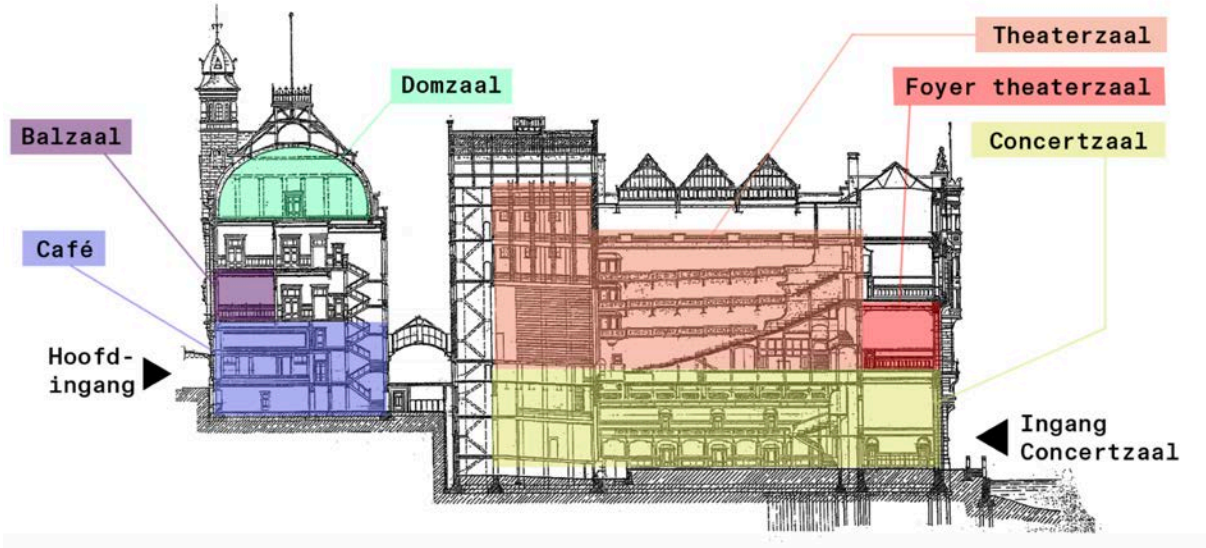
Biocraftsmanship Studio

Semester 1 Studio (October 2025 to January 2026)**, Ghent: Bio-Craftsmanship – Regenerative Architecture & Social Ecologies**
Tutor(s): Rachel Armstrong [*and second tutor TBC*]
Researchers: Ezgi Ogun, Anna Vershinina, Marie Melcore, Isil Yucel, Jannes Moons, Rosie Broadhead
Engagement: Craftsmanship / Open to students from Interior Architecture
Language: English

De Vooruit



BIO-CRAFTSMANSHIP: ARCHITECTURE AS SYMBIOTIC PRACTICE

In the BioCraftsmanship studio, you will learn how through making, you can become an **active participant in ecological cycles**, where every detail, joint, surface, and structure of your architectural design possesses innate agency.

The **BioCraftsmanship** studio reimagines Ghent's Vooruit Arts Centre—a historic symbol of socialist solidarity—as a prototyping site for living architecture. Through bioreceptive surfaces that cultivate algae, lichens, and microbial communities, we transform the building into an active participant in post-carbon spatial systems. Walls, floors, building systems, and facades transcend conventional static geometric enclosures to become life-promoting substrates where craftsmanship collaborates with organismal intelligence. Working with the limitations of this protected site, our symbiotic approach produces architecture that co-evolves with its ecosystems and human inhabitants, extending Vooruit's socialist legacy into the ecological realm—from worker solidarity to multispecies interdependence.

Your vision for the future of Vooruit will be grounded in three foundational principles:

1. **Bioreceptive surfaces**—designing walls, floors, façades, and structures that *host* life (microbes, algae, lichens) as the creative foundation for mutualistic relationships between people and nature.
2. **Venetian hydro-logics**—embracing water as a collaborator for sustaining life and activating *living materials*, using fluid dynamics and the physicochemical properties of water to design and direct the adaptive resilience of simple organisms on building surfaces.
3. **Socialist solidarity**—reclaiming architecture as a collective endeavour, where craftsmanship promotes communal thriving and equitable futures for human and non-human communities.

These principles will enable you transform Vooruit into a prototype for regenerative architecture[1]—where the building itself becomes an active participant in ecological and social cycles by metabolising waste, filtering air, purifying water, generating bioelectricity, catalysing biodiversity, and promoting ecological kinship.

The Vooruit: A Socialist Monument Reimagined through nature

The Vooruit building, founded by Edward Anseele and designed by Ferdinand Dierkens in 1913 as a "House of the People," embodies socialism's horizontal organisation through architecture—its theatres, bakeries, and assembly halls eroding class hierarchies[2,3] just as microbial ecosystems flatten biological ones. Where Antonio Gramsci saw cultural hegemony[4] reinforcing vertical power structures, Vooruit's raked seating (eliminating privileged boxes) and Art Nouveau details (stained glass scoring *The Internationale*[5]) embodied Tahl Kaminer's "spatial class consciousness".[6] This was architecture as

dialectical instrument: collective seating forced cross-class interaction, while the building's grandeur overturned industrial workers' grim realities.

21st-century science reveals that such organisational horizontality mirrors nature's own most resilient systems[7,8]. Where the "Tree of Life" metaphor once placed humans at its apex[9], we now recognise that microbial networks—outnumbering macroscopic life by orders of magnitude—thrive through decentralised, cooperative relationships. The 21st century has revealed that microbes—bacteria, fungi, algae—are not merely lifeforms, but the biosphere's fundamental designers and engineers[10]. These organisms govern Earth's most critical processes: they sculpt soils, regulate climates, and sustain ecosystems through metabolic networks far more diverse than those of plants and animals combined. This scientific revolution that characterises the Age of Biology[11] demands an architectural response. Buildings must evolve from static objects that are designed solely for humans, into dynamic, biodiverse, living systems—hosting curated microbiomes[12] that actively participate in spatial performance. Vooruit's revival as a living building extends this logic: its bioreceptive surfaces (cultivating algae, lichens, and bacteria) and hydro-logical systems embody socialism's collective ethos at a multispecies scale.

To socialise nature is to heal the rift between people and ecosystems. Just as Vooruit's original halls empowered workers to reclaim culture, its transformation into living infrastructure—water-purifying walls, habitat facades, and stages for interspecies collaboration—redefines productivity as regeneration rather than extraction. Here, craftsmanship partners with organismal intelligence; ornament emerges as oxygen-producing biofilm; and solidarity extends rhizomatically across kingdoms, threading animal, plant, and mineral into a continuous body. The building's microbial redesign upholds socialism's biophilic roots while advancing its ultimate goal: ecological equity as the new means of circular production.

This vision unfolds across three interdependent scales: At the **microbial** scale, materials recruit and sustain beneficial microbiomes[13], enabling biological succession—where simple microbial communities mature into complex ecosystems, transforming Vooruit's façade into a living, carbon-sequestering skin. At the **social** scale, community labs revive Vooruit's cooperative spirit, as citizens cultivate algae for bioremediation, develop composting protocols for organic waste, tend rooftop allotments, and fabricate mycelium biocomposites for insulation. At the **planetary** scale, the 'Ghent System' of mutual aid expands beyond unemployment support to interspecies care, ensuring the building's lifecycle actively enriches local ecosystems.

Together, these scales generate an architecture that is neither object nor monument but **negotiated habitat**—a pact between human craft and non-human ingenuity.

Socialist and Mercantile Models of Ecological Coexistence: Lessons from Vooruit and Venice

While the Vooruit building embodied socialist emancipation through collective ownership and worker empowerment, Venice's mercantile-communitarian model demonstrates how trade networks—predicated on trust and civic solidarity—can promote urban resilience. Despite their divergent political economies, both sites converge on a fundamental principle: human prosperity depends on our capacity to collaborate with nature's systems.

Venice's centuries-old dialogue with water reveals architecture's neglected kinship with living systems. Where modern engineers see threats—in the algae clinging to Istrian stone, the molluscs colonising water stairs, the microbial films staining terrazzo—we recognise nature's own infrastructure: self-repairing, pollution-filtering, and carbon-sequestering. These 'algatectural' adaptations, once dismissed as mere 'biofouling'[14], now offer blueprints for resilience. Yet contemporary solutions like the MOSE barriers betray this legacy, prioritising brute-force containment over symbiotic negotiation.

The BioCraftsmanship studio transposes Venice's hydro-logical intelligence to Ghent's Leie River waterfront, reimagining Vooruit's edges through living precedents. We take inspiration from Venice's submerged stairs—where tidal rhythms have transformed utilitarian docks into thriving intertidal habitats, proving that architectural thresholds can evolve into ecological incubators. This ethos extends to our engagement with TAMAssociati, whose Venice studio we will visit to explore how their bioclimatic strategies—like the Organic Challenge to build Climate-Smart Communes in Togo[15]—that engage rainwater harvesting and reuse, smart irrigation and thermally efficient walls, which combined with with mitigation measures to reduce and at least partially reverse these effects. Examples include using solar panels and wind turbines for clean energy production, planting drought and/or salt-tolerant native plants, and using natural materials for houses, to advance both environmental and social equity. Together, these models guide Vooruit's transformation: where staircases become mussel-crusted filters, façades turn into respiratory membranes, and every intervention asks how architecture can redistribute agency—not just among people, but across species.

Vooruit's legacy, however, also demands a more negotiated relationship between human and nature, rejecting the capitalist reduction of ecosystems to "resources," to replace these extractive principles with a paradigm of cohabitation. Emerging biotechnologies such as bioreceptive panels, demonstrate how architecture might use and advance this potential through community-based actions. During our site visit to Venice, we will study the 2025 Architecture Biennale's[16] intelligent design themes to interrogate such innovations—from bioreceptive designs to algae-powered bioreactors and biomineralizing microbial colonies—noting how the shared intelligence between human, non-human and digital platforms, can transform Vooruit into a dynamic testbed for symbiotic construction.

Manifesto for a Mutualist Architecture

The BioCraftsmanship studio moves beyond mere technical innovation to propose a radical rewriting of architecture's social and ecological contract. Where the Anthropocene enshrined extraction, the Biocene demands reciprocity; where modernist

architecture asserted human mastery, we must cultivate co-authorship. Venice's 'living' stones offer the material methodology; the 19th Venice Architecture Biennale establishes the range of intelligences that can inform our decision making, while Vooruit's socialist legacy articulates the ethical framework. In concert, they propose an architectural paradigm where resilience emerges through cultivation rather than imposition, where structural integrity derives from our ongoing, negotiated coexistence with biological and elemental forces.

From Socialist Utopia to Ecological Kinship

Just as Vooruit's halls once encouraged worker solidarity through collective space, its living redesign invites interspecies solidarity through bioreceptive tectonics. Here, biofilms become building systems, algal colonies transform into carbon-negative cladding structures, and biodiverse communities emerge as essential stakeholders in spatial justice. This is architecture as shared, intelligent habitat—where craftsmanship negotiates through human mastery to establish modes of ecological collaboration. Where we no longer build just to shelter life but also incorporate the very processes that sustain it.

Starting as a constructed socialist protocol, today Vooruit can become a **biopolitical prototype** for how we live together—a counterpoint to ecological collapse. By weaving Venetian hydro-logics, microbial technologies, and Ghent's legacy of solidarity, we propose the production of an architecture that doesn't fossilise but *grows and evolves* with its communities—a living construction that paves the way for a regenerative future.

BIOCRAFTSMANSHIP SUMMARY

SITE & CONTEXT

Vooruit Arts Centre

- **History**: Built in 1913 as a **socialist cooperative**, the Vooruit building hosted theatres, bakeries, and worker assemblies. Its **waterfront location** along the Leie River makes it ideal for **hydro-biological experiments**.
- **Design Challenge**: How can a **monument to human labour** become a **hub for interspecies collaboration**?

Venice as Precedent

- **Water-Brick Symbiosis**: Venice's **algatectures** (algae-coated walls) and **TAMAssociati's** projects reveal how **porosity** and **tidal rhythms** can shape bioreceptive design.

- **Design Challenge**: How can a surface that encourages **biofouling** become a **substrate and site for interspecies collaboration**?

PROGRAM

Phase 1: Research & Ethics

- **Biomaterials Survey**: Study **bioreceptive materials** (e.g., porous ceramics, wood, concrete blends) and their performance in environments exposed to water and the elements.
- **Optional Venice Site Visit** is organised for mid/late October 2025. This excursion is designed to enhance your research and reinforce team collaboration in advance of the focus on individual work starting in November. The visit will involve the analysis of water-material interfaces, and a site visit to TAMAssociati's architecture studio—known for projects that combine social justice with ecological design, such as their "Rebuild with Care" initiatives in post-disaster contexts. You will also survey of the exhibitions at the 19th International Venice Architecture Biennale to establish the cutting edge research practices in BioDesign, microbial architectures, and bioreceptivity.
  While participation is not mandatory, students who attend will benefit from shared learning and site-specific investigations. An estimated cost of **€550-750** (low budget travel and accommodation) will apply, and entry fees (€16 per day as concessions for students and/or Under 26 to the Biennale, other concessions are available). If you organise yourselves in groups, it is possible to reduce these costs. For those unable to join, an alternative activity will be organized in Ghent. Please note that **Week 7 of Semester 1 is dedicated to studio work and Master's dissertation development, and absence due to other courses will not be permitted.** If you cannot attend the Venice trip, you must participate in the alternative sessions in Ghent. All missed studio days must be justified in writing to ensure alignment with the program's learning objectives.
- **Group model of the Vooruit building**: A scaled model of the waterside building façade will be developed for the studio to analyse its existing structure, details and help you visualise and evaluate your building programs in relationship to the overall site and space. The building is extensively documented as it is currently applying for heritage status
- **Vooruit's Legacy**: Map its history as a **socialist "palace for the people"** and identify programs (e.g., **fungal cultivation labs**, **repair workshops**) that align with its ethos to develop a program for the building for the next 50 to 100 years.

Phase 2: Prototyping & Community Engagement

- **Living Prototypes**: Propose designs, protocols, and experiments to cultivate **algae panels**, **lichen-embedded tiles**, or **mussel-colonised substrates** for the waterfront façade.

- **Stakeholder Visits and Presentations**: Work with **Vooruit's curators** to develop and receive feedback on your ecological programs for the future of the building and its community.

Phase 3: Building Design

- **Bioreceptive Façade**: Design, and model a dynamic skin that filters water, hosts biodiversity, and changes seasonally.
- **Social-Ecological Programs**:

  Microbial Kitchen: A space for fermenting foods using building-grown cultures.
  Soil Library: Archive local mycorrhizal networks for urban farming.
  Rising Water Assembly Hall: A flood-adaptive space for community gatherings.
- **Maintenance Protocols**: Develop **"more-than-human" routines** and interventions (e.g., **bird nesting schedules**, **microbial feeding cycles**).

Phase 4: Final Exhibition & Activation

- Present work at **Vooruit**, e.g. an **exhibition** on **living architecture** and **post-carbon future conversation with Vooruit and its communities**.

KEY QUESTIONS

1. **How can regenerative architecture embody socialist values—collective care, equity, and ecological justice?**

   Vooruit's history as a **workers' cultural centre** invites designs that prioritise **shared resources** and **multispecies solidarity**.
2. **What materials, processes, and hybrid technologies enable bio-integrated design that can be seamlessly integrated in buildings?**

   We'll test **bioreceptive concrete**, **mycelium biocomposites**, and **microbial substrates** that thrive in Ghent's humid climate.
3. **How does biocraftsmanship differ from conventional preservation, adaptive reuse or retrofit?**

   Unlike static restoration, we propose **living interventions** that evolve with the building's ecosystem and become an integral part of the architectural community of actors/agents.
4. **How can a building's lifecycle (construction, operation, decay) contribute to ecosystem health?**

   From **carbon-sequestering cladding** to **compostable structures**, we'll design for resource **circularity and an aesthetics that evolves from the relationships that are integrated into the building**.
5. **What role can architecture play in promoting and supporting more-than-human communities?**

Spaces for **bats, birds, pollinators, native plants, and microalgae** can be integrated into Vooruit's program.

DELIVERABLES

1. **Final Project** – Architectural/spatial intervention (drawings, models, bio-design experiments) based on ecological and regenerative protocols.
2. **1:1 Bio-Receptive Prototype** – A living façade component that is integrated into the building program.
3. **Group Model** – of the water facing façade of the Vooruit building.
4. **Bio-Craftsmanship Manifesto** – Develop your personal ethical and technical principles for regenerative design to help you establish your unique design perspective.
5. **Reflection Document** – Research methods, co-design processes, and stakeholder engagement discuss the proposals, interventions and evaluations that you performed to realise your final design.

---

[1] Armstrong, R. (2024) 'Regenerative Architecture', *Journal of Chinese Architecture and Urbanism*, 6(1), p. 1882. Available at: https://doi.org/10.36922/jcau.1882

[2] Discovering Belgium (n.d.) 'Socialist Movement Ghent'. Available at: https://www.discoveringbelgium.com/socialist-movement-ghent/

[3] Vooruit (n.d.) 'The Building'. Available at: https://web.archive.org/web/20090926083612/http://vooruit.be/en/gebouw

[4] Gramsci, A. (1971) *Selections from the Prison Notebooks*. Edited and translated by Hoare, Q. and Nowell-Smith, G. New York: International Publishers, pp. 55–60, 175–185.

[5] Focus on Belgium (n.d.) 'Did you know the composer of the Internationale was Belgian?'. Available at: https://focusonbelgium.be/en/facts/did-you-know-composer-internationale-was-belgian

[6] Kaminer, T. (2016) *Architecture, Crisis and Resuscitation: The Reproduction of Post-Fordism in Late-Twentieth-Century Architecture*. London: Routledge, p. 112.

[7] Zhu, S., Hong, J. and Wang, T. (2024) 'Horizontal gene transfer is predicted to overcome the diversity limit of competing microbial species', *Nature Communications*, 15, p. 800. Available at: https://doi.org/10.1038/s41467-024-45154-w

[8] Hug, L.A., Baker, B.J., Anantharaman, K., Brown, C.T., Probst, A.J., Castelle, C.J., Butterfield, C.N., Hernsdorf, A.W., Amano, Y., Ise, K., Suzuki, Y., Dudek, N., Relman, D.A., Finstad, K.M., Amundson, R., Thomas, B.C. and Banfield, J.F. (2016) 'A new view of the tree of life', *Science*, 353(6299), pp. 903–904. Available at: https://doi.org/10.1126/science.aad4597

[9] Gould, S.J. (1989) *Wonderful Life: The Burgess Shale and the Nature of History*. New York: W.W. Norton & Company.

[10] Crowther, T.W., Rappuoli, R., Corinaldesi, C., Danovaro, R., Donohue, T.J., Huisman, J., Stein, L.Y., Timmis, J.K., Timmis, K., Anderson, M.Z., Bakken, L.R., Baylis, M., Behrenfeld, M.J., Boyd, P.W., Brettell, I., Cavicchioli, R., Delavaux, C.S., Foreman, C.M., Jansson, J.K., Koskella, B., Milligan-McClellan, K., North, J.A., Peterson, D., Pizza, M., Ramos, J.L., Reay, D., Remais, J.V., Rich, V.I., Ripple, W.J., Singh, B.K., Smith, G.R., Stewart, F.J., Sullivan, M.B., van den Hoogen, J., van Oppen, M.J.H., Webster, N.S., Zohner, C.M. and van Galen, L.G. (2024) 'Scientists' call to action: Microbes, planetary health, and the Sustainable Development Goals', *Cell*, 187(19), pp. 5195–5216. Available at: https://doi.org/10.1016/j.cell.2024.07.051

[11] Hockfield, S. (2019) *The Age of Living Machines: How Biology Will Build the Next Technology Revolution*. New York: W.W. Norton & Company.

[12] Whipps, J.M., Lewis, K. and Cooke, R.C. (1988) 'Mycoparasitism and plant disease control', in Burge, M.N. (ed.) *Fungi in Biological Control Systems*. Manchester: Manchester University Press, pp. 161–187.

[13] Lederberg, J. and McCray, A.T. (2001) ‘’Ome Sweet ’Omics — A Genealogical Treasury of Words’, *The Scientist*, 15(7), p. 8.
[14] Callow, M.E. and Callow, J.A. (2002) ‘Marine biofouling: a sticky problem’, *Biologist*, 49(1), pp. 1–5.
[15] An Organic Challenge to build Climate-Smart Communes in Togo, TAMAssociati: https://www.tamassociati.org/portfolio/an-organic-challenge-to-build-climate-smart-communes-in-togo/ (Accessed: 16 May 2025)
[16] La Biennale di Venezia (2025) *Biennale Architettura 2025*. Available at: https://www.labiennale.org/en/architecture/2025 (Accessed: 16 May 2025)