

Summary Statement of Research Interests for Juliet Hahn:

I am a proven principal investigator researcher and any college which hires me will know exactly what they are getting **before** they hire me. I have been working on the 3 research projects described herein. I am the sole principal investigator of these projects (none of these projects are collaborative with anyone at DSU or anywhere else) and the 3 projects will continue into a future tenure track faculty position.

Project A: Carbon Nanotube Materials

Carbon nanotube will be modified using DNA bases, surfactants and porphyrin and characterized by spectroscopic techniques (FT-NMR, FT-IR, UV-Vis and Raman spectroscopy). The surfactant CNT (carbon nanotube) modification project (funded as a research subcontract with Johns Hopkins Applied Physics lab) will continue. Because of startup fund limitations, the CNT DNA modification research project has been proposed but has not yet started. I am also proposing a new research project using porphyrin CNT functionalization. These projects have applications in: (a) developing new solar energy collectors (b) development of semiconductors and transistors (c) drug delivery.

Project B & C : Thymine Photodimerization

The mechanism of the photodimerization of a derivative of the DNA base, thymine, will be investigated. The project is bioorganic in scope and nature and will not extend to the biochemical or biological systems. The commercially available stand alone DNA base derivative will be derivatized and used to simulate the photodimerization implicated in skin cancer. This project has applications in: (a) understanding the mechanism of skin cancer (b) synthesis of DNA based pharmaceuticals

Project D: Tropanone Stereoselective Synthesis

Stereoselective synthesis of tropanone, a derivative of cocaine, will be investigated using organoaluminum catalysis and a modification of the heterocyclic amine structure. Tropanone is one of a class of some 200 natural products many of which have biological and pharmaceutical effects. This project has applications in developing pharmaceuticals for treating (a) Alzheimer's disease (b) cocaine addiction (c) other neurological diseases

These projects need startup funds typical for an experimental organic chemist (on the lower end in startup funds needed by most Organic Chemists – I started out at DSU with \$3,500 in start up funds 5 months after I arrived at DSU and then added equipment as research grants were funded.). I already have a lot of preliminary data for these projects so that the projects will be up and running with a minimum of delay. I have had approximately 15 undergraduate students working on these research projects during 3 years at DSU. The research projects are appropriate in scope for both undergraduate and graduate students.