**UNIVERSITY OF FLORIDA**

**Department of Health Outcomes and Biomedical Informatics**

**Health Outcomes and Biomedical Informatics Research Seminar**

**GMS 7887 / sections 016E (Summer A) and CSE2 (Summer B)**

**Summer 2020**

Instructor: Mathias Brochhausen, Ph.D. and Bruce Vogel, Ph.D.

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Class Meetings: Tuesdays, 3rd Period, 11:00am-12:15pm

Classroom: Virtual

Credits: 1 credit each, Summer A and B

Office Hours: By appointment

**Introduction**

This class will be cover a series of current topics in health outcomes and biomedical informatics from the perspective of the past, present, and future. We have chosen topics where past and present shortcomings in the implementation and application of research have caused real world problems. All students will read the assigned papers on the topic and do the assigned activities prior to class. Discussion questions will be provided on each topic and these questions will be explored during each class meeting. Please come to class prepared to contribute to the discussion and to raise any issues or questions of your own on the assigned topic.

**Grading**

Grades will be S/U (Satisfactory/Unsatisfactory) based on class attendance and participation in class discussions. Any absence from class must be approved by the instructors prior to the class meeting. For additional grading policy information, you may visit <http://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

**Objectives**

As a result of this course, students will be able to:

1. Review, evaluate, and comment upon the evolving literature in health outcomes and biomedical informatics.
2. Identify strengths and weaknesses of peer-reviewed journal publications based on the nature of the research topic and the appropriateness of the study design.
3. Contribute to critical discussions of the scientific literature in a meaningful manner.
4. Understand the evolution (past, present, and future) of important research themes in the areas of health outcomes and biomedical informatics.

**Course Requirements**

We will operate as an advanced graduate seminar in a virtual synchronous environment using Zoom, with students taking an active role in initiating and leading discussions. Attendance (virtual) and active participation in all class discussions are required. You should give thoughtful attention to the discussion questions associated with each topic prior to class.

**Class Attendance**

Class attendance is required. Excused absences follow the criteria of the UF Graduate Catalogue (e.g., illness, serious family emergency, military obligations, religious holidays), and should be communicated to the instructors prior to the missed class day whenever possible. Regardless of attendance, students are responsible for all material presented in class. The use of cell phones, pagers, or laptop computers (except for class assignments) is not permitted in class.

**Accommodations for Students with Disabilities**

Students requiring accommodations must first register with the Dean of Students' Office. The Dean of Students' Office will provide documentation to the student who must then provide this documentation to the faculty member when requesting accommodation. The College is committed to providing reasonable accommodations to assist students in their coursework.

**University of Florida Academic Honesty Statements**

“I understand that the University of Florida expects its students to be honest in all their academic work. I agree and adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University.”

“All faculty, staff and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate.”

“We, the members of the University of Florida, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.”

**University of Florida Course Evaluation Policy**

“Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via [https://ufl.bluera.com/ufl/](https://urldefense.proofpoint.com/v2/url?u=https-3A__ufl.bluera.com_ufl_&d=DwMFAg&c=sJ6xIWYx-zLMB3EPkvcnVg&r=y2HjEMjRMHJhfdvLrqJZlYczRsfp5e4TfQjHuc5rVHg&m=WXko6OK_Ha6T00ZVAsEaSh99qRXHOgMNFRywCoehRho&s=itVU46DDJjnIg4CW6efJOOLgPjdzsPvCghyfzJoFONs&e=). Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.”

**Class Meetings – Summer A and B**

**Tuesday, May 12, 2019**

**Causal Inference**

**Past**

Skim: Bothwell, L., & Podolsky, S. (2016). The Emergence of the Randomized, Controlled Trial. N

Engl J Med, 375(6), 501–504. https://doi.org/10.1056/NEJMp1604635

**Present**

Read: Vogel, W.B. (2020) “An Overview of Causal Inference in Observational Settings,” class handout

Varian, H. R. (2016). Causal inference in economics and marketing. Proceedings of the National Academy of Sciences, 113(27), 7310–7315. https://doi.org/10.1073/pnas.1510479113

**Future**

Skim: Shpitser, I. (2014). Causal Graphs : Addressing the Confounding Problem Without Instrument

or Ignorability. *Statistical Science*, *29*(3), 367–370. https://doi.org/10.1214/14-STS488

**Tuesday, May 19, 2019**

**Semantic Integration of Health Data**

**Past**

Barry Smith and Mathias Brochhausen, “Putting Biomedical Ontologies to Work”, Methods of Information in Medicine, 2010 Feb 5;49.

**Present**

Ogunyemi OI, et al. Identifying appropriate reference data models for comparative effectiveness

research (CER) studies based on data from clinical information systems. Med Care. 2013 Aug; 51(8

Suppl 3): S45-52.

Post AR, et al. Metadata-driven Clinical Data Loading into i2b2 for Clinical and Translational Science

Institutes. AMIA Jt Summits Transl Sci Proc. 2016; 2016: 184–193.

**Future**

Brochhausen M, Bona J, Blobel B. “The Role of Axiomatically-Rich Ontologies in Transforming Medical Data to Knowledge.” Stud Health Technol Inform. 2018;249:38-49.

Bona JP, Prior FW, Zozus MN, Brochhausen M. Enhancing Clinical Data and Clinical Research Data with Biomedical Ontologies - Insights from the Knowledge Representation Perspective. Yearb Med Inform. 2019 Aug;28(1):140-151. doi: 10.1055/s-0039-1677912. Epub 2019 Aug 16. PMID:31419826

**Tuesday, May 26, 2019**

**Medicare Hospital Compare**

*The following Health Affairs blog entry provides an overview of the controversy over Medicare’s July 2016 implementation of its new overall star rating system on the Hospital Compare website.*

Read online: Xu S, Grover AG. (2016). CMS’ Hospital Quality Star Ratings Fail To Pass The Common Sense Test. Retrieved March 12, 2019, from <https://www.healthaffairs.org/do/10.1377/hblog20161114.057512/full/>

*Visit the Medicare Hospital Compare website for yourself:*

Medicare.gov website. *Hospital Compare*. Accessed at <https://www.medicare.gov/hospitalcompare/search.html>

*Suggested exercise: Type in “Gainesville, FL” to see the star ratings for local hospitals. Compare ratings for UF Health Shands in Gainesville and Shands Lake Shore Regional Medical Center in Lake City. Look up Johns Hopkins Hospital in Baltimore, MD (#3 ranked in the U.S. by US News and World Report) and Barnes Jewish Hospital in St. Louis, MO (tied for #11 in the U.S.)*

*Review (skim) the Medicare Hospital Care methodology report to see how the reported ratings are developed:*

Center for Outcomes Research and Evaluation. (2017). Overall Hospital Quality Star Rating on Hospital

*Compare*, *Methodology Report (v3.0).* New Haven, CT. Yale University.

*Review (skim) a representative published study about Hospital Compare:*Hu, J., Jordan, J., Rubinfeld, I., Schreiber, M., Waterman, B., & Nerenz, D. (2017). Correlations Among Hospital Quality Measures: What "Hospital Compare" Data Tell Us. *American Journal of Medical Quality*, *32*(6), 605–610. https://doi.org/10.1177/1062860616684012

**Tuesday, June 2, 2019**

**Biobanks and Biomedical Informatics**

**Past**

Harris JR, Burton P, Knoppers BM, et al. Toward a roadmap in global biobanking for health. *Eur J Hum Genet*. 2012;20(11):1105–1111. doi:10.1038/ejhg.2012.96

**Present**

**Brochhausen M, Zheng J, Birtwell D, et al. OBIB-a novel ontology for biobanking. *J Biomed Semantics*. 2016;7:23. Published 2016 May 2. doi:10.1186/s13326-016-0068-y**

**Future**

Coppola L, Cianflone A, Grimaldi AM, et al. Biobanking in health care: evolution and future directions. *J Transl Med*. 2019;17(1):172. Published 2019 May 22. doi:10.1186/s12967-019-1922-3

**Tuesday, June 9, 2019**

**Pay-for-Quality / Pay-for-Value**

Slides: Texas Medicaid Pay-for-Quality Program: Why Simpler is Better

Bruce Vogel

**Value-Based Purchasing – Past and Present**

Read: Porter, M. E. (2010). What Is Value in Health Care? *N Engl J Med*, *362*(26), 2477–2481. Retrieved from https://www.nejm.org/doi/pdf/10.1056/NEJMp1011024?articleTools

Skim: Porter, M. E., & Lee, T. H. (2016). From Volume to Value in Health Care. *JAMA*, *316*(10), 1047. https://doi.org/10.1001/jama.2016.11698

**Value-Based Purchasing – Near Future**

Slides: Texas Value-Based Enrollment Model – Spreadsheet Model

Matt Ferrara, Texas Health and Human Services

Data Envelopment Analysis (DEA)

Read: Dowd, B., Swenson, T., Kane, R., Parashuram, S., & Coulam, R. (2014). CAN DATA ENVELOPMENT ANALYSIS PROVIDE A SCALAR INDEX OF ‘ VALUE ’ ? Health Econ, 23(12), 1465–1480. https://doi.org/10.1002/hec

Slides: Texas Value-Based Enrollment Model – Data Envelopment Version

Bruce Vogel

**Tuesday, June 16, 2019**

**Precision Medicine vs Precision Public Health**

Present 1: Auffray C, Caulfield T, Griffin JL, Khoury MJ, Lupski JR, Schwab M: From genomic medicine to precision medicine: highlights of 2015. *Genome Med*. 2016; 8: 12.

Present 2: Khoury MJ, Iardemarco MF, Riley WT: Precision Public Health for the Era of Precision Medicine. *Am J Prev Med*.2016 Mar; 50(3): 398–401.

Future: Taylor-Robinson D, Kee F: Precision public health—the Emperor’s new clothes. *Int J Epidemiol*. 2019 Feb; 48(1): 1–6.

**Tuesday, June 23, 2019**

Summer Break, No Class

**Tuesday, June 30, 2019**

Summer Break, No Class

*Summer B*

**Tuesday, July 7, 2019**

**Geographical Variations in Health Care Spending**

**Past**

Read: Wennberg J, Gittelsohn A. (1973). Small Area Variations in Health Care Delivery. *Science,* 182, 1102–1108. Retrieved from http://archive.dartmouthatlas.org/downloads/papers/Science\_1973.pdf

Skim: Wennberg JE, Cooper MM. (1996). *The Dartmouth Atlas of Health Care*. Center for Evaluative Health Sciences, Dartmouth University. American Hospital Publishing. Retrieved from http://archive.dartmouthatlas.org/downloads/atlases/96Atlas.pdf

**Present**

Skim: *Crossing the Quality Chasm : A New Health System for the 21st Century. (2001).* Washington DC: Institute of Medcine. https://doi.org/1.

Skim: Dartmouth Atlas Project, <https://www.dartmouthatlas.org/>

**Future**

The Leapfrog Group, <http://www.leapfroggroup.org/>

Haven, <https://havenhealthcare.com/>

**Tuesday, July 14, 2019**

**Google Trends and Infodemiology**

Ginsberg et al. (2009). Detecting influenza epidemics using search engine query data. <http://www.ncbi.nlm.nih.gov/pubmed/19020500>

Lazer et al. (2014). Big data. The parable of Google Flu: traps in big data analysis. <http://www.ncbi.nlm.nih.gov/pubmed/21311013>

Butler (2013). When Google got flu wrong. http://www.ncbi.nlm.nih.gov/pubmed/23407515

Arora et al. (2019). Google Trends: Opportunities and limitations in health and health policy research. <http://www.ncbi.nlm.nih.gov/pubmed/30660346>

Mavragani et al. (2018). Assessing the Methods, Tools, and Statistical Approaches in Google Trends Research: Systematic Review. <https://www.ncbi.nlm.nih.gov/pubmed/30401664>

**Tuesday, July 21, 2019**

**Risk Adjustment**

**Present**

Read: Vogel WB, Chen GJ. (2018). An Introduction to the How and Why of Risk Adjustment. *Biostatistics and Epidemiology*,  Retrieved from <https://www.tandfonline.com/action/showCitFormats?doi=10.1080%2F24709360.2018.1519990>

**Past**

Skim: Hebel, R., Entwisle, G., & Tayback, M. (1971). A Risk-Adjustment Technique for Comparing Prematurity Rates Among Clinic Populations. HSMHA Health Reports, 86(10), 946–952. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1937218/pdf/hsmhahr00010-0094.pdf

This is the first paper in PubMed to use the term "risk adjustment".

**Future**

Skim: Rose, S. (2016). A Machine Learning Framework for Plan Payment Risk Adjustment. *Health Services Research*, 51(6), 2358–2374. https://doi.org/10.1111/1475-6773.12464

Skim: Delahanty RJ, Kaufman D, Jones SS. (2018). Development and Evaluation of an Automated Machine Learning Algorithm for In-Hospital Mortality Risk Adjustment Among Critical Care Patients. *Critical Care Medicine*, *46*(6), e481–e488. Retrieved from http://ovidsp.tx.ovid.com/sp-3.33.0b/ovidweb.cgi

**Tuesday, July 28, 2019**

**Using EHR data for risk predication and hypothesis generation**

**Past**:

Goldstein BA, Navar AM, Pencina MJ, Ioannidis JP. Opportunities and challenges in developing risk prediction models with electronic health records data: a systematic review. J Am Med Inform Assoc. 2017 Jan;24(1):198-208. doi: 10.1093/jamia/ocw042. Epub 2016 May 17.

**Present**

Kaji DA, Zech JR, Kim JS, et al. An attention based deep learning model of clinical events in the intensive care unit. *PLoS One*. 2019;14(2):e0211057. Published 2019 Feb 13. doi:10.1371/journal.pone.0211057

**Future**

Jensen AB, Moseley PL, Oprea TI, et al. Temporal disease trajectories condensed from population-wide registry data covering 6.2 million patients. *Nat Commun*. 2014;5:4022. Published 2014 Jun 24. doi:10.1038/ncomms5022

**Tuesday, August 4, 2019**

Late-Breaking Topics

**Tuesday, August 11, 2019**

Late-Breaking Topics