

# Sweet Briar College

## John J. Beck

# JEOL ECX 400 MHz

## Undergraduate Research

NSF MRI 0216261  
Jan '03-Dec '05

### Sophomore Organic AY 2004/2005



- Multistep synthesis laboratory
- Check starting materials, intermediates, and products
- $^1\text{H}$  and  $^{13}\text{C}$  NMR acquisition and interpretation

### Intermediate Laboratory Spring 2005



- Independent research projects
- Isolation of capsaicin from chilies
- Synthesis of capsaicin
- Preliminary results for yearlong organic lab
- Ellena Bethea (06) & Kim Wilson (06)

### Senior Research AY 2004/2005



- Synthesis of 4,5-dihydrophthalide derivatives
- Molecular Modeling of endynes and the Bergman cyclization

### Advanced Organic Fall 2004



- 7 students in the class
- Complete assignment of  $^1\text{H}$  and  $^{13}\text{C}$  NMR signals of (+)-Catechin
- Two students performed in-depth write-up for *Journal of Chemical Education* paper
- Jessica Mercier (06) & Kim Wilson (06)

### Senior Honors Thesis 2003/2004



- Extraction and bioactivity testing of medicinal herbs
- Synthesis of 4,5-dihydrophthalide derivatives
- Nausheena Baig (04) George Washington, MS
- Jaime Heimbegner (04) Univ. So. Florida, Ph.D.

### Research Spring 2004



- Isolation of bioactive components from Noni
- Reverse-demand Diels-Alder
- Birch reduction studies
- Isolation of bioactive components from Lemongrass

### Summer Research 2004



- Isolation of bioactive components from Noni, Beggar's Tick, & Lemongrass
- Synthesis of phthalide derivatives

### Summer Research 2005



- Extraction, isolation, bioactivity testing, and characterization of bioactive components from *Lomatium californicum*, *Morinda citrifolia*, *stachytarpheta jamacensis*, & *Bidens bipinnata*
- Synthesis of 4,5-dihydrophthalide derivatives

### Miscellaneous Academic Year Research Groups



### Collaboration with Neighboring College



- Senior Chemistry Major from Lynchburg College
- Project with Fleet Pharmaceuticals
- Determination of an unknown surfactant

### Postdoctoral Associate



- Dr. Shen-Cheih Chou
- Two year research grant from the Commonwealth Health Research Board
- Synergistic Bioactivity Testing of Extracts from Medicinal Herbs of the USVI

### Collaborations

- University of the Virgin Islands
  - Plant collection for investigations
- Lynchburg College
  - Use of NMR for student projects
- Virginia Military Institute
  - Training of students in Natural Products Chemistry methodology

### Publications with Undergraduates

- *Multistep Synthesis of Piceones Benzylidenephthalide Derivatives*. Evermann, M.C.; Beck, J.J. *Tri-College Symposium*, April 18, 2005.
- *Investigation into the Reduction of Benzylidenephthalide Derivatives*. Baig, N.; Beck, J.J. *Tri-College Symposium*, April 14, 2004; Honors Thesis Defense, April 9, 2004.
- *Synthetic Bioactivity Testing of Extracts from Medicinal Herbs of the United States*. Virgin Islands. *Manuscript submitted to J. Chem. Res.* Beck, J.J. *Tri-College Symposium*, April 15, 2004; Honors Thesis Defense, April 9, 2004.
- *Methodology Studies of Coumaric Acid Derivatives and the Diels-Alder Reaction*. *Expos. M.L.* Beck, J.J. *Tri-College Symposium*, April 14, 2004.
- *Progress Towards the Synthesis of Benzylidenephthalide Derivatives*. Baig, N.; Beck, J.J.; De Santis, J.M.; Thaddeus, J.R.; Beck, J.J. *Southeastern Regional Meeting of the American Chemical Society (SERMACS)* Nov. 13-17, 2002. *MARCS* Oct. 12, 2002.
- *Molecular Modeling of Benzylidenephthalide Derivatives*. Baig, N.; Beck, J.J. *SERMACS 2002*. *MARCS 2002*. *Virginia Foundation of Independent Colleges Symposium*. Sep. 27-28, 2002.
- *Bioactivity Testing of Isolated and Synthetic Organic Compounds*. Thaddeus, J.R.; Beck, J.J. *SERMACS 2002*.

### Presentations by Undergraduates

- *Isolation of Bioactive Components from Noni*. Baig, N.; Beck, J.J. *Tri-College Symposium*, April 14, 2004.
- *Reverse-Demand Diels-Alder Reaction*. Baig, N.; Beck, J.J. *Tri-College Symposium*, April 14, 2004.
- *Birch Reduction Studies*. Baig, N.; Beck, J.J. *Tri-College Symposium*, April 14, 2004.
- *Isolation of Bioactive Components from Lemongrass*. Baig, N.; Beck, J.J. *Tri-College Symposium*, April 14, 2004.

### Sweet Briar College Background

- Private Women's College
- 3,250 acres in Central Virginia
- ~600 total student population
- 6 chemistry major/year
- 4% of the graduating class are chemists
- High acceptance rate into graduate school

