

## Organic Fantasia

Halloween Skit Production of Prof. Barany's Fall 2003 Chemistry 2301 Class

### Cast:

Ann Stimmel — concept; musical arranger; nucleophile (bassoon)

Oana Lungu — script; chiral carbon

Becky Loper — leaving group (saxophone)

Danielle Gaetz and Matt Kuehl — substituents

Kristine Domingo — narrator

Tamar Meyers — video; program notes

Music by Paul Dukas (1865-1935), "The Sorcerer's Apprentice" (1897) [as adapted for Walt Disney's 1940 full-length animated musical cartoon movie "Fantasia"]

The video starts with Kristine, the narrator, explaining the sequence of events. Next Professor Barany stalls by telling some jokes, including the scientifically proven funniest joke, while the student thespians make last-minute preparations.

Once the production starts, we see Ann playing the bassoon, acting as the nucleophile and approaching Oana, the chiral carbon. Oana is wearing red and has a newspaper on her head representing one of the four substituents (to achieve chirality, the four substituents need to be different). Danielle and Matt represent two more substituents, and Becky the saxophone player is in the back and serves as the leaving group. As Ann begins attacking Oana from one side, Becky begins to leave from the other side. Once Ann has fully bonded to Oana, Becky has been forced to completely leave (not obvious from Tamar's camera angle), demonstrating how  $S_N2$  reactions occur via *backside attack*. Watch carefully to notice the movements of Danielle and Matt, demonstrating *inversion*.

In the second act, Ann once again acts as the nucleophile (but recall, most good nucleophiles are also strong bases). This time, Ann is unable to carry out backside attack due to steric hindrance (watch how she is aggressively pushed away by the bulky other students). In desperation, Ann removes Danielle's baseball cap, which represents a proton. Becky again leaves, and Danielle puts both arms on Oana indicating formation of a double bond. This is known as an E2 *elimination* reaction, and just like  $S_N2$ , it is *concerted* (the students in this class heard quite a concert through this production). For completeness, note that Ann who is now wearing Danielle's cap is a protonated base (positive charge) and forms an ionic bond with Becky the leaving group (negative charge).

A short coda illustrates the concept of *regiochemistry*. In another E2 reaction that occurs because  $S_N2$  is unlikely on account of steric hindrance, Ann grabs Matt's stocking cap, a different proton. Now, it is Matt's turn to put both arms on Oana, showing formation of a different double bond which means a different product has been created.

At the end of the video, the cast members are introduced, and take their individual and group bows. Prof. Barany points out a couple of special guests from the Chemistry Department team who took time out from their busy schedules to watch the show.

For notes about the music, please see:

[http://www.musicweb.uk.net/Programme\\_Notes/dukas\\_sorcerer.htm](http://www.musicweb.uk.net/Programme_Notes/dukas_sorcerer.htm)

and [http://www.galvestonsymphony.org/composers/Dukas\\_Sorcerer.html](http://www.galvestonsymphony.org/composers/Dukas_Sorcerer.html)

For information about the Disney film, see: <http://imdb.com/title/tt0032455/>

For more on the scientific search for the world's funniest joke, see:

<http://www.laughlab.co.uk/>, which gets you to <http://www.laughlab.co.uk/winner.html>

File is 155 MB, and plays on Quick Time or a related program.

Running time, approximately 6 minutes.