GMS 6806: Security and Privacy in Clinical Research (3 credit hours)
Fall 2025

LOCATION: DSIT (Malachowsky Hall) 7126 and 3003

Class will be in DSIT 3003 on the following days:

- Monday, August 25th
- Monday, September 22nd
- Monday, October 27th
- Monday, November 24th

All other classes will be held in DSIT 7126.

CLASS HOURS: Mondays, 12:50pm to 3:50 pm

INSTRUCTORS:
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COURSE OVERVIEW:
GMS 6806 provides students with an introduction to a wide range of concepts, policies, and techniques in security and privacy (S&P) as they apply to biomedical and clinical research. Information security and data privacy are essential components of biomedical and clinical research. It is imperative for students to understand S&P rules and guidelines (e.g., the Health Insurance Portability and Accountability Act (HIPAA)) but also gain practical experience with technologies, tools, and approaches in dealing S&P issues thought out the life cycle of a research project, from experimental design and data collection to data analysis to the dissemination and archiving of valuable results. In this course, students are introduced to the broad landscape of information security and data privacy for biomedical and clinical research: S&P related regulations and guidelines in clinical research; basic concepts of computer security; security analysis of a study's security plan; best practices in secure data management (e.g., de-identification and encryption); and state-of-the-art tools, methods, and approaches for the protection of information security and data privacy.

COURSE OBJECTIVES:
The goals of the course are:

- To provide basic understanding of the role of information security and data privacy in biomedical and clinical research.
- To familiarize students with basic principles of computer security (e.g., confidentiality, integrity, and availability).
- To deepen students' understanding of security principles in research data management.
- To help students understand ethical and legal issues dealing with biomedical and clinical data.
- To introduce the concepts of the Institutional Review Board (IRB) and its function in protecting human subjects.
- To give students access to state-of-the-art tools, methods, and approaches for the protection of information security and data privacy.

TEXTBOOKS/READING MATERIALS:
Rinehart-Thompson LA. Introduction to Health Information Privacy and Security (3rd ed). 2024. Chicago, IL: AHIMA Press. Print ISBN: 9781584269236. eText ISBN: 978-1-58426-924-3.

Additional readings will be assigned each week, as specified in course schedule below.

OFFICE HOURS:
Office hours are by request. Please email the instructors for an appointment in advance. It is likely that we can address the questions over email. However, if this is not possible, please make an appointment.

PREREQUISITES:
N/A

CLASS STRUCTURE:
Generally, we will start each class period with a lecture led by the instructors or a guest speaker. The second part of the class will be a student-led discussion by an assigned discussion leader.

GRADE COMPOSITION:
Attendance and Participation: 5%
Discussion lead: 30%
Midterm (presentation): 25%
Final (report): 40%

Course project: During the course, you will choose one of the following options and will complete a midterm presentation and final paper. You can complete this individually or collaborate with other students as a team. However, each team can have up to two (2) members. Exceptions can only be made with written explanation and subject to the instructor's approval. Please clearly delineate the roles and responsibilities of each team member. Your final grade of the course project will be adjusted based on your contribution (e.g., merely presenting the project in the midterm presentation is NOT a contribution).

OPTION 1: Practical project: Propose a study that uses at least two of the following activities as part of your Methods. You are welcome to do this activity related to your research in your lab, but make sure it is something you have not already done in the lab and new for this course, and you must not leverage work your PI or a lab mate does.

Choose at least one of the following Methods for each subsection below to include in your project (and to complete during the semester as part of your project):

Do at least one of the following:

- Run an i2b2 query on your intended study sample
- Develop an informed consent and an authorization for PHI use/disclosure

AND
Do at least one of the following:

- Submit an IDR data request (including the full process of obtaining IRB approval, and including the information needed by IDR in the request portal; may include consulting with IDR if needed)
    - If you do not have a 'real' project for which you need to do this, you do not actually need to submit the IRB and IDR request, but you should complete all forms
- Complete a UF risk assessment using the UF Integrated Risk Management System including a workflow diagram that you develop (https://security.ufl.edu/resources/risk-assessment/)
    - You do not need to actually hit submit unless this is for a 'real' project
- Run a model for federated learning/differential privacy

OPTION 2: Review: Students will be asked to conduct a systematic review of papers relevant to specific areas of the course (e.g., data privacy with big data in healthcare applications) and write a technical report (or a review paper). You are encouraged to come up with novel ideas related to the course.

Midterm (proposal) presentation:

- Up to 10 slides and no more than 10 minutes of presentation with 2 minutes Q&A.
- Please send the slides to the instructor at least three (3) days in advance.
- Please include the following in your slides: Background and motivation for the work, aims/objectives, planned approach/methods, roles of each team member, and timeline

Final paper requirements: the project report can be up to ten (10) pages (not including references), and please structure the report to include:

- Cover page with title and names of each team member
- Abstract: no more than 350 words summarizing the project.
- Introduction: a short background and significance, and objective(s)/aims of the study.
- Methods: design, setting, dataset, approaches, and main outcome measurements.
- Results: key findings
- Discussion: key conclusions with direct reference to the implications of the methods and/or results.

- References: please follow Vancouver style. No page limit.
- Appendices: Completed materials listed in "completed documents" below
- Proposals must use a single column and be double-spaced; Arial or Times New Roman font; font size no smaller than 11 point; tables and figure labels can be in 10 point; minimum 0.5 inch margins. Submit as a Word document.

Completed documents: Each project team is expected to turn in a final paper, including associated code (GitHub Repo URL) and datasets (or reference to used datasets if not able to share), codesheet (if systematic review), completed documents (e.g., i2b2 report, informed consent and authorization for HIPAA documents, IRB protocol and application and IDR request form, risk assessment application, model output, etc.).

Student led discussion: Students will be required to select a week for which they will act as the discussion leader on the assigned topic for that day. Discussion leaders have the responsibility of facilitating discussion by helping to summarize, compare/contrast, integrate, and consider the practical or research implications of the assigned readings. Discussion leaders should plan ahead by forming their own questions and creating activities, debates, and so forth to facilitate meaningful class discussion. Discussion leaders should also find and discuss a recent news article on the topic (ex: https://www.nytimes.com/2025/04/09/us/politics/trump-musk-data-access.html) in order to inform the class of things that are relevant current events or "hot off the press." The overarching goal of class discussion should be to enhance knowledge of the subject, as well as skill in communication and conceptualization.

You are not limited to any particular media outlet for identifying a relevant news article. However, please recall that UF provides free subscriptions to The New York Times, The Economist, and Wall Street Journal to students, if you choose to use one of these sources: https://businesslibrary.uflib.ufl.edu/wsj-nyt-economist

Participation: Students are expected to attend all classes. Students are expected to read all required materials before class, having thoughtfully considered the implications and contributions of each reading individually and collectively. Both the quantity and quality of student contributions will be evaluated. Recommendations for effective class participation include (but are not limited to) the following: (1) participate constructively by listening and posing questions or comments that elicit discussion; and (2) contribute additional value to discussions by integrating material and playing devil's advocate.

Attendance policy:
Class attendance is mandatory. Excused absences follow the criteria of the UF Graduate Catalogue (e.g., illness; serious accidents or emergencies affecting the student, their roommates, or their family; Title IX-related situations; special curricular requirements [e.g., judging trips, field trips, professional conferences]; military obligations; severe weather conditions that prevent class participation; religious holidays; participation in official university activities [e.g., music performances, athletic competition,

debate], and court-imposed legal obligations [e.g., jury duty or subpoena]). Other reasons (e.g., a job interview or club activity) may be deemed acceptable if approved by the instructors. Planned absences should be communicated to the instructor prior to the missed class day when possible. For all unplanned absences because of accidents or emergency situations, students should contact their instructor as soon as conditions permit.

This course is in person with limited support for virtual and hybrid options. Occasional exceptions may be made on a case-by-case basis in consultation with the instructors. Please contact the instructors at least one business day in advance of class (unless an emergency) if you have an extenuating circumstance that prohibits you from being able to attend class in person on a given date, and you would like consideration for a virtual option.

UF rules require attendance during at least one of the first two course sessions. If a student does not participate in at least one of the first two class meetings of the course, and they have not contacted the department to indicate their intent, the student can be dropped from the course. Students must not assume that they will be dropped, however. The department will notify students if they have been dropped from a course.

Regardless of attendance, students are responsible for all material presented in class and meeting the scheduled due dates for class assignments. Finally, students should read the assigned readings prior to the class meetings, and be prepared to discuss the material for each session.

Statement on the Use of ChatGPT

ChatGPT is a conversational artificial intelligence (AI) that uses a natural language processing (NLP) model by OpenAI. ChatGPT's language model was trained using billions of words and phrases collected from the internet, and it can generate responses in a conversational "thread" and take previous prompts or instructions into account. However, ChatGPT is far from perfect, "hallucinates" things (including citations), and is not an effective tool for certain types of tasks. We highly encourage you to read more about how ChatGPT works and the strengths and weaknesses of ChatGPT here https://citt.ufl.edu/services/learning-innovation--technology/artificial-intelligence/chatgpt/ and here https://libguides.umn.edu/chatgpt.

In this course, ChatGPT or other generative AI models may be used for brainstorming, but not for writing of any type (exception: for this course, use for grammar and language editing is OK). If you are in doubt as to whether you are using generative AI models appropriately in this course, we encourage you to discuss your situation with us. You are responsible for fact checking statements composed by generative AI models, and for ensuring content does not violate intellectual property laws, or contain misinformation or unethical content.

How to cite ChatGPT: https://www.scribbr.com/ai-tools/chatgpt-citations/

Grading Scale:

A 93-100%
A- 90-92%
B+ 87-89%
B 83-86%
B- 80-82%
C+ 77-79%
C 73-76%
C- 70-72%
D+ 67-69%
D 63-66%
D- 60-62%
Failure 0-59%

University policy on accommodation students with disabilities: Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

University policy on academic misconduct: Academic honesty and integrity are fundamental values of the University community. Students should be sure that they understand the UF Student Honor Code at http://www.dso.ufl.edu/students.php. You are expected and required to comply with the University's academic honesty policy (University of Florida Rules 6C1-4.017 Student Affairs: Academic Honesty Guidelines, available at http://regulations.ufl.edu/chapter4/4017.pdf). Cheating, plagiarism, and other forms of academic dishonesty will not be tolerated. Note that misrepresentation of the truth for academic gain (e.g., misrepresenting your personal circumstances to get special consideration) constitutes cheating under the University of Florida Academic Honesty Guidelines

Communication courtesy: Some content and discussion of this class may be around hard topics that can be sensitive, and individual experiences with, and opinions on, topics may be different. We respect diversity of opinion and will not tolerate inappropriate behavior towards or comments at, or about, any individual in this course. All members of the class are expected to follow rules of common courtesy in in-person class discussions, all email messages, threaded discussions, and chats. The first instance of clearly rude and/or inappropriate behavior will result in a warning. The second instance will result in a deduction of five percentage points from your overall grade. The third instance will result in a drop of a letter grade (A to B, A- to B-, and so on). If at any time you feel emotional about, or would like to opt out of a discussion, you are welcome to step out of class. You will not be penalized for doing so.

Course Evaluations
Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online. Students can complete evaluations in three ways:
1. The email they receive from GatorEvals,

2. Their Canvas course menu under GatorEvals, or
3. The central portal at https://my-ufl.bluera.com

Guidance on how to provide constructive feedback is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

Diversity and Inclusivity

We consider this classroom to be a place where you will be treated with respect, and we welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability – and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class.

Honesty Policy

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Conduct Code specifies a number of behaviors that are in violation of this code and the possible sanctions. If you have any questions or concerns, please consult with the instructors.

In-Class Recording Policy

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session. Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media

platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

GETTING HELP:
For issues with technical difficulties for E-learning, please contact the UF Help Desk at:
• learning-support@ufl.edu
• (352) 392-HELP - select option 2
• https://lss.at.ufl.edu/help.shtml

Health and Wellness:
U Matter, We Care: If you or someone you know is in distress, please contact umatter@ufl.edu, 352-392-1575, or visit U Matter, We Care website to refer or report a concern and a team member will reach out to the student in distress.

Counseling and Wellness Center: Visit the Counseling and Wellness Center website or call 352-392-1575 for information on crisis services as well as non-crisis services.

Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need, or visit the Student Health Care Center website.

University Police Department: Visit UF Police Department website or call 352-392-1111 (or 9-1-1 for emergencies).

UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; Visit the UF Health Emergency Room and Trauma Center website.

GatorWell Health Promotion Services: For prevention services focused on optimal wellbeing, including Wellness Coaching for Academic Success, visit the GatorWell website or call 352-273-4450

Academic Resources:
E-learning technical support: Contact the UF Computing Help Desk at 352-392-4357 or via e-mail at helpdesk@ufl.edu.

Career Connections Center: Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services.

Library Support: Various ways to receive assistance with respect to using the libraries or finding resources. Call 866-281-6309 or email ask@ufl.libanswers.com for more information.

Teaching Center: 1317 Turlington Hall, Call 352-392-2010, or to make a private appointment: 352- 392-6420. Email contact: teaching-center@ufl.edu. General study skills and tutoring.

Writing Studio: Daytime (9:30am-3:30pm): 2215 Turlington Hall, 352-846-1138 | Evening (5:00pm-7:00pm): 1545 W University Avenue (Library West, Rm. 339). Help brainstorming, formatting, and writing papers.

Academic Complaints: Office of the Ombuds; Visit the Complaint Portal webpage for more information.

Enrollment Management Complaints (Registrar, Financial Aid, Admissions): View the Student Complaint Procedure webpage for more information.

Topical Outline/Course Schedule (Tentative)

The course schedule is subject to change.

Week	Date	Topic	Readings (Read before class)	Instructor
1	Aug 25	Introduction and course overview: information security and data privacy articulated, examples, technology landscape	n/a	Gregory
2	Sep 1	Labor Day - No class	n/a	n/a
3	Sep 8	History and context for security and privacy rules; What is PII and PHI; Intro to federal laws Student discussion leader:	Samuel Warren and Louis Brandeis. The right to privacy. Harvard Law Review. 1890; V. IV, No. 5. Textbook ch 1 (p. 3-9) Price WN 2nd, Cohen IG. Privacy in the age of medical big data. Nat Med. 2019 Jan;25(1):37-43. doi: 10.1038/s41591-018-0272-7. Epub 2019 Jan 7. PMID: 30617331; PMCID: PMC6376961. Gulkesen KH, Sonuvar ET. Data Privacy in Medical Informatics and Electronic Health Records: A Bibliometric Analysis. Health Care Analysis. 2025 May. PMID: 40366511 DOI: 10.1007/s10728-025-00519-0 https://sharing.nih.gov/data-management-and-sharing-policy/about-data-management-and-sharing-policies/data-	Gregory

			management-and-sharing-policy-overview#after	
4	Sep 15	HIPAA: Overview and Privacy Student discussion leader:	Textbook ch 2, ch 3 (pp. 62-63, 73-81, 99-111) Guerrini CJ, Botkin JR, McGuire AL. Clarify the HIPAA right of access to individuals' research data. Nature Biotechnology. 2019 Aug;37(8):850-2. Chikwetu L, Miao Y, Woldetensae MK, Bell D, Goldenholz DM, Dunn J. Does deidentification of data from wearable devices give us a false sense of security? A systematic review. The Lancet Digital Health. 2023 Apr 1;5(4):e239-47. PMID: 36797124 PMCID: PMC10040444 DOI: 10.1016/S2589-7500(22)00234-5 Zadushlivy N, Biviji R, Williams KS. Exploration of reproductive health apps' data privacy policies and the risks posed to users: qualitative content analysis. Journal of Medical Internet Research. 2025 Mar 5;27:e51517. PMCID: PMC11923453 PMID: 40053713 Alhassani ND, Windle R, Konstantinidis ST. A scoping review of the drivers and barriers influencing healthcare professionals' behavioral intentions to comply with electronic health record data privacy policy. Health Informatics Journal. 2024 Nov 23;30(4). PMID: 39435737 DOI: 10.1177/14604582241296398 https://www.medprodisposal.com/20-catastrophic-hipaa-violation-cases-to-open-your-eyes/	Gregory
5	Sep 22	HIPAA: Security,	Textbook ch 1 pp. 16-23, ch 4 (pp. 115-130), ch 5 (pp. 149-160, 166-172)	Gregory

		Computer security: Threat identification, risk analysis Student discussion leader:	https://ocrportal.hhs.gov/ocr/breach/breach_report.jsf Yaraghi N, Gopal RD. The role of HIPAA omnibus rules in reducing the frequency of medical data breaches: Insights from an empirical study. The Milbank Quarterly. 2018 Mar;96(1):144-66. Pencarrick Hertzman C, Meagher N, McGrail KM. Privacy by Design at Population Data BC: a case study describing the technical, administrative, and physical controls for privacy-sensitive secondary use of personal information for research in the public interest. Journal of the American Medical Informatics Association. 2013 Jan 1;20(1):25-8. https://www.forbes.com/sites/kateoflahertyuk/2024/05/17/chatgpt-4o-is-wildly-capable-but-it-could-be-a-privacy-nightmare/ https://www.forbes.com/sites/daveywinder/2025/06/30/spy-attack-alert-for-headphone-users---is-yours-on-the-at-risk-list/ https://it.ufl.edu/it-policies/information-security/related-standards-and-documents/data-classification-guidelines/ https://irm.ufl.edu/irm-toolkit/uf-data-storage-solutions/	

6	Sept 29	Ethics & Dual Use, Genetic Data Student discussion leader:	Horner J. Morality, ethics, and law: Introductory concepts. In: Seminars in speech and language 2003 (Vol. 24, No. 04, pp. 263-274). Thieme Medical Publishers, Inc. Hudson KL, Holohan MK, Collins FS. Keeping pace with the times—the Genetic Information Nondiscrimination Act of 2008. New England Journal of Medicine. 2008 Jun 19;358(25):2661-3. McGuire AL, Beskow LM. Informed consent in genomics and genetic research. Annual review of genomics and human genetics. 2010 Sep 22;11:361-81. Christenhusz, G. M., Devriendt, K., & Dierickx, K. 2013. "To tell or not to tell? A systematic review of ethical reflections on incidental findings arising in genetics contexts." European Journal of Human Genetics, 21(3): 248-255. Jarvik GP, Amendola LM, Berg JS, Brothers K, Clayton EW, Chung W, Evans BJ, Evans JP, Fullerton SM, Gallego CJ, Nanibaa'A G. Return of genomic results to research participants: the floor, the ceiling, and the choices in between. The American Journal of Human Genetics. 2014 Jun 5;94(6):818-26. https://www.forbes.com/sites/kateoflahertyuk/2025/05/12/23andme-deadline-you--have-until-july-14-to-file-a-claim/	Gregory
7	Oct 6	Midterm Presentations	n/a	Gregory/Liu
8	Oct 13	Achieving Formal Privacy -Null-Map, Wrong-Map, K-Map, K-Anonymity	Sweeney L. Guaranteeing anonymity when sharing medical data, the Datafly System. In Proceedings of the AMIA Annual Fall	Liu

		-Datafly Algorithm -L-Diversity -T-Closeness Student discussion leader:	Symposium 1997 (p. 51). American Medical Informatics Association. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2233452/ Sweeney L. Achieving k-anonymity privacy protection using generalization and suppression. International Journal of Uncertainty, Fuzziness and Knowledge-Based Systems. 2002 Oct;10(05):571-88. https://www.ics.uci.edu/~projects/295d/papers/achieving-k-anonymity-privacy-protection-using-generalization-and-suppression.pdf Li N, Li T, Venkatasubramanian S. t-closeness: Privacy beyond k-anonymity and l-diversity. In2007 IEEE 23rd international conference on data engineering 2006 Apr 15 (pp. 106-115). IEEE. https://ieeexplore.ieee.org/document/4221659	
9	Oct 20	IT Security Risk Assessment & Privacy Guest Lecture Student discussion leader:	Landwehr CE. Computer security. International journal of information security. 2001 Aug;1(1):3-13. Meingast M, Roosta T, Sastry S. Security and privacy issues with health care information technology. In 2006 International Conference of the IEEE Engineering in Medicine and Biology Society 2006 Aug 30 (pp. 5453-5458). IEEE. Software security and risk assessment at UF: https://security.ufl.edu/resources/risk-assessment/ and https://irm.ufl.edu/fast-path-solutions/ ' https://software.ufl.edu/software-listings/	Gregory /Guest Lecture (Craig Gorme & Carol Meszlenyi)

			https://it.ufl.edu/security/audiences/faculty--staff/risk-assessment/creating-an-information-system--data-flow-diagram/	
10	Oct 27	Re-identification - Uniqueness Bounds - Identifiability Bounds - Record Linkage Student discussion leader:	K. Benitez and B. Malin, "Evaluating re-identification risks with respect to the HIPAA privacy rule," J. Am. Med. Inform. Assoc., vol. 17, no. 2, pp. 169–177, Mar-Apr 2010. https://academic.oup.com/jamia/article/17/2/169/809345?login=true Grannis SJ, Overhage JM, McDonald CJ. Analysis of identifier performance using a deterministic linkage algorithm. InProceedings of the AMIA Symposium 2002 (p. 305). American Medical Informatics Association. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2244404/pdf/procamiasymp00001-0346.pdf The AOL Search Log Case of 2006 https://en.wikipedia.org/wiki/AOL_search_log_release Hospital Discharge Record Case https://hcup-us.ahrq.gov/reports/final_report.pdf	Liu
11	Nov 3	Computer Security - Confidentiality, integrity and availability (CIA) - Access Control Models (Role-engineering) Student discussion leader:	Sandhu RS. Role-based access control. In Advances in computers 1998 Jan 1 (Vol. 46, pp. 237-286). Elsevier. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://profsandhu.com/articles/advcom/a98rbac.pdf Blobel B, Nordberg R, Davis JM, Pharow P. Modelling privilege management and access control. International Journal of	Liu

			Medical Informatics. 2006 Aug 1;75(8):597-623. (Optional) Bacon J, Moody K, Yao W. A model of OASIS role-based access control and its support for active security. ACM Transactions on Information and System Security (TISSEC). 2002 Nov 1;5(4):492-540. https://dl.acm.org/doi/pdf/10.1145/581271.581276?casa_token=sS0iQv8gQgwAAAAA:Q2wFr_EirBFZ-KBWq4Mgi8sx_0KxTJm70_8VjXxPfWxSM7GkF4EzP0a2B3LwIFEz9kmAvOE2MWTN (Optional) Simons WW, Mandl KD, Kohane IS. The PING personally controlled electronic medical record system: technical architecture. Journal of the American Medical Informatics Association. 2005 Jan 1;12(1):47-54. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC543826/	
12	Nov 10	De-identification Guest Lecture Student discussion leader:	https://irm.ufl.edu/irm-toolkit/how-to-de-identifying-data/ https://www.immuta.com/blog/what-is-data-de-identification/ https://healthitanalytics.com/features/exploring-data-de-identification-in-healthcare https://guides.library.jhu.edu/protecting_identifiers/de-id_steps	Liu /Guest Lecture (Khoa Nguyen)
13	Nov 17	No class - AMIA	n/a	n/a
14	Nov 24	No class - Holiday	n/a	n/a
15	Dec 1	Emerging topics -Federated learning -Differential privacy	Rieke, Nicola, et al. "The future of digital health with federated learning." NPJ digital medicine 3.1 (2020): 119.	Liu

		-Adversarial machine learning Student discussion leader:	https://www.nature.com/articles/s41746-020-00323-1 J. Xu, B. S. Glicksberg, C. Su, P. Walker, J. Bian, and F. Wang, "Federated learning for healthcare informatics," J. Healthc. Inform. Res., vol. 5, no. 1, pp. 1–19, 2021. https://link.springer.com/article/10.1007/s41666-020-00082-4 F. K. Dankar and K. El Emam, "Practicing differential privacy in health care: A review," 2013. http://www.tdp.cat/issues11/tdp.a129a13.pdf Federated learning AI model could lead to healthcare breakthrough https://venturebeat.com/ai/federated-learning-ai-model-could-lead-to-healthcare-breakthrough/	
16	TBD, 5pm	Final exam week	Submit your final paper on Canvas by 5:00 pm on this date. Do not come to class.	n/a