

HIST 385/CS 495: Women in Computing History

Illinois Institute of Technology

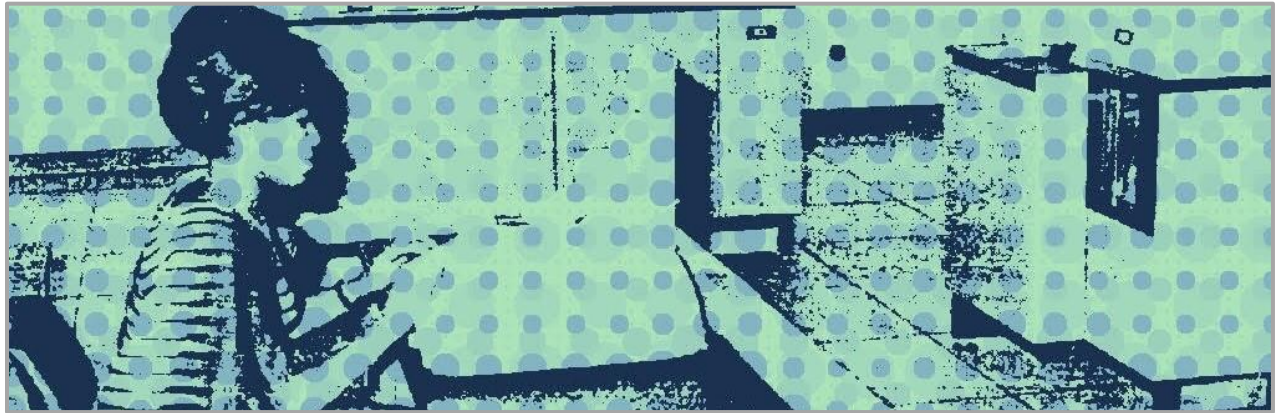
Spring 2021

Online, Asynchronous (due to pandemic)

Office Hours (online): Wednesdays 4-5PM

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A computer operator at Ashanti Goldfields in Ghana, c. 1970

“It was a great first job, you were not trapped in an office, you were working fantastic hours, which gave you a lot of freedom, and no one had any idea what you did.”

—Cathy Gillespie (*Programmed Inequality*)

“What I could, I changed; What I couldn’t, I endured.”

—Dorothy Vaughan (*Hidden Figures*)

“The ENIAC was a sonofabitch to program.”

—Jean Jennings Bartik (*Pioneer Programmer*)

Course Description

Programming and even hardware manufacture used to be feminized work. Yet, for decades the history of computing has mostly revolved around "great men" and the machines they designed. From the earliest days of computerization, women played a major role in computing's history. This course looks at that history and the reasons why historians have recently begun to write these computer workers back into the main narrative of the history of computing. Today, this new understanding of computing's history is changing what we think we know about technology's past and how we see our own contemporary interactions with it.

In this course, we will look at the history of computing through the eyes of women--some famous, some ordinary. We will read sections of several biographies and autobiographies in addition to articles and books on the history of computing. The first half of the class will focus on the origins of electronic computing. After the midterm we will transition to talking about more recent—even contemporary—developments. This class will help you better understand where computing has been, where it is going, and why technological change has as much to do with social, political, and economic categories as with technical considerations.

Expectations:

Readings should be completed for the week that they are listed. You need to do the readings each week (and not all at once at the end of the course) in order to participate in our online discussions. These discussions will form an important part of the course. Think of them as akin to in-class discussion, but online. You can do the readings before or after watching the weekly lecture. Weekly lectures will usually be released the Friday right before the week they are assigned.

Your **course grade** will include:

Online discussion board participation: 30%

(As a general rule, you should aim to participate with substantive comments on the discussion boards at least every other week, and ideally every week. Students who wish to get an "A" in the course should aim to participate at least 12 out of the 16 weeks.)

Short papers & other formal writing exercises: 25%*

(These are described in the syllabus, below.)

Midterm Paper: 20%

(This will be assigned close to the midterm date.)

Final Paper/Project (in lieu of an "in class" final exam, due on final exam date): 25%*

(This will be assigned close to the end of the course.)

*If you are taking the course for **graduate credit** I will expect you to perform your work at a higher level than your undergraduate peers. Your papers should be slightly longer than the required length for undergrads. In addition, for certain assignments your assigned tasks may be slightly different to accommodate your particular interests or course of study. Speak with me if you have any questions about what to do, or if you have a particular project you would like to work on.

Academic Honesty:

Read the Student handbook section on Academic Honesty and be sure you understand it. Cheating, plagiarism, or any other kind of academic dishonesty is grounds for a failing grade in the course. All work is expected to be your own unless you have explicitly been assigned to collaborate with others. The code of student conduct and the sections on academic honesty in the student handbook are here: <https://web.iit.edu/student-affairs/handbook>. If you are still confused, speak with me **before** you pass in an assignment. Remember that it is *never* appropriate to use someone's ideas or words without giving them credit, and that copying text from sources or peers—in addition to being plagiarism and cheating—short-circuits the learning process and is the exact opposite of what I want to see.

Pandemic Policy Statement:

My goal is for you to be able to complete this course and for the educational experiences provided by it to add to your life rather than be a burden during a difficult time. I understand that if you or your loved ones get sick you may need to be away from class to recover (and this may also happen if I become sick or need to care for ill loved ones). My goal is for everyone to pass this course and for all of us to make it through this difficult semester.

Americans with Disabilities Act (ADA) Policy Statement:

Reasonable accommodations will be made for students with documented disabilities. In order to receive accommodations, students are asked to obtain a letter of accommodation from the Center for Disability Resources. The Center for Disability Resources (CDR) is located in 3424 S. State St., room 1C3-2 (on the first floor), telephone: [312.567.5744](tel:312.567.5744) or disabilities@iit.edu. If you need resources but cannot file the paperwork for an ADA accommodation please let me know and I will still do my best to accommodate your needs.

Title IX Office and Resources

Illinois Tech complies with Title IX as required by federal law. On the university's [Title IX website](#) you can find more information about the resources available for people who have been subject to sexual harassment or unfair treatment on the grounds of gender.

Course materials and tools:

Because this course is *asynchronous* we do not have a formal class meeting each week where everyone gets together at the same time. Instead, you will do your work and interact with your classmates (and me) online each week in time-shifted ways, through the [discussion board](#) and [course sites](#). Each week I will also post one or more [video](#) lectures or other A/V material. Keep an eye on the schedule below for those links—they will be posted as we get to each week.

You will also have the opportunity to meet with me and your classmates through our weekly online office hours. Every Wednesday from 3-4:30pm CT you can attend office hours by appointment either individually or, if you prefer, with one or more of your classmates. Use [this link](#) to schedule a slot. We will use [Zoom](#) (free videoconferencing software for computers and smartphones) to meet.

This schedule may be slightly updated or altered as the semester proceeds. Please check back each week. Please do the readings, viewings, and assignments listed on the syllabus the week they are listed—this will allow you to engage online with your peers. Here is a [short reading guide](#) you may find helpful as you read for this class.

Note: We are not using Blackboard because students have told me that they are unable to easily interact with Blackboard over slow connections and while using mobile phones. Since a sizable number of students are facing situations this year where the machines and connections they are using may not be ideal, we are using software that is easier to load than Blackboard LMS and an alternative to Blackboard's messageboards. If you have any questions, problems, or confusion about how to use any of the tools above, just ask.

Course Schedule:

Week 0: Jan 19-22

Introduction and Getting Started

This week we will get started slowly, by getting to know the systems we are going to be using and getting to know each other a little bit. You should also start doing the readings for next week, listed under "Week 1" below.

Assignments: Read the welcome email I sent and follow the instructions to get set up on the class site and the message boards. Post a message in the "introductions" thread on the boards and do the course survey online when I send it out. Let me know via email if you encounter any problems.

Week 1: Jan 25-29

Where Were the Women? (And Why Should We Care?) and War Machines: Why Electronic Computers Were a Big Deal

Beyer, *Grace Hopper and the Invention of the Information Age*, [pp. 35-72](#)

Hicks, *Programmed Inequality*, ["Introduction" pp. 1-18 and most of Ch. 1 "War Machines" pp. 19-51](#)

Note: Each week, view the lecture for that week number (so this week view the lecture for week 1). They will be posted on the [course site](#). Lectures will generally be posted on the Friday before the week they are due. After finishing the readings and viewing the lecture, look for the weekly class discussion thread posted on the [discussion board](#).

Things to think about this week: *Why do I call early electronic computers "war machines" in the chapter of my book that you read? What was the specific purpose of each of the early electronic computers (and in the case of the Mark I, an electromechanical computer) discussed in the readings? Do "firsts" in computing matter? Why does the fact that the Colossus computers were the first digital electronic computers matter? What were they actually doing for the war effort while the ENIAC was still under construction, and while the Mark I was helping create ballistics tables at Harvard? (Note: you can play with a simulation of the Colossus [here](#).)*

What is the purpose of studying the history of computing through the eyes and experiences of women? Can we do this in a way that doesn't just take the existing history of computing and then "add women & stir?" How can we use an understanding of gender, and its intersection with many other categories of difference and oppression—like class, race, nationality, dis/ability, and sexuality—to help us arrive at new insights? What is the concept of historiography, and why is it important here?

Week 2: February 1-5

The ENIAC "Girls" (And How They Got That Way)

Shirley, *Let IT Go*, [pp. 1-17](#)

Light, "[When Computers Were Women](#)" pp. 455-483, whole article—images at end of article

Shetterly, *Hidden Figures* Excerpts, [pages 9-17 and 107-124](#)

Exercise: Computer History Scavenger Hunt in London Times and Ebony Magazine Archives

Using the Times of London historical newspaper, available through [Galvin Library](#) (look under databases-->"T" for Times of London) try to find articles related to women in computing and to the events and people you have read about so far. Then try using the archives of [Ebony Magazine](#) and [Jet Magazine](#). What sorts of things can you learn about white and Black women computer workers from looking at these archives?

Try to come up with a question, based on the readings, and use these archives to answer it. Or, do a series of searches and find one or two interesting articles, and then tell us how they show us something new--something you didn't already know. What can you find in these archives that helps us understand the past's relationship to the present (and future) a bit better? In addition to articles, feel free to also talk about advertisements, photos, obituaries, or anything else in these newspaper and magazine sources that's related to the topic.

Post your findings on the discussion board thread set up for this by Friday Feb. 5th at noon. And remember to cite your article with: Author, "Title," *Publication Name*, Date of Publication. (You can include links BUT don't just cut and paste links without also giving full citation info, because often links break--and giving full citations is important so people can easily see your sources at a glance without following the link.)

Things to think about this week: *What's the difference between writing history, biography, and hagiography? How have the bad habits of "great man" historical narratives carried over into how we see women pioneers in computing as well, and whom we decided to write about? How have our decisions about which women are important enough to write histories about led to a replication of some of the mistakes of earlier versions of computing history that focused primarily on men and the machines they designed? When I say that gender a classed category, what does this mean and how might it affect how people write computing history going forward? Will this help us get away from history of computing that is just focused narrowly on technical innovations?*

Week 3: February 8-12

Swords to Plowshares: Space Research, Racism, and Intersectionality

Shetterly, *Hidden Figures* Excerpts, [pages 125-131 and 161-211](#)

Clancy, "Abacus Computing in the Age of Electronics: Sekiko Yoshida and the Early U.S. Space Program" (read [conference paper and](#) look through [pictures and diagrams in accompanying image file](#))

Bartik, *Pioneer Programmer*, [pp. 36-52, 91-106, 113-120](#)

Optional:

McLennan, "Computing and the Color Line: Race, Gender, and Opportunity in Early Computing at NASA" (11 page [article](#) and [pictures](#) in the accompanying images file.)

Things to think about this week: *How does race intersect with the issues of gender and class that we've been discussing already? What is similar, and what is different, about how NASA mobilized Black women workers as computers for space research projects? How does Yoshida's nationality play into her ability to integrate, and also remain somewhat apart from, the academic research institution where she does some of her most important work? Why have we never heard of her before now? What does it mean for a technology to have its start as a warfaring technology, and then turn to "peacetime" applications? Why does the Cold War play a major role in this process of "swords to ploughshares" for electronic computing? And why has this narrative (arguably) been submerged by our greater interest in making the development of the PC the cornerstone of how we understand and interpret postwar computing history?*

Week 4: February 15-19

Making Something Out of Nothing

Shirley, *Let IT Go*, [pp. 39-65](#)

Bartik, *Pioneer Programmer*, [pp. 121-129](#)

Hicks, "[Built to Last](#)"

Beyer, *Grace Hopper and the Invention of the Information Age*, [pp. 175-212](#)

Optional:

Sammet, "[Brief Summary of the Early History of COBOL](#)"

Things to think about this week: *Do you find the longevity of COBOL surprising? Why might this surprise help us understand our current computing infrastructure a bit better? Why does Grace Hopper get SO much attention, even more so than the women who programmed the ENIAC and had careers in computing, like Jean Bartik, or who helped invent incredibly long-lasting programming languages, like Jean Sammet? What are some similarities between the women in the readings from this week? What about differences? Are these instructive?*

Week 5: February 22-26

Computer Love: Gender, Sex, and Computing Before the Internet

Drucker, "[Keying Desire: Alfred Kinsey's Use of Punched-Card Machines for Sex Research](#)," 21 pp.

Hicks, "[Computer Love: Sex, Social Order, and Technological Matchmaking at the Dawn of the Electronic Age, 1950-1979](#)"

Optional:

Hicks, "[The Mother of All Swipes](#)"

Short Paper Assignment: *In the Drucker article, we see a very clear example of how computers construct the categories that go on to define sexuality over the course of the 20th century and through to the present day. How is this similar to the point made in the Hicks article about heteronormativity? Think back to the other things we've read so far during this semester: how has heteronormativity defined the shape of computing in important ways in other instances? Given this, what can you say about the relative importance of sexuality on the history of computing? What role does it play alongside gender, race, nationality, and class? How does this change our understanding or lead us to new insights? Make sure your paper has a clear, original argument. Length: **800-1500 words, due on March 8th**, uploaded as a comment to the appropriate post on [digitalhistorylab.com](#).*

Week 6: March 1-5

Making Programming Professional

Ensmenger, "[Making Programming Masculine](#)," in *Gender Codes: Women and Men in the Computing Professions*, Thomas Misa, ed. (Wiley, 2010)

Look at Cosmo "Computer Girls" article

Moffat, *The IT Girl* (excerpts)

Cohen, "[What Programming's Past Reveals About Today's Gender-Pay Gap](#)"

Optional:

Abbate, *Recoding Gender*, Ch. 2 "Seeking the Perfect Programmer"

Shirley, *Let IT Go*, pp. 66-123

Look at Ensmenger's book, [The Computer Boys Take Over](#) (MIT, 2010)

or his article "[Beards, Sandals, and Other Signs of Rugged Individualism': Masculine Culture within the Computing Professions](#)"

Things to think about this week: *How does professionalization "happen" in computing? Is it a natural, evolutionary process, or a sudden change? Why? How does gender—and sexuality and whiteness—play an important role in this change in the labor force? Why do figures like Grace Hopper seem to skate through relatively unaffected, while other women like Shirley, Bartik, and some of the other former ENIAC women talk about the difficulties of being a woman in a masculinizing field?*

Week 7: March 8-12

The Fiction of Meritocracy

Hicks, "[Hacking the Cistem](#)" *IEEE Annals of the History of Computing*

Shirley, *Let IT Go*, pp. 124-137

Beyer, *Grace Hopper and the Invention of the Information Age*, pp. 213-261

Optional:

Abbate, *Recoding Gender*, Ch. 3 "Software Crisis or Identity Crisis"

Hicks, "[Against Meritocracy in the History of Computing](#)" (4 pp.)

Hicks, "[Only the Clothes Changed](#)" (14 pp.)

Things to think about this week: *What is meritocracy, and why is it a fiction? How is it specifically problematic—and seductive—in the case of computing and engineering disciplines and fields of work? What do you think about the concept of a "software crisis" or a "programmer labor shortage" in the 1960s? What about today? How is this concept (both then and now) also a kind of fiction?*

Week 8: March 15-19

Hidden Figures Struggling to Become Visible

West, [excerpts from autobiography](#), *It Began With a Dream*

[Guardian article](#) on Dr. Gladys West

[Oral History](#) of Annie Easley

Slaton, "[Meritocracy, Technocracy, Democracy: Understandings of Racial and Gender Equity in American Engineering Education](#)"

Things to think about this week: *Both Dr. Gladys West and Annie Easley faced racism in their careers and as a result took on additional labor to work for their equal rights and advocate for the rights of other Black people. What are some of the specific ways you see this in Annie Easley's career? Is that similar to or different from what*

happens in West's career? What are some of the important lessons about the history of computing you can learn through the experiences of these two women that we don't necessarily learn from looking at the careers of Grace Hopper or Steve Shirley?

Week 9: March 22-26

MIDTERM EXAM (more details will be given closer to this week)

Week 10: March 29-April 2

Hidden Histories

Conway, "[Reminiscences of the VLSI Revolution: How a series of failures triggered a paradigm shift in digital design](#)"

Nakamura on Navajo women in hardware manufacturing at Fairchild Semiconductor: Indigenous Circuits [blog post](#) and [journal article](#)

Hicks, *Programmed Inequality*, excerpts: pages 157-186 (don't worry about the details, just get the gist) and 216-221, 229-239

Shirley, *Let IT Go*, [pp. 138-152](#)

Things to think about this week: *This week's readings look at two fairly different sets of workers—Lynn Conway and Stephanie "Steve" Shirley, who were high-status professionals in computing—and the anonymous and almost invisible Navajo workers at the Shiprock plant who manufactured computer hardware for Fairchild Semiconductor. What is instructive about the differences here? And why do you think I paired these readings together? Is there anything similar or any connections that can be made that might give us a better understanding of issues of hiding (labor), minimizing skills, having accomplishments ignored, and the effects of those things on who gets credit for their work in computing? How does race and eugenics play a role in one of these histories that is different from the other set of histories? And, what does the end of the mainframe era look like when we don't focus on the narrative of the "boy geniuses" superseding stodgy big iron?*

Week 11: April 5-9

The Personal Computing "Revolution"

Excerpts from *Small Fry* and *The Bite in the Apple*

Brief Bio of Sophie Wilson: <http://www.computerhistory.org/fellowawards/hall/bios/Sophie,Wilson/>

BBC, "BBC Micro Ignites Memories of a Revolution," <http://news.bbc.co.uk/2/hi/technology/7307636.stm>

Salim, "[Meet the Mother of the Internet \(Radia Perlman\)](#)"

Beyer, *Grace Hopper and the Invention of the Information Age*, pp. 277-314

Optional:

Sophie Wilson Interview about Acorn: <http://speleotrove.com/acorn/acornWilson.html>

Adele Goldberg Oral history: http://ethw.org/Oral-History:Adele_Goldberg

Things to think about this week: *Why do women start to disappear as we get into the era of the "PC revolution" and what does that mean for telling the history of computing in a way that is attentive to women's experiences? Is gender still an important category of analysis here? Why or why not? Also, how does the definition of computing start to change in this era? Explain how Sierra Online is an important part of computing history, and not some other field. Lastly, is the arrival of the PC a "revolution" and what is the agenda of the folks who want to see it as such? What are their unspoken assumptions, biases, and even political beliefs? Search exercise with NYT and London Times historical databases on gender representation and the PC era in class (if time).*

Week 12: April 12-16

Telecommunications: Global Computing, Global Production

Noble, [excerpts from *Algorithms of Oppression*](#)

Nakamura, "Economies of Digital Production in East Asia: iPhone Girls and the Transnational Circuits of Cool," <http://www.mediafieldsjournal.org/economies-of-digital/>

Villa-Nicholas, Ch. 11: [The Invisible Information Worker: Latinas in Telecommunications](#), in *The Intersectional Internet* (pp. 195-214)

Final Project assigned this week—you may wish to make an appointment for office hours in the upcoming weeks to discuss your ideas

Things to think about this week: *As we turn to more contemporary events, what concerns arise that might not have arisen if this were a more "traditional" history of computing class? Are the "iPhone Girls" and Latina telecommunications workers an important part of computer history? Why? How are they similar to other workforces we've learned about from earlier in computing's history? And how is the historiographical context of those earlier workers instructive as we try to think about this week's readings and why they're important?*

Week 13: April 19-23

Politics and Identity Online

Losse, "The Male Gazed," <https://modelviewculture.com/pieces/the-male-gazed>

Hampton, "[The Black Feminists Who Saw the Alt-Right Threat Coming: Your Slip is Showing](#)"

Gray and Leonard, "Introduction" to *Woke Gaming*

Roberts, "Social Media's Silent Filter," <https://www.theatlantic.com/technology/archive/2017/03/commercial-content-moderation/518796/>

Optional:

Tynes, Schuschke, & Noble, Ch. 1: Digital Intersectionality Theory and the #BlackLivesMatter Movement in *The Intersectional Internet* (pp. 21-40)

Wenger, "I Look Like an Engineer," <https://medium.com/the-coffeelicious/you-may-have-seen-my-face-on-bart-8b9561003e0f#.q9sqasu13>

Noble, "Google Search: Hyper-visibility as a Means of Rendering Black Women and Girls Invisible" <http://ivc.lib.rochester.edu/google-search-hyper-visibility-as-a-means-of-rendering-black-women-and-girls-invisible/>

Losse, *The Boy Kings* (about her time working at Facebook in its early days)

Things to think about this week: *Discourses matter to the material reality of people's lives, sometimes in ways that determine life or death. How do the examples of #blacklivesmatter, #ilooklikeanengineer, and Losse's and Noble's concept of raced, gendered gazes getting embedded in Google and Facebook relate to the power that discourse has in the real world to affect people's bodies and lives? How does appearance and assumption not only play into each of these examples, but also earlier examples from the course that show how what we think about women in computing history has a lot to do with visual imagery? Exercise finding contemporary news articles in class to discuss (if time).*

Week 14: April 26-30

Changing the Accepted Narrative and Summation:

How Do Women's Stories Change What We Think We Know About Computing History?

Broussard, [excerpts from *Artificial Unintelligence*](#)

Sweeney, "[Discrimination in online ad delivery](#)"

Varma and Kapur, "[Decoding femininity in computer science in India](#)"

Things to think about this week:

How does gender change the main narrative of the history of computing, and how do we write this history in a way that goes beyond the notion of just "add women and stir" so to speak? What do women's perspectives bring to our understanding of the field's past and present that we wouldn't have known otherwise? And what is a woman, anyway? What categories, other than gender, do we need to be attentive to in order to define what women are in any given historical period and why they are important to our changing understandings of technological "progress"?

Week 15: May 3-7

Conclusion

Buolamwini, "Gender Shades," watch video at: <http://gendershades.org/> or

read: <https://www.businessinsider.com/biases-ethics-facial-recognition-ai-mit-joy-buolamwini-2019-1>

Articles on Dr. Timnit Gebru (formerly of Google)

Articles on the Google Walkout, AI Ethics Board, and labor unions at Google and Kickstarter

Thomas, "[If you think women in tech is just a pipeline problem, you haven't been paying attention](#)"

(NOTE: Final Projects will be due on the date of our Final Exam as set by the registrar. This schedule is published halfway through the semester.)