

暗物质： 密苏里州圣路易斯墓地景观演变研究

Dark Matter: Research on an Evolving Funerary Landscape in St. Louis, Missouri

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摘要

毕业设计《暗物质》研究了遗体的生态价值及其对促进城市墓地生物多样性的潜在作用。该项目采用地上腐熟加速技术（即“自然有机还原”），将人体组织和骨骼转化为富含养分的类土壤。遗体随着时间的推移逐渐腐烂、与生态环境融合，对逝者的吊唁和缅怀就此永恒。能量和物质在转化的过程中转移至邻近的其他生命，整个自然系统和生态生产力都成为了纪念逝者的载体。于是，墓地景观从静态的纪念场所分散为一个不断演变的纪念体系，使生者参与其中。

在这个疫情横行、物种大规模灭绝、气候危机不断加深的时代，致力于环境伦理的殡葬仪式将个体的消逝与全球生态破坏和环境衰退格局联系起来。人类在不同时间尺度上对逝者的哀思也不尽相同，这意味着需要一种新型纪念景观，将人类生命置于更长久的自然周期中——出生、死亡、腐烂并蜕变。当纪念程序、生态保护和集体行动的场合合而为一时，纪念仪式、管理和行为模式将发生难以预料的变化。《暗物质》提出了一个具有高生物多样性的公共景观网络，为肉体的消亡赋予助推生态系统中生命再生的意义。

关键词

墓地景观；纪念体系；分解作用（腐熟）；生态损失；生物多样性

ABSTRACT

Dark Matter, a research by design thesis, investigates the ecological value of human remains, and their latent agency for advancing biological diversity in urban cemeteries. The project proposes an expedited aboveground decomposition process (Natural Organic Reduction) to convert human tissue and bone into nutrient-rich soil-like materials. Following decomposition, human remains merge with non-human ecologies over time to offer mourners an extended period of ceremony and remembrance. Transference of energy and matter to adjacent non-human life is emphasized in the transition, and a memorial's embodiment in physical space is expanded to include natural systems and ecological productivity. The funerary landscape is thus decentralized from a static site of memorial to an evolving memorial system that invites engagement with the living.

In an age of pandemic, mass extinction, and deepening climate crises, a commitment to an environmentally ethical funeral practice connects the loss of the individual to global patterns of ecological ruin and environmental decline. These layered scales of grief are experienced at divergent timescales, suggesting the need for a new typology of memorial landscape that positions the human life within larger natural cycles of birth, death, decay, and metamorphosis. Rituals of commemoration, management, and activism would be alchemized to unexpected outcomes when the program of memorial, ecological preserve, and a theater for collective actions are merged. *Dark Matter* proposes a network of biodiverse public landscapes where bodily death events meaningfully contribute to ecological systems of propulsive regenerative life.

KEYWORDS

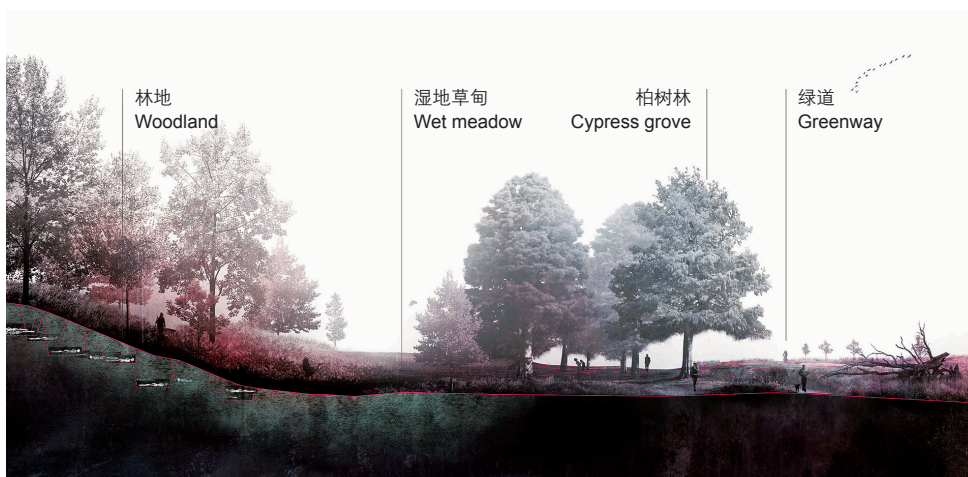
Funerary Landscapes; Memorial System; Decomposition; Ecological Loss; Biodiversity

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1. 本研究讨论了逝者的生态价值以及人体遗骸在促进墓地景观生物多样性方面的作用。

1. *Dark Matter* investigates the ecological value of the deceased, and the role human remains could play in advancing biological diversity in funerary landscapes.

1 引言

人类发展导致的全球栖息地破坏的格局，以及气候变化相关的自然灾害威胁着生物多样性，将脆弱的生态系统和其他生物暴露在人类—自然互动之下。不过，新冠肺炎（COVID-19）疫情凸显出社会不平等、公共卫生与生态韧性之间的关联。^[1]病原体使人类重新面对自身的脆弱性，此前人们普遍缺乏对自身与生态环境关系的考虑，如今与大规模用地性质转换、农业实践相关的人畜共患病爆发风险也成为了主流群体的关注焦点^[2]。灾难是无形的浪潮，裹挟着景观与人群，迅速蔓延至生态系统、社区、家庭和生活，摧枯拉朽。在新冠肺炎疫情之后，随着社会重新开放，公众将重新认识他们的社群关系，意识到所失，这个过程必然痛苦且无人可以幸免。人们将走进新现实，与死亡的关系亦将发生改变。

大规模死亡的冲击可能拉开集体反思时代的序幕，主流群体终将意识到支撑人类和其他生物健康的系统密不可分。为实现将顺应而变的文化传统和仪式纳入环境健康目标的范式转变，必须超越人类生命尺度来思考：个体与生态系统的交互并不随死亡而告终。在共同的伤痛之下，在肯定生物多样性对人类自保的重要作用之上^[3]，未来的墓地景观必须重视稍纵即逝的个体生命与世界的短暂连结，这要求我们尊重不同的悼念传统，积极建立生物多样性。

在此背景下，毕业设计《暗物质》以美国密苏里州圣路易斯圣马库斯公墓为例，研究了城市公墓中逝者的生态价值以及遗体促进生物多样性的潜在作用^[4]（图1）。该项目采用卡特里娜·斯佩德开创

的地上腐熟加速技术（名为“自然有机还原”，以下简称NOR），遗体经此成为场地中的营养和物质回收传递网络的助力（图2）。

2 绿色殡葬的出现

当代美国殡葬业标准流程有着高昂的费用和环境成本。一个标准的埋葬式葬礼平均需要9 900美元^[5]，而含凭吊的火葬通常超过6 000美元^[6]。美国每年有超过3 000m³的防腐液（包括一类致癌物福尔马林）被掩埋。此外，还有1.15亿吨钢铁和相当于160亿平方米森林的硬木也被制成棺椁并被埋葬。每年因墓地和市政要求所建造的墓室使23亿吨混凝土埋入土壤，这也是人体和土壤之间最坚固的屏障。

虽然，人们通常认为火葬比埋葬更加生态友好，但其环境后遗症也令人担忧。火化十分耗能，且大部分火葬场使用化石燃料，向大气排放各种化学物质、难以降解的有机污染物、非甲烷挥发性有机化合物（NMVOC），以及微量重金属（如汞）^[7]。

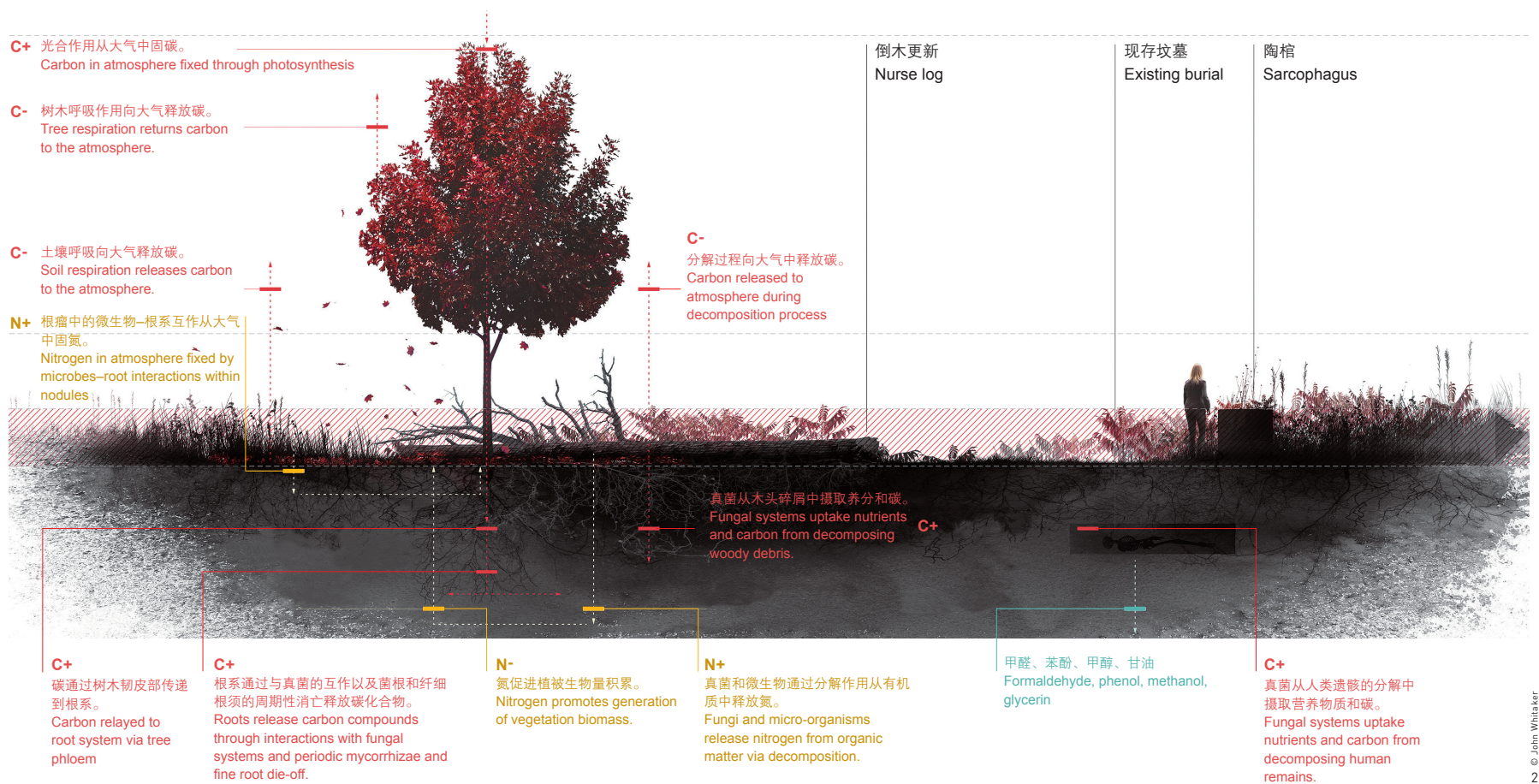
近20年来，“绿色殡葬”在美国日益风行：不使用防腐液，随尸体在入土的材料必须无毒且可生物降解^[8]，将对环境的负面影响降至最低（图3）。为了进一步实现对环境的责任，保护性墓地投入一部分丧葬费，用于建立和发展公共土地信托，以保护当地生态系统，杜绝未来开发。2020年，华盛顿州批准NOR合法化，这是一种由Recompose公司设计的腐熟方法，通过嗜热微生物活动将人体组织和骨骼转化为类土物质。这一过程在地上墓室内进行，历时4~6周，遗体在埋葬前会完成分子层面的质变。^[9]

3 场地现状

本文的研究对象圣马库斯公墓是圣路易斯墓地迁移史和创伤史上的一页，坐落于密苏里州中西部圣路易斯市和圣路易斯县交界处星罗棋布的古老墓地中，这里原本是德国福音派教会墓地。墓地的集中出现既是因为城市中持续的霍乱疫情、失衡的投资、掠夺性发展，也是因为从奴隶社会持续至今的系统性种族压迫、隔离和权利剥夺。不断变化的城市横征暴敛，死去的人也未能幸免：尸体从旧公墓中挖出、转移到不断扩大的城市外围区域^[10]，直至下次扩张再次侵占它们长眠的土地。市内古老的公墓大都经历过破产和随之而来的衰落。

圣马库斯公墓破产后，一度经历了多年的忽视、衰败与恣意破坏，后于1977年被改造为城市公园。虽然收购费包含了迁移原本属于永久看护协议的坟墓的费用，但墓园内19 500座坟墓中的绝大多数仍留在了原址。

虽然大型纪念碑和墓碑仍然可见，但其中许多较小的墓碑正逐渐被长高的草皮淹没（图4）。事实上，圣马库斯公墓是圣路易斯地区面临的生态挑战的缩影，其中最严峻的问题是城市林冠退化以及愈加频繁和严重的洪灾。现存场地大部分被草皮覆盖，仅有几棵老园景树点缀其上。场地中低洼地的小树林由美国红栎（*Fraxinus pennsylvanica*）和美国白栎（*Fraxinus americana*）构成，但目前都受到了白蜡窄吉丁（*Agrilus planipennis*）的虫害。公墓位于德斯佩雷斯运河一条关键支流的岸边低处，是减缓、拦蓄径流的关键点，可以降低周边防洪基础



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设施的压力。污染严重、洪涝多发的德斯佩雷斯运河两岸的众多溢流站会将圣路易斯地区的雨水和生活污水一同排入运河之中（图5）。

4 广义的伤痛

在这个疫情横行、物种大规模灭绝、气候危机不断加深的时代，个体选择环境伦理葬礼的临终行为别有深意——这是其对即将告别的世界的深切关注和同情。NOR的过程消除了肉体永存的幻想，促

进了遗体与生态系统的融合。在这种融合之下，失去所爱之树与全球生态破坏、环境衰退格局攸关的生存之伤，融为一体。

为了容纳这种广义的伤痛，《暗物质》提出了一种新型纪念景观——墓地景观。它可以通过空间私密瞬间与将遗体置于无限的时间与生态复杂性之中的体验间发生的现象学转换，来容纳个体与集体的失落感。当纪念程序、生态保护和集体行动的场合合而为一^[11]，纪念仪式、管理和行为模式将发生难以预料的变化（图6）。

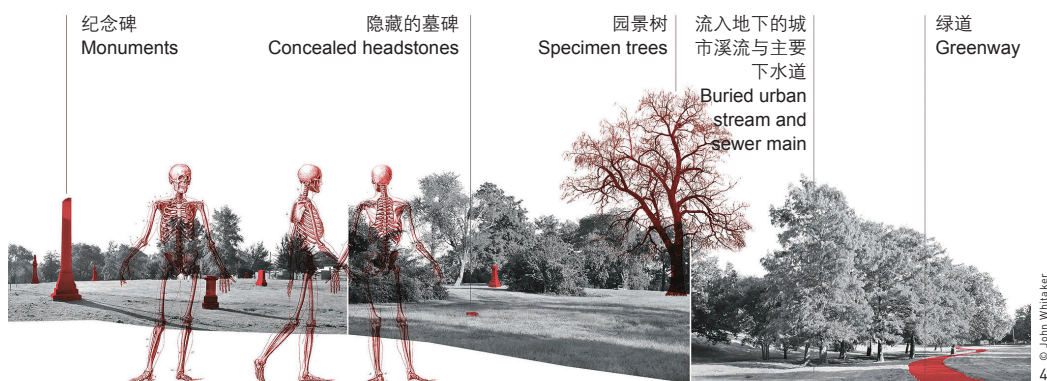
圣路易斯市由白蜡窄吉丁虫害造成的白蜡树批量死亡，是该地区面临的最明显生态损失之一——该市超过18%的行道树为白蜡树（*Fraxinus* spp.），共计约15 000棵，发挥着为城市街道和公园遮阴的功能^[12]。《暗物质》将城市中消逝的白蜡树冠作为资源与生态与文化变革的触媒，进行了重新设计，全市搜集来的枯木会有计划地布置在场地上，持续300~400年的分解过程就此开始（图7）。场地中聚集的枯树将城市的损失一一呈现，成为对未来生态灾难的警告。腐烂的树木既具象了人类必将“与死亡相遇”^[13]，也实现了向微生物、真菌和无脊椎动物（生物多样性的基础）缓慢释放营养的目的^[14]。

经过有机还原的遗体盛装在低温烧结的陶棺中，随着时间的推移，陶棺破碎，遗体与场地相融。传统殡葬方式追求以地点承载个人的记忆，通常会建造“永久的”标记物。陶棺的功能与此类似，是景观中容纳个人遗体、具象个人遗志的标志物。鼓励家属们在陶棺内种植乡土植物，既可以起到区分棺椁的作用，同时也为墓园中的生物多样性作出贡献。一年之内，陶棺底部软松木板腐烂，遗骸和土壤接触。10年内，低温烧结的陶棺经日晒雨



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2. 场地设计突出了分解作用的各项元素以及循环、分配养分和物质的生态网络。
3. 在遗体下葬之前，现场将进行殡葬服务和NOR过程。
2. The site design highlights elements of decomposition and the ecological networks that recycle and distribute nutrients and matter.
3. Funerary services and the process of NOR would occur in on-site facilities prior to the body's interment in the landscape.



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4. 圣马库斯公墓的现存景观元素
 5. 圣路易斯面临着双重环境危机：愈发严峻的洪水风险和城市林冠的损失。市域范围内白蜡树数量的急剧下降加重了这些问题。
4. Elements of St. Marcus Cemetery's existing conditions
 5. St. Louis faces dual environmental crises of increasing flood risks and a loss of urban tree canopy. Decimation of the city's Ash tree populations has intensified the problem.

淋风化侵蚀，棺内的物质便可转移至周围生物，棺椁连同遗体降解成墓园中一座座土丘（图8）。常来吊唁的逝者亲友们最初通过陶棺来辨别坟墓，但随着时间的推移，“坟墓”的具象会扩展到场地中的植被、自然系统和生态生产力（图9）。

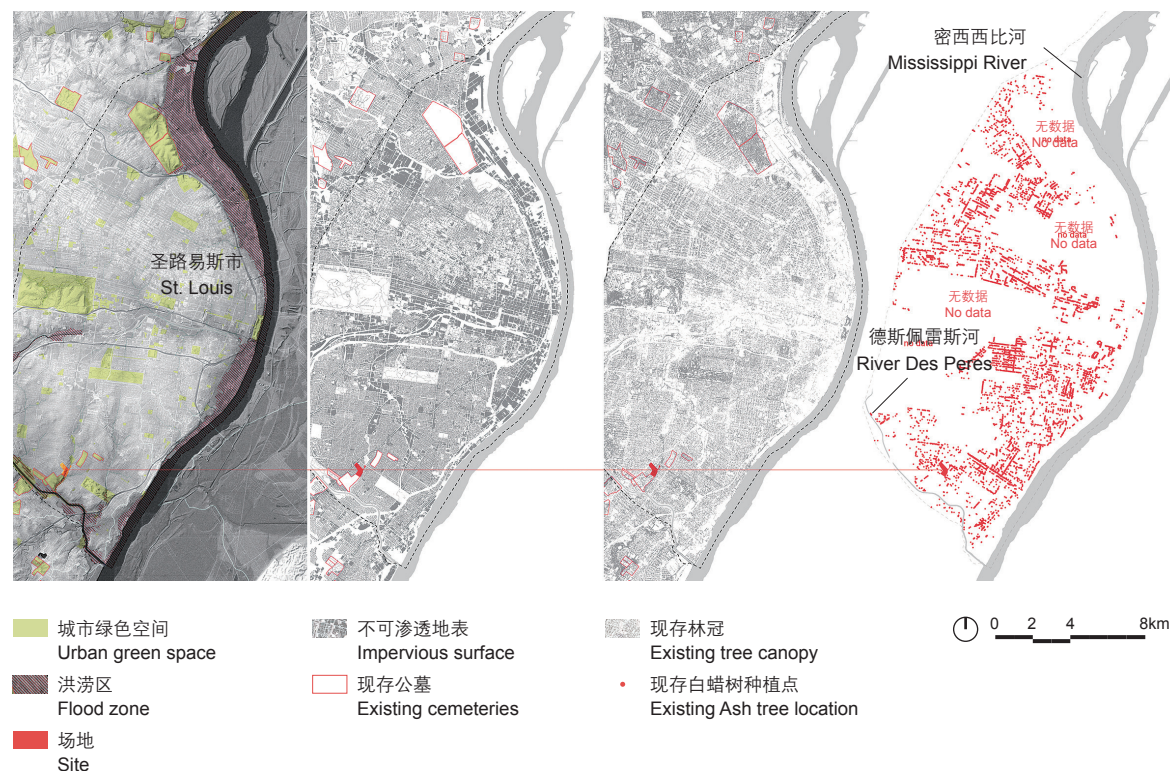
卡特里娜·西蒙称墓地“存在就是为了被阅读”，墓地景观“以其多样性和模糊性反映并塑造了人类体验。我们对死亡的认识或信仰塑造了死亡景观，也决定着如何阅读或体验它。”^[13]重新设计后的圣马库斯公墓为家庭和社区提供了一个生物多样的公共空间框架，在这个框架中，已故之人在大地上存在过的痕迹可以经由惯常的丧葬习俗得以体现。场地上设计的植物群落突出了富有表现力的繁殖形态。果实和种子象征着出生、死亡、腐朽和蜕变的自然循环（图10）。生态和空间环境的变化性帮助亲属决定所爱之人的遗体将在何处、以何种方式奉献给土壤和地球供养系统（图11）。在墓园里，种植、修剪或疏伐等方式可以表达出外人无法解读的、加密的碑文。黛安·琼斯认为这些文化附加特性，虽然“不易获得认可，也不被视为景观设计学科或墓地设计的一部分”，但它们标识着鲜活的文化中的已故成员，不可或缺^[15]。生与死的永恒循环或削弱或拓展了这些符号并产生了一种模糊性，它神秘莫测，吸引人去解读，并催生出不可复制的场所感（图12）。

也没有步道，如果不是家族后代每年祭扫，这里很快就会被迅速扩散的忍冬灌丛和周围的森林所取代。近50年来的每年春天，这家人都会清理掉蚕食空地的灌丛和树木。林冠因此打开一道缺口，阳光汇聚在鲜花莎草丛生、生机勃勃的土地之上，跳跃于一杯风化的混凝土碑石之间。祭扫的延续和集中的生态效益并不依赖于技术进步，而是一种通过景观塑造来“延续逝者生命”的模式。堆积石头、垒放贝壳^[16]、清理植物、播撒种子——各种参与式元素一直是景观中体现人类死亡的核心。这些仪式默认了逝者已然参与到腐朽与蜕变的自然循环中，生者亦是如此。

《暗物质》提出了一种殡葬方式，以不断演变的纪念体系取代静态的纪念场所，使生者以多种方式参与其中。当社群努力克服新冠肺炎疫情后的集体伤痛，面对持续的环境损失时，景观作为延续性与适应性的象征予以慰藉。通过参与和努力，可以预见一个更有益健康和充满前景的未来。供悼念者进行祭扫的空间为其提供充满希望的邂逅，经此与自我对话，从而获得更强的生命力。种植、修剪、季节性焚烧、采集种子和清除入侵物种的行为是对已逝亲人及其遗愿的尊重，而让遗体重新进入生态循环系统，则为肉体的消亡赋予了更大的意义。LAF

5 结语

在对圣路易斯公墓进行的过程中，作者发现许多景观可作为生者与逝者之间复杂互动界面的例子。其中最具有共鸣的是一座非裔美国人的小公墓——圣乔治公墓，位于伊利诺伊州一座森林覆盖的小山上，俯瞰着伊利诺伊河谷。这里没有标识，



1 Introduction

Worldwide patterns of habitat destruction from anthropogenic development and climate-change-linked natural disasters threaten biodiversity and expose fragile ecosystems and organisms to human interactions. COVID-19 has emphasized the interconnectedness of social inequality, public health, and ecological resiliency.^[1] Confronted anew with human vulnerability to pathogens, urgent concerns have entered the mainstream regarding the risks of zoonotic spillover events associated with large scale land use conversion, agricultural practices and a pervasive lack of consideration of our relationship with non-human ecologies^[2]. Ruin can move rapidly, through landscapes and populations, invisible ripples building to waves, crashing through ecosystems, communities, families, and lives. In the wake of COVID-19, as society reopens, the public will begin the painful collective process of mentally remapping their communities, discovering who and what has been lost. People will emerge into this new reality with a changed relationship with death.

The shock of mass death may precede an era of collective introspection, sparking a mainstream realization that systems supporting human and non-human health are inseparable. The paradigm

shift of connecting adapted cultural traditions and rituals to objectives of environmental health must be considered outside of the human timescale. An individual's interactions with ecological systems do not end with death. In the state of communal grief, and in recognition of the critical role biodiversity plays in human self-preservation^[3], future funerary landscapes must emphasize the fleeting interconnectedness of individuals' existence by honoring diverse grieving traditions and actively building biodiversity.

In this context, *Dark Matter*, a research by design thesis taking St. Marcus Cemetery, in St. Louis, Missouri in the United States as the example, investigates the ecological value of the deceased and the latent agency of human remains to advance biological diversity in urban cemeteries^[4] (Fig. 1). The project adopts the physical realities of an expedited aboveground decomposition process (called Natural Organic Reduction, NOR hereafter), pioneered by Katrina Spade, where human remains become agents among networks recycling and relaying nutrients and matter through the site (Fig. 2).

2 Emergence of Green Burials

Standard practices of the contemporary American funeral industry come at a high

financial and environmental cost. A standard burial averages 9,900 dollars^[5] and cremation with visitation is commonly above 6,000 dollars^[6]. In a typical year, over 800,000 gallons (approximately 3,028 m³) of embalming fluids are buried in the United States, including formaldehyde, a known carcinogen. Additionally, 115 million tons of steel and the hardwood equivalent of 4 million acres (approximately 16 billion square meters) of forest are buried in casket constructions. Vault construction, the most robust barrier between body and soil, and a common requirement of cemeteries and municipalities, commits 2.3 billion tons of concrete to the earth every year.

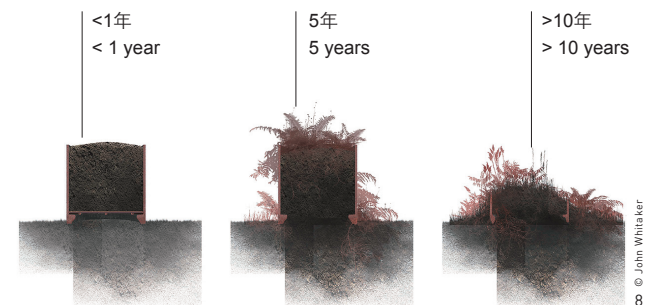
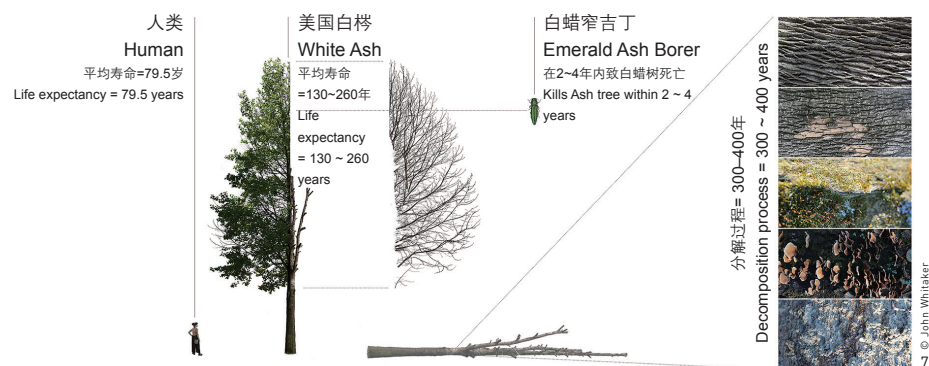
Commonly thought of as the more eco-friendly option, cremation also leaves a troubling environmental legacy. The cremation process is energy-intensive and a majority of crematoriums operate on fossil fuels. Emissions from a crematorium deliver a cocktail of chemicals, persistent organic pollutants, Non-methane Volatile Organic Compounds (NMVOCs), and trace heavy metals such as mercury into the atmosphere^[7].

The popularity of “green burials” has steadily increased in the United States over the last two decades. Green burial practices minimize negative environmental impacts by forgoing the use of embalming fluids and requiring that only non-toxic and biodegradable materials accompany the body into the earth^[8] (Fig. 3). In an additional step towards environmental responsibility, conservation cemeteries have committed a portion of burial fees to establish and grow public land trusts that preserve native ecosystems and prohibit future development. NOR, a process that relies on thermophilic microbial activity to transform human tissue and bone into inert soil-like materials, was legalized in the state of Washington in 2020. Designed by the company Recompose, this method of decomposition takes place in aboveground chambers over 4 ~ 6 weeks. Transformation occurs at the molecular level,

6. 场地为纪念、维护和集体活动提供了空间，个人或公共的损失都能得到充分展现。

6. The site accommodates expressions of personal and communal loss, providing spaces for commemoration, maintenance, and collective action.





resulting in the complete metamorphosis of the human body prior to interment.^[9]

3 Existing Site Context

St. Marcus Cemetery, situated within a larger history of displacement and trauma associated with St. Louis' burial grounds, is studied in this paper. Originally a German Evangelical cemetery, St. Marcus Cemetery is in a constellation of the oldest remaining cemeteries along the political border of St. Louis City and St. Louis County in the mid-western State of Missouri. This concentration of burial sites was shaped by the city's successive cholera epidemics, disproportionate investments, predacious development, and a tortured history of systemic racial suppression, segregation, and disenfranchisement from slavery through the present. The dead were not exempt from the changing city's impositions: Older urban burial

grounds were routinely exhumed and bodies relocated to the perimeter of the growing city^[10], only to be encroached upon and surrounded anew. Many of the city's oldest cemeteries have experienced bankruptcy and subsequent decline.

St. Marcus Cemetery was converted to a city park in 1977 after bankruptcy that led to years of neglect, decay, and vandalism. The purchase price funded the relocation of interments that were originally covered under perpetual care agreements, but the majority of the 19,500 graves remain on site.

Large scale monuments and headstones remain, though turf is slowly consuming many of the smaller markers (Fig. 4). St. Marcus Cemetery hosts a microcosm of ecological challenges faced by the St. Louis region. The most critical issues are the deterioration of the city's urban tree canopy and the increasing frequency and severity of flood events. The majority of the existing grounds are treeless

turf with a scattering of aged specimen trees. The site's lower elevations are populated by a grove of Green (*Fraxinus pennsylvanica*) and White Ash (*Fraxinus americana*), both species currently being decimated by the Emerald Ash Borer (*Agrilus planipennis*). The cemetery's location at the base of a key tributary within the watershed of the channelized River Des Peres makes it a critical point to slow and retain runoff, reducing pressure on adjacent flood control infrastructure. Heavily polluted and prone to flooding, the River Des Peres is lined by a number of overflow stations that purge St. Louis' combined storm and sanitary sewers into the channel during flood events (Fig. 5).

4 Expanded Field of Grief

In an era of mass extinction, global pandemic, and intensifying climate crises, an individual's commitment to an environmentally

7. 死去的白蜡树遍布场地，在腐朽过程中缓慢释放养分，为新的成长供养。
 8. 文化上有重要意义的植物种植在开放的陶棺中，在10年内陶棺会破碎成土丘。
 9. 逝者遗体促进了丧葬地的演变。亲属一次次的祭扫中，生态的变迁得以见证。
7. Deceased Ash trees populate the site, supporting new growth by slowly releasing nutrients through decomposition.
 8. Culturally important plantings are included in the open ceramic sarcophagus. Within a decade, the ceramic erodes to form a mound.
 9. Deceased remains are an active agent in the burial site's evolution; ecological change is expected between visitations by the bereaved.





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10. 经过设计的植物群落能孕育出富有表现力的果实和种子，象征着出生、死亡、腐朽和蜕变的循环。
11. 逝者遗体的安葬位置由亲属决定。
12. 景观作为一个不断演变的纪念体系，使生者深度参与和管理。

10. Designed plant communities include species that produce expressive seeds and fruits as a universal symbol of the cycle of birth, death, decay, and metamorphosis.
11. Families decide the placement of a loved one's remains on the site.
12. Landscape as an evolving memorial system, invites engagement and management from the living.

ethical funeral practice is a deeply intentional final act that bares profound concern and empathy for the world they are leaving. The process of NOR removes any conceit of somatic permanence and facilitates the merging of human matter with non-human ecological systems. This coalescence fuses the acute pain felt from losing an individual with an existential grief associated with global patterns of ecological ruin and environmental decline.

To accommodate this expanded field of grief, *Dark Matter* suggests a new typology of memorial landscape, i.e. funerary landscapes—that can accommodate personal and communal loss, with phenomenological transitions between moments of spatial intimacy and experiences that position the human body within an immensity of time and ecological complexity. Rituals of commemoration, maintenance, and activism would be alchemized to unexpected outcomes when the program of memorial,

ecological preserve, and a theater for collective action overlap and merge^[11] (Fig. 6).

The death of St. Louis' Ash trees by Emerald Ash Borers is one of the region's most visible examples of ecological loss—18% of the trees shading St. Louis' streets and public parks are Ash (*Fraxinus* spp.). Numbering at over 15,000, the genus is the most common tree within the city's urban canopy.^[12] *Dark Matter* refashions the city's lost Ash canopy as a resource and catalyst for ecological and cultural change. The deceased Ash trunks removed from the whole city will be strategically distributed across the site to decompose, a process that lasts 300 ~ 400 years (Fig. 7). Their concentrated presence will register as a visible tabulation of the city's loss and a warning against future ecological catastrophe. The decaying trees embody humanity's universal "encounter with mortality"^[13] and serve the practical purpose of slowly releasing nutrients to populations of

micro-organisms, fungi, and invertebrates, the foundations of biodiversity^[14].

Organically reduced human remains are applied to the site via a low-fired ceramic sarcophagus that diminishes over time. Funeral practices traditionally seek to ascribe the memory of an individual to the place, commonly through the locating of a "permanent" marker. The sarcophagus functions similarly, an identifiable object in the landscape, containing a person's physical remnant and embodying the legacy of an individual. The bereaved are encouraged to plant native species within the sarcophagus, expressing agency through personalization, while contributing biodiversity to the cemetery. Within a year, the soft pine bottom of the sarcophagus decomposes to allow for contact between remains and soils. Within 10 years, the low-fired ceramic will weather and erode, foregrounding the transference of matter to adjacent life and allowing the deceased human remains to degrade into a mound-like form in the landscape (Fig. 8). The bereaved who frequent the site will initially use the sarcophagus itself to identify their loved one's burial place, but over time, recognition of embodied place will expand to encompass plantings, natural systems, and ecological productivity (Fig. 9).

Katrina Simon writes that cemeteries "exist to be read" and funerary landscapes "reflect as well as shape human experience, in all of its diversity and ambiguity, and what we know or believe about death will shape the landscape of death, as well as how we read or experience it."^[13] The redesigned St. Marcus Cemetery offers a framework of biodiverse public spaces for families and communities to apply idiomatic practices and traditions signifying a deceased loved one's presence in the landscape. The site's designed plant communities accentuate expressive reproductive morphology. Seeds and fruits serve as universal indicators of natural cycles of birth, death, decay, and metamorphosis (Fig. 10). Variety in ecological and spatial



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settings provide agency to families deciding where and how their loved one's remains are committed to the soil and Earth's sustaining systems (Fig. 11). It is common for expressions of planting, pruning, or trimming in cemeteries to contain coded epitaphs that may not be legible to outsiders. Diane Jones writes that these cultural overlays, though "not readily sanctioned nor seen as part of the discipline of Landscape Architecture or cemetery design" are essential markers for a deceased member of a living culture^[15]. Perpetual cycles of life and death degrade or expand these symbols, resulting in an ambiguity that evokes mystery, invites interpretation, and elicits an irreplicable sense of place (Fig. 12).

5 Conclusion

In researching St. Louis' cemeteries, many examples of landscape serving as an interface for complex interactions between the living and dead were discovered. The most resonant is a small African American cemetery on a forested hill overlooking the American Bottom in Illinois—St. George Cemetery has no signage or walking paths and would be swiftly overtaken by invasive bush honeysuckle and the surrounding forest, if not for an annual ritual performed by a family of descendants. Each spring for nearly 50 years, the family clears

shrubs and trees encroaching upon a clearing. The resulting opening in the forest canopy pools sunlight among a handful of weathered concrete tombstones, amidst a vibrant ground cover of sedges and woodland flowers. The longevity of this ritual and the focused ecological benefit are a model not dependent upon technological advancements, but in the connection found by shaping landscape to indicate the dead's presence. The stacking of stones, laying of shells^[16], clearing of growth, spreading of seeds—elements of participation have always been central to representations of human death in landscape. Within these rituals is an acquiesce to natural cycles of decay and metamorphosis that the deceased have joined and that the living inevitably will.

Dark Matter proposes a funerary practice that abandons the static site of memorial for an evolving memorial system, inviting a diversity of engagement from the living. As communities grapple with collective grief in the aftermath of COVID-19, and in the face of ongoing environmental losses, landscape can serve as comfort and a symbol of continuity and adaptation. A more healthful and promising future is possible through engagement and intention. Providing for mourners, the space for rituals of maintenance can offer an ultimately hopeful encounter where personal communion intensifies one's own aliveness. Acts of planting,

pruning, seasonal burning, seed collection, and removal of invasive species honor a loved one's identity and last wishes, and carry greater significance in a bodily death event meaningfully rejoining ecological systems of propulsive regenerative life. **LAF**

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