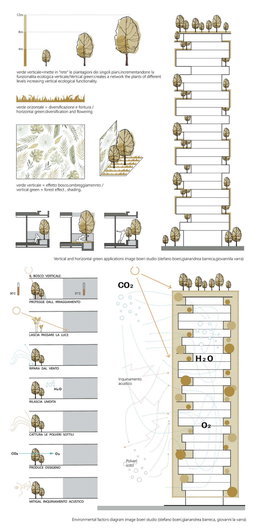
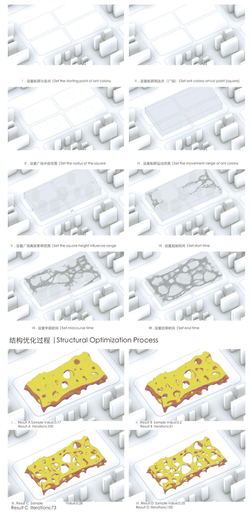
Sky Eden | 未来社区 II

—基于理论算法与可持续性的交叉融合下后疫情绿色开放共享的创新社区设计

局部节点透视图 | Local Node Perspective



结构生成过程 | Structure Generation Process



结构优化过程 | Structural Optimization Process

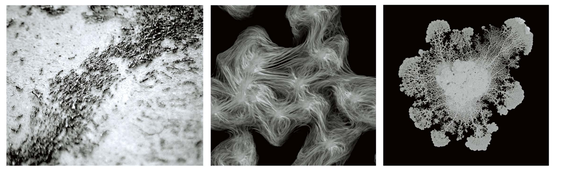
Stigmergy 遗传算法优化分析 | Stigmergy genetic algorithm optimization analysis

Stigmergy 是一种间接协调的机制，通过环境，代理或行动之间。其原理是个体行为在环境中留下的痕迹会刺激相同或不同代理人执行后续行为。对环境中的痕迹做出反应的代理人会获得积极的健康益处，从而增强了这些行为随着时间的推移在人群中固定下来的可能性。

Stigmergy is a mechanism of indirect coordination, through the environment, between agents or actions. The principle is that the trace left in the environment by an individual action stimulates the performance of a succeeding action by the same or different agent. Agents that respond to traces in the environment receive positive fitness benefits, reinforcing the likelihood of these behaviors becoming fixed within a population over time.

Stigmergy 是一种自组织形式。它产生复杂的、看似智能的结构，不需要任何计划、控制，甚至不需要代理之间的直接通信。因此，它支持极其简单的代理之间的有效协作，这些代理可能缺乏记忆或彼此之间的个人意识。

Stigmergy is a form of self-organization. It produces complex, seemingly intelligent structures, without need for any planning, control, or even direct communication between the agents. As such it supports efficient collaboration between extremely simple agents, who may lack memory or individual awareness of each other. Stigmergy 是一种间接协调的机制，通过环境，代理或行动之间。[1] 其原理是个体行为在环境中留下的痕迹会刺激相同或不同代理人执行后续行为。对环境中的痕迹做出反应的代理人会获得积极的健康益处，从而增强了这些行为随着时间的推移在人群中固定下来的可能性。

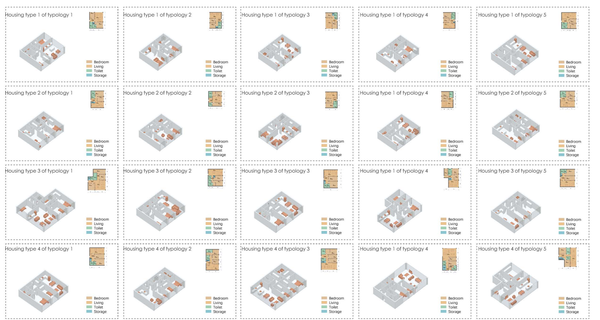


单体设计部分基于葡萄生长的概念，采用类比手段将单元框架比作葡萄架，户型则被视为葡萄。该设计方案结合了当代的装配式建筑、3D 打印和机械臂在建筑领域的发展和未来趋势，呈现出一种新的建筑结构方式。不同户型被插入到框架中，形成错位排列，从而产生相应的露台和灰空间，并且在户型和通高空间中种植绿化。在单元的两侧分别设置露台和景观楼梯，创造更加交流性的空间。每层露台错位排列形成通高空间，成为社区内的交流空间。景观楼梯以一种渗透的方式回应基地内的绿化景观，增强社区的可持续性和生态友好性。

The unit design is partly based on the concept of grape growth, using analogy to compare the unit frame to a grape trellis, and the house type is regarded as a grape. The design scheme combines the development and future trends of contemporary prefabricated buildings, 3D printing and robotic arms in the construction field, presenting a new architectural structure. Different apartment types are inserted into the frame to form a dislocation arrangement, thereby generating corresponding terraces and gray spaces, and planting greenery in the apartment types and double-height spaces. Terraces and landscape stairs are set up on both sides of the unit to create a more communicative space. The staggered arrangement of terraces on each floor forms a double-height space, which becomes a communication space in the community. The landscape staircase responds to the green landscape in the base in a permeable way, enhancing the sustainability and eco-friendliness of the community.

单体户型各楼层平面图分析 | Analysis of each floor plan of a single house

单体户型功能分区面积分析 | Analysis of functional zoning area of single house type



单体户型对外景观可见性分析 | Analysis of external landscape visibility of single house type

Sky Eden | 未来社区 I

—基于理论算法与可持续性的交叉融合下后疫情绿色开放共享的创新社区设计

设计理念 | Ddesign concept:

未来社区的设计理念是以多学科交叉的设计方法论和智能化技术应用为基础，构建一个高度定制化、可持续化的社区系统，以满足不同客户群体的多元化需求和期望，提升社区的经济效益和社会价值。
The design concept of the future community is based on the multidisciplinary design methodology and the application of intelligent technology to build a highly customized and sustainable community system to meet the diverse needs and expectations of different customer groups and improve the economy of the community benefit and social value.

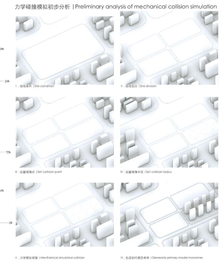
具体而言，未来社区将采用基于 BIM(Building Information Modeling) 和物联网技术的数字化和智能化设计理念，构建一个全面数字化、高度智能化的社区平台。客户可以通过该平台，自由选择房屋的户型、楼层、位置、内饰、设施等因素，并进行多维度的仿真分析，以实现最大化的自由度和个性化定制。同时，未来社区将考虑可持续化设计理念，以优化社区的环境性能和生态系统，提升社区的生态品质和人居健康。
Specifically, the future community will adopt digital and intelligent design concepts based on BIM (Building Information Modeling) and Internet of Things technology to build a comprehensive digital and highly intelligent community platform. Through this platform, customers can freely choose the house type, floor, location, interior decoration, facilities and other factors, and conduct multi-dimensional simulation analysis to achieve maximum freedom and personalized customization. At the same time, the future community will consider sustainable design concepts to optimize the community's environmental performance and ecosystem, and improve the community's ecological quality and human habitation health.

在设计过程中，未来社区将采用系统化的设计思维和方法，与客户紧密合作，实现一个共同协作、集思广益的设计过程，通过前沿的虚拟现实技术和仿真分析手段，客户可以获得真实的房屋效果和感受，以更好地指导和完善设计方案。设计团队还将考虑建筑外观、内部空间、环境景观和用户体验等多个方面的细节，以确保设计的高质量和一致性。
In the design process, future Community will adopt systematic design thinking and methods, and work closely with customers to achieve a collaborative and brainstorming design process. Through cutting-edge virtual reality technology and simulation analysis methods, customers can obtain real house effects and feelings, so as to better guide and improve the design scheme. The design team will also consider the details of various aspects such as building appearance, interior space, environmental landscape and user experience to ensure the high quality and consistency of the design.

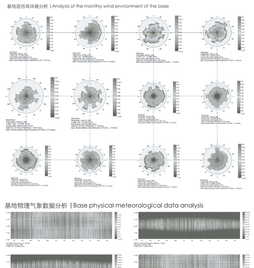
最后，未来社区将采用基于数字化和智能化技术的智能制造模式和工程管理模式，实现工程全生命周期的智能化管理和控制。同时，未来社区还将考虑现代化的装配式预制生产技术，以优化施工效率和提高建筑质量。未来社区旨在成为一个全球领先的、数字化、智能化和可持续化的社区品牌，为客户提供最佳的未来生活空间和社会价值。
Finally, the future community will adopt the intelligent manufacturing mode and engineering management mode based on digital and intelligent technology to realize intelligent management and control of the entire project life cycle. At the same time, the future community will also consider modern prefabricated production technology to optimize construction efficiency and improve building quality. Future Community aims to become a world-leading, digital, intelligent and sustainable community brand, providing customers with the best future living space and social value.

设计背景分析 | Design Background Analysis

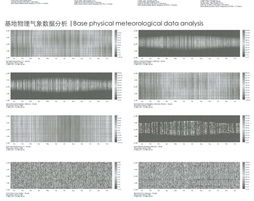
力学碰撞模拟初步分析 | Preliminary analysis of mechanical collision simulation



基地温湿风环境分析 | Analysis of the monthly wind environment of the base



基地物理气象数据分析 | Base physical meteorological data analysis



设计人群分析 | Design Population Analysis

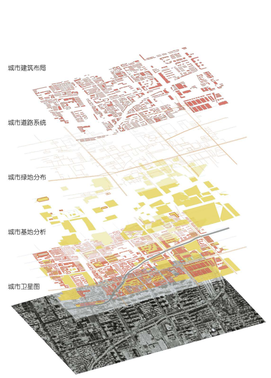
城市建筑布局

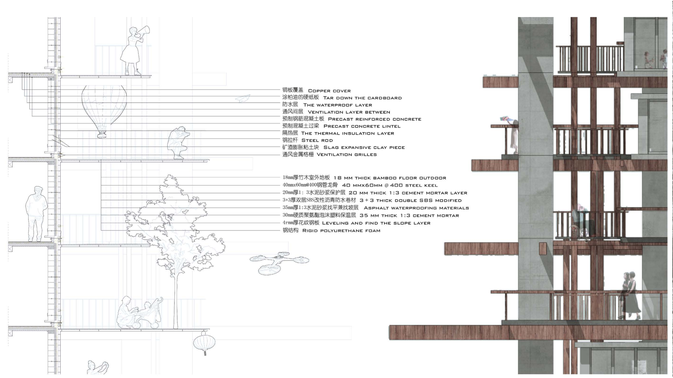
城市道路系统

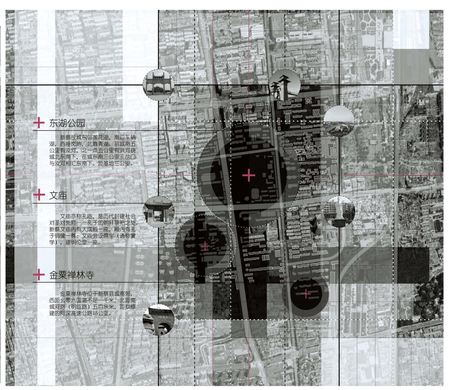
城市绿地分布

城市基地分析

城市卫星图

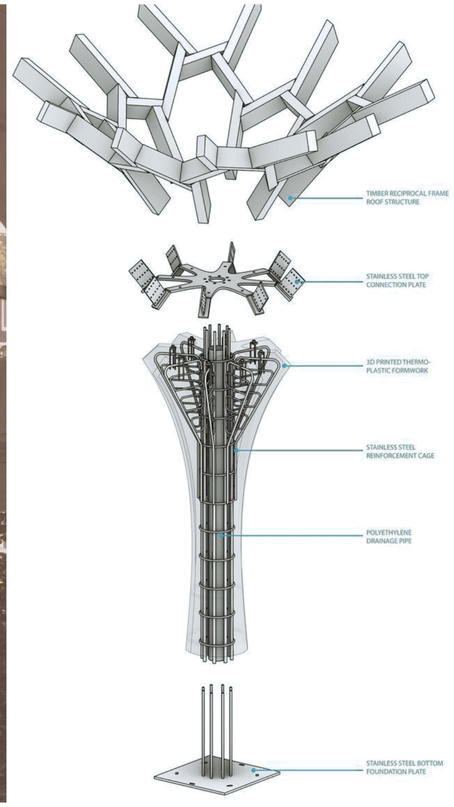






Sky Eden | 未来社区 III

一基于理论算法与可持续性的交叉融合下后疫情绿色开放共享的创新社区设计



结构柱的设计理念源于仿生设计的树干，希望以一种自然的状态将设计融入·到社区生活中，去营造一种舒适轻松、绿色自然开放的生态景观环境。伞形结构柱更好的去承受上端给与的压力，更好的传导到地面.柱子的顶部可以采用模数化设计，利用机械臂可以批量定制生产。中间一共拆分为三个部分，外层是围护结构通过材料和钢去模仿有机的树干。内部是核心层放置一些机械装置去为平台的使用提供更加便利的条件同时可以加以设置雨水收集装置更好的创造未来创新型绿色智能社区。

The design concept of the structural column originates from the bionic design of the tree trunk, hoping to integrate the design into the community life in a natural state, to create a comfortable, relaxed, green, natural and open ecological landscape environment. The umbrella-shaped column is better able to withstand the pressure given by the upper end and better conduct to the ground. The top of the column can adopt the modular design, the use of mechanical arms can be mass customized production. The middle is divided into three parts, and the outer envelope is made of materials and steel to mimic the organic trunk. Inside the core layer, some mechanical devices are placed to provide more convenient conditions for the use of the platform. Meanwhile, rainwater collection devices can be set up to better create the future innovative green intelligent community.

优化方案日照时间分析 | Analysis of sunshine duration of optimization scheme

优化方案低温辐射分析 | Low temperature radiation analysis of optimal schemetype

优化方案日照时间分析 | Analysis of sunshine duration of optimization scheme

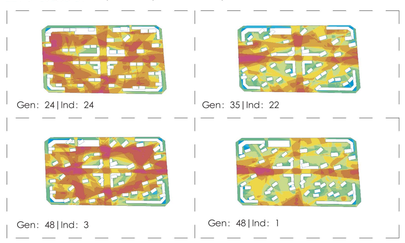
优化方案高温辐射分析 | High temperature radiation analysis of optimal schemetype

初轮优化模拟 | Initial round optimization simulation：

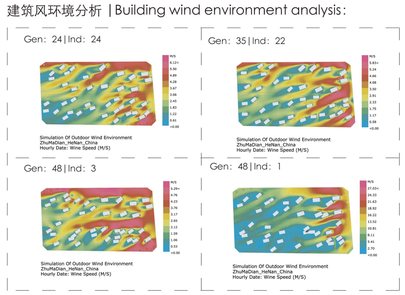
通过初次优化模拟可以为优化单体确定太阳日照时间和低温辐射和高温辐射三个优化目标对建筑产生影响的最优解，获得四个相对优势的解决方案将通过第二轮优化模拟为单体确定风环境以及室外可见性的优化目标最优解。

Through the initial optimization simulation, we can determine the optimal solution of the solar sunshine duration and the influence of the three optimization objectives of low temperature radiation and high temperature radiation on the building for the optimized monomer. The solutions with four comparative advantages will determine the optimal solution of the optimization objectives of wind environment and outdoor visibility for the monomer through the second round optimization simulation.

空间句法分析 | Space syntax analysis：

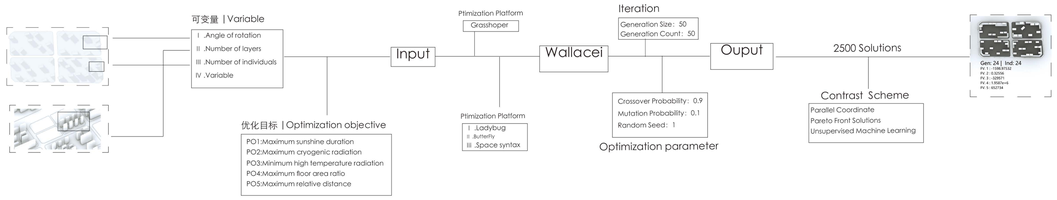


建筑风环境分析 | Building wind environment analysis：

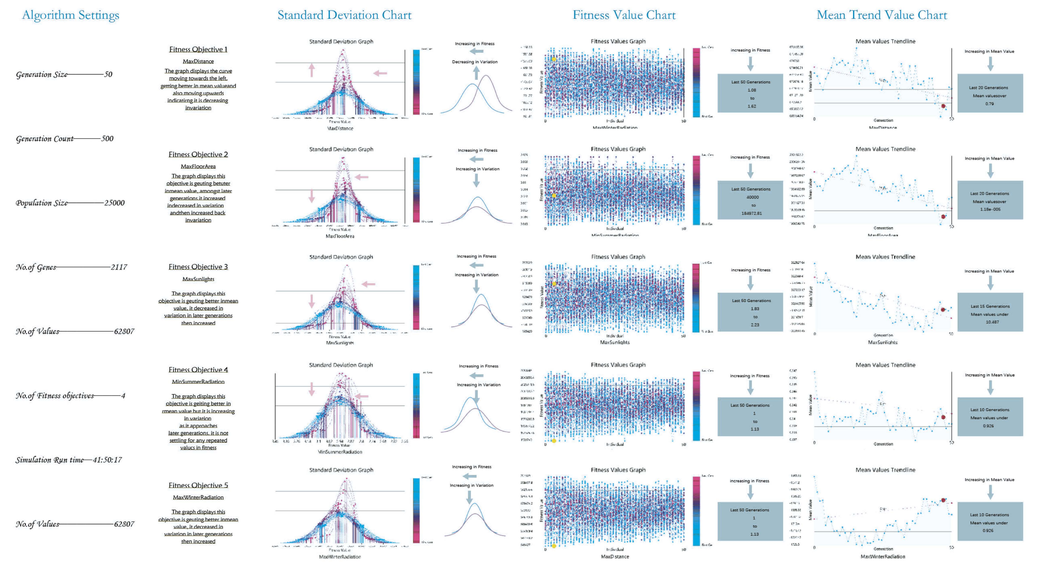


Wallacei 遗传算法分析 | Wallacei Genetic algorithm analysis

优化分析流程图 | Optimization Analysis Flowchart



优化数据分析 | Optimize data analysis



优化单体数据分析 | Optimize single data analysis