

**DEPARTMENT OF PHYSICS
College of Arts and Sciences**

**SUMMER RESEARCH OPPORTUNITIES
FOR UNDERGRADUATE WOMEN**

APPLICATION DEADLINE: MARCH 1, 2004

The Department of Physics is pleased to offer the following research project(s) for the summer of 2004. Interested students are urged to contact the faculty member(s) directing the project that most interests them. By contacting the faculty member, you can discover more about the project, learn what your responsibilities will be, and if possible, develop a timetable for the twelve-week research period.

***Experimental Condensed Matter Physics and Optics
“Dendritic Crystal Growth”***



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We are using optical Interferometric techniques to investigate the growth of dendrite (needle like) crystals from the melt. During crystal growth, a concentration gradient in the solution drives molecules towards the crystal. This results in release of heat. This heat is fed back into the temperature field of the melt. We use Fourier Interferometric techniques to map the index of refraction of the solution in the vicinity of the growing crystal. From knowledge of the temperature dependence of the index of refraction we can map field surrounding the crystal. An Algebraic reconstruction technique is used to obtain a three dimensional tomographic image of the field.

A student working on this project will become familiar with Experimental Mach Zehnder Optical Interferometry, Dendritic crystal growth, as well as Fourier fringe analysis techniques using computer programs such as Matlab and Mathematica.