

VIGRE Report, Fall 2001
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Full VIGRE support was provided for the Fall, 2001 semester. It supported study and research with Prof. Alan Newell on pattern formation. The aim was to explore pattern formation in plants, with an emphasis on cactuses. I surveyed the biological and mathematical literature on phyllotaxis and made films of growing cactuses in the lab of Prof. N. Mendelson in the Department of Molecular and Cellular Biology. I also studied basic elasticity theory. We have made progress in a coordinate-free approach to the problem and a study of scale-invariant systems.

The above work is related to work that Michael Kuecken of the Applied Math Program is doing with Prof. Newell on modeling fingerprints. Thus, I have been working with him to understand the relevant biology and mathematics.

I also put considerable effort into a study of solitons and inverse scattering theory and applications of Lie groups to differential equations.

The grade "A" was earned in the classes that follow:

Math 528a Banach and Hilbert Spaces
Math 537a Global Differential Geometry
Math 538 Symplectic Geometry

The following talk was given in December, 2001:
Numeral Systems of Natural Languages. Graduate Student Mathematics Colloquium.

A poster on Pattern Formation in Cactuses was produced for the Applied Math Fest in November.

I participated in the knot theory workshops for high school students. Two such workshops were given. Although I could only attend the second workshop, I helped to organize both of them. Furthermore, I was a super TA for Prof. Goriely's Math 454 class on Intermediate Differential Equations and Chaos as well as Prof. Pinson's Math 520a Complex Analysis class.