

Syllabus: Biology 4900B (CRN 21397) – Senior Seminar – Spring 2012

Instructor: Dr. Archana Bhasin

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Office: 2093 Bailey Science Center

Class: Thurs 2:00 - 3:50pm Bailey Science Center Rm. 1024

Thurs 4:00 – 5:00 pm Student Union Theatre, unless otherwise indicated

Office hours: Thurs 12:50-1:50pm weekly or by appointment

Thurs 2-3:50pm when class does not meet (Jan. 26, Feb. 9, Feb. 16)

Course Objective (from the Undergraduate Catalog): “The capstone course in biology. This course assesses students’ abilities to research independently topics in biology, assimilate the information, and disseminate the information in an organized and understandable fashion in both oral and written forms. Besides demonstrating comprehension of their topic and competence in communication skill, students take the ETS Major Field test in biology and complete the Senior Exit Questionnaire for successful course completion.” Course objectives support Department of Biology Educational Outcome a#1 and VSU General Educational Outcomes #4 and #7.

Course requirements

in order to pass this course with a Satisfactory (S), you will need to complete the following:

- **a minimum score of 140 on the Major Fields Test;** the first exam will be free, but you will have to pay a fee for further testing; you will lose 40 points for a score below 140
- **a 30 minute PowerPoint presentation** that is understandable to your classmates, is in your own words and that demonstrates your understanding of the material
- **a review paper, minimum of 10 pages (not including references and figures, double-spaced, 12 pt Times New Roman, 1 inch margins on all sides, printed on only one side)** based on one of the articles that I provided that is well-written, well-referenced, understandable to your classmates, is in your own words and that demonstrates your understanding of the material
- you must have a **minimum of 8 appropriate primary references (not including the main article that I provided) and 2 appropriate secondary references**
- **attendance at all scheduled class sessions and student presentations is mandatory and you must attend and evaluate 10 Science Seminar sessions;** you will lose ten points for each absence

Plagiarism

Plagiarism will absolutely not be tolerated! Plagiarism, whether intentional or not, from your sources will result in failure of the course. You must be diligent in citing all of your reference and you must avoid taking someone else’s words, even if you quote them. A paper full of quotes does not demonstrate understanding and will result in failure of the course.

Paraphrasing does not mean changing a word or two. The best way to ensure that you do not plagiarize is to read the material, then step away from it for a day or two, and then begin writing. This method also allows you to gauge your understanding of the material.

PowerPoint presentation and paper

Your presentation and paper must include the following:

- thorough background on the system
- the biological questions that the authors are addressing
- the methods that the authors use to answer the questions
- the results of the experiments and interpretations of the experiments
- you will determine the appropriate sub-headings for your paper
- do not submit a title page, at the top of your first page, just give your name and title of your paper on one line (12 pt Times New Roman bold), number your pages on the bottom right or bottom center
- you must look at all the data and walk the audience through the data; do not merely accept the authors’ interpretations without critical analysis
- your presentation must be 30 minutes, should include appropriate figures and appropriate text font
- you must explain your presentation, not read your presentation; reading of your presentation does not demonstrate understanding
- your paper must be in review format (like a term paper) and should not have methods, results or discussion sections since this is not your work; see other review articles as a guide
- your paper must be thorough and complete, a minimum of 10 pages (not including references and figures, double-spaced, Times New Roman 12 pt font, 1 inch margins, printed only on one side)
- you must use a minimum of 8 appropriate primary references and 2 secondary references

- use Inter Library Loan; do not limit your articles to free ones or you will have a very incomplete story
- the paper should be spell-checked (don't let spell-check auto-correct scientific terms), grammar-checked and very well-edited by yourself and others
- references should include authors (only use *et al.* if there are more than five authors), title, year published, journal, volume, page numbers

Paper Submission

Papers due on Thursday, March 8 by 5pm. You must submit your paper in a folder along with all of your article references. For references that are accessible for free online, submit the first page of the reference. For articles that were received through InterLibrary loan, submit the entire article. For book chapters, submit the first page of the chapter. Your paper must be stapled, and articles must be stapled individually. Please put your name on the folder, your paper and each article.

Senior Seminar class schedule

Thurs 1/12/11 - organizational meeting

Thurs 1/19/11 - select articles

Thurs 1/26/11 - no meeting

Thurs 2/2/11 - go to the Testing Office in Powell Hall to take the Major Fields Test, take your student I.D. with you

Thurs 2/9/11 - no meeting

Thurs 2/16/11 - no meeting

Thurs 2/23/11

Proc Natl Acad Sci U S A. 2011 Sep 20;108(38):15822-7. **The bacterial actin MreB rotates, and rotation depends on cell-wall assembly.** van Teeffelen S, Wang S, Furchtgott L, Huang KC, Wingreen NS, Shaevitz JW, Gitai Z.

Rainer Kalscheuer, Brian Weinrick, Usha Veeraraghavan, Gurdyal S. Besra, and William R. Jacobs, Jr. **Trehalose-recycling ABC transporter LpqY-SugA-SugB-SugC is essential for virulence of Mycobacterium tuberculosis** PNAS 2010 107 (50) 21761-21766

Patricia Bordes, Anne-Marie Cirinesi, Roy Ummels, Ambre Sala, Samer Sakr, Wilbert Bitter, and Pierre Genevaux **SecB-like chaperone controls a toxin-antitoxin stress-responsive system in Mycobacterium tuberculosis** PNAS 2011 108 (20) 8438-8443

Rachna Chaba, Benjamin M. Alba, Monica S. Guo, Jungsan Sohn, Nidhi Ahuja, Robert T. Sauer, and Carol A. Gross **Signal integration by DegS and RseB governs the σ^E -mediated envelope stress response in Escherichia coli** PNAS 2011 108 (5) 2106-2111

Thurs 3/1/11

Proc Natl Acad Sci U S A. 2011 Sep 13;108(37):15390-5. **Bacterial outer membrane channel for divalent metal ion acquisition.** Hohle TH, Franck WL, Stacey G, O'Brian MR.

Sumant Puri, Thomas H. Hohle, and Mark R. O'Brian **Control of bacterial iron homeostasis by manganese** PNAS 2010 107 (23) 10691-10695

Pauline Yoong and Gerald B. Pier **Antibody-mediated enhancement of community-acquired methicillin-resistant Staphylococcus aureus infection** PNAS 2010 107 (5) 2241-2246

Jingru Li, Wenliang Wang, Stacey X. Xu, Nathan A. Magarvey, and John K. McCormick **Lactobacillus reuteri-produced cyclic dipeptides quench agr-mediated expression of toxic shock syndrome toxin-1 in staphylococci** PNAS 2011 108 (8) 3360-3365

Thurs 3/8/11

Richard Siehnell, Beth Traxler, Ding Ding An, Matthew R. Parsek, Amy L. Schaefer, and Pradeep K. Singh **A unique regulator controls the activation threshold of quorum-regulated genes in Pseudomonas aeruginosa** PNAS 2010 107 (17) 7916-7921

Sudha Chugani and Everett Peter Greenberg **LuxR homolog-independent gene regulation by acyl-homoserine lactones in Pseudomonas aeruginosa** PNAS 2010 107 (23) 10673-10678

Michael J. Trimble and Linda L. McCarter **Bis-(3'-5')-cyclic dimeric GMP-linked quorum sensing controls swarming in *Vibrio parahaemolyticus*** PNAS 2011 108 (44) 18079-18084

Thurs 3/22/11

Parameth Thiennimitr, Sebastian E. Winter, Maria G. Winter, Mariana N. Xavier, Vladimir Tolstikov, Douglas L. Huseby, Torsten Sterzenbach, Renée M. Tsolis, John R. Roth, and Andreas J. Bäuml **Intestinal inflammation allows *Salmonella* to use ethanolamine to compete with the microbiota** PNAS 2011 108 (42) 17480-17485

Mitchell T. Butler, Qingfeng Wang, and Rasika M. Harshey **Cell density and mobility protect swarming bacteria against antibiotics** PNAS 2010 107 (8) 3776-3781

Thomas W. Cullen and M. Stephen Trent **A link between the assembly of flagella and lipooligosaccharide of the Gram-negative bacterium *Campylobacter jejuni*** PNAS 2010 107 (11)

Proc Natl Acad Sci U S A. 2011 Sep 27;108(39):16410-5. **Avenolide, a *Streptomyces* hormone controlling antibiotic production in *Streptomyces avermitilis***. Kitani S, Miyamoto KT, Takamatsu S, Herawati E, Iguchi H, Nishitomi K, Uchida M, Nagamitsu T, Omura S, Ikeda H, Nihira T.

Thurs 3/29/11

Patrick R. Shea, Stephen B. Beres, Anthony R. Flores, Amy L. Ewbank, Javier H. Gonzalez-Lugo, Alexandro J. Martagon-Rosado, Juan C. Martinez-Gutierrez, Hina A. Rehman, Monica Serrano-Gonzalez, Nahuel Fittipaldi, Stephen D. Ayers, Paul Webb, Barbara M. Willey, Donald E. Low, and James M. Musser **Distinct signatures of diversifying selection revealed by genome analysis of respiratory tract and invasive bacterial populations** PNAS 2011 108 (12) 5039-5044

Randall J. Olsen, Izabela Sitkiewicz, Ara A. Ayeras, Vedia E. Gonulal, Concepcion Cantu, Stephen B. Beres, Nicole M. Green, Benfang Lei, Tammy Humbird, Jamieson Greaver, Ellen Chang, Willie P. Ragasa, Charles A. Montgomery, Joiner Cartwright, Jr, Allison McGeer, Donald E. Low, Adeline R. Whitney, Philip T. Cagle, Terry L. Blasdel, Frank R. DeLeo, and James M. Musser **Decreased necrotizing fasciitis capacity caused by a single nucleotide mutation that alters a multiple gene virulence axis** PNAS 2010 107 (2) 888-893

Mor Meyerovich, Gideon Mamou, and Sigal Ben-Yehuda **Visualizing high error levels during gene expression in living bacterial cells** PNAS 2010 107 (25) 11543-11548

Thurs 4/5/11

Keiko Sato, Mariko Naito, Hideharu Yukitake, Hideki Hirakawa, Mikio Shoji, Mark J. McBride, Ryan G. Rhodes, and Koji Nakayama **A protein secretion system linked to bacteroidete gliding motility and pathogenesis** PNAS 2010 107 (1) 276-28

Maria Chatzidaki-Livanis, Katja G. Weinacht, and Laurie E. Comstock **Trans locus inhibitors limit concomitant polysaccharide synthesis in the human gut symbiont *Bacteroides fragilis*** PNAS 2010 107 (26) 11976-11980

David T. Hughes, Darya A. Terekhova, Linda Liou, Carolyn J. Hovde, Jason W. Sahl, Arati V. Patankar, Juan E. Gonzalez, Thomas S. Edrington, David A. Rasko, and Vanessa Sperandio **Chemical sensing in mammalian host-bacterial commensal associations** PNAS 2010 107 (21) 9831-9836

Thurs 4/12/11

Andrew M. Wier, Spencer V. Nyholm, Mark J. Mandel, R. Prisca Massengo-Tiassé, Amy L. Schaefer, Irina Koroleva, Sandra Splinter-BonDurant, Bartley Brown, Liliana Manzella, Einat Snir, Hakeem Almabrazi, Todd E. Scheetz, Maria de Fatima Bonaldo, Thomas L. Casavant, M. Bento Soares, John E. Cronan, Jennifer L. Reed, Edward G. Ruby, and Margaret J. McFall-Ngai **Transcriptional patterns in both host and bacterium underlie a daily rhythm of anatomical and metabolic change in a beneficial symbiosis** PNAS 2010 107 (5) 2259-2264

Yanling Wang, Yann S. Dufour, Hans K. Carlson, Timothy J. Donohue, Michael A. Marletta, and Edward G. Ruby **H-NOX-mediated nitric oxide sensing modulates symbiotic colonization by *Vibrio fischeri*** PNAS 2010 107 (18) 8375-8380

Hubert Salvail, Pascale Lanthier-Bourbonnais, Jason Michael Sobota, Mélissa Caza, Julie-Anna M. Benjamin, Martha Eugènia Sequeira Mendieta, François Lépine, Charles M. Dozois, James Imlay, and Eric Massé **A small RNA promotes siderophore production through transcriptional and metabolic remodeling** PNAS 2010 107 (34) 15223-15228

Thurs 4/19/11

Proc Natl Acad Sci U S A. 2011 Oct 4;108(40):16747-52. **A role for variable region-containing chitin-binding proteins (VCBPs) in host gut-bacteria interactions.** Dishaw LJ, Giacomelli S, Melillo D, Zucchetti I, Haire RN, Natale L, Russo NA, De Santis R, Litman GW, Pinto MR.

Proc Natl Acad Sci U S A. 2011 Sep 20;108(38):16032-7. ***Helicobacter pylori* vacuolating cytotoxin A (VacA) engages the mitochondrial fission machinery to induce host cell death.** Jain P, Luo ZQ, Blanke SR.

Proc Natl Acad Sci U S A. 2011 Sep 6;108(36):14944-9. **Carcinogenic bacterial pathogen *Helicobacter pylori* triggers DNA double-strand breaks and a DNA damage response in its host cells.** Toller IM, Neelsen KJ, Steger M, Hartung ML, Hottiger MO, Stucki M, Kalali B, Gerhard M, Sartori AA, Lopes M, Müller A.

Thurs 4/26/11

Proc Natl Acad Sci U S A. 2011 Sep 6;108(36):14733-40. **Minimization of the *Legionella pneumophila* genome reveals chromosomal regions involved in host range expansion.** O'Connor TJ, Adepoju Y, Boyd D, Isberg RR.

Proc Natl Acad Sci U S A. 2011 Sep 20;108(38):E746-52. **Targeted enrichment of ancient pathogens yielding the pPCP1 plasmid of *Yersinia pestis* from victims of the Black Death.** Schuenemann VJ, Bos K, DeWitte S, Schmedes S, Jamieson J, Mittnik A, Forrest S, Coombes BK, Wood JW, Earn DJ, White W, Krause J, Poinar HN

Proc Natl Acad Sci U S A. 2011 Sep 13;108(37):E709-17. **Global discovery of small RNAs in *Yersinia pseudotuberculosis* identifies *Yersinia*-specific small, noncoding RNAs required for virulence.** Koo JT, Alleyne TM, Schiano CA, Jafari N, Latham WW.

The Science Seminar Series Spring 2012 Schedule seminars will be held in the Student Union Theatre at 4pm, unless otherwise indicated, check the website regularly for updates: <http://www.valdosta.edu/cas/scisem/Spring2012.shtml>

Thursday, January 19 - Dr. Gretchen K. Bielmyer, VSU Biology
Emerging issues in marine metal toxicity

Thursday, January 26 - Ed Mondor, Georgia Southern University
The good, the bad, and the downright nasty: Microhabitat preferences of carrion-infesting Diptera

Thursday, February 2 - Dr. Jose A. Velez Marulanda, VSU Math/CS
Title TBA

Thursday, February 9 - Dr. Will Crampton, University of Central Florida
Reproductive Character Displacement in Neotropical Electric Fishes

Thursday, February 16 - Dr. Corey Anderson, VSU Biology
Title TBA

Thursday, February 23 - Andrew Noss

Thursday, March 1 - TBA

Thursday, March 8 - TBA

Thursday, March 15 - Spring Break

Thursday, March 22 - Martin Grosell

Thursday, March 29 - Dr. A. Saatchi
From Parthian Batteries to Li ion Batteries

Thursday, April 5 - TBA

Thursday, April 12 - TBA

Thursday, April 19 - TBA

