## SCI199Y Great Ideas in Computing Fall 2023 Very ambitious list of possible topics:

- What responsibilities do computer professionals have for the impact (and possible misuse) of the technology?
- What is a computer? The von Neumann architecture. Digital vs analogue. What were the alternatives? What else is possible (parallel, quantum)?
- The genious of Alan Turing; A precise mathematical definition of computable functions. The concept of interpreters. Theorem: There exists non computable functions.
- How did computers and computing become a commodity?
- Fortran, the first commercial source level language and compiler. John Backus vs the prevailing view that compiled code would be too slow compared to machine code.
- The internet; packet routing. TCP/IP.
- How search engines work and what they do well and what (if anything) they dont do well. Is there a "next generation search engine"?
- A local great idea: NP completeness. What is and what is not *efficiently* computable.
- Complexity based cryptography; public key cryptography; digital signatures.
- Another local great idea: deep neural networks and the success of machine learning (ML). Large language models. What (if anything) is the limitation of ML? Computers vs human thought. The Turing test.
- HCI (human computer interaction). Graphical interfaces, the mouse, menus, click, paste and drag. Portable output formats: PDF, Word, Powerpoint, Excel Visualization.
- Operating systems; Virtualization.
- Information theory: the genius of Claude Shannon. Error correcting codes; compression.
- Social networks and the spread of information (and mis-information, conspiracies, etc). Targetting information to different communities. (What is a social network community?)
- Open Source. Wikipedia.