



SYLLABUS

Chemistry 890 “Highlights at the Chemistry–Biology Interface”

Credits: 1 Credit
Course time: 12:00–1:00 pm, once a month (*day TBA each semester*)
Classroom: Chemistry building (*room TBA*)

COURSE OVERVIEW

The Highlights at the Chemistry–Biology Interface course, or “colloquium”, is intended for the graduate student trainees in the UW–Madison NIH Chemistry–Biology Interface Training (CBIT) program, to allow them to meet together and share their research progress once a month. This course gives two trainees each month the opportunity to communicate their research results with a diverse scientific audience, and to obtain constructive feedback on their presentation skills. In turn, every trainee benefits by being exposed to a variety of research areas and techniques aimed at understanding and manipulating biological systems at the molecular level. In addition to this focus on research and communication skill development, the 890 course provides all trainees a regular venue to consider critical aspects of research rigor and the responsible conduct of research. This course is offered in both the Fall and Spring terms, and CBI trainees enroll in this course every term from the time of their appointment to the training grant to their graduation.

- The credit standard for this course is met by an expectation of a total of 45 hours of student engagement with the course learning activities, which include regularly scheduled instructor–student meeting times (5 times a semester, for one hour each), individual meetings with the instructor, readings, presentation preparation, and application of learning from the seminar to the students' own doctoral research and scientific communication.
- Written requirements include careful preparation of presentation slides and filling out thoughtful feedback forms for each speaker.
- Instruction is delivered face-to-face.
- This course fulfills the Graduate 50% requirement.

INSTRUCTORS AND TEACHING ASSISTANTS

Chemistry 890 is coordinated by the CBIT Program Director, Prof. Helen Blackwell, with the assistance of Dr. Cara Jenkins, the CBIT Program Coordinator.

Office hours with each are by appointment:

- Prof. Helen Blackwell: blackwell@chem.wisc.edu
- Dr. Cara Jenkins: clbradfo@wisc.edu

OFFICIAL COURSE DESCRIPTION

Includes oral presentations by students reporting their current thesis research at the chemistry–biology interface and discussions of reproducibility, rigor, and the responsible conduct of research. Intended for and required of all graduate student trainees in the UW–Madison NIH Chemistry–Biology Interface Training Program.

REQUISITES

Graduate/professional standing

LEARNING OUTCOMES

Students in CHEMISTRY 890 will:

- *Identify and clearly present key background concepts relating to their research*
- *Explain experiments leading to research conclusions*
- *Analyze the results of each experiment with the appropriate scientific rigor, and develop skills to justify their analytical choices*
- *Identify short-term and long-term research steps and goals*
- *Provide feedback to other trainees on presentation style and clarity, data analysis, and scientific rigor and the responsible conduct of research*

GRADING

Students are graded on their attendance and participation, as well as on their presentations. Not every student will be assigned to give a presentation every semester, and for those students who do not give talks, their grades will be based 100% on their attendance and participation. For students assigned to give talks, their grades will be based 50% on attendance and participation and 50% on their presentations.

Pre-approved absences may be made up by submitting written feedback within one week. This includes viewing the video of the talks given on the day missed, filling out the feedback form for each speaker, and sending the forms to the instructors.

PARTICIPATION GRADE GUIDELINES (A, B, C, D or F)

Up to 10 points will be awarded for attendance and participation for each class meeting.

A (90-100%): Student attends every colloquium meeting, gives excellent and detailed feedback to student speakers, regularly asks thoughtful questions, and engages in discussion.

B (80-90%): Student attends most colloquium meetings, gives good speaker feedback, occasionally asks thoughtful questions, and engages in discussion.

C (70-80%): Student attends most colloquium meetings, gives minimal speaker feedback, may occasionally ask superficial questions, and does not engage in discussion.

D (60-70%): Student attends one colloquium meeting without notifying instructors in advance of absences, and gives minimal feedback to speakers.

F (below 60%): Student does not attend any colloquium meeting, and does not perform make-up work.

PRESENTATION GRADE GUIDELINES (A, B, C, D or F)

Up to 40 points will be awarded for each presentation given during the semester.

A (90-100%): Student prepares excellent slides, practices the talk beforehand, and gives an excellent talk in class appropriate for a broad scientific audience within the allotted time. The student is also able to effectively answer student and faculty questions.

B (80-90%): Student prepares good slides, gives a good talk appropriate for a broad scientific audience within the allotted time, and effectively answers student and faculty questions.

C (70-80%): Student prepares mediocre slides, gives a talk that is not clear to the audience, and is marginally able to answer student and faculty questions.

D (60-70%): Student does not prepare slides (or uses the exact same slides as the year before) and/or gives a talk not tailored for the audience. The student is not able to answer questions about the science presented.

F (below 60%): Student neither prepares for nor gives the assigned presentation.

FINAL GRADING SCALE

Final grades will be awarded based on the percentage of points earned out of the points possible for each student. For those students who are not assigned to give a presentation, the grade will be based 100% on attendance and participation points (out of 40 points). For those students who are assigned to give a presentation, the final

grade will be based 50% on attendance and participation and 50% on their presentation (out of 80 points).

A (90-100%)

B (80-90%)

C (70-80%)

D (60-70%)

F (below 60%)

AB and BC grades are not awarded.

REQUIRED COURSE MATERIALS

Access to a laptop computer and presentation software such as Keynote or Microsoft PowerPoint. (PowerPoint is available for free through the Campus Software Library.)

STUDENT RIGHTS AND RESPONSIBILITIES

Every member of the University of Wisconsin–Madison community has the right to expect to conduct his or her academic and social life in an environment free from threats, danger, or harassment. Students also have the responsibility to conduct themselves in a manner compatible with membership in the university and local communities. UWS Chapters 17 and 18 of the Wisconsin Administrative Code list the university policies students are expected to uphold and describes the procedures used when students are accused of misconduct. Chapter 17 also lists the possible responses the university may apply when a student is found to violate policy. The process used to determine any violations and disciplinary actions is an important part of UWS 17. For the complete text of UWS Chapter 17, see [this link](#), or contact the on-call dean in the Dean of Students Office, 608-263-5700, Room 70 Bascom Hall.

No student may be denied admission to, participation in or the benefits of, or discriminated against in any service, program, course or facility of the [UW] system or its institutions or centers because of the student's race, color, creed, religion, sex, national origin, disability, ancestry, age, sexual orientation, pregnancy, marital status or parental status.

ACADEMIC INTEGRITY

By enrolling in this course, each student assumes the responsibilities of an active participant in UW–Madison's community of scholars in which everyone's academic work and behavior are held to the highest academic integrity standards. Academic misconduct compromises the integrity of the university. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these acts are examples of academic misconduct, which can result in disciplinary action. This includes but is not limited to failure on the assignment/course, disciplinary probation, or suspension. Substantial or repeated cases of misconduct will be forwarded to the Office

of Student Conduct & Community Standards for additional review. For more information, refer to: studentconduct.wiscweb.wisc.edu/academic-integrity/.

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

McBurney Disability Resource Center syllabus statement: “The University of Wisconsin–Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW–Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life.

Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty will work either directly with the student or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA.” For more information, refer to:

<http://mcburney.wisc.edu/facstaffother/faculty/syllabus.php>

DIVERSITY & INCLUSION

Institutional statement on diversity: “Diversity is a source of strength, creativity, and innovation for UW–Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals.

The University of Wisconsin–Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world.” For more information, refer to:

<https://diversity.wisc.edu/>

CHEM 890 READINGS

This list of readings is representative of what would have been assigned for each session’s talks in the 2018-2019 school year. The readings are based on the background readings suggested by the student speakers, and therefore will change each year.

September 12, 2018

Program update, introduction of new students, and group picture—no readings

October 12, 2018

Student-invited guest speaker—Kimberly Kaufman—no readings

November 9, 2018

Stephanie Chong-Macias

Synthesis and characterization of perfluoro-tert-butyl semifluorinated amphiphilic polymers and their potential application in hydrophobic drug delivery.

Decato S, Bemis T, Madsen E, Mecozzi S.

Polym Chem. 2014 Nov 21;5(22):6461-6471.

Kayleigh Nyffeler

A Comparative Analysis of Synthetic Quorum Sensing Modulators in *Pseudomonas aeruginosa*: New Insights into Mechanism, Active Efflux Susceptibility, Phenotypic Response, and Next-Generation Ligand Design.

Moore JD, Rossi FM, Welsh MA, Nyffeler KE, Blackwell HE.

J Am Chem Soc. 2015 Nov 25;137(46):14626-39.

November 30, 2018

Marc Chevrette

The antimicrobial potential of *Streptomyces* from insect microbiomes.

Chevrette MG, Carlson CM, Ortega HE, Thomas C, Ananiev GE, Barns KJ, Book AJ, Cagnazzo J, Carlos C, Flanigan W, Grubbs KJ, Horn HA, Hoffmann FM, Klassen JL, Knack JJ, Lewin GR, McDonald BR, Muller L, Melo WGP, Pinto-Tomás AA, Schmitz A, Wendt-Pienkowski E, Wildman S, Zhao M, Zhang F, Bugni TS, Andes DR, Pupo MT, Currie CR.

Nat Commun. 2019 Jan 31;10(1):516.

Emerging evolutionary paradigms in antibiotic discovery.

Chevrette MG, Currie CR.

J Ind Microbiol Biotechnol. 2019 Mar;46(3-4):257-271.

Mark Klein

An inactivating mutation in the histone deacetylase SIRT6 causes human perinatal lethality.

Ferrer CM, Alders M, Postma AV, Park S, Klein MA, Cetinbas M, Pajkrt E, Glas A, van Koningsbruggen S, Christoffels VM, Mannens MMAM, Knecht L, Etchegaray JP, Sadreyev RI, Denu JM, Mostoslavsky G, van Maarle MC, Mostoslavsky R.

Genes Dev. 2018 Mar 1;32(5-6):373-388.

Identification of and Molecular Basis for SIRT6 Loss-of-Function Point Mutations in Cancer.

Kugel S, Feldman JL, Klein MA, Silberman DM, Sebastián C, Mermel C, Dobersch S, Clark AR, Getz G, Denu JM, Mostoslavsky R.

Cell Rep. 2015 Oct 20;13(3):479-488.

December 14, 2018

Joseph Vasquez

Simplified Autoinducing Peptide Mimetics with Single-Nanomolar Activity Against the *Staphylococcus aureus* AgrC Quorum Sensing Receptor.

Vasquez JK, Blackwell HE.

ACS Infect Dis. 2019 Apr 12;5(4):484-492.

Simplified AIP-II Peptidomimetics Are Potent Inhibitors of *Staphylococcus aureus* AgrC Quorum Sensing Receptors.

Vasquez JK, Tal-Gan Y, Cornilescu G, Tyler KA, Blackwell HE.

Chembiochem. 2017 Feb 16;18(4):413-423.

Kaitlin Dunn

Chemically defined, albumin-free human cardiomyocyte generation.

Lian X, Bao X, Zilberter M, Westman M, Fisahn A, Hsiao C, Hazeltine LB, Dunn KK, Kamp TJ, Palecek SP.

Nat Methods. 2015 Jul;12(7):595-6.

Engineering Scalable Manufacturing of High-Quality Stem Cell-Derived Cardiomyocytes for Cardiac Tissue Repair.

Dunn KK, Palecek SP.

Front Med (Lausanne). 2018 Apr 24;5:110.

January 11, 2019

Responsible Conduct of Research discussion

Chapter 6 of the *Office of Research Integrity Introduction to the Responsible Conduct of Research*, including case studies: <https://ori.hhs.gov/ori-introduction-responsible-conduct-research>.

February 8, 2019

Stephanie Blaszczyk

Recent advances in site-selective functionalization of carbohydrates mediated by organocatalysts.

Blaszczyk SA, Homan TC, Tang W.

Carbohydr Res. 2019 Jan 1;471:64-77.

Isoquinoline-1-Carboxylate as a Traceless Leaving Group for Chelation-Assisted Glycosylation under Mild and Neutral Reaction Conditions.

Wang HY, Simmons CJ, Blaszczyk SA, Balzer PG, Luo R, Duan X, Tang W.

Angew Chem Int Ed Engl. 2017 Dec 4;56(49):15698-15702.

Trisha Tucholski

A Top-Down Proteomics Platform Coupling Serial Size Exclusion Chromatography and Fourier Transform Ion Cyclotron Resonance Mass Spectrometry.

Tucholski T, Knott SJ, Chen B, Pistono P, Lin Z, Ge Y.

Anal Chem. 2019 Mar 19;91(6):3835-3844.

Top-Down Proteomics of Large Proteins up to 223 kDa Enabled by Serial Size Exclusion Chromatography Strategy.

Cai W, Tucholski T, Chen B, Alpert AJ, McIlwain S, Kohmoto T, Jin S, Ge Y.

Anal Chem. 2017 May 16;89(10):5467-5475.

March 8, 2019

Tim Tiambeng

Impact of Phosphorylation on the Mass Spectrometry Quantification of Intact Phosphoproteins.

Wu Z, Tiambeng TN, Cai W, Chen B, Lin Z, Gregorich ZR, Ge Y.

Anal Chem. 2018 Apr 17;90(8):4935-4939.

Korbin West

Nonwoven Polymer Nanofiber Coatings That Inhibit Quorum Sensing in *Staphylococcus aureus*: Toward New Nonbactericidal Approaches to Infection Control.

Kratochvil MJ, Yang T, Blackwell HE, Lynn DM.

ACS Infect Dis. 2017 Apr 14;3(4):271-280.

Simplified AIP-II Peptidomimetics Are Potent Inhibitors of *Staphylococcus aureus* AgrC Quorum Sensing Receptors.

Vasquez JK, Tal-Gan Y, Cornilescu G, Tyler KA, Blackwell HE.

Chembiochem. 2017 Feb 16;18(4):413-423.

April 12, 2019

Nathan Murray

Conserved Lipid and Small-Molecule Modulation of COQ8 Reveals Regulation of the Ancient Kinase-like UbiB Family.

Reidenbach AG, Kemmerer ZA, Aydin D, Jochem A, McDevitt MT, Hutchins PD, Stark JL,

Stefely JA, Reddy T, Hebert AS, Wilkerson EM, Johnson IE, Bingman CA, Markley JL, Coon JJ,

Dal Peraro M, Pagliarini DJ.

Cell Chem Biol. 2018 Feb 15;25(2):154-165.e11.

Biochemistry of Mitochondrial Coenzyme Q Biosynthesis.

Stefely JA, Pagliarini DJ.

Trends Biochem Sci. 2017 Oct;42(10):824-843.

Benjamin Ortiz

Synthetic Mimics of Bacterial Lipid A Trigger Optical Transitions in Liquid Crystal Microdroplets at Ultralow Picogram-per-Milliliter Concentrations.

Carter MC, Miller DS, Jennings J, Wang X, Mahanthappa MK, Abbott NL, Lynn DM.
Langmuir. 2015 Dec 1;31(47):12850-5.

Liquid crystal chemical sensors that cells can wear.

Manna U, Zayas-Gonzalez YM, Carlton RJ, Caruso F, Abbott NL, Lynn DM.
Angew Chem Int Ed Engl. 2013 Dec 23;52(52):14011-5.

May 3, 2019

Rebeca Fernandez

Spectroscopic and Computational Investigation of the H155A Variant of Cysteine Dioxygenase: Geometric and Electronic Consequences of a Third-Sphere Amino Acid Substitution.

Blaesi EJ, Fox BG, Brunold TC.
Biochemistry. 2015 May 12;54(18):2874-84.

Spectroscopic and computational characterization of the NO adduct of substrate-bound Fe(II) cysteine dioxygenase: insights into the mechanism of O₂ activation.

Blaesi EJ, Gardner JD, Fox BG, Brunold TC.
Biochemistry. 2013 Sep 3;52(35):6040-51.

Kevin Garcia

Nickel-Catalyzed Addition of Aryl Bromides to Aldehydes to Form Hindered Secondary Alcohols.

Garcia KJ, Gilbert MM, Weix DJ.
J Am Chem Soc. 2019 Feb 6;141(5):1823-1827.

Coupling of Challenging Heteroaryl Halides with Alkyl Halides via Nickel-Catalyzed Cross-Electrophile Coupling.

Hansen EC, Li C, Yang S, Pedro D, Weix DJ.
J Org Chem. 2017 Jul 21;82(14):7085-7092.