

BENG 294C - Clinical Exp in Bioengineering - Engler [SP22]

BE 294C - Clinical Bioengineering - Spring 22

Class: MWF 8 – 11AM (but variable based on physician schedule - see schedule below for individual links)

Instructor: Dr. Adam J Engler

Email: aengler@ucsd.edu (<mailto:aengler@ucsd.edu>)

Office and Hours: Zoom, By appointment

Course Objectives

MS-Med students will be exposed to and develop a basic understanding of the clinical practices within UC San Diego's Department of Medicine (DOM) and Departments of Surgery (DOS), Radiology, Ophthalmology, Pediatrics, Emergency Medicine, Neurosurgery, and the Simulation Center of the School of Medicine and 3D Printing lab at Rady Children's Hospital. This course is intended as a capstone experiential learning course that will require students to identify and understand problems in clinical medicine from lectures from clinical faculty, one-on-one experiences, and asynchronous course content. From these materials, students will identify problems with diagnostics, clinical practice, and/or treatment, and use engineering principles to design solutions. In separate group discussions, the class will apply engineering tools to solve these problems in the practice of medicine. In this context, students will act as *engineering consultants* by identifying a problem in the physician mentor's clinical practices, proposing engineering-based solution(s), and working towards a solution if possible.

Zoom Instruction

Due to the pandemic, observing rounds and shadowing in-person are not allowed. Instead, all interactions with physician mentors will occur weekly via Zoom in a preset schedule of physician interactions for all students; rotations in small teams matched to student interests is not possible. Due to the unpredictable nature of the practice of medicine, there will not be a set meeting time. However, all meeting times will be announced in advance per the syllabus on CANVAS and electronic recordings available to students; meeting dates, times, and Zoom links will be posted below. Hospital orientation will be provided in the first week Spring quarter.

Physician Mentorship

Students will meet with physician mentors on Zoom in weekly hour-long lectures. Prior to meetings, clinical videos will be posted on CANVAS for students to watch. Videos will include but are not limited to cases relevant to the physician's practice. **Mentor list, dates, and times will be posted on a rolling basis to CANVAS. Please check back routinely for updates.**

Asynchronous Content

Several Departments will provide asynchronous content for you to watch prior to a particular synchronous discussion. Please check the Files/Asynchronous folder for those details. Announcements will be made about that content ahead of when you should have watched it.

Course Evaluation

1. Weekly Discussions (25%)

During the course of the quarter, MS-Med students will meet weekly on Fridays from 10-11am with Dr. Engler for a group discussion of the course content for that week. Discussions will be related to the physicians and asynchronous content of the week. At this time, the group will identify a common problem on which each student will then have the option to develop a more in-depth solution. Credit for this portion of the grade is based on participation in the discussion.

2. Problem Identification Essays (25%)

After the discussions, MS-Med students must twice turn in short, 3- to 4-page essay describing the problems discussed from a particular week (focus on the economics, social responsibility, current events, etc. involving healthcare and technology). Papers must cite scientific literature to justify the position taken and outline what a possible solution would be. Technical drawings of the solution are not required but encouraged.

3. Final Presentation (50%)

Students will give a 30-minute presentation describing their capstone engineering-based solution to a problem identified during from the physician interactions. Presentations will be made during the final exam time slot. The presentation must include how their problem was identified, the proposed

solution, and progress made towards the solution, if any. Accompanying this presentation will be a detailed, 10-page report providing an in-depth literature review, motivation for the solution, technical drawings of the solution, and an analysis of the proposed solution's ability to address the unmet problem in clinical medicine.

UPCOMING ZOOM LINKS:

1. Orientation - April 4th, 2022 - 9am

<https://ucsd.zoom.us/j/94412228310?pwd=SFBNtmNMMm1ra2RtbDVmTVJVU2FZUT09> 
(<https://ucsd.zoom.us/j/94412228310?pwd=SFBNtmNMMm1ra2RtbDVmTVJVU2FZUT09>)

Meeting ID: 944 1222 8310

Password: BENG4LIFE!

2. Radiology - Dr. Adam Searleman - April 13th, 2022 - 8am

Recording-1(273 MB)

https://ucsd.zoom.us/rec/play/-JqHME1JOAN4a35PsW_GWEk0Zx90K4cTidyQUOxTx0oR3hPkU2cXblcb-LbWYGMIInV0jNcKWtTWNOXIt.tJjR3V3-NIQTJ80g  (https://ucsd.zoom.us/rec/play/-JqHME1JOAN4a35PsW_GWEk0Zx90K4cTidyQUOxTx0oR3hPkU2cXblcb-LbWYGMIInV0jNcKWtTWNOXIt.tJjR3V3-NIQTJ80g)

Passcode: &U8Wvh8s

3. Radiology - Dr. Mohammad Eghtedari - April 15th, 2022 - 8am

Recording-1(906 MB)

https://ucsd.zoom.us/rec/play/Eb73JweheRsa0AhjDB_XLWwxPqKydayrYCXHik9bKhy2UWv1bcQrnuq.oSZs7vJery1Z9Zob 
(https://ucsd.zoom.us/rec/play/Eb73JweheRsa0AhjDB_XLWwxPqKydayrYCXHik9bKhy2UWv1bcVtyQmPPafdQrnuq.oSZs7vJery1Z9Zob)

Passcode: hrK&9qaB

4. Radiology - Dr. Justin Tse - April 18th, 2022 - 8am


Recording-1(493 MB)

<https://ucsd.zoom.us/rec/play/hEP6Y6FQAJzEIzocsicI0-yCoCCJMn1EN7hQjRXkm6aPCWDt5ykGCrOgC1tM5ZWUB4GzDtGTrjtb0uyJ.BM4BNfXTmAW-M0ze>  (<https://ucsd.zoom.us/rec/play/hEP6Y6FQAJzEIzocsicI0-yCoCCJMn1EN7hQjRXkm6aPCWDt5ykGCrOgC1tM5ZWUB4GzDtGTrjtb0uyJ.BM4BNfXTmAW-M0ze>)

Passcode: @Q?0hB3.

5. Nuclear Medicine - Dr. Sebastian Obrzut - April 20th, 2022 - 8am


Recording:

https://ucsd.zoom.us/rec/play/1pdmoqZI5WfJSAbhVlpgPCJwi6B43y4Q_NL38hi7zWEZgePhfzdh1J-DBTWdUIOMF_hQTzDfTvrI7-8K.yZXGyWBesWdcwB1d 
(https://ucsd.zoom.us/rec/play/1pdmoqZI5WfJSAbhVlpgPCJwi6B43y4Q_NL38hi7zWEZgePhfzdh1J-DBTWdUIOMF_hQTzDfTvrI7-8K.yZXGyWBesWdcwB1d)

Passcode: OhjC0%=0

6. Dental Medicine - Dr. Marcelo Lamers - April 22nd, 2022 - 8am

Recording:

<https://ucsd.zoom.us/rec/play/4cvgrUAWxyJmDatFZpQ068jKWZkCDSWoV3DjKngIJGt2aTOMGZkrl4vV9ffaa> 
(<https://ucsd.zoom.us/rec/play/4cvgrUAWxyJmDatFZpQ068jKWZkCDSWoV3DjKngIJGt2aTOMGZkrl4vV9ffaa>)

Passcode: 69.Q1p9K

7. Pediatric ICU - Dr. Nicole Coufal - April 25th, 2022 - 8am

Recording-1(649 MB)

<https://ucsd.zoom.us/rec/play/QAtI48mnl4ahatyv75mzPwfchlrXaofSfulSQYa1JdWXAMteSXIuB5RSYpekPM.yypxzIMnTviKhWmw> 

<https://ucsd.zoom.us/rec/play/QAtI48mnl4ahatyv75mzPwfchlrXaofSfulSQYa1JdWXAMteSXIuB5NzwwgNKVttaRSYpekPM.yypxzIMnTviKhWmw>


Passcode: iA2=&6Ru

8. Simulation Center - Dr. Preetham Suresh - April 27th, 2022 - 9am

Meet in person at the Simulation Center in Telemedicine Building (Room LL154)

9. 3D Innovations Lab - Dr. Justin Ryan - April 29th, 2022 - 8am

Recording-1(624 MB)

https://ucsd.zoom.us/rec/play/xL5RCT6Kme0zD_Yjy2NjDCF3urrnlUum6zixso-MeQBvF2-4UmMX7sgnAKk8uYJdP3PlvFnGfS6BjPxi.RbrlOzVTa6SAgHoc 

https://ucsd.zoom.us/rec/play/xL5RCT6Kme0zD_Yjy2NjDCF3urrnlUum6zixso-MeQBvF2-4UmMX7sgnAKk8uYJdP3PlvFnGfS6BjPxi.RbrlOzVTa6SAgHoc

Passcode: 4pO&iA+f

10. Radiology - Dr. Rebecca Rakow-Penner - May 2nd, 2022 - 8am

Recording-1(167 MB)

<https://ucsd.zoom.us/rec/play/OJE9qUJHtnnqbEnQyE0iNpeo3SMDQOg3k78FurPATPbSzO1cfGpNn.dLRrAIWvJE1y1MyJ> 

https://ucsd.zoom.us/rec/play/OJE9qUJHtnnqbEnQyE0iNpeo3SMDQOg3k78FurPATPbSzO1cfGo_zvC1U0yJpNn.dLRrAIWvJE1y1MyJ

Passcode: ?Zs7R1RU

11. Pediatric Neurology - Dr. Jeffrey Gold - May 4th, 2022 - 8am

Recording-1(719 MB)

[https://ucsd.zoom.us/rec/play/TdBnlw6SPMKU2-](https://ucsd.zoom.us/rec/play/TdBnlw6SPMKU2-AjWyuWSadxSSVHEGaUPAmLCI8CDsAnT9whtnk7hxAfYeu1YJwm_RFo--hi3hMbcvWW.b5gQxnfQ1qRo7kTG)

[AjWyuWSadxSSVHEGaUPAmLCI8CDsAnT9whtnk7hxAfYeu1YJwm_RFo--hi3hMbcvWW.b5gQxnfQ1qRo7kTG](https://ucsd.zoom.us/rec/play/TdBnlw6SPMKU2-AjWyuWSadxSSVHEGaUPAmLCI8CDsAnT9whtnk7hxAfYeu1YJwm_RFo--hi3hMbcvWW.b5gQxnfQ1qRo7kTG)


Passcode: @N?FZ4&x

12. - Plastic Surgery - Dr. Frederic Kolb - May 6th, 2022 - 8am

(TO BE RESCHEDULED)

13. - Orthopaedic Surgery - Dr. Susan Bukata - May 9th, 2022 - 8am


Recording-1(389 MB)

<https://ucsd.zoom.us/rec/play/mgKde-QeohrDqgGPi4HzxXY3G6HQ04CKsMNpIISSz2v8Ntflx-axdzUp6gy85Ju0eXKubmWo0Bcl-d65.Vo8qVx4ddljp2TSU>  (<https://ucsd.zoom.us/rec/play/mgKde-QeohrDqgGPi4HzxXY3G6HQ04CKsMNpIISSz2v8Ntflx-axdzUp6gy85Ju0eXKubmWo0Bcl-d65.Vo8qVx4ddljp2TSU>)

Passcode: 48W&+u0z

14. - Oncology - Dr. Scott Lippmann - May 11th, 2022 - 8am

Recording-1(662 MB)

<https://ucsd.zoom.us/rec/play/setVgV68CKzKM8Sc6ah-2QWU55POL0Ld4E5v-KuBcTHL7SHIaxZqJO3avhT7PU0k29xQUJRy7pbrjbhF.nJzpQXlrjHFA3QYF>  (<https://ucsd.zoom.us/rec/play/setVgV68CKzKM8Sc6ah-2QWU55POL0Ld4E5v-KuBcTHL7SHIaxZqJO3avhT7PU0k29xQUJRy7pbrjbhF.nJzpQXlrjHFA3QYF>)

Passcode: b.6CXv=#

15. - Emergency Dept/Clinical Informatics - Dr. Christian Dameff - May 16th, 2022 - 8am

https://ucsd.zoom.us/rec/play/Wp5e67mMTGAMyihpeliV8yAC31j7gaRxZoZgfjeRKEGAHCleEH037lppJi3mRp-N.CEkcBY_UpSNrxSvs  (https://ucsd.zoom.us/rec/play/Wp5e67mMTGAMyihpeliV8yAC31j7gaRxZoZgfjeRKEGAHCleEH037lppJi3mRp-N.CEkcBY_UpSNrxSvs)

[37lppJi3mRp-N.CEkcBY_UpSNrxSvs\)](#)

Passcode: 4#@yAQ*K

16. - Orthopaedic Surgery - Dr. Anshuman Singh - May 18th, 2022 - 8am

Recording-1(374 MB)

https://ucsd.zoom.us/rec/play/ms8siGOIk_r6CW5k7iVrBjKuHZchIx7oDgDZjzYZETZ5DQiASSoul



https://ucsd.zoom.us/rec/play/ms8siGOIk_r6CW5k7iVrBjKuHZchIx7oDgDZjzYZETZ5DQiASSoulT9K_hMx1uF

Passcode: !zS0&xW9

17. Plastic / Reconstructive Surgery - Dr. Frederic Kolb - May 20th, 2022 - 8am

Recording-1(513 MB)

https://ucsd.zoom.us/rec/play/9jqXyJYtAILHDFurNNmFvS_j379RX36jAxTcnBFRmhQMTot_V4yy



https://ucsd.zoom.us/rec/play/9jqXyJYtAILHDFurNNmFvS_j379RX36jAxTcnBFRmhQMTot_V4yyx_y5tYDWRc



https://ucsd.zoom.us/rec/play/9jqXyJYtAILHDFurNNmFvS_j379RX36jAxTcnBFRmhQMTot_V4yyx_y5tYDWRc

Passcode: Dr4E7*7j

18. Ophthalmology - Dr. Jiun Do - May 23th, 2022 - 8am

Recording-1(524 MB)

<https://ucsd.zoom.us/rec/play/pdvvdtRLL3xaXmC8ti1clGHIhHA7DVFrf1iPOPPtAlleg1M10NgiY>

[DwU4vX-5aziOcu5.af9Be3U42GuCxURo](https://ucsd.zoom.us/rec/play/pdvvdtRLL3xaXmC8ti1clGHIhHA7DVFrf1iPOPPtAlleg1M10NgiYKbTmYWZX) 

<https://ucsd.zoom.us/rec/play/pdvvdtRLL3xaXmC8ti1clGHIhHA7DVFrf1iPOPPtAlleg1M10NgiYKbTmYWZX>
[DwU4vX-5aziOcu5.af9Be3U42GuCxURo](https://ucsd.zoom.us/rec/play/pdvvdtRLL3xaXmC8ti1clGHIhHA7DVFrf1iPOPPtAlleg1M10NgiYKbTmYWZX)

Passcode: @K7LVr3U

19. Cardiothoracic Surgery - Dr. Steven Howe - May 25th, 2022 - 8am

Recording-1(631 MB)

https://ucsd.zoom.us/rec/play/mNU9moJOHJasZo1S7lqu-zEN9-flSbodOybjDcnSNw_O9Ghk9lp-D5FqxABT8NUVbS-ebiu6HGZbGwO6.bTzQstAIX9ufv_3u 

(https://ucsd.zoom.us/rec/play/mNU9moJOHJasZo1S7lqu-zEN9-flSbodOybjDcnSNw_O9Ghk9lp-D5FqxABT8NUVbS-ebiu6HGZbGwO6.bTzQstAIX9ufv_3u)

Passcode: HpSX2\$ai

20. Plastic Surgery - Dr. Samuel Lance - May 27th, 2022 - 8am

Recording-1(287 MB)

[https://ucsd.zoom.us/rec/play/AhV2X0N-dTTGK-](https://ucsd.zoom.us/rec/play/AhV2X0N-dTTGK-gx0GE1zGPemky1GECsFLemb_p37JCBn2jll9uViB73V8Kx0zZlqklEzoSBmTJX3U2u.Jos3zPLWZx_4i)

[gx0GE1zGPemky1GECsFLemb_p37JCBn2jll9uViB73V8Kx0zZlqklEzoSBmTJX3U2u.Jos3zPLWZx_4i](https://ucsd.zoom.us/rec/play/AhV2X0N-dTTGK-gx0GE1zGPemky1GECsFLemb_p37JCBn2jll9uViB73V8Kx0zZlqklEzoSBmTJX3U2u.Jos3zPLWZx_4i)

Passcode: or7=r9&y

21. Cardiac Imaging - Dr. Albert Hsiao - June 1st, 2022 - 8am

Recording-1(971 MB)

https://ucsd.zoom.us/rec/play/34yKN_8tHzjx2a58l6KbHfmbyaPmfsevfmIP2lhoKAUH2A0rWaQwqiE5-k_Fy96QJqKGSv1GN8XS-Gh_.wHknrlafVTAyOcZd

Passcode: h@ndLG1=

22. Ophthalmology/Glaucoma - Dr. Alex Huang - June 3rd, 2022 - 8am

Title: Dr. Alex Huang (Glaucoma)

Recording-1(909 MB)

https://ucsd.zoom.us/rec/play/xzeDOt3YFsLiBsqrfrph_CZFTuuirTnv57yfc9ys7vMi8pRebxZy6gndh-hVHaDGFRnaFPSEc57_oJx5.lmlwNC3mCIQAG3-x

Passcode: r&zz2M#x

Course Summary:

Date	Details	Due
Fri Apr 15, 2022	 BENG 294C - Class Discussion (https://canvas.ucsd.edu/calendar?event_id=751741&include_contexts=course_37761)	10am to 11am
Fri Apr 22, 2022	 BENG 294C - Class Discussion (https://canvas.ucsd.edu/calendar?event_id=751742&include_contexts=course_37761)	10am to 11am
Fri Apr 29, 2022	 BENG 294C - Class Discussion (https://canvas.ucsd.edu/calendar?event_id=751743&include_contexts=course_37761)	10am to 11am
Fri May 6, 2022	 BENG 294C - Class Discussion (https://canvas.ucsd.edu/calendar?event_id=751744&include_contexts=course_37761)	10am to 11am
	 Essay 1 (https://canvas.ucsd.edu/courses/37761/assignments/491178)	due by 5pm
Fri May 13, 2022	 BENG 294C - Class Discussion (https://canvas.ucsd.edu/calendar?event_id=751745&include_contexts=course_37761)	10am to 11am
Fri May 20, 2022	 BENG 294C - Class Discussion (https://canvas.ucsd.edu/calendar?event_id=751746&include_contexts=course_37761)	10am to 11am
Fri May 27, 2022	 BENG 294C - Class Discussion (https://canvas.ucsd.edu/calendar?event_id=751747&include_contexts=course_37761)	10am to 11am

**Essay 2**<https://canvas.ucsd.edu/courses/37761/assignments/491184>due by 5pm

Fri Jun 3, 2022

**BENG 294C - Class****Discussion**[https://canvas.ucsd.edu/calendar?](https://canvas.ucsd.edu/calendar?event_id=751748&include_contexts=course_37761)[event_id=751748&include_contexts=course_37761](https://canvas.ucsd.edu/calendar?event_id=751748&include_contexts=course_37761)10am to 11am

Fri Jun 10, 2022

**Final Project Report**<https://canvas.ucsd.edu/courses/37761/assignments/491188>due by 5pm

**Final Project Slides**<https://canvas.ucsd.edu/courses/37761/assignments/491187>due by 5pm
