

**Field Prelim: Anticipating One's Reproductive Future(s): Sociotechnical Anticipation  
Work by Reproductive Citizens**

by

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## TABLE OF CONTENTS

ACKNOWLEDGEMENTS . . . . .	ii
LIST OF ACRONYMS . . . . .	v
ABSTRACT . . . . .	vi
CHAPTER	
<b>1 Introduction . . . . .</b>	<b>1</b>
1.0.1 Note on Terminology . . . . .	1
1.1 Introduction . . . . .	2
1.1.1 Paper Organization . . . . .	4
1.1.2 Note on Researcher Positionality and Commitments . . . . .	5
<b>2 Anticipation and Reproductive Future(s) . . . . .</b>	<b>6</b>
2.1 Anticipation . . . . .	6
2.1.1 Anticipation Work . . . . .	7
2.2 Anticipating Reproductive Futurity . . . . .	8
2.2.1 Reproductive Citizens' Anticipation Work . . . . .	10
<b>3 Technology, Reproductive Futures and Anticipation Work . . . . .</b>	<b>11</b>
3.1 Reproductive Technologies as 'Reproductive Citizenship Projects' . . . . .	11
3.2 Anticipation in Sociotechnical Reproductive Contexts . . . . .	12
3.2.1 Menstrual and Fertility Tracking Applications . . . . .	13
3.2.2 Artificial Intelligence and Precision Medicine . . . . .	13
3.2.3 Online Support Groups . . . . .	14
3.3 Sociotechnical Anticipation Work by People Trying to Conceive . . . . .	15
<b>4 Contested Landscape of Sociotechnical Anticipation Work by [Ir]responsible Reproductive Citizens . . . . .</b>	<b>19</b>
4.1 Framings of [Ir]responsible Reproductive Citizenship in Sociotechnical Contexts . . . . .	19
4.2 Reproductive Justice, Power and Control . . . . .	21
4.2.1 A Brief Explanation of Reproductive Justice . . . . .	21
4.2.2 Power and Control . . . . .	22
4.3 Intimate Privacy, Stigma and Reproductive Capacity . . . . .	23

4.3.1	Intimate Privacy . . . . .	23
4.3.2	Stigma . . . . .	25
4.4	Stakes of Anticipating Reproductive Futures via Technology for People Who are Trying to Become Pregnant or Are in Early Pregnancy . . . . .	26
<b>5</b>	<b>Project Proposal . . . . .</b>	<b>28</b>
5.1	Research Objectives . . . . .	29
5.1.1	Research Questions . . . . .	29
5.2	Methods . . . . .	29
5.2.1	Asynchronous Remote Community . . . . .	29
5.2.2	Semi-Structured Interviews . . . . .	30
5.2.3	Participation Timeline . . . . .	30
5.3	Recruitment and Data Collection . . . . .	32
5.3.1	Participant Pool . . . . .	32
5.3.2	Recruitment Strategies . . . . .	32
5.3.3	Incentives . . . . .	33
5.3.4	Participant Privacy and Protection Considerations . . . . .	34
5.4	Data Analysis . . . . .	34
5.5	Reflections on Special Considerations and Limitations . . . . .	35
5.5.1	Participant Attrition . . . . .	35
5.5.2	Moderating the ARC . . . . .	35
5.5.3	Limitations . . . . .	36
5.6	Study Instruments . . . . .	36
5.6.1	Asynchronous Activities . . . . .	36
5.6.2	Interview Protocol: Trying to Conceive . . . . .	38
5.6.3	Interview Protocol: First Trimester of a Pregnancy . . . . .	39
5.7	Expected Contributions . . . . .	41
<b>6</b>	<b>Conclusion . . . . .</b>	<b>42</b>
	<b>BIBLIOGRAPHY . . . . .</b>	<b>43</b>

## **LIST OF ACRONYMS**

**ACRJ** Asian Communities for Reproductive Justice

**ARC** Asynchronous Remote Community Method

**ART** Assisted Reproduction Technology

**HCI** Human-Computer Interaction

**MFTA** Menstruation and Fertility Tracking Applications

**NRT** New Reproductive Technology

**SCOT** Social Construction of Technology

**STS** Science, Technology and Society

**IoT** Internet of Things

## **ABSTRACT**

Reproductive Health has been a site of contested interest between governments, companies, communities and individuals for distributing power, exerting influence and deriving profit from society's reproductive capacity. Much of reproductive history in the United States is centered on tensions between who, how and what controls individuals' and communities' reproductive capacity in efforts to create or control anticipated reproductive health futures, which can be engaged with at the individual, communal, institutional and organizational levels.

The fields of Science, Technology and Society (STS) and its subfield Feminist STS has an interest in the gendered sociotechnical relationships between technology, society and power, including reproductive technologies and their connection to actors' efforts of exerting power over an anticipated future. The field of Social Computing and Human Computer Interaction (HCI) has explored user behavior and attitudes surrounding reproductive technology, with some exploration of how these technologies implicate privacy, safety and trust concerns. The field of Reproductive Justice has traced the history of reproductive health, noting powerful actors' vested interests in the reproductive capacity of individuals and communities, and is committed to ensuring individuals and communities have reproductive justice (e.g. the right to (not) have a baby, the right to parent in safe and healthy conditions, gender & sexual autonomy). Drawing from the fields of Feminist STS, Social Computing/HCI, and Reproductive Justice, this Field Prelim explores the relationships and tensions that emerge between processes of anticipation and its applications to technology in the reproductive health and reproductive future(s) context, with particular attention to the case of people trying to conceive. This paper ends with a mixed-methods study proposal that would explore the myriad sociotechnical entanglements—such as the human, nonhuman, temporal, political, and sociocultural elements—of anticipating reproductive futurity for people trying to conceive into the early stages of pregnancy.

# CHAPTER 1

## Introduction

### 1.0.1 Note on Terminology

Reproductive health has been frequently conflated with ‘women’s health’ and cisgender women, particularly in Human-Computer Interaction (HCI) scholarship [42]. However, this project joins Keyes et al. [42] and Reime et al. [67] in conceiving reproductive health as not specific to cisgender women, recognizing that it too includes the reproductive health of men, non-binary and transgender people. Because of this, I choose to use gender-neutral terms, such as *individuals*, *people trying to conceive*, *people with capacity for pregnancy* and so on. However, when quoting prior work or specific policies or historical events designed around normative ideas of *women*, I will echo their terminology unless otherwise stated.

This Field Prelim is predominantly engaged with reproductive health and reproduction. For this paper, I draw from Asian Communities for Reproductive Justice (ACRJ)’s conception of ‘reproduction’ as “*encompass[ing] both the biological and social processes related to conception, birth, nurturing and raising of children as participants in society*” [7]. Reproductive Health, more broadly, refers to the processes and functions of individuals’ reproductive health system and encompasses the physical, mental, and social well-being associated with this system [84].

When I refer to technology in this Field Prelim, I particularly refer to the tools that assist with or infringe upon the biological and social processes salient to reproduction and reproductive health. This definition is intentionally broad to encompass the breadth of technologies supporting and influencing reproduction and reproductive health. My definition is not limited to digital technologies. It includes but is not limited to reproductive technologies [83] (e.g., ultrasounds, algorithms used during delivery), medications (e.g., fertility medications, contraception), mobile and Internet of Things (IoT) devices (e.g., wearable fertility monitors), social media and online forums. This broad scope of technology is informed by a Social Construction of Technology (SCOT) approach, often



found in Feminist STS scholarship, where technology and society are viewed as interconnected, instead of separated, where each informs and shapes the other [13]. SCOT understands technology as part of a system with *"interlocking elements of physical artifacts, institutions, and their environment and [...] an integration of technical, social, economic, and political aspects"* [13]. For this reason, my understanding of technology also encompasses the information encountered passively (e.g., targeted ads, media messaging) or actively (e.g., online search, discussion boards) through tech use or exposure.

When speaking of a certain type of technology, I will name the technology (e.g., reproductive technologies, self-tracking technologies) to be clear about what is being discussed.

## 1.1 Introduction

Much of what it means to be human is navigating uncertainty, questioning what tomorrow will bring and what we can do to manage and prepare for the unknown. Questions and experiences of reproductive health and human reproduction (e.g., births) are one domain where the future is directly implicated [31]. People may engage with reproductive futures at the individual level (e.g., a person trying to conceive [47, 24, 67]), a communal level (e.g., a community desiring reproductive justice<sup>1</sup> for its members [68, 59]) or at the institutional and organizational level (e.g., a state government trying to ban abortion [81], an industry selling prediction and testing technologies to individuals throughout the reproductive cycle [25, 35]). In the present, people might experience and encounter these reproductive futures via what Adams et al. refer to as anticipation [1], an affect *and* affective state of relating to the future made possible by the belief that one can prepare for or ensure certain outcomes. At times, living in a state of anticipation may prompt what Clarke calls anticipation work [2] where people invest time, resources, and emotional energy into the labor of managing, preparing, and hoping for future possibilities and the avoidance of risks. In this Field Prelim, I am drawing directly from Adams et al. and Clarke's theoretical concepts of Anticipation [1] and Anticipation Work [2], and applying it to reproduction and reproductive health contexts. The imagined possibilities and risks that emerge when people engage with reproductive futures bring both the affect and affective state of anticipation to the forefront.

Technology is deeply salient to the relationship between anticipation and individu-

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<sup>1</sup>Reproductive Justice, as a movement, is guided by 3 principles: people have the right to have or not have a child, the right to parent children in environments that are safe, well-resourced and healthy, as well as the right to gender freedom and sexual autonomy [68]

als' reproductive futures, particularly with the growing influx of technologies managing intimate data about people's reproductive capacities [5, 48] and the ways that technology can be used to facilitate information about one's reproductive pasts and presents—shaping labor and action in the present based on one's anticipated and desired reproductive future(s) (e.g., (not) becoming pregnant) [66, 25]. However, the beliefs and practices surrounding the subject of these technologies—both data subjects when applicable (e.g., people with the capacity for pregnancy), and the broader context of reproductive health—are heavily contested in the U.S. context, from a social [81, 30], cultural [73, 23], and political [34, 68] perspective. This might look like the increased policing and moralization of people with capacity for pregnancy [34, 81], as well as the growing threats to reproductive rights in the U.S. political arena [73]. Increasingly, technologies contributing to the datafication of individuals [50] and their reproductive and sexual health experiences [48] transcend many environments across space and time (e.g., bodies, geographies, temporality) [5]. As a result, it is important to understand the breadth of entanglements *across time and space* involved in anticipating reproductive futurity among people with the capacity for pregnancy that considers the contested landscape (social, political, cultural) of reproductive health in the United States that may shape these entanglements<sup>2</sup>. Doing so allows us to understand how a deeply intimate aspect of people's lives (their present *and* possible futures) may be reconfigured by the interplay between technology, anticipation, and the material, social, cultural, and political forces at play.

This Field Prelim draws from the fields of Feminist STS, Social Computing, and HCI as well as Reproductive Justice. Feminist Science, Technology and Society (STS) is a sub-field of STS that formed in part from a distrust of sciences' masculinist values of objectivity and neutrality [82]. Feminist STS commits to challenging masculinist notions of technology and knowledge production as neutral, believing artifacts of technology and knowledge encompass the culture, practices, language, symbols, identities, etc. implicated by their development and deployment [80]. Likewise, the field of HCI has more formally incorporated feminism into its research and design efforts [9]. Together, the fields of Feminist STS and HCI inform my commitments in this field prelim to situate how people's reproductive lives are configured by technology and processes of anticipation by considering the social, political, and cultural implications of the development, design, deployment, and applications of technology.

When it comes to situating any sociotechnical anticipation work in the reproductive

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<sup>2</sup>I am drawing from Haraway's conception of the body as a series of entanglements between human and non-human actors [36], recognizing that embodiment extends beyond the individual to encompass other actors. In this context, a deeply embodied experience of reproductive health is entangled with social, political, cultural, and material forces—human and non.

health context, the historical context valued by the field of Reproductive Justice<sup>3</sup> is necessary to consider. Reproductive justice is committed to challenging "*structural power inequalities*" [7] that infringes on an individual's self-determination over their lives, with a heavy emphasis on "*the interconnecting social justice and human rights issues that affect women's bodies, sexuality, and reproduction*" [7]. In this way, reproductive justice is an intersectional framework [27] that recognizes the difference in experience, centers marginalized communities, and works to counter power imbalances [70]. For this paper, the field of reproductive justice offers a framework for situating the different relationships people may have in anticipation and the work of anticipating their reproductive future(s). It also informs my commitment to being attentive to how experiences of reproduction and the reproductive labor of anticipating reproductive futurity might be unequally valued or experienced based on social hierarchies, and shaped by social and political forces [21].

### 1.1.1 Paper Organization

This paper starts with Chapter 2 (*Anticipation and Reproductive Future(s)*), answering: **What is the relationship between anticipation and reproductive futurity, and what does this mean for reproductive citizenship?** I provide an overview of the foundational theoretical framework for this Field Prelim—anticipation and anticipation work—before explaining the ways reproduction and anticipation are deeply interconnected.

Chapter 3 (*Technology, Reproductive Futures, and Anticipation Work*), answers the questions of: **How has technology been shown to shape, mediate, and complicate anticipation in reproductive contexts? What does this sociotechnical anticipation work look like for people trying to conceive?** Here, I focus on the anticipation work of reproductive citizens, before turning to the sociotechnical relationships that emerge between anticipation and reproductive health technologies, with a particular interest in sociotechnical anticipation work by people trying to conceive.

Chapter 4 (*Contested Landscape of Sociotechnical Anticipation Work by [Ir]responsible Reproductive Citizens*), answers questions of: **What is the broader context sociotechnical anticipation work for reproductive future(s) takes place in and what political, social and cultural dynamics are in play?; How does this broader context heighten the stakes for people trying to conceive engaging in sociotechnical anticipation work?** In this chapter, I zoom out to describe the relevant political, cultural, and social contexts

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<sup>3</sup>Reproductive Justice is "*a movement-building and organizing framework that identifies how reproductive oppression is the result of the intersection of multiple oppressions and is inherently connected to the struggle for social justice and human rights*" [68]

that complicate and raise the stakes for people with the capacity for pregnancy engaging with technology to anticipate their reproductive futures.

Lastly, Chapter 5 (*Project Proposal*) proposes a mixed-methods study (Asynchronous Remote Community Method (ARC), semi-structured interviews) to explore the myriad sociotechnical entanglements—such as the human, nonhuman, temporal, political, and sociocultural elements—of anticipating reproductive futurity for people who are trying to become pregnant or are in early pregnancy.

### **1.1.2 Note on Researcher Positionality and Commitments**

Recognizing the present and future as deeply connected to the past, the field of reproductive justice offers critical analyses of reproductive history in the United States and a deep understanding of the sociocultural and sociopolitical structures shaping individual and communities' reproductive capacity and well-being [74, 68]. This project is directly interested in understanding the relationships between technology and technology's meanings in anticipation and anticipation work that engages with reproductive health futures. By drawing from the field of reproductive justice, I aim to contextualize sociotechnical behaviors, attitudes, and beliefs within a longstanding history of efforts to control reproductive choices or resist reproductive oppressions. I believe that reproductive history and the reproductive justice movement are important to draw from as the reproductive present is built on the past. Any analysis and critique of reproductive health past, present, and (anticipated) future should incorporate this context or risk perpetuating shallow analyses that help to maintain and embolden oppressive structures.

It is important to mention that I am a mixed-race (Italian/Lebanese) cisgender woman who has personal experiences related to this field prelim (e.g., sociotechnical anticipation work for reproductive health contexts, trying to conceive, unexplained infertility). As a result, this field prelim, in part, emerges from my personal experience(s), as well as my general scholarly interests in relationships between reproductive health and technology, and its social implications.

## CHAPTER 2

# Anticipation and Reproductive Future(s)

## 2.1 Anticipation

Anticipation is both an affect *and* affective state of being in relation to time, specifically of relating to the future in the present with the hope (and expectation) of being able to prevent or ensure certain outcomes [1]. In this way, anticipation configures the future as something that can be viscerally experienced in the present, turning peoples' fears and hopes into sources for manipulation. Adams et al. discuss anticipation from a technoscience perspective, focusing primarily on sites of health and medicine (e.g., markets for human tissue & future demands for organ transplants), but claim anticipatory practices exist in other contexts [1]. Adams et al. [1] argue that anticipation has 5 key dimensions—**injunction, abduction, optimization, preparedness, and possibility**—and can operate at the individual and collective level through anticipation regimes as well as at the systematic level through generating new domains reliant on anticipation (e.g., disaster capitalism). Because anticipation is largely speculative, it does not rely on actualized events or material realities and, instead, relies on what can be *imagined*. Because imagination is infinite, anticipation can be a never-ending endeavor.

To outline the 5 dimensions of anticipation as presented by Adams et al. [1]:

- **Injunction** refers to the “*obligation to 'stay informed' about possible futures...[becoming] mandatory for good citizenship and morality, engendering alertness and vigilance as normative affective states*” [1]. Given this moral imperative, individuals and communities are required to be disciplined enough to preemptively consider risk and work to manage this risk to ensure desirable futures.
- Similar to injunction, **optimization** refers to the moral imperative for people to strive for their 'best possible futures', "*maximizing one's chances for a best possible future*[1]. Optimization, however, can often become a site for contention

where there can exist competing beliefs for what is the 'best possible future', resulting in pressure to comply with certain actions deemed acceptable by anticipatory regimes that normalize what possible futures are to be aspired or avoided [1].

- **Abduction** refers to the act of making decisions about what actions to take in the face of ongoing future uncertainty [1]. This dimension is directly connected to Clarke's conception of the labor of abduction involved in anticipation work [2]. It is also how Adams et al. argue the present can be 'kidnapped' by the perceived risk of future violence and harm—where the present is robbed by *living in anticipation* for some violence or wrong to occur that one must be prepared for [1].
- **Preparedness** refers to the way anticipatory modes enable technoscientific interventions to be prepared for a possible future, motivated by a sense of urgency to secure a future against a future danger. What Adams et al. emphasize is a distinction between prevention and preparedness in anticipation. They write, "*anticipatory preparedness is speculative and reactive, in 'preparation for' the event and the trauma as if it were already here, rather than offering [full] 'prevention of' it so that it never happens*" [1]. Surely, certain things can never be fully prevented, but one can always try and be prepared.
- Underlying the entirety of anticipation is **possibility**, referring to the "*sense that things could be (all) right if only we anticipate them properly*" [1]. In anticipation, a belief that it is possible to react to and manage anticipated futures is requisite.

### 2.1.1 Anticipation Work

Anticipation work, the labor that emerges from the state of being in anticipation for some promissory future [1], "*includes but is not limited to gathering information, abducting, simplifying, guessing, deciding, planning, acting, and hoping against hope that the guesses made are good enough*" [2]. Clarke's conception of anticipation work relates to Star and Strauss' engagements with *articulation work* [76, 77], which refers to the work that enables projects by "*putting together tasks, task sequences, task clusters, and [...] aligning larger units such as subprojects, in order to accomplish the work*" [78]. Articulation work allows work to occur, helping provide details and information that make it possible for workers to adapt and adjust in the face of unanticipated or unexpected challenges [78]. Like anticipation work, articulation work is often invisibilized or dismissed to the periphery by hegemonic notions of labor [2, 76]. While articulation work might



involve the management of anticipation work [2], they should not be confused as the same.

Clarke breaks anticipation work down into three overlapping types of labor: *abduction*, *simplification* and *hope* [2]. Clarke defines **abduction** as the work of aggregating data or information that is deemed appropriate to address the problem or questions posed by future possibilities. It is iterative, involving the “*tacking back and forth multiple times between the empirical information collected (possibly with great care and at considerable expense) and new theorizings about that data to generate new conceptualizations*” [2]. Abduction is intentional, informed by some assumption or hypothesized future possibility. Abduction is also pragmatic, a term Clarke uses to refer to usefulness, where one’s hypothesis shaping their anticipation work is influential as long as it is deemed helpful or useful to one’s goals. And, when it is no longer useful, new theorizing and abduction work will ensue. In this way, abduction is a series of “ongoing loopings” [2] of moving back and forth between information gathered and experienced and the theories that emerge in turn. **Simplification** focuses on work practices and processes, as opposed to the individual doing the labor, involved in simplifying “*too much information, too much data to manage—or too much affect*” [2]. Simplification is labor invested in sorting through, managing, and making sense of copious amounts of information to suit one’s goals. Clarke argues that anticipation work is political, filled with decisions around what types of uncertainties to preemptively consider in the process of anticipation [2]. The labor of anticipation work is fueled by **hope**, referred to by Clarke as “*a primal energy source for action*” [2]. Hope involves the labor of “*generating or producing, distributing, and consuming hope*” [2]. It is the emotion embodied by the affective state [1] of living for some possible future.

With this understanding of anticipation [1] and anticipation work [2], in the next section, I describe how anticipation and anticipation work are deeply relevant to reproductive futurity.

## 2.2 Anticipating Reproductive Futurity

When it comes to questions and experiences of reproductive health and human reproduction (e.g., births, fertility, pregnancy), the relationship between past, present, and future is directly implicated [31]. Anticipation [1] invokes a complicated relationship with time and temporality. Scholars like Costa Figueiredo and Chen [25] conceive of time as both a tool for structuring processes of reproduction (e.g., fertility) and also as a source of pressure and influence—for example, time serving as a way to organize the labor of

trying to conceive, as well as producing a sense of urgency given fertility reducing with age. Reime et al. make sense of these complicated relationships with time through their concept of 'Reproductive temporalities', which they define as the *"lived and embodied experiences of reproductive time and the entanglements of past and future that form actions in the present"* [67]. For example, [15] found that some women chose to freeze their eggs to manage the risk of future infertility *and* to buy time until they were in a desirable anticipated coupledness to have children. In this way, people with the capacity for pregnancy make decisions in the present based on their hopes for the future that may account for *other people* (e.g., *hypothetical partners*), revealing how experiences of reproductive capacity are entangled in terms of time *and* those they have met and are yet to meet or be affected by.

Anticipation [1] and anticipation work [2] offer us a new lens through which to understand these entanglements with time and labor towards some desired reproductive future. I argue that embodied experiences with one's reproductive potentials (e.g., (in)fertility, pregnancy, miscarriage) are fundamentally paired with anticipation and anticipation work [2] as people strive for certain future outcomes (e.g., pregnancy) or reliable certainties (e.g., effective birth control) in the present. Beyond anticipating future outcomes or ensuring future expectations, I also argue people may engage in anticipation work towards the experiences associated with these outcomes or expectations (e.g., maintaining privacy in the first trimester of pregnancy, feeling supported by their OBGYN, timing pregnancy for a certain season).

In optimizing one's best possible, desirable future via anticipation, pressures can emerge for what best futures should be aspired for *and* what actions are acceptable to get there. As an illustration, Waggoner [79] highlights the way health promotion materials in the U.S. that typically targeted pregnant women have shifted to focus on non-pregnant women, particularly those of reproductive age. These promotion materials are part of an anticipatory regime that represents what Waggoner calls a framework of anticipatory motherhood where all women's future selves are a maternal self, positioning the responsible woman as one who *"must anticipate any possibility of pregnancy and any potential risks to the health of that pregnancy"* while in their *"pre-pregnant body"* [79]. This example from [79] highlights how normative constructions of reproductive temporalities and reproductive bodies that assume and project certain reproductive futures (e.g., pregnancy, motherhood) onto people with the capacity for pregnancy can complicate experiences of anticipating reproductive futurity by perpetuating prescriptive notions of what reproductive futures are desirable.

In anticipating reproductive futurity, people with the capacity for pregnancy navigate



a relationship with time and all its future possibilities in the present. While navigating prescriptive ideas about what reproductive future they should aspire for *and when*, they are also pushed to engage in labor to try and preserve their own desired reproductive experiences in the mix. This necessitates, I argue, overlapping streams of anticipation work to manage myriad concurrent reproductive futures that entangle with social, political, cultural, and material forces.

### **2.2.1 Reproductive Citizens' Anticipation Work**

While actors at different levels (e.g., individual, communal, institutional, organizational) may be salient to the reproductive health context, this Field Prelim is interested in the level of the *individual* who *embodies and experiences* their reproductive health intimately. Anticipation work is one way these individuals might interact with their reproductive health as they try to manage their possible reproductive futures. Individuals may be rethought of as reproductive citizens [15] who engage in anticipation and anticipation work towards their reproductive future(s). Carroll and Kroløkke offer an analytical framework of *responsible reproductive citizenship* [15] in which expectations abound for individuals to manage and anticipate their future (in)fertility, and act on these anticipations to protect their reproductive future by investing their time, money and energy. While they speak about the responsible reproductive citizen in the specific context of egg freezing, where egg freezing is undertaken to prevent future infertility in anticipation of some future (heterosexual) relationship, the responsible reproductive citizen refers to an individual who manages risk and engages in anticipation [1] to optimize their reproductive future(s). And yet, this responsible reproductive citizenship is gendered, where *"the responsibility of reproduction, including the making of healthy babies in heterosexual relationships, continues to rest squarely on women"* [15]. The responsible, and, its counterpart, the irresponsible reproductive citizen is the actor at the individual level who participates, engages with, or is the target of anticipatory regimes [1] and/or performs anticipation work towards a reproductive future(s)[2].

In an increasingly datafied society, the use of technologies to manage one's reproductive health is becoming more common [48, 5]. In the next section, I provide more insight into the relationships between reproductive health technologies and anticipation in the reproductive future(s) context, with particular attention to the sociotechnical anticipation work by people trying to conceive.

## CHAPTER 3

# Technology, Reproductive Futures and Anticipation Work

### 3.1 Reproductive Technologies as 'Reproductive Citizenship Projects'

Reproductive citizens may use various technologies in their anticipation work, such as reproductive technologies embedded with cultural meanings and social relationships beyond the material objects involved in their development and application [13]. These reproductive technologies include (but are not limited to) "*pharmaceuticals to assist sexual performance, widespread use of contraceptive technologies, ultrasounds, and genetic screening, ubiquitous cesarean births, medicines used to facilitate birthing, the algorithms used to determine labor progress, and the datafication of maternal outcomes...genetic screening and editing, uterine transplants, bioengineered wombs, ovarian tissue transplants, and gametogenesis*" [83]. These technologies can embody cultural norms and create ways of relating to reproduction that contradict one's desires for or lived experiences of reproductive health. For example, Menstruation and Fertility Tracking Applications (MFTA) reconfigure a reproductive body as one that is linearly progressing towards a reproductive future—where one is a parent, one is with a child, etc. [67]. As a result, MFTAs conceive of reproductive bodies and reproductive temporalities in reductive ways that do not account for the complex lived experience of reproductive bodies (e.g., infertility, IVF, surrogacy, LGBTQ+ relationships, not wanting a pregnancy) [67].

Kroløkke and Petersen argue that reproductive technologies and the types of new ways of relating to reproduction they enable (e.g., uterus exchanges via surrogacy or uterus transfers) are actually *reproductive citizenship projects* [45] where an "*individual exercise[s] his/her reproductive rights and choice to become a legitimate (active and responsible) reproductive citizen*" in the context of a neoliberal ideology and "*affective econ-*

omy of [reproductive] hope and desire<sup>1</sup>." In this way, people who (do not) engage with their reproductive capacity and (do not) use technologies relating to reproduction implicate sociocultural meanings relating to reproduction, social relationships, and what it means to be an actualized agentic reproductive citizen.

Using the dimensions of anticipation [1], the perceived and encouraged ability to anticipate reproductive futurity [*possibility*] generates a context where reproductive citizens at the individual level have a moral responsibility to be aware of possible reproductive futures [*injunction*], make choices in response to these futures [*abduction*], take action to increase the chances of the best future [*optimization*], and be prepared to handle risk if and when it arrives [*preparedness*]. Reproductive technologies are implicated in anticipating reproductive futurity; their application and usage simultaneously moralized and necessitated by peoples' hopes for ensuring desirable reproductive futures and mitigating the likelihood of perceived risk(s).

Reproductive technologies are about more than the technical aspects of reproduction—their usage is deeply embedded with societal norms and expectations that shape and reflect how people understand and manage their reproductive futures. Individuals' engagement (or lack of engagement) with these technologies signals what type of reproductive citizen they are (e.g., active and responsible, passive and irresponsible)—and these citizens' ability or willingness to anticipate reproductive futurity further moralizes technology use in the reproductive health context.

In the next section, I detail the ways anticipation has manifested in sociotechnical reproductive contexts, articulating in detail how technology is connected to anticipating reproductive futurity.

## 3.2 Anticipation in Sociotechnical Reproductive Contexts

The reproductive health context is rife with technologies touched by affective states or processes of anticipation [2, 83]. While I do not detail every relevant technology and its relation to anticipation here, these examples illustrate how anticipation is implicated in myriad sociotechnical reproductive contexts. These specific examples were chosen as they capture the range of technologies in the reproductive health context engaged within STS and HCI scholarship. By articulating how anticipation is relevant to these technolo-

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<sup>1</sup>Affective Economies [4] is a concept that conceives of emotions as objects that can influence and be influenced by different social infrastructures. In the context of this Field Prelim, 'affective economies' of [reproductive] hope and desire refer to the emotions (e.g., hope) that motivate the production and consumption of goods, and shape the experiences of infrastructures relating to reproduction.

gies, I bridge the abstract theoretical concepts of anticipation and anticipation work with the material technologies shaping and shaped by anticipating reproductive futurity.

### **3.2.1 Menstrual and Fertility Tracking Applications**

MFTAs are a type of reproductive technology involved in processes of anticipation where one's reproductive past, present, and future are entangled [67]. MFTAs are self-tracking devices that encourage users to input information about their sexual activity and reproductive health for goals centered on monitoring their menstrual cycle or fertility for myriad reasons. Reime et al. discussed the ways "*bodily experiences of the present (e.g., menstrual bleeding and ovulation) become translated into data archives of the past that serve as the basis for action in the present (e.g., intercourse) to produce an anticipated future (e.g., becoming pregnant)*" [67]. In this way, MFTAs build an anticipated future based on the quantified self [48] of one's past and present.

MFTAs may support the labor of simplification [2] by turning user-inputted data into data visualizations (e.g., charts tracking basal body temperature, calendars recording intercourse, or charts tracking menstrual cycle symptoms) [66] that help conjure up a (supposedly) clearer picture of individuals' reproductive or fertility presents for purposes of working towards desired reproductive futures [67]. However, individuals using MFTAs might struggle with making sense of this data and feel the need to engage in additional labor with others (e.g., social support, healthcare providers) to try and collaboratively understand their data, subsequently shaping their future reproductive health-related decisions [24].

### **3.2.2 Artificial Intelligence and Precision Medicine**

Precision medicine, a type of technology-mediated healthcare increasingly found in reproductive health contexts, involves individually tailored healthcare based on artificial intelligence systems' predictions that use an individual's data (e.g., genetics, environment(s), lifestyle(s)) to optimize future health outcomes [35, 12]. It is a form of healthcare that aims to predict (or anticipate) future health outcomes to inform decisions made in the present—decisions formed by the relationship between this anticipated future, the data of the present moment, and the data of the past (e.g., training models) [35].

With reproductive health, precision medicine has been applied to help preserve future fertility [43], diagnose and treat anticipated pregnancy complications (e.g., pre-eclampsia, preterm birth) [12], assess the risk of future infertility [22], as well as conduct

carrier genetic testing and support infertility treatments (e.g., IVF, IUI) [35] to name a few. The algorithms and other predictive tools used in precision medicine in the reproductive health context mediate a relationship between people's present with multiple anticipated reproductive futures and their hopes for these futures (e.g., full-term birth, an IVF procedure resulting in pregnancy). And, while the application of these technologies is fueled by the hope and promised possibility of ensuring desired reproductive futures, scholars like Matsumi and Solove caution us to assert the algorithms as responsible for this actualized future—algorithmic predictions that may prompt action *or* intervention are unfalsifiable and the interventions' preemptive application creates an inability to confirm whether the predicted outcome would (not) have happened without action(s) [55].

### 3.2.3 Online Support Groups

Online support groups have acted as sites of abduction, simplification and hope [2] for those experiencing both the affective state and processes of anticipation concerning their reproductive health experiences [66, 6, 17, 75]. These online spaces offer a place for individuals to share and seek out information about their reproductive health experiences, as well as to share and view others' relevant data (e.g., blood work, menstrual cycle, prescriptions) [66]—engaging in the labor of gathering and making sense of this information to prompt (non)action [2]. For example, [17] found that given the uncertainty associated with the management of polycystic ovary syndrome (PCOS), individuals turn to online support groups, like Reddit, to share and learn about the outcomes of self-management techniques (e.g., medication, diets, fitness regimens) as a way to make sense of their present experiences and make decisions about what they can do in the present to optimize their future health as desired. Similarly, [66] found that individuals dealing with fertility challenges engage in sense-making on online support groups by sharing information about their experiences as a way to 'check' if their present reality (e.g., doctors' advice, symptoms) is 'normal' by engaging in social comparison. This, in turn, offers hope to those finding individuals in similar circumstances (who have reached their desired reproductive outcome) [66]. Online support groups have also been used for the labor of making sense of and trying to be prepared for anticipated risks or threats to reproductive health (e.g., privacy threats posed by MFTAs following the overturning of *Roe v. Wade*) [75].

While these online spaces are sites for the labor and expression of anticipation, they can also perpetuate normative notions around people's reproductive health experiences,

creating a sense of exclusion based on one's identity (e.g., sexual orientation, race) [6] and lived experience of reproductive health when their experiences contradict these norms (e.g., infertility in non-heterosexual relationships, irregular menstrual cycles, pregnancy's ending in miscarriage) [66]. For example, Andalibi and Garcia found that individuals dealing with pregnancy loss turned to online support groups as a space to understand what is 'normal' for pregnancy loss through reading others' experiences. While this resulted in emotional validation when their experience aligned with what they perceived as normal, they also experienced emotional harm when they encountered disruptors to emotional validation (e.g., feeling judgment in interpersonal interactions, and encountering distressing or untrue information).

With an understanding of how anticipation might manifest in sociotechnical reproductive contexts, I turn next to prior work specifically focused on the sociotechnical anticipation work of people trying to conceive.

### **3.3 Sociotechnical Anticipation Work by People Trying to Conceive**

Reproductive citizens may be anticipating many different types of reproductive futures shaped by their unique health circumstances, as well as their aspirations. One subset of reproductive citizens are people who are trying to conceive, and aspiring to manage fertility. (In)Fertility is one reproductive context where anticipation is deeply embedded in peoples' efforts to navigate uncertainty to manage their fertility-related goals (e.g., pregnancy, having a child), with the majority of HCI scholarship in this space focusing on self-tracking technologies (e.g., MFTAs) and online support groups [24, 67, 25, 26, 62, 51]. These works primarily focus on labor in anticipating reproductive futures relating to binary goals (e.g., becoming pregnant/ remaining not pregnant), rather than goals surrounding the experience of these outcomes. People may have goals relating to their future reproductive experiences, such as wanting to keep their fertility efforts private until a certain time, wishing to feel supported and have their concerns validated by an OBGYN, wanting to experience pregnancy by a certain age, or hoping to not have the government involved in their reproductive health decisions. I argue these experiential hopes matter because the outcomes found in any anticipated reproductive future are predicated by a series of deeply intimate and embodied experiences of reproductive health. The absence of scholarship focusing on sociotechnical labor in anticipating future *experiences* of reproduction raises questions of how technology might both constrain and extend possi-



bilities for lived experiences in the present when people try to ensure future desirable reproductive health experiences (whatever that means to an individual).

When thinking of the processes of trying to conceive through the lens of anticipation [1], there exists a perceived ability to manage the uncertainty of trying to conceive or ensure a desired reproductive future (e.g., a viable pregnancy). This produces a context where individuals trying to conceive—reproductive citizens—have *a moral responsibility* to be informed of the possible (in)fertile reproductive futures, *make informed decisions* in response to their understandings of these futures, *take action* to secure this future, *and be prepared* to navigate challenges (e.g., infertility, pregnancy loss) if and when they arrive.

Through the myriad ways people may try to conceive (e.g., donor insemination, IVE, penetrative sex within a heterosexual relationship), the process often includes the observation and interpretation of a wide range of reproductive health indicators (e.g., menstrual cycle, cervical mucus, basal body temperature) [24]. Prior work like [25] has established how narratives affirming consistent and deliberate action (e.g., self-tracking fertility data practices) as a way to secure one's goals (e.g., conception) in the future moralizes the labor of trying to conceive—furthermore, the responsibility of the labor of aggregating, monitoring, and making sense of reproductive health indicators disparately falls on women, or the person expected to carry a pregnancy as opposed to others who may be involved in the conception experience (e.g., cisgender men, sperm donors) [15, 24, 51]. It is important to note, however, that as individuals' efforts to conceive become more medically complicated, this responsibility may also be shared with healthcare providers like OBGYNs and reproductive endocrinologists [24]. It is not clear from this prior work how those who are made to carry the burden of sociotechnical anticipation work for anticipating reproductive futurity make sense of this disparate labor distribution, nor how this awareness (or lack thereof) shapes their decision making regarding the technologies sought out during anticipatory processes.

Sociotechnical anticipation work emerges when people trying to conceive might turn to technologies (e.g., MFTAs, online support groups) as a way to work towards their hoped for reproductive futures of pregnancy [66, 26, 24], turning to these technologies as a way to manage and practice the labor of trying to conceive (e.g., timing intercourse or Assisted Reproduction Technology (ART) treatments within a predicted fertile window), as well as to increase their awareness and sense of preparedness for navigating the overall process as they wish [24]. Costa Figueiredo et al. found that women trying to conceive by engaging in self-tracking fertility methods are navigating a uniquely dynamic knowledge-intensive context where the labor of collecting information is necessary—

complicated even more by the need to routinely and co-currently reflect on previously collected data (i.e., week to week, month to month) to prepare for future fertility cycles [24]. I view this labor as anticipation work, abduction [2], as it involves an iterative process of aggregating, returning to, and theorizing about information to prepare for some anticipated future in the present. Data practices to navigate fertility are emotionally intense for people trying to conceive, riddled with feelings of hope and disappointment as people navigate uncertainty [26]. However, data interpretation challenges may increase this uncertainty and emotional burden as the mere existence of data does not directly translate to data subjects' understanding [26]. These data interpretation challenges occur despite technologies' potential to simplify mass amounts of reproductive health data into organized data visualizations [66]. This brings up the question of how the design of technology may both support or complicate abduction and simplification [2] when anticipating reproductive futurity, as well as shape emotional experiences, like experiences of hope, for people trying to become pregnant.

While these technologies might offer some users a sense of empowerment, others with marginalized identities along the axes of gender, sexuality, race, ability, class, and health status might find the usage of these tools navigating their fertility as putting them at increased risk for surveillance *and* harmful exposure to normative presentations of fertility [46, 66]. For example, prior work on general MFTAs and online spaces designed for navigating fertility has found that these spaces are designed for and dominated by those trying to conceive within heterosexual relationships [67, 10]. As a result, people with non-normative fertility experiences might turn to technologies specifically designed for their experiences (e.g., queer fertility) in their sociotechnical anticipation work—engaging in online spaces to share their experiences deprioritized in the design of general fertility sociotechnical spaces [66]. In addition, the types of data prioritized by the design of technologies help to shape the sociotechnical anticipation work by people trying to conceive, producing notions of what types of data practices are collected (and thus, valued by those deploying and developing reproductive technologies) in people's fertility experiences *and*, as a result, influencing the types of sense-making that is possible [25, 67]. These differences in experiences of reproductive technologies shaped by identity further necessitate questions of how identity is implicated in the *experience* of sociotechnical anticipation work and processes of anticipating reproductive futurity along the axes of gender, sexuality, race, ability, class, and health status. It also poses questions of how the types of reproductive futures being anticipated and worked towards are shaped by what it means to live with a wide range of identities and lived experiences.

The sociotechnical anticipation work by people trying to conceive is not occurring in



a vacuum. The processes and labor of anticipation in this context are heavily contested and entangled with multiple actors (e.g., family/friends, partners, healthcare, governments) and sociocultural norms (e.g., taboos about the female body) [25]. In the next section, I paint a picture of the political, cultural, and social contexts that complicate and raise the stakes for people with the capacity for pregnancy engaging with technology to anticipate their reproductive futures.

## CHAPTER 4

# Contested Landscape of Sociotechnical Anticipation Work by [Ir]responsible Reproductive Citizens

In this section, I discuss some of the social, political, and cultural contexts of reproductive health and reproductive capacity that shape the meanings and experiences of being a reproductive citizen in the U.S.

### 4.1 Framings of [Ir]responsible Reproductive Citizenship in Sociotechnical Contexts

In Western contexts, society frames the 'responsible reproductive citizen' as one that embraces the responsibility of managing their reproductive health status, while adhering to hegemonic notions of health, without the support of any social welfare systems [49, 15, 54]. Societal discourse about those with assumed reproductive capacity shapes ideas of what it means to be a responsible reproductive citizen. For example, the discourse of anticipatory motherhood positions all women as pregnant or pre-pregnant bodies who must engage in anticipation to grant their future baby good health [79], such as by abstaining from alcohol and regularly engaging in physical activity. Moreover, these discourses are racialized. When looking at public health materials embodying an anticipatory motherhood ethic, Waggoner found that the images and messaging relied on tropes of white heterosexual women as 'responsible' planners, and women of color as those who need to be told to be responsible with their reproductive health [79]. Similarly, when looking at ads for long-acting reversible contraception (LARC), Mann and Grzanka found that LARC ads evoked themes of personal responsibility, framing the responsible individual as the one who uses contraception to prioritize their education and career

development *before* any *planned* pregnancy occurs [54]. These discourses are reflective of societal pressures on women and those assumed to be able to get pregnant that help to moralize and necessitate anticipation work to be considered responsible reproductive citizens. In discourse found in sociotechnical spaces (e.g., targeted ads, in-app text), Lupton argues the beneficiary of this labor is represented as the future would-be baby of which the individual is deemed responsible for, in part, through their technologically-mediated behaviors like self-tracking or by adhering to an app's reminders to take a prenatal vitamin [49].

The responsabilization of sociotechnical anticipation work in reproductive contexts is enabled by *quantified sex*, which refers to when individuals' sexual and reproductive capacities and desires are datafied into calculable, comparable, and predictable categories [48]. The neoliberal ethos of responsabilization that quantified sex [48] encourages aligns with the anticipation dimension of injunction [1], where people are thought of as risk subjects who must remain responsible and informed. Quantified sex also encourages preparation for one's myriad reproductive futures, prompting action in the present based on data managed by algorithms present in self-tracking technologies [66] (e.g., predictive algorithms). Additionally, the normativity and assumptions about sex, gender, and reproduction embodied by self-tracking technologies [67, 48] reveal values about what it means to be optimizing oneself in a reproductive (and sexual) context—producing notions of what are 'normal' reproductive and sexual experiences to aspire for and how a 'responsible reproductive citizen' might get there.

Scholarship in HCI has found that individuals' responsibility for their fertility outcomes and a potential pregnancy is judged based on the personal actions they take concerning their fertility data, with self-tracking one way individuals can try to control and optimize future fertility and pregnancy outcomes [25]. Costa Figueiredo et al. argue that the idea that one might be able to empower oneself and achieve one's goals through persistent data practices like self-tracking leads to a climate where individuals have "the moral responsibility to engage in data practices and act towards their health goals" of conceiving [25]. Similarly, Lupton considers self-tracking applications as a type of participatory surveillance where the datafication and quantification of sexual and reproductive activities are celebrated as part of a neoliberal ethos where one's reproduction and sexual health are responsibilities for the individual to manage and stay informed on [48, 49]. Beyond self-tracking technologies, Lowry argues how other types of reproductive technologies (e.g., ultrasound, amniocentesis) may shape what it means to be responsible [46]. By providing individuals with additional information and capabilities to monitor the health of a (anticipated) pregnancy—and respond to these observations

with action—Lowry argues reproductive technologies may also provide people with additional responsibilities (and culpability for any ‘negative’ outcomes) to navigate in the present [46]. Overall, applying the lens of anticipation [1], the belief that engaging in persistent sociotechnical anticipation work will ensure one’s goals regarding a future pregnancy moralizes and necessitates sociotechnical anticipation work by people trying to conceive or who might be pregnant [25, 48, 46].

## 4.2 Reproductive Justice, Power and Control

### 4.2.1 A Brief Explanation of Reproductive Justice

Reproductive Justice—not to be conflated with reproductive rights or reproductive health—is a framework centered on three primary principles: the right to have or not have a child, the right to parent children in environments that are safe, well-resourced and healthy, as well as the right to gender freedom and sexual autonomy [68]. ACRJ dubs “the control and exploitation of women’s bodies, sexuality, and reproduction as an effective strategy of controlling women and communities, particularly those of color” [7] a primary preoccupation of reproductive justice. As a result, reproductive justice is interested in policies and legislation that infringe on individuals’ and communities’ bodily autonomy, meddle with peoples’ reproductive decision-making, *and* constrain the ability for individuals and communities to exist in safe, well-resourced, and healthy environments [68].

Expanding beyond questions of individual choice or personal reproductive autonomy, reproductive justice moves from questions of choice to questions of access, recognizing individual choices are shaped by resources accessible and denied to individuals and their communities [68, 70]. Ross and Solinger argue that material resources are necessary for reproductive justice to be achieved and for genuine *choice* to be able to occur, stating “the reproductive options that fertile people have are always structured by the resources they have—or do not have” [68]. The resources constraining or expanding an individual or communities’ reproductive options are thus a way to expand or limit reproductive choice, making it possible for governments and authorities to control and regulate both individuals and entire communities [7]. Differential access to resources and government regulation of reproduction is part of what Colen refers to as ‘stratified reproduction’ [21], a term to describe how reproduction is structured by political and social forces differently based on social hierarchies [21]. It also describes how reproductive labor, like childbearing, and its outcomes, like pregnancy, are unequally valued and

experienced across hierarchies of class, race, gender, and other characteristics [21]. By considering the power dynamics and inequalities that have influenced individuals and communities' reproductive realities at the intersections of race, gender, class, sexuality, age, and other identity facets [7, 74, 68], we understand the reproductive realities of the present emerge from a broader historical context. As anticipatory processes invoke a relationship between the past, present, and future, this history is relevant to anticipating reproductive futurity.

#### **4.2.2 Power and Control**

Bodies of power like state and federal governments are deeply invested in managing the reproductive capacity of people who may become pregnant under their domain as this has implications for their labor force and military enrollment, economic growth, nation-building/colonizing, as well as maintaining a [in the U.S. context] demographic (white) majority, and power among white elites [74, 68]. As a result, fertility and certain reproductive health outcomes are supported and encouraged for some (e.g., white, middle class), and stigmatized and discouraged for others (e.g., low socioeconomic status, people of color) *de jure* and *de facto* [21, 3].

The U.S. has a long history of surveillance in the reproductive health context, both of surveilling people (e.g., people with capacity for pregnancy), behaviors (e.g., sexual practices, reproductive healthcare accessed), and technologies (e.g., contraception) [68, 74, 81]. For example, in the 1800s, Congress passed the Comstock Law [69], working to prevent the U.S. postal system being used to distribute “any article or thing designed or intended for the prevention of conception or procuring an abortion” [69], and allowing officials to monitor and access any packages moving through the postal system [68]. This helped to legally establish the Government as conductors of surveillance relating to reproductive health care and people with the capacity for pregnancy's information that helps to limit the control people have over their reproductive capacity.

People with the capacity for pregnancy have long been the target of pro- and anti-natalist policies that govern reproductive capacity based on race, class, and other characteristics [68, 37]. To preserve the U.S.' 'white' racial majority in the U.S., the government violated the privacy of middle-class white women and their right not to have children with the Comstock law [69, 68], aiming to constrict their access to contraceptives. Racist and classist efforts to limit the reproductive capacity of poor women, and women of color culminated in policies, as recent as the 1990s, to make welfare benefits conditional on their use of contraception [68]. These policies serve as examples of the classed

and racialized historical policies aimed at managing the reproductive capacity of people who may become pregnant.

In the 21st century, these policies continue with state-sanctioned policies and legislation that criminalize motherhood and pregnancy, helping to deny privacy and reproductive autonomy to people with the capacity for pregnancy, disparately affecting minoritized groups (based on class, race, ability, health status, and sexuality)[34, 32]. For example, maternal conduct laws aim to police the behaviors of people perceived to be carrying a pregnancy in the present, or near future [79]. These laws center legislators' ideas of what behaviors are responsible or acceptable (e.g., eating habits, working during pregnancy, engaging in 'reckless' behavior) for [would be] pregnant people [34]. These policies, as a result, implicate issues of accessibility. The material resources community members have access to impact their ability to meet the behavioral expectations affirmed by governments (e.g., those with access to 'healthy' foods, those with the ability to abstain from labor at their place of employment), or else face threats of criminalization [34, 74]. Furthermore, these policies serve as examples of how bodies of power might weave into the intimate experiences of those trying to conceive through politics, further stratifying reproduction [21].

## **4.3 Intimate Privacy, Stigma and Reproductive Capacity**

### **4.3.1 Intimate Privacy**

When it comes to reproductive health and reproductive experiences, a desire for reproductive privacy so integral for one's self-determination over their reproductive lives *is* encompassed by Citron's conception of intimate privacy [18]. Danielle Citron coined the term *intimate privacy* to refer to privacy that "[involves] the social norms (attitudes, expectations, and behaviors) that set and fortify the boundaries around our intimate lives...[concerns] the extent to which others have access to, and information about, our bodies; minds (thoughts, desires, and fantasies); health; sex, sexual orientation, and gender; and close relationships...[includes] our on- and offline activities, interactions, communications, and searches..." [18]. While it is natural for people to want intimate privacy and *deserve* this right, Citron argues, we—in the United States—live in a time where the right to intimate privacy is denied and increasingly infringed upon by digital surveillance, 'informational capitalism', and an absence of U.S. legislation securing a civil right to intimate privacy [18].

The fields of HCI and social computing have begun to grapple with digital privacy in

the context of reproductive health, specifically with regards to FemTech (e.g., female-oriented technologies) with a unique interest on MFTAs [56, 58, 51, 5, 57, 28, 60, 14]. This is, in part, due to the ever-expanding pools of intimate data emerging from technologies collecting, and producing intimate data about individuals' reproductive capacity that poses privacy vulnerabilities for data subjects, those in their communities, and society at large [5]. Technologies like MFTAs collect large swaths of sensitive data (e.g., menstrual cycle, sexual activity, birth control) [28, 57]. In particular, Almeida et al. argue that the ubiquity of FemTech as mobile and IoT devices compared to more stationary computer-based systems pose greater risks to privacy because they are entangled with an individuals' many environments across space and time (e.g., bodies, geographies, temporality) [5]. While people seem to understand that intimate data produced by FemTech brings privacy risks, Mehrnezhad et al. have found that U.K. users of FemTech are less certain about the nuances of this risk, not knowing how intimate data is managed by owners of these technologies or how they might mitigate threats to their intimate privacy [58]. In the U.S., Cao et al. similarly found that people feel unable to protect themselves from privacy threats posed by intimate data produced and collected by MFTAs. And yet, FemTech remains largely unregulated [60] and the burden of anticipating and responding to threats to intimate privacy is placed on individuals.

Legislative changes (confirmed, perceived, or anticipated) (e.g., abortion bans, contraception access hurdles) that pose constraints on individuals' ability to access reproductive healthcare is one piece individuals might consider when anticipating (and reacting to) privacy threats via sociotechnical anticipation work. McDonald and Andalibi learned that following the overturning of *Roe v. Wade* [56], individuals implemented myriad privacy strategies in anticipation of privacy intrusions that might reveal their reproductive health decisions (e.g., abortion/terminating a pregnancy) in undesirable ways (e.g., resulting in legal consequences) [56]. In particular, they found individuals with complicated circumstances (e.g. high reproductive risk, precarious state legislation) managed reproductive privacy risk with a combination of no/low- and high-technology strategies as motivated by their legal, reproductive, and social literacy [56]. Others have found that people turn to online forums, like Reddit, as spaces to engage in collective sensemaking around reproductive privacy threats and mitigation strategies [75]. I situate these works [56, 75] as beginning to illustrate how anticipation [1] of future privacy threats may motivate sociotechnical anticipation work by individuals to try and thwart an undesirable (and dangerous) reproductive future.

Privacy concerns in the reproductive health context might implicate a wide range of social (e.g., privacy within interpersonal relationships [51]), political (e.g., legislation vio-



lating reproductive freedoms / reproductive privacy) [56] as well as cultural (e.g., normative understandings of fertility [57]) contexts. One might ask how these privacy concerns and the anticipation [1] / sociotechnical anticipation work [2] these concerns may inspire complicate what it means to be a reproductive citizen trying to conceive or in early pregnancy—especially one that values their intimate privacy and the consequences of it being violated.

### **4.3.2 Stigma**

Goffman uses the term 'stigma' to refer to social shame or rejection, which can serve as an informal tool to control those who do not adhere to social norms or expectations [33]. Reproductive health is a deeply sensitive context, and a site for multiple stigmatized [33] experiences relating to one's reproductive capacity (e.g., use of contraception or ART, unmarried parenthood, miscarriages, abortions, pregnancy) [23]. The stigma associated with pregnancy reflects many gendered and racialized stereotypes that help to disenfranchise women and people who may become pregnant [71]. Skorinko et al. argue that stereotypes concerning pregnancy that often position pregnant people as noncommittal, needing accommodations, and being incompetent contribute to biases in the workplace and higher education [71].

Sometimes, stigma is shaped by the reproductive experience and its relationship to social norms dictating normative reproductive temporalities. For example, [11] found that women who experience a miscarriage encountered feelings of loss, isolation, and struggles to find social support, in part due to social norms where pregnant people are encouraged to keep a pregnancy private until the first trimester has successfully passed. As a result, people who experience a miscarriage might turn to social media as a way to process this stigmatized experience and access social support [6, 10]. Stigma also emerges between people who are in different stages of the 'want to be pregnant' to 'pregnant' spectrum—those who are also in different relationships with their reproductive capacity. Jansen found that individuals struggling with infertility sometimes face stigmatization from pregnant people, such as through receiving unsolicited suggestions and advice on fertility from pregnant people, as well as feeling defined by the amount of time they've been trying to conceive within those relationships [40]. These experiences of stigmatization between individuals dealing with infertility and those who are pregnant also manifest in online spaces [10]. Altogether, these prior works highlight how normative reproductive temporalities are salient to possible stigmatization. One might ask how people trying to conceive and in the early stages of pregnancy make sense of these nor-



mative reproductive temporalities in their sociotechnical anticipation work *and* how this labor is shaped by anticipated [1] (and undesired) future experiences of stigmatization.

Those who do become pregnant are at risk of facing stigma when their lived experiences contradict socially acceptable notions of what it means to be pregnant ‘correctly’ (e.g., relationship and financial status) or *who* should (not) become pregnant (e.g., people with substance use disorder). For example, people trying to conceive and those who are experiencing pregnancy may encounter weight stigma [39, 71, 38], exacerbated when their (pre)pregnancy weight or weight changes during pregnancy contradict social and medically normative expectations. Similarly, people who (may) become pregnant often face societal expectations that they are doing so under certain conditions (e.g., within a monogamous (heterosexual) relationship) [40]. Smith et al., in a study regarding the stigma and social norms young women in Alabama encounter when having an unintended pregnancy, found that women had common behavioral expectations from those who might find out about an unintended pregnancy. They expected their communities to shame and ostracize those who became pregnant outside of ‘acceptable’ conditions (e.g., planned pregnancy, monogamy, financial stability) [72]. These examples highlight how experiences of being (or becoming) pregnant are in flux with what is deemed socially, culturally, or medically acceptable at any given time. Furthermore, across generations, these norms can differ and have implications for intergenerational relationships salient to pregnant people or those trying to conceive [8]. I argue that those trying to conceive who engage in sociotechnical anticipation work may need to navigate moving social and cultural norms stigmatizing pregnancy. These norms can shape their overall *experiences* of trying to conceive and early pregnancy against or in support of their wishes.

#### **4.4 Stakes of Anticipating Reproductive Futures via Technology for People Who are Trying to Become Pregnant or Are in Early Pregnancy**

There are many different types of reproductive futures a person trying to conceive or who is pregnant might be anticipating or aspiring for simultaneously, such as wanting a certain outcome in their fertility experiences (e.g., pregnancy) *and* a certain experience of trying to conceive (e.g., private, (un)medicated). The previous sections of this chapter highlight the myriad social, political, and cultural forces that heighten the risks and complicate the experiences of reproductive citizens—particularly those who are trying

to conceive or who are recently pregnant— anticipating reproductive futurity. People trying to conceive and those who are recently pregnant are pushed to navigate this landscape riddled with prescriptive notions of what reproductive futures they *should* aspire for, how, and when.

Political, cultural, and social forces may shape overlapping forms of anticipation and anticipation work people experience. For example, a queer person hoping to conceive through IVF might be engaging in anticipation work in their efforts to conceive, but they also might be anticipating facing unwanted stigmatization in the future, due to normative conceptions of a responsible reproductive citizen being one who tries to conceive in a heterosexual relationship. In anticipating their future experience of trying to conceive,—which is part of their reproductive future—this person may engage in additional labor to manage anticipated stigmatization. The labor of managing stigmatization preemptively, in this scenario, is a type of anticipation work. As another example, a person in their first trimester might be living in a state where experiencing a miscarriage might make them liable for legal consequences. In addition to their wishes to carry their pregnancy to term, and engaging with myriad forms of technologies (e.g., seeking ultrasounds to check fetal status, using online spaces for social support) to assist that goal, they might perform preparatory behaviors to keep their reproductive status private in case a miscarriage occurs and an undesirable reproductive future (e.g., facing criminalization for a miscarriage) arrives.

The overlapping nature of these multiple anticipatory processes engaging with reproductive futurity is important to grapple with. Attending to a wide range of multiple desired reproductive futures (e.g., future outcomes, future experiences) allows us to understand how time, space, and lived differences shape sociotechnical anticipation work. It also allows us to tease out the breadth of entanglements that reproductive citizens choose (or are pressured) to manage in efforts to anticipate and ensure desired reproductive futures. Furthermore, I argue the labor of sociotechnical anticipation work towards anticipating reproductive futurity is a type of reproductive labor, and it is unclear how this labor is stratified [21] across social hierarchies, nor what political and social forces structure this labor of anticipation[1, 2].

## CHAPTER 5

# Project Proposal

This Field Prelim has established that anticipation is integral to reproductive health and reproductive futures (Chapter 2), technology is implicated in anticipating reproductive futurity (Chapter 3), and there exists a contentious social, political, and cultural landscape for people with capacity for pregnancy who might engage in sociotechnical anticipation work (Chapter 4). Prior work demonstrates the process of trying to conceive and the first trimester is associated with privacy and stigma concerns with heightened risk for stigmatized experiences (e.g., miscarriage, medical surveillance) [23, 34]. Additionally, people who have decided to try to conceive may be at increased likelihood of engaging with technology to try and have control over their fertility and pregnancy trajectories [24, 67, 25, 65, 26, 62].

I want to work towards an understanding of the breadth of entanglements *across time and space* involved in anticipating reproductive futurity among people trying to conceive and into early pregnancy, considering the contested landscape (social, political, cultural) of reproductive health in the United States that may shape these entanglements. Beyond this, I wish to address how technology is involved in anticipating and striving for a certain *experience(s)* of reproductive futurity, beyond solely focusing on binary outcomes (e.g., pregnant/not pregnant, fertile/infertile).

Below is a project proposal for a 4-month long study that would explore the myriad sociotechnical entanglements—such as the human, nonhuman, temporal, political, and sociocultural elements—of anticipating reproductive futurity for people who are trying to become pregnant or are in early pregnancy. This study draws inspiration from Haraway’s conception of the body as a series of entanglements between human and non-human actors [36], recognizing that embodiment extends beyond the individual to encompass others. And so, I ask: **What entangles with the reproductive citizen [15] who must navigate reproductive temporalities [67] along with material, social, cultural, and political forces in their embodied experiences of trying to conceive into a possi-**

ble pregnancy?

## 5.1 Research Objectives

### 5.1.1 Research Questions

This study aims to answer the following questions:

- **RQ1:** What are the sociotechnical entanglements of anticipating reproductive futurity for people trying to conceive and into the first trimester of pregnancy?
- **RQ 1.1:** What technology-mediated labor emerges among people trying to conceive and into the first trimester of pregnancy due to anticipation?
- **RQ 1.2:** What cultural, political, and social framings [of pregnancy, motherhood, pregnant people] motivate or inform this sociotechnical labor?
- **RQ 1.3:** What uncertainties do people who are trying to become pregnant or are in early pregnancy try to manage? How do these uncertainties and their efforts to manage them shift *across time and space*? And, how do technologies configure this management?

## 5.2 Methods

To answer the study's research questions, I will do a mixed methods study with people over the age of 18 who live in the United States and report they are trying to conceive *or* are in their first trimester of pregnancy at the time of recruitment.

### 5.2.1 Asynchronous Remote Community

This study will use the ARC method—a type of online focus group—[52, 53] which has been adapted and applied successfully to sensitive reproductive health contexts [64, 44, 63]. ARC is a method where researchers create private closed groups where participants are invited to complete asynchronous tasks and participate in discussions independently at their own pace. [53] offers a series of ARC guidelines with proposed activities that can be adapted to a study's unique context, such as the case of [64] where Prabhakar et al. modified ARC with additional activities tailored for pregnant people and new mothers. Following [64] and [44], I will adapt the ARC method towards a targeted

population of people trying to conceive or in the first trimester of pregnancy, creating activities inspired by [53] and [64]. The goal of these activities will be to elucidate the sociotechnical entanglements of anticipating reproductive futurity, making clear the cultural, political, and social meanings and forces embedded in these entanglements and the technology-mediated labor that emerges in turn. Once at least 10 participants are recruited to join a closed group, participants will receive an invite link to join a remote community on Quallie, a service that supports online focus groups and allows for a moderator to provide a series of tasks to participants, as well as for participants to comment and engage with each other within a task setting. I will organize participants into focus groups based on their pregnancy status (e.g., Focus Group 1: Trying to Conceive, Focus Group 2: First Trimester).

### **5.2.2 Semi-Structured Interviews**

In addition to ARC, I will invite participants in the remote community to also participate in a semi-structured interview once the ARC portion of data collection is completed. During these interviews, the outcomes of the online communities' activities and discussions may be used as artifacts to inform tailored questions to gain more insight into a participant's experience. I will ask questions relating to individuals' desired reproductive health experiences and outcomes, what types of labor they engage in (if at all) to ensure these outcomes, and how technology is implicated within this labor. While these themes will be touched on in activities in the ARC, semi-structured interviews will allow me as the researcher to ask more follow-up questions and get a deeper understanding of the nuances of experience shared within the private online group. I will invite participants to complete a 60 to 90-minute interview over Zoom (video or audio call, depending on their preferences).

### **5.2.3 Participation Timeline**

Table 5.1 details the participation timeline and the types of contact I will have with participants during the study's 4-month data collection stage.

TABLE 5.1 Participation Timeline

Month 0	<p><b>Recruitment:</b> During this time, I will work on recruiting participants for the study. I will invite eligible potential participants <b>to a short 15-minute one-on-one Zoom call</b> where I will explain the requirements of the study and the ARC environment. Following the completion of this call and pending the possible participant's interest, I will <b>share the informed consent form</b>. Once 10 participants have been recruited and signed the consent form for each group (e.g., trying to conceive, first trimester), they <b>will be added to FocusGroupIt</b>.</p>
Months 1 through 3	<p><b>ARC:</b> During Months 1-3, the ARC portion of <b>data collection will be ongoing</b>. At this time, participants will be invited to <b>participate in asynchronous tasks</b> at a cadence as established by the group (e.g., 2x/week). The extent of my participant contact during the ARC will be to <b>distribute the activities, answer any questions participants have regarding the activities, moderate participant comments and posts, and distribute incentive payments</b>. <b>At the end of Month 3, I will close the online group.</b></p>
Month 4	<p><b>Semi-Structured Interviews:</b> In Month 4, I will invite participants from the ARC to <b>complete interviews</b>. During this time, participant contact will be limited to <b>scheduling the interview, conducting the interview, and distributing incentive payments</b> once the interview is completed.</p>
Month 5+	<p><b>Data Analysis:</b> In Months 5 and beyond, I will be in the depths of data analysis and will <b>no longer seek out any contact with participants</b>. However, if contacted by a participant, I will respond to any questions they may have. After data analysis is complete, I will <b>destroy the 'participant key'</b> bridging participants' identities with any data .</p>

## 5.3 Recruitment and Data Collection

### 5.3.1 Participant Pool

For the ARC study, I will recruit 30 people trying to conceive or in the first trimester of pregnancy [at the time of recruitment] who currently reside in the United States. While other ARC studies working in the context of reproductive health [44, 64] have had 13 to 42 participants in their studies, recruiting 30 participants will help me ensure I can recruit a diverse representative (not generalizable) sample of participants *and* be prepared for possible participant attrition. Dunbar et al. suggest ARC's can handle slightly larger sample sizes than traditional focus groups, recommending 10 to 20 participants per group [29].

I hope to have an evenly distributed participant pool based on their pregnancy status (e.g., 50% trying to conceive, 50% first trimester). Participants may include people in early pregnancy who did not intend to become pregnant, but will not include those who intend to deliberately end their pregnancy (e.g., receive an abortion)<sup>1</sup>. I will also intentionally recruit participants across a diverse spectrum of races and ethnicities, genders, sexual orientations, and socioeconomic statuses. When inviting participants, I will work towards having equal representation across a range of identities. These participant pool composition efforts will help to ensure a wide range of experiences are represented across participants and support this study's commitment to the reproductive justice framework [68] by being attentive to differences among lived experiences of reproduction.

The interview study will occur after the ARC study is complete. I will be responsive to the observations and findings within the remote group during interviews. For the interview study, I will aim to interview participants successfully recruited into the ARC study *until* data saturation is reached—no new emerging themes come from the data.

### 5.3.2 Recruitment Strategies

To generate the participant pool described above, I will conduct purposive sampling, actively seeking out people who self-report that they are trying to conceive or are in the first trimester of pregnancy at the time of recruitment.

I will recruit participants from multiple sources. I will start by recruiting participants

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<sup>1</sup>Including participants who intend to deliberately end their pregnancy increases their risk for participating in this study, particularly as they may live in states where such activity is considered illegal. As best as I can, I would like to minimize the risk of harm to participants.

from **UMHealthResearch**, which is a service offered by the Michigan Institute for Clinical & Health Research that connects researchers with nearly 100,000 interested participant volunteers across the U.S.. Depending on the diversity of recruited participants from that source, I will also publicize recruitment messages within several online forums relevant to pregnancy and trying to conceive. Potential participants will fill out a screening survey to be considered for this study, regardless of where they are recruited from. As a last resort, due to increasing instances of deceptive participants in qualitative research online [61], I might also share recruitment messages on my social media accounts with relevant hashtags (e.g., #Pregnancy, #TTC, #FirstTrimester, #TryingtoConceive).

I will contact respondents to participate via email before being officially onboarded to the study and added to the remote group. In these emails, I will provide participants with study details. I will ask participants to participate in the ARC over 3 months. This time frame is designed to give flexibility to each group to determine the cadence of activities they would like to be invited to participate in each week. Additionally, given the asynchronous nature of the method, 3 months will allow participants the flexibility to complete the tasks on their own time—this is particularly important given the time constraints people trying to conceive or in early pregnancy may be navigating that limits the time they have to participate in research [41].

### **5.3.3 Incentives**

To incentivize participation, participants will receive gift cards throughout the study, with compensation being provided at the beginning, mid-way, and endpoint. Participants will receive \$25 after being onboarded to the remote community, \$50 at 1 month, \$75 at 2 months, and \$100 at 3 months. In total, participants will receive \$250 for participating in the ARC for the full 3 months. Participants are considered participating if they complete at least 75% of the total activities shared during a study period (e.g., Months 1, 2, or 3). Participants who participate in a semi-structured interview will receive an additional \$40 gift card.

Participants are eligible to receive between \$25 to \$290 each. This means I must budget for the total possible incentive costs for this study: \$8,700.

To cover these costs, I would seek out funding from resources such as the Candidate Rackham Graduate Student Research Grant (up to \$3,000), the Center for the Education of Women+ Fellowships (between \$2,000 and \$5,000), and other funders who provide grants for students' research.



### 5.3.4 Participant Privacy and Protection Considerations

Before any participants are onboarded to the study, I will share an informed consent form with participants for them to review *and* sign. This informed consent documentation will provide detailed insight into the expectations of the study, possible risks of participation, conditions on participant incentives, as well as the practices that will be put in place to protect their privacy during (and after) the study. I will complete the informed consent form in adherence with the University of Michigan's IRB requirements.

While I have chosen to use Quallie to host the ARC due to its flexibility to host multiple activities and ways for respondents to interact, I chose Quallie over other online focus group platforms due to its privacy policy having to adhere to the EU's General Data Protection Regulation (GDPR). This is particularly important because participants may be sharing or alluding to sensitive reproductive health experiences within the group that subject them to varying degrees of risk based on the State in which they live.

## 5.4 Data Analysis

For data analysis, I will integrate Clarke's situational analysis [20] with Charmaz's constructivist grounded theory [16] to gain a deeper understanding of the sociotechnical anticipation work of people who are trying to become pregnant or are in early pregnancy—including how this labor is entangled with different political, cultural, material and social elements, as perceived by both the participants and myself as the researcher. My analysis will be highly iterative with data collection and analysis informing each other throughout the study's duration. Clarke's situational analysis, with its focus on mapping human and non-human actors (e.g., situational maps, social worlds/arenas maps, and positional maps) [20], will help me understand the many entanglements that exist among the contested landscape where sociotechnical anticipation work toward reproductive futures might take place. In parallel with mapping [20], I will apply the constructivist grounded theory approach to participants' interviews and their written responses in the ARC, beginning with open coding (initial), followed by focused and axial coding [16].

Both situational analysis and constructivist grounded theory are committed to feminist principles of reflexivity and subjectivity, acknowledging that the theories developed are “embedded in the historical, social, cultural, and situational conditions of their production” [19]. Together, these methodologies will enable me to both “[map] the situation of inquiry and [analyze] basic social processes of action within” [19] the sociotechnical

anticipation work by reproductive citizens in the U.S. context. This method's feminist principles align with my commitments, informed by Feminist STS and Feminist HCI, to be attentive to the broader social context a technology's materiality is situated within.

## 5.5 Reflections on Special Considerations and Limitations

### 5.5.1 Participant Attrition

There may be multiple reasons why somebody recruited for this study may choose to withdraw from the ARC, such as lacking the time to participate or experiencing a change in their reproductive health status that alters their position within their group (e.g., someone in the early pregnancy group experiencing a miscarriage).

To avoid a sense that one *must* disclose *why* they need or want to withdraw from the study, I will have a standard policy for withdrawal to share with participants. Participants wishing to withdraw will be asked to answer the following questions regarding their decision to withdraw and preferences for their data:

- **Would you like to withdraw from the study?** (Yes/No)
- **What would you like done with the information you've provided to researchers up until this point?** (I am okay with the researchers including the information I've shared with them in future data analysis. / I would like the researchers to not include the information I've shared with them in future data analysis. )

I will adhere to participants' preferences for what happens to their data following their withdrawal from the study. If participants are okay with their data remaining in the study, I will include it in the data analysis.

Participants removing themselves from the study will receive compensation based on the week they withdraw. As participants can earn a total of \$225 over the 3 months of the study (\$18.75/week), a participant who withdraws during week 4 would receive \$75 (= \$18.75 X 4 weeks). This policy will be relayed to potential participants during the onboarding meeting.

### 5.5.2 Moderating the ARC

During the onboarding meeting, I will share a document with some initial community guidelines with participants. These will be a starting point and will be expanded on dur-

ing an activity early in the study to establish group expectations. The *initial community guidelines* will include requests like acknowledge other's experiences and recognize they may be different from your own, interact respectfully with other group members, avoid generalizations, and speak from your own experience.

As a researcher, I will check the group twice daily, in the morning and afternoon, to review any responses to activities, and read through participants' interactions in the comments to watch for problematic content or interactions.

### **5.5.3 Limitations**

There are several anticipated limitations to this study. Since this study covers topics about reproductive experiences, and as fertility and pregnancy is a sensitive topic for many, this study might miss out on the experiences and perspectives of those who do not feel comfortable speaking with researchers (and other participants) about their experiences trying to conceive or early pregnancy. Secondly, participants who live in locations where legislation has criminalized certain reproductive health experiences (e.g., miscarriages, abortions) may not be interested in participating in studies where their involvement alludes to a possible (future) pregnancy. This, and the mere existence of legislation criminalizing reproductive health experiences, shapes what information participants may be willing to share with researchers as they assess their circumstances. This study also asks participants to commit to 3 months of involvement in the ARC portion of data collection and to consider additional involvement with an interview. As a result, this study might exclude participants who do not have the time or resources to fulfill the study's commitments. This study might also exclude those who do not speak English or feel comfortable in their fluency to engage with the researchers or other participants.

## **5.6 Study Instruments**

### **5.6.1 Asynchronous Activities**

I will invite participants to be involved in several asynchronous activities over 3 months in their ARC. They will receive an email from Quallie when a new activity has been posted for them to complete on their own time.

While I do not detail every single activity that may be shared within the ARC here, below are examples of 10 activities inspired by and adapted from prior work [64, 44, 53]. I highlight which of my study's research questions they help to answer.

#	Name	Activity	Shared with Group	Duration	Generative or Recall?	Medium	RQs	Connection to RQs
A1	Preferences Poll	Participants are asked to complete a poll answering questions about their preferences regarding days when activities are shared with the group, and how often.	Directly	One Time	Generative	Poll	N/A	This question helps me understand the desired cadence of activities among the group.
A2	Timeline	Participants create a timeline of their experiences trying to conceive or into pregnancy. They are invited to comment and engage with what others share.	Directly	One Time	Recall	Text, Media	1.1, 1.3	This question is meant to begin to elicit recollection of one's experiences across time and space, and used as a starting point for future activities. The timeline will highlight the order of 'events' they experienced and may need to manage and labor towards.
A3	Technology Use Timeline	Participants are asked to return to A2, and add to it the type of technologies they've used and why. They are invited to comment and engage with what others share.	Directly	One Time	Recall	Text, Media	1.1, 1.3	Similar to A3, however, this timeline activity will explicitly elicit the types of technologies used across time and space, and the purpose of these uses—as a result, it will illuminate what types of uncertainties these technologies were used to manage.
A4	Future Technology	Participants are asked to think about future interactions they may have with technology in their experiences relating to trying to conceive or pregnancy, and why they may or may not interact with these technologies.	Directly	One Time	Generative	Text	1.2, 1.3	This activity will bring out participants' anticipated technology uses they might engage with (or might not), and why. This will help bring out attitudes around possible sociotechnical labor in anticipating reproductive futurity.
A5	Problems (Uncertainties)	Participants are asked to submit a list of things they feel uncertain about with regards to their experiences trying to conceive or early pregnancy.	Not Shared	One Time	Generative	Text	1.3	This activity will elicit uncertainties people may try to manage in their experiences.
A6	Ranking	Participants rank a list of uncertainties, generated from A5, in order of how much each is a concern for them personally.	Not Shared	One Time	Generative	Ranking	1.3	Building off of A5, this activity will ask all participants to rank the uncertainties that emerged among the group and which ones are concerns for them. This will allow me to assess for patterns of these uncertainties among participants based on identity, whether they're trying to conceive or in early pregnancy, etc.
A7	Organizing Tools	Participants will be asked to look at the lists of uncertainties, generated from A5, and the technologies referenced in A3 and A4. They will be asked to organize the technologies based on which they've used to manage these uncertainties that are a concern for them.	Directly	One Time	Recall	Media	1.1, 1.3	Building off earlier activities, this activity will explicitly help me bridge technologies participants use with the uncertainties they may manage.
A8	Advice Columnist	Participants are asked to write responses to advice column submissions, taking the role of the advice columnist. For example, one scenario will ask participants to respond to someone new to trying to conceive who is feeling overwhelmed and nervous with all of the different tools out there that they might feel a need to use in the future towards their goals. Additionally, they express having 'mixed feelings' about using tools or technology to assist with their reproductive experiences. They seek advice on what they should or should not be worried with respect to using technology for their reproductive goals, as well as how others feel about using (or not using) technology.	Directly	One Time	Generative	Text	1.2	This activity will help elicit participants' attitudes towards sociotechnical labor towards trying to conceive or early pregnancy. It aims to elicit participants' opinions, while also hoping to prompt the sharing of their own feelings and framings towards technology use in this context. From sharing these attitudes, opinions, and feelings, I will be able to note what types of framings of pregnancy, motherhood, pregnant people, and technology, etc. emerge across participants.
A9	Rant line	Participants will be made aware of a 'Rant Line', which will be a number they can call, text, or send images to whenever they'd like. They will be invited to share with me their thoughts as they wish, or as seem relevant.	Not Shared	3 months	Generative	Audio, Text, Media	1.2, 1.3	This activity provides an open space for participants to vent about their experiences and interactions involving technology uses as time passes in their experiences trying to conceive or in early pregnancy. It allows for more casual sharings of emotions or thoughts salient to sociotechnical labor in the reproductive context, in which anticipation might be relevant.
A10	Diary	Participants will be asked to track interactions they had with others about trying to conceive or early pregnancy. They will be asked to keep track of who they interacted with, the medium used, what was discussed, and how they felt about the interaction. They will also be asked to pay attention to advice or suggestions they encounter in these interactions, and what tools are mentioned.	Directly	7 days	Generative	Text	1.2	This activity will elicit participants' interactions with others and the types of attitudes towards pregnancy or trying to conceive, as well as technology in these experiences. It'll help pull out some of the social, cultural, and political framings that are implicated in their sociotechnical labor or relevant encounters with technology.

Table 5.2: This table includes a brief description of asynchronous activities I may deploy to participants within the remote community, along with how they'd be shared with the group, the duration of the activity, whether it is generative or asks participants to recall, the medium of the activity, as well as what research questions (RQs) the activity addresses.

## 5.6.2 Interview Protocol: Trying to Conceive

Below is an example of interview questions for participants in the 'Trying to Conceive' Focus Group. Throughout the entire interview, I will be probing deeply into references to technology and its entanglements with social, political, cultural, and material elements.

*Thank you so much for agreeing to do this interview!*

1. How would you describe your experience trying to conceive so far?
2. Can you tell me about when you started trying to conceive? **Probe:** What made you to start?
3. When thinking about what may happen in the future as you try to conceive, what do you imagine?

Why do you think those are the types of things you imagine as future possibilities?

4. Are there things you feel strongly about wanting to happen while trying to conceive? Why?
5. Are there things you feel strongly about not wanting to happen during this experience? Why?
6. Beyond the possibility of getting pregnant, are there certain aspects of a possible future pregnancy that feel particularly important to you?
7. Are there things about trying to conceive that feel out of your control?

If yes, what are they?

[If needing a probe:] Can you tell me about a specific time when you felt like you lacked control over your experience of trying to conceive?

Have you done anything to try and have more control over [blank]?

8. Are there things about trying to conceive that you feel you have control over?

If yes, what are they?

[If needing a probe:] Can you tell me about a specific time when you felt in control over your experience of trying to conceive?

What makes you feel in control over [blank]?

Have you always felt control over [blank]? If not, what changed?

9. Thinking about technology, are there certain technologies you've used while trying to conceive? **Probe: Online Support Groups, MFTAs, Telehealth, ARTs, medicines to assist conception?...**

How have you used [technology]?

How did you decide to incorporate [technology]?

What do you hope [technology] helps you with?

Do you have any concerns about your decision to use [technology]? If yes, what are they? How do you manage these concerns?

10. Are there aspects of your identity that you feel have shaped your experiences trying to conceive? How?

Have these experiences influenced the types of technologies you've chosen to use or not use while trying to conceive?

Can you tell me about a specific decision you've made while trying to conceive that you feel is related to your experiences as a [identity]?

### 5.6.3 Interview Protocol: First Trimester of a Pregnancy

Below is an example of interview questions for participants in the 'First Trimester' Focus Group. Throughout the entire interview, I will be probing deeply into references to technology and its entanglements with social, political, cultural, and material elements.

*Thank you so much for agreeing to do this interview!*

1. How would you describe your experience trying to conceive into now being pregnant?
2. Can you tell me about when you started trying to conceive for your current pregnancy? **Probe:** What influenced you to start?
3. When thinking about what may happen in the future with this pregnancy, what do you imagine?  
Why do you think those are the types of things you imagine as future possibilities?
4. Are there things you feel strongly about wanting to happen during this pregnancy? Why?

5. Are there things you feel strongly about not wanting to happen during this pregnancy? Why?
6. How do you hope this pregnancy ends?
7. Beyond the possibility of [hoped ending], are there certain aspects of this pregnancy that feel particularly important to you?
8. Are there things about this pregnancy that feel out of your control?
  - If yes, what are they?
  - [If needing a probe:] Can you tell me about a specific time when you felt like you lacked control over your pregnancy?
  - Have you done anything to try and have more control over [blank]?
9. Are there things about this pregnancy that you feel you have control over?
  - If yes, what are they?
  - [If needing a probe:] Can you tell me about a specific time when you felt in control over your pregnancy experience?
  - What makes you feel in control over [blank]?
  - Have you always felt control over [blank]? If not, what changed?
10. Thinking about technology, are there certain technologies you've used during your first trimester [up until now]? **Probe: Online Support Groups, MFTAs, Telehealth, ARTs, medicines?...**
  - How have you used **[technology]**?
  - How did you decide to incorporate **[technology]**?
  - What do you hope **[technology]** helps you with?
  - Do you have any concerns about your decision to use **[technology]**? If yes, what are they? How do you manage these concerns?
  - What technologies did you use before getting pregnant that you feel are relevant here?
11. Are there aspects of your identity that have shaped your pregnancy experiences? How?
  - Have these experiences influenced the types of technologies you've chosen to use or not use during your pregnancy?

Can you tell me about a specific decision you've made during your pregnancy that you feel is related to your experiences as a [identity]?

## **5.7 Expected Contributions**

This study will contribute the following:

1. A map of the human, nonhuman, temporal, cultural, social, and political elements entangled in individuals' experiences anticipating their own experiences of reproduction
2. An understanding of how these sociotechnical entanglements change and shift across space and time, enabling a more nuanced understanding of the labor done by this group, as well as making more space for acknowledging differences in experiences for more tailored design and policy to support these efforts
3. An illustration of how the social, political, cultural, and material merge to shape and influence a deeply intimate and personal aspect of people's lives, illuminating tensions and constraints
4. At the study level, creates a space for participants to find community, and social support and interact with others in a similar time/context as them.



## CHAPTER 6

### Conclusion

This field prelim draws from the fields of Feminist STS, Social Computing/HCI and Reproductive Justice to explore the relationships between anticipatory processes, reproduction and reproductive health, and technology. Drawing from prior work, I provided an understanding of how anticipatory processes are connected to reproduction, reproductive health, and reproductive futures (Chapter 2). I've also highlighted how technology is implicated in anticipating reproductive futurity, with a specific focus on people trying to conceive (Chapter 3). Moreover, I painted a picture of the contentious social, political, and cultural environment surrounding those with the capacity for pregnancy (Chapter 4) that complicates anticipation in the reproductive health context.

I then proposed a study (Chapter 5) that aims to explore the complex entanglements that span across time and space in anticipating reproductive futures for those trying to become pregnant and in early pregnancy. Building off prior work, my research focus will consider the contested social, political, and cultural landscape of reproductive health in the United States and how it shapes sociotechnical anticipation work toward reproductive futures. Additionally, I deviate from past literature to investigate how the pursuit of dynamic reproductive experiences is configured by technology and processes of anticipation across space and time, moving beyond a focus on individuals' technology use and experience toward managing binary outcomes (e.g., pregnant/not pregnant, fertile/infertile).

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