of Minnesota.

Brian Smith is in graduate school in physics at the University of Oregon.

Dustin Thomas is in the dual degree program in Civil Engineering at the University of Minnesota.



"It seems to be a real team effort to get these kids reading and doing things for themselves."

Lab Computer Upgrades for Fall 2000

One of the suggestions made during the Physics Department's external review two years ago was to upgrade our lab interfaces to modern ones that were commercially available. Generous support from the College has made it possible for us to purchase enough Vernier LabPro® interfaces and sensors to outfit all of our introductory

laboratories. The faculty and our summer assistant have spent many hours learning how they work so that they can be integrated into our lab program. Indeed, they will become an important part of our program as the custom built "blue-box" interfaces are phased out

(Continued on page 12)

Gustavus Adolphus College
Physics Department

Olin Hall
800 West College Avenue
St. Peter, MN 56082

Phone: 507-933-7308
Fax: 507-933-6104

We're on the Web!
<http://physics.gac.edu>

Editor: Dr. Steve Mellema
(mellema@gustavus.edu)

Computer Upgrades

(Continued from page 11)

this fall. Anyone working in one of the introductory labs will notice the improvement. Besides interfacing easily with our computers, the instruments are portable and designed to allow students to take data remotely. Another advantage of these interfaces is that they will work in *Windows NT*. This fall students in the introductory labs will be using an NT system that is very similar to that available in the public computing labs around campus. During the first week of lab, everyone will receive instructions on adding Physics Ap-

plications and Astronomy Applications folders to their desktop, allowing them to use most of our applications from anywhere on campus. Even *Logger Pro*®, the software used with the interfaces, will be available for students to explore and use outside the lab. Students will be able to store data taken during labs on their Unix accounts, meaning that data will be accessible even when they cannot log into the Physics Network. Please let computer czar Niederriter know of any difficulties you experience so that they can be fixed as quickly as possible.

Gustavus Represented at Summer AAPT Meeting

The Physics Department was well-represented at the summer meeting of the American Association of Physics Teachers (AAPT) which was held from July 31-August 2 at the University of Guelph in Ontario, Canada. The following papers were presented:

Dennis Henry and Carrie Ginder ('99), *Some Implications of Electronic Ballast Fluorescent Lighting for Physics Laboratories.*

Tom Huber, *Visualization in 3-D Using Chromatek Coloration.*

Steve Mellema, *Pre-Lab Exercises Using Physlets and the World Wide Web.*

Chuck Niederriter and Peter Scherbring ('00), *Spectroscopy in Introductory Astronomy Courses.*

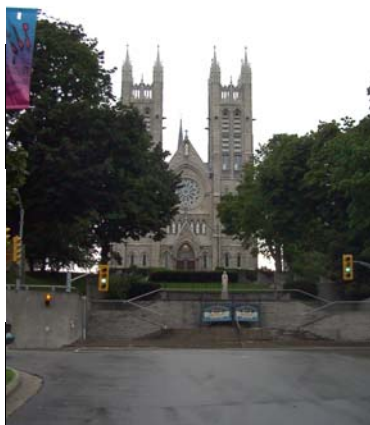
Professor Emeritus **Richard Fuller** also gave an invited talk, *Teaching Environmental Physics Topics in*

China.

This was the largest number of papers and attendees from any liberal arts college in North America.

Additionally, on the final evening of the meeting, a "Physics Olympics" was held following the annual AAPT banquet. A team known as the "St. Peter Saints" managed to take first place in two of the three Olympic events: Hockey/Lacrosse and Snow Tower Construction. The team members were Tim, Joe, Robert, Brad and Chuck Niederriter along with Jacob, Daniel and Steve Mellema. (Yes in Canada they really brought in snow in August to build towers!)

By the way, Steve Mellema's report of the meeting, commissioned by *Physics Education*, is scheduled to appear in that journal's November issue.



The Church of Our Lady is Guelph's most familiar landmark