

Chemistry 324 is an advanced half-unit course in organic chemistry. The course emphasizes the following activities and topics:

- Using **molecular modeling** to study critical molecules in chemical reactions
- Learning to apply various rules (**Woodward-Hoffmann, Fukui FMO, Dewar-Zimmerman**) to the analysis of *pericyclic** reactions
- Learning to read and understand the **research literature**

*A *pericyclic* reaction is one in which the transition state contains a cyclic array of forming and breaking bonds. Typical examples are cycloadditions (Diels-Alder), migrations and rearrangements (1,2-hydride shift), and electrocyclizations.

Instructor

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Home page

- <http://falkorpx.wordpress.com>

Assigned work (see next page for tentative schedule)

- Reading assigned papers (8)
- Completing assigned homework (8)
- Taking take-home exams (2)
- Performing a final project (1). The project will be described by a written report and the project/report will be the basis for an oral exam. The oral exams will take place during Finals Week.

Locations

- Lecture, Discussion, and Conference will be held in Rm. 301
- Molecular modeling sessions will be held in the chemistry computer lab, Rm. 203

Topics

- **Diels-Alder cycloaddition:** stereochemistry, thermochemistry, conformational preferences of conjugated dienes, thermodynamic v. kinetic control, frontier MO theory, isotope effects
- **Sigmatropic rearrangements:** order, stereochemistry, Cope, Claisen, oxy-Cope, oxy-anion Cope
- **Electrocyclization:** stereochemistry, thermochemistry
- **Thermal and “Click” 3+2 cycloadditions**
- **Photochemical reactions**
- **Molecular modeling:** stereochemistry, thermochemistry, frontier MO analysis, transition state modeling
- **Theory of pericyclic reactions:** conservation of orbital symmetry (Woodward-Hoffmann), frontier MO (Fukui), transition state aromaticity (Dewar-Zimmerman)