May 2024

Research Proposal Deck

The Bioplanning Institute

Transportation & Mobility

info@bioplanninginstitute.org

bioplanninginstitute.org

Agenda

A commitment to advancing ecological planning

The Bioplanning Institute is a non-profit created with the intention of advancing the Bioplanning approach in urban planning, architecture, and construction. Its mission is to research, develop, promote the study of, and raise awareness about Bioplanning as an effective and viable approach to address the world's rapid urbanization needs, the climate crisis, and the metacrisis that our civilization is facing.

Our mission is to advance Bioplanning as a recognized design discipline through research and development, education, and talent activation.

The urgent challenges of social justice, mental health, food production and distribution, and water quality are intertwined with this urban dilemma, amplifying the call for immediate action.

The Bioplanning Institute **Pillars**

1 Public Engagement and Awareness

We advocate for urban design changes by publishing books and organizing events for architects, planners, developers, municipalities, and government agencies.

2 Theoretical and Applied Research

Funding and coordinating multidisciplinary research on Bioplanning, including long-term impact analysis and applied research on specific sites and projects, to define urban needs and priorities.

3 Stakeholder Articulation and Process Redesign

We urge integrating Bioplanning into urban design, making it central to development. It aids lawmakers in embedding Bioplanning into zoning, incentives, and environmental policies.

The Bioplanning Institute **Methods**

1 Evidence-Based Approach

Bioplanning relies on empirical exploration, creating and refining urban prototypes. It advances urban planning through evidence-based hypothesis testing, avoiding dogmatic adherence to any single perspective.

2 A Life-Centric Urban Paradigm

As an approach, it builds off and collaborates with organizations and bodies of knowledge such as Design with Nature, Cities for a Small Planet, The Hannover Principles, Ecourbanism, Biophilic Cities, Nature-based Solutions, Salutogenic Design, Indigenous Wisdom, Urban Rewilding, and others.

3 Industry Process Optimization

To achieve our goals, we must engage in experiments, academia, and urban planning processes. The Institute should work with industry and government to design impactful changes. Prototyping Bioplanning will refine methods and strengthen its practice. Certification will ensure projects follow Bioplanning principles and build its evidence base.

Bioplanning Approach

Bioplanning is an urban design approach that integrates nature's patterns to create efficient, ecologically-based cities. It promotes land use optimization, reduced environmental impact, and minimal road infrastructure, advocating for urban environments that mimic natural ecosystems through life-centric principles, regenerative thinking, and biomimetic solutions.

Bioplanning Approach **Principles**

1 Oneness

Design with life at the center. Oneness represents harmony, respect for all life, and the pursuit of environmental restoration. It focuses on preserving resources, reducing waste, and counteracting climate change through strategies like circular economy and clean energy.

2 Flowing

Embrace natural cycles to create balance. Flowing optimizes resource flows inspired by natural systems, improving water, waste, and transportation management for resilient infrastructure.

3 Grounding

Connect everything to the earth's natural energy. Grounding integrates nature into human development, harmonizing urban spaces with natural ecosystems using vegetation, earth-based materials, and biophilic design.

4 Belonging

Be present. Be local. Be inclusive. Belonging fosters community, inclusivity, and local identity. It encourages face-to-face interactions and designs that respect cultural and geographic contexts, supporting local adaptation and sustainability.

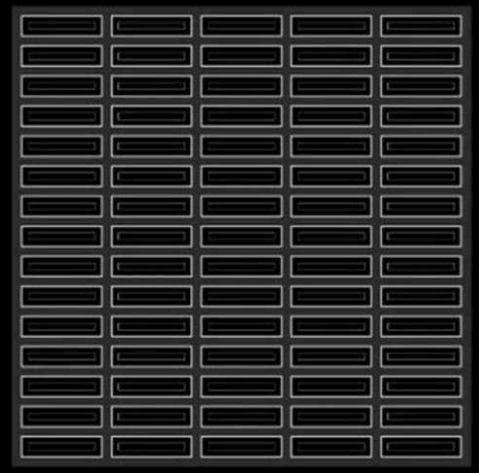
5 Flourishing

Co-create as a community at every scale. Flourishing promotes collaboration and decentralization, empowering communities to innovate with equality, accessibility, and open access to growth opportunities.

Supercell: Bioplanning using Cellular Typology

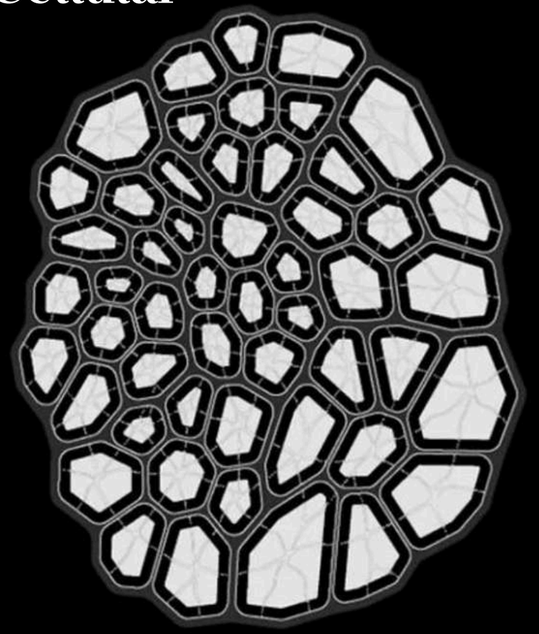
The first typology we propose is underpinned by cellular logic, an approach that has revealed unique benefits throughout its formulation. The cellular typology was developed under Supernature Labs and supported by research conducted in collaboration with Buro Happold.

From Cartesian



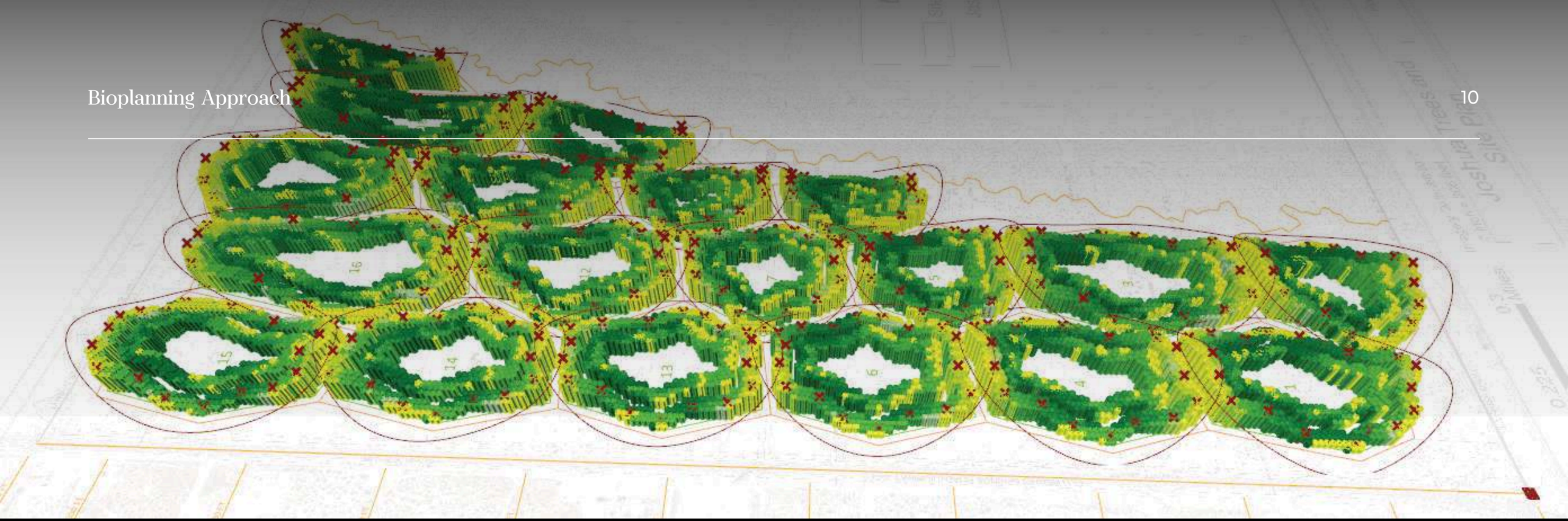
57% Building Area
43% Road Area
1% Natural Area*

To Cellular



57% Building Area
16% Road Area
27% Natural Area*

*According to the research that was done by Supernature Labs and Buro Happol. Full research is avaliable per request at @info@bioplanninginstitute.org



The Supercell, an optimized architectural typology for bioplanned communities, is based on a hexagonal structural grid.

This grid allows for a pivot from traditional rectilinear systems to the cell system, a shift that has proven significant benefits in its potential to optimize material utilization, and spatial efficiency in replicable architectural design typologies.

Supercell Benefits*

Economizes on space by approximately

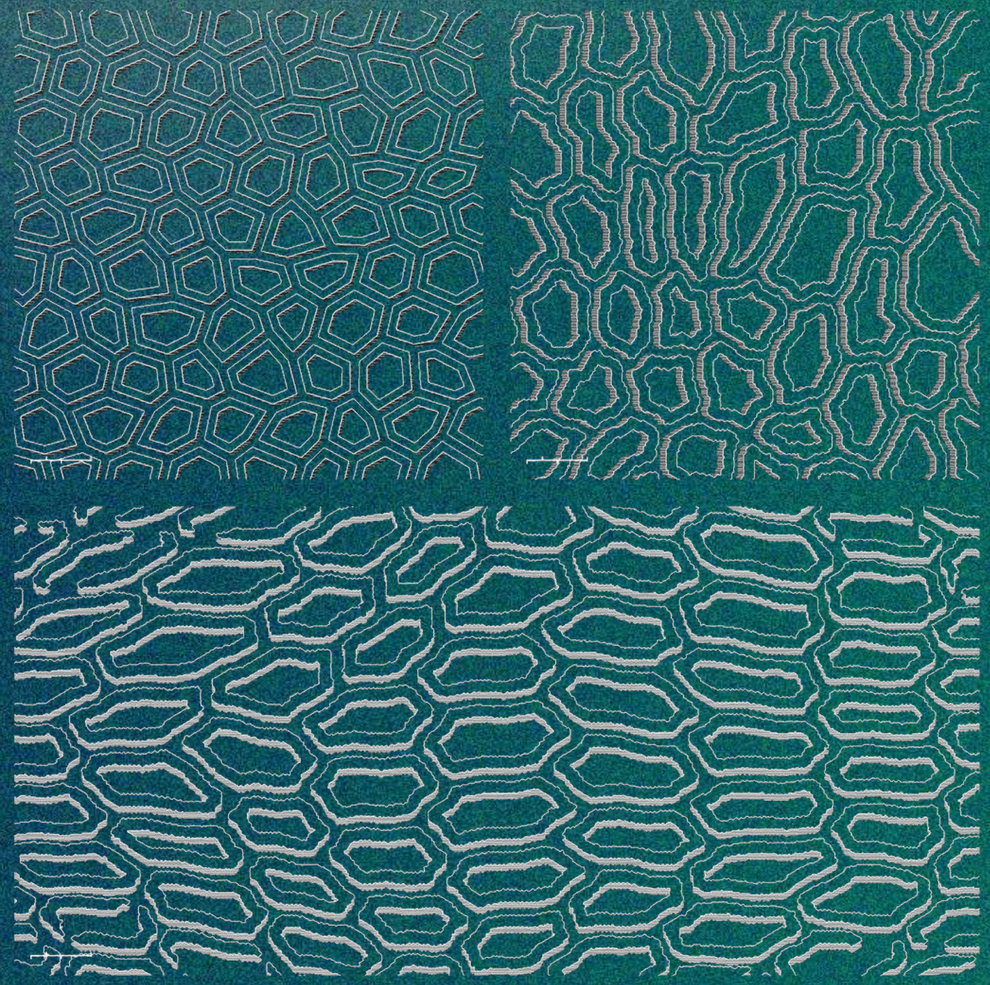
6.5%

Increases natural areas on

25%

Transition in road area from

43% to **18%**



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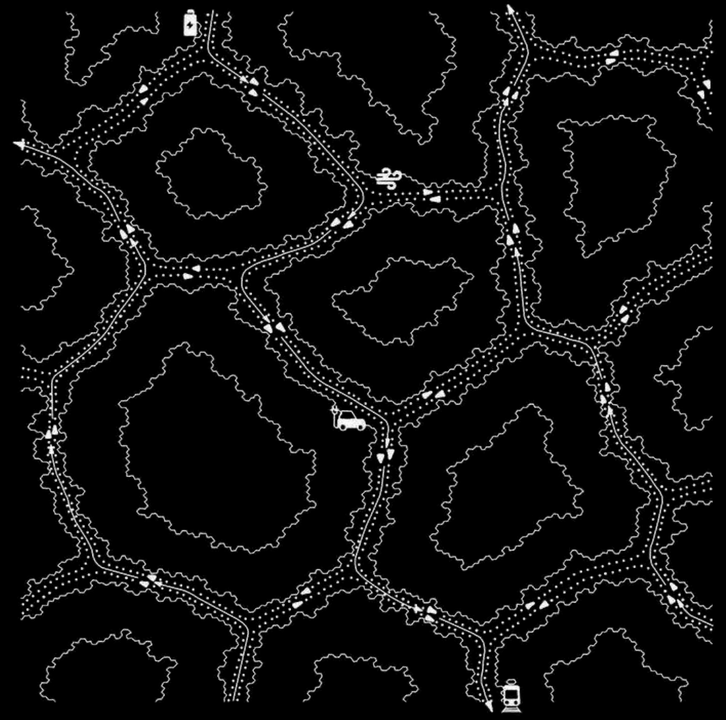
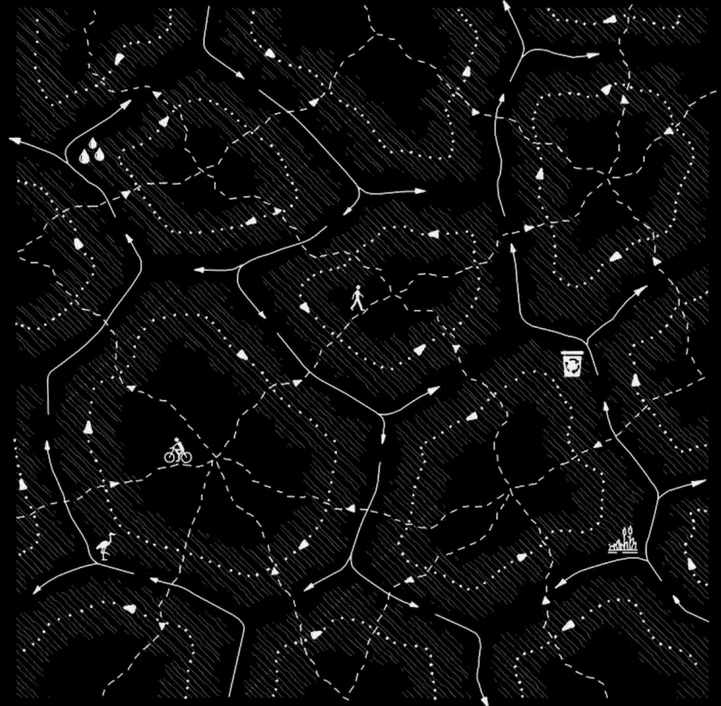
Bioplanning prioritizes nature nodes over traditional land subdivision, making nature central to communities.





Key aspects of Bioplanning under further research. To address these gaps and advance the field in academia and policy, we are structuring a research program around six main categories.

Transportation & Mobility

Biodiversity

Decarbonization

Post-War & Post-Disaster Reconstruction

Public Health

Policy & Standarts

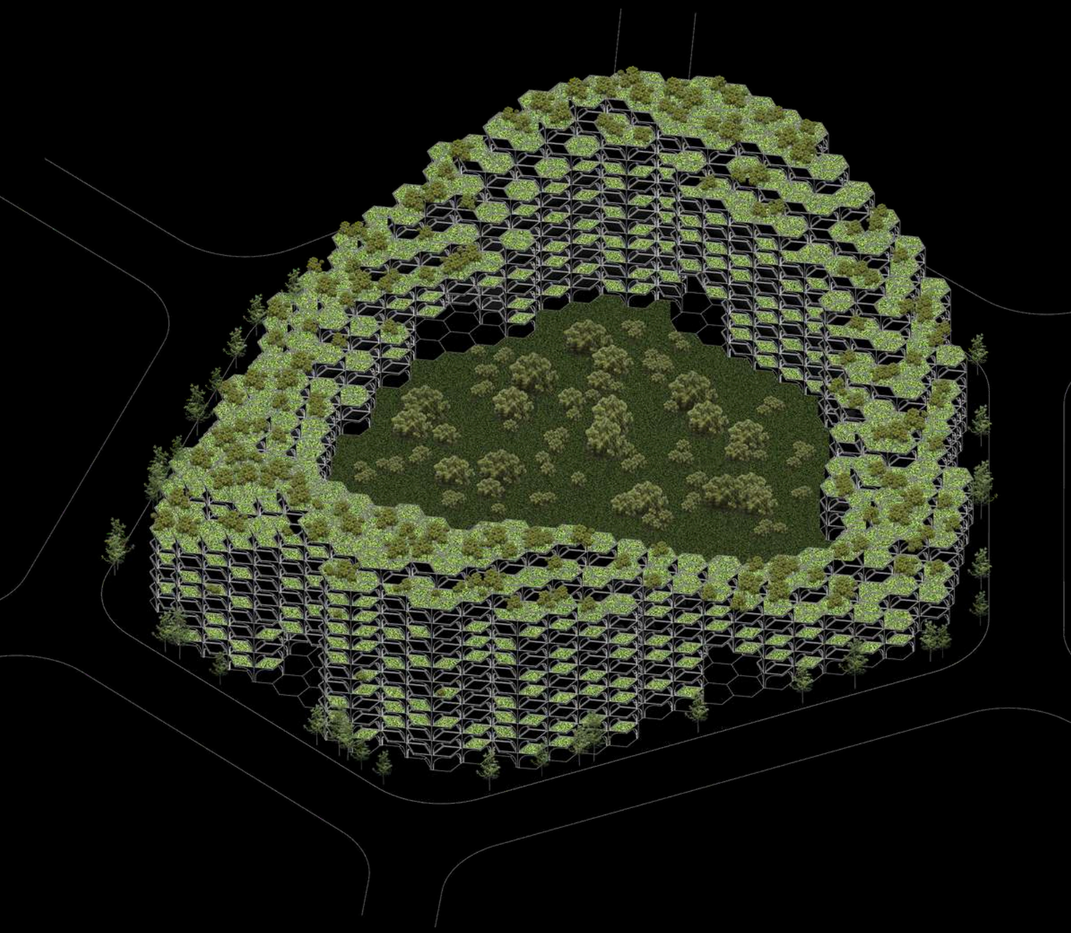
Transportation & Mobility: Potential Research Proposal & Questions

We recognize the critical need for comprehensive research to understand how Bioplanning can enhance transportation and mobility in urban settings through SuperCell geometry. We aim to uncover the intricate ways in which these designs can optimize traffic flow, improve safety, and support diverse transportation modalities. Our commitment to advancing this research ensures that we bring the best knowledge and methodologies to the forefront, paving the way for efficient, sustainable, and user-friendly urban mobility networks.

Hypothesis

Integrating Bioplanning designs within urban settings can significantly enhance mobility by:

1. Facilitating clear road naming and effective navigation through innovative, non-orthogonal street layouts.
2. Minimizing road infrastructure requirements, optimizing traffic flow, and enhancing safety through distinct separation of pedestrian and vehicular paths.
3. Utilizing three-way junctions to improve traffic flow and reduce accidents.
4. Efficiently accommodating private transportation (cars, bikes, scooters) and public transportation (buses, trains) in both high-density and low-density areas.
5. Integrating Bioplanning with current mobility systems to facilitate a smooth transition and compatibility with existing environments.



Research Proposal:
Objectives

1 Understand and model transportation modalities in Bioplanned areas, focusing on private individual transportation and collective public transportation.

2 Analyze the impact on high-density and low-density areas, traffic flow, road spacing needs, bottlenecks, transit system capacity, and parking spaces.

Research Proposal: Methodology

1 Transportation Modeling

- Model transportation systems in high-density and low-density Bioplanned areas.
- Include private (cars, bikes, scooters) and public transportation (buses, trains).

2 Network Analysis

- Analyze traffic flow, spacing needs for roads, bottlenecks, and the carrying capacity of transit systems.
- Evaluate the impact of Bioplanning on road naming and placemaking.

3 Efficiency and Safety

- Model the implementation of Bioplanning principles to minimize road infrastructure and optimize traffic flow.
- Assess the safety improvements from distinct separation between pedestrian and vehicular traffic paths.
- Examine the role of three-way junctions in enhancing traffic flow and safety.

4 Integration with Existing Systems

- Develop strategies for integrating Bioplanning with current mobility systems.
- Ensure compatibility and easy transition for existing urban environments.

Research Proposal: Questions

1. How can Bioplanning enhance placemaking and facilitate clear road naming in urban mobility networks, diverging from conventional orthogonal street layouts?
2. How can the application of Bioplanning principles in urban mobility enhance network efficiency by minimizing road infrastructure, optimizing traffic flow, and enhancing safety through distinct separation between pedestrian and vehicular traffic paths?
3. How do three-way junctions contribute to improved traffic flow and safety in urban mobility networks planned with Bioplanning principles?
4. How can Bioplanned designs efficiently accommodate diverse transportation modalities, including private and public transportation, in both high-density and low-density areas?
5. What strategies can ensure the seamless integration of Bioplanning with current mobility systems, allowing easy transition and compatibility with existing urban environments?

This research proposal is an initial idea and remains flexible.

It will be refined and expanded based on the expertise and knowledge of the research group. The goal is to develop a robust understanding of the impact of Bioplanning on urban biodiversity and explore its potential for fostering sustainable urban development.

Dror Benshetrit

Founder and CEO

Davi Lemos

Chief Strategy Officer

Winka Dubbeldam

Design Leader & Academic, Founder of Archi-Tectonics

Bruce Mau

Massive Change, Publishing & Education Partner

Indrani Pal-Chaudhuri

Filmmaker & Anthropology Specialist

Thomas Ermacora

Guest Curator and Community Futurist

Dr. Hila Oren

Geographer & Smart Cities Expert

Jorge Pérez-Jaramillo

Urban and Regional Planning Specialist

Dr. Mike Wells

Biodiversity by Design Chartered Scientist

Marian Stuiver

Sustainable Urbanization & Governance Specialist

Tim Papandreou

Emerging Transport, Mobility Specialist

Astrid Wurdig

Visionary Architecture Management

Buro Happold
Net-zero, building performance, and climate resilience consulting

IAE Paris Sorbonne
Innovation think tank focused on the links between economy, territory and society

Gensler Urban Division
Urban Design & Master Planning Partner

Stuart Weitzman School of Design
Advanced Research & Innovation Lab

Biodiversity by Design
Innovative and multi-functional ecological design

MDE Urban Lab
Urban and Territorial Transformation

Archi-tectonics
Multidisciplinary Design Research & Manufacturing Partner

Dror
VIsion-Driven Masterplanning & Design Partner

ETA Transport Advisors
Specialists in Urban Mobility Innovation & Emerging Technologies

SECDEV Group
Agile research and innovation firm managing geopolitical, geospatial and geodigital risk

Regenesis
Sustainable and regenerative practice in built environment

Igarapé Institute
Brazi Research and Policy Advisors

Metabolic
Organization consultancy for systemic venture financing and circular economy strategy

ReLab
Building scalable business and capital models for regenerative organizations

WUR Wageningen University
Green Cities Program

MCN
Design Leadership and Governmental Communications Leadership

Climate Action Africa
Regental partner for West Africa development

China State Construction
Construction & Economic Feasibility Partner-Asia, Middle East & Africa

Stealth SBB
International Bioenergy & Biotechnology Consulting

Tel Aviv Global
Expertise in Global Branding and Placemaking for Cities

Turner Construction
Construction and Design - Middle East

Setec Engineering
Design Management

Contact Us

Sofya Krasnaya
Head of Research Programs

Phone

646-897-1404

Email

info@bioplanninginstitute.org
sofya@bioplanninginstitute.org

Website

bioplanninginstitute.org

Thank you

The Bioplanning Institute