Print Form

*DEPARTMENT OF MATHEMATICS*

# VIGRE Funding Report

**(due 30 days after semester of support)**

**Semester/Summer and Year:** Spring 2009

Name: Brendan Fry

List the graduate courses you have taken this semester (including independent studies), your grades, and the instructors:

| Course | Title | Grade | Instructor |
|---|---|---|---|
| MATH 527B | Principles of Analysis | A | Shankar Venkataramani |
| MATH 575B | Numerical Analysis | A | Robert Indik |
| MATH 583B | Methods of Applied Mathematics | A | William Faris |
| MATH 586 | Case Studies in Applied Mathematics | A | Michael Tabor |
| | | | |

List the title, date and location of any talks you have given, either here or elsewhere:

If you are working on your dissertation, include a one paragraph description of your research progress. If you have not yet begun dissertation research, describe your progress toward finding a dissertation topic and advisor and beginning that research.

This spring 2009 semester, I wrote a term paper under the advisement of Dr. Alain Goriely in the Department of Applied Mathematics. The paper was entitled "A mathematical model of diffusion-driven tumor growth with viral therapy". We developed and tested a model for tumor growth with viral therapy by first considering a model for tumor growth driven by oxygen diffusion in the absence of therapy, then extending the model to include the effect of viral therapy on the system. We then analyzed the model, which revealed necessary conditions on the virus for successful treatment of the tumor. This was a very interesting project, as it allowed me to familiarize myself with mathematical biology, and develop a model from scratch. I have not yet begun my dissertation work, but I look forward to examining my options this coming semester. I will begin an independent study research project (RTG) this coming fall semester, most likely with Dr. Tim Secomb in the Department of Applied Mathematics and the Department of Physiology. I will be investigating oxygen transport in the human body, and perhaps will be able to apply this to my term paper project on cancer therapy.

List publications, if any.

Check all activities you completed during the funded period:

Academics:

- ☐ Independent Study
- ☐ Oral Comprehensive Exam
- ☐ Commence Thesis Research
- ☐ Conference attendance
- ☐ Conference participation
- ☐ Complete PhD

Professional development and outreach:

- ☐ AP Calculus Visit
- ☐ High School Workshops
- ☐ Undergraduate Research Project
- ☐ Undergraduate Research Seminar
- ☐ Super TA
- ☐ Mentoring junior graduate students for the qualifying exams
- ☐ RTG (help organize)
- ☐ Research Seminar (help organize)

☐ Other (please specify)

Attach a brief statment about your academic progress and professional development during the period of support.

BRENDAN FRY SPRING 2009

VIGRE FUNDING REPORT

I have spent the past semester as a first-year applied mathematics student taking the core courses and writing a term paper under the advisement of Dr. Alain Goriely in the Department of Applied Mathematics. The paper was entitled "A mathematical model of diffusion-driven tumor growth with viral therapy". We developed and tested a model for tumor growth with viral therapy by first considering a model for tumor growth driven by oxygen diffusion in the absence of therapy, then extending the model to include the effect of viral therapy on the system. We then analyzed the model, which revealed necessary conditions on the virus for successful treatment of the tumor. This was a very interesting project, as it allowed me to familiarize myself with mathematical biology, and develop a model from scratch.

I have not yet begun my dissertation work, but I look forward to examining my options this coming semester. I will begin an independent study research project (RTG) this coming fall semester, most likely with Dr. Tim Secomb in the Department of Applied Mathematics and the Department of Physiology. I will be investigating oxygen transport in the human body, and perhaps will be able to apply this to my term paper project on cancer therapy. Hopefully this will lead to an interesting research topic to pursue further, but I am keeping an open mind for the moment as to what my dissertation topic will be and as to whom my dissertation advisor will be.