From Textile Town to Biopolis: Kannapolis, NC and the Social Life of Biobanking Technology[1]

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Abstract

Life changed suddenly on July 30, 2003 in Kannapolis, North Carolina, a Southern US textile mill town where one factory employed thousands of residents for almost one hundred years. In just one day, the factory closed and 4,340 mill workers lost their jobs. Just two years later, a billionaire investor and former mill owner announced construction of a public-private biotechnology research campus on the site of the former mill. In a radical post-industrial urban transformation, the mill was totally demolished and replaced by university-style buildings for researching both food and human genetics. A populational blood study now aims to recruit 50,000 participants, one out of every three residents in the town and a neighboring county, to donate blood and medical histories to a privately-run biobank focusing on identifying biomarkers for future intellectual property licensing in the sector of genetic diagnostics. This paper will argue that, in Kannapolis, an emergent form of biocapital domination resembles mill town power relationships of the past, but in an information-economy 'recombinant' form of research trial workfare, voluntary blood donation, and speculative real estate practices operating together in a seamless web of technology. Drawing on primary and archival sources from oral histories and local newspapers, this paper will argue that churches, workplaces, hospitals, schools, and the body itself form vital nodes of this technology. More than simply drawing on blood in a bank, biobank research draws on places, people, their experiences, and social relationships: to each other, to history, to church, and to a 'regime' of biomedical knowledge.

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List of Abbreviations

CRO	Contract / Clinical Research Organization
DTMI	Duke Translational Medical Institute
DHMRI	David H. Murdock Research Institute
HGDP	Human Genome Diversity Project
IP	Intellectual Property
NCRC	North Carolina Research Campus
The Study	The M.U.R.D.O.C.K Study, Measurement to Understand the Reclassification of Disease Of Cabarrus/Kannapolis
TIF	Tax Increment Financing
YMCA	Young Men's Christian Association (a community recreation facility in the U.S.)

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Part I – The Textile Town

Chapter 1 – Introduction

One Day in July

The town of Kannapolis, North Carolina is situated in the state's Piedmont region, a fertile land of hills and red rivers that flow from the Appalachian Mountains in the west toward the Atlantic Ocean in the east. In the Piedmont, tobacco farming, furniture manufacturing, and the textile industry sustained the region's growth and economic life for much of the 20th Century. That began to change in the 1990's when both textile manufacturing and tobacco farming shifted abroad where production was cheaper, with major implications for small towns dependent on one of these major industries. A string of factory closings sent shock waves through the region's communities as the transition from an industrial to a post-industrial economy shuddered toward a dramatic climax in 2003 in Kannapolis, NC.

On a single day in July, 2003, 4,340 workers lost their jobs (Beatty, Longman, & Tran 2004) when Pillowtex Corporation[2] closed its textile plant in Kannapolis. In order to understand all that came afterwards, it is important to first understand what the mill closing meant to this small, Southern town. The lay-off was the largest permanent[3] layoff in North Carolina's history and the company did not file a legally-required 'warn notice'[4] (Beatty 2008, p. 3), a step meant to help state officials prepare and coordinate services for dislocated workers and communities affected by mass job loss. Daily rhythms, practices, and social relationships structured around

[2] The last corporate mill owner in a quick succession of private ownerships after a long period of family management that lasted from the early 1900's to the early 1980's.

[3] Meaning workers were not laid off temporarily or put on retainer for a possible factory re-opening, as sometimes happens, but rather completely fired.

[4] According to the State Department of Commerce's 'rapid response team coordinator', interviewed for the North Carolina State University Library Special Collections Research Center's "North Carolina Research Campus Archive".

the mill, the center of town life for a century, had changed forever. A local state employee and job retraining officer, whose husband and father both worked at the mill at one time, described the atmosphere after the lay-off.

> […] Kannapolis almost became a ghost town after the mill closed because there were no longer people occupying the streets, going in and out of the shops, going in and out of the restaurants, so it really was a very dramatic event, a very traumatic event...it was not unusual to have people just kind of milling around and asking, you know, well, 'when's the mill gonna open back up?' (Moore 2008, p. 2).

In this account, laid-off workers wander somnolent like sleepwalkers in a surreal dream, moving in a state of shock through the post-industrial landscape, together yet alone, repeating their existential question to no one in particular. Where people once moved through streets and in out of shops, there lies only a "ghost town" where the unspoken answer to the workers' question is foreshadowed in the town's emptiness. The mill would not open again.

Left without jobs but largely unwilling or *unable* to move elsewhere, workers faced not *only* job loss, but loss relevance of a semiotic system for meaning creation and understanding, in short, an entire 'way of knowing'. This 'way of knowing' was rooted in a specific place in time: a place that had changed forever on one single day in July. Just two years after the closing of the mill, a significant announcement of a new 'project' set the course a massive restructuring of not only the urban space, but also 'ways of knowing' in the town. This paper aims to present an analysis of this process in its local context – and its significance on a broader, global scale.

A New Plan: Postindustrial Real Estate and Science

In 2005, the State of North Carolina and the billionaire CEO of the multinational agricultural corporation Dole Food Company, David H. Murdock, announced plans for a joint

public-private biotechnology research campus and real-estate project on the site of the former mill in Kannapolis. Murdock and project stakeholders with the state announced plans to transform Kannapolis into a research 'Biopolis' with a focus on fruit and vegetable nutritional components and human health. The campus is named the North Carolina Research Campus (NCRC)[5] and property leases on the site are managed by Murdock's real estate development company, Castle & Cooke. Murdock donated $150 million of his personal money ("Timeline for a Dream" 2008) in 2006 to construct the David H. Murdock Core Laboratory Building, the architectural centerpiece of the campus. Castle and Cooke has also unveiled plans for houses in its nearby luxury golf community, Irish Creek, as well as town-homes for future researchers.

While real estate is managed by Murdock's for-profit company Castle & Cooke, research on the campus is overseen by the non-profit David H. Murdock Research Institute (DHMRI). While the institute holds an official non-profit status, Murdock serves as President of its board of directors and a man who formerly held a vice president position at the pharmaceutical giant Merck, a man named Michael Luther, serves as its chairman (Ford 2009a). The DHMRI website describes itself as a "catalyst" devoted to helping "government and industry scientists in their pursuit of improved human health through advancements in nutrition, pharmaceuticals, and agricultural products" (*DHMRI* "Mission", 2011).

The public-private research campus first announced an interest in researching fruit and vegetable nutritional components. According to the founding agreement with the state, eight universities in the state, including Duke University and North Carolina State University, have agreed to lease research space on the campus and conduct research related to nutrition. However, one scientist pointed out that "Murdock's administrative group has made it plain that

[5] An economic impact study, conducted for the town by a private firm in 2006, estimated that the project would create 5,000 research jobs ("Estimating the Economic Impact", 2006), roughly equal to the number of laid-off workers.

the IP will stay with the companies that we deal with," (Nieman 2008, p.4) While the state threw its support behind funding salaries and lab space for public employees on the campus, state employees began working on research projects to develop intellectual property related to nutrition for private companies, many of them food industry companies. Soon, however, leaders at the biotechnology research campus announced a project that would focus not only on nutritional components of fruits and vegetables, but the genetic frontier of the human *body itself*.

Something New: Human Blood Research and the "The BioMarker Factory"

In 2007, Murdock gave $35 million to Duke University (Clark 2007), a site leasee and major private medical research university in the state, for a long-term[6] epidemiological study of the local population involving the collection of blood, urine, and medical history information ("What is the Murdock Study?" n.d.) through a 60-question survey related to each participant's individual medical history (Walker 2010). Biological materials from unpaid donors will be stored in a biorepository[7], also called a biobank, which is physically located in Kannapolis and utilized by a company joint-owned equally by LabCorp and Duke (Walker 2010) called the "Bio-Marker Factory"[8] . Research will be managed by the Duke Translational Medical Institute (DTMI)[9] while the project will be operated by the private corporation LabCorp. The Kannapolis study has a recruitment goal of 50,000 people, *one out of every three* adults in Kannapolis and neighboring Cabarrus County (Ford 2010a).

Research will be aimed at innovation primarily in the sector of 'personalized medicine', a

[6] Longitudinal

[7] A storage repository, also called a biorepository, for biological materials ranging from urine to tissues and plasma, as well as sometimes medical information stored in a digital form and accessed for analysis in the field of bioinformatics.

[8] ("The Bio-Marker Factory", n.d.)

[9] DTMI asserts a dedication to "translation across the continuum of scientific discovery, clinical research, care delivery, and global health" ("About US", *DTMI,* n.d.).

sector focused on creating customized treatment regimes based on individual genetic profiles and on what those profiles indicate about a person's disease risks or how the person might respond to certain pharmaceuticals. According to study leaders, research will focus on identifying 'biomarkers'. Biomarkers, in the genetic sense, are specific genetic information bits that can suggest the presence of or potential for developing a disease or, on the other hand, serve as indicators of how a patient might respond to a drug. Biomarkers are important for research in the growing sector of 'personalized medicine' because of their potential for use in drug trials and diagnostics. Importantly, they can also be patented (Williams 2008). Patents can secure biomarkers as objects of exclusive intellectual property (IP) rights and as profit commodities in the genetic diagnostics sector. According to news reported in the local press the Biomarker Factory will conduct its own research, with a goal of producing new, commercializable biomedical discoveries, as well as conduct “fee-for-service” work for private companies with the goal of earning money to fund the Study in the future (Ford 2008a). What this means is that partners of the M.U.R.D.O.C.K Study, such as LabCorp, can obtain “licenses” to the study's discoveries, which through licensing become tradable IP property objects. The BioMarker Factory will “produce its own intellectual property” (Ford 2008a), through research into biomarkers and their diagnostic potentialities, and then “sub-license” that IP to “corporate partners” such as LabCorp (Walker 2010, PP presentation).

As of 5 January, 2011, the so-named M.U.R.D.O.C.K Study (subsequently referred to as the Study) had enrolled exactly 5,000 participants (Gardner 2011). The acronym used for the Study, with Murdock as its namesake, stands for the “Measurement to Understand the Reclassification of Disease of Cabarrus/Kannapolis”. A ticker on the Study's website (“Home”, n.d.) continues to count an increasing number of donors, who are *not* paid for their participation

but 'compensated' for their time with a gift card worth $10. Recruitment has taken place in area schools, hospitals, workplaces, and churches.

The convergence of human-based genetic medical research, in Pálsson's (2007) words, the 'new genetics', and post-industrial transformation in Kannapolis form the context for my primary anthropological research focus. Based on my interest and encounters with the Kannapolis case, my primary interest relates to the following questions: **How do biotech leaders and long-time mill town residents construct meaning around genetic research technology, specifically biobanking, and their own roles and place in it? What can these narratives, and 'ways of knowing', reflect about social relationships in the post-textile era?**

My own interest in this case emerges first and foremost from my experience as a native of the region – I was born in a town neighboring Kannapolis - and my deep interest in understanding the larger processes connecting change in the region to the world. The Kannapolis factory closing roughly coincided with my own graduation from a four-year university program in journalism and my harsh initiation into a work landscape increasingly dominated by short-term contracts, freelancing, and part-time jobs without benefits or hope for advancement. As textile and furniture factories closed, small-town newspapers were shutting down or laying off staff. And beyond all of this, as if whispered from a distance, was the promise that, with enough individual motivation, lay a realm of autonomy, self-actualization, and personal freedom in a new and golden information age. In short, I was familiar with how the bright promises of the 'knowledge economy' often contrasted with some of its more shadowy realities.

In 2007 when I returned home to North Carolina after a period of travel, I began following news of the project in my hometown newspaper, the *Salisbury Post*. Then, in spring

2008, a former university colleague of mine working for a democracy reform non-profit in the state's capital discussed making an exploratory visit to the town to talk with residents and witness the changes under way. On the day we first visited Kannapolis, the mill had already been demolished and potted plants lay beside a sidewalk ready to be planted. Construction bulldozers moved across a vast, red clay field, empty except for a few University-style buildings, where six million square feet of mill space (Ford 2009b) had once stood.

In this paper, I will argue that recruitment for the Study is implemented and facilitated within the framework of a unique place-based moral economy in terms that appeal to faith, memory, kinship, and allegiance to place. Donors give their blood for free and accept and recirculate a recruitment rhetoric that appeals to ideas about future health benefits, future generational benefit, and citizenship. This rhetorical recirculation is clearly visible in newspaper interviews with donors who talk about their reasons for giving. At the *same* time, industry rhetoric depicts blood as a raw, disembodied resource to be "mined" for profit. Furthermore, industry language surrounding biobanking in Kannapolis depicts medical technology as a product of futuristic, almost-mythic scientific innovation rather than as a grounded process in which unpaid donors – and their blood and acts of donation - are equally as valuable as paid scientists or 'biotech startup' risk (or venture) capital investors. This paper will also argue that *despite* the involvement of private corporations with clearly-stated commercial interests, Study leaders also make subjective and strategically constructed claims about objective scientific 'ways of knowing', public benefit, and the meaning of 'health' itself. These claims are presented as objective and legitimized by affiliations with major medical research institutions that are widely respected in the local community.

McNamara and Peterson (2008) have identified similar divisions in "public-oriented"

versus “industry-oriented” rhetoric and information distribution surrounding an Australian biobanking project, arguing that it has implications for “citizenship and processes of governance” (p. 199). Likewise in Kannapolis, if residents do not have clear information about their contributions – and just *who* research will benefit – then processes of biobank recruitment cannot be viewed as democratic but rather as something else entirely. An informant recently told me that she had not heard from the Study in years, despite being told that she would be contacted for follow-up research projects. She knows nothing of the state of the project or how her blood is being used. She lamented the lack of information about the Study, and while she did not openly regret donating, she said that the lack of updates had left her with a sense of isolation and disappointment.

Because the State, local government, and *every type* of social institution within Kannapolis - including hospitals, workplaces, schools, and churches - are implicated in the biobanking project in Kannapolis, which functions within its own all-encompassing framework of meaning – a “foundational epistemology” (Rajan 2005) - these questions *must* be asked.

This thesis consists of two parts. Part I highlights the pre-history of the Biopolis and part II continues with the return of Murdock and the construction processes involved in creating the Biopolis. I will first put forward a conceptual framework for exploring the case (Chapter 2), initially highlighting some of the issues which I see as central in an analysis of Kannapolis' transition and then exploring some existing concepts I see as useful for articulating what is happening. The focus of Chapter 3 will be to explore the period in time which I will call the “pre-history of the Biopolis” because, in biotech rhetoric, the history of the Biopolis begins with a “clean slate.” I will explore the city's past in order to suggest that social relationships – especially power relationships – of the past carried over to the new era, but in a 'recombinant'

form. Understanding the past is not only critical for contesting rhetoric of the "clean slate" and creation mythology of the Biopolis, it is also important for understanding why donors donate blood to the biobank. I will articulate this argument in Chapter 5, "Consent and Citizenship."

Section II takes up the story's chronology after the demolition of the mill and Chapter 4 mainly focuses on the financial processes and work landscape in the post-industrial era in Kannapolis. Here, I will argue that several processes are at work, including a transition to a public-private clinical trials economy offering workfare to local residents ("Work to Workfare"), a process of 'fetishism of pathologies', and speculative financial practices that have roots in the past. Chapter 5 argues that these processes combine in the ambit of biobanking, and focuses particularly on how industry narratives depict donor blood in a way that raise questions about commodification of donor bodies, some of whom are former mill workers. However, donors consent to take part in the study. I will argue that donors reproduce the rhetoric of biobank donation in their own terms within their own social networks, reconstructing biotech epistemologies of 'health' and the 'Future' by drawing on their own experiences of loss and memories of the past. They do this despite the fact that there is no evidence biobanking, personalized medicine, or IP licensing for exclusive property (and profit) rights on diagnostic testing will *ever* have broad public health application for anyone who is uninsured, unable to afford expensive genetic diagnostic tests, or not a resident of the "developed world". Still, more than 5,000 donors have donated blood in Kannapolis. This paper will ask *why* and *how* this is happening by exploring some of the processes at work and developing an argument. I will build this case drawing on primary references including oral history archive interviews, newspaper articles, web sites, and my own interviews and discussions with informants.

As Pálsson (2007) urges, "the challenge of anthropology is to provide rich ethnographies

and comparative frameworks that facilitate understanding of what is going on, taking a critical stance with respect to the hype of biotechnology and the new genetics..." (p. 128.) This paper intends to do that. Anthropologists, journalists, and witnesses to what is going on have a critical responsibility to examine what is really happening and to interpret and suggest how it connects to larger processes. For all those who value freedom of information, critical analysis and deconstruction of prevailing rhetoric is necessary and obligatory. Without this necessary step, there is the major risk of replicating and reinforcing the bias of certain regimes which could have critical social implications. We must examine the words we are given and ask whose vision they represent. Examining the story of Kannapolis not only has significance for one little mill town, but for anywhere in the world where residents have experienced totalizing change – both economic and urban – and not felt entirely comfortable with the new landscape.

Chapter 2 - A Framework for Approaching the Case: Questions and Concepts

Genesis Stories, Nomenclaturae, and Strange Fruit: Main Themes

The particular circumstances of Kannapolis, North Carolina post-industrial transition to a biotech-based economy present several interesting avenues for inquiry. These avenues divide and merge between the different phases of the NCRC project, from its conception, its total demolition of the symbols and physical spaces of the former mill, and their subsequent radical reconstitution and reformulation as part of the project in its current phase. From the town's 'company town' past to the closing of the mill and the eventual construction of the biotech research campus, several elements of the town's transition from textile town to biopolis stand out as not only anthropologically significant, but also connected in profound ways to broader observations about social relationships and power in the age of 'biocapital' and 'biocapitalism' (Rajan 2007, Lock 2002, p. 88). But first, however, I would like to highlight the elements of interest in the particular case of Kannapolis. It is from this context that I will suggest a theoretical framework for considering the Kannapolis biobank project and its deeper social meaning and significance.

The first element of interest arises from the speed of Kannapolis' dramatic metamorphosis from a seemingly devastated town to a place, both depicted and perceived, as rich with hope for the Future and 'excitement', a word that appears over and over again in interviews referencing the project from both scientists and residents. The Future is referenced repeatedly as the most salient factor convincing donors to donate to the biobank. Futuristic rhetoric also prevails in industry language promoting the project and its accompanying emergent

technologies. In the Biopolis, industry rhetoric has little use for the past. But while research campus project leaders claim that the project represents the birth of something totally new, some aspects of the project recall the past. For example, naming the biobank the "Biomarker Factory" recalls the former textile factory, a place central to the economic and social life of the community. Town residents are integral to the BioMarker Factory much as they were to the textile factory of the past. Resident experiences of the past, as I will explore later, are also critical in their own stated rationalizations for donating to the biobank. But despite these threads to the past, the story of the NCRC project is often presented in the form of a *creation myth,* with science and technology emerging from a *tabula rasa* and the demolition of the mill as a sort of Big Bang from which a new cosmology and ideology can emerge with Genesis. But while the demolition is a useful enabling symbol for a creation myth, closer ethnographic examination reveals a palimpsest of nuanced overlaps, repetitions, and contestations to a black and white reading. One thing is certain however: in its new incarnation, the BioMarker Factory - the site of intellectual property production in the town - holds dramatic new implications for social relationships and the role of former mill workers. Determining just what that role is – and what shapes those relationships – remains the central question of this work.

A second point of interest relates to the town's near-total physical transformation. Construction of the biotechnology research campus in Kannapolis, both physical and ideological, began with the demolition of the mill structure which collapsed in a cloud of dust and micro-particulate, industrial fallout. New university-style, brick buildings with Greek-revival Corinthian columns were constructed almost immediately, replacing the mill and its spaces with a new cartography. The new cartography is accompanied by its own toponymy, one that refers to laboratories and microscopes instead of machine rooms and looms. However, strategies on the

part of stakeholders to construct a new urban landscape and an accompanying sense of citizenship that can integrate all residents contradict corresponding plans to develop high-end real estate and luxury golf course mansions. The inclusive rhetoric of the Biopolis is contradicted by exclusive realities in the urban sphere. Symbolically, both inclusion and exclusion work together to benefit stakeholders: inclusion benefits biobank recruitment, and exclusion benefits the sale of high end real estate. This complex and contradictory new cartography, and its toponymy, are accompanied by their own unique 'ways of knowing', different from those of the mill era, where 'those who know' appear to occupy a privileged status in the post-industrial economy in Kannapolis. A main research question asks how old and new 'ways of knowing' compliment or contrast one other. Research will also explore how physical spaces, nomenclatures, and cartographies articulate and legitimize new 'ways of knowing' in Kannapolis.

The third point of interest relates to the campus' main research focus on the nutritional components of fruits and vegetables and its parallel focus on human genomics. This focus on food and agricultural products, their breakdown, and subsequent reconstitution as objects of value in the 'knowledge economy' resembles another campus focus: the focus on human blood. Human blood - and the biomarkers it contains - emerges as an object of intellectual property in the Biopolis, much like the nutritional components in fruits and vegetables. The campus' stated focus on the related fields of “genomics, proteomics, and metabolomics” (“About NCRC” 2011), research areas in which advanced understandings of plant and animal molecular biology could benefit both the agriculture and pharmaceutical sectors, take both human and fruit and vegetables as objects of interest to be studied. Much in the way fruits and vegetables are valuable only to the extent that they can be scientifically broken down and constituted as “nutritional”, human

blood is valuable to the extent that it can be broken down to reveal sought-after biomarkers and reconstituted in the creation – and patenting – of new diagnostic kits or treatment therapies. All this is undertaken with the stated goal of improving 'global health'. What do these research projects have in common, and who will they benefit? What do these projects reveal about ideas about 'health' at the root of the biobanking project?

These main questions emerge from a complex regional background where good jobs are still hard to come by, faith plays a major role in community life, and where few have forgotten the shock of the past or the familiar rhythms of mill town life. As noted in other biobanking projects such as one in Australia, these elements "are likely to influence how biobank issues are 'framed'" (McNamara and Peterson 2008.) In Kannapolis, faith, memory, and social relationships combine in ways that often compliment Study efforts to recruit biobank donors; so well, in fact, that recruitment has already reached 5,000 donors. A Biomarker Factory leader said the project was "running very successfully down on the ground in Kannapolis" (Walker 2010) at a genomics forum at Duke University in fall 2010. A further question examines how place-based experiences in Kannapolis interface with the local biobank initiative as it is constructed and constituted as legitimate.

Kannapolis' postindustrial nexus of luxury residential real estate ventures, public-private biotechnology projects, and community-based human blood research form a complex vortex of meanings and significance. Making sense of this vortex is an open and ongoing process and a task that requires many critical examinations from different angles. There is no single theory or interpretation of the biopolis, only a synergy of conceptual strategies that can be employed to suggest a critical reading. To this end, I have found several concepts to be particularly useful.

Biocapital as a Lens into Postindustrial Social Relations

While the aforementioned questions form the primary nexus of inquiry, what is called for is a theory of the nature of relationships in the Biopolis; a theory that takes into account postindustrial urban change, or deindustrialization, urban reconstruction, and the corresponding overlay of specific 'ways of knowing'. To this end I find Rajan's (2005) notion of 'biocapital' particularly useful. Rajan sees biocapital as embodied in the nature of "exchange and circulation" of the "life sciences" and the "regime of knowledge pertaining to the life sciences as they become increasingly foundational epistemologies for our times" (p. 21). Like Pálsson (2007), Rajan (2005) explores the significance of the 'new genetics'[10], its associated potentialities, such as 'personalized medicine'. Rajan takes a critical view of how humans are often integrated into these regimes in two radically different ways: either as "experimental subjects" (p. 25) or as patients-in-waiting" (p. 24). Most significantly, Rajan's work explores how 'biocapital' systems of exchange manifest themselves in urban spaces, such as the former textile industry neighborhood of Parel outside Mumbai, India, a zone "teeming with unemployed millworkers" (p. 25). In Parel, pharmaceutical investors have redeveloped post-industrial real estate with a focus on the life sciences. Rajan argues that the main "resource" attracting life science research investors to Parel, Mumbai is not state investment in biotech but the *population* [original emphasis] itself (p. 25).

Rajan's (2005) framework of biocapital, with its consideration of "salvationary rhetoric" (p. 23) and 'regimes of knowledge', provides amble basis for confronting the question of consent and the widespread voluntary public participation in the Study despite the lack of concrete

[10] Scholars of the 'new genetics' (Rajan 2007, Pálsson 2005) consider the practices and social configurations, urban and biopolitical, and their implications by focusing on the 'post-genomic era', the current state of the life sciences in which the emphasis of research is focused not primarily on *mapping* the human genome, a feat which has already been accomplished, but on *determining* how information within the human genome can be connected with pathology and disease, with implications for diagnostics and treatment plans.

evidence that the project will have concrete future public benefit. Some clue about the *nature* of this 'regime' is anticipated in the work of Schulman and Anderson (1999), who also conducted a case study of Kannapolis during the town's textile era. Building on the Bourdieaun notion of social capital, Schulman and Anderson identify a “dark side” of capital relations in textile-era Kannapolis described as “paternalistic social capital”, a form of relation in which “norms of beneficence, deference, and patron-client relationships” characterize work and community life (p. 355). I believe that an analysis of 'domination' is implicit in this work. While Schulman and Anderson suggest that, in 1999, 'paternalistic social capital' had declined, they do not suggest which form of social capital will replace it. I believe that evidence suggests that a *new form* of 'biocapital' domination is emerging in Kannapolis: one that is evident in an unbalanced monopoly on the privilege to define concepts like “health” and to distribute this information within a clear 'teacher-pupil' hierarchy. I will expand on this point later.

Biocapital takes on further significance in the case of Kannapolis if considered in tandem with Hughes' (1986) concept of a “seamless web”, which locates scientific technology within a social context and provides a system in which technology is shaped by relationships, places, systems of knowledge, as well as ideologies (p. 289). Within Hughes' “seamless web”, the relationships of knowledge, histories and objects within the web are themselves subject to transition and dynamic change. The products – the inventions - produced or improved-upon by the technology of the web themselves re-enter the system and produce it, according to Hughes' concept of *seamlessness*. Within Hughes' seamless web, technology is inseparable from the actors, places, and ways of knowing that form part of the web. Similarly, Haraway (1991) argues that science technologies imply certain 'ways of seeing', and that “we are embedded” (p. 589) in them. In Kannapolis, this embeddedness is represented by social institutions and networks that

are situated critically inside a smooth, though not uncontested, circulations of objects - such as blood - and 'ways of knowing' - such as about science – that shape the technology of biobanking. That technology must be examined. Haraway (1991) argues that an examination of the nature, assumptions, and relationships that constitute scientific technology is critical in understanding the "production in what we call scientific knowledge" (p. 589).

In Kannapolis, local experiences and relationships, as well as churches, workplaces, hospitals, schools, form vital nodes of a 'seamless web' (Hughes 1986) of bio-medical technology which is discursively shaped by both market-oriented, 'industry' and 'local' narratives. Place-based social relationships (especially in the place of church) facilitate recruitment to the Study. Here, we see support for Hughes' (1986) claim that places are "often fully integrated components in a system in which physical artifacts are also components" (p. 290). Research aims to show how this technology has a "social life" in the Appadurian sense (Appadurai 1988.) It *draws* on *and* is *shaped* by places, people, and their experiences and social relationships: to each other, to history, to church, and to research leaders. Within this framework, a system of object and social relationships emerges as a technology in which component parts include persons, places (like cities), and objects, such as blood.

Blood as a Social Object

Scholars of the new genetics have explored blood as a social object and suggested ways for conceptualizing the meaning of human blood as well as the processes that give value to human blood. They have explored how blood and other biological materials can be viewed within the Marxian framework of "commodification" (Sharp 2000) when they are separated from their human sources and frameworks of community-based meaning, both literally and

figuratively such as through the use of language (Andrews and Nelkin 1998) that depicts body parts as pure profit objects. Shiva (1998) has examined blood as an object "biopiracy" (Shiva 1998) when companies take genetic materials, such as biomarkers contained in human blood, and patent them as objects of intellectual property, a practice Shiva strongly criticizes. Other scholars have viewed blood as a gift. Titmuss' work (1970) examines the motivations of blood donors, drawing inspiration from Mauss (Mauss 1923 in Titmuss 1970, p. 71), to explore the nature of the "gift relationship" and, as Mauss saw it, its obligation of reciprocation, in the lives of donors, the market, and society.

The value of blood as an object of social and anthropological inquiry has a clearly established history. Again, what is important is not necessarily the blood as an object in itself, but the way in which it becomes meaningful when considered in relation to other social actors: donors, researchers, international investors, or product development chains for example. Latour (2005) argues that

> For sociologists of associations, what is new is not the multiplicity of objects any course of action mobilizes along its trail....what is new is that objects are suddenly highlighted not only as being full-blown actors, but also as what explains the contrasted landscape we started with, the overarching powers of society, the huge asymmetries, the crushing exercises of power (p. 72.)

Latour is interested not simply in identifying the object in its frame (or in its body), but situating this frame within a discussion of power. Here, we see an unexpected theory of power from Latour, whose claim seems pregnant with political – in the Kannapolis case, biopolitical - implications. The relational analysis of the object, as Latour highlights, problematizes it further in relation to signifiers that arise from the shadowy constellations of religion, family, community

values, moralities, and political economies. Latour's thesis that objects themselves have agency creates new and sometimes surprising conceptualizations, such as stock indexes with hearts and medicines with dreams. This process of recognizing the object gives deeper, more nuanced views of the many relationships – both human and object – at the heart of the Kannapolis case.

Anthropology has produced a wealth of considerations of blood as an object with agency, an active creator of meaning and bearer of significations, in the era of the new genetics. But, in Kannapolis, the intersection of biobanking and real-estate warrant a a serious consideration of blood when it becomes an object of *property*. In Kannapolis, dealings in biomarkers as objects of *intellectual property* intersect with ventures in physical, residential real estate property. A key part of the NCRC project involves laboratory space lease agreements with the state, residential luxury development, and all managed by Murdock's real estate company Castle & Cooke. The North Carolina Research Campus, along with various other shopping complexes and golf communities spanning the United States, is listed in Castle & Cooke's on-line property directory (Castle & Cooke 2011, "Property Directory"). One such commercial property venture is a science-themed restaurant, "Forty Six", named after the 46 chromosomes in the human genome and founded by Murdock. The restaurant's logo features a strand of human DNA and tables are decorated with laboratory beaker-shaped flower vases.

Parallel to dealings in biologically-themed real estate property, the campus also features a focus on biomarkers as objects of property, with the "BioMarker Factory" having openly stated an interest in creating intellectual property out of blood and engaging in dealings with sub-licensees to that property. In the world of research biobanking, blood as an object of property passes through various phases on its circulatory journey from donor to biobank, licensee and sub-licensee, and eventually from diagnostic labs to doctors and patient-users of that intellectual

property. Hann (Hann 2006) highlights the complexity of applying clear-cut ideas of ownership "in which every item can be attributed to one exclusive owner" (p. 122) in the age of the new genetics. From land to genetic data, Hann argues that anthropologists must explore property "at all the layers of social organization and practice" (p. 121.) Such an exploration is not a simple one.

In Kannapolis, the Study consent form articulates which specific rights donors can exercise, thus somewhat clarifying, at least officially in legal language, some of the complex social and cultural understandings surrounding donated blood. The form clearly states that donors will not benefit from any corporate profits that could potentially come from discoveries from research using donor blood. The Study consent form states that "in the event that research using samples and information stored in the bio-repository leads to a product that could be sold commercially, there are no plans for you to share in any profits" (M.U.R.D.O.C.K Study website 2010 "Consent Form".) This policy is not unusual in the United States where study participants typically have no legal post-donation ownership rights over their biological materials (blood, tissues, urine). According to Maschke (2008) of the Hastings Center, a bioethics public policy research institute:

> Institutions in the United States also typically assert ownership rights over biospecimens stored in their repositories. But some commentators – including researchers and individuals who provided biospecimens for research – have challenged this ownership claim. To date, challenges have been unsuccessful (Maschke 2008).

While donors to the Study do not have rights to share in potential profits gained through the licensing of donated blood, they *do* have a right to ask for their blood to be destroyed if they

want to withdraw from the Study at any point. Donors have a mix of rights. Rose (2004, as cited in Pálsson 2007) has presented a concept for understanding intellectual and cultural property, proposing the term "'limited common property'" which is "neither completely public nor completely private" (p. 174). Verdery (Verdery 1999) uses the term "fuzzy property" to describe land rights in Eastern Europe's post-socialist transition period. I believe this idea of "fuzzy" property can also be usefully applied to the ambiguity of rights to blood in the postindustrial biobanking effort under way in Kannapolis where the mixed bag of rights allocated to donors raises interesting ethical questions in regard to *how* Study organizers chose this specific combination of donor rights.

While donors to the Kannapolis Study have the right to ask for their blood to be destroyed, they do not have the right to profit or benefit from the property as it is exchanged on the medical marketplace. This is by no means the only way that biobanking blood studies can be organized, nor is it compatible with North American ethical recommendations for another biobanking project, the Human Genome Diversity Project (HGDP), a controversial 20-year-old project to map global genetic diversity through research of blood from various populations. Lock (2002) has explored the terms of the Model Ethical Protocol for the project, a list of ethical recommendations formulated in 1997 by the HGDP North American Regional Committee. She outlines how ethical recommendations include a suggestion that "if any financial reward accrues from the specific analyses instigated by the HGDP, then a mechanism should be in place whereby individuals or populations who donate blood receive fair monetary compensation" (p. 82.) Some projects have adopted such benefit-sharing agreements. Pálsson (2007) has explored studies throughout the world, such as one in Tonga where an Australian biotech company, Autogen, in 2000 announced plans to recruit 50,000 Tongan blood and medical information

donors for a biomedical collection and offered a profit-sharing deal for donors (p. 102.) Despite the profit-sharing agreement, Autogen abandoned its Tonga project in the face of sharp criticism from local residents, churches, and human rights groups (p. 102.)

While consent forms, legal frameworks, and ethical recommendations attempt to create clear frameworks for common ground among the complex cultural and economic understandings of blood as a property object, these efforts are nonetheless often met with contestations, misunderstandings, and abuses. Lock (2002) argues convincingly that "disentangling who speaks for whom, who represents what interests and what value blood samples have to the involved parties is like walking in a hall of distorting mirrors" (p. 84). On top of this complexity, the values associated with blood change and shift as blood is transferred and circulated, on both local and global scales.

Object Transformation and Liquid Capital: Flows

Blood as a social object of inquiry is meaningful in its relationships to other social institutions and relationships, and these relationships are not static, but nuanced by changes and flows. These dynamic movements and circulations, in the case of biobanking medical technology in a global economy, are characterized by value transformations as blood flows through the economy. For example, a person contributes her blood to biomedical research Study, helping researchers finds a new biomarker connected to a certain disease. That research leads investors to develop and patent a new diagnostic test, a 'personalized treatment', based on scanning individual genetic profiles for that particular biomarker in order to give patients (who can afford it) a new level of certainty in their diagnosis[11]. Many years later, that same donor visits her doctor with a

[11] Also, genetic diagnostic tests can give patients other valuable information, such as whether the disease stems

complaint. The doctor then prescribes the diagnostic test to diagnose the disease and/or to determine whether there is a genetic component to the affliction the patient is suffering from and discovers that, in fact, there is one. In this way, the circulation of blood outside the human body, through a series of value transformations, returns to the donor.

Blood circulates not only within the human body, but outside of it in the biocapital economy. The blood, as liquid capital that is also a source of profit, cycles back to the donor in a new form. Blood is a particularly interesting object of focus because of its liquid properties and the diverse significations and meanings it gains as it flows from donor to biobank, from biobank to researchers, and from researchers into new genetics "discoveries" and health consumer products. This circulation is mediated through computers and the algorithmic cycles of bioinformatics, a field engaged in managing and making sense of the massive amount of biological data that have come to light in the genetic and post-genomic eras. In the M.U.R.D.O.C.K study, 60-question health surveys collected from each participant will be analyzed using bioinformatics.

The movements of *flows* and *circulations* are appropriate for our study of the object of blood and are especially relevant to a period in which *liquid capital* travels across the world at the speed of thought, building fortunes and ruining the economies of small countries with the blink of a cursor or the flash of the venture currency speculator's signal to sell or trade on global stock exchanges. The creation and production of knowledge from genetic research, a venture requiring massive investment, is signified and given value within a global system of financial flows, crises, and myriad fractal subjectivities. Kannapolis constitutes a node in this larger web.

Kannapolis as a Node in a Global Medical Technology

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from familially inherited genetic mutation, for example, or whether a patient is 'likely' to develop a disease based on the presence of a certain biomarker.

While the 'seamless web' as a metaphor for conceptualizing these dynamic relationships is rather static, Hughes (2004) later work recognizes that the metaphor of a 'seamless web' must also convey relationships between stationary *nodes* as well as *flows* between these nodes. In Hughes later work, cities are "nodes...in the space of flows" (Hughes 2004, p. 106). Hughes argues that "global cities, in which information is generated and managed, become network nodes," (p. 106.) Similarly Ong (2007) also describes biotech cities in Singapore as characterized by *multi-directional* flows, with cities facing both "in towards development" and "outward toward recruiting investors" in practices that are described as optimizations that "configure an 'enterprise ecosystem' linked to global networks" (Ong 2005 in Ong 2007, p. 7). The communities under examination, themselves nodes in the global system of exchange, are sites of production where labor takes on new formations as "city space, architecture and citizens are all subject to re-engineering for techno-optimization" (Ong 2007, p. 7.) Cities are the sites where manifestations of biocapital-based social relationships can be observed. They are the microcosmos, the testing grounds, the *rooted though connected foci* for examining the phenomenon in its many manifestations. These are the sites where the labor, the value production, and transformation of objects in the global economy can be observed (Sassen 2000). Sassen argues that:

> A focus on the *work* behind the command functions, on the actual *production process* in the finance and services complex, and on global market*places* has the effect of incorporating the material facilities underlying globalization and the whole infrastructure of jobs typically not marked as belonging to the corporate sector of the economy (p. 56.)

Sassen argues that an examination of such sites of production localizes and "recovers" the

"material conditions, production sites and place-boundedness that are also part of globalization and the information economy" (Sassen 2000, p. 56). Kannapolis, North Carolina forms one level of this scale, just as Duke University's affiliated 'translational medicine' research campuses in Singapore and India form other nodes on a broader scale in the 'knowledge economy.' While innovations and "breakthrough" technologies often seem to appear as if from nowhere from the cosmos of global medical innovation – the utopias of the imagined future – the actual work which Sassen calls us to examine is rooted in place and is conducted by people.

Here, we have a clear framework for analyzing the case of Kannapolis, North Carolina. The site is a node of production in the global knowledge economy, just as the biobank constitutes one node in a biomedical technology with global scales, dimensions and connections. While laborers in the city used to work in a factory, they are now being asked to donate their blood for free to a "Bio-Marker Factory".

Methods

The approach to researching this case has been informed by a long history of engagement with the materials and informational resources made available to other members of the Kannapolis community, such as newspaper articles and marketing brochures. Methods for this research include the analysis of qualitative data drawn from texts that reference the campus such as websites, newspaper articles, and marketing materials. I also visited the site personally several times between 2008 and 2011 and talked informally with residents. Also critical in the analysis were 20 oral history interviews from a state archive, called the NC Research Campus Archives, set up by North Carolina State University, to document the transition from the textile era to the biotech era in Kannapolis. These interviews were conducted in the spring 2008 by a state employee. While not entirely unbiased - the state is a stakeholder in the project - these

interviews showcase a rich variation of narratives chronicling different experiences of Kannapolis' recent past from local residents, biotechnology researchers, and newcomers to the town. During the spring of 2011, I continued to follow up with newspaper articles related to the survey and conducted telephone interviews, including follow-up interviews with an informant I spoke with 2008 and a new in-depth interview with a blood study donor. Other insights into the nature of blood study donation come from interviews with donors featured in newspaper articles published in the local paper, as well as testimonies posted on the Study's website.

Chapter 3 - A Pre-History of the Biopolis: Life Up To Demolition

The Way Things Were

Stories in the press about the construction and development of the North Carolina Research Campus, a project inextricably pegged to the town's identity, more often reference the *future* than the past. Both project stakeholders and residents themselves often repeat metaphors that paint the project as starting with a "blank slate." These narratives emerge from a wealth of oral histories, amateur historian projects, interviews, and newspaper articles that reference the town *prior* to the mill demolition and the research campus project, contesting metaphors of a "blank slate" by revealing what can only be described as a 'pre-history' to the research campus creation story.

The Kannapolis community, like many small, Southern towns, is typified by closely-linked kinship, religious, and professional groups with ties to textile production that stretch back more than a century. Construction on the mill began in 1906 by the Cannon family, the mill's namesake for most of the factory's operating time, and the father and son team of James and Charles Cannon (Mock 2009-2010). A woman recalled the social relationships that formed based on her job filling customer orders on a conveyor line at the mill during the days of Cannon family ownership.

> I loved the lady who sat in front of me and the one beside of me and on the other side. And I mean like the conveyor belt was here and our then our desks were like this so um, so but I think too maybe we're we were all alike since we all worked at the mill and we were all ages. Like the lady across from me was the age of my mother. Actually, her son graduated when I did but she did everything we did. If we went to the movie, if we went out to eat, she did now and then. Her husband, when her husband passed away we really did do a lot together...I mean our little

> group...and we still get together for birthdays and Christmas and things like that, a group of us do (Richards 2008, p. 5).

As most of the mill workers lived in Kannapolis, social relationships that developed at work often overlapped with other community social networks related to school or church. Not only were social relationships deeply tied to the mill, so were worker relationships with town governance, which was managed by the mill. As an all-encompassing way of community life in the mill town enmeshed faith, work, health care and governance.

Governance and Failed Unionization Efforts

Until the town's official incorporation in 1984, much of the town's basic services, "everything from garbage service to health care" (Ford 2009c), were overseen by Canon Family mill owners. In their oral histories and archived interviews, residents of the town recall both the pride and privacy issues that accompanied such an intimate relationship between residents, town governance, and the mill company's ownership. Kannapolis is a community with a very specific experience and history, one that is similar to the experience of many other Southern mill towns. The town, during its mill town decades, was characterized by a distinct form of governance in which mill owners held administrative rights over intimate aspects of workers' daily lives. This control extended to worker efforts to unionize. Unionization efforts throughout the 20th century were repeatedly repressed, from the 1920's when the state militia was called in to quell strikers (Schulman and Anderson 1999, p. 359) to the 1990s when post-Cannon family corporate mill owners fought unionization votes in 1993 using strong-arm tactics and were charged guilty of intimidating employees by the National Labor Relations Board in 1995 (p. 364). In a re-vote, attempts to unionize still failed. "In the 1980s and 1990s, an army of lawyers and media consultants converged on the town to defeat the union" (Schulman and Anderson 1999, p. 368.)

Schulman and Anderson argue that these defeats occurred because struggles were "embedded in a local community where various social institutions reinforced company-based hierarchical social capital" (p. 364.) A community organizer I interviewed in 2008, an activist helping workers deal with the aftermath of the mill closing, said workers had a lack of voice and described the textile-era atmosphere in Kannapolis:

> People were basically told how to vote, when to get up, when to go to bed, because the shift work, 1st shift, 2nd shift, 3rd shift…there was a big whistle went off and you had to be at work at 7:00 am. The mill owned the utilities, so if you rented your house from the mill, it was tied to your job, your health care was tied to your job, your utilities were tied to that renting of the house and so you were pretty much scrutinized in terms of your moral and ethical behavior, so if you went to go carousing on a Sunday night and the sheriff happened to arrest you, you were subject to lose your job. So I want to kind of paint for you, that historically that Kannapolis has been a company town, and usually it has been run with people with money (Author interview, June 3, 2008, Kannapolis, NC).

The narrative above reveals that a specific mode of governance typified life in the mill town, framing mill town governance in terms of hierarchy. She sees mill town owners as "people with money" and identifies a specific power relationship between mill owners and voiceless workers. This historical narrative paints a clear picture of a "company town", what Green (2010) describes as "a place where one business exerts a Big-Brother like grip over the population – controlling or even taking the place of government, collecting rents on company-owned housing, dictating buying habits (possibly at the company store), even administering where people worship and how they may spend their leisure time," (p. 3). The specific form of leader-worker relationship in Kannapolis in the Cannon family mill town era has been described as embodying paternalism (Schulman and Anderson 1999) in which mill town leaders assumed a parent-like

role, imbued with connotations of power and dominance, in relationship to mill workers. However, Schulman and Anderson highlight how stories show that "workers befitted from their integration in Cannon's network of paternalist social capital" (p. 361.)

But outsider readings of domination, even of dictatorship, do not go uncontested among local residents. One Kannapolis native recalled what she saw as positive aspects of life in the era when the mill town. When a professor of hers at college told her Kannapolis was site of a mill town "dictatorship", she challenged him: "And I disagreed with him; we never felt like that," (Macon 2008, p. 5.) But an Ohio native who moved to Kannapolis to take a job as a pastor at a local church in 2001 saw the role of mill leaders in mill town life in a different light.

"Benevolent Dictatorship" and Churches: "Calming" the Community

A local pastor who moved to Kannapolis from Ohio recalled, in the state oral history archive, an impression of the history of Kannapolis as a place where social relations were anything but equal. From his newcomer perspective and what he had heard from long-time residents, he said saw social relations in terms of "benevolent dictatorship" in which the interests of mill town owners were behind acts of generosity. This generosity – and what the pastor articulates as its implications of dictatorial control – even reached into the religious life of the community. The pastor described how, through oral histories told to him by Kannapolis residents, he had learned that mill town owners donated property to area churches in order to forward their own interests:

> This is what I've been told by folks in the community that these were places where there were really rough things happening on Friday, Saturday nights, he [Cannon] planted churches so as to help calm the community and to stabilize his workforce (Rhoades 2008, p. 5)

Mill owner involvement in church life and the use of religion to achieve company goals did not end when the Cannon family sold the mill to new owners in the early 1980s. Schulman and Anderson (1999) have collected informant interviews from Kannapolis residents who claimed that, during the unionization vote of 1993, “local ministers who spoke out against the union during this period received gifts, such as church organs and vans” (p. 365.) Oral histories reveal a historically mutually-beneficial relationship between churches and mill town company leaders and owners.

In the town's textile era, mill owners helped churches with material support, and pastors helped mill town owners with ideological support. The role of churches as highlighted above raises interesting questions about role of the church in the mill town era and whose interests they represent. Similarly, an exploration of this historical pattern constitutes an interesting starting point for exploring the role of churches in the age of the Biopolis. In January, 2010, the Study counted its “largest recruitment yet”, a total of 40 people, at an area church (Ford 2010b) These questions will be explored later. Narratives of Kannapolis history take a decisive turn in the 1980s when David H. Murdock, a California millionaire (now a billionaire) entered the scene and bought the mill – along with much of the downtown and thousands of acres - from Cannon family heirs. While narratives differ on the nature of Murdock's legacy, few deny that his arrival in the town marked a turning point in the town's history.

Enter David H. Murdock

While Murdock is now most frequently-referenced as the founder of the NC Research Campus, his involvement in the town is not new. Murdock was not a stranger to Kannapolis when he bought the mill to build a biotech research campus in 2004. In fact, he owned the mill for four

years in the early 1980's. Murdock's purchase of the mill – and much of the town – ended a period of family ownership when Cannon family heirs sold the mill to David H. Murdock, a California millionaire (Schulman and Anderson 1999, p. 361), in 1982. Along with Murdock's purchase came 17 plants, real estate in the town center, 4,000 acres of land, 1,600 homes, the employee pension fund, and the Cannon Country Club (Kearns 1995 in Schulman and Anderson 1999.) Corporate ownership of what had long been a family-owned business set the scene for major change. A local newspaper reporter described a collective sense that something about the town had changed dramatically:

> See, everyone loved the Cannons. They absolutely loved Charlie Cannon and the Cannon family. They had so much loyalty to the Cannons […]] Um, you know so they, they were very generous and they were very beloved in the community[...] Because I really believe talking to folks it was more than a mill. It was a lifestyle, it was their life and there was something to it, because the Cannons made it that way. They set the tone for that and while they were still making money, you know, they realized that this was more than just, just a cotton mill. And then when the Cannons left, that whole attitude changed (McNeely 2008, p. 7.)

While Murdock made many changes in the town during his short years of ownership in the early 1980s, including the sale of property and investment in infrastructure, I will focus on two events: Murdock's pension fund investment scandal and his demolition of the YMCA. I will focus on these events because of their symbolic importance for understanding Murdock's current engagement with the Biopolis. They are also events that remain imminent in the consciousness of local residents. Residents interviewed for the state archive make repeated reference to the old YMCA as a symbolic source of pride in the community. Murdock demolished the YMCA as part of urban restructuring in the early 1980s. Despite the many years that have passed since anyone

set foot in the old YMCA, residents interviewed for the state's oral history archive make repeated references to the YMCA, describing it in all its physical detail, drawing nostalgically on the rich well of memories surrounding the cartography of the now-demolished YMCA.

A Pension Scandal and Speculative Dealings

A mixed legacy of patronage and scandal typify Murdock's nuanced reputation in the town, as well as perceptions surrounding his role in the context of the NCRC project in Kannapolis. During Murdock's brief period of ownership of the mill in the early 1980's, he invested in infrastructure but shifted mill finances to another insecure, out-of-state venture, leading to a major pension scandal (Hodges 2000). A local reporter described how Murdock "liquidated the pension fund and took that money so he could get out of the textile business, went into the oil business, and then subsequently went into the food business as well," (McNeely 2008, p. 6.) A story published in a local newspaper at the turn of the 21st century reflected on Murdock's legacy in the town. It described how Murdock invested workers' pension funds into an attempted takeover of Occidental Petroleum. As for the pension fund, Murdock took out the cash and, in replacement, bought annuities from a firm in California, which later collapsed. Occidental later bought Murdock's shares back from him at a profit of $60 million on Murdock's investment (Hodges 2000). The eventual total pension sum that Murdock pocketed has been placed at $25 million. A suit was brought to court and a ruling awarded defrauded workers with a settlement of $1 million, "leaving Murdock with $24 million" (Schulman and Anderson 1999, p. 364.)

The pension fund scandal surrounding Murdock's legacy of financial dealings in the town is highly significant. According to Schuman and Anderson's (1999) analysis, Murdock's interest in owning Cannon mills was never in textiles or in producing goods of quality such as towels and linens, "rather, Murdock wanted to use the firm's capital to make more capital by doing things

like investing the company's pension funds in the stock market," (p. 362.) The way Murdock used mill "capital to make more capital" by betting on *future* earnings and ventures sets a framework for understanding the nature of his dealings in the town, which are characterized by speculation. I believe this historical pattern of speculation foreshadows the same culture of speculation that Rajan (2005) argues shapes biocapital ventures in the United States - and in Kannapolis today in the form of biobank venture holdings in the object of human blood. Rajan argues that genomics is inherently futures-based and "takes shape in the context of a U.S. speculative marketplace" (p. 23). Murdock's speculative dealings – and they way they reinforced an upward accumulation of financial capital into private holdings – critically shaped Murdock's legacy and the pre-history of the Biopolis in Kannapolis. While Murdock exerted control over financial capital in Kannapolis, he also worked during his short period of ownership in the 1980s to reshape urban real estate, including sites that constituted precious architectural heritage in the eyes of local residents. One such piece of architectural heritage was the YMCA.

The "Prettiest YMCA Anywhere Around"

Another event that critically shaped Murdock's legacy was his decision to demolish the town's YMCA building, a decision that some residents found deeply unsettling. The YMCA (Young Men's Christian Association) has a chain of recreation centers in cities across the United States and Kannapolis was one of those places. Charles Cannon, son of James, built the YMCA, which opened in downtown Kannapolis in 1940 (Horton 2008, p. 6) and was called the "New Y"; the original Y building burned down in the 1930's. One native of Kannapolis, a historian who was born in the town in 1940, recalled what the structure meant to the community. "I know is probably important in every town; here the YMCA and the churches were the center not only of religious life but actually of social and civic life," (Horton 2008, p. 5.) The Cannons subsidized

membership dues to Y and encouraged young people to join, especially young women (p. 5). The historian also recalled the physical structure in great detail, including the separate entrances for males and females and the colonial facade (p. 6). Another native of Kannapolis, interviewed for the NCRC Archive, remembered activities she took part in the YMCA as a youth, including Tri-Hi-Y meetings (a YMCA-sponsored club for school-aged youth):

> It was a beautiful architectural building. We had the curved stairs around the front that go up to the doors. And then a big lobby – oh, Tri-Hi-Y's and the Hi-Y's – that was the boys – when they were all coming in, they'd come to our YMCA and they'd be, oh, they'd never seen one any prettier because we had the prettiest YMCA anywhere around. And a pool, two gymnasiums, a bowling alley down below, pool tables, ping-pong tables […] (Macon 2008, p. 5).

Resident narratives of the former downtown YMCA evidence the strikingly detailed cartography of memory surrounding a space that was deeply connected to mill town community social networks and central to the town's identity in the region. Residents remember the YMCA building as a site of health and recreation and as a source of pride. When Murdock demolished the YMCA in the 1980's, residents felt a sense of loss. The female resident cited above said the demolition marked the moment when the town seriously began to consider incorporation (Macon 2008, p. 4), perhaps to give residents a platform to exert some control over how urban issues played out. A local newspaper reporter summarized how he saw the destruction of the YMCA:

> If the mill was the economic center the YMCA was the social and recreational center of the city […] The YMCA was a beautiful building, marble floors, people loved it and Murdock tore it down and I think turned it into a parking lot. He did build another YMCA off of West C Street but it just wasn't the same (McNeely 2008, p.6).

For residents, the demolition of the YMCA represented a critical fracture in the continuum of urban life as most people knew it and a failure on the part of Murdock to understand something important about the town, its values, and its identity. The fact that Murdock constructed a new YMCA, perhaps believing that it could replace the old one, was also an act that did not go unnoticed for its insensitivity. More than just the destruction of a physical building, an object of exchange value on the real estate market, the demolition of the "New YMCA" represented the erasure of the "center of social and civic life" for several generations in Kannapolis. In oral histories and interviews, residents do not openly blame Murdock for other turns of history but rather voice reflections that convey a sense of acceptance and forward-facing optimism. But the demolition of YMCA, on the other hand, created a wound that would not easily heal.

Residents still recall the building in striking detail, almost as if it still stood somewhere in a parallel time, that beautiful YMCA, with its elegant colonial facade and its winding staircase, marble floors, and the rumble of the bowling alley coming from the basement down below. One resident struggled to remember the details of the library, ultimately trailing off. "The old YMCA had a beautiful library. And the library was just wood paneling...it wasn't wood paneling...it was just very nice looking" (Macon 2008, p. 7). In the end, even if the details fade, residents remember the meaning of the YMCA as a place in the community. But if the demolition of the YMCA marked a critical event in the lives of Kannapolis residents, it was nothing compared to the demolition of the mill.

Mill Demolition: Into a Void of Meaning

The events between the time Murdock sold the mill in 1986 and the demolition of the mill under his ownership in 2005 are complicated. A condensed version of the events goes roughly as follows. After the first period of his ownership, Murdock sold the mill for $250 million to

Fieldcrest Mills Inc. in 1986 (Mildenberg 2005). Murdock held on to commercial real estate in downtown Kannapolis valued at $100 million (Schulman and Anderson 1999, p. 364.) Fieldcrest sold the mill to Pillowtex in 1997, which then went bankrupt and closed in in 2003, leading to the lay-off detailed above. The mill would stand vacant for only two years. After appeals from local leaders, Murdock once again considered investing in Kannapolis and, in 2004, bought the site of hundreds of acres and the entire mill complex for $6.4 million at an auction (Lubove 2007). The announcement of public-private plans for NCRC came the next year, in 2005, and demolition of the massive mill structure began. The largest part of the demolition implosion took place on February 23, 2006 when, according to the local newspaper The Salisbury Post, "about one million square feet of mill in 12 seconds [went] down as the third largest implosion in American history" ("NCRC: Timeline" 2008).

A community college worker described how a sense of shock haunted mill workers, even during the days of demolition. He said: "they sat around waiting for the, the plant to reopen as it was being torn town," (Gennett 2008, p. 4.) A local pastor described a similar sense of disbelief that pervaded the community even as mill buildings were being gutted for any objects of value that could be sold. "Even when the equipment was being taken out of the building they still struggled with....they knew it was going to reopen" (Rhoades 2008, p. 4). The pastor's account hints at a sense of denial that pervaded the community, a deep chasm between ideas about life 'as it always was' and 'as it should be' in the eyes of mill workers and what was happening before their eyes.

After a century of life spent circulating around and through the mill and all its associated practices, smells, and rhythms, the closing and demolition of the mill meant that town residents and mill workers were suddenly left in a space where the body memories – of cotton smells, of

droning looms, and conveyor belt work movements - would be detached forever from their familiar referents. The dramatic urban change was disorienting for some. A local pastor described the experience of a member of his church who went for a drive in her car downtown:

> One of our older members [...] spoke of 'I turned onto Main Street and I didn't know where I was' because the buildings that had sat there for her whole life were gone. And that day when she did that there was a true sense of grief...people grieving over 'I worked in that building for my whole life and I have nothing to show for it, now it's gone' (Rhoades 2008, p. 6).

While the demolition of the mill left a gaping hole in the urban landscape, it left a void of meaning in the place where the mill – the town's moral, social, and economic center – had once stood. That flat, empty field that was left in the center of Kannapolis after the demolition of the mill represented a polysemic space, laden with dichotomous significations. While some residents saw the empty field as a space of loss, others viewed it as a space for potential growth and future positive developments. This second meaning is one that project narratives build on and circulate within the community through strategic use of the metaphor of the "clean slate."

Quantum Physics of the "Clean Slate": Remembering the Future

Research campus official narratives of the birth of the Biopolis in Kannapolis made use of the highly symbolic and dramatic demolition of the mill through use of the metaphor of the "clean slate" (Cornish and Dunham 2008, p. 9; Leath 2008, p. 2), a metaphor that conveyed a sense of hope and potential surrounding biotech plans following demolition of the mill. Informants often repeated the metaphor of the "clean slate", even while contradicting through stories of the past or accounts of historic preservation projects. The "clean slate" cannot be 'clean' if it is still laden

with the memories, the zeitgeist of the past, and inhabited by people whose present decisions are informed by the past and whose relationships have roots in common memories and past experiences. Nonetheless, the idea of a "clean slate" held appeal and this metaphor circulated within the community during and after the demolition. At the same, the mill was also framed as a burden.

One former local government official expressed a positive opinion about the demolition of the mill, arguing that it represented a tax liability and a place of perceived risk. "But boy, the first thing that happened was they started the destruction of the mill site. Well, this mill site, 325 acres was a tremendous liability. You had the structures that were in no way usable" (McCombs 2008, p. 5). Much like in the deindustrialization of the "Rust Belt", the approach to "viewing ruins as sites of melancholy and demolitions as signs of hope encouraged people to accept de-industrialization as a natural process and a precondition for progress" (Hirsch 2009.) In Kannapolis, the demolition serves as a potent symbol that project leaders have harnessed in order to promote the 'creation story' of the Biopolis in the futures-based knowledge economy. Another article in a state features magazine highlighted this view of teleological progression, of predestination, using the metaphors of death and birth. "On a Wednesday in 2003, when Cannon Mills closed, the way it was died. And what could be was born," (Graff 2010). In order for something new to be born, biotech, this view prescribes death for something else: the textile mill. It simultaneously reduces the textile past to a state of non-existence using the dramatic metaphor of death.

The language of the post-demolition landscape as a "clean slate" is complimented by official references to the "Future" and symbolic iconography in city logos that do not include references to the mill era, but instead employ such images as fruits, leaves, and DNA strands as symbols of

prosperity, growth, and development embodied in the promises of the new genetics. Rajan (2005) identifies similar narratives in his case study, which he argues reflect a "discourse of futurity that structures both technoscience and capital" (p. 28.) Without the textile mill or any of its accompanying symbols, innovations and "breakthrough" technologies can be freely painted as if appearing from nowhere, from the cosmos of global medical innovation, the utopias of the imagined future. Alternative, accounts reveal that history is more than just a burden, doomed to death.

The chairman of the history and politics department at a nearby college, Catawba Collage, Dr. Gary Freeze, echoed a sense of the importance of history in an interview with the Salisbury Post. He said he believed Murdock's project was a post-modern repetition of what the Cannon family did, and that the city was ""repeating history, even as it's making history," Freeze said" (Ford 2009c). Echoing Hughes' (1986) idea of "seamlessness", the community organizer and informant who I interviewed in 2008 (and again in 2010) said that she also sensed something familiar in the way events unfolded:

> Then drops the whole North Carolina Research Campus and this public-private venture that David Murdock, who once owned Cannon Mills, owned it for a few years, sold it to Fieldcrest, it became Fieldcrest Cannon, Fieldcrest Cannon sold it to Pillowtex, and even though there were all these name changes it was the same people working and all of these arrows in a seamless kind of way, and it felt like there was a huge connection to what had historically happened with the textile mill. And that was, it was a very paternalistic 'company town' kind of place (Author interview, June 3, 2008, Kannapolis, NC).

As local accounts suggest, a closer inspection of the nature of the patterns of history and their importance allows a more nuanced interpretation of the present. Imagery of a "clean slate" was also employed in capitalist theories about the proper course for the re-creation of Eastern Europe, though anthropologists of post-socialism have contested this idea. In his study of trader-tourists

in Bulgaria after socialism, Konstantinov (1996) proposes that trader tourists inhabit a system where the promised "Ithaca"12 of the of the market economy results in a never-ending journey and "Ithaca is therefore sought in the previous orientation frame; the future is in the past. This movement entails circular or at best spiral reinterpretation" (p. 766.) The notion of the spiral also serves as a way of conceptualizing the nature of biocapital itself. Narin (2006) explores this aspect of the spiral by drawing on the historical materialism of Karl Marx (Marx 1976 in Narin 2006). Narin's argument is based on the Marxian idea that when simple exchange becomes capitalist commodity exchange, the circulation of commodities is the source of profit, which - in order to self-perpetuate - must continue onward and upward, ever circulating, creating a spiral. His argument explores three levels of exchange, including the simple trade, then a stage where labor itself becomes a commodity within "capitalist commodity exchange", and capitalism of the new genetics in which "labour power itself, (not only as a capacity), as a being becomes commodity" (Narin 2006):

> The exchange of waged labour as commodity is a rupture in the continuous process of simple exchange that takes the exchange process to a new and higher level, i.e. capitalist commodity exchange. The specific exchange is a singularity point that transforms the circulatory movement to a new phase, to a spiral movement. Marx often emphasizes this transformation from circulation to spiral movement, referring to Sismondi (1819: 119). But what if the ontological being of waged labour becomes a commodity itself? Capital-labour exchange breaks the continuity of simple circulation and reproduce capitalist commodity production. Circle becomes a spiral (Narin 2006).

Konstantinov's (1996) view of capitalism as a spiral journey (a return to Ithaca of the past) and

[12] Greek island home of the epic hero Odysseus, protagonist of Homer's epic The Odyssey. After his ten-year journey, Odysseus returned home.

Narin's (2006) idea about the spiral of biocapital exchange highlight the relevance of the metaphor. Strategically, rhetoric of a “clean slate” perpetuated the ideology of capitalist profit and growth, spiraling onward and upward. References to the past are meaningful to the extent that they serve as the foundation for the future and demolition becomes a symbolically sacred, ritualized event of cleansing, catharsis, and 'a speeding up' of history through the sanctified violence of engineered annihilation. But as in the non-quantum law on the conservation of mass in physics, matter cannot be destroyed. In Kannapolis, demolition represented the symbolic dispersion of the 'recombinant' architecture, capital, and power that would later be reconstituted as R-matter, R-capital, and R-power in the Biopolis. However, metaphors of the “clean slate” take space-time to a quantum level, “floating” the future and rejecting the past, creating a confusing vacuum where planes invert in on themselves leaving actors and narratives of continuity, like particles in a vacuum, in a state of uncertainty. For those who seek to contest this confusion, the memory of the textile zeitgeist, or ghost epoch, is more 'real' – like the Ithaca of Konstantinov's (1996) analysis - than the 'floated' and intangible future. In defiance of the quantum, residents actively contest the "clean slate" simply by existing, by invoking the past, and by preserving the memories and objects of the urban landscape before the demolition.

Contesting Rhetoric of the 'Blank Slate' – The Insurrection of Memory

In Kannapolis, the emic oral histories of residents who recall the textile mill era and its intimate geography in striking detail contrast with etic narratives of a “blank slate.” One archive interview referred to the experience watching the campus rise from an empty field as “*deja vu*” (McCombs 2008, p. 6), comparing the construction of the biotechnology campus to the construction of the original textile mill around 1906. Another historian described the event as an “extraordinary coincidence” (Horton 2008, p. 13). Here we see clearly how resident narratives

contest “clean slate” interpretations by blurring time scales and sharp bifurcations of the future from the past.

Archive interviews reflect many local efforts at historical documentation. These efforts include organized projects to collect, catalog, and document evidence of the past that reflects the materials, practices, vocabulary, and memories of the mill town history. Residents are collecting photographs, oral histories, and even the physical tools related to mill work. However, personal motivations for these efforts are deeply ambivalent and reflect different ideas about residents' relationships to the future and to the transition. One local historian, the son of two weavers who both worked at the mill, said he was motivated to capture a disappeared era. “Whatever comes up next is going to be different. It will start its own history” (Hayer 2008, p. 6). He saw his efforts as documenting a history which local residents *were a part of* in the face of a future “we are no longer a part of” (p. 6). Another local historian (Horton 2008) saw things differently:

> We have, we had, I think a unique and a marvelous century in history but we're still here and I see my job as emphasizing the elements and things of Kannapolis, the institutions and the people, that emphasize that they are still here and that that's what makes us special and they're going to, we're going to remain whatever happens” (Horton 2008, p. 13).

These narratives deserve to be affirmed and recognized, but biotech industry logic *by nature* cannot do this. It cannot and will not recognize the textile past, its *symbols*, or mourn its death. Most of all, it cannot recognize the implicit and self-perpetuating necessity of its own annihilating tendencies - the systemic need to destroy and rebuild in order to have a "clean slate", the perfect conceptual 'real estate' where anything is possible. The cycle leads inevitably to repetition of the past, even while all eyes are on the future. In some way, the blogger reporter who wrote the following line about the grand opening of the campus's “Core Lab” hit on

something fundamental about the ideology of biotech: "But for one wonderful day in October 2008, no one dwelled on thoughts of downturn. They focused on the future and how Murdock's dream might make it better for all of us," ("Murdock's Fantasy", 2008). Despite their myriad differences, emit and etic ideas about blood donation to the Study ultimately converge: they are both centered teleologically on an ideal future. One is financial speculative, and the other is based on social hope related to kinship ties and faith. One denies the past, another recognizes it, but they both must nonetheless move forward and make sense of blood donation and the future in a town which is irrevocably pegged to the promises and doctrine of the new genetics. It is within *this* context of social relationships based in local experiences, identity, and a common connection to the past that Study donors reconstruct, reproduce, and circulate the discourse of health and blood donation within friend networks, work networks, and in public communication. This circulation fills a void of meaning left by demolition and the loss of an entire cosmology. It also helps to make sense and corroborate a pervasive narrative about the inevitability of the demolition. The final product is a smooth-functioning technology, one that, upon closer inspection, reveals itself to be a perfectly formed spiral.

Part II

Chapter 4 - Constructing the Biopolis

Building the Core Laboratory: Real and Symbolic Constructions

The process of constructing the Biopolis involved not only the physical construction of new buildings, but a metaphorical construction using symbols referencing nature, nutrition, and ideas of progress in the life sciences. These references emerged in the new iconography and discourse associated with the complex makeover of Kannapolis' urban landscape, toponymy, and economic shift from an industrial to knowledge and information-based economy. Vestiges of the town's textile era such as looms, the factory's pond, and the mill itself were replaced with laboratories and university-like buildings in a complete and total reinvention of the urban landscape (See Figure 1 and 2).

Figure 1 – Before Mill Demolition (RootsWeb, 2010)

Figure 2 – After Construction of NCRC Campus (NCRC Archives 2008)

At the heart of the construction project is the David H. Murdock Core Laboratory building where a reporter noted that "it appears no expense was spared" (Ford 2008b). The building of the research campus also involved the construction of an entire semiology of references to life sciences and nutrition. One such symbol includes a giant mural inside the Core Laboratory Building. Murdock hired an artist to paint a large mural featuring fruits and vegetables, symbols of Murdock's ideas of 'health' and 'nutrition', on the dome inside the building's main atrium. The mural features fruits and vegetables surrounding an eagle with an 18-foot wing span, meant to symbolize Murdock himself (Graff 2010). Bird metaphors were frequently used to refer to Murdock during the construction of the project, both in newspaper articles and oral interviews. While fruits and vegetables represent the totem objects of nutrition research, the eagle represents the campus "visionary".

While in the above-mentioned mural, Murdock is represented as an eagle, the local press and project stakeholders referred to Murdock as a "phoenix rising from the ashes". References to Murdock as a bird depict him as a being above the earth with non-human, even divine capacities. Interestingly, references to Murdock as a divine symbol are often interspersed with references to local Christian religious life and culture in way that is mutually complimentary.

This aspect of divine rhetoric, and its role in building the new regime of scientific knowledge, will be explored later. The mural described above was not the only aspect of the Core Laboratory that was meant to give the campus the mark of exceptionalism.

The Core Laboratory building also includes 250,000 pounds (125 tons) of marble ("Fun Construction Facts", n.d.) that Murdock traveled to Italy to pick out, ultimately ordering twice as much "as necessary". The campus also bought a 950-MHz nuclear magnetic resonance spectrometer, a giant microscope built in Germany (Ford 2008b) "to study the behavior of molecules on the sub-atomic level" ("A Phoenix Rising" n.d.). Marketing materials for the campus highlight the piece of machinery as a centerpiece symbolic of the campus' state-of-the-art technology. Construction of the Core Laboratory building was just one part of a massive project to reshape the landscape and toponymy of the town with a new semiology of science and health: a specific *kind* of 'health' as this paper will later explore.

Not only did Murdock's real estate development company, Castle and Cooke, invest heavily in the Core Laboratory building, but also in a large urban reinvention effort involving construction of a parking garage, a restaurant, and landscaping (See Figure 3). Streets on the campus are named according to science-inspired themes, such as "Biotechnology Lane" (Bruni 2011). The new urban cartography was accompanied by its own vocabulary of symbols. As mentioned above, Murdock's restaurant Forty Six contained references to science with laboratory beaker flower vases and DNA inspired lamp bases. The restaurant's logo, designed by an Atlanta-based marketing agency, "Denmark {the agency}" (actual name), contains a DNA double helix (See Figure 4).

Figure 3: Forty Six Restaurant Logo (Denmark {the agency} 2011)

The research campus' marketing agency also designed build-boards for the campus that were displayed by a nearby highway, Interstate I-85. A reporter for the journal NC Medical Journal wrote about the campus, "As you enter the town of Kannapolis, North Carolina, a billboard reads, "Historians will no longer differ on when the modern scientific age began,'"(Gessner 2010.) The rhetoric of such slogans takes on a different meaning entirely when considering the campus' collaboration with marketing experts. This ideology references the "Future", the time in which promises of the new genetics and their social benefit will be realized in the Biopolis. The local city school system also designed a new logo, with the "Future" as a theme (See Figure 5.)

Figure 4: Kannapolis City Schools Logo (Kannapolis City Schools website, n.d.)

New symbolic place and space markers such logos, build-boards, icons, the "Core Laboratory" building on the campus, and the highly-touted "nuclear magnetic resonance spectrometer" ("NCRC: Timeline for a Dream", 2008) *anchor* and *inscribe* on the local geography the promises and claims of the promise of biotech in Kannapolis. Project employees, when asked about

expected global outcomes, said the Murdock Study would help in "rewriting the textbooks of medicine" and creating "new treatment plans" (Cornish and Dunham 2008, p. 4). Study leaders and stakeholders make impressive claims promising that the research in Kannapolis will lead to innovations in health care that will "re-write the textbooks of medicine" ("What is the Murdock Study?" n.d.) and "make the world healthier" (Gessner 2010.) These claims are mammoth and require a very strong system of meaning-creation and legitimization.

While news articles focused on the details of the new campus and the people associated with it using glowing reviews, the way articles depicted long-time residents of the town was different. In one article, residents of the town are painted as obsessed with the past, haters of facts and data, and dependent -types who were now floundering because they "had always looked to Cannon Mills as the provider." The following excerpt from an article published in the popular regional magazine *Our State* epitomizes this perspective of Kannapolis residents.

> Six years ago, it was just that piece of land, saddled with a six million-square-foot elephant decorated in weeds and broken windows — the remnant of the dying American textile industry, shuttered with ghosts inside, ghosts of those generations of people who looked to Cannon Mills as the provider. Now, it's filled with a new generation, people who believe more in facts and data than ghosts, people who spend more time thinking about the way it will be than the way it was (Graff 2010).

Scientists and a "new generation" were being lifted up as superior to the native population, which was subject to a host of double standards and contradictory framings. In a barrage of contradictory messages, while locals are blamed for "looking to Cannon Mills as the provider", they are simultaneously being asked to look to Murdock as a provider. Natives of Kannapolis are being asked to entrust their futures to the promise of biotech and its ability to provide health,

economic prosperity, and meaning in the Biopolis. The contradictions of messaging in the construction of the Biopolis are not easily disentangled. The task of interpreting other issues of ownership and access in the Biopolis becomes even more complex when examining the structure of funding supporting the campus, a complex amalgam of public and private investments. In order to understand the unique way in which public resources are allocated, it is important to understand funding in the Biopolis and the way in which decisions about funding are made: many times through good-old-boy networks, in informal situations not subject to public open meetings laws, and in private mansions.

Funding the Biopolis: Speculative Real Estate, 'Good Ol' Boy' Networks, and the State

The North Carolina Research Campus construction project was funded in part by David Murdock with millions of dollars in support from the state of North Carolina, allocated by the general assembly. Murdock donated $100 million to the construction of the 311,000 square-foot "David H. Murdock Core Lab" building (Ford 2008b) and estimated that the entire multi-building project could cost up to $700 million. Part of that funding, the state promised, would come from public financing. The NC General Assembly voted in 2005 to allocated to the project $16 million for laboratory equipment, with dedicated funding of about $25 million yearly (McClary 2008). With that money, the state university system could throw its support behind the project and seven universities transferred faculty, funding, and nutrition-related research projects to the buildings Murdock built. The universities, under a 20-year lease-to-own agreement with Murdock, rent lab space from Murdock's real-estate company Castle and Cooke and then own the buildings after 20 years (2008, "Timeline for a Dream".) Although funding shifted up and down between the years of 2006 and 2010, in 2010 state funding was still at almost $24 million

for “rent, salaries and equipment” for seven public universities and their 102 employees on the campus (Ford 2010c).

A newspaper article published in a local paper described how Murdock and the incoming University of North Carolina system president at the time made an agreement privately regarding state involvement in the research campus project immediately following the president's inauguration in Greensboro in 2006. The two men, according to a local state senator, had an immediate understanding because “both men were venture capitalists and both knew how big projects like this work” (“A Phoenix Rising”, n.d.) After the university system then-president's inauguration, the two men “went off by themselves and hashed out the details of the UNC lease agreement for lab buildings on the campus” (“A Phoenix Rising”, n.d.).

In 2007, Murdock met with privately with some county officials at his private mansion near the campus in order to promote a $168 million public bonds (investment funding) package to support 'infrastructural improvements' around the campus (Cherrie 2007). But the scheme collapsed, partly due to the financial crisis of 2007, and the bonds went unsold. Health department leader had already spent hundreds of thousands of dollars on planning the new clinic, the city couldn't issue the funds necessary to realize the project. The clinic fired employees instead: a total of 12 full-time and six part-time employees lost their jobs (Ford 2009d). In 2010, investment ratings agency Standard and Poor's gave the campus a low investor grade rating (Fisher 2010), killing the possibility that the city would find investors for its TIF bond deal with Murdock. The city later funded the clinic in a different way (Jenkins 2011), but at the expense of 12 sustainable, well-paying jobs and large amounts of money.

The evidence points to a unique funding scheme that involves state resources, speculations on the future, and information campaigns to promote public and investor buy-in.

An important state decision-maker with a hand in a large portion of state funding, the former NC university system president, dealt in venture capital in the past. Other local decision-makers met with Murdock to discuss public bond funding totaling more than 100 million dollars and some of these meetings were not subject to open meetings laws. In fact, local newspaper stories indicate some took place at Murdock's mansion where local leaders may have been wined and dined: there is no way to know.

These processes point to the unique way in which speculative financial practices form the core of the campus' funding scheme. Even after the investment ratings agency Standard and Poor's gave the campus a low rating in 2010, the state has continued to invest in the campus. A government funding appropriations bill up for vote in 2011 could exempt the North Carolina Research Campus from any funding cuts related to a severe state budget crisis enveloping the university system and school systems all over the state (Thomas 2011). While high-level researchers, department directors, and full-time state employees (with generous health insurance benefits packages) working at the research campus may still have solid incomes, due in part to the state's buy-in in the project based on 'good ol' boy' networks and verbal agreements hashed out in mansions, many former mill workers struggle to piece together an income and keep their homes. Murdock promised that the employment landscape in Kannapolis for mill workers, and his billion dollar research campus project, would one day offer '"sustainable, better-paying jobs for the people of Kannapolis and the region,"' ("Murdock Biotech Plan" 2005). The reality points to a different trend.

From Work to 'Workfare': Clinical Trials and Service Jobs

Underemployed

While work in the mill often represented a secure and stable job option for thousands of town residents, the transition to the knowledge-based information economy has led to 'workfare' for

former mill employees. Comaroff and Comaroff (2000) argue that the closing of industrial factories is followed by "their replacement at the hands of nonhuman or "nonstandard" means of manufacturing...which, in turn, has left behind, for ever more people, a legacy of irregular piecework of menial "workfare," of relatively insecure, transient, gainless occupation" (p. 5.) Workfare in Kannapolis is characterized by temporary work, part-time work, and participation in nutrition and consumer-product research trials related to the research campus.

An economic impact study, conducted for the town by a private firm in 2006, estimated that the project would create 5,000 research jobs ("Estimating the Economic Impact", 2006), roughly equal to the number of laid-off workers. Other estimates placed the number of possible additional jobs that would be created in the service economy in the form of support jobs at 30,000 ("Murdock biotech plan" 2005). Because of the mix of companies, institutes, state research institutes, and private employers present on the campus, estimating the number of actual jobs created this far is difficult. A state workforce development worker described the current state of employment using the state's employment statistics tracking system which is used to measure the results of state-sponsored employment assistance programs. As of 2005, two years after the mill lay-offs, she described a situation of pervasive underemployment:

> They may have had multiple part time jobs that they were piecing together in order to get a sustainable wage or they may have been working at a job that paid less than where they were in order to have the benefits, health package and that kind of thing. So we know that there's a number of them who are underemployed (Moore 2008, p. 5)

Local newspapers enthusiastically promote new hirings and advertise the campus's triumphs at integrating laid-off mill workers into the research employment infrastructure, but these stories have been in the tens rather than in the thousands. Specifically to retrain mill workers who

might seek work on the biotech research campus, the local community college opened a $26 million "biotechnology training center", constructed by Castle and Cooke real estate company and leased by the state of North Carolina (Ford 2010e). The campus also partnered with the "scientific and clinical staffing firm" Aerotek, which has an office in the nearby city of Charlotte, to create a "pipeline for jobs" at the campus (Ford 2009e). Staffing agencies, also often called "temp agencies", assist in the flexibilisation of labor by hiring through a practice of "at will employment", a type of contracting which, while protecting the worker from discrimination according to labor law, allows the agency to fire an employee at any time.[13]

In 2008, one community non-profit worker helping to assist unemployed workers in the wake of the mill closing said many former workers were working several part-time jobs and were being forced to sell their homes and downgrade their lifestyles. The most pressing issue, he said, was health insurance "that guards them financially and that helps them do some of the preventive work that they need to be doing is a problem right now" (Hosack 2008, p. 3). While the community non-profit worker said he believed that young people would be able to find campus-related jobs in the future, he said he was concerned about how former mill workers could fare.

Experimental Trial Workfare and Corporate Sponsors

One scientist, director of a state university-operated nutrition research center leasing lab space on the campus, expressed the view that grant money for research experiments and clinical trials could support the local economy. He pointed out that participants in research studies in another city in the state earned money from participating in experiments. He also said towns could benefit from the presence of corporate research sponsors:

[13] Likewise, the employee can also leave at any time.

> So you asked about the economy um, I mean with CocaCola and the companies I have been working with, if this gets out I mean there actually gonna be making a lot of money off of this and, then the question is, what does it do to the economy of that area? You know like for ASU (state university) we have now received 2.7 million dollars in grant money...looking at this molecule and ah, in my last grant - the 1.6 million dollar grant - a third of a million went to subjects in the community for stipends for serving as subjects in the study. So that was on way a third of a million went to subjects in the community (Nieman 2008, p. 6).

Companies and privately-sponsored grant-funded university studies in Kannapolis are actively recruiting local people to participate as subjects in experiments. While these activities are not considered jobs, some pay up to $400, an amount that could be a significant supplement to other part-time work. Thus, the option of earning "compensation" by participating in clinical nutrition trials has become just one of the bits of 'workfare' available to Kannapolis residents. For example, under an article entitled "Get Paid to Eat", the local paper reported that one company is "paying consumers an average of $20 an hour to use products like cat litter, lotion, and paper towels and then give their opinions, which Fortune 500 companies covet," (Ford 2009f). Another study, co-sponsored by two state universities, recruited male participants for a study on metabolism and exercise. The men would "eat, sleep, and exercise" in a metabolic testing chamber for four nonconsecutive days and have their metabolism constantly monitored. (Ford 2009g) The participants, it was announced, could earn $400, but only if they successfully completed the study.

Another university study recruited participants for a study of Chia Seeds, targeting specifically the 60 most inflamed of 100 overweight females and 30 female "elite cyclists" (Ford 2010f) Those recruits were promised $300 dollars in exchange for their consent to eat Chia seeds

daily for a specific amount of time. The university did not reveal its private sponsor, saying only that the sponsor was a major food company interested in developing a sports bar (Ford 2010f).

Another study announced in 2011 which required a high level of commitment from participants was sponsored by Murdock's company Dole Food Company. The study required participants to work out, consume a plant material-containing juice beverage, give blood, and come to a total of nine visits. In exchange, participants were promised $100 as well as “free fitness test information worth $100 and important health data from their blood samples”(“Volunteers needed” 2011). The beverage Dole is developing is used at Murdock's privately-owned and operated wellness retreat (“Volunteers needed” 2011), the Wellbeing Institute in California, where guests pay up to $4,500 dollars for a one-week “ultimate” wellness package (Lubove 2007.) While campus leaders promote the campus' benefits to global health and Murdock' philanthropic intentions, evidence points to benefits for Dole, not only in clinical trials, but all over the campus. “Dole is the world’s largest producer of fruits and vegetables, so studies into their health benefits have a huge potential upside for the company. Many of the foods under the microscope are foods Dole sells” (Bruni 2011). Research on the campus is partly funded by the state, conducted by state employees, but oriented toward corporate interests. This public-private link is one which Buchbinder (1993) sees as having “occurred within the ethos of the marketplace; the goals of research and development of knowledge are more and more linked to the production of marketable products rather than social knowledge” (p. 334). In this case, 'health' is the market product in question. If the market university produces 'health' as a marketable product, the implications for public health – and just who will define it - become blurry.

A Fetishism of Pathologies

Study participants in clinical trials are asked to use their bodies for various tasks, including to use consumer items, eat food, exercise, and give blood. They must answer questions and be willing objects of the gaze and observation of test coordinators. In exchange they are given cash, often small amounts not equivalent to money they could have earned doing paid work during the same hours. As volunteers, while their contributions contribute to the development of consumer products sold on the market for profit, they freely give of their bodies in exchange for cash payments without having access to future 'health products'. At its most perverse, I see a clear commodification of 'health' in Kannapolis draws volunteer local residents – possibly former mill workers - into a weird "fetishism of pathologies". Pathologies, such as inflammation and obesity, become valuable assets that can be sold in the local marketplace of clinical trials and nutrition experiments.

Pathology is prescribed as an indicator for access into the marketplace of exchange in the world of clinical trials. States of being, both pathological and healthy, are equally valued. As the focus on health shifts toward the marketing of consumer 'health' products, the epistemology of 'health' shifts toward a brand that can be accessed through purchasing power rather than a physical state of being. The obese, inflamed, and the sick, with enough purchasing power, all equal in the marketplace of 'health'. Constructing this specific idea of 'health' involves production of a certain 'way of knowing'. This specific 'way of knowing' about 'health' is reinforced through trainings, workshops, and health seminars for local residents.

Chapter 5 - 'Health' in the Biopolis: New 'Ways of Knowing'

Despite the 'subjective' nature of market constructions of 'health', high-level project leaders refer to the goal of "educating and engaging" (Cornish and Dunham, 2008, p. 3), "training and teaching" (Murdock 2008 p. 6) and "training the people in the community" (Vogelien 2008, p. 7) about health and lifestyle choices. In my view, knowledge is *didactically* offered to local residents despite the problematic nature of claims about 'health'. The seeming objectivity of this knowledge is not only legitimized through high-tech geographic symbols such as the nuclear magnetic resonance spectrometer, but solidified through science and health related "seminars" (Ford 2010g) and a "nutrition expert" lecture series (Ford 2010h).

Treatment plans, healthy foods, and nutritional drinks may be healthy, however a specific pattern emerges in official discourse surrounding 'health' in the Biopolis. Health is often referred to in terms of objects or services that are mediated by the market, such as health drinks or personalized medicine treatment plans. Although adopting healthy eating habits is an important step toward health, the official interest in 'changing' of these habits must be considered in conjunction with the motivations of corporate stakeholders who can influence which fruits and vegetables are constructed as "healthy".

Scientists one the campus emphasize the consumption of healthy foods and "Mr. Murdock's vision of the prevention and treatment of disease through what you eat" (Vogelien 2008, p. 5). A researcher who emphasizes health eating habits also explains, in the same interview, how researchers will be "working closely with Dole" (Vogelien 2008, p. 7). A scientist affiliated with the site said health research could lead to "companies adding" natural nutritional components "to their drinks which we think will improve human health" (Nieman

2008, p. 6). Thus, statements about health cannot be taken as referencing *social* health in general, but rather specific *ideas* about health that are intertwined with ideas about the market.

Campus leaders' – including private corporations and state universities - construct specific ideas about the meaning of health to recruit clinical trials participation and sell health products – both to venture investors and consumers. But ideas about 'health', especially as it is constructed in the local context of Kannapolis, also help promote buy-in and local donor participation in the M.U.R.D.O.C.K Study, a populational blood study recruiting 50,000 local residents and dedicated to research in the growing pharmaceutical sector of personalized medicine.

Sensational rhetoric about 'health' in the age of the new genetics inspires trust and excitement – a word repeated consistently in archive interviews about the town's transition – about the campus project and about the blood study. This excitement is amplified by experiences of loss in the past. Recruitment appeals to this sense of loss, as does Murdock's rhetoric about nutrition, health, and its promises for the information economy in Kannapolis. In Kannapolis, the unique experiences of history of the town's residents form a necessary part of the conditions for production within the town's new technology: biobanking, with the aim of commercial innovation in the personalized medicine sector.

Speculating on 'Biocapital': Donor Blood into 'Personalized Medicine'

The demolition of the mill and the construction of a new biotechnology research campus in Kannapolis is the story of transition to a 'knowledge-based economy' (Safrit 2008, p. 6). In this section of the paper, I will examine the 'etic' discourse of biotechnology research experts and project leaders, such as researchers and high-level employees of the campus and blood Study who are widely seen as the bearers of the *types* of knowledge that *have* market value in the

'knowledge-based economy'. First, in order to better understand local experiences of the transition to the 'knowledge economy' in Kannapolis, this section will explore key concepts such as biobanking and personalized medicine and the way those concepts are framed in the Biopolis. Second, industry discourse surrounding biobanking will be explored to show how 'etic', industry narratives view and give meaning to donor blood and the concept of health.

Research surrounding the Study will take place within an emerging medical area called "personalized medicine". According to Rajan (2005) the field of personalized medicine entails "a new ensemble of techniques, practices, and institutional structures of medicine" (p. 20). He describes personalized drug development as: "(1) the identification of a disease with a genetic component; (2) the mapping of the gene(s) involved in the disease to a specific chromosomal regions; and (3) the identification of the involved gene(s)" (Rajan 2005: 20.) Rajan then describes how biomarkers can be used for diagnostic purposes, used themselves as a form of treatment, or used to develop other treatments (p. 20.) The biobank, or BioMarker Factory in Kannapolis, is the physical and symbolic site of production in the field of personalized medicine.

Tutton and Corrigan (as cited in Pálsson 2005) describe biobanks as "'databases involving the collection, storage, and the use of physical tissue (usually blood, but by no means exclusively), genotype and other biological information derived from that tissue, and a variety of personal data from populations of various sizes'" (p. 95). The BioMarker Factory in Kannapolis will provide services that span from drug development to intellectual property and patenting ("The Bio-Marker Factory", n.d.). This focus on intellectual property (IP) serves a specific purpose: it facilitates profit on the market by turning genetic discoveries into private property. Caruthers and Ariovich (2004) point out in their exploration of the sociology of property rights that "to capture those profits, new products must be brought within intellectual property law and

constituted as legitimate objects of property," (p. 38).

The main focus of the research will be devoted to "the development and *commercialization* [emphasis mine] of innovative diagnostic and laboratory tools" (Geiger 2010) in the growing sector of personalized medicine. Official and industry language referring to the Bio-Marker Factory - and to plans for personalized medicine research there - is heavy with references to the market. For example, an article announcing news of the launch of the project in the *Pharmacogenomics Reporter* asked rhetorically, "if a factory is where raw components are manufactured and assembled into commercial products, then why not take a similar approach to developing diagnostics to predict disease predisposition and response to drugs?" (Ray 2010.) In April, 2010, Duke University Medical Center circulated a press release detailing the Biomarker Factory project and its collaboration with LabCorp of America in the field of "personalized medicine" (Geiger 2010). The DTMI press release gave information that LabCorp, an "S&P 500 Corporation," had "profits of $4.7 billion in 2009". Duke stated plans to "*capitalize on"* [emphasis mine] LabCorp's bio-repository being developed to discover and validate biomarkers in human disease" (Geiger 2010, par. 8). LabCorp and DTMI own the biobank in a 50/50 ownership deal, with Duke supplying the "know how" and LabCorp "supplying the cash" (Walker 2010.) DTMI's appointed director of the BioMarker Factory has stated that LabCorp's main interest in the biobank was explicitly to develop new diagnostic tools that could help the company *compete* with its largest competitor (Walker 2010).

This market-based dialect surfaces in other documents. For example, a DTMI newsletter featured a quote from a Study coordinator expressing plans to "leverage existing *assets*" ("DTMI News", 2010, p. 2) in implementation of the project. In 2008, a Duke University doctor and director of the Duke Translational Medical institute, Dr. Robert Califf (Califf 2008), made a

PowerPoint presentation detailing future plans for the Biomarker Factory which stated the need for “big populations” and “access to technology and populations to *optimize* [emphasis mine] progress” (slide 2). Another slide in the presentation presents a visual representation of “patient data to be *mined* [emphasis mine]” (slide 23). In a genomics presentation at Duke University in 2010 (Walker 2010), the director of the BioMarker Factory repeatedly referred to the the study, the Kannapolis community, donor populations – or “cohorts” as they are referred to in medical language - and institutional frameworks, lumping them together using one blanket phrase: “infrastructure”.

In Study leader references to the BioMarker Factory, blood is referred to as a material – an *asset* - to be '*capitalized on*', '*mined*', and '*optimized*' in the context of the *'BioMarker Factory'*. The language refers to Kannapolis people only as a *function* of the BioMarker Factory. Furthermore, it does not refer to the thousands of acts of donation – an act that gives donors agency and serves as evidence of their contributions - that will be necessary to the project. According to Sharp (2000) “we must pay close attention to the metaphorical references of fragmentation and objectification because they frequently flag body commodification” (p. 295). This language reinforces what Andrews and Nelkin (1998) have noted about advanced biotechnology research involving human subjects:

> “researchers often refer to the body as a 'project' or 'subject'—a system that can be divided and dissected down to the molecular level. But this reductionist language is increasingly permeated with commercial metaphors. Body parts are extracted like a mineral, harvested like a crop, or mined like a resource” (p. 54).

Although donors are alternately depicted as the “objects” to the expert, “subject” educators of the new biotechnology age and framed as “infrastructure” by Study leaders, this discourse has

not discouraged donation. This may be due to the fact that Study leaders frame the Study differently when presenting information for other researchers and when recruiting donors. McNamara and Peterson (2008) identified a similar division between rhetoric surrounding the Australia biobank project in which "there is a notable division between information prepared for 'the public', whether this be in the area of community consultation or through media, and information disseminated to a professional audience of researchers..." (p. 199.) Leaders with the Study construct community information campaigns on appeals to citizenship, memory, and faith. In Kannapolis, I argue that residents actively accept and circulate narratives about 'health' drawing on their own place-based experience, as well as on a moral economy of hope for their own futures, families, and local citizenship in the post-textile era.

Place-based Experience and Biomedical Technology – Memory as Infrastructure

More than 5,000 residents had donated their blood to the Study by January, 2011 (Gardner 2011). In order to understand how the has Study successfully recruited so many donors, it is necessary to examine donors own reasons for giving. These have been chronicled in stories published in the local newspaper. According to a newspaper article, the first woman to enroll in the Study in 2009 was a 75-year-old retired nurse who said she believed participants in the Study had a duty to their "fellow man" (Ford 2009h). A pastor who enrolled right after the woman said he was participating as a "gift to his children and grandchildren", while another man said he was participating because he felt the Study was "historic" (Ford 2009h.) Diverse participants have also shared the belief that the Study would one day help contribute to cures for diseases - diseases they said they had experienced in their own families.

A., ("A. Profile Page", n.d.) a participant featured on the Study's website, learned about the Study from her hairstylist. She said she was participating because she hoped the Study

would help with early detection of diseases, such as her own arthritis. Mostly, she said her goal was to "help others." "It will be a great impact for the future," She said. "This community is so dead because it used to be just textiles, and now all of that history is gone. I think it will take a while, but the future is promising." M. ("M. Profile Page", n.d.) worked in the accounts department of the mill. She learned about the Study through her church and decided to participate. She said she had participated in the Study in the belief that participation could "help the community and the world." A clinical trials assistant for the Study said participating in the Study was important for future generations, but also that "our community has been hit hard with the closing of Pillowtex, but this is a chance to put our community on the map" ("V. Profile Page", n.d.).

Donor narratives reveal the importance of memory, and particularly local experiences and memories of the textile era, in motivations for donating. Donors draw on their memories of the past to make decisions in the present, specifically, the decision to donate. Promises of world-changing breakthroughs and medical discoveries (See Figure 6) contrast starkly with the experience of losing the mill and its accompanying 'ways of knowing'. Donors embrace the promises of a new 'way of knowing', even if they do not know what those promises will bring and believe that the promises will be fulfilled. In this way, memory and loss constitute part of the Study recruitment success, just as they are part of the "seamless web" (Hughes 1986) of biomedical technology in Kannapolis.

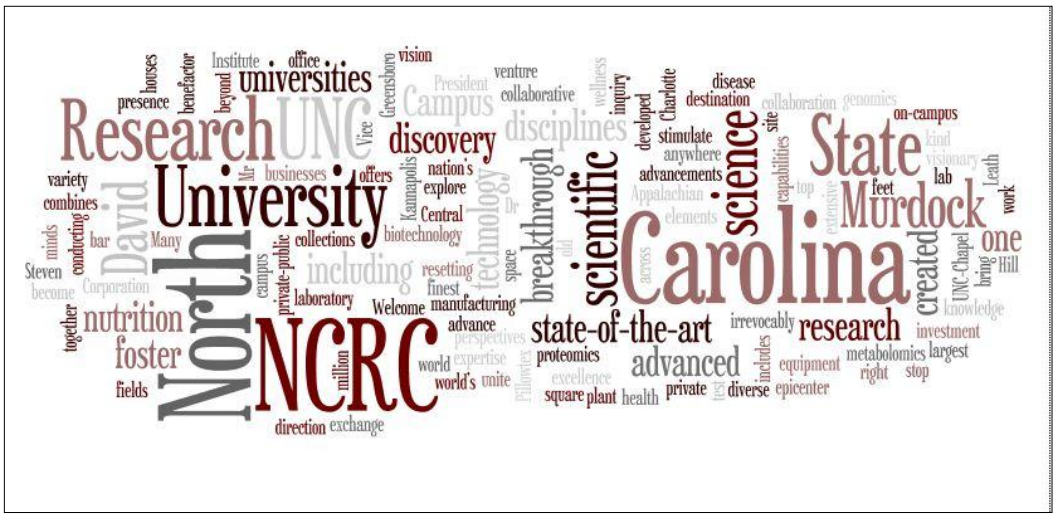

Figure 6 – Wordle-generated map of frequently-used words in NCRC marketing literature

Study recruiters also visit workplaces and businesses to solicit participation. These recruitment drives are chronicled in local newspaper stories. For example, recruitment at a local car dealership brought in 33 volunteers to the Study in 2010 (Ford 2010i). A project leader then emphasized that recruiting participants at workplaces *facilitated the convenience* of participation (Ford 2010i). A recruitment visit to a local high school resulted in the participation of 30 people, including the school system superintendent, who told the local newspaper: “ "It's that important...This is a study that will change the future of medicine and health care"” (Ford 2009i.)

An informant I interviewed told me she donated because she believed that her donation could help Study researchers “battle more diseases” using her blood. She learned about the study after seeing recruitment advertisements in two local newspapers and donated during the first year of recruitment in 2009. She said Study employees were kind, but that she expected more follow up regarding how her contribution to the Study was being used:

> [...] everybody was real excited about this research coming in. And everybody was excited about this helping things come back the way it was as to 50 years ago. But that's not the case. They are not very forthcoming in letting the community know what is going in the research. Honestly, the people who did the study were

> very nice in just saying that this is going to help us; they weren't real forthcoming, but they were not withholding either [...] Of course you want to cure all the diseases in the world. As far as me feeling uncomfortable with it at that time, I did not. Still, to this day, you really do not know about how much is going on there (Author interview, May 21, 2011.)

My informant was convinced to donate to the study because of an appeal to help cure "diseases in the world." After several years of not hearing from Study organizers or any contact from the Study of any kind, she began to feel a lack of information. She gave her donation in exchange for the belief that it would help make a concrete difference in public health. Without that information, she felt a sense of disconnect. Her testimony reveals the complexity of donation and the strong ties of reciprocity that bind donors and recipients of the donation.

Rajan (2005) articulates an act of "exchange and circulation" (p. 21) that characterizes biocapital. This mirrors the act of exchange that blood undergoes as it passes from donor bodies into a system of market values and pharmaceutical research. Just as Schulman and Anderson (1999) identify a "dark side" (p. 351) to social capital in Kannapolis, closer analysis reveals a "dark side" to biocapital as well. Claims made by Kannapolis stakeholders and university researchers to "re-write the textbooks of medicine" ("What is the Murdock Study?" n.d.) and "make the world healthier" (Gessner 2010) may be misleading. Rajan (2005) argues that marketing "hype" characterizes the "discursive grounds in which reality unfolds" (p. 24) when biocapital investors sell a hypothetical vision of the future to gain credibility and buy-in in the present. Critically, it is this *same* vision of the future that also establishes the grounds for donors who give the "gift" of donation to the biobank in Kannapolis. Reflecting on Mauss' concept of "the gift", Hart emphasizes that "the big difference between gifts and market contracts, according to Mauss, lies in the timing of the return. A gift must be returned at some time in the

future, whereas a contract is defined by the instant equivalence of the exchange," (Hart 2001, p. 194). Promises given in exchange for donor blood stake the fulfillment of those promises on the future. In the moment of exchange, the promise of future return on that exchange is just as real as the promises that surrounded TIF bonds in the town's real estate development project – a project that later failed.

Study leaders circulate rhetoric, using medical promises that are simplified for non-experts to understand, in order to recruit donors. This rhetoric emphasizes the mutually beneficial nature of the donation exchange: blood in exchange for 'curing disease'. While this promise seems abstract, my informant did not forget her reasons for donating or the promises she received in exchange. Specifically, she believed the promises of the Biopolis and that it would help bring the city "back the way it was as to 50 years ago." My informant's story highlights the power of memory in donation. It also shows that when the contract of Maussian gift exchange remains unfulfilled, a void of uncertainty and doubt can open in the place where hope and excitement once flourished. In order to continue recruitment, the Study must sustain narratives of promise and hope – based on the future and the inevitability of promise fulfillment. Some places where such narratives are circulated are local churches.

The Gospel According to Pfizer: Church in the Biopolis

Study recruiters have also turned to local churches to achieve their recruitment goals. In January, 2010, the Study counted its "largest recruitment yet", a total of 40 people, at an area church where the pastor compared participation in the Study to donating food to the needy or "building a childcare facility in Ukraine" (Ford 2010b). The pastor told the newspaper that he would also donate blood for the Study, and said he believed Jesus would have wanted participants to take part. "'We understand Jesus to be the great physician that wants us all whole...how better to be a

part of that process than to make ourselves available for this study that may have great benefits'" (Ford 2010b.) The article also quoted the Study manager as saying: "'Churches are a logical place for us to start...churches are an important part of a community, and people look to their churches for guidance'" (Ford 2010b.)

In Kannapolis, church leaders, researchers, and blood donors refer to blood donation in the framework of a Christian moral economy in which values such as philanthropy, selflessness and benevolence are framed as compatible with Study goals. In Kannapolis, churches play an important role: Study recruiters embrace churches as influential institutions that can legitimize the donation of blood to the biobank. Recruitment takes place inside churches, and some churches embrace narratives of 'health' and 'wholeness' offered by Study recruiters and facilitate these narratives within the community using comparisons to Jesus, Christian understandings of 'mission work', and ideas about divine will. These narratives circulate within a 'way of knowing' in which ideas of 'health' are compatible with the community's Christian values.

A Kannapolis pastor described how he saw the church in relationship to the future of the Biopolis, a future he sees as divinely ordinated and part of God's plan: "One thing we've emphasized, transition and looking at the steps of transition which means having to grieve the past while embracing what God is unfolding into the future," (Rhoades 2008, p. 10.) Pastors and local residents often refer to the study – and to Murdock – within the framework of a Christian moral economy. So has at least one out-of-town pharmaceutical industry executive. A local resident repeated what an executive for the pharmaceutical giant Pfizer said on a visit to Kannapolis "a few years after the project was announced":

> Well, I think this is a Godsend for the City of Kannapolis, this research campus. You know I remember several years ago, that there was a lady and her name is Dr.

> Diane ---- and she was an MD and a PhD and she was in charge of research and development for Pfizer Corporation and she was making a presentation and she told us that this research campus - the thing that Mr. Murdock was doing - was a Godsend for the City of Kannapolis. And we agree with her wholeheartedly" (Misenheimer 2008, p. 13.)

As this resident's account evidences, a Pfizer executive visited Kannapolis and used Christian allusions to refer to the research campus project. It is possible the executive was a Christian who believed in what she said. It is also possible that the executive was using powerful innuendos and references that she knew would have purchase in the Kannapolis Christian community and faith-based moral economy.

As WikiLeaks reports have revealed, drug giant Pfizer sought to blackmail a Nigerian attorney general to keep him from filing charges against the company over 11 child deaths that occurred during the company's drug trials on children in Nigeria in 1996 (Boseley 2010). The Pfizer blackmail dealings in Africa mirror what Sharp (2000) has observed in other cases where "socially expendable categories of persons are ironically transformed into valued objects through their involvement in medical research" (p. 296.) Pfizer has no stakeholder role at the North Carolina Research Campus, but DTMI and BioMarker Factory leaders have clearly stated a goal to use the blood Study to identify "populations that can be used for powered clinical studies, as well as the potential for predictive studies later down the road," (Walker 2010). Populations in Kannapolis are being targeted for their pathologies, their genetic profiles, and for potential future value as "subjects" in clinical studies. This research aims to create IP that will benefit private corporations, namely LabCorp. While these studies may not represent harm to local populations or cause deaths, questions still need to be asked about what is being given up, who is benefiting, and the methods that are being used to recruit participants.

Recruitment for the Study in Kannapolis builds on cooperation with one of the most cherished institutions in the community: church. Other donation campaigns have recruited donors through appeals to Christians, such as appeals for kidney donations in the 1990s. As Cohen (2002) notes, "popular television news and features in the United States in the 1990s often focused on live unrelated kidney donation as an act of Christian charity, a figuration that obscured the particular assemblage of gift, sale and debt that has constituted the transplant as both social drama and industry" (p. 26, footnote 6). The Kannapolis case represents a similar trend in the way Christian rhetoric surrounding donation effectively obscures the corporate interests behind the Study while simultaneously imbuing the Study with the halo of divine provenance. Serious questions must be asked about whether these methods constitute 'ethical' corporate behavior, in Kannapolis, in the USA, or anywhere in the world. Is the Kannapolis case evidence of what Jean and Jean Comaroff argue is an emerging era in which "Africa anticipates the unfolding histories of America" (Comaroff and Comaroff 2010)? These questions touch on issues that go deep to the heart of citizenship in the Biopolis. I will begin an exploration of the new configurations of citizenship in the Biopolis through the lens of consent.

Consent and Citizenship in the Biopolis

Donors become integrated into the medical technology of biobanking in Kannapolis starting with the act of donation, initiated through the symbolic signing of the consent form. Participants must sign a seven-page consent form ("What to expect", 2010) stating that they are fully aware of the "risks and benefits" of their participation. They learn that their identities will be kept secret and are informed that the Study does not entail any medical care. They are asked to give blood and urine samples and provide their full medical histories to the Study, including images, family

histories, and medicines taken. In a process called "tailored consent" (Maschke 2008), study participants are also informed that they will be contacted any time their blood or urine is used in a study to sign new consent forms. This could happen, according to the study website, "up to four times per year" ("What to expect", 2010). Participants are also informed that they can withdraw from the Study at any time and their materials will be destroyed[14] The consent form also explicitly states that the benefits of any discoveries or profits resulting from research on participant samples will not be shared: "In the event that research using samples and information stored in the Biorepository leads to a product that could be sold commercially, there are no plans for you to share in any profits"[15].

The consent form is problematic because while it reveals that donors will not profit directly, it does not explicitly state who will profit and how exactly research results will have broad, even 'global' public benefit. Ursin, Hoeyer, and Skolbekken (2008) argue that "informed consent is an end in itself – it is part of the guide for a meeting of citizens and science. Through consent procedures, biobanking becomes a mass education project," (p. 189). Consent as education in Kannapolis takes place within a didactic regime of biocapital knowledge in which certain 'ways of knowing' about health are privileged over others private stakeholders dictate the meaning of citizen 'health' itself. Consent procedures, combined with a lack of alternative frameworks, obscure this aspect of citizenship in the Biopolis. McNamara and Peterson (2008), in their study of the Australian biobanking project, have argued that "by focusing on privacy and informed consent in the ethical oversight of the project, other important questions regarding the ownership, use and control of the information collected in the database are obscured," (p. 198.) McNamara and Peterson argue that this form of consent "passive consent" because it places

14 ("M.U.R.D.O.C.K Study Consent Form" n.d., p. 6)
15 ("M.U.R.D.O.C.K Study Consent Form", n.d., p. 5)

individual responsibility on the donor and assumes support for the project while obscuring "alternative participatory frameworks" (p. 198).

The BioMarker Factory project also involves the unanimous support of state public institutions and health facilities, which are working alongside recruiters to promote donation to the biobank. There is a "Murdock Community Advisory Board," but this body is organized by DTMI and aims to identify ways to increase donation. In February, 2011, a public employee working to provide services to the unemployed through the state's community college system joined DTMI's community advisory board. Her responsibilities as a board member include work to "ensure the success of the M.U.R.D.O.C.K Study". On the other hand her duties as a state employee include working "with major area employers incurring plant closures and layoffs including Freightliner, Philip Morris USA and other, smaller companies," ("RCCC leader joins", 2011.) Within a system of infrastructural support for private biobanking, these two allegiances are not viewed as presenting a conflict of interest. The state serves the BioMarker Factory while at the same time serving unemployed mill workers, whose interests the BioMarker Factory claims to represent. In this way the BioMarker Factory becomes a surrogate public institution, working hand in the hand with the state. Likewise, the BioMarker Factory claims to offer 'future health' to genetic citizens of Kannapolis and their decedents in exchange for donation to the Study. Citizenship comes in exchange for donation in a trade-off, the benefits of which are not clear.

While not focusing on money or profit, donor narratives focus instead on intangible future benefits for participants' descendants such as a "better life", a "better future", and "health." This narrative also affirms the Study's power to place the city on the map and give it global significance and, in this way, it is similar to the etic narrative. For donors who *actively*

reproduce this narrative, I believe it serves three purposes. First, it affirms donor commitment to their families, town, and community. Second, it affirms their citizenship in the town, the state, the nation, and in a new global economy by placing them in seemingly empowered citizen positions in a place that is "on the map." In an interview, a Study organizer said participants were "really excited about being part of something larger than themselves" (Cornish and Dunham 2008, p. 3.) Donors actively use the narrative to make sense of their role in the new space and to affiliate their bodies directly with history. Finally, it heals *past* voids of meaning: rhetoric of globalizing change for the better fills the gap of loss left by the mill's closing.

While acknowledging that personalized medicine may speed drug innovation, Olivier, Williams-Jones, and Godard, et al. (2008) point out that the power of the sector to fulfill its promises "remains unclear, particularly with regards to the development of new drugs for complex disorders, which are the very illnesses that pose the greatest public health challenges," (p. 110). In his study of the US company Genomic Health, Rajan (2005) observes the same "salvationary rhetoric and language of genomics, as it manifests as a market enterprise and business model, and as a therapy or medicine or Health," (p. 23.) With about one in six out of all United States citizens uninsured (Wolf 2010), personalized treatment plans will not available to everyone unless there is radical systemic change. Fletcher (2008), in her work on biobank governance in the United States, points out a need to "constrain the fantastic commercial claims about the efficacy and availability of drugs targeted to individual genetic profiles" (p. 110.) These cautions could be valuable to donors making decisions about whether to donate to the Study, but DTMI Study leaders do not have an interest in presenting this information to the public: it might jeopardize the appeal of genetic citizenship in the Biopolis.

Study organizers introduce the discourse of 'health' to the community in terms that appeal

to faith, ideas of local citizenship and solidarity, and most of all, a community's hope for the future after the loss of the textile mill. Kannapolis residents take these terms, and the act of donation itself, and interpret and repeat them in ways that have personal meaning, not from the 'etic' standpoint of utility for the market, but rather as situated within a place-based *moral* economy. Study leaders – including DTMI - use a didactic top-down education model to construct subjective 'ways of knowing' about health as universally truthful. These ideas about 'health', and the credibility that surrounds them, are used in conjunction with recruitment for the BioBank. Donors believe, at the moment of consent, that they have the information they need to embrace genetic citizenship in the Biopolis.

In Kannapolis, individual donors must evaluate the potential benefits and drawbacks of the blood study and decide whether to participate on their own. As far as my research has shown, there is no community-based ethical review panel, no substantial public debate, and no public interest group organized to discuss issues surrounding the use, storage, and future plans for blood donated to the Kannapolis biobank project. If donors want to withdraw from the project, they must actively ask for their blood to be destroyed. This contrasts, for example, an alternative form of consent that could require mandatory yearly follow-up on the part of the BioMarker Factory to establish whether donors still consent to taking part in the project. The nature of biobanking in Kannapolis is a top-down model in which the terms of "genetic citizenship", consent, and benefit distribution are dictated by the BioMarker Factory.

The nature of this genetic citizenship has implications not only for Kannapolis, but for a broader scale of subject populations constructed as either donors or patients to be "managed" on the local and global scales of the personalized medicine industry. DTMI is working to reshape the medical world in a vertically integrated business model, creating an entirely new cosmology

of patient, doctor, insurance, and pharmacy relationships. This new way of 'doing health' will have global implications, not only for those who can afford the high-cost genetic tests offered by personalized medicine, but for those who cannot afford it as more and more public state funds are channeled into public-private biomedical ventures to create IP for private corporations.

Kannapolis to the Moon – Global and Cosmic Scales of Imaginative Bio tech-Futuring

DTMI's plans to expand biobank recruitment in Kannapolis are unfolding in parallel to the Institute's plans to expand its personalized medicine research projects in both India and Singapore (Califf 2008, slide 17) and possibly China (slide 22.) According to industry news, what these countries have in common is that they are all popular destinations for the off-shoring of personalized medicine clinical trials by multi-national contract research organizations (CRO's)[16] and are valued for the cheap cost of conducting research (Taylor 2009, Barnes 2007). Although competing with China which holds the number one destination spot for clinical trials, Singapore has invested heavily in recruiting "biopharma" firms, with industry eyes shifting to the country's "lower cost per patient" to conduct trials, as well as its "vast patient population" (Barnes 2007). As WikiLeaks cables have shown, local populations' participation in clinical trials does not come without risks: sometimes deadly ones – that industry will go to great lengths, including blackmail, to cover up. (Pfizer is also conducting clinical trials in Singapore (Barnes 2007.)) India is also becoming a more popular destination to the industry "thanks to a huge patient pool representing both chronic and infectious diseases" (Taylor 2009.) We can see a fetishism of pathologies emerging in the developing countries of East and Southeast Asia where legislation and regulations governing biobanking and consent are likely to be even more relaxed

[16] Organizations (or companies) that conduct trials for pharmaceutical or medical service corporations. Also called "clinical research organizations."

than in the United States.

Kannapolis trends are not disconnected from the experience of Singapore where Ong (2007) argues that, with the rise of bio-tech and public-private global research institutes, "city space, architecture and citizens are all subject to re-engineering for techno-optimization" (Ong 2007, p. 7). Similarly, in India, Rajan (2005) explores "the history of the textile industry in Mumbai, which sets the stage for particular ways in which technoscientific emergence occurs and for the particular type of subject – the unemployed millworker – who gets configured as an experimental subject of global genomics research" (p. 26.)

DTMI plans to expand recruitment in Kannapolis parallel larger CRO efforts to tap into populations around the world where local knowledge about personalized medicine research and genetic IT production – and precisely *who* will benefit from it – are likely to be low. Meanwhile, in Kannapolis, DTMI is partnering with local clinics and hospitals to recruit even more donors to the BioMarker Factory. An update on the Study published on the DTMI site in April announced that "fourteen sites are actively recruiting and enrolling patients in the MURDOCK Study. A new recruiting model has been implemented at two of the sites, where MURDOCK Study staff members recruit alongside the physicians," (Jenkins 2011). A local newspaper article on the groundbreaking for a public health clinic, the Cabarrus Health Alliance, in Kannapolis reported on public health clinic plans to:

> taken part in public health research projects with Appalachian State, Duke and N.C. State universities, and officials say researchers are considering more ways to partner […] Murdock, who flew in for the groundbreaking, said he met just before the ceremony with representatives of a company interested in the Research Campus. He made it clear he considers the Health Alliance a part of that (Jenkins 2011).

The Study is part of larger DTMI plans to develop “vertically integrated” (DTMI power point, 2010, slide 6) health care models in the developed world where, according to DTMI's vision, “in 20 Years…(or a bit longer) all people in developed nations will have an electronic health record, biological samples, digitized images, health care will be personalized using an individual’s images, samples and clinical data,” (Califf 2008, slide 15.) Plans say *nothing* of how this will realize promises for global health, or about benefits for people in the developing world where many personalized medicine trials are taking place. Neither do plans mention how personalized medicine will benefit people without insurance in the U.S. or people who do not live in communities where public health clinic clients can choose to participate as volunteers in clinical trials in exchange for health information.

“Vertically integrated” health care models, such as the one promoted by DTMI and LabCorp, outline a new form of “patient management” (Walker 2010, slide 12) in which health care providers partner with pharmaceutical and genetic testing corporations partner with doctors and health care providers to provide care at every stage of the patient's life, from prevention to disease control (see Figure 7). This care would be implemented through the use of genomics information, predictive testing, and genetic diagnostic procedures developed as IP and sold by private corporations. Upon closer inspections, the cycle of “patient management” resembles a “seamless web” (Hughes 1986). The 'seamless web' or cycle of “patient management” proposed by DTMI would operate as its own self-enclosed way of 'doing health' within a specific regime of knowledge surrounding meanings of 'health' that is constructed by private interests and available to health consumers with purchasing power on a market of biocapital exchange. Rajan (2005) argues that “by changing the equation from a “healthy patient to a “patient-in-waiting” by suggesting that every person, no matter how healthy, is possibly someone who might fall ill, the

potential market for a drug is enlarged from "diseased" people to, conceivably, everyone with purchasing power," (p. 24.) Those with purchasing power are concentrated in developed nations. Not surprisingly, according to DTMI plans, their proposed form of vertically integrated patient management is prescribed for "all people in developed nations" (Califf 2008, slide 15.)

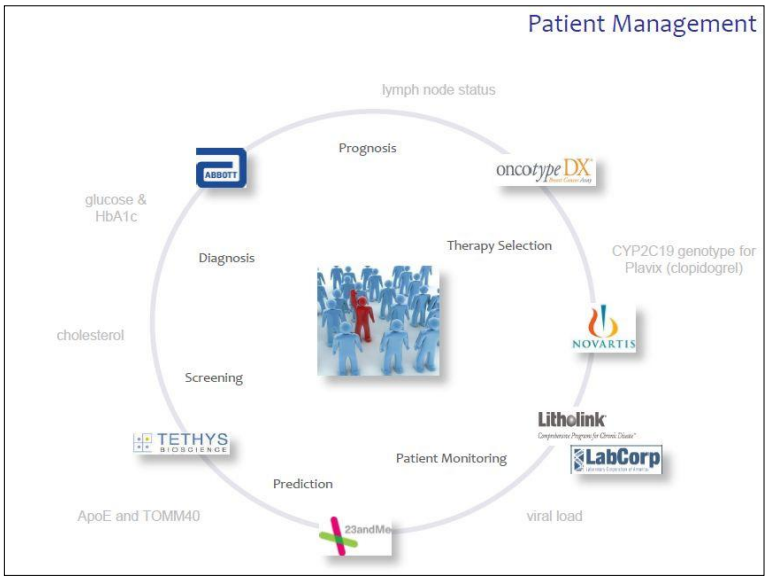

Figure 6 - "Patient Management" as foreseen by DTMI (Walker 2010, PowerPoint, slide 12.)

In this model, doctors fulfill a role of personal coach for "managed" patients whose states of both health and sickness become sites of future potential intervention in for personalized medical care. Rajan (2005) argues that these genomics emergences take shape in "the context of a U.S. Speculative marketplace" where:

> the calculation of risk as a mode of prophecy could be about getting patients-in-waiting to undertake preemptive or prophylactic actions on the basis of diagnostic tests (what might be broadly called "personalized medicine") but could also, in the same way, be about getting investors to invest in companies through investor pitches and story stocks (Rajan 2005, p. 23.)

DTMI is actively involved in building a market for personalized medicine in which predictions

and potentialities are valued as much as illness and disease: it is a market in which the 'fetishism of pathologies' translates, through translational and personalized medicine epistemologies, a 'fetishism for *potential* pathologies'. This focus on the science of the future and its unexplored territory filled with myriad possibilities emerges as a focus of another realm of culture: science fiction.

Fictive futuring, the shared basis of both biotech speculation and science fiction, is based on imagining realities that 'could' potentially emerge if certain conditions are met in the future. Both science fiction and the fictive imaginings that pervade the Biopolis speculate on future possibilities and alternative 'ways of being' human and living as humans in the Future. The scientific possibilities of the biotech future grip the cultural imagination in convincing - and sometimes unconvincing ways - in a landscape where the biotech industry promises future breakthroughs and global public health scenarios just as fictive and imaginative as those offered by science fiction. According to Haraway (1989), who uses Judith Merril's designation of SF to refer to science fiction:

> SF is a territory of contested cultural reproduction in high-technology worlds. Placing the narratives of scientific fact within the heterogeneous space of SF produces a transformed field. The transformed field sets up resonances among all its regions and components. No region or component is “reduced” to any other, but reading and writing practices respond to each other across a structured space. Speculative fiction has different tensions when its field also contains the inscription practices that constitute scientific fact. The sciences have complex histories in the constitution of imaginative worlds and of actual bodies in modern and post-modern “first world” cultures (Haraway 1989, p. 5.)

The marketing language of the Biopolis uses the tractive currency of imagination to paint new worlds, hypothetical futures, and new scenarios for public health using a conflation of fact with

constructed, speculative scenarios. These stories focus on the body and blood as sites of future discoveries, and the journey of genetic exploration becomes a venture into the pre-colonial unknown of unmapped territories, an epic journey into the farthest reaches of spaces, both micro-cosmic and cosmic. While the human body is the site of inscription, it also becomes the site of abstraction as narratives of the new genomics write prescriptions on individual bodies while simultaneously universalizing bodies as the objects of an institutionalized form of "management". In the Biopolis, science fiction is written on and drawing *from* the body.

The practice of shaping and distributing imaginative configurations of fact and potential futures is a practice refined to an art by the narrators who dictate and sell ideas about the promises of genomics. The *mise-en-scène* of biotech envisioning range from the microcosms of the body to the reaches of outer space. Biotech is best known for envisioning the nature of spaces *in the body*, but it is less known for its history of imagining bodies *in space*. In 1999, Murdock's multi-national agricultural company, Dole Food Company, sponsored a "Win a Trip to Outer Space" sweepstakes contest. The sweepstakes promised a trip to outer space with a partner space tourism venture company and distributed "collectible space-theme stickers on more than 100 million Dole bananas" ("Dole Food Company Reaches for the Stars", 1999). According to Hobbyspace.com "this contest was won by a retired man who decided to take $50K in cash instead of waiting for the trip to space," ("More Contests, Games, and Promotions," 1999-2011). From the microcosms of genetics to the cosmic spheres of outer space, biotech agricultural giant Dole Food Co. and investor Murdock have a history of imagining fictive potential futures and employing stories about those futures to promote projects and products and capture the popular imagination.

The scope of Dole Food Company imagining has stretched far into outer space. The

imagination of DTMI and LabCorp stretches from Kannapolis to India and Singpore – shaping and molding the world and 'ways of knowing' creatively through the production of fictive scenarios about the potentials of personalized medicine and consumer genomics. But if corporations can imagine such alternative futures, so can the public. This paper calls for an effort to construct alternative future public health scenarios to the one that prescribes a 20-year road map toward an idealized, end-point future world where "managed" patient-consumers – at least those who are lucky enough to have access - are born, live, and die in a "vertically integrated" corporate care regime. The potential 'ways of being' in the future are infinitely greater than roles as either 'patients-in-waiting' (Rajan 2005) or 'consumers'. There is a social need for other imaginings, for other fictive speculation on the wildest possible scenario for global public health - the most accessible and egalitarian health care system imaginable. If biotech corporate imagination can reach outer space, there must be a public effort to imagine new configurations of health care here on earth. Those with a genuine interest in public health must predict, prescribe, and promote wildly imaginative potential futures with as much courage – and as much conviction – as those at the top of the Biopolis' knowledge regime.

Conclusion

Kannapolis, a city with an industrial textile history and experience of loss following the lay-off of over 4,000 mill workers in 2003, is a site where anthropological inquiry reveals much about how the global technologies of the new genomics take shape in one small community. In Kannapolis, genomics technology, especially that of biobanking, takes on a unique configuration as it merges and intertwines with local experiences and histories. The function of the biobank in Kannapolis is closely tied to a network of place-based social relationships that have roots in the

industrial past. This paper first explored local resident memories of the past in order to compare the former mill town with the striking changes brought about by the research campus project.

A new urban landscape, toponymy, and semiology in the town have set the symbolic foundation for a new 'way of knowing' in an emerging ‘knowledge-based’ economy. A deeper exploration of the town's past revealed repeating histories and circular time sequences in which familiar hierarchies and relationships recombine in the unfolding present. Evidence presented here revealed how memories of the mill and social relationships from the pre-history of the Biopolis are salient in the lives of local residents. This landscape of memory shades the lens through which residents perceive and make sense of a new biobanking study in the town, and Murdock's promises for the future. These memories also color how residents choose to interpret, embrace, or circulate the “foundational epistemologies” (Rajan 2005, p. 21) of the new genetics as they are presented by researchers and project promoters in order to sustain biobanking and recruitment for the M.U.R.D.O.C.K Study.

Through a close analysis of discourse in the Biopolis, this paper outlined the way in which powerful industry language discursively shapes biobanking technology, framing donors as passive objects that are acted upon, for example through “mining”, and educated didactically through trainings and health seminars that present specific ideas about 'health'. These ideas are shaped by private interests and are informed by goals aiming toward the production of IP for the fields of personalized medicine and branded genomics diagnostics. Industry discourse surrounding biobanking technology imbues it with panacea-like qualities, specifically, as a promise of the future rather than something *actively* being produced in the present, specifically through the act of donation.

This examination of Kannapolis, North Carolina has aimed to “recover” one of the

"material conditions, production sites and place-boundedness" (Sassen 2000, p. 56) of this new global, medical technology. Here, residents *actively* contest ideas of a "blank slate". They draw on knowledge of the past to give meaning to action and relationships in the present. This paper then highlighted testimonies that show how donors connect donation to the biobank within a framework of relationships: to community, to church, to family, and to dreams for the future. In this way, people, place, faith, and memory become inextricable from the technology of genetic and personalized medical innovation, forming a "seamless web" (Hughes 1986) of medical technology which has a "social life" (Appadurai 1988.)

I have aimed to show how biobanking production entails action on the part of donors and, critically, a connection to the past. Discourse analysis revealed the way in which industry language "floats" technology and the discoveries of the future, referring to donors and their place-based experiences only as "infrastructure". Industry language also minimizes the way in which history forms a part of biobanking technology in Kannapolis as part of the "seamless web" (Hughes 1986) of biobanking technology. I have tried to show how resident experience and testimonies contest industry rhetoric of the "blank slate" by exploring how memories of the past shape the grounds on which donors make decisions about donation and accept the terms of genetic citizenship in the Biopolis.

The terms of genetic citizenship are dictated by the BioMarker Factory and its owners, DTMI and LabCorp. A 'regime of knowledge' is constructed within top-down relationships of biocapital dominance in the place of past relationships characterized by dominance through "paternalistic social capital" (Schulman and Anderson 1999). According to Bourdieu:

> Dominated individuals make common cause with discourse and consciousness, indeed with science, since they cannot constitute themselves as a separate group,

> mobilize themselves or mobilize their potential power unless they question the categories of perception of the social order which, being the product of that order, inclined them to recognize that order and thus submit to it (Bourdieu 1999, p. 131).

Bourdieu's interpretation of domination and science describes perfectly how epistimologies of 'health' circulate and gain credibility in Kannapolis, ultimately forming an entire 'way of knowing'. This new framework offers an entire model for existence and knowledge of the world, much in the same way the textile mill shaped residents' relationships to mill town life, social structures, and an entire cosmology of meaning. The discursive power of subjective 'ways of knowing' and their capacity to seem totalizing and universal is the exact reason loss of the textile mill was so devastating. It is also the reason the promises of the Biopolis are described as so "exciting". Kannapolis residents cannot mobilize unless they recognize the constructed nature of the Biopolis. Instead, many accept it as a "Godsend". Challenging the categories of the Biopolis, and its definitions, could mobilize residents and help them realize their potential power as subjects with agency: agency to withdraw from the study, say "no", or demand more benefits.

This paper has shown how biobank stakeholders in Kannapolis work in close connection with every local institution in the community, including churches, workplaces, hospitals, schools, and state agencies to shape ideas about 'health' and reinforce the promises of personalized medicine, especially the idea of future public benefit. This idea of global public health based on personalized medicine innovation, in its inherently speculative form, blurs the boundaries of science fact and science fiction. Just as clinical trials in Kannapolis do not offer residents – or the larger public - a comprehensive public health plan, contract research organization interests in Singapore depart from global public health needs.

The research practices and objects, and the accompanying language of health attached to

them, constitute what Haraway (1991) calls “visualization technologies” (p. 594) that seem to offer an objective vision of the world, but can be employed in the service of power and specific interests. In highlighting the stories of residents, this paper has aimed to explore the subjectivities of those residents and former mill workers whose own “situated and embodied knowledges” (Harway 1991, p. 583) are no less important in the new landscape of medical technology than nuclear magnetic resonance spectrometers.

Haraway (1991) argues that we ourselves are physically “*embedded*” [emphasis mine] in such technologies and that only by examining them will we truly understand “the patterns of reality for which we must be accountable” (p. 589.) In Kannapolis experts and stakeholders exercise significant and privileged authority in the dissemination of specific ideas about scientific knowledge and specific 'ways of knowing'. However, their claims beg to be challenged. This paper calls for a recognition of the social lives, memories, and dreams at the center of biobanking medical technology, which is actively shaped and produced by both researchers and donors. “Indeed, coming to terms with the agency of the 'objects' studied is the only way to avoid gross error and false knowledge of many kinds in these sciences” (Haraway 1991, p. 593). Only by recognizing the active and critical role that donors play within the production of health technologies can we ever hope to reclaim the *language* of health, and, especially in the United States, the *justified* and *deserve*d right to “health” *itself*.

Epilogue: Alapház (EN: Basic House)

Figure 8 - *Alapház* (EN: *Basic House*). Szemző, Zsófia (Artist). 2011. [watercolor painting], Budapest, Hungary. From the exhibit: "Mézesmadzag Ingatlan Iroda" (En: "Feint Real Estate Agency"), Brigitta Muladi (curator), Inda Galéria. Budapest, Hungary. May 26, 2011. Painting scan by artist. Used with permission of the artist.

Artist Zsófia Szemző's exhibit "*Mézesmadzag Ingatlan Iroda*" (En: "Feint Real Estate Agency") shown at the Inda Galéria, Budapest, Hungary, from May 17 to June 17, 2011, conceives of the dwelling spaces – both physical and conceptual - at the intersection of the imagination and real estate. The exhibit encouraged and empowered visitors to design their own imaginary houses and visit a little real estate agency, an actual wooden shed constructed by the artist and set up in the gallery, to submit their designs. The exhibit offered visitors the chance to reflect on concepts of property and, ultimately, to take the task of imagining into their own hands. At the blurred boundary between imagination and construction, forms rise up in the shape of houses, space

shuttles, and DNA and ideas ownership and property rights are less and less clear. Nonetheless, it is critical to question who is creating the *terms* of these rights and the boundaries of access. What are the stakes, the implications for the Commons, the dream of equal access to life and health? In spring 2010 in the United States, a New York circuit court judged ruled against patents on human life (and patents on genetic information such as gene biomarkers) and the right of Myriad Genetics, a diagnostic testing company and owner of a patent on a breast cancer gene, to exercise exclusive rights to certain breast cancer diagnostic genetic information through the use of IP law (Kean 2011.) The case, *Association for Molecular Pathology, et al.* v. *United States Patent and Trademark Office, et al.,* is currently under appeal in federal court and industry insiders expect much of the ruling to be overturned, arguing that it could "stifle innovation." However, Shiva (1998) argues that patents in general do not promote innovation but serve primarily "as instruments of market control. Indeed, the existence of patents undermines the social creativity of the scientific community by stifling free exchange among scientists" (p. 19.) The case will have implications for Kannapolis, North Carolina in any case. If judges rule against gene patents, DTMI and LabCorp's project to 'mine' blood in Kannapolis for potential IP licensing will be undermined. Financial resources for the project could dry up with no funding to sustain the storage of massive quantities of biological materials. However, if judges overturn the previous ruling against gene patents, this might unleash a free-for-all in which more and more US diagnostics and pharmaceutical companies scramble to establish biobanks/ biorepositories in other locations, drawing on resident bodies of all types to stake claims on more and more biological information in the human genome, 20 percent of which is already patented (Lovgren 2005). The ultimate ruling in the case will reveal much about how we can expect plans for personalized medicine to play out in the future, both in sites in the U.S and in East and

Southeast Asia where CROs, just as in Kannapolis, NC, increasingly conduct clinical trials.

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