WPI CBC BS/MS

Nothing but abbreviations here.
We have no time to spare.

Arne Gerike
Biochemistry

Anita Mattson
Chemistry

Ron Grimm
Chemistry

Mary Spencer
Grad Studies

Where are we going today?

- What is the combined BS/MS?
- Who may and may not benefit from a combined BS/MS degree?
- What does one have to do to earn a BS/MS?
- Application process
- Courses going on this summer, other details.

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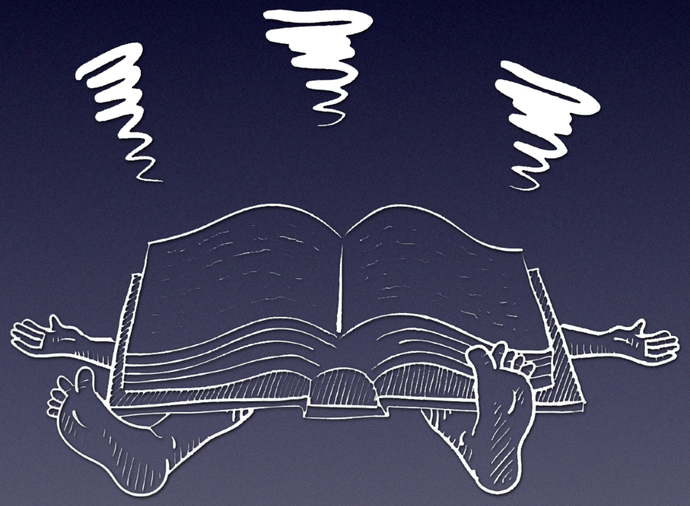
What is a combined BS/MS?



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- Opportunity to earn two degrees simultaneously or in rapid succession
- Allowed to double count 12 of the required 30 credit hours from certain undergrad credits. (40%)
- Can be done in four years by exceptional students, but often done in 4.5–5 years (full time) or longer (part time, but 4 years max from acceptance into MS program).

Who benefits from the combined BS/MS Program?

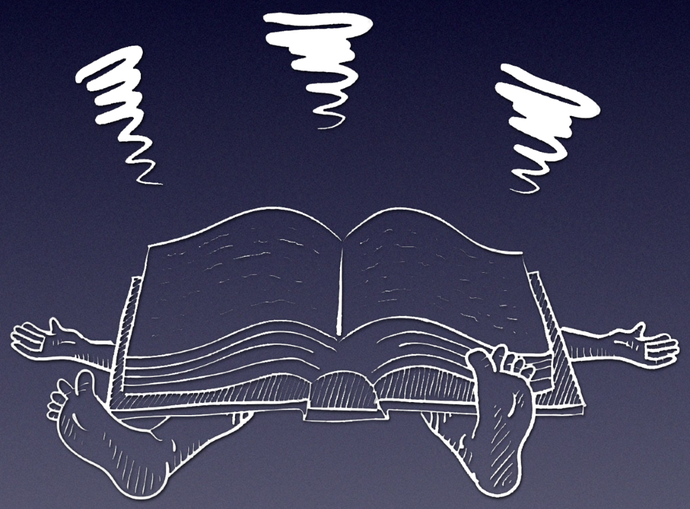
- Students applying to medical school
  (Can set applications apart from the rest of the pack)
- Students applying to industry jobs
  (Many companies consider MS effort to count towards job training)
- Students looking for further mobility in a company than can be available for people with BS degrees
- Specific skills for in-demand specialties:
  Plant medicinal chemistry, materials chemistry, and others

Who may not benefit from the combined BS/MS Program?

- Students applying to Ph.D. programs
  (Research and MQP are far more important than more MS classwork)

- Students applying to companies that may not give additional consideration for MS degrees

Mechanics of the BS/MS Degree



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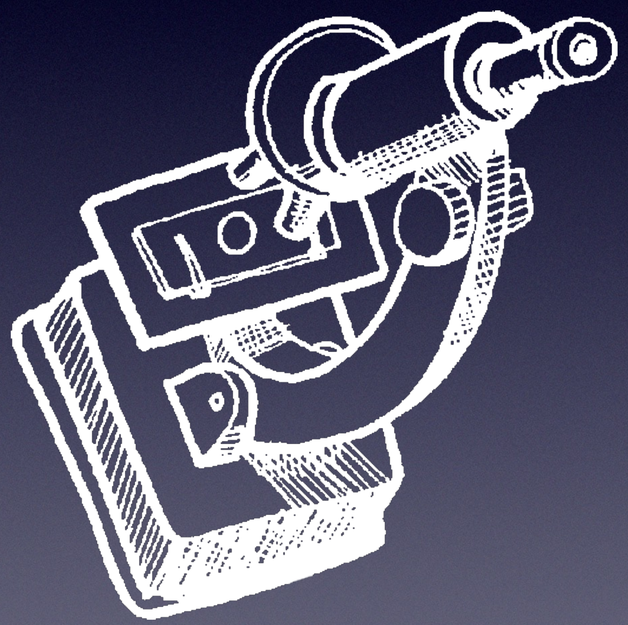
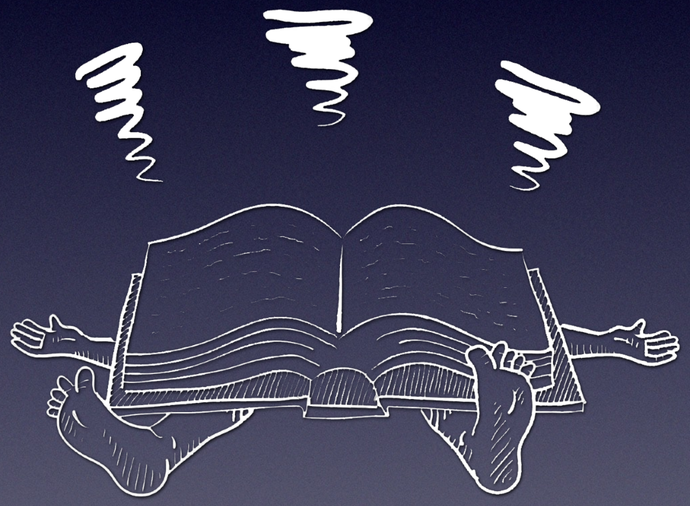
- A Master's degree is 30 credit hours:
  18 of the 30 must be at 500- or 600-level courses
  (15 of the 30 must be in "major" but CBC is lenient)
- 12/30 credit hours can be double counted from 4000-level undergraduate courses.
- 1/6 undergrad unit ≡ 1 graduate credit hour
  SIX 4000-level 1/3-unit UNDERGRAD CLASSES
  SIX 500- or 600-level 3-cr-hr GRAD CLASES

Research and the BS/MS Degree



- In CBC: thesis or non-thesis options, but…
  …*CBC's four-year BS/MS follows the non-thesis option only*
- CH 598 (directed research) available up to 9 credit hours for the non-thesis option
- WPI defines one credit hour as 56 hours of effort:
  1 credit hour of CH 598 in a term → 8 hrs wk^{-1}
- CBC expects a product of CH 598 proportional to number of hours put in. Writeup, manuscript for submission, etc.
- *Students will be discouraged from taking CH 598 and MQP simultaneously in the same research group*

The Degree and the Application



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- Must apply while a matriculating undergraduate student to receive 40% course-double-counting credit
- 2020 graduating students only: can apply by July 1
- Once in the program, students must earn their degrees within four years of starting.
- Looking to complete a BS/MS in four years?
  - CBC undergrads only
  - Higher GPA requirements
  - Apply as 3rd-year students
  - Coursework-based MS degree only

Great, I'm interested, now what?

- **3rd- and 4th-year students**: go to https://gradapp.wpi.edu/apply/
  - No application fee for WPI students.
  - Select BS/MS program in dropdown or checkbox somewhere…
  - This year only: graduating students must apply by July 1st!
  - No rec. letters needed, but give us the names of **three** contacts

- **1st- and 2nd-year students**: think about possible areas of focus, talk your advisor, talk to Grimm.
  - CBC considers any qualifying class taken at any time

Name:								
Start year:	2017							
						Course credits (consult catalog, transcript)		
	A	B	C	D	E	UG only	Combined	Grad only
1st Year 2017/2018	MA 1024	CH 1020	CH 1030	CH 1040		0	0	0
	PH 1110	PH 1120	BB 2550	BB 2003		0	0	0
	BB 2920	PY 1731	PY 2712	PY 2718		0	0	0
2nd Year 2018/2019	CH 3510	CH 2310	CH 2320	CH 2330		0	0	0
	CH 2640	BB 2915	CH 2660	PY 1504		0	0	0
	EN 2219	PY 2719	MA 2611	HU 3900		0	0	0
3rd Year 2019/2020	CH 4110	CH 4120	CH 4150	CH 555		6	9	3
	BB 3003	CH 4170	CH 4130	CH 4140		6	6	0
	IQP	IQP	IQP			0	0	0
			CH 3410					
4th Year 2020/2021	MQP	MQP	MQP	MQP		0	0	0
	CH 554	CH 538	BB 562	BB 562		0	9	9
	CHE 515			CH 540		0	6	6
						0	3	3
					Σ	12	33	21

- Consider your focus, map out a plan of study
  Grad classes: https://www.wpi.edu/offices/registrar/course-registration/schedules
  CPE classes: https://www.wpi.edu/academics/online/study

Possible areas of focus

- Plant medicinal chemistry to launch in Fall 2020 (Mattson, Olsen)
  - Legalization yielded >10,000 new jobs in Massachusetts
  - 400% projected job growth in the cannabis industry!
  - Positions incl. Cannabis Extraction Technician and Grow Master/Botanical Specialist

- Materials chemistry (Grimm, Burdette)

- Connections between departments
  - Biotechnology (Dittami)
  - Neuroscience master's degree (Scarlata, Dempski)

- More programs and offerings coming through the department in each year!

Summer 2020 Classes

- CH 543, Professor Burdette
  Organometallic Chemistry & Catalysis

- CH 555 196E, Professor Dempski
  Transforming the Central Dogma of Molecular Biology to Real World Applications

- CH 554, Professor Deskins
  Molecular Modeling

- PH 597, Professor Titova
  Optical Properties of Materials

- *Great breadth in other departments or through CPE*
  Grad classes: https://www.wpi.edu/offices/registrar/course-registration/schedules
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CH 543 - Organometallic Chemistry & Catalysis

Organometallic chemistry and catalytic reactions have fundamentally changed the way drugs and polymeric materials are made today. Furthermore, they have enabled the synthesis and application of new electronic materials (e.g. in OLEDs and molecular wires) and materials mimicking natural processes (e.g. self-healing and anti-bacterial coatings). This course will establish principles to understand the reactivity of organometallic compounds of transition and main groups metals. Furthermore, metal-free catalysis will be introduced. Pulling on influences from both inorganic and organic chemistry, the class will provide insight into catalysis approaches that have revolutionized synthetic chemistry, enabling highly efficient, sustainable production of compounds that are used in such different areas as drug discovery, protein analysis, and performance plastics. Case studies will be drawn from the current literature and applications that are widely used in industrial and academic settings and will include work that has led to recent Nobel prizes in the area. Recommended preparation includes the organic chemistry sequence (CH2310, CH2320, and CH2330) and CH3410. The course is recommended for both graduate and advanced undergraduate students.

CH 555 196E - Transforming the Central Dogma of Molecular Biology to Real World Applications

This central dogma of molecular biology describes the flow of genetic information within a biological system. For most systems, this includes three main topics: DNA replication, transcription and translation. This course aims to provide molecular and atomistic level details of these three processes highlighting similarities and differences between prokaryotic and eukaryotic organisms. At the same time, a number of strategies have been developed which take advantage of the central dogma to create solutions to critical issues in human health, biotechnology or biomedical engineering. As part of the course, students will identify an existing unmet need in one of these areas and will develop their own project to solve this unmet need. Combined, this course is focused on enabling students to apply their newfound knowledge of DNA replication, transcription and translation to a problem that we face today.

CH 554 - Molecular Modeling (Professor Deskins in ChE)

This course trains students in the area of molecular modeling using a variety of quantum mechanical and force field methods. The approach will be toward practical applications, for researchers who want to answer specific questions about molecular geometry, transition states, reaction paths and photoexcited states. No experience in programming is necessary; however, a background at the introductory level in quantum mechanics is highly desirable. Methods to be explored include density functional theory, ab initio methods, semiempirical molecular orbital theory, and visualization software for the graphical display of molecules.

PH 597 - Optical Properties of Materials (Professor Titova in Ph)

We will cover the classical theory of light propagation in solid state dielectric materials; introduction to the quantum theory of absorption and emission in solids; excitonic effects in solids; optical properties of nanomaterials; and introduction to nonlinear optics.

2020-2021 Classes in Plant Medicinal Chemistry

- CH 542 - Drugs in the Brain, anticipated C21
  This class will introduce the concepts of basic neuropharmacology and the action of major neurotransmitter families in the brain. The mechanisms of action of the major psychoactive drugs families including cannabis, opioids, and psychedelics will be covered. The effects of pharmaceutical treatments for anxiety and depression on brain chemistry will be discussed.

- CH 545 - Plant Natural Products
  This class will cover the chemistry of a number of families of plant-derived natural products, including, terpenoids, phenolic compounds, and alkaloids. The coverage of aspects of the chemistry involving these natural products may include biosynthesis, chemical synthesis, and medicinal chemistry applications. The historical and current roles of select natural products, such as tetrahydrocannabinol, taxol, heroin, and quinine, in society may also be discussed.

- CH 546 - Natural Product Isolation & Analysis
  In this laboratory class, students will learn strategies to isolate and characterize natural products. Techniques used during this course may include solvent extraction, supercritical fluid extraction, NMR spectroscopy, IR spectroscopy, mass spectrometry, gas chromatography, and liquid chromatography.

- CH 555 with Scarlata - Cell Signaling & Physiology

Summer 2020 and the Monies…

- Tuition will be 50% only for the Summer of 2020 for non-graduating students:
  - Normally $1433 per undergrad credit (1 undergrad credit = 1/9th of a unit)
  - 1 undergrad credit × 1.5 = 1 grad credit (2 grad credits = 1/3 of a unit)
  - Soooo… a 3-credit-hour grad class will cost $716 × 3 × 1.5 = $3,222
    and a 1/3 unit undergrad class will cost $716 × 3 = $2,148

- Alumni will have a 20% tuition discount:
  - Normally $1566 per graduate credit
  - Soooo… a 3-credit-hour grad class will cost ‖ $1566 × 0.8 ‖ × 3 = $3,759

- There is presently no discount for matriculating graduate students.
  (Graduate students who are alumni do receive the 20% tuition discount)

- Tuition has not been announced for the 2020-2021 school year yet.

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For more information…

- Gericke: agericke@wpi.edu
- Mattson: aemattson@wpi.edu
- Grimm: rlgrimm@wpi.edu
- Mary Spencer: mspencer@wpi.edu or grad@wpi.edu