

## BISC 436: Human Genetics (Spring 2015)

Tu/Th 11 am-12:15 pm

Hume 221

Professor

Office Hours: MW 11-12 or by appointment

Sarah Liljegen

office: 118 Shoemaker Hall

Textbook:

[liljegen@olemiss.edu](mailto:liljegen@olemiss.edu)

Michael Cummings. *Human Heredity*

<b>Date</b>	<b>Topic</b>	<b>Read</b>
Jan 22	<b>Introduction to Human Genetics</b> Draw for book report dates <i>Find a current news article about genetic testing</i>	Chapter 1
Jan 27	<b>How does genetic testing affect us?</b> Discuss articles (2 min presentation each) <i>Choose books (email your choice to Dr. Liljegen)</i>	Chapter 1
Jan 29	Discuss articles	
Feb 3	<b>Transmission of Genes</b>	Chapter 3
Feb 5	<b>Book Reports #1-8: Living with Human Diseases and Disorders</b> <i>(4 min presentation each + discussion)</i>	
Feb 10	<b>Book Reports #9-16</b>	
Feb 12	<b>Book Reports #17-21 Pedigree Analysis in Human Genetics</b>	Chapter 4
Feb 17	<b>Pedigree Analysis</b>	Chapter 4
Feb 19	<b>The Inheritance of Complex Traits</b>	Chapter 5
Feb 24	<b>Cytogenetics: Karyotypes and Chromosome Aberrations</b>	Chapter 6
Feb 26	<b>Guest Expert: TBD</b> <b>University of Mississippi Medical Center</b> "What does a genetic counselor do?"	
Mar 3	<b>From Proteins to Phenotypes</b>	Chapter 10
Mar 5	<b>Midterm</b>	
Mar 17*	<b>Introduction to Group Research Projects</b> Draw for group presentation dates Choose disorder or disease/Group Research	

<u>Date</u>	<u>Topic</u>	<u>Read</u>
Mar 19*	<b>Group Research</b>	
Mar 24	<b>Group Presentations: Preliminary Findings</b> <i>(6 min presentation/group + discussion)</i>	
Mar 26*	<b>Mutations and Epigenetics/Group Research</b>	Chapter 11
Mar 31*	<b>Genes and Cancer/Group Research</b>	Chapter 12
Apr 2*	<b>Biotechnology and Society/Group Research</b>	Chapter 14
Apr 7*	<b>Genomes and Genomics/Group Research</b>	Chapter 15
Apr 9	<b>Reproductive Technology and Gene Therapy</b>	Chapter 16
Apr 14	<b>NO CLASS</b> <i>Practice presentation with your group</i>	
Apr 16	<b>Group Presentations: The Big Show</b> <i>(30 min presentation/group + discussion)</i>	
Apr 21	<b>Group Presentations</b>	
Apr 23	<b>Group Presentations</b>	
Apr 28	<b>Group Presentation/ Genetics of Behavior</b>	Chapter 18
Apr 30	<b>Finish and Review for Final</b>	
May 5	<b>Final Exam Tuesday Noon</b>	

*Syllabus revisions will be posted on Blackboard.*

**Course Description:** This course is designed to allow Biology majors and students planning careers in medical/scientific fields to explore the ongoing revolution in our understanding of human genetics and the ability to uncover human disease and variability through genetic testing. Students will review the basics of molecular genetics, learn about genetic counseling, discuss ethical issues of genetic testing and treatment, and carry out research projects in small groups on human diseases such as cystic fibrosis, breast cancer, sickle cell anemia, and Huntington's disease.

**Laptop Requirement:** You will need to bring your laptop for the indicated class periods (\*) to do research online with your group. On presentation days, please arrange for one member of your group to bring a laptop.

**Book Reports:** Please pick one of the following books for your report about living with a disease/disorder and email your choice to me by 1/27. Books not on the list may also be selected

with pre-approval. If the same book is selected by more than one person, the earlier choice will have precedence.

Looking up the book descriptions on amazon.com is a quick way to find out more about the titles that interest you. Books marked with an asterisk are available at the Oxford Public Library (free!). Your oral report should be concise (4 minutes maximum)--What insights did you gain from reading your book? A word-processed version of your report is due during the same class period (4 double-spaced pages maximum). Both components of your report will be graded.

Beck, Martha. *Expecting Adam: A True Story of Birth, Rebirth and Everyday Magic\**  
Biderman, Beverly. *Wired for Sound: A Journey into Hearing*  
Cohen, Richard. *Blindsided: Lifting a Life Above Illness: A Reluctant Memoir\**  
Deford, Frank. *Alex: The Life of a Child*  
Detrich, Terry & Detrich, Don. *The Spirit of Lo: An Ordinary Family's Extraordinary Journey*  
DiDonato, Tiffanie. *Dwarf: a Memoir.*  
Estress, Jenifer & Couric, Katie. *Tales from the Bed: On Living, Dying, and Having It All*  
Gable, Mona. *Blood Brother: The gene that rocked my family*  
Gironimi, Jay. *Can't Eat, Can't Breathe and other ways Cystic Fibrosis has F#\$%\*d me*  
Grandin, Temple. *Thinking in Pictures: And Other Reports from My Life with Autism\**  
Grandin, Temple. *The Autistic Brain: Helping Different Kinds of Minds Succeed\**  
Grandin, Temple. *The way I see it: a personal look at autism & Asperger's\**  
Hampton, Kelle. *Bloom: Finding Beauty in the Unexpected—A Memoir*  
Heyman, Carly & Conley, Stephanie. *My Extra Special Brother*  
Higashida, Naoki. *The Reason I Jump: the Inner Voice of a 13-year-old boy with autism\**  
Hirsch, James. *Cheating Destiny: Living with Diabetes\**  
Hull, John. *Touching the Rock: An Experience of Blindness*  
Karlen, Richard. *Devil's Dance*  
Kennedy, Dan. *Little People: Learning to See the World Through My Daughter's Eyes*  
Kingsley, Jason & Levitz, Mitchell. *Count Us in: Growing Up With Down Syndrome*  
Kisor, Henry. *What's That Pig Outdoors: A Memoir of Deafness\**  
Lesh, Margaret. *Let Me Get This Off my Chest: A Breast Cancer Survivor Over-shares*  
Nash, Jennie. *The Victoria's Secret Catalog Never Stops Coming: And Other Lessons I Learned From Breast Cancer\**  
Preves, Sharon. *Intersex and Identity: the Contested Self*  
Prince-Hughes, Dawn. *Songs of the Gorilla Nation: My Journey Through Autism\**  
Richardson, John H. *In the Little World: A True Story of Dwarfs, Love, and Trouble\**  
Rogers, Cindi. *Becoming Mrs. Rogers: Learning to Live the Fragile X Way*  
Rothenberg, Laura. *Breathing for a Living: A Memoir\**  
Seligman, Adam Ward. *Don't Think about Monkeys. Extraordinary Stories written by people with Tourette syndrome.*  
Silver, Ann. *One Way, Deaf Way.*  
Sinton, William. *I Choose to Live: A Journey through Life with ALS*  
Simmons, Philip. *Learning to Fall: The Blessings of an Imperfect Life\*(library e-book)*  
Smoak, Shelby. *Bleeder: A Memoir\**  
Spradley, Thomas & Spradley, James. *Deaf like Me.*  
Stallings, Gene & Cook, Sally. *Another Season: A Coach's Story of Raising an Exceptional Son*  
Tolchin, Charlie. *Blow the House Down: The Story of My Double Lung Transplant*  
Walker, Lou Ann. *A Loss for Words: The Story of Deafness in a Family*  
Warner, Delores. *Don't Buy Too Many Green Bananas: Living with ALS*

Weihenmayer, Erik. *Touch the Top of the World: A Blind Man's Journey to Climb Farther Than the Eye Can See\**  
 Weiner, Jonathan. *His Brother's Keeper: A Story from the Edge of Medicine*  
 Wexler, Alice. *Mapping Fate: A Memoir of Family, Risk, and Genetic Research*  
 Wexler, Alice. *The Woman Who Walked into the Sea: Huntington's and the Making of a Genetic Disease.*  
 Williams, Montel & Grobel, Lawrence. *Climbing Higher\**  
 Wolfson, Penny. *Moonrise: One Family, Genetic Identity, and Muscular Dystrophy*  
 Zimmermann, Susan. *Grief Dancers: A Journey into the Depths of the Soul*  
 Zimmermann, Susan. *Keeping Katherine: A Mother's Journey to Acceptance\**(library e-book)  
 Zuckoff, Mitchell. *Choosing Naia: A Family's Journey\**

**Group Projects:** As part of this course, you will be working with other students in teams of 3 (which I will assign). As a group, you will select a disorder/disease to research during the semester from the following list. Alternatively, your group may come up with your own topic with my approval. As the molecular basis of the disorder/disease selected will be part of your presentation, information about altered gene function should be available for any disorder/disease selected which is not on the list. Please let me know your choice during class on 1/17. If a disorder/disease is selected by more than one group, the earlier choice will have precedence.

Osteogenesis imperfecta	Achondroplasia
Hemochromatosis	Down syndrome
Duchenne Muscular Dystrophy	Familial Adenomatous Polyposis
Celiac disease	Sickle cell anemia
Breast cancer (BRCA1 or BRCA2)	Cystic fibrosis
Huntington's disease	Marfan's syndrome
Neurofibromatosis	Tay-sach's disease
Hearing loss (Connexin26)	Noonan syndrome
Bloom syndrome	Fragile X syndrome

**Grades:** Group projects (35%): Preliminary Results (10%), The Big Show (25%). Individual presentations (25%): News Article (5%), Book Report (20%). Discussion participation (10%). Exams (30%): Midterm (15%), Final (15%). Attendance is important! Points will be deducted from your participation grade for any unexcused absences.

Exams will have a multiple choice/fill-in-the-blank/short answer format and will be based on the material we cover in class, including the diseases/disorders presented as individual and group projects. Late individual or group presentations will automatically receive half credit. The plus/minus grading system will be used with standard cutoffs. Ie. 90-100% = A-/A; 80-89% = B-/B/B+.

#### **Useful websites**

<http://www.genetests.org/>  
<http://www.geneticalliance.org/>  
<http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=OMIM>

## **A sampling of recent news articles about genetic testing and human genetics**

\*\*\*<http://www.vox.com/2014/9/9/5975653/with-genetic-testing-i-gave-my-parents-the-gift-of-divorce-23andme> (everyone, please read for discussion on 1/27)

\*\*\*[http://www.salon.com/2014/03/23/hitlers\\_favorite\\_american\\_biological\\_fascism\\_in\\_the\\_shadow\\_of\\_new\\_york\\_city/](http://www.salon.com/2014/03/23/hitlers_favorite_american_biological_fascism_in_the_shadow_of_new_york_city/) (everyone, please read for discussion on 1/29)

[http://www.slate.com/blogs/future\\_tense/2015/01/07/23andme\\_has\\_a\\_60\\_million\\_contract\\_deal\\_with\\_genentech\\_to\\_provide\\_data\\_for.html](http://www.slate.com/blogs/future_tense/2015/01/07/23andme_has_a_60_million_contract_deal_with_genentech_to_provide_data_for.html)

[http://www.slate.com/blogs/wild\\_things/2014/08/25/human\\_pheromones\\_the\\_lack\\_of\\_a\\_jacobson\\_s\\_or\\_vomeronasal\\_organ\\_doesn\\_t\\_keep.html](http://www.slate.com/blogs/wild_things/2014/08/25/human_pheromones_the_lack_of_a_jacobson_s_or_vomeronasal_organ_doesn_t_keep.html)

<http://www.bbc.com/news/health-30742774>

<http://www.nytimes.com/2014/08/17/opinion/sunday/cancer-and-the-secrets-of-your-genes.html>

[http://www.cnn.com/2014/03/08/us/mississippi-unmarked-graves/index.html?hpt=hp\\_t2](http://www.cnn.com/2014/03/08/us/mississippi-unmarked-graves/index.html?hpt=hp_t2)

[http://www.slate.com/articles/health\\_and\\_science/new\\_scientist/2014/08/dna\\_donors\\_for\\_the\\_resilience\\_project\\_carriers\\_of\\_inherited\\_diseases\\_could.html](http://www.slate.com/articles/health_and_science/new_scientist/2014/08/dna_donors_for_the_resilience_project_carriers_of_inherited_diseases_could.html)

<http://www.reuters.com/article/2014/07/29/us-healthcare-23andme-idUSKBN0FY2IM20140729>

[http://www.slate.com/articles/technology/future\\_tense/2014/05/decode\\_genetics\\_wants\\_to\\_collect\\_dna\\_from\\_one\\_third\\_of\\_icelanders.html](http://www.slate.com/articles/technology/future_tense/2014/05/decode_genetics_wants_to_collect_dna_from_one_third_of_icelanders.html)

[http://www.slate.com/blogs/xx\\_factor/2014/06/18/jesse\\_lee\\_herald\\_agrees\\_to\\_a\\_vasectomy\\_as\\_part\\_of\\_his\\_plea\\_deal\\_bad\\_idea.html](http://www.slate.com/blogs/xx_factor/2014/06/18/jesse_lee_herald_agrees_to_a_vasectomy_as_part_of_his_plea_deal_bad_idea.html)

[http://www.nytimes.com/2014/03/06/health/study-gives-hope-of-altering-genes-to-repel-hiv.html?\\_r=0](http://www.nytimes.com/2014/03/06/health/study-gives-hope-of-altering-genes-to-repel-hiv.html?_r=0)

<http://www.sciencedaily.com/releases/2014/07/140730043402.htm>

<http://www.nytimes.com/2014/03/09/opinion/sunday/the-fat-drug.html?hp&rref=opinion>

<http://www.nature.com/news/biomarkers-could-predict-alzheimer-s-before-it-starts-1.14834>

<http://www.nytimes.com/2014/03/18/science/shoukhrat-mitalipovs-mitochondrial-manipulations.html?hpw&rref=science>

[http://www.nytimes.com/2014/05/05/science/young-blood-may-hold-key-to-reversing-aging.html?hp&\\_r=0](http://www.nytimes.com/2014/05/05/science/young-blood-may-hold-key-to-reversing-aging.html?hp&_r=0)

[http://www.nytimes.com/2014/06/29/magazine/the-brave-new-world-of-three-parent-ivf.html?\\_r=0](http://www.nytimes.com/2014/06/29/magazine/the-brave-new-world-of-three-parent-ivf.html?_r=0)