FERAL SURFACES FOR THE MULTI-SPECIES CITY
HARRISON ATELIER www.harrisonatelier.com
FACULTY RESEARCHER: Ariane Lourie Harrison, Coordinator of MS Urban Design, GAUD
TEAM: Yuxiang Chen, MS Architecture, Pratt 2018; Carlos Balza Gerardino, MS Architecture, Pratt 2021; Wei Lin, MS Architecture, Pratt 2021; Dr. Seth Harrison

PROJECT STATEMENT

New York City buildings comprise approximately 3000 square miles of building facades. These surfaces are underused as enclosures that simply protect humans from the exterior while signaling symbolic capital. These surfaces can become vital preserves of new habitat for Northeastern avian and insect species facing dramatic decline.

Harrison Atelier's Feral Surfaces prototypes new formats of building cladding as smart habitat for native pollinators. Developing our multi-species design for pollinators (ROH awards 2020 and 2019), we have prototyped analogous habitats from mycelium-infused hempcrete, an ethically sourced and sustainable material that can be cast to accommodate habitats for cavity and ground-nesting insects. Each of these analogous habitats contains cameras and microprocessors to monitor, record and feed a data-base for automated insect identification with Microsoft's AI for Earth program. While the construction of analogous habitat is essential for species survival, we argue that design can do more for climate resilience by addressing gaps in scientific research on insects. IUCN data from 2021 show that the conservation status of only about 1% of the vast insect class has been assessed. The monitoring system on the one hand allows for the recording and image-database for automating insect identification, on the other, it offers a real-time portal for experiencing the city at a non-human scale.

In April 2023, Feral Surfaces will be constructed in two urban sites—Barcelona (awarded a place in the 2023 festival d'arquitectures de Barcelona) and at Governors Island's The Bee Conservancy. Feral Surfaces seeks to transform building surfaces into intelligent novel habitats, making cultivation and maintenance of building surfaces synonymous with planetary care.

Area of investigation:
Biodiversity support, Design for Multiple species, Analogous habitats, Reconciliation ecology, Biodiverse urbanism

Goals and Impact:

- To create a hybrid installation (physical rooftop prototype with digital public interface) to demonstrate architecture's potential contribution to reconciliation ecology in developing new and novel urban habitats for building a biodiverse city.

- To build on Harrison Atelier's existing work in this area, notably its prize-winning rooftop proposal for Accelerate the City and its awarded Hempcrete Habitats.

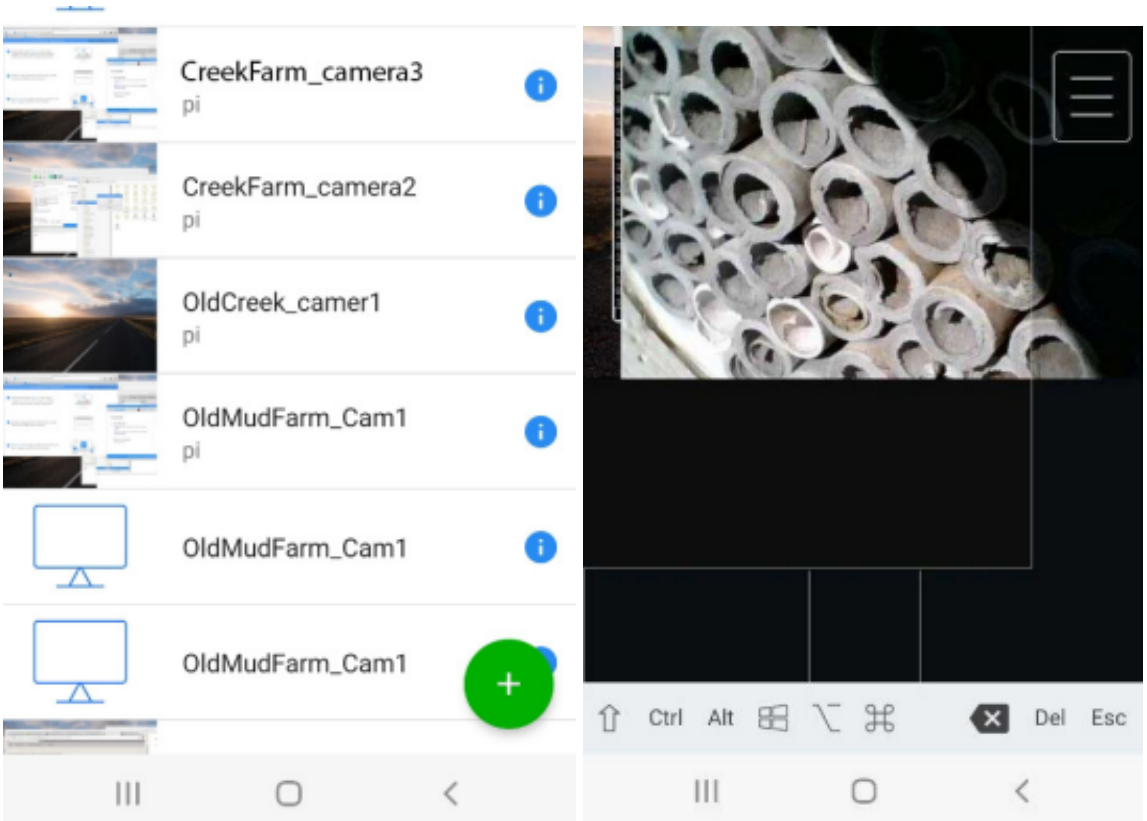
- To install a physical hempcrete habitat that connects Harrison Atelier's ongoing Feral Rooftops research with Barcelona's Living Roofs and Green Covers and the experimental scope of MODEL and to connect to the conservation efforts of The Bee Conservancy, Governors island.

- To establish digital monitoring protocols via App interface. Images harvested from rooftop contribute to ongoing effort to develop AI models for identifying native bees at family level, thereby contributing to conservation biology characterization of native insects (Microsoft AI for Earth program).

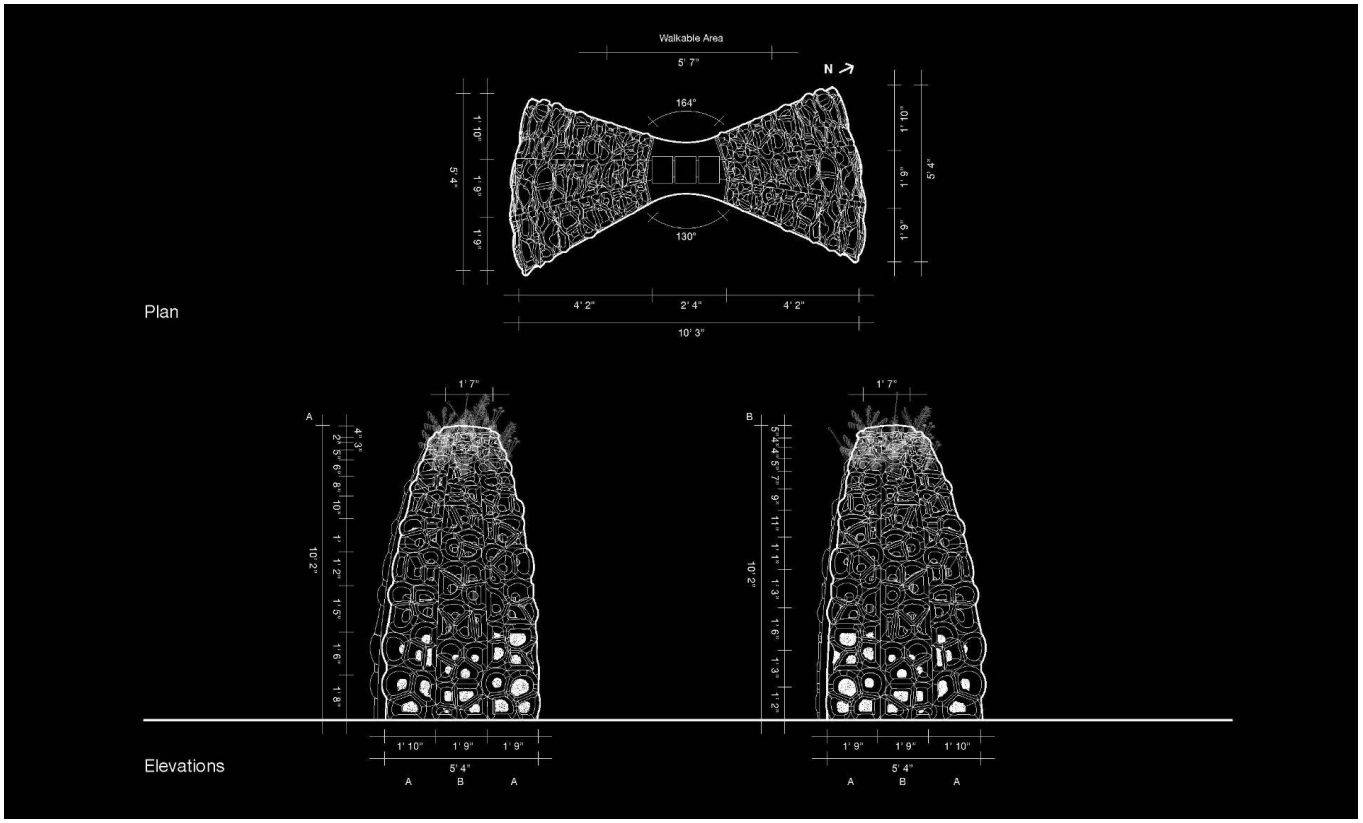
Harrison Atelier has developed a series of hempcrete habitats for The Bee Conservancy on Governors island. The design process includes modeling and milling molds as indicated above. This flexible and sustainably (and ethically) sourced material is mixed and hand-cast at the Harrison Atelier office in Brooklyn to create novel and monitored cavity-dwelling insect habitats.

Launching the monitoring app:

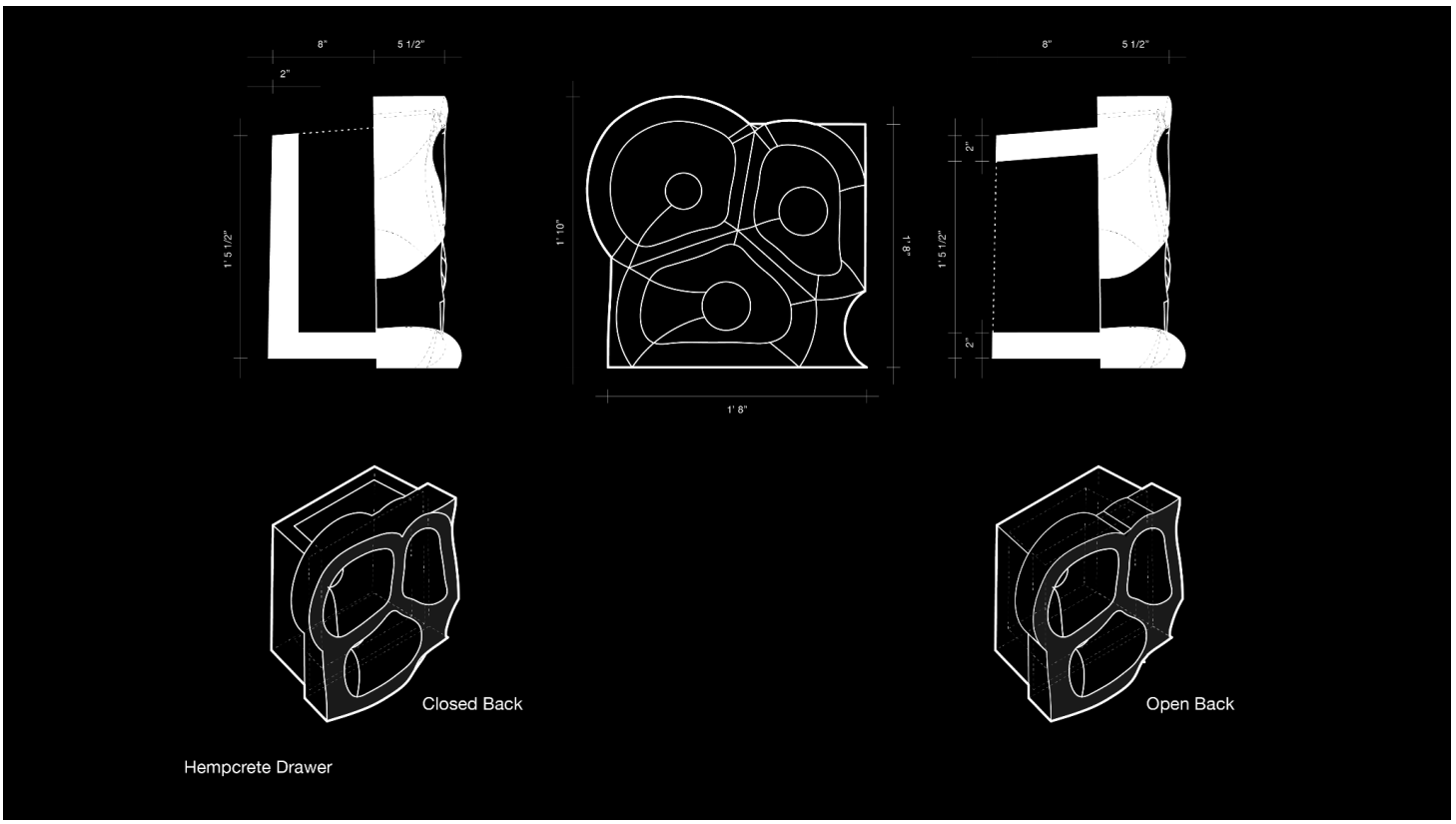
The live camera feed will be shown on an app developed by Yuxiang Chen at HAT. Currently it is designed to feature live camera feed of the habitats and generate images for an image-based database for automating insect identification (github address). An augmented reality component that helps demonstrate the location, design and experience of the rooftop can be added to the app.



Feral Surfaces at the Hempcrete Habitat, The Bee Conservancy




Solar Panels
Vegetation
Rain Water Storage
Information
Data Gathering
Bee Nesting
Tubes + Ground
ULA
Urban land-Laguardia complex soil
PE36 36" Penetrator™ American Earth Anchors
Au - 0" to 8": cobbly-artifactual coarse sandy loam
BCu - 8" to 26": very cobbly-artifactual coarse sandy loam
Cu - 26" to 79": very cobbly-artifactual coarse sandy loam
Longitudinal Section


8"
5 1/2"
2"
1' 5 1/2"
1' 10"
1' 8"
1' 8"
8"
5 1/2"
2"
1' 5 1/2"
2"
Closed Back
Open Back
Hempcrete Drawer

HARRISON ATELIER TEAM

Harrison Atelier
Harrison Atelier is a Brooklyn based architecture and design firm that has built several pavilions featuring cladding systems that accommodate multiple species. Completed in 2020, the Pollinators Pavilion in Hudson, NY is a 350 sf visitor center/field station that houses and monitors solitary bees with an innovative cladding system (awarded 2021 AIANY Design Honor, NYCML 2018 and grants for AI for the Earth from Microsoft and National Geographic) that was fabricated in partnership with LafargeHolcim's Ductal® Workshop. The Hempcrete Habitats will be installed at The Bee Conservancy on Governors Island, NY in 2023 using a mycelium-infused hempcrete as an ethically sourced material; the Hempcrete Habitat continues to develop a database on native pollinators using an AI-based model. A prototype for the Hempcrete Habitats was installed at the Bee Conservancy from 2021-present. Prior built work for multiple species include the Species Wall at Clermont, NY (2017); and the Birds and the Bees at CR-10, Germantown, NY (2018-9).

Ariane Lourie Harrison, AIA, PhD.
Ariane is a Principal and co-founder of Harrison Atelier and a registered architect in New York State. She currently is the Coordinator of the Masters of Science in Urban Design program at the Graduate School of Architecture, Pratt Institute; Lecturer at The Weitzman School of Design and Lecturer at the Yale School of Architecture. She was a critic and lecturer at the Yale School of Architecture and Yale College from 2006 to 2017. Her teaching develops multi-species cladding and habitats for the biodiverse city in studios at Pratt Institute (2017-present). She teaches history and theory of envelope assemblies for multiple species (Weitzman School of Design 2022-present; Yale School of Architecture 2006-2017; 2023-). Her projects and writing explore the concepts and realities of making architecture for multiple species, from her anthology Architectural Theories of the Environment: Posthuman Territory (Routledge, 2013) to "Feral Envelopes" in The Future Office (Actar, 2023). She earned her AB from Princeton University in 1993 (summa, Phi Beta Kappa) , her M. Arch from GSAPP Columbia University in 2006 (design excellence award) and PhD. From New York University in 2008.

Seth Harrison, MD
Seth is a Principal and co-founder of Harrison Atelier. He is an entrepreneur in biotechnology and culture. Seth's role in shaping Harrison Atelier's thought-into-action approach to posthumanism and building for multiple species derives from his work with new technologies. He founded Apple Tree Partners in 1999, a firm that creates companies in the life sciences. Seth received his MFA in writing (fiction concentration) at Columbia University's School of the Arts (2010). Seth received his MD and MBA from Columbia University and completed his surgery internship at New York Presbyterian Hospital. He received his AB in Comparative Literature, from Princeton University.

Yuxiang Chen
Yuxiang is the lead designer and project manager of Harrison Atelier, Yuxiang Chen leads the design and AI team for the Pollinators Pavilion. His research is focussed on robotic programming and digital fabrication for sustainable architecture. He previously participated in the Tongji Digital Future team in 2016 and Pratt Consortium research center in 2018. He received his Bachelor of Architecture from Tongji University, and his Master of Science degree (with Pratt Circle Awarded) from Pratt Institute.

Carlos J. Balza Gerardino, MS
Carlos J. Balza Gerardino, originally from Venezuela, earned his Bachelor in Science in Architecture and Master of Architecture from Texas Tech University, and completed his Masters of Science, Architecture (Post-Professional) at Pratt Institute. Carlos currently works as an Architectural Designer for Harrison Atelier, as a Visiting Assistant Professor at Pratt Institute, and as an Adjunct Faculty at New York Institute of Technology. His research focuses on the role that public education, and its design, plays in a Post-Pandemic New York City, and the role of beauty and aesthetics in contemporary design methodologies.

Wei Lin
He is devoted to the research on endangered marine species and sustainable coastal environment. His thesis project Blurred Boundary won the first prize of GAUD Post Anthropocene, and this project was invited by Tsinghua University (Beijing, China) to participate in the ICADE exhibition in 2021. He received his Bachelor of Architecture from Chung Yuan University and his Master of Science degree from Pratt Institute.

AI TEAM

Zhengyang Chen

Zhengyang earned his Masters in Computer Science & Engineering at Georgia Tech in 2021, and a Master's degree, Architectural Technologies from Georgia Tech in 2019.He has a strong interest in Database Techniques / Game AI/ Machine Learning / High Performance Computing. His personal skills include: C/C++, Python, Java, JavaScript/HTML/CSS, Node.js, D3.js, SQL, MongoDB, Neo4j, EXPRESS, Spark, Hadoop, Tensorflow, Keras, R, Azure, AWS. At Harrison Atelier he has participated in a project in collaboration with Microsoft named 'AI for earth' in scope of bee category identification, developing the deep learning model using transfer learning techniques, with VGG-16 deep learning architecture and SVM classifier Keras for image identification with optimization. Also, enhancing the model performance by reaching an accuracy level of 97.20%, compared with 70% of the original model.

Hanwen Zheng

Hanwen received her MS in computing from the University of Munich.

SCIENTIFIC ADVISORS

Dr. Christina Grozinger, Professor of Entomology; Director, Center for Pollinator Research, Insect Biodiversity Center; Penn State College of Agricultural Sciences
Dr. Jerome Rozen, Curator Emeritus, Apoidea Collection, Professor Emeritus, Richard Gilder Graduate School
Dr. Dustin Partridge, Director Of Conservation And Science, NYC Audubon