Motivation
Context: Graduate programs frequently use coursework to create interdisciplinary learning opportunities for students. Little has been done to investigate how graduate courses impact interdisciplinary learning.

Research Questions:
• Does a single graduate elective impact interdisciplinary learning?
• Do graduate students increase their usage of skills and language from disciplines outside of their own during a single semester elective course?
• Does a graduate elective that is designed to be interdisciplinary change student self-perception of interdisciplinary learning outcomes?

Methods: Course & Logistics
Course Description:
We studied the impact of ChE 696: Microbial Soft Matter, an elective course about bacterial biofilms, on student interdisciplinary learning. The following steps were taken to encourage interdisciplinary learning:
• Two course instructors from different departments (ChE and emergency medicine)
• Recruitment of students from three different graduate programs
• Guest speakers from medicine, environmental engineering, and army research laboratories to bring new perspective to topics
• Project presentations and reflection on the projects of peers

Student Demographics:

<table>
<thead>
<tr>
<th>Department</th>
<th>All students</th>
<th>Enrolled Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Engineering (ChE)</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Civil and Environmental Engineering (CEE)</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Microbiology and Immunology (MBI)</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

*Students from chemical engineering, civil and environmental engineering, and microbiology and immunology were enrolled in the course. Four post-doctoral students audited the course, but still participated in surveys.

Timeline of Data Collection
The course was divided into two segments. Three surveys were conducted, and two assignments were coded (one from each course segment).

Results: Graduate students in Microbial Soft Matter increase fluency across disciplinary boundaries
Comparison of disciplinary language used in coded assignments

<table>
<thead>
<tr>
<th>Coded Assignment 1</th>
<th>Coded Assignment 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacterial adhesive</td>
<td>Project peer reflection</td>
</tr>
<tr>
<td>82% (9 students)</td>
<td>82% (9 students)</td>
</tr>
<tr>
<td>Majority of response was grounded in major discipline</td>
<td>73% (8 students)</td>
</tr>
<tr>
<td>Response was either interdisciplinary or predominantly outside of discipline</td>
<td>27% (3 students)</td>
</tr>
</tbody>
</table>

Use of language outside a student’s major field of study increased between homework coded at the beginning and end of the course.

Conclusions & Future Work
• Increases in interdisciplinary learning occur in a graduate elective intentionally designed to promote interdisciplinarity, specifically in areas of recognizing disciplinary perspectives and teamwork skills.
• Fluency across disciplinary boundaries increased during a single semester, as revealed through coded responses.
• This study serves as a pilot study for advancing the understanding of interdisciplinary learning in the graduate classroom.
• Determining if these findings hold true in other interdisciplinary classes or with other interdisciplinary classroom techniques is necessary to prove how single graduate courses impact interdisciplinary learning.

Acknowledgements:
We would like to thank Shanna Daly for her encouragement, support, and suggestions throughout this work.