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**MARSHALL SPACE FLIGHT CENTER  
THE UNIVERSITY OF ALABAMA IN HUNTSVILLE**

**USING NATURALLY OCCURRING POLYSACCHARIDES TO ALIGN  
MOLECULES WITH NONLINEAR OPTICAL ACTIVITY**

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absorption by chitin films containing PNA but further Z-scans using a picosecond pulsed laser are required to determine non-thermal nonlinear effects which are the values of real importance for NLO devices. Transmission electron microscopy of the films requires materials which are not currently available on site.

This work will be continued at Albany College of Pharmacy in collaboration with my colleagues at MSFC.

#### CONCLUSIONS:

It is still unclear whether chitin and/or cellulose thin films containing PNA can be used in the construction of NLO devices. We have made stable, transparent films of chitin both with and without PNA but further characterization is required before can evaluate the success of the project so far.

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#### REFERENCES:

- Revol, J.-F. and Marchessault, R.H. In vitro chiral nematic ordering of chitin crystallites. Int. J. Macromol. **15**: 329-335. 1993
- Revol, J.-F., Bradford, H., Giasson, J., Marchessault, R.H., and Gray, D.G. Helicoid self-ordering of cellulose microfibrils in aqueous suspension. Int. J. Macromol. **14**: 170-172. 1992
- Madeleine, M. and Guille, G. Liquid order of biopolymers in cuticles and bone. Microscopy Res. and Tech. **27**: 420-428. 1994.