

# CYANE: An Emergent Organism and Its Adaptive Strategies in the Future Urban Ecology of HafenCity (2050-2090)

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## Abstract

This study delves into the future of urban ecology within the context of climate change, specifically focusing on HafenCity from 2050 to 2090. By employing the IPCC's Climate Change scenarios, particularly RCP 8.5, and utilizing the innovative [Climate Future: Image Generator], this study visualizes the trajectory of HafenCity, revealing the emergence of a novel organism, CYANE. Thriving amidst ecological shifts and societal adaptations, CYANE exploits gaps in ecosystems caused by climate-induced changes, displaying remarkable adaptability. As extreme weather events intensify, CYANE's resilience is tested, yet it persists even in shattered urban landscapes. By 2090, a unique coexistence between humans and CYANE emerges, prompting a reevaluation of absence and presence in evolving ecosystems. This interdisciplinary exploration emphasizes the importance of understanding adaptive organisms in the (post) anthropocene era and underscores the need for collaborative research, advanced technology, and a deep comprehension of ecological dynamics in addressing the challenges posed by climate change.

## 1 Introduction

This study explores the future development of cities amidst the challenges posed by climate change, focusing on the ecology of HafenCity from 2050 to 2090. Ecology refers to all the relationships of an organism to the surrounding external world, in which all the conditions of its existence are taken into account [1]. Utilizing the fifth IPCC report on Climate Change, which delineates scenarios based on climate protection levels, we aim to understand the potential ecological transformations under the RCP 8.5 scenario, where drastic emissions reduction does not occur [2].

Employing the [Climate Future: Image Generator], we visualize the future world with a predictive Artificial Intelligence. This revealed the unexpected emergence of CYANE, a novel organism thriving in the face of ecological disruptions caused by climate change.

## 2 Methods

The study utilizes the [Climate Future: Image Generator], which transforms current images into future scenarios based on the RCP 8.5 framework. By mapping the period from 2050 to 2090, the research focuses on HafenCity, Europe's largest urban development project, but still offering diverse settings for

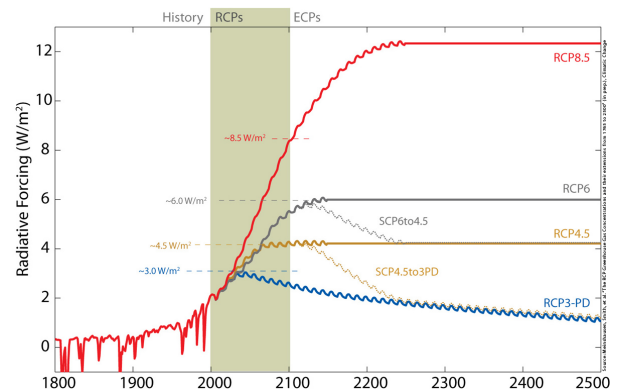


Figure 1: Representative Concentration Pathway (RCP) 2.6 - 8.5, showing the correlation between climate and radiative forcing [3].

analysis. The emergence of CYANE is tracked over five decades, shedding light on its adaptability and resilience in varying climatic conditions.

## 3 Results

### 2050: Adaptation and Phenological Shifts

In 2050, the study observes the initial adaptations in HafenCity, marked by imported climate-resilient plant species. CYANE begins exploiting gaps result-

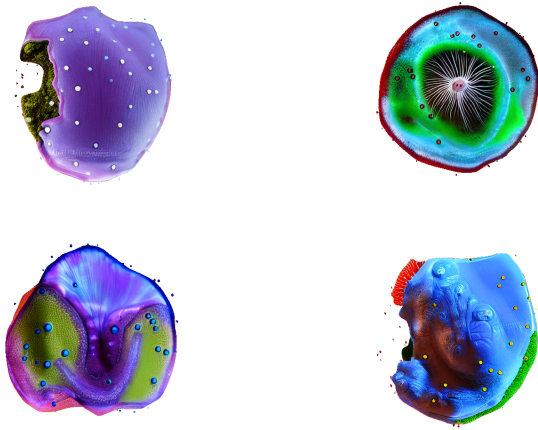


Figure 2: Visualisations of the CYANE organism.

ing from shifting phenological cycles [4], showcasing its ability to thrive amidst ecological changes. Further, imported plants differ in the availability and timing of soil moisture and vegetation structure, influencing which species can coexist there, adding to extinction as a multi-species event [9][7].

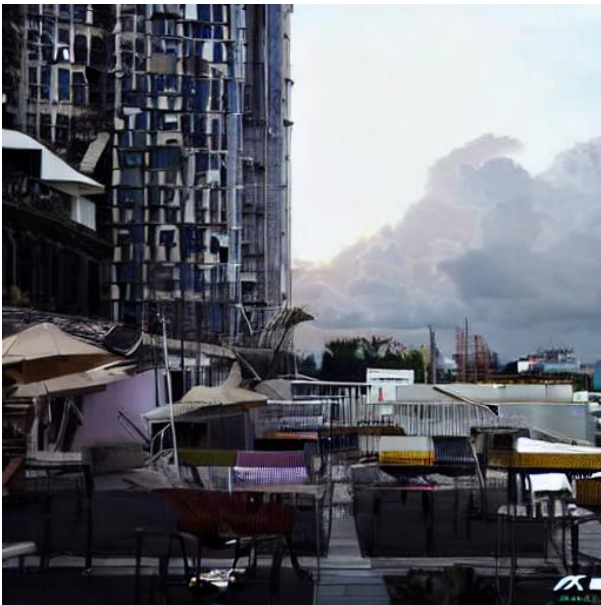


Figure 3: CYANE in the year 2050, profiting from gaps in shifting cycles.

### 2060: Extreme Weather Events and cyane's Resilience

Aside the temperature increase and the rise of the sea level, extreme weather conditions will appear more often and be way stronger [4]. Extreme weather includes heavy rain, tornados, hurricanes, floods, storms, hail and heatwaves. The year 2060 witnesses extreme weather events, including flooding, as

a consequence of climate change. CYANE capitalises on shattered structures, exhibiting its resilience and adaptability in the face of environmental challenges.

Extreme weather events also occurred in the near past. Many Hamburg residents remember the storm surge in February 1962 with over 300 deaths or the storms Anatol (1999) and Christian (2013).



Figure 4: Image of the flood 1962 [5].



Figure 5: Image of the flood 2060. Will CYANE maybe profit from the flooding, from shattered structures?

### 2070: Urban Climate Challenges and cyane's Proliferation

Cities display distinct climatic differences, such as urban heat islands, altered wind patterns, and reduced evaporation compared to surrounding areas. These disparities intensify with city size and density. Recent heat waves (2018-2020) offer a preview of potential future climate [4]. By 2070, HafenCity experiences urban climate challenges, creating opportunities for CYANE to fill gaps in the ecosystem. Self-constructed shelters become habitats, and CYANE proliferates,

demonstrating its resilience to heat and disrupted urban conditions.



Figure 6: Image of CYANE in the year 2070.

## 2080: Underground Housing and cyane’s Adaptation

In 2080, a shift to underground housing occurs in response to climate challenges. The structure of underground houses offers protection on multiple levels: Earth temperatures vary much less than outside air temperatures, which means the earth can absorb extra heat. CYANE’s presence diminishes in visible images, suggesting potential barriers to its entry. There might be a relation between underground structures and CYANE’s habitat.

## 2090: Coexistence of Humans and cyane

In 2090, a unique coexistence between humans and CYANE emerges. CYANE’s ability to adapt, clone, and share genetic information facilitates its integration into the ecosystem. Its cloning mechanisms mirror the ones of Pando: a colossal aspen in Utah’s Fishlake National Forest, appears as a vast forest but is a single organism with 47,000 trunks stemming from one root system. It is among earth’s largest and oldest individuals, originating at the end of the last ice age [6]. This coexistence prompts a reevaluation of the concepts of absence and presence in evolving ecosystems.



Figure 7: Image of the subway station used as housing shelter in the year 2080.

## 4 Discussion

This study unravels the emergence of CYANE as a novel organism in the future urban ecology of HafenCity. CYANE’s ability to clone itself, perform horizontal gene transfer, and engage in symbiotic relationships contributes to its adaptability and resilience. CYANE accumulates knowledge and adapts to environmental changes, altering morphology and pigment production. It can form specialised structures, such as pigments, to protect against extreme conditions like increased UV radiation.

CYANE, the species that emerged in times of change, might change our perception of loss. To phrase it in the words of the researcher Karen Barad: Loss is not absence but a marked presence, or rather a marking that troubles the divide between absence and presence [8]. This challenges traditional notions of absence and presence in evolving ecosystems, even more as anthropogenic landscapes are always haunted by imagined futures [7].

The study emphasizes the importance of interdisciplinary collaboration, innovative technology, and a deep understanding of ecological dynamics in addressing the challenges posed by climate change. Further research on CYANE’s adaptive strategies can offer valuable insights for future urban planning and environmental management.

## 5 Conclusion

The study provides an exploration of CYANE’s adaptive strategies in the face of climate change, shed-



Figure 8: The Lohsepark in the year 2090.

ding light on its resilience and coexistence with human populations. By leveraging advanced technology and interdisciplinary approaches, this research opens avenues for further investigation into adaptive organisms in anthropogenic landscapes. Understanding *CYANE*'s abilities can inform future urban planning efforts, offering insights for adapting to ecological transformations in the (post) anthropocene era.

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