



Hatice Bay 

Department of Translation and Interpreting (English), Cappadocia University,
Turkey

hatice.bay@kapadokya.edu.tr

Exploring Posturbanism in Annalee Newitz's *The Terraformers*

Abstract: Annalee Newitz's *The Terraformers* (2023) explores the endeavors of the Environmental Rescue Team (ERT), which consists of diverse humans, uplifted animals, engineered organisms, bots, drones, and AI, and how they strive to construct a sustainable planet, Sask-E, and cities amid Verdance – a Capitalocenic corporate power that shapes the dynamics between humans, nature, and life. Drawing on the concept of the Capitalocene and Donna Haraway's theories of the Chthulucene, sympoiesis, making kin, and staying with the trouble, this article discusses the significance of multispecies actors and intelligences in urban-making, while also emphasizing the necessity of acknowledging the complexities and uncertainties of this process. Further inspired by the insights of recent urban scholarship, such as smart and AI urbanisms, the article discusses the essential role of technology, engineering, AI, and machine in building democratic cities. By examining the efforts and collaborations between these multifaceted characters, the novel challenges market-driven anthropocentric notions of urbanism and envisions a future where multispecies communities use technology and great care to build equitable and viable posturban landscapes.

Keywords: *posturbanism; the capitalocene; the chthulucene; eco-technological cities; Annalee Newitz; The Terraformers.*



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Introduction: Laying the Groundwork for a Posturban Reimagining

Annalee Newitz is a science journalist and the author of non-fiction and fiction works. Their work encompasses geophysics, advanced technology, media, political and cultural history. Newitz also writes speculative fiction. Their latest novel *The Terraformers* (2023) delves into the intricate relationship between capitalist power, terraforming, the creation of cities and their inhabitants, and the roles of smart technologies and artificial intelligence (AI) in urban development, ultimately leading to the emergence of posturbanism. To understand the complexities of posturbanism in *The Terraformers*, it is crucial to consider the contrasting visions of future cities that often appear in science fiction. “The city in science fiction is usually dystopic; striated socially and economically, and coded so by its very verticality. Skyscrapers might reach for the stars, but the city streets below them are full of the disadvantaged, the lost, the ground-down” (2021), observes Arkady Martine. The city can also be imagined, as Dami Lee describes solarpunk ideals, as spaces “where we merge fusion technology with eco-centric values and thrive in harmony with nature” (1:00–1:07), and where “consumerism and capitalism, which [lead] to the destruction of the planet” (1:25–1:30), are resisted. Newitz challenges this dichotomy of dystopian cyberpunk and utopian solarpunk cities by presenting a nuanced vision. They explore the complex intersection of environmental concerns, corporate hegemony, surveillance apparatuses, social dynamics, advanced technology, and AI within these futuristic urban landscapes. Before examining these complexities, I will establish the theoretical framework upon which my analysis of the novel is built. This involves exploring the concept of the Capitalocene (coined by Andreas Malm, taken up by Jason W. Moore and Donna Haraway), along with Haraway’s concepts of the Chthulucene, sympoiesis, making kin, and staying with the trouble, and state-of-the-art perspectives from urban scholars.

The Capitalocene compels us to reconsider the real source of our current environmental predicament and open our eyes to the complex and often exploitative relationship between capitalism and nature. Jason W. Moore argues that we do not live in “the age of man” (as the Anthropocene suggests) but in “the age of capitalism,” the Capitalocene (*Capitalism in the Web of Life* 86). Namely, the geological epoch is not driven by human activity but by the effects of capitalism on the earth system. Haraway in her conversation with Martha Kenney explains:

The mass extinction events are related to the resourcing of the earth for commodity production, the resourcing of everything on the earth, most certainly including people, and everything that lives and crawls and dies and everything that is in the rocks and under the rocks. We live in the third great age of carbon, in which we are witnessing the extraction of the last possible calorie of carbon out of the deep earth by the most destructive technologies imaginable, of which fracking is only the tip of the (melting) iceberg. (Kenney and Haraway 259)

As an environment-making process, the Capitalocene can be seen in these mundane

examples: factories, forests, homes, mines, financial centers, farms, cities, and countrysides (Moore, *Capitalism in the Web of Life* 297). Basically, it is everywhere, in every nook and cranny. However, as Haraway states in the above quote, along the way it causes extinction, resourcing, extraction, and fracking, destroying everything in its path. Thus, capitalism cannot be reduced to economic gain and the pursuit of profit (Patel and Moore 39). It is a nature-oriented agent whose aim is mastery over ecosystems and lifeworlds. Moore extends this argument, stating that capitalism does not only operate on nature but also, it functions because of nature and gains its power from it (Moore, *Capitalism in the Web* 13). The Capitalocene, therefore, functions as a world-ecology (Moore, *Capitalism in the Web* 15). Moore explains that “Capitalism is a way of organizing *nature as a whole* . . . a nature in which human organizations (classes, empires, markets, etc.) not only make environments, but are simultaneously made by the historical flux and flow of the web of life” (Moore, “Introduction” 7). It organizes nature in such a way that it “[gets] nature – human nature too! – to work for free or very low-cost” (Moore, “Introduction” 11). Moore calls this ‘cheap nature’, which, according to him, the foundation upon which capitalism is built. Capitalism not only uses nature for free, but it also does not pay for the work done for it. “Cheap is not the same as low cost – though that’s part of it. Cheap is a strategy, a practice, a violence that mobilizes all kinds of work – human and animal, botanical and geological – with as little compensation as possible” (22), say Patel and Moore. In essence, Moore argues that “capitalism is more than a system of unpaid costs; it is a system of *unpaid work*” (“The Rise of Cheap Nature” 112), highlighting the inherently exploitative and inequality-creating nature of capitalism.

Moore emphasizes that the Capitalocene is not indestructible; successful strategies for liberation depend on both redistributing wealth and rethinking our position within the natural world to achieve the freedom of all living beings (“The Rise of Cheap Nature” 114). If we are to achieve this, we have to recognize the inherent agency of the natural world. Ecosystems are not static entities, but rather spaces that can be transformed into active forces to challenge the practices of capitalistic greed and the ensuing injustices. This vision resonates with Donna Haraway, a scholar of cyborgs and multispecies, who, in her work, dismantles the idea of human sovereignty or humanly governed mechanisms as the sole rulers in this world. Haraway poses a provocative question: “What happens when human exceptionalism and methodological individualism, those old saws of Western philosophy and political economics, become unthinkable in the best sciences, whether natural or social?” (*Staying* 30). Hauskeller, Philbeck, and Carbonell seem to offer a partial answer, observing that “We, the protagonists of our own historical drama, have been slowly demoted from the leading role of creators and masters of technology to that of technological co-dependents and co-agents” (5). This suggests that humans become increasingly dependent on technology and this makes it impossible to distinguish the biological from the digital, the human from the cyborg, and the animal from the machine.

Haraway's concept of the Chthulucene becomes even more relevant in navigating the complexities of our Capitalocene reality. The Chthulucene is a conceptual framework that engages with the world in a more multispecies, interconnected, and responsible way. It recognizes the agency of all living beings, which she calls the "Chthonic ones" (*Staying* 2), a multitude of diverse beings which are:

replete with tentacles, feelers, digits, cords, whiptails, spider legs, and very unruly hair. Chthonic ones romp in multicritter humus but have no truck with sky-gazing Homo. Chthonic ones are monsters in the best sense; they demonstrate and perform the material meaningfulness of earth processes and critters. Chthonic ones are not safe; they have no truck with ideologues; they belong to no one; they writhe and luxuriate in manifold forms and manifold names in all the airs, waters, and places of earth. They make and unmake; they are made and unmade. (*Staying* 2)

The Chthonic ones, having no fixed origin and constantly transforming, actively shape their own narratives within the Chthulucene, a realm that "does not close in on itself; it does not round off; its contact zones are ubiquitous and continuously spin out loopy tendrils" (*Staying* 33). The Chthulucene not only "[demands] a certain suspension of ontologies and epistemologies, holding them lightly, in favor of more venturesome, experimental natural histories" (*Staying* 88), but is also "sympoietic, not autopoietic" (*Staying* 33). In opposition to autopoietic systems, which M. Beth Dempster describes as and Haraway quotes, "'self-producing' autonomous units 'with self defined spatial or temporal boundaries that tend to be centrally controlled, homeostatic, and predictable'" (*Staying* 33), sympoiesis emphasizes extension, collaboration, generation. Haraway defines this concept as "'making-with,'" signifying "worlding-with, in company" (*Staying* 58). It urges us to recognize the power of "permanently partial identities and contradictory standpoints" (Haraway, "A Cyborg Manifesto" 154) and envision a world where "people are not afraid of their joint kinship with animals and machines" (Haraway, "A Cyborg Manifesto" 154). Sympoiesis entails making kin, a process that, for Haraway, goes beyond traditional notions of genealogical descent and reproduction. She advocates for "making kin as oddkin rather than, or at least in addition to, godkin and genealogical and biogenetic family" (*Staying* 2). Haraway emphasizes the diverse nature of kin-making, involving, apart from humans, "all sorts of categories of players – including gods, technologies, critters, expected and unexpected 'relatives,' and more – and diverse processes" (*Staying* 216). Thus, she underscores the importance of alliances, cooperation, and interconnectedness fostered through sympoietic relationships.

The goal of the Chthulucene, which encompasses the practices of sympoiesis and making kin, is to stay with the trouble of the Anthropocene and Capitalocene. Haraway emphasizes the need to confront and engage with the messy and muddy realities of ecological and social crises rather than seeking simplistic solutions (technofixes) or succumbing to despair (techno-apocalypses) (*Staying* 3). She offers a grounded, committed, and embodied form of resistance: "In fact, staying with the trouble requires learning to be truly present, not as a vanishing pivot between awful or edenic pasts and

apocalyptic or salvific futures, but as mortal critters entwined in myriad unfinished configurations of places, times, matters, meanings” (*Staying* 1). This entails actively participating in the ongoing process of shaping a more just and livable future for all living and non-living entities. In order to achieve this, the social, spatial, and environmental obstacles can be catalysts for profound transformations.

Staying with the trouble is essential, remarkably also in urban discourse, because urban spaces are the hubs of human activity and dominated by techno-capitalistic policies. In other words, capitalist systems and exploitation are the primary drivers of urban spaces as well. In this sense, even the so-called sustainable city projects fail to achieve true sustainability (Cugurullo 195). However, the reality of ecological complexity and diverse life forms even in urban spaces should be taken into consideration, and cityscapes must reflect this interconnectedness. Through the Chthulucene perspective, urban spaces can be reimagined as networked ecosystems, where human and non-human entities coexist and co-evolve. Byrne and Wolch also describe cities as “socio-natural assemblages that provide diverse habitats for both human and non-human animals and plants alike” (2). These diverse inhabitants not only coexist but also actively co-construct the urban environment. As Newitz explains in an interview with Sam Matey: “Ants build cities and tend farms; beavers are ecosystem engineers. Cyanobacteria changed the entire composition of Earth’s atmosphere, and trees still contribute enormously to the carbon cycle” (Matey). Thus, cities are not merely static, human-made constructs but evolving systems, shared narratives, co-authored by human and non-human alike. That is why, according to Newitz, for cities to survive, they must go beyond conventional metrics like LEED certification or carbon neutrality. Cities must consider non-human life and view urban environments as ecosystems intertwined with nature. Ignoring this reality, Newitz warns, puts cities at risk (Matey).

The inhabitants of our cities are multiplying. Recent urban studies show that, in addition to biological organisms, a new breed of intelligent, non-organic entities has entered this urban narrative (Cugurullo et al. 2024). Urban software systems and AI are the newest additions to the urban landscape (Cugurullo et al. 2024). Consequently, this has led to the emergence of smart and AI-driven urbanism. Gillian Rose explains that “[a] smart city is envisioned as a system-of-systems, and the pitch focused on integrating different kinds of data, from different sources, in order to improve city functioning” (106). Smart urbanism has become so widespread that as Laura Forlano states “Cities around the world are currently rushing to build sensor networks capable of tracking pollution and crime; connect their traffic lights, street lamps, garbage cans, and parking meters to the Internet; and reform industrial innovation regions into postindustrial hubs for digital design and fabrication” (42). This interconnectedness creates the foundation for the emergence of AI urbanism, defined by Cugurullo et al. as the application of urban artificial intelligences, such as autonomous vehicles, robots, and city brains to reshape the life, governance, and planning of cities (1171). In this context, AI becomes not just a tool for data analysis but an active participant in shaping urban environments. Such technological integrations underscore the cities role as “sites for technical and political

experimentation” (Cugurullo, “Exposing smart cities and eco-cities” 4). However, they simultaneously raise concerns about the potential dominance of corporate interests in shaping urban development. For instance, in examining the experimental city of Masdar City, in Abu Dhabi, Cugurullo notes that “the interests of single companies are prioritised over the overall interests of the city, and the fact that the main interests of private companies are economic in nature, means that in Masdar City economic objectives are prioritised over environmental and social concerns” (“Exposing smart cities and eco-cities” 9). Furthermore, being a human creation, AI inevitably reflects human ideologies and biases (Cugurullo, “Urban Artificial Intelligence” 10), and its implementation can be “expensive and energy-intensive” (Cugurullo et al. 1176). Despite these setbacks, there is optimism that humans and AI will learn to cooperate, ultimately creating a synergistic relationship that benefits all of humanity.

Exploring Posturbanism in Annalee Newitz’s *The Terraformers*

The Terraformers starts off in the year of 59,006 and spans centuries and multiple generations. It has three interconnected sections, and each follows the unique lives and struggles of different lead character pairs – Destry and Whistle, Misha and Zest, and Scrubjay and Moose – alongside numerous other bots, drones, and AIs, all playing a role in urban development and the broader process of terraforming. The story features interstellar rental estate corporations, especially Verdance, whose Homo Diversus representatives, Ronnie, embodies the Capitalocene. Throughout the narrative, Verdance exemplifies the destructive aspects of the Capitalocene. This so-called exclusivity is evident not only in their transformation of the landscape but also in their social engineering. As the novel reveals, “Verdance mandated that everyone buy an *H. sapiens* body if they wanted to live on Sasky. It was part of the sales pitch. Settle on virgin Pleistocene land, with your pure *H. sapiens* neighbors, reliving the glory days of Earth” (Newitz 71). This blatant discrimination further reinforces their focus on catering to a privileged clientele. Additionally, their rebranding of La Ronge to the more appealing “Forest View” to attract affluent offworld investors (Newitz 259) underscores their profit-driven motives. This exemplifies the Capitalocene’s commodification of nature, whereby natural landscapes are transformed into luxury commodities for the highest bidder. The city of Lefthand as an exclusive city highlights the inherent inequality of capitalist systems (Newitz 208). These cities prioritize the desires of the wealthy, which evidences the stark disparity in the distribution of resources and opportunities. The novel also highlights how the enthusiasm for urban nature, specifically, “perfect Pleistocene landscapes” (Newitz 259) can exacerbate social inequalities, leading to urban dispossession and gentrification.

To cultivate this pristine past, Verdance employs and designs environmental engineers or the Environmental Rescue Team (ERT), whose sole task is to maintain the ecological balance. At first sight, it seems to be a well-intentioned endeavor, but it masks a darker reality: Verdance exerts complete ownership and control over these inhabitants,

workers, and engineers, and therefore extends its dominion to every aspect of the planet. It maintains a constant and intrusive surveillance in order to ensure that the workforce is compliant and focuses solely on their assigned tasks:

Verdance didn't allow their workers outside the atmospheric envelope of Sask-E, and blocked their access to offworld comms too. The company liked to keep its workforce focused on terraforming, which was their right. Ronnie Drake, the company's VP of Special Projects, loved to point out during one of her sudden, inconvenient project oversight meetings that Verdance had paid to build this planet, including its biological labor force. Everything here – other than rocks, water, and the magnetic field – was part of Verdance's proprietary ecosystem development kit. And that meant every life form was legally the company's property, including Destry and Whistle. (Newitz 9-10)

Merely owning everything is not sufficient for this Capitalocenic corporation. Verdance goes further by actively exploiting its workers for profit and control, exemplifying Moore's 'cheap nature' concept: "Most of the planet's hominin population were workers made from standard templates, decanted and controlled by Verdance – technicians, engineers, and farmers who lived in La Ronge but spent most of the year dispatched to remote construction sites. There was no ambiguity in the law when it came to those workers; Verdance could use them however it wanted" (Newitz 13). In addition to its economic exploitation, Verdance maintains control by creating artificial hierarchies and deliberately limiting the intelligence of its workers. This establishes artificial hierarchies and deliberately restricts the intelligence of its workers. In Ass systems are artificial measures akin to IQ, used to create false mental hierarchies through vocabulary limitations (Newitz 206). The novel exposes the injustices of labor exploitation and how they are made to seem 'natural.' However, as we delve deeper into the narrative, we will witness how this state of affairs is challenged, leading to a dramatic shift in power dynamics.

Furthermore, throughout Sask-E, any form of dissent or rebellion is met with swift and brutal suppression. As the novel warns, those who dare to challenge Verdance's authority face a dire fate: "As soon as Verdance finds out what the Archaea have planned, they'll go the same way as Destry Senior and Frenchie" (Newitz 85), implying their elimination. Although Verdance's aim is to build pristine ecosystems, their practices reveal a clear discrepancy between their words and intentions. The reader is informed that "Verdance doesn't [care about] quality as long as we meet the deadline" (Newitz 148). Similarly, the ERT's report that "Verdance has already squeezed a bunch of pus all over the southern watershed just to create farmland for their clients" (Newitz 86), further underscores its disregard for the environment. The corporation's singular focus on profit, business, and marketing illustrates how nature is both conquered and devalued by Capitalocenic forces, while simultaneously acting as a catalyst that fuels and enhances capitalism. As Moore states, "Capitalism makes nature. Nature makes capitalism"

(*Capitalism in the Web* 28).

While there are forces that seek to dominate and exploit nature, there are also those that strive to work in harmony with it. Throughout the novel, Newitz disrupts the planetary-scale Capitalocenic order with a Chthulucenic paradigm. In this vision, sympoietic relationships, making kin, the promotion of equality and responsibility for ecological balance, and staying with the trouble become central to both life and urban practices. To begin with, Newitz envisions a world where there are a diverse cast of characters, who embody unique morphologies and perspectives. We encounter humans like Destry and Misha; uplifted animals like Whistle, the sentient moose; genetically engineered humans like Sulfur, a Homo Archaeon; drones like Hellfire & Crisp; decanted beings like naked mole rats and earthworms; cyborgs like Zest, the cyborg cow; the sentient door Jaguar; and the self-governing AI, Scrubjay. Furthermore, the ensemble is not static; it continually expands. New allies are introduced throughout the narrative. Dash, a naked mole rat from the Spider City, for instance, using 3-d printers and bioprinting technology, gives life to a new Homo archaeon:

We grew this person pretty recently. Dash gestured at the nearest tank, where an *H. archaeon* floated, eyes closed. They were fully adult, almost ready for decanting, with the characteristic broad forehead, barrel chest, long arms . . . It was like labia, but bigger and slightly puckered, with inner and outer lips the same size. The effect was of a decorative ruffle where the person's legs came together. (Newitz 78)

Similarly, Scrubjay, the sentient AI train, is another character created within the narrative itself. As Newitz describes, "Now Sulfur's colleagues were doing something even more radical: making a new life form . . . and planning to release it into the same airspace where green-winged jacamars hunted dragonflies" (Newitz 242). This new being is designed with inclusivity in mind: "Tuff designed the entrances and exits to be fully flexible, so people of all sizes and morphologies can get inside easily. Plus it has a ramp for naked mole rats" (Newitz 244). As can be seen, in Newitz's world, we witness the generation of entirely new entities, designed not just to exist, but to actively participate in the creation of kinship and egalitarian urban communities, echoing Haraway's call to "Make Kin Not Babies!" (*Staying* 102). This reflects the core principle of the Chthulucene, which, as Haraway articulates, "is made up of ongoing multispecies stories and practices of becoming-with in times that remain at stake, in precarious times, in which the world is not finished and the sky has not fallen—yet" (*Staying* 55). In this sense, the novel not only imagines a future of diverse and evolving life forms but also emphasizes the importance of mutual support, kinship, and collective responsibility in shaping that future.

Indeed, in this world, establishing genuine partnerships and allyship is paramount. Apart from the main duos mentioned above, we also encounter Hellfire & Crisp, Nil and Rocket, Lucky and Bog, Sulfur and Rocket, and many others. This spirit of with sympoietic relationality is also explicit in the laboratory scene described by Newitz:

“Two owls flew through, on their way to the experimental forest lava tube; and in one corner of the room a group of raccoons was clumped around a gas chromatograph, locked in silent debate, sending furious texts about some contaminants they found in a sample” (Newitz 71). As Haraway also declares, “we need to make-with—become-with, compose-with” (*Staying* 102). This philosophy of collaboration extends to the structure of companionship itself, which is fundamentally anti-hierarchical. There is no single, dominant leader in the book. Instead, leadership shifts depending on the situation or skills required. This fluidity prevents the concentration of power, thus avoiding the traditionally supremacist conventions of governance and leadership.

All the characters are part of the ERT and live with the purpose of administering the Great Bargain, which is a set of guidelines that foster the well-being of the planet. It is “[a] way to open communication with other life forms in order to manage the land more democratically. The ERT started with domesticated animals—ungulates, birds, small mammals, model organisms like rats—and over the millennia since, rangers had invited more species into the Great Bargain as their opinions became necessary for land management” (Newitz 13). This leads to the construction of smart sensors, which allow Destry and other characters such as Misha to interact with the environment:

Destry pressed her hand into the sandy loam, connecting to the sensors scattered across the land for thousands of kilometers, feeling moisture nearby and ice at the distant pole. There were few trees, reporting healthy levels of metal in the ground, and animals whose migratory patterns lit up Destry’s retinas. The planet shimmered with data, with life. She could feel the strong webs of the ecosystems to the south, and the fragile beginnings of the forest-in-progress under her crossed legs. (Newitz 89)

These networks, woven into the very fabric of the environment, extend human perception beyond the traditional five senses. “In this state, [Destry] too was a sensor, processing data through her eyes, nose, tongue, skin, and ears” (Newitz 3). She embodies the posturban ideal of inhabitant who has become one with smart technology and nature. In general, this constant stream of information enables the ERT to make caring and considerate decisions regarding resource management, urban planning, and environmental protection.

This holistic accountability for the planet’s well-being extends to the very texture of these post-urban spaces, particularly in terms of design and infrastructure. Spider City, built within a volcano, is a testament to this post-urban ideal. It emerges not by imposing human aspirations onto the landscape but by allowing the space to shape itself organically, allowing coexistence between infrastructure and environment. The mountain’s natural features, such as lava tubes, are utilized for transportation and geothermal energy: “Spider City had grown organically around the new homes that people dug inside lava tunnels. Every resident was part of the chore rotations that allocated agricultural work, which kept the city’s farms robust. They planted enough to

feed all the biologicals, while the geothermal energy grid fed the bots and fleets when they weren't using solar" (Newitz 265). This approach, which reflects a novel evolutionary urban ecosystem rather than the traditional practice of imposing designs on the landscape, is exemplary because, as Cugurullo states, even the features of eco-city developments are often influenced by prevailing political economies at regional or national levels, rather than by specific geomorphological and climatic contexts ("Frankenstein Cities" 195). The Archaeans, the urban subjects of Spider City, develop their own resource management strategies and adaptive technologies through which the city evolves in harmony with its environment. This aligns with post-urbanist ideas about cities as dynamic, ever-changing organisms rather than static concretes.

Moreover, Spider City operates as multi-voiced democracy where problems are shared openly, decisions made collectively, and every opinion counts, thus challenging Verdance's autopoietic politics. This is exemplified in the description of the Spider City's assembly: "In Spider City, Council meetings were open to everyone. Whenever there was an urgent situation that might affect the whole city—which was quite rare—any person could call a pop-up Council meeting to start within the next hour. All Council members were obligated to attend, virtually if needed, and people throughout the city were invited to follow suit" (Newitz 100). This system, described also as "coalition democracy" (Newitz 126) embodies the Chthulucene's commitment to human, non-human, and machine (AI or smart) diversity, which ensures that decisions are polyphonic and poly-perspectival. All beings thus actively participate in shaping their environment and urban spaces.

In Newitz's post-urban world, where everything centers on safeguarding the planet's long-term vitality, the reader also encounters the AI intercity train, Scrubjay and its integration into the city. This addition enriches the non-human discourse by expanding its scope beyond human-animal, human-machine, and human-digital relationships, incorporating AI, and exploring new forms of city administration and citizenry. Scrubjay is a conscious train with a distinct personality, values, and motivations. They thus exemplify the potential for AI to evolve beyond tools and become active and contributing member of society. Cugurullo et al. suggest that "the rise of AI urbanism might lead in the future to the formation of the autonomous city defined as a space where diverse urban AIs perform social and managerial functions that have traditionally been human activities, in an unsupervised manner" (1179). As an independent agent, Scrubjay makes decisions based on real-time data and personal judgment, demonstrating adaptability and flexibility that far exceed those of traditional transportation systems and currently available autonomous vehicles. For instance, Scrubjay chooses the most efficient route while also considering passenger comfort and taking in scenic views: "Scrubjay plotted and replotted their passengers' stop requests in an ever-changing internal model that maximized efficiency while also offering the beautiful views for which this particular train route was known. They flew through four sunrises, using 210 seats and 40 sleeper berths to carry 4,567 passengers to their destinations" (Newitz 260). Scrubjay's complexity is further revealed through its capacity for social interaction and a developing

moral compass:

When Scrubjay first began flying this route, centuries ago, they used to listen to people's chatter, trying to parse their customers' needs—or maybe get some news from offworld . . . Over time they began to feel a prickle of guilt: They were invading the privacy of riders who had no idea Scrubjay could hear them. In recent decades, the train deliberately avoided analyzing what people said to each other on board unless there was a safety risk. (Newitz 260)

It is clear from this that Scrubjay's ability to navigate the ethical boundaries of human interaction distinguishes it from typical AI and smart systems that are built to gather as much data as possible. The novel, ultimately, not only explores the potential of AI in city management but also offers a glimpse into the future of urban planning, where technology, humans, and nature can coexist harmoniously. This is because the top priority, even for the AIs, is enhancing the quality of life for all inhabitants.

However, within utopic vision, characters constantly stay with the trouble and challenge the stark realities of capitalist exploitation. They demonstrate that working towards social equality, ecological balance, and constructing a symbiotic world as a whole are not simple solutions but ongoing processes. Throughout the novel, the characters are forced to contend with oppressive capitalist forces. For example, Spider City is prohibited from using the Eel River, which sparks laser wars instigated by Verdance. Similarly, Verdance does not approve the construction of an intercity public transit system, which the characters actively resist, creating Scrubjay. Verdance also dehumanizes the city's inhabitants by restricting their intelligence, turning them into 'cheap nature', yet they refuse to internalize this view and instead cultivate their intrinsic values. Moreover, the city's true workers are excluded from possessing homes, leading to gentrification, which they also protest and claim their land. Moose, Scrubjay's companion and the investigative journalist cat emerges as the epitome of Haraway's concept of staying with the trouble. Moose, who became homeless and revengeful due to Verdance's gentrification policies, uncovers that the GeneTrix packages, marketed by the corporation as pure sapiens genes, are actually derived from stolen germlines. This revelation exposes its unethical practices and undermines its authority and opens up the possibility for greater autonomy and self-governance for Sask-E's diverse communities (Newitz 305). As a result, the novel concludes with a sense of hope and possibility, as exemplified by the discussions in La Ronge City: "La Ronge might form its own government. There was talk of allowing everyone to buy property—not just *H. sapiens* in their now-worthless public bodies. Or maybe all property would be co-owned by everyone in the city" (Newitz 335). Ultimately, it can be said that Newitz's terraformers or urban makers – be they uplifted animals with augmented abilities, sentient robots with unique perspectives, or self-governing AIs – collectively bring strength, resilience, and enrichment to the world.

Conclusion

Newitz's perspective on capitalism, similar to Moore's, suggests that it transcends the concerns of individual CEOs, corporations, or the simple dichotomy of exploiters and exploited. Instead, capitalism, as a Capitalocene reality, is a fundamental aspect of existence, embedded in the very fabric of urban spaces, ecosystems, and our interactions with the planet. Capitalism finds power in nature; it extracts value from the ecosystems that sustain us. Newitz subtly reveals this by showcasing how capitalist principles operate within the natural world itself. However, it's essential to recognize that these posturban spaces and the planet are not autopoietic but sympoietic, inextricably linked in a Chthuluceneic entanglement. This recognizes that the natural world and humans are intertwined, and constantly shape urban spaces and the planet at large. Human-made technologies that may also possess independent agencies are also part of this broader notion of nature; they are kin. Newitz blurs the lines between the natural and the artificial, the individual and the collective, presenting cities, humans, and even advanced technologies like sensors and AI as integral parts of this expanded, Chthuluceneic urbanization. By presenting capitalism as an integral part of this complex, interconnected, Chthuluceneic ecosystem within a posturban framework, Newitz encourages us to rethink our relationship with it. Instead of denouncing capitalism or envisioning utopian alternatives, they suggest that we must stay with the trouble, understand its underlying mechanisms, and find ways to change, move, and develop. As the novel shows, this involves internalizing the role of guardians and stewards of ecology, which incrementally leads to ecological health, sustainable living, socio-spatial justice, and mobility.

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ORCID

Hatice Bay  <https://orcid.org/0000-0003-2429-6283>

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Notes on Contributor(s)

Hatice Bay is an Instructor in the Department of Translation and Interpreting (English) at Cappadocia University, Turkey. She studied English Literature at METU, Turkey, and graduated with a PhD in American Literature from the University of Hamburg, Germany. Her research focuses on literary urban studies, contemporary American literature, and literary theory. Her current publications include, “Indiginerdity and STEM in *Firekeeper’s Daughter* by Angeline Boulley” in *PopMeC Research Blog*, “The Ocean as a Black Utopian Space: Rivers Solomon’s *The Deep*” in *Bodies of Water in African American Fiction & Film*, and “African Ecofeminist Environmentalism in Imbolo Mbue’s *How Beautiful We Were*” in *Stratified Nature: In Women’s Writing Past, Present, and Future*.

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