Overview of SEI Activities in MCDB
# The MCDB Team

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
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<tbody>
<tr>
<td>Jia Shi</td>
<td>STF</td>
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<tr>
<td>Michelle Smith</td>
<td>STF</td>
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<tr>
<td>Sarah Wise</td>
<td>STF</td>
</tr>
<tr>
<td>Caleb Trujillo</td>
<td>Research Assistant</td>
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<tr>
<td>Breanna Pritchard</td>
<td>Research Assistant</td>
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<tr>
<td>Katie Southard</td>
<td>Research Assistant</td>
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<tr>
<td>Jennifer Knight</td>
<td>SEI Coordinator</td>
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<td>Bill Wood</td>
<td>Faculty Director</td>
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The MCD Biology Majors Curriculum

Introduction to MCD Biology (lab)  
Genetics (lab)  
Cell and Molecular Biology (lab)  
Developmental Biology, Immunology or Molecular Neurobiology (capstone courses)

(a. Starting in Fall 2010, Molecular and Cell Biology have been taught as a more integrated, two-semester course.  
b. In Spring 2011, Molecular Neurobiology was added to the list of capstone courses)
Primary Objectives

For each core course, develop:

- Course- and topic-level learning goals
- A pre-/post-assessment to measure achievement of goals (learning gains)
- Active-learning materials to facilitate student progress toward learning goals

Evaluate effectiveness of these interventions through educational research
# Current status of the project

<table>
<thead>
<tr>
<th>Course</th>
<th>Learning goals</th>
<th>Pre-post assessment*</th>
<th>Active-learning materials**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intro</td>
<td>Done</td>
<td>Done</td>
<td>Complete</td>
</tr>
<tr>
<td>Genetics</td>
<td>Done</td>
<td>Done</td>
<td>Complete</td>
</tr>
<tr>
<td>Cell and Molecular</td>
<td>Done</td>
<td>In progress</td>
<td>Some</td>
</tr>
<tr>
<td>Development</td>
<td>Done</td>
<td>Done</td>
<td>Complete</td>
</tr>
<tr>
<td>Immunology</td>
<td>In progress</td>
<td>In progress</td>
<td>Some</td>
</tr>
<tr>
<td>Neurobiology</td>
<td>Complete</td>
<td>In progress</td>
<td>Complete</td>
</tr>
</tbody>
</table>

* An assessment instrument for overall curricular objectives in the major is under development for the capstone courses.

** Clicker questions, homework, other in-class activities. Further development, archiving of these materials for all courses is ongoing.
Noteworthy statistics

• Over 60% of MCDB faculty who teach undergraduates are now participating actively with STFs on course transformation and materials development, including 90% of core course instructors.

• An additional 30% have interacted with STFs to some extent.

• Clickers with peer discussion are now used in all the MCDB core courses.

• Pre-/post-assessments are used in three of the six MCDB core courses.
Participating core-course faculty

Jennifer Martin (Intro)
Nancy Guild (Intro)
Ken Krauter (Genetics)
Tin Tin Su (Genetics)
Mark Winey (Genetics)
Michael Stowell (Molecular)
Greg Odorizzi (Cell)
Gia Voeltz (Cell)
Jenny Knight (Development)
Corrie Detweiler (Immunology)
Kevin Jones (Neurobiology)
Publications with SEI support


Publications, continued


Some projects in progress:

• Knight, J.K. et al., Are majors achieving our key goals? Involving faculty and students in the creation of a cumulative “capstone” assessment.

• Shi, J., Klymkowsky, M., and Knight, J.K., What do undergraduate students consider when designing and analyzing experiments? *

• Wise, S.B., Southard, K., Pritchard, B. and Knight, J.K. What are they actually talking about? Analyzing student discussions of clicker questions. *

• Shi, J., Chun, H., Knight, J.K., and Martin, J. Using one-minute papers and in-class questions to change student understanding of molecular movements.

* See accompanying MCDB posters