Portfolio
Research & Practice

These five projects form a single research argument developed across twelve years of practice, fieldwork, and academic work. The sequence moves from ethnographic encoding of indigenous spatial knowledge, through territorial network analysis and continental-scale governance, to a functioning federated Digital Twin system.
Each project identified a gap that the next one was built to address.

01
Wärüi Tapüy* — *The House of the Woman
Ethnographic encoding · Pemón · Venezuela

02
Mosquera AgrodiverCity
Graph-based urbanism · UPenn · Colombia

03
Amazonas* — *Environmental Protection Bolsón
Territorial governance · Amazon Basin

04
BIM-Coordinated Practice* — *Arka Atelier
Professional BIM lead · $7.5M+ scope

05
SILVIA* — *Federated Digital Twin Framework
Research synthesis

Published preprint: doi.org/10.5281/zenodo.19616669 · CC-BY 4.0 · AGPL-3.0 · March 2026

Munich, April 2026 · I hereby declare that the information in the following Portfolio is accurate.

Dipl. Architect Josue Mendes

Venezuela · Diploma thesis USB
Supervisor: Prof. Architect Franco Micucci
Universidad Simón Bolívar
Academic · Diploma

01 · *Wärüi Tapüy* — The House of the Woman

Ethnographic spatial encoding · Pemón indigenous community · Kanaimö, Canaima National Park

SYSTEM INTERVENTION: GIS map illustrated with the proposal of a system (following actual systems of tourism) for the visitors and the community.

LOCATION

Kanaimö, Canaima
National Park
Pueblo Pemón Kamarakoto
Venezuela

METHOD

Participatory research
Kevin Lynch mapping
System intervention
5 Space types

TYPOLOGIES

3 original archetypes
Community co-validated

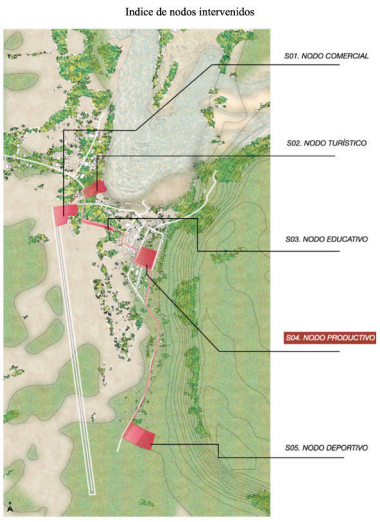


Figura 237. Ilustración en mapa de nodos intervenidos
[Fuente: Autoría propia]

BASE RULES SYSTEM: Three original archetypes derived from Pemón culture show as morphable spatial typologies

Figura 218. Maqueta de cerámica con posibilidades de diferentes combinaciones entre las tres morfologías básicas tradicionales de la cultura Pemón: la churuata Waipa, la churuata oblonga y el kalabo:so.
[Fuente: Autoría propia]

GENERATIVE SYSTEM: BIM Models of iterations in productive node S04 Würüy Tapüy, conservation of archetypes although recycling materials and reconfiguring spaces.

RESEARCH PREMISE

How does a community encode its spatial knowledge — and what is lost when that knowledge cannot be communicated in real time, updated, or digitally governed? Wärüi Tapüy began with **two weeks of participatory field research** in Kanaimö: interviews, observation, and Lynch-based path-landmark mapping to encode the spatial intelligence of the Pemón community.

The proposal — **La Casa de la Mujer**, a productive-cultural node within the Escuela de Ecoturismo de Kanaimö — emerged from five space typologies: commercial, residential, touristic, educational, and productive. Self-governance criteria were explicit from the outset. The building is not a single structure but **a replicable, multi-scalar catalogue** of landscape-architecture rules adaptable to any Amazonian regional context.

FIELD DATA

Duration	2 weeks participatory fieldwork, Kanaimö
Protocol	Kevin Lynch: paths, landmarks, districts, edges, nodes
Validation	**Co-adjusted through direct community dialogue:** self-governance from outset
Output	Multi-scalar catalogue Morphability through 3 original archetypes Amazonian adaptation rules

CONNECTION TO SILVIA

Wärüi Tapüy identified the **core epistemic gap**: the spatial knowledge of the Pemón — encoded through interviews and field mapping — could not be communicated in real time, updated, or digitally governed. SILVIA is the technical response: a federated territorial digital twin that carries the same ontology (territory as living system, not constructed object) into an AI-driven model with real-time TRI computation. **IIS: 1.0 when a community leader reports** is the direct quantification of the self-governance principle first encountered in this fieldwork.

OUTCOME

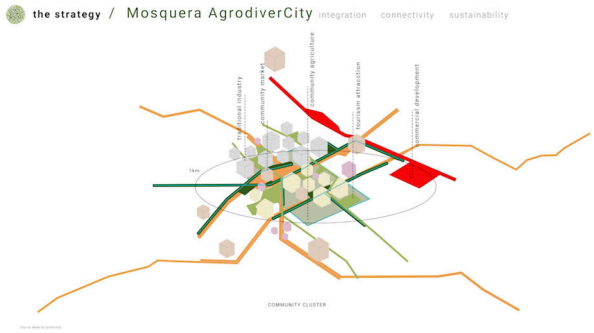
La Casa de la Mujer — productive-cultural node S04 within the Escuela de Ecoturismo de Kanaimö. Low-impact agro-production, insect sector, ecotourism interface. A replicable operative system with defined adaptation rules for any Amazonian regional context where community identity validates its own quality and translatability.

Prof. Urbanist David Gouverneur - Prof. Architect Franco Micucci - Prof. Architect Silvia Soonets
Stuart Weitzman School · UPenn
Grade: 1.4
Academic Exchange Workshop

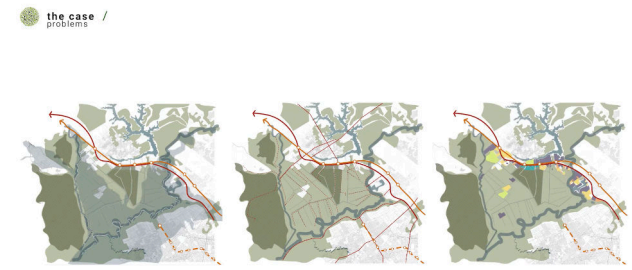
02 · Mosquera AgrodiverCity

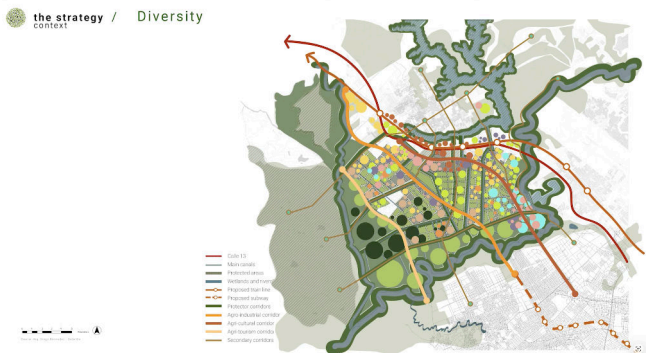
Graph-based territorial urbanism · Circular economy masterplan · Cundinamarca and Bogota, Colombia
UPenn Exchange Workshop

TERRITORIAL NETWORK: Nodes, corridors and occupancy cells derived from ecological infrastructure



REGIONAL MASTER PLAN THROUGH GIS ANALYSIS: Problems become into opportunities with a sustainable strategy connected to Bogota's city and their connected future develop.





OCCUPANCY CELLS
Ecological polygons
Not imposed grids — derived from existing landscape logic

CORRIDOR TYPOLOGY
Wetlands + waterways
Floodplain squares · linear parks as connective tissue

CIRCULAR ECONOMY
Hydroponics · biofilters
Material flows separable and recombinant across scales

LOGIC
+100 Combinations in rules system
Asynchronous planning with diverse architectural and urbanism typologies

RESEARCH PREMISE

Mosquera faces a **structural dissociation** between its two settlement cores, linked by a single arterial road. Accelerating expansion in 2024 would consolidate this fragmentation. The studio's question: can infrastructure reconcile rather than obstacle growth?
The framework is **replicable and heterogeneous** — not a masterplan but a set of combinatorial rules applicable asynchronously across the territory. A typological catalogue organises mixed-use systems at multiple scales, each with defined performance guidelines. The proposal merges three municipalities into a new agro-agricultural urban rail corridor.

FRAMEWORK

Territory
Cundinamarca savanna, La Sabana, Colombia

Logic
Combinatorial rules system :
not a masterplan; asynchronous application

Cell structure
Ecological polygons :
each cell a future patch, independently executable

Economy
Circular :
hydroponics, biofilters, flows separable across activities

CONNECTION TO SILVIA + WÄRÜI TAPÜY

AgrodiverCity introduced a **graph-based reading of territory**: nodes, edges, and cells derived from ecological infrastructure rather than planning convention. This logic reappears directly in SILVIA's ontological architecture — the TRI variables (ESD, TCI, RAR, IIS) are not metrics applied to buildings but to the **relational properties of living territories**.

Three projects, one arc: *ethnographic encoding → spatial network analysis → real-time information system*.

OUTCOME

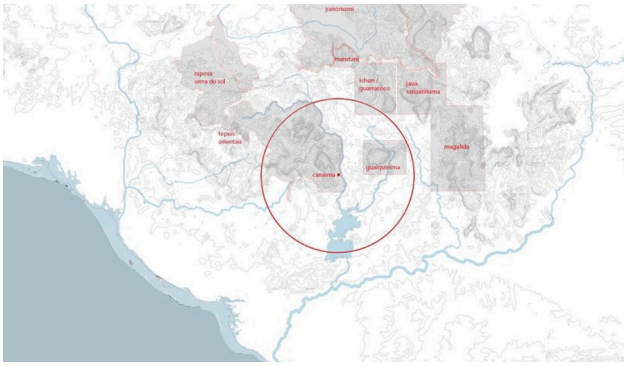
A replicable, heterogeneous urban framework — combinatorial rules applicable asynchronously across La Sabana. The assembly test validated a typological catalogue operating via mixed-use organisers at multiple scales.

Prof. Architect Franco Micucci, others
Escola da Cidade · São Paulo
Postgraduate · Workshop contributor

03 · *Amazonas* — Environmental Protection Bolsón

Territorial governance at continental scale · Amazon Basin, Venezuela–Brazil
Postgraduate studio · Escola da Cidade São Paulo

TERRITORIAL MAP: Bolsón containment system linking tepuis, Orinoco networks and lowland water systems



PROFILE CONCEPT:

"The core of the idea is a water renovation infrastructure designed to connect and expand protected areas. Architecturally, it aims for minimal intervention despite its territorial scale, alternating between elevated structures that leave the soil untouched and sections hidden within the massive tepuis(tabletop mountains). Its circular design is envisioned as a "suspended river" of calm waters, drawing a mythological parallel to the history and location of Lake Parima"

WATER INFRASTRUCTURE
Juncal + rivers as ecological connectors
Hydro-relational zones — not service infrastructure

REPLICABILITY
Continental scale
Exportable to any similar Amazon basin context

FOOTPRINT PRINCIPLE
Minimal — some touches ground
Embedded, calm, near-mythic. Parallel to lake altitude.

THREAT
Illegal mining · contamination
UNESCO World Heritage Site — fragmented zones

FACULTY - MÓDULO VENEZUELA

Franco Micucci
Alejandro Haiek
Maria Isabel Peña
Henri Vicente
Elisa Silva
Ricardo Avella
Marcos Coronel

RESEARCH PREMISE

The Parque Nacional — UNESCO World Heritage Site — faces **accelerating threats from illegal mining, systematic contamination, and ecological fragmentation** across its most sensitive zones. The studio's mandate: multiply protection without imposing external order on a landscape whose value is its undisturbed vastness.
The answer proposed an **environmental bolsón**: a containment system linking tepuis, Orinoco downstream networks, and lowland water systems into a coherent protection continuum. Not a park boundary — a relational infrastructure of thresholds, corridors, and near-mythic calm zones at lake-altitude footprint.

STUDIO STRUCTURE

Format	7-week intensive postgraduate module · cumulative jury structure
Institution	Escola da Cidade, São Paulo - Pós-Graduação Geografia e Arquitetura
Role	**Workshop team trainer + design contributor**
Network	USB + UCV + Escola da Cidade : part of same research network as Wärüi Tapüy

CONNECTION TO SILVIA
THE TERRITORIAL SCALE PROTOTYPE

The Amazonas studio asked the **governance question that SILVIA was built to answer**: how do you monitor and protect a living territory in real time? The bolsón is a spatial proposition — SILVIA is its informational counterpart: federated nodes, real-time TRI computation, community sovereignty over territorial data. **Franco Micucci's presence closes the loop** — the same research network that produced Wärüi Tapüy in Canaima is now building the digital infrastructure to govern it. Alejandro Haiek (Lab.Pro.Fab) bridges the Amazon postgraduate context directly into this application.

OUTCOME + PRINCIPLE

Minimalist principle: infrastructure that barely touches ground, embedded, calm, near-mythic recalling roman aqueducts. Territorial scale water conduct run parallel to lake altitudes at biological footprint. Framework designed for continental-scale replication — any similar Amazon basin context can apply the same system. Protection as presence, not enclosure.

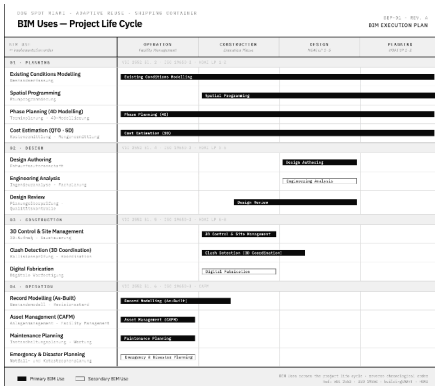
Co-founder · BIM Lead
Arka Atelier Studios
Professional · ISO 19650 · openBIM
https://josuemendes.vercel.app/

04 · *BIM-Coordinated Practice* — Arka Atelier Studios

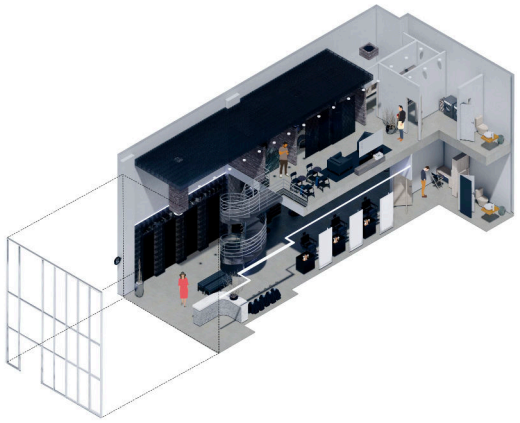
Professional BIM lead · +12 commercial projects · $7.5M+ combined scope · Caracas · Miami · 2019–2024

Due to Data Protections in Germany is not allowed to show some projects.

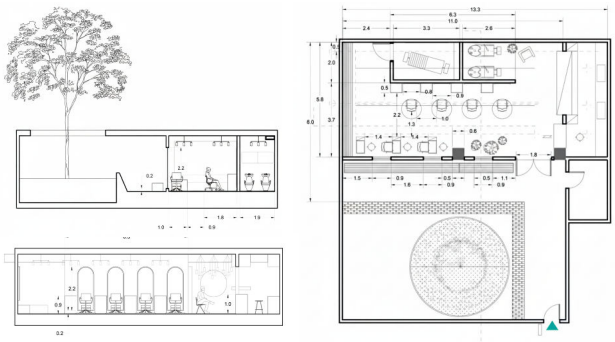
BIM USES CHART - DOG SPOT, Reutilised Infrastructure. Florida, USA.



BIM COORDINATION MODEL - ROCKOs luxury barbershop, Valle Arriba, Caracas. LOD 300 multidisciplinary model.



EXECUTION DRAWINGS - LOTTO luxury barbershop and spa, Los Campitos, Caracas.



WHY THIS BELONGS IN THIS PORTFOLIO

These projects are not presented as design showcases. They are **evidence that BIM coordination was tested under real constraints** — budget pressure, client-facing deadlines, and supervision in contexts where information management directly determined project quality. This is the professional foundation from which the architectural questions in SILVIA and Wärüi Tapüy emerge.

PROJECTS — ARKA ATELIER STUDIOS

ROCKO / LOTTO

Luxury barbershop and Spa · Valle Arriba and Los Campitos
Caracas, VE
BIM Lead + coordination

DOG SPOT

Container-based hood hall
Florida, USA
Full BIM · ISO 19650

JULIETTA / KABAL

Restaurant · urban landmark
Caracas, VE
Concept to construction docs

MATILDA / LUPE

Two renovations proposals · Restaurants
Caracas, VE
BIM + brand-spatial integration

PORTFOLIO	CLASHES	SECTORS	STANDARDS
$7.5M+	340 → <20	Service · Retail	ISO 19650
+10 projects	3 weeks saved	LP 1–9	openBIM · IFC

CONNECTION TO SILVIA

The gap between **LOD 300 coordination and living territorial data** — between a clash report and a TRI score, between a building model and an indigenous knowledge base — is the precise gap SILVIA is designed to cross. Managing information in a Caracas barbershop is categorically different from managing it in Kanaimö territory under CARE Principles. **That difference is the research question.**

OUTCOME

Portfolio scope: +12 commercial projects across residential, office, and mixed-use sectors spanning concept design through LPH 9 (construction documentation) in Caracas, Venezuela (2019-2024), with $7.5M+ combined scope. Current work includes active proposals for German market adaptation, standardising BIM workflows to HOAI phases and ISO 19650 compliance for Munich-based opportunities. Projects demonstrate BIM coordination under real constraints; budget pressure, client-facing deadlines, and supervision contexts where information management directly determined project quality. More projects documentation available at https://josuemendes.vercel.app/

Josue Mendes
Independent research · Munich
https://doi.org/10.5281/zenodo.19616669

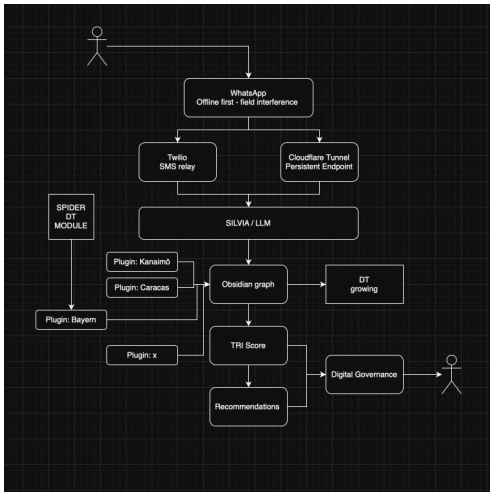
05 · *SILVIA* — Federated Digital Twin Framework

Sovereign Information Learning Virtual Intelligent Architecture · 2022–present · Zenodo preprint v1 · March 2026

LIVE PROOF-OF-CONCEPT (ILLUSTRATED)

Real WhatsApp exchange.
TRI calculated live via Claude API.
IIS = 1.0 because reporter is ***community_leader****.*
Sovereignty as a quantified variable, not policy

SYSTEM ARCHITECTURE



RESEARCH GAP ADDRESSED

Drechsel, Förster, Schubert & Petzold (eCAADe 2024) identify a structural gap in digital participation tools: generic map-viewers and surveys fail to incorporate the situated, contingent, and performative dimensions of community knowledge. SILVIA addresses this gap at a different register, where Petzold's work focuses on urban mobility stakeholders in European contexts, SILVIA asks what participation infrastructure looks like when the community is indigenous, the territory is living, and data sovereignty is not a policy preference but a constitutional right.

THREE CORE CONTRIBUTIONS

1 · TRI

Territorial Regeneration Index — TRI = *ƒ*(ESD · TCI · RAR · **IIS**). IIS (Indigenous Information Sovereignty) embedded as a quantified variable, not policy.

2 · Plugins

Modular community-plugin architecture — same core infrastructure, interchangeable knowledge bases per territory. Pemón ≠ Caracas ≠ next territory.

3 · Interface

Offline-first WhatsApp/SMS interface — data collection without stable connectivity. Gran Sabana, Venezuela. No app install required.

TRI FORMULA

TERRITORIAL REGENERATION INDEX

TRI = *ƒ*(ESD · TCI · RAR · **IIS**)

IIS = Indigenous Information Sovereignty

community_leader → 1.0 · observer → 0.6

Berkes 2008 · Mang & Reed 2012 · Niemi & McDonald 2004

CASE STUDIES

Kanaimö + Caracas
Pemón + Informal settlements

KNOWLEDGE GRAPH

Obsidian, density indicator
Digital Twin maturity as graph density

LIVE POC

WhatsApp running
Flask · Twilio · Cloudflare · Claude API

PUBLISHED

Zenodo v1 · 21 - March 2026