

# Engaging the Post-Pandemic Student

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# Biochemistry Majors

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- Most students are medical school, graduate school, dental school, PA school, law school-bound
- Type A<sup>++</sup> students
- For medical school-bound students, taking BCHM 4360 (Genes to Proteins) and BCHM 4320 (Metabolism) prior to taking the MCAT significantly raises the score on the Biochemistry section

# BCHM 4360 Genes to Proteins

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- Because many of the students in my class will end up in medical school, I feel a sense of responsibility to help prepare them for:
  1. Taking the MCAT
  2. Succeed in medical school
- The rigor in my class forces even the most exceptional students (the ones that typically study 1-2 days before an exam to earn an A) to learn how to study effectively. I had a few students their first B.
- I teach them how to study effectively. For virtually every person in the class, it is the first time they have been taught how to study.

# First day of class...

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- Syllabus
- How to read research articles
- How to study effectively
- First Day Quiz
  1. Provides students an example of each of the test question format
  2. Provides an opportunity for assessment for both instructor and student

# Danger Will Robinson

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- Each exam will consist of a few multiple-choice answer, a few multiple-multiple answer choice, a few true/false, but mainly short answer and essay format questions.
- The exams are long and challenging for the time allotted. This is by design and on purpose.
- A student that has studied the material every day thoroughly and reviewed regularly will be able to complete the exam (barely). If a student stops to ponder the world and the things around them, well, they are burning clock and losing points.

# Be prepared for the outcome if you don't study

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Every year, students have mini-heart attacks when they see their first exam grade. It is usually at this point that they realize I was not kidding when I advised them to study every day and to try to master the information for each exam.

By master, I mean know the material so well, that when you close your eyes, you can read the words on the slide in your mind's eye.

# A successful way to study

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- Please stay on top of the material as we go along. Be done with today's lecture before the next lecture.
- I highly recommend that you do not only study (learning) for 5-7 days before the exam. This is a recipe for a disappointing grade.
- Rather, I would REVIEW for 5-7 days before the exam but not study (learning).
- The time to learn is after class but before the next class period. Repetitious cycles of studying and proving to yourself that you know the information, 3 slides at a time, working your way through the powerpoints. This will only take 45-60 min for each class period.

# Last but not least, come find me!

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If you do not know how to study effectively and efficiently, I am more than willing to provide you with suggestions that other highly successful students have told me helped them succeed.

# Evaluation Scheme

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Average of Canvas Quizzes	= 10%
Average of DNA, RNA, Amino Acid quizzes	= 10%
Class participation during discussions	= 10%
Average of three in class examinations	= 50%
Comprehensive final exam	<u>= 20%</u>
	100%

# Hope is a powerful emotion

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- Every year, students ask if the class is curved. Because of the way the exams are designed, the average for the exams will be lower than you are used to seeing. This will spread out the grades allowing for a natural curve to develop.
- The class is NOT fit to a bell curve. This grade distribution fosters competition and dissuades students from helping each other to improve their knowledge on the subject.
- I encourage them to help each other learn the material (GroupMe Sans me). The only time collaboration is not permitted is during quizzes and exams.

Dear Dr. Schorn,

I wanted to thank you for being such an amazing genes to proteins professor and for writing me a stellar evaluation letter for dental school. I trust that it was a highlight in my application which I believe helped me get accepted to the Tennessee dental school in Memphis, MUSC in Charleston, and Nova Southeastern University in Fort Lauderdale. I just put down a deposit for NSU and will begin dental school this summer! The material in your class greatly helped me to study for the DAT. I can recall a specific question on the difference between pol I and pol III. I got a 24 academic average which is above the 98<sup>th</sup> percentile and got a perfect score in the math section. I graduated a semester early this December and am very grateful for the role you played!

PROFESSOR SEHORN,

Thank you so much for an amazing, fascinating,  
and insightful semester of GTP! It feels quite  
odd writing out something GTP-related and not  
being under a 50 min excessive tree response  
impeding environment. Leaving Clemson this semester  
I felt sad leaving this class behind, as each  
day brought me stimulating content, challenging  
details, and personal growth as a student.  
Your class has excited me greatly for my  
future outside of Clemson, and I really appreciate  
all you do for us as your students!

Dr. Sehorn,

I am grateful to have taken your class despite the hardships and challenges. Your class really did push me to new limits and made me adapt. I am no rocket scientist and I did not think I had the ability to process hundreds of slides and several papers, but your class improved my confidence in my abilities. I have a much better understanding of what it means to work hard and have it pay off in the end. I appreciate how you treat us with high expectations and that we are already successful people on the right path because even the smartest people need reassurance.

Your expectations for us made me feel wrong if I put in anything less than my best. I respect you and your work and I am glad you were my professor. Thank you for a semester of personal growth and overcoming adversity!

Dr. Sehorn,

I want to thank you for all you have done this past semester. I always looked forward to GTP even on days when I really did not feel like attending other classes. I enjoyed (almost) every minute of your lectures as well as your sense of humor. I appreciate how approachable you always have been and that you are so willing to share your passion with us. Thank you for always trying to offer a connection where you could find one. Would love to get your shoe size so that Tommy and I can get you a sick pair of Heely's!!

Dear Dr. Sehorn,

Thank you so much, once again, for writing my letter of recommendation.

[ I truly enjoyed being in your class because you kept us on edge the entire semester. For years, as science students, we've learned to trust peer-reviewed articles; but you taught us that even papers published in highly-reputed journals can be up for discussion. I thank you for being such a supporting mentor. ]

Sincerely,

[Redacted signature]

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Sincerely,

[Redacted Signature]

Dr. Schorn,  
I have been required to write a thank you note to someone who has impacted ~~my~~ my life for my professional development class. Strangely enough, I chose to write you after all the torment GTP has put me through. With that being said, your class has been my favorite to attend at this point in my college career. While it may feel like I am going through hell and back, I have learned so much. This might be TMI, but over this past semester, I have had pretty terrible mental health problems. A lot of times, studying for your class is my escape. Also, I think my boyfriend hates you because of how much I talk about you and funny GTP stories. Anyways, I just wanted to thank you for everything you do to teach us dumb students at Clemson. I know you may not feel like you've done a lot for ~~my~~ the class, but personally GTP and your wise words have gotten me through some of my darkest times. You are an amazing (and very intimidating) man, but my life is much better thanks to you. I hate ending letters and

# Exam 1: 140 PPT slides, structure of DNA, 6 research articles

⋮	 Craig3ed-Ch04-Chromosome Structure&Function	✓	⋮
⋮	 Craig3Ed-Ch06-DNA Replication-Slides 58-66	✓	⋮
⋮	 Craig3ed-Ch06-DNA Replication	✓	⋮
⋮	 Craig3Ed-Ch06-DNA Replication-Slides 67-74	✓	⋮
⋮	▼ Exam 1 - Papers and Recorded Discussions of Papers	✓ +	⋮
⋮	 Hewish&Burgoyne-NucleosomeDigestion	✓	⋮
⋮	 Noll&Kornberg-MNase	✓	⋮
⋮	 ISWI	✓	⋮
⋮	 Brownell&Allis HAT gel PNAS	✓	⋮
⋮	 Bell Nature Orc	✓	⋮
⋮	 Meselson Stahl Replication	✓	⋮

# Exam 2: 192 PPT slides, structure of RNA, 8 research articles

Exam 2 Powerpoints		
	Craig3ed-Ch08-Transcription	<input checked="" type="checkbox"/>
	Craig3ed-Ch10-RNA Processing	<input checked="" type="checkbox"/>
	Craig3ed-Ch09 Regulation of Transcription Ver2	<input checked="" type="checkbox"/>
	Ch09-Regulation of Transcription Missing Slide #1	<input checked="" type="checkbox"/>
	Ch09-Regulation of Transcription Another Missing Slide #2	<input checked="" type="checkbox"/>
	Y2H Figure	<input checked="" type="checkbox"/>

Exam 2 Papers		
	Reinberg-TFIIB	<input checked="" type="checkbox"/>
	Cairns-RSC	<input checked="" type="checkbox"/>
	Guzder-RAD3 transcription	<input checked="" type="checkbox"/>
	Sung-RAD3 helicase	<input checked="" type="checkbox"/>
	Sung-XPD helicase	<input checked="" type="checkbox"/>
	Fire and Mello - RNAi	<input checked="" type="checkbox"/>
	Kornberg-Mediator Nucleosome Interaction	<input type="checkbox"/>
	Greenleaf-CTD kinase	<input type="checkbox"/>

# Exam 3: 206 PPT slides, Peptide Structure, 2 research articles

⋮	▼ Exam 3 Powerpoints	✓	+	⋮
⋮	📎 Craig3ed-Ch11-Translation	✓		⋮
⋮	📎 Craig3ed-Ch12-Regulation of Translation	✓		⋮
⋮	📎 Craig3ed-Ch14-Protein Modification and Targeting	✓		⋮
⋮	📎 Craig3ed-Ch13 Version 2.ppt	✓		⋮

⋮	▼ Exam 3 Papers	✓	+	⋮
⋮	📎 2A protease	✓		⋮
⋮	📎 PABP	✓		⋮

# Pandemic Recorded Lectures

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## Students love them

- Ability to play at 2x or 3x
- Replay them over and over
- Don't have to read the textbook
- Don't have to leave your room

## The dark side of recorded lectures

- False sense of security
- Don't have to read the textbook

# Return to in person after 2.5 year Online/hybrid hiatus

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- Had no idea how to take notes
- Typed every word I said
- Missed when I pointed out things because they were too busy typing
- Repeated the same statement because they were too busy typing
- Some had limited ability to determine what was relevant

# A large table that was part of a question on Exam 1

DNA polymerase families			
family	polymerase	source	function
A	pol I Taq	<i>E. coli</i> <i>Thermus aquaticus</i>	gap repair replication
B	pol $\alpha$ pol $\delta$ pol $\epsilon$ pol $\zeta$ (Rev3) pol II pol B	eukaryotes eukaryotes eukaryotes eukaryotes <i>E. coli</i> archaea	primase and repair replication replication translesion synthesis replication
C	pol III	<i>E. coli</i>	replication
D	pol D	archaea	replication
X	pol $\beta$ pol $\lambda$ pol $\mu$ pol $\sigma$	eukaryotes eukaryotes eukaryotes eukaryotes	gap repair gap repair gap repair gap repair
Y	pol $\eta$ (Rad 30) pol $\iota$ pol $\kappa$ REV 1 Din B (Pol IV) UmuCD (Pol V) Dbh Dpo4	eukaryotes eukaryotes eukaryotes eukaryotes <i>E. coli</i> <i>E. coli</i> archaea archaea	translesion synthesis translesion synthesis translesion synthesis translesion synthesis translesion synthesis translesion synthesis translesion synthesis translesion synthesis
RT	reverse transcriptase telomerase	retrovirus eukaryotes eukaryotes	copy genome copy retrotransposons elongate telomeres

# A table on Exam 2

RNA polymerase subunits					
RNA polymerase	pol I	pol II	pol III	bacterial	archaeal
ten-subunit core					
	A190	Rpb1	C160	$\beta'$	A'/A''
	A135	Rpb2	C128	$\beta$	B
	AC40	Rpb3	AC40	$\alpha$	D
	AC19	Rpb11	AC19	$\alpha$	L
	A12.2	Rpb9	C11		X
	Rpb5 (ABC27)	Rpb5	Rpb5		H
	Rpb6 (ABC23)	Rpb6	Rpb6	$\omega$	K
	Rpb8 (ABC14.5)	Rpb8	Rpb8		
	Rpb10 (ABC10 $\alpha$ )	Rpb10	Rpb10		N
	Rpb12 (ABC10 $\beta$ )	Rpb12	Rpb12		P
Rpb4/7 subcomplex					
	A14	Rpb4	C17		F
	A43	Rpb7	C25		E
additional subunits					
	A49		C37		
	A34.5		C53		
			C82, C34, C31		

# Online Homework and Exams

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They are cheating

Ways to defeat it if you are using it for meaningful grades

- Time
- Versions
- Question banks
- One question at a time (this is actually important as students on phones will struggle to scroll, not allowing them to go back is kind of mean).

Most successful way to defeat it....

One or two free response questions (the critical thinking challenges them)

# Things I tried

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- I saw great potential for iPad incorporation however I found it to be clunky and interface was not reliable especially with hybrid teaching
- TopHat was clunky, connectivity issues and too time consuming for my needs
- FlipGrid...Loved it.

# Things I do

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## Dry erase boards Rule!

- Students use a dry erase board to demonstrate knowledge/lack thereof
- Competitions between students to work through a problem at the board

Hand a student to use the laser pointer and microphone to explain something on the slide or answer a question

My new thing I am working on is social media

- Polls on Instagram
- Posting tips on papers
- Asking questions about papers they should be reading

# Spontaneous vs Planned questions

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Ask thought questions and have students just answer out loud, call on them, let them think it through out loud, have them stand up or raise hands.

Is a virus alive? If so, what makes it alive? If not, what makes it not alive? What could you do to make a virus alive?

Not everything needs to be graded or planned.

The energy I teach with doesn't vibe well with iClicker or Tophat-style interrogations of knowledge.

\*I put them as bonus opportunities on exams.

# Out of class student interactions during the pandemic

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## Zoom

- Convenience of not have to leave the house, office, sofa etc.
- No one lingered around
- They could be scheduled easily
- You could have group Zoom sessions

# Out of class student interaction since the pandemic restrictions were lifted

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- The students come to my office to ask for help
- The students ask for advice
- I found myself with students that revealed all sorts of things from mental health to Title IX issues (Sadly, I learned a lot about the resources for these issues)
- They really just needed someone to listen to them (therapist?)

# I want to see what they know, not how well they study while managing life (Demi World)

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- Working two full time jobs
- Getting COVID twice
- Dealing with domestic violence
- Roommate is doing drugs
- An advisor gave bad advice
- Significant health issues that cause them to pass out in class
- Deaths in the family
- Fighting deportation of mother
- 3x Title IX events
- Personal relations that ended or caused debilitating stress

# Trying to not break students

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- It is no skin off my back if they take the exam on a different day
- I gave more incompletes this Spring than in all my previous semesters combined

# Sometimes I push to hard and break one

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With how hard I push the students, I have to be flexible.

## Office meeting

- We discuss how they are doing in life
- We discuss their time management
- They describe when they start studying and how they do it
- We do an exercise together to demonstrate a more effective study strategy and how to fit it in their day

Lastly, I ask is there anything I can do to provide them a better opportunity to succeed