

MS_ACT
ARCHITECTURE,
COMPUTATIONAL TECHNOLOGIES
PROGRAM SUMMARY



COMPUTATIONAL DESIGN
AI - ML



ROBOTIC INTERACTIVITY VR



ROBOTIC FABRICATION



MATERIALS DESIGN

WHY

ARCHITECTURE OF INFORMATION:
EXPAND
DESIGN AUTHORSHIP TO
NEW MEDIA AND NEW MEDIUMS.

WHAT

ARCHITECTURE EXPERIMENTATION:

SCIENCE, TECHNOLOGY, ECOLOGY, DESIGN.

NEW SYSTEMS OF REPRESENTATION:

ADVANCE CULTURAL PROJECTS THROUGH

COMPUTATIONAL TECHNOLOGIES.

VIRTUAL REALISMS.

HISTORY, THEORY, AND CRITICISM OF REPRESENTATION

SCIENTIFIC EVIDENCE-BASED DESIGN

BIG DATA - SURVEY - DATA LINK

INNOVATION IN COMPUTATIONAL TECHNOLOGIES

COMPUTATIONAL DESIGN - PROGRAMMING (PYTHON)

ARTIFICIAL INTELLIGENCE - MACHINE LEARNING

APPLICATION - INTERFACE DESIGN

VIRTUAL - MIXED - AUGMENTED REALITY

ROBOTIC FABRICATION

ROBOTICS SYSTEMS DESIGN

COMPOSITE BIOMATERIALS - MATERIALS DESIGN

MASTER OF SCIENCE IN ARCHITECTURE, COMPUTATIONAL TECHNOLOGIES

New York Institute of Technology
School of Architecture and Design



[Maria R. Perbellini](#), M.Arch.,
Dean of the School of Architecture and
Design

NYIT SCHOOL OF ARCHITECTURE AND DESIGN RECEIVED A GRANT EXCEEDING \$2 MILLION FROM THE IDC FOUNDATION [Excerpt]

“We are honored and thrilled about this partnership with the IDC Foundation and are sincerely grateful for this extraordinary commitment to NYIT,” said **Maria R. Perbellini**, M.Arch., dean of the School of Architecture and Design. “We aspire to transform NYIT as an institution so that the architecture, medical, and health fields can work together on unprecedented research and education activities through design and technology.”

The grant will provide funding for academic activities, scholarships, projects, and the development of two new post-graduate academic programs to foster collaborative and cross-disciplinary efforts between the School of Architecture and Design and other NYIT schools and colleges, including NYIT [College of Osteopathic Medicine](#) (NYITCOM) and NYIT [School of Interdisciplinary Studies and Education](#). The proposed M.S. program in Design and Health will focus on health care design, biomedical systems, parameters affecting health and wellness, and solutions for better living in a more sustainable world.

“We will move beyond architectural research, to engage with alternative and unconventional design solutions towards a healthier built environment and a holistic

approach to wellbeing,” said Perbellini. “My appreciation goes to Wolfgang Gilliar, D.O., dean of NYITCOM for coming on board with a collaboration that will propel future fruitful inter-sections between our two schools.” [...]

The master’s degree in Digital Fabrication is being developed to focus on design at a variety of scales, from nano to micro, and investigate the development of high-performing building components, integrated material systems for environmentally responsive building skins, smart material processes and biomaterials, leveraging the fields of architecture, engineering, health, and medicine.

“Our goal is to immerse students in a transformative learning environment that advances new knowledge while blurring disciplinary boundaries and imparts a deep understanding of innovation and specialization to address globally significant issues,” said Perbellini.

The grant will also fund the IDC Foundation Endowed Chair of Digital Technology in the School of Architecture and Design, the first endowed chair at NYIT. In addition, it will also support the design and construction of the IDC Foundation Digital Fabrication Lab that will include a new robotic matter design lab.

“This is a true agent of change for the School of Architecture and Design and stewards NYIT’s mission to sustain a vibrant

student-centered learning community,” said Perbellini. “On behalf of the School of Architecture and Design, I would like to express our most sincere gratitude to NYIT President [Hank Foley](#), Ph.D., for his enthusiastic support and faith in the promise of the proposal and our work.”

The IDC Foundation is a legacy of the Institute of Design and Construction, the former Brooklyn-based, nonprofit, technical college that educated more than 30,000 students between its founding in 1947 and its closing in 2015.

“The IDC Foundation is pleased to support the New York Institute of Technology, whose mission is closely aligned with the legacy of the Institute of Design and Construction,” said Raymond R. Savino, president of the IDC Foundation. “Both share a commitment to career-oriented professional education, access to opportunity, and applications-oriented research. We are especially pleased to support the commitment of NYIT’s School of Architecture and Design to explore opportunities at the intersection of the architecture and medical fields to collaborate on unique and unprecedented research and educational activities through design and technology.”

MASTER OF
SCIENCE IN
ARCHITECTURE,
COMPUTATIONAL
TECHNOLOGIES



Director
[Pablo Lorenzo-Eiroa](#), Associate Professor

“Students will discover possible futures for the discipline of architecture by expanding design authorship through innovations in algorithms and interfaces, robotic systems, and new materials. Ultimately, an architecture of information will be activated through transformative spatial conceptions, built ecological architectural prototypes, and interactivity at full virtual and actual scales.”

Pablo Lorenzo-Eiroa, M.Arch II

Automated Machines for Drawing and Building: The Expansion of Design Authorship in Architecture

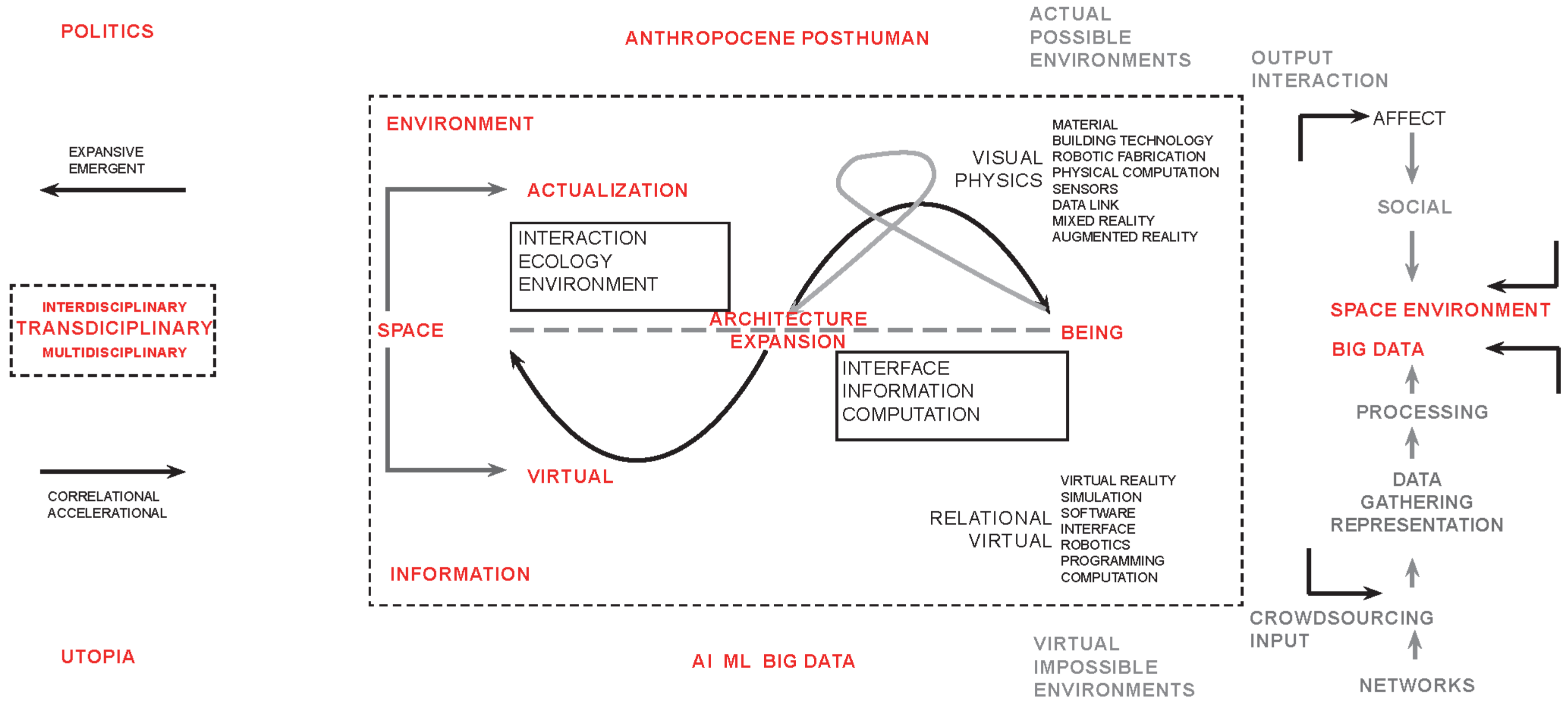
Architecture’s projective imagination continues to reshape its modes of operation and production, through experimentation with design technologies. Computational technologies are establishing new cognitive references across all disciplines, consequently challenging the core of architecture, from conventional systems of spatial representation, to conventional building construction systems. Universal paradigms are being revolutionized and architectural practice, research and pedagogies are now driven by information. This transformation is comparable to the first Industrial Revolution and, in architecture, the technological determinism of the Modern Movement.

Integrating technological innovation with cultural advancements, similar to the Renaissance, remains as the discipline’s challenge. The core understanding of the discipline, including its own history and theorization, is being tested through new survey mechanisms for gathering and processing big data, new computational paradigms to represent space including emergent systems and geometries. The repercussions for an emergent architecture of information increasingly informed by algorithms facilitate the conception of computation as proto-architectural. Within this informational transition, architecture is surrendering design authorship and cultural relevance to computer software programmers and technologists.

By default, software embeds parameters for generating architecture, without addressing the culturally biases constrained by software, which inform resulting spatial representations. This marks the necessity for architecture to expand its own field of knowledge by actively participating in the ongoing information revolution by coding

reality, therefore deepening the authorship of its tools and technologies. An important challenge for architecture in this context is the discipline's capacity to claim higher levels of cultural relevance.

From deep representational structures to physical material experience, research and pedagogy, the Master of Science program explores the possibility of an architecture of informed realisms.



MS_ ARCHITECTURE, COMPUTATIONAL TECHNOLOGIES PROGRAM CONCENTRATION AREAS WITH CERTIFICATES

Maria Perbellini, M.Arch,
Dean, School of Architecture and Design

Pablo Lorenzo-Eiroa, M.Arch II,
Director, Associate Professor, School of
Architecture and Design

Tom Verebes, PhD,
Professor, School of Architecture and
Design

The Master of Science in Architecture, Computational Technologies (M.S.ACT) program is a one year, 30-credit, post-professional master's degree. Targeted primarily to recent graduates from undergraduate professional programs, candidates with a background in design and an interest in architecture are eligible to apply.

Located primarily in New York City, the M.S.ACT program is led and taught by international faculty, benefiting from partnerships with public and private organizations, and professionals leading experimental design practices based in New York City. A distinctive area of applied research is proposed, which leverages the School of Architecture and Design's Digital Fabrication and Robotics Labs, and the advantages of its New York City campus with space to construct large scale prototypes in the institute's Long Island campus. The first two semesters during the academic year are based in New York City, and the third summer term is based in Long Island.

The MS.ACT program builds up expertise in three consecutive terms, organized as core studios and seminars in a sequence of three **concentration areas** and culminating with an interdisciplinary integrated Project Based Learning Studio in the summer term.

The concentration areas are:

- I COMPUTATIONAL DESIGN
- II ROBOTICS AND FABRICATION
- III MATERIALS

The program runs as a single cohort of students, based on studios, workshops, and core seminars. The Advanced Architecture Design Studios I, II and III serve as a platform to design-apply knowledge and skills acquired in the different workshops, and core seminars. The first Core Pro-Seminar serves to lay out the basic intellectual, conceptual and

historical and theoretical context to the program and the three areas of concentration. The second Core Seminar works as an applied research experimental course. In addition, students are able to focus on Areas of Concentration to get in deep in certain themes and aspects of the Master Program by choosing from a series of coordinated elective seminars. These elective seminars serve the three Areas of Concentration and are available at two levels: introductory and advanced.

Students initially acquire skills in coding (virtual and physical computation), program machines and robots for digital fabrication. This knowledge is then applied to activate material processes, towards a critique of conventions, and the refining of expertise with which to develop emergent technologies from rigorous cultural questions. Each concentration area is based on a core studio and seminar which are complemented by introductory and advanced level elective courses.

First Term

The First Term focuses on **Computational Design**. In this term, students may choose one elective **introductory course in each of the three concentration areas**. The **core seminar** introduces concepts of computation through digital humanities focusing on the history, theory, and criticism of systems of representation in architecture. The discipline is reviewed through the lenses of new technologies. The **studio** investigates computational design in relation to specific architecture and urbanism issues: from topics of virtual space-environments, to simulation, VR and video games; from new formal languages, to new logico-spatial relationships; from new concepts of space, to the design of new representation interfaces, with the goal of innovating in software development.

Second Term

The Second Term focuses on **Robotics and Fabrication** through applied design research. Students may choose one elective **advanced course in each of the three concentration areas**. The **core seminar** follows an evidence-based design approach to architecture by applying digital fabrication to a specific structural typology, an environmental condition, and a single material project. The **studio** investigates **robotic fabrication** in relation to specific architecture issues: from physical material experiments, to expanding relationships between computer representation and machine-based output; from experimentation with conventional and responsive live materials, to designing new materials; from fabrication details, to full architecture technology prototypes. The **studio** also serves as an applied design research platform to investigate **robotics and interactivity** in relation to specific architecture issues: from data gathering and processing through programmable sensors, to informed immersive spaces; from interactive robotic design, to the design of new robotics systems.

Third Term

The Third Term is an integrated interdisciplinary **Project Based Learning Studio (PBL)**. Students apply their research and collective learning in a full scale pavilion on the Long Island campus, where they have access to a larger robotic fabrication laboratory and open space for site-specific installations. The PBL studio merges the three concentration areas into a single project, developing linkages and expanding relationships between computation, robotics and materials. The PBL studio also functions as an interdisciplinary applied research studio in which students from other disciplines can collaborate.



CURRICULUM

<p style="text-align: center;">MASTER OF SCIENCE IN ARCHITECTURE COMPUTATIONAL TECHNOLOGIES</p> <p style="text-align: center;">DEGREE MAP (30 CREDITS)</p>		
TERM 1 (12 CREDITS)	TERM 2 (12 CREDITS)	TERM 3 (6 CREDITS)
<p>STUDIO 1 <i>Computational Design</i> ARCH 701B (6 CREDITS)</p>	<p>STUDIO 2 <i>Fabrication and Robotics</i> ARCH 702B (6 CREDITS)</p>	<p>STUDIO 3 <i>Project Based Learning</i> ARCH 703B (6 CREDITS)</p>
<p>CORE SEMINAR 1 <i>History and Theories of Representation and Technologies</i> ARCH 775 (3 CREDITS)</p>	<p>CORE SEMINAR 2 <i>Fabrication Optimization</i> ARCH 776 (3 CREDITS)</p>	
<p>STUDIO WORKSHOP 1 in Concentration Area I</p> <p>ARCH 761 <i>Computational Design</i> (1 CREDIT)</p>	<p>STUDIO WORKSHOP 2 or 3 Elective in Concentration Area II or III</p> <p>ARCH 762 - Fabrication</p> <p>ARCH 763 - Materials (shared with MS in Health and Design) (1 CREDIT)</p>	
<p>ELECTIVE SEMINAR 1 In Concentration Area with Certificate ARCH 781 – <i>Computational Design 1</i> ARCH 783 - <i>Fabrication and Robotics 1</i> ARCH 785 - <i>Materials 1</i> (shared with MS_AHD) (2 CREDITS, or 2 modules of 1 CREDIT- microcredentials)</p>	<p>ELECTIVE SEMINAR 2 In Concentration Area with Certificate ARCH 782 – <i>Computational Design 2</i> ARCH 784 - <i>Fabrication and Robotics 2</i> ARCH 786 – <i>Materials 2</i> (shared with MS_AHD) (2 CREDITS, or 2 modules of 1 CREDIT - microcredentials)</p>	

MS_ ARCHITECTURE, COMPUTATIONAL TECHNOLOGIES

COURSE DESCRIPTIONS

TERM 1

**ARCH 701B Computational Design Studio 1:
Computational Design** 6 CR

This course, ARCH 701B, is the first Advanced Architecture Design Studio in the Master of Science of Architecture, Computational Technologies program. This design studio will focus on specific issues of representation through computational design. An informed realism implies that reality is continuously transformed by information systems. The designer can now intervene directly upon reality by recognizing and displacing information systems. Students will address computation as proto-architectural. Questioning how architects represents space, the studio will implement, displace, and advance computer algorithms, data representation and data interaction. The studio will use an applied experimental design exercise, to integrate through computational design, the parallel knowledge being acquired in the co-requisite seminars. The studio will do experimental applied research within a range of spatial-based problems, ranging from: Big Data gathering and processing; to simulation; to emergent geometry implementing computational languages, machine learning and artificial intelligence; to an augmented virtual reality simulation interface. The studio will ultimately question systems of representation in architecture, innovating in interfaces and building up concepts and knowledge towards software development.

**ARCH 775 Core Seminar 1: History and Theory of
Representation and Technologies** 3 CR

This is the first core seminar, ARCH 775, in the Master of Science in Architecture, Computational Technologies program. The focus of this course is on the history and theory of architecture spanning from the perspective of the Renaissance to contemporary Big Data processing. This seminar will first study history and theory of representation and technologies in relation to architecture; then, the history of computer science and information theory; and will conclude with an experimental applied exercise addressing how new survey technologies challenge assumed theories of architecture in history. Students will be asked to critique relationships between emerging technologies and cultural innovation.

Concentration Area Electives

ARCH 761 Studio Workshop 1: Computational Design 1 CR

ARCH 781 Elective Seminar 1: Computational Design I 2 CR

The objective of this first elective seminar, ARCH 781, is for students to learn and apply computation in relation to architectural design and to build up expertise towards Focus Area I in Computational Design. The objective of the two consecutive elective seminars on Focus Area I (ARCH 781, ARCH 782) is for students to analyze, research, displace and eventually investigate new paradigms in computer-based systems of representation applied to architecture design. Aiming to develop algorithms applied to architecture design, the seminar will teach existing informational structures, focusing on specific issues ranging from binary information, algorithmic structures, flow diagrams, code syntax, scripting, programming languages, and visual algorithms. The seminar will teach students basic computer programming skills through simple scripts building up knowledge to develop more complex algorithms activating emergent geometry in computational design. This first seminar elective will teach students how to apply research to gather and process Big Data, develop scripts, algorithms, a short program, a virtual reality interactive navigation interface, an augmented reality navigation interface retrieving data, and/or other computational design exercises in preparation for a plug-in, an interface, applications and software development.

**ARCH 783 Elective Seminar 1: Fabrication and
Robotics I** 2 CR

This elective seminar, ARCH 783, is offered in the Master of Science in Architecture, Computational Technologies program. The objective of this first elective seminar is for students to learn and apply computation in relation to architectural fabrication and to build up expertise towards Focus Area II: Digital Fabrication/Robotics, and Physical Computation/Responsive Space-Environments. The objective of the two consecutive elective seminars on Focus Area II (ARCH 783, ARCH 784) is for students to analyze, research, displace and eventually investigate new paradigms in computer-based systems of fabrication, construction, interaction and robotics applied to architecture. In the first part of this elective seminar, students will apply computational design to digital fabrication processes and assemblies. Students will also learn about programming, coding and editing CAM (computer aided manufacturing software) for 3D printing, CNC and Robotics, in relation to emergent material processes and assembly in digital fabrication. In the second part of this elective seminar, students will learn physical computation by programming

sensors to gather data, respond to ecological environmental conditions, health conditions, actions, interactive interfaces and spaces, and activate physical response mechanisms. Students will learn skills integrated through visual algorithms and plug-ins in combination with physical computing hardware and software.

**ARCH 757 Elective Seminar 1: Materials I – Intelligent
Materiality** 2 CR

This elective seminar, ARCH 757, is offered to satisfy the Focus Area III of the Master of Science of Architecture, Computational Technologies program and Focus Area II of the Master of Science of Architecture, Health and Design program. In the two consecutive elective seminars (ARCH 757, ARCH 758) students will learn and apply computation in relation to fabrication and will analyze, research, displace and investigate new paradigms in materiality applied to architecture. This seminar will focus on material properties, behavior and characteristics through environmental simulation and optimization, structural simulation and optimization, studies the properties of material composites, hybrid materials, and polymers through 3d and 4d printing. New knowledge and research will be developed and implemented through a creative applied design exercise aimed to build up specific skills but also critical positions in relation to material computation, material logic, informed material processes, and simulation applied to architecture, ecology and health.

TERM 2

ARCH 702B Computational Design Studio 2: Fabrication and Robotics 6 CR

This course, ARCH 702B, is the second Advanced Architecture Design Studio in the Master of Science in Architecture, Digital Technologies program. The studio will follow an applied research approach to computational design by developing physical experiments leading to a full-scale prototype or a digital fabrication full-scale spatial exercise. Digital fabrication will be expanded to include the several interfaces, machinic systems, CAM (computer aided manufacturing software) for tool-paths in 3d Printing, CNC (computer numeric control mechanisms), Robotics and informational processes between computer representation and machine-based output, expanding dimensions between materials, drawing and building processes and systems. Each student will be asked to understand critically the translation differential between computational design as representation and material computation as digital fabrication. The design studio will work to integrate in a hands-on design exercise knowledge acquired in the prerequisite, co-requisite studios and seminars. Students will address architecture through: computational fluid dynamics/simulation, structural simulation, material simulation (3d printing and time-based programmable 4d printing), performance simulation and optimization activating an evidence-based design in forensic architecture and post-occupancy measurement. The project will also work with environmental simulation to activate micro-ecologies for a post-human responsive healthy space researching into materials as mediums to activate ecologies. This hands-on project-driven studio will engage with the design of built prototypes thinking them 1:1 scale, working with emergent material forces. The studio will aim to develop a prototype, a full scale digitally fabricated space, or a part of a building such as a facade lattice, a wall system, a column-beam connection or a shell structure. This studio will teach students the emergent issues in digital fabrication and materials to prepare students for applied research in physical computation/robotics and sensors for the third and last studio.

ARCH 776 Core Seminar 2: Fabrication Optimization 3 CR

This core seminar, ARCH 776, for the Master of Science of Architecture, Computational Technologies program will focus on evidence-based design through a full scale design and digital fabrication exercise. This course will use an experimental project-driven application to address computational fluid dynamic simulation and material

optimization. Students will work on an integrated project through software focusing on the simulation of various architectural elements: site conditions, environmental conditions and/or interior environmental conditions and/or systems, structural typologies, materials, and material-based construction systems. Applied research exercises will focus on a single material (material based construction system), a single structural typology, and a single environmental condition. Projects will range from design to materialization through computer based fabrication, developing a range of possible results: from a 1:1 scale detail, to a 1:1 scale bay or full space, to a scaled envelope prototype system, to any other real scale prototypes or experimental construction systems.

Concentration Area Electives

ARCH 762 Studio Workshop 2: Fabrication 1 CR ARCH 763 Studio Workshop 3: Material Simulation 1 CR

ARCH 782 Elective Seminar 2: Computational Design II 2 CR

This elective seminar, ARCH 782, is offered in the Master of Science of Architecture, Computational Technologies program. The objective of this elective seminar is for students to learn and apply computation in relation to architectural design and to build up expertise towards Focus Area I, Computational Design. The objective of the two consecutive elective seminars on Focus Area I (ARCH 781, ARCH 782) is for students to analyze, research, displace and investigate new paradigms in computer-based systems of representation applied to architectural design, therefore understanding architecture innovation in relation to software innovation. Aiming to develop algorithms applied to architectural design, this second seminar will critique conventional informational structures studying more complex algorithms such as blockchain, machine learning (meta- algorithms or algorithms of algorithms) and artificial intelligence. Students will study more complex scripts, coding and programming activating emergent computational issues in design. Students will also learn how to develop a short program, a plug-in, an application, and/or other computational design exercises in preparation for interface and software development implementing blockchain technology, machine learning using Big Data, and/or artificial intelligence.

ARCH 784 Elective Seminar 2: Fabrication and Robotics II 2 CR

This elective seminar, ARCH 784, is offered in the Master of Science of Architecture, Computational Technologies

program. objective of this elective seminar is for students to learn computation applied to Robotics research and digital fabrication and to build up expertise towards Focus Area II, Digital Fabrication/Robotics, Physical Computation/Responsive Space-Environments. The objective of the two consecutive elective seminars on Focus Area II (ARCH 783, ARCH 784) is to build up relationships between digital fabrication, machinic systems, sensors and robotics, and architecture. Students will be asked to program CAM (computer aided manufacturing software) for 3d printing and CNC, and also develop innovative fabrication solutions in 3d printing, CNC and Robotics. Special attention may be given to the implementation of machine learning and artificial intelligence to sensors controlling interactivity with 3d Printing, CNC and Robotics. Each student will design through physical computation new fabrication methods based on emerging problems in systems of representation that structure building construction systems. Knowledge will be developed through a creative applied research design exercise aimed to build up specific digital skills. Students will critically rethink the relationship between construction systems and digital fabrication processes and will investigate how fabrication innovation in 3d Printing and CNC, robotics and sensors can structurally transform architecture.

ARCH 758 Elective Seminar 2: Materials II – Living Materiality 2 CR

This elective seminar, ARCH 758, is offered to satisfy the Focus Area III of the Master of Science of Architecture, Computational Technologies program and Focus Area II of the Master of Science of Architecture, Health and Design program. In the two consecutive elective seminars (ARCH 757, ARCH 758) students will learn and apply computation in relation to fabrication and will analyze, research, displace and investigate new paradigms in materiality applied to architecture. Material design and research will be developed through computer simulation, optimization, testing and prototyping. This seminar will focus on innovative research on ecological materials, bio-materials, live cell materials, live cell growth and synthetic live cell 3d printing, and intelligent responsive materials. New knowledge and research will be developed and implemented through a creative applied design exercise aimed to build up specific skills but also critical positions in relation to material computation, material logic, informed material processes, and simulation applied to architecture, ecology and health.

TERM 3

ARCH 703B Computational Technologies Studio 3: CT Project Based Learning (PBL) 6 CR

This course, ARCH 703B, is the third Advanced Architecture Design Studio in the Master of Science in Architecture, Computational Technologies program. This last Studio 3 - PBL, in continuity with but differing from Studio 1 and 2, will be a project based applied research studio aiming to complete a single class-wide project through a diverse set of approaches and expertise. The knowledge acquired through the previous studios, core and elective seminars will be integrated into a site-specific, 1:1 scale construction in the Long Island campus at NYIT. The PBL studio will work during the summer semester. Each class will be asked to integrate the diverse knowledge previously acquired, and potentially activate new mediums and new media as means of doing architecture, by implementing new technologies that aim to generate new parameters, innovative design-thinking processes and enable proto-architectural structures. First, building up from previous studios and seminars, this studio will use an applied experimental approach expanding dimensions between computational design, materials and digital fabrication and assembly. Second, it will expand design authorship to include the parameters that define computation in architecture design and that structure systems of representation, including, among others, distinct algorithmic structures, emergent geometry (machine learning, AI), new plug-ins, and ultimately new software to develop the class-wide project. Third, this studio will facilitate subject-object interaction through sensors and augmented reality that can be used to develop responsive ecological and healthy environments. Fourth, studio work will also focus on the parameters that define material based construction systems in architecture and structure building components based on economic efficiency. The design and investigation of new materials, new fabrication processes exploring 3d Printing and CNC machinic systems, and ultimately robotic technologies will be tested to develop the class-wide project. The studio concludes with an exhibition of final projects in this MS program.

CONCENTRATION AREA I COMPUTATIONAL DESIGN

HISTORY THEORY CRITICISM
COMPUTATION THEORY
DETERMINATION
NON-DETERMINATION
ROBOTIC AUTOMATION

VIRTUAL MACHINES
MACHINE SELF-REPLICATION
SIMULATION
ABSTRACT ROBOTIC SYSTEMS
UNIVERSAL CONSTRUCTOR
PROCEDURAL LOGIC
FLOW DIAGRAMS
PROGRAMMING LANGUAGES

SURVEY SYSTEMS
DATA GATHERING, API
DATA PROCESSING
ARTIFICIAL INTELLIGENCE
MACHINE LEARNING
BLOCK CHAIN
BIG DATA
EVOLUTIVE COMPUTATION

ALGORITHMS DESIGN
INTERFACE DESIGN VR MR AR
SOFTWARE DEVELOPMENT
SYSTEMS OF REPRESENTATION

The **concentration area I Computational Design** helps students develop a critical understanding as well as advanced skills in computational design including learning, analyzing and displacing computational systems through applied research. Over the course of their study, students learn: programming concepts, as well as different forms of computation; skills in programming languages such as Python and/or

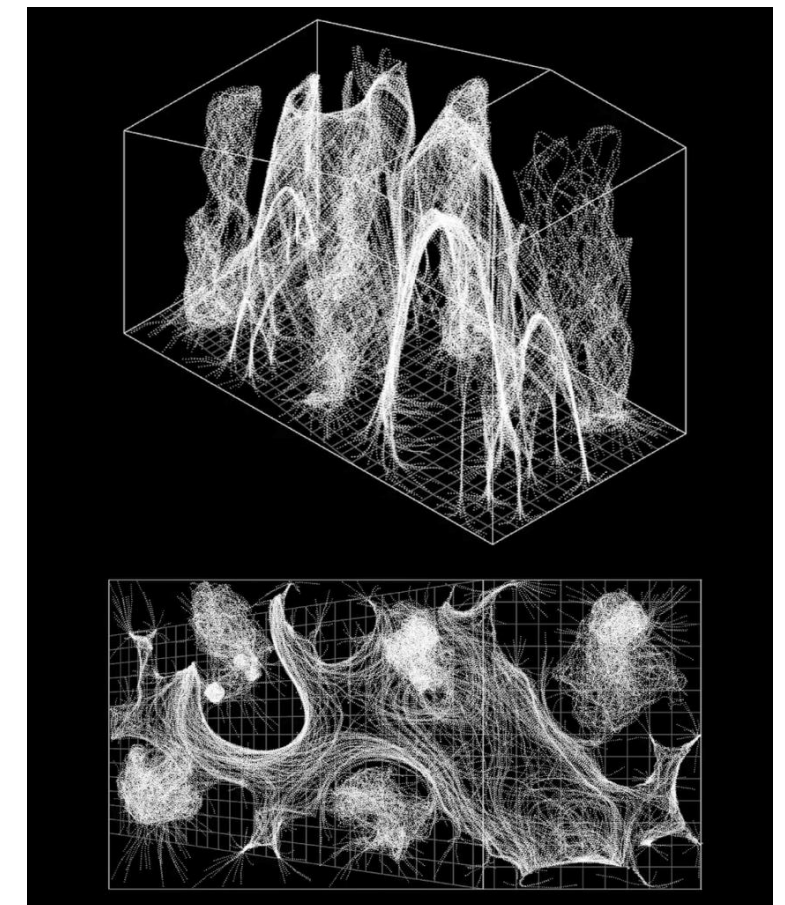
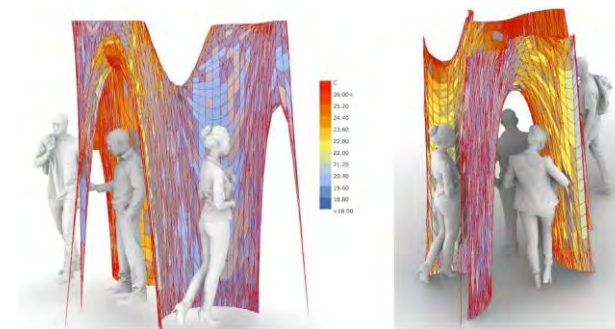
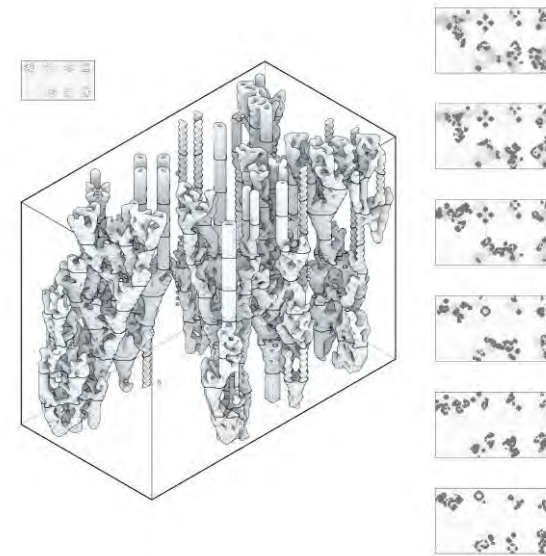
JavaScript; surveying systems and their application in urbanism and architecture; information representation and application through Big Data gathering, API, and processing; computational simulation and evolutive computational systems; Virtual Reality (MR, AR); and advanced computational technologies such as blockchain, neural networks, machine learning, and artificial intelligence.

The courses also help students develop a critical understanding of how architects implement computation to design architecture and to represent space. Through applied design research, students learn how to design and advance applications, computational algorithmic structures, data representation, data processing, and data interaction. This concentration area aims at questioning and displacing the systems of representation that structure architecture. The ultimate goal is to innovate in computer interfaces and to design-develop architecture software.

[The following sample work has been developed by Undergraduate Thesis Students at The School of Architecture and Design (SoAD) at The New York Institute of Technology, during the period of Fall and Spring 2019-2020. The studio produced an installation project for the Architecture Venice Biennale 2021 GAA ECC Space Time Existence, with an exhibition and installation representing NYIT's SoAD. The initiative was supported by Dean Maria Perbellini and curated by Marcella Del Signore and Pablo Lorenzo Eiroa

Interscalar Informed Fluidity, Installation Credits
Professor: Pablo Lorenzo-Eiroa with Students:
Ari Begun, Andres Carcamo, Alexandra Panichella, Brianna Lopez, Benjamin Sather, Isaiah Miller, Karina Pena, Oluwayemi Oyewole, Peter Leonardi

Final Review Critics included:
Maria Perbellini, Christian Pongratz, Tom Verebes, Mario Carpo, Cynthia Davidson, Sandra Manninger, Maider Llaguno, Alessandro Melis, Fred Levrat, Galia Solomonoff, Karl Chu, Matias del Campo, Marcella Del Signre, Ciro Najle, and Mario Graziano Valenti]



CONCENTRATION AREA II ROBOTICS AND FABRICATION

ROBOTIC FABRICATION
ROBOTIC SIMULATION

CAM TOOL PATH DESIGN
SIMULATION OPTIMIZATION

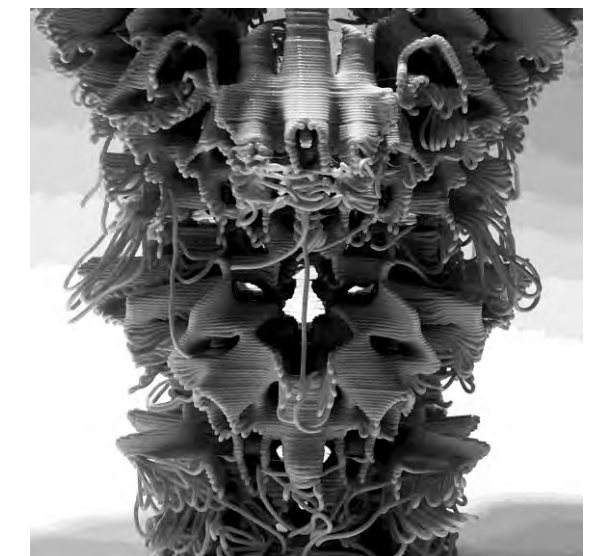
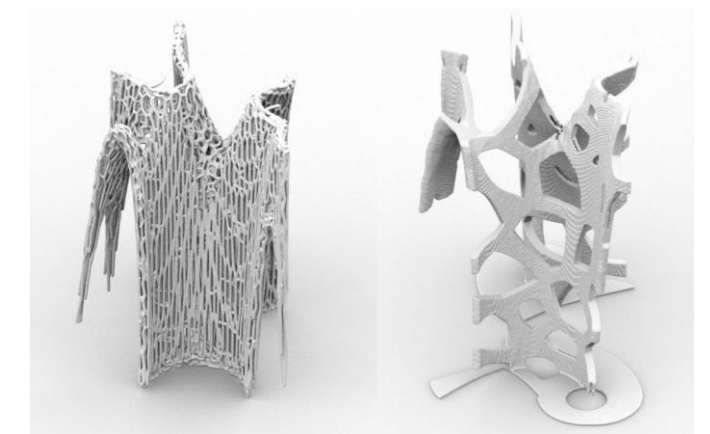
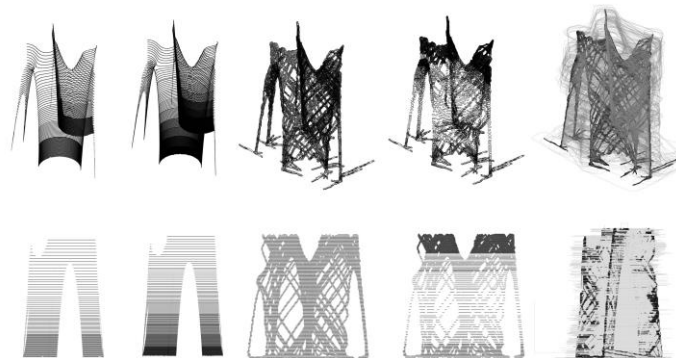
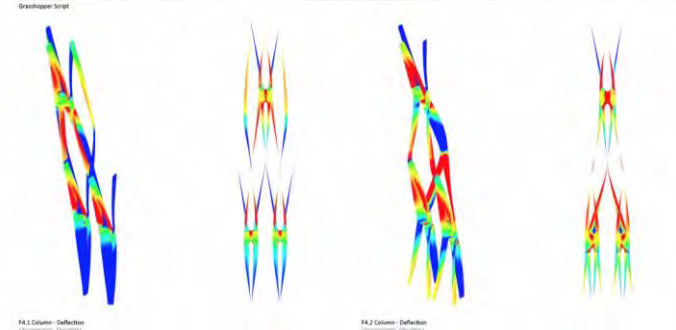
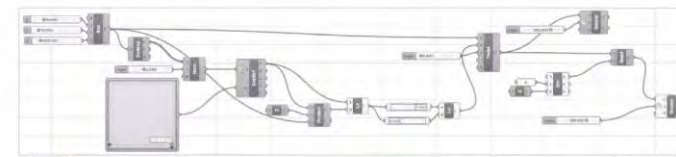
EXPANDING RELATIONSHIPS
BETWEEN DRAWING AND
BUILDING.

AUGMENTED REALITY
FABRICATION.

NEW ROBOTIC SYSTEMS FOR
DRAWING AND BUILDING.

The **concentration area II Robotics and Fabrication** helps students develop a critical understanding as well as advanced skills in robotic systems including learning, analyzing, and displacing fabrication systems through applied research. To secure a strong foundation in digital fabrication, students research relationships between computational design, robotic fabrication and materials; and learn, analyze and displace multiple aspects of CAM (computer aided manufacturing software), 3d printing, CNC (computer numeric control mechanisms), and robotic construction systems.

The courses also help students develop a critical understanding of how architects use material based construction systems. These courses also highlight the implementation of Big Data, machine learning and artificial intelligence to 3d printing, CNC and robotic fabrication, including machine calibration and material feedback. The ultimate goal is to innovate in material-based construction systems and design-develop new robotic fabrication systems.

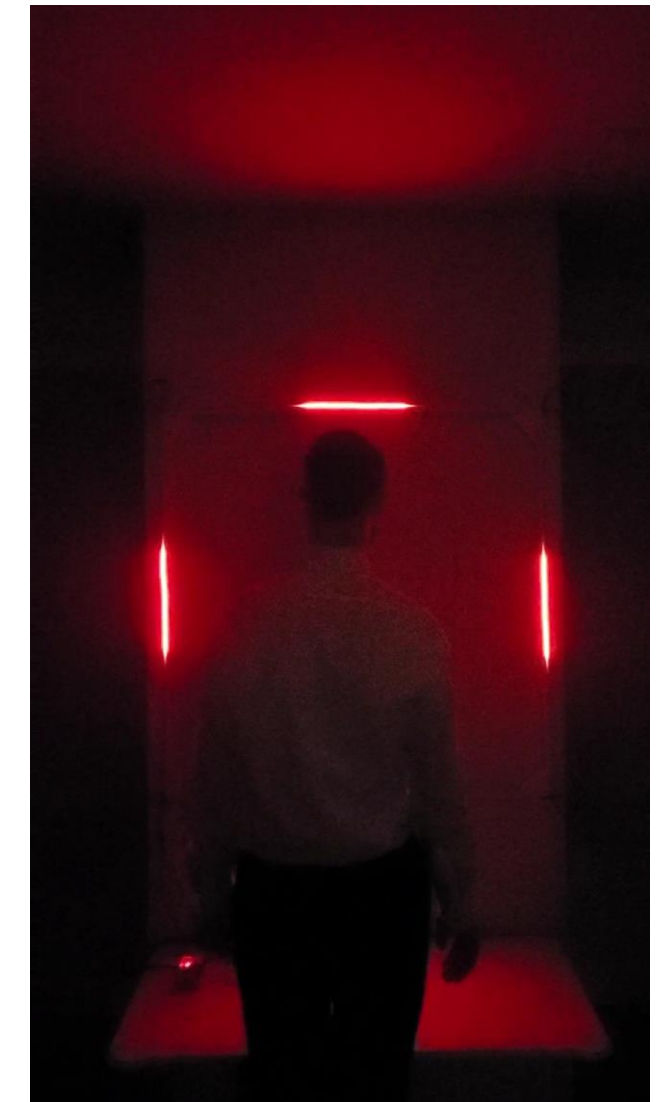
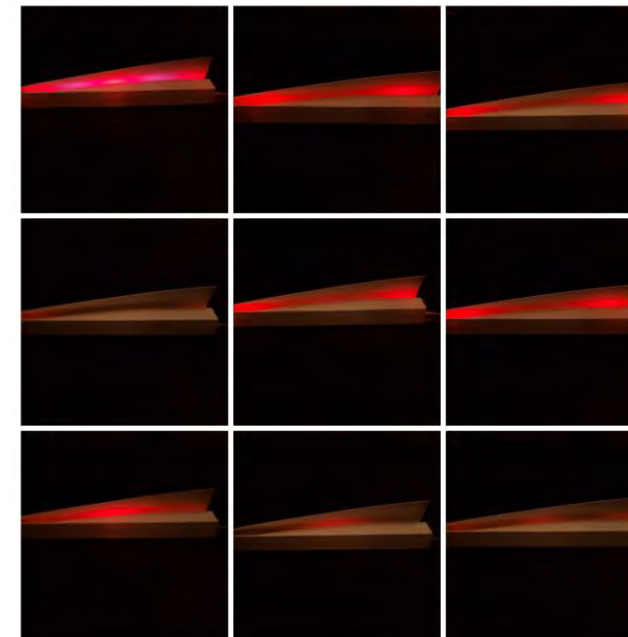
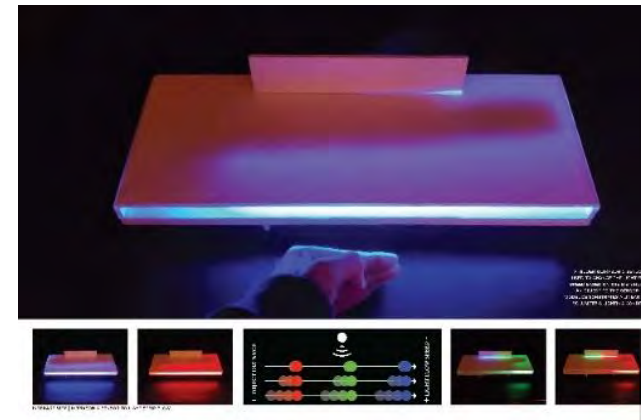
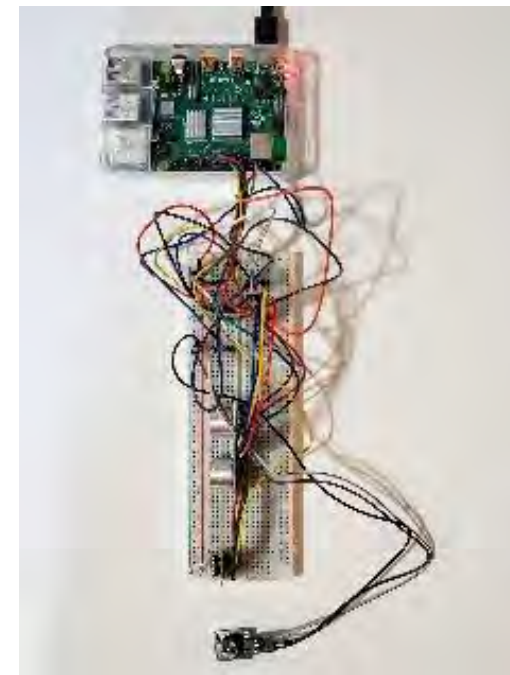
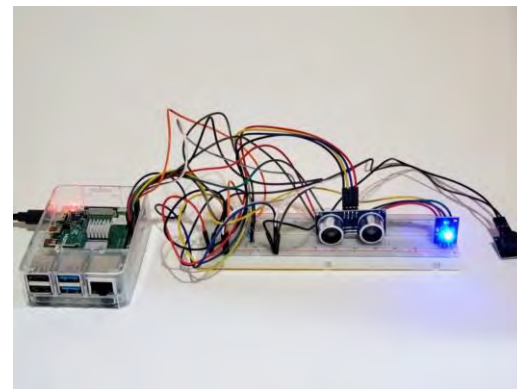


CONCENTRATION AREA II ROBOTICS AND FABRICATION

ROBOTIC INTERACTIVITY
PHYSICAL COMPUTATION
SENSORS DESIGN
IMMERSIVE ENVIRONMENTS
MICRO AND MACRO ECOLOGIES
DATA LINK, DATA SENSING,
DATA PROCESSING
RESPONSIVE INTERACTION
POSTHUMAN INTERACTION
HEALTH OF THE BODY
INTERFACE DESIGN
VR MR AR
NEW ROBOTIC SYSTEMS FOR
DRAWING AND BUILDING
NEW ROBOTIC SYSTEMS FOR
DATA MEASUREMENT, DATA
LINK AND DATA INTERACTION.

The **concentration area II Robotics and Fabrication** helps students develop a critical understanding as well as advanced skills in physical computation including learning, analyzing, and displacing robotic interactive systems through applied research. To secure a strong foundation in interactive robotic systems, students research relationships between sensors, data, and microcontrollers in physical computation; learn how to program interactive microcontrollers; learn how to gather data through sensors and a network data link; Virtual Reality (MR, AR); learn how to apply Augmented Reality to fabrication; design wearable technology expanding a posthuman body; and learn automation.

The courses also help students develop a critical understanding of ecological responsive space-environments and the body. These courses also highlight the implementation of Big Data, machine learning, and artificial intelligence in robotic interactive systems. The ultimate goal is to innovate in interactive robotic systems and interface applications.



CONCENTRATION AREA III MATERIALS

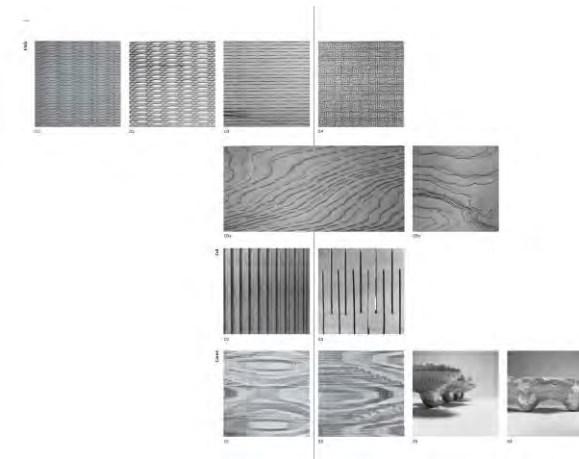
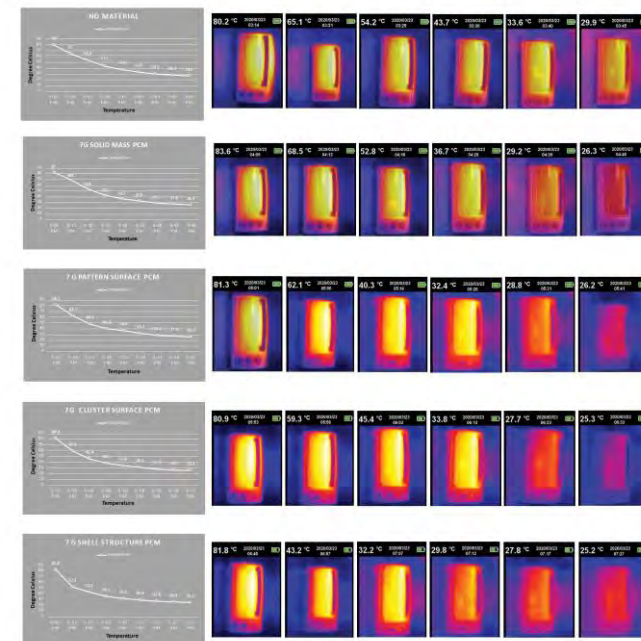
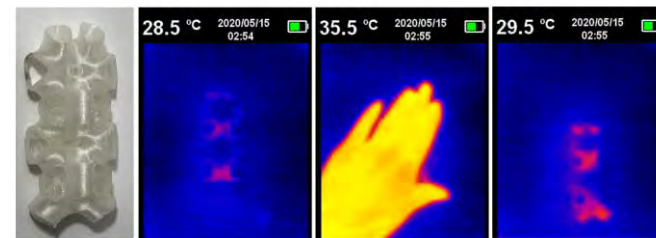
ROBOTIC MATTER
3D PRINTING DESIGN
4D PRINTING
MATERIAL SIMULATION
MATERIAL OPTIMIZATION
MATERIALS DESIGN

SYNTHETIC MATERIALS
MATERIAL INTELLIGENCE
COMPOSITE MATERIALS
NANO, POLYMERS
BIOMATERIALS

NEW MATERIALS DESIGN
NEW MATERIAL BASED
CONSTRUCTION SYSTEMS

The concentration **area III Materials** helps students develop a critical understanding as well as advanced skills in computation applied to material properties including learning, analyzing, and displacing material systems through applied research. To secure a strong foundation in materials, students research relationships between computation, fabrication, and materiality; learn computational material simulation and optimization (composite materials, polymers, biomaterials, live materials, responsive materials, others); investigate new paradigms in materiality; study material properties through environmental and structural performance simulation and optimization; and do research in multiple 3d and 4d printing technologies.

These elective courses also investigate critical concepts of materiality in architecture. The ultimate goal is to innovate in materiality and investigate how materials can inform new construction systems that can transform architecture.



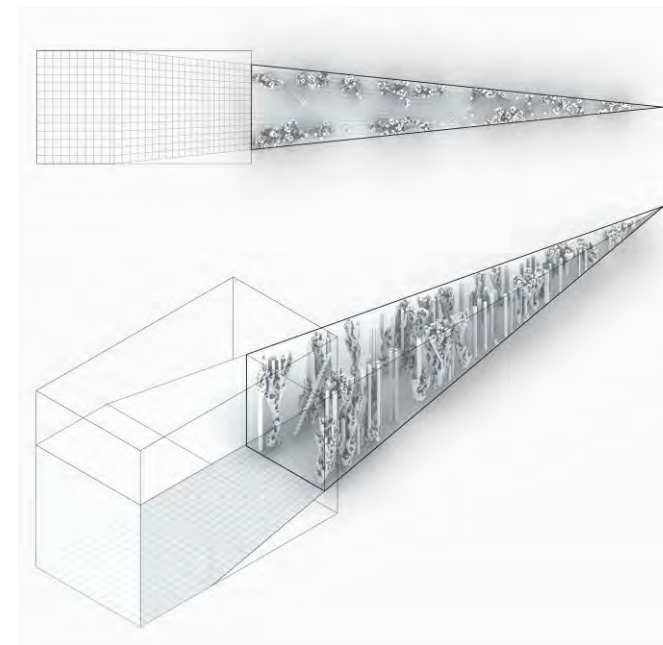
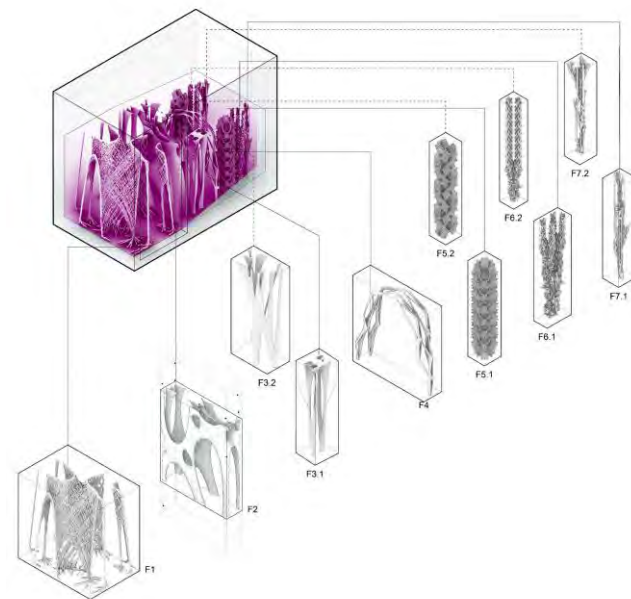
PROJECT BASED LEARNING STUDIO

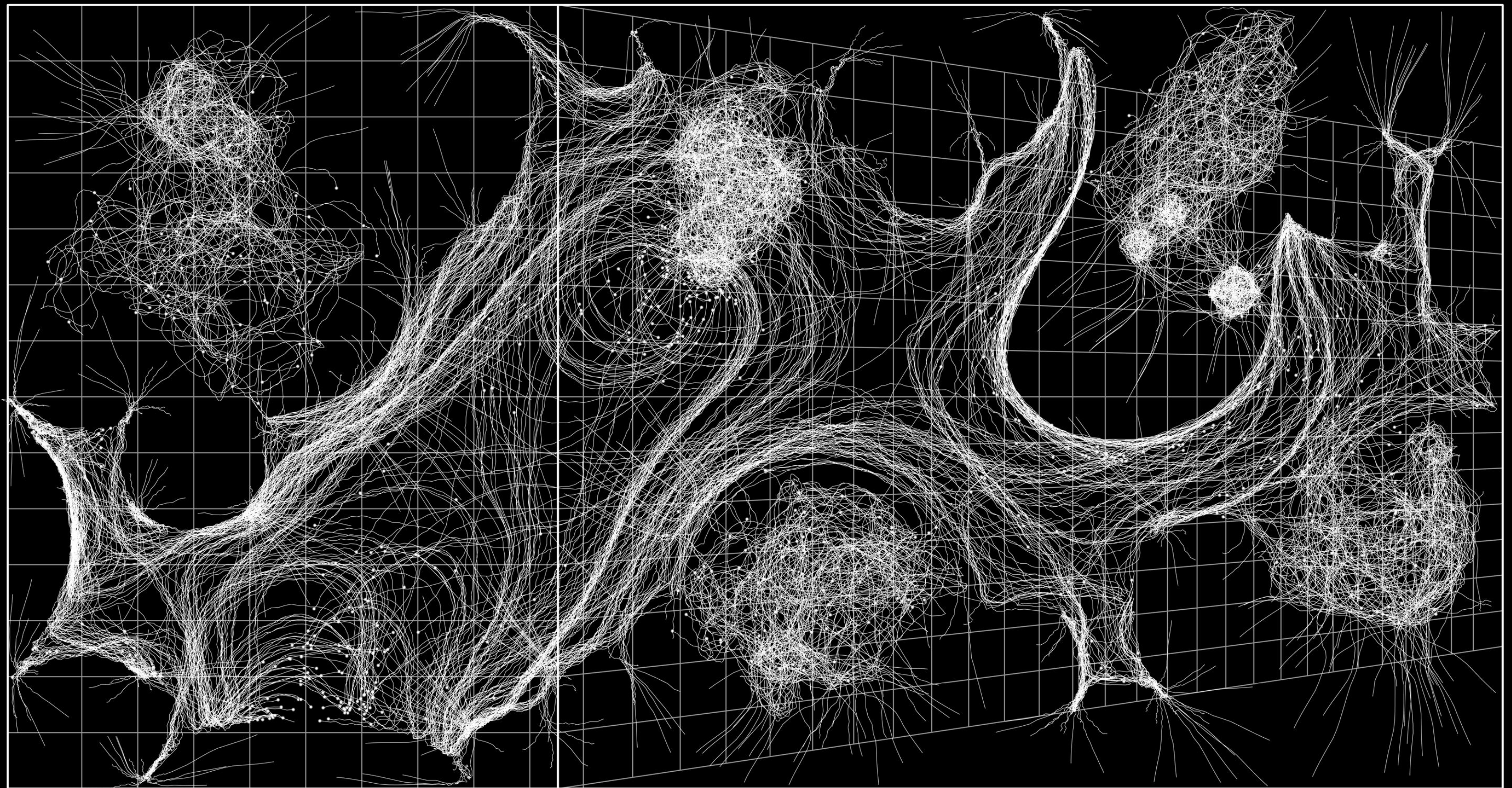
1:1 FULL SCALE APPLIED
RESEARCH INTEGRATION
IMMERSIVE
SPACE-ENVIRONMENTS
ARTIFICIAL ECOLOGIES
BIO DESIGN
POSTHUMAN SPACE
URBAN INTERVENTIONS
INTERACTIVE PAVILION/S

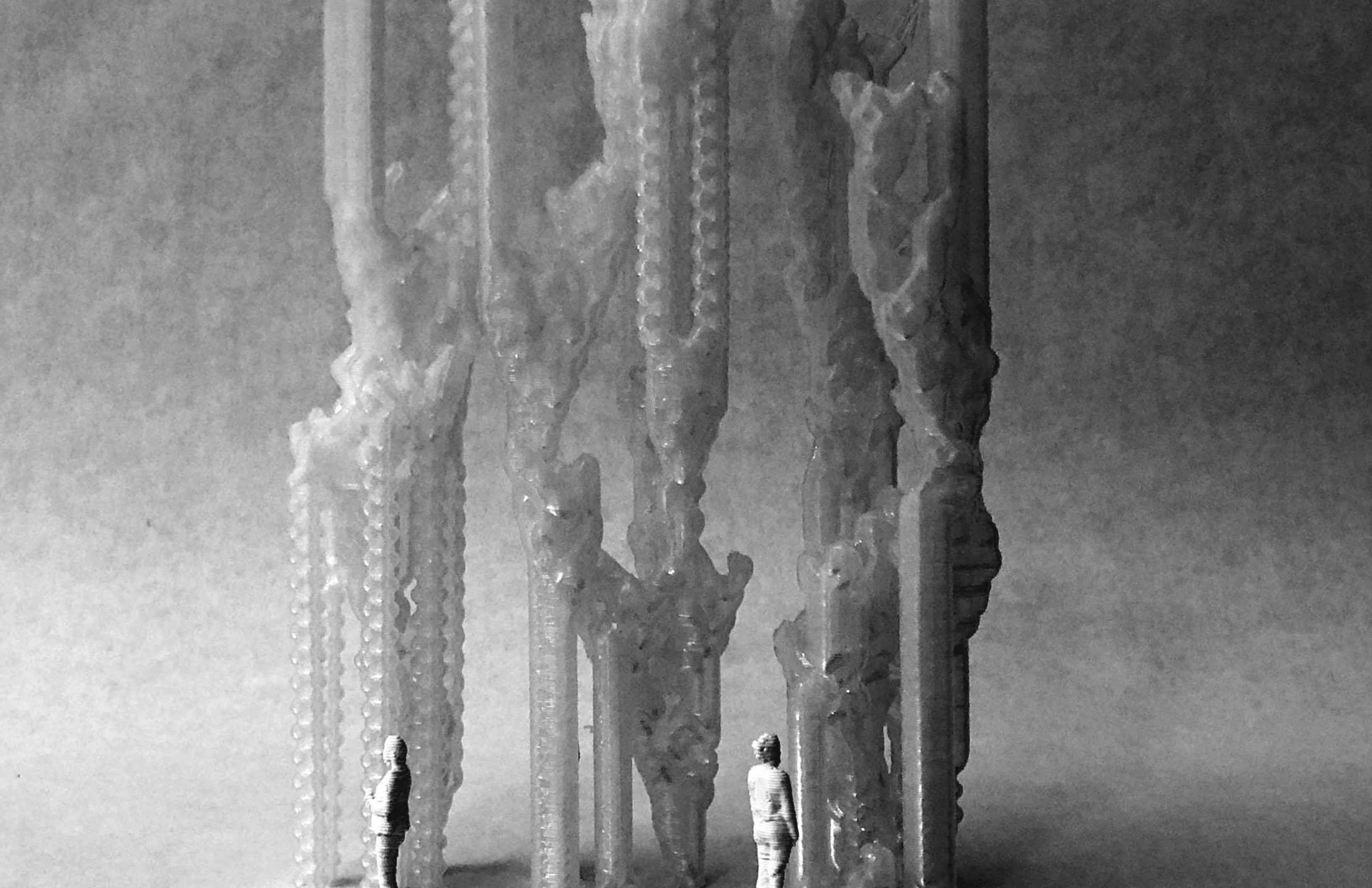
INTERFACE DESIGN
SOFTWARE DESIGN
MATERIAL DESIGN
ROBOTIC DESIGN

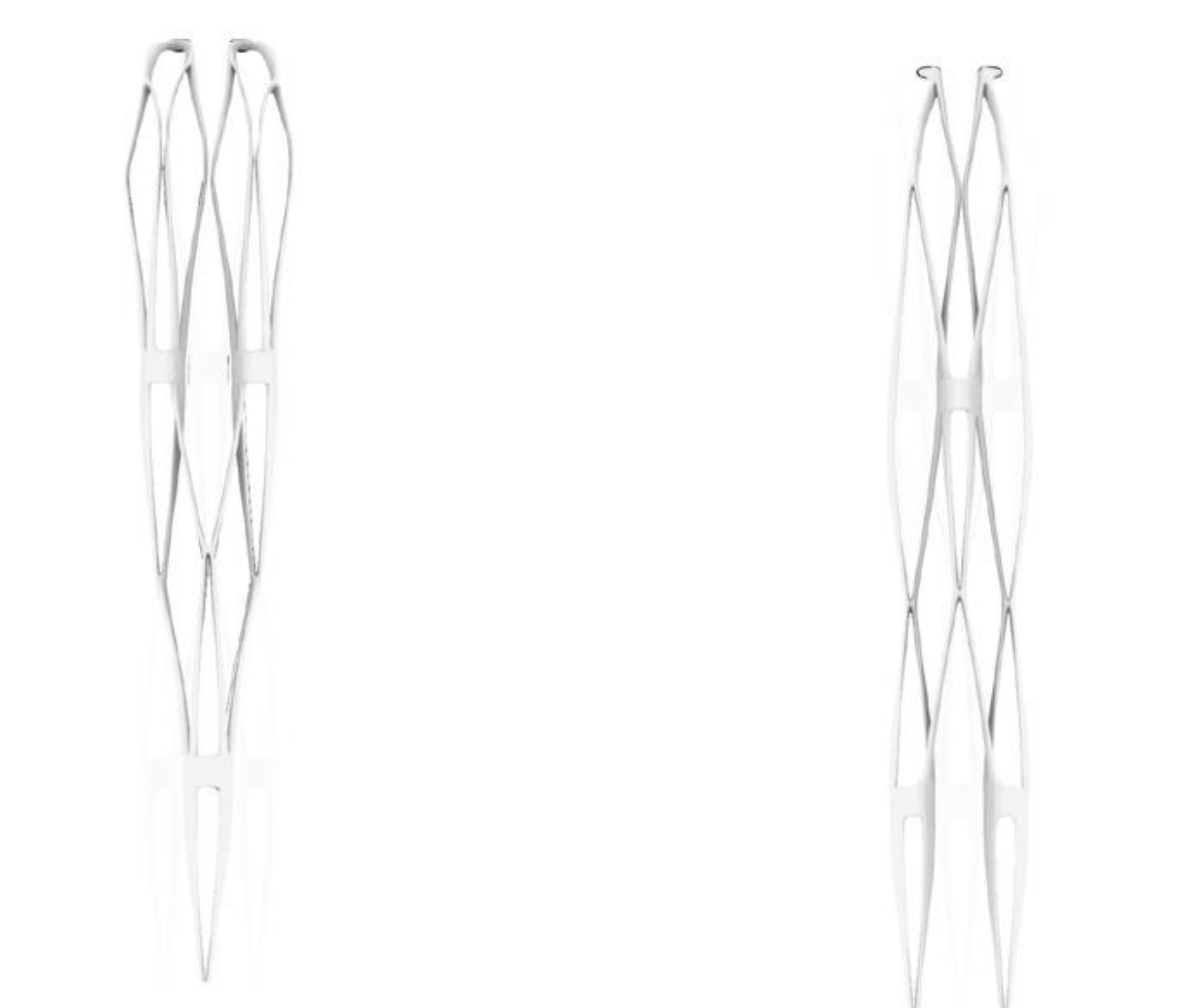
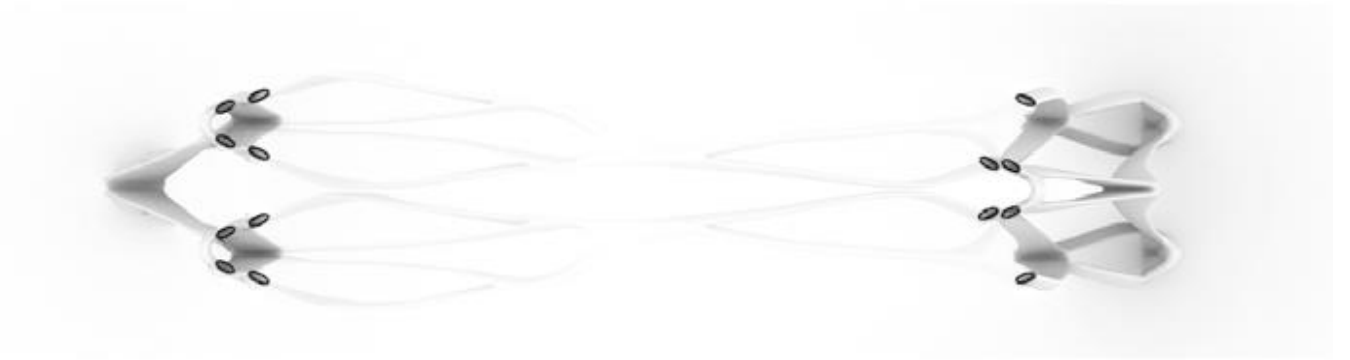
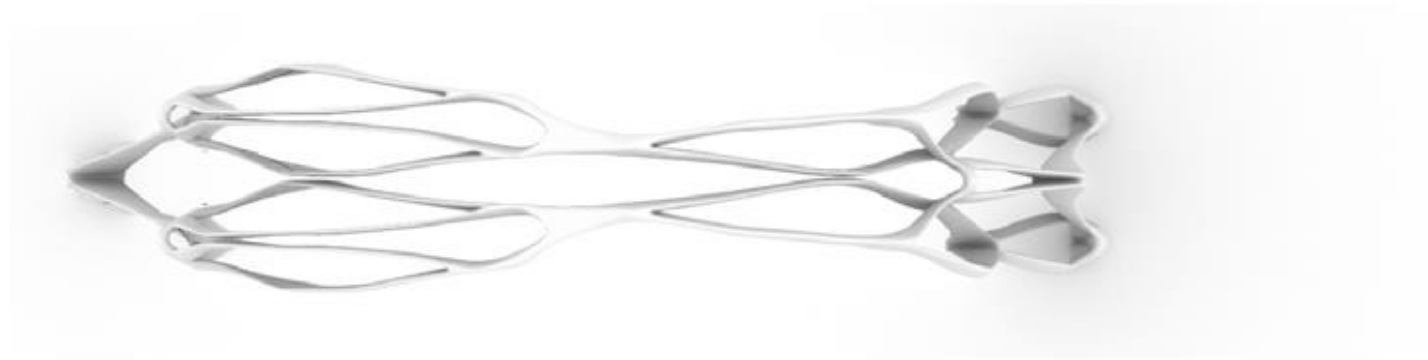
INTERDISCIPLINARY DESIGN
TRANSDISCIPLINARY DESIGN
MULTIDISCIPLINARY DESIGN

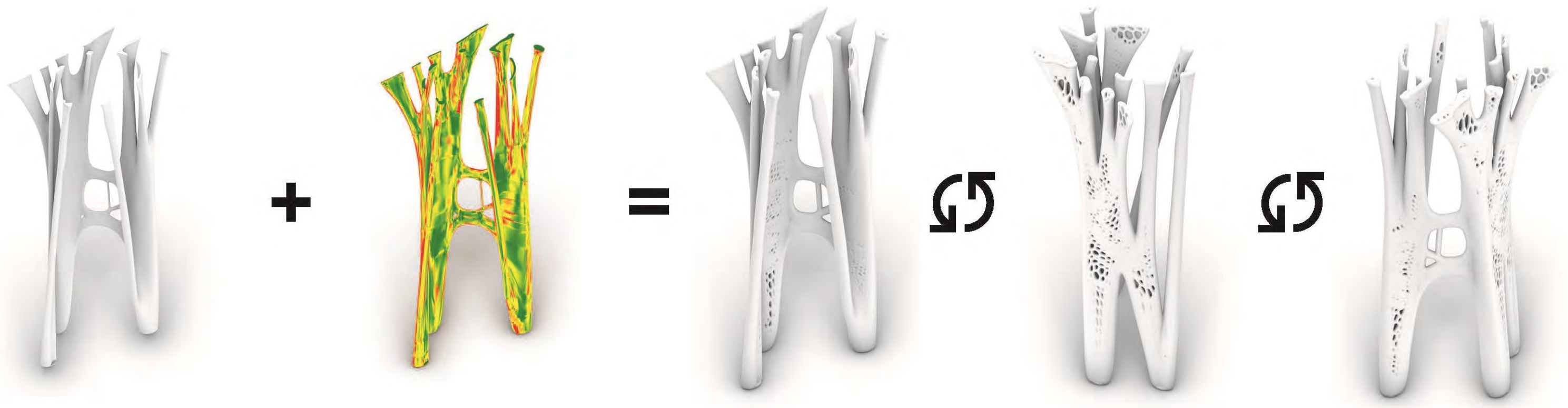
The Third Term merges the three concentration areas into an interdisciplinary **Project Based Learning Studio (PBL)**. During this term, students are able to fully integrate the research done during the first two terms into a 1:1 full-scale-built interactive pavilion on the Long Island campus, with the benefits of a larger robotic fabrication laboratory facility and open space to design-develop a full scale site specific architecture installation. The PBL studio also integrates expertise from other disciplines with students who collaborate in the full scale project.

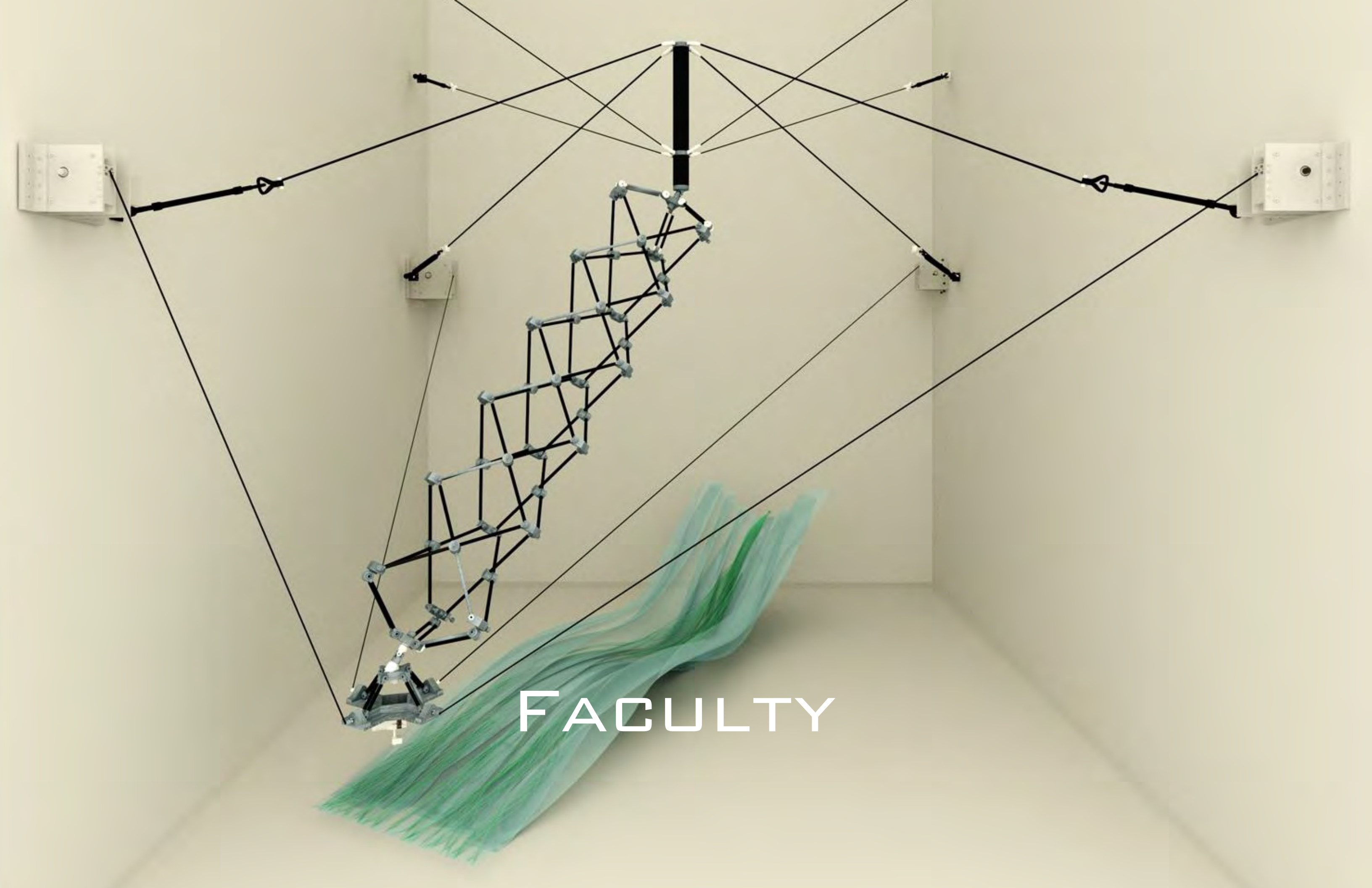












FACULTY

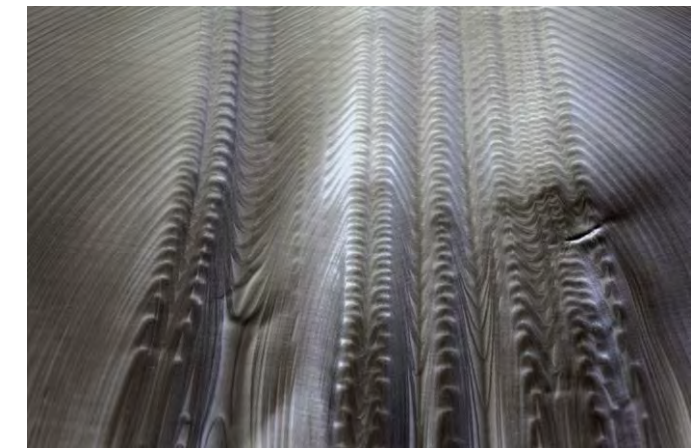
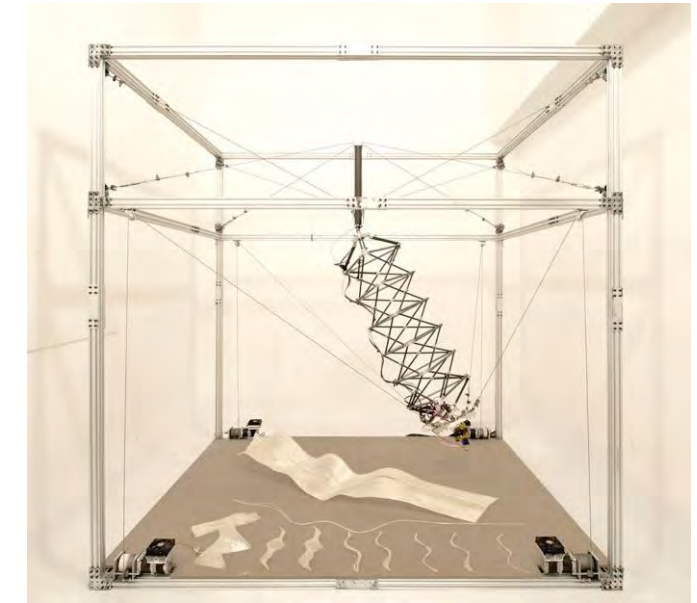
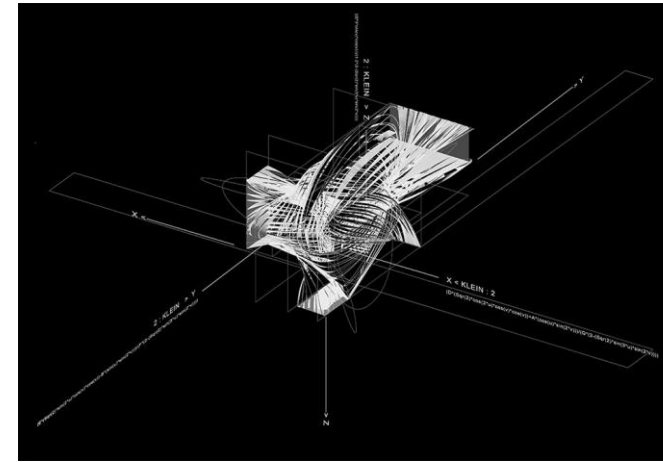
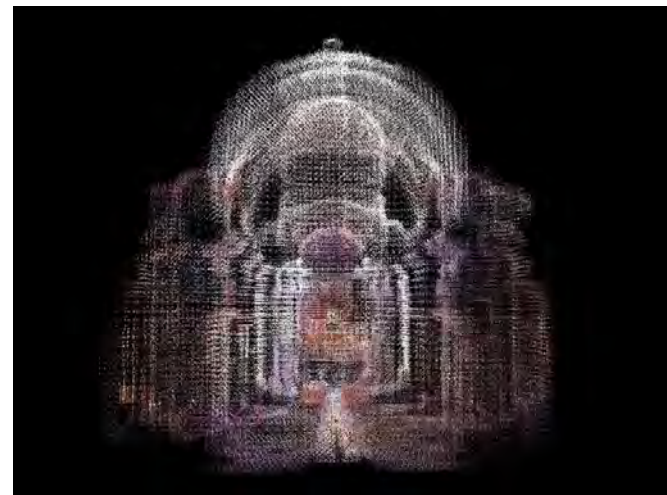
MS_ ARCHITECTURE, COMPUTATIONAL TECHNOLOGIES FACULTY



Director MS_ACT
Associate Professor
Pablo Lorenzo-Eiroa, M.Arch II

Pablo Lorenzo-Eiroa is an associate professor with Tenure at New York Institute of Technology. He is an international architect and scholar in the fields of architecture, urbanism, ecology, and computation. His work innovates in information-based representation and construction systems through materials, robotics and digital fabrication. Lorenzo-Eiroa received his architecture degree from the University of Buenos Aires, where he completed studies for his second Masters and a post-graduate seminar at the Superior School of Fine Arts de la Carcova. He then won the Fulbright and the National Endowment for the Arts Scholarship to complete his M.Arch II at Princeton University.

Lorenzo-Eiroa is the design principal of the experimental practice e(airoa)-Architects based on an emerging Architecture and Urbanism of Information. e-Architects develops software, information “mapping” and “visualizations” using Big Data for cities, including machines to “draw” and machines to “build”, understanding them as proto-architectural. His built work includes a park, houses, and buildings in Buenos Aires and New York and Installations in Europe. Lorenzo-Eiroa’s projects and articles have been published, exhibited and presented in several publications and institutions, including The Venice Biennale (XIII, XIX, XIV, XVI), MoMA, MAS Summit 2017, NYC Media Lab, ACADIA, The Storefront for Art and Architecture, The New York Times, Clarin ARQ, La Nacion, Constructs (Yale University SoA), Paradigms in Computation (eVolo), Imagining Ground Zero, The Generic Sublime (Actar/Harvard GSD), Plataforma Arquitectura, Arch Daily, Suckerpunch, Pulsation, Pidgin (Princeton), Plot magazine, and many others. His latest book is *Architecture in Formation*, Routledge 2013.





**Professor
Christian Pongratz, M.Arch**

Christian R Pongratz is the Senior Advisor to the Provost and Professor of Architecture. From 2017-2019, he was the Interim Dean of the School of Interdisciplinary Studies and Education. In order to facilitate increased collaboration among NYIT's disciplinary silos he is initiating new collaborative programs and teamwork driven projects engaging people, communities and industry. He co-founded the Creative Tech Innovation Council together with Isabel Draves (New York Creative Tech Week) and by forming transdisciplinary teams explores how innovation emerges at the intersection of design research, technology and business serving communities and solving broader environmental, social and economic issues.

Prior to joining NYIT, Christian R. Pongratz was the director and founder of the Digital Design and Fabrication Program and Master of Science Specialization in the College of Architecture at Texas Tech University, where he also was a professor. He taught at the School of Architecture, University of Texas at Austin from 2000 – 2002, and was visiting professor at Yeungjin Jr. College, Taegu, Korea, the Busan International Architectural Design Seminar, Busan, Korea, and at the Architectural Association.

He is a jury member for the Pinnacle Awards by the MIA since 2007. He studied Architecture at TUM and Sci-Arc, and is a licensed architect in Germany with registration in Berlin. Before establishing his own practice, he worked in New York for Peter Eisenman and John Reimnitz, and was involved

with the design of international, invited design competitions and with prestigious commissioned buildings.

Together with Maria Perbellini, in 2002 he co-founded and is a principal at pONGRATZ pERBELLINI Architects, an architectural design practice and research-oriented atelier investigating computation with material-based processes. PPA's expertise in digital design and fabrication technologies engages with an architecture of experience and explores geometries, textures, and surface structures, and their material properties, behaviors, and performances. Recent Projects/Research

Selected current grant awards are the Texas Liberator Project, Design of Digital book and interactive teaching app with historical background, Interdisciplinary Collaboration between Honors College, History Department, Visual and Performing Arts, Media and Communications, Southwest Collection and Architecture, (P.I., Lead P.I. Aliza Wong), total \$170,046, (2016-2017), and for Transforming Student Learning and Innovation through Design Research with Digital Craft in a new Interdisciplinary Design Center \$104,465 (2014-17) from the CH Foundation; a gift in kind contribution totaling \$277,340 in 2013 for the founding of a Robotics Mechatronics Lab; and together with Associate Dean Prof. Maria Perbellini, a gift of \$750,000 in 2013 for a vision plan which proposes new interdisciplinary collaborations across campus with enhanced College facilities and a building extension, matched by TRIP with \$225,000; This initiative increased in support to over \$1.6 million by 2016.

Publications

pONGRATZ pERBELLINI Architects are authors and designers of the monograph "Peter Eisenman," (C3 Publishing Co, Seoul, Korea, 1997). They published in the series IT Revolution in Architecture by Bruno Zevi, "Natural born CaaDesigners," (Birkhaeuser, Basel, 2000); "Cyberstone," a book investigating digital design and fabrication with natural stone in the IT Revolution series directed by Nino Saggio, (Edilstampa, Rome, 2009); and a "Digital Media for Design" textbook (Cognella Academic Publishing 2015). Currently under review by Texas Tech University Press are: "Digital Design and Fabrication" (Issue.com, 2015), and a book in collaboration with Dustin White, "Urban Stage," (Issuu.com, 2015). In progress is "300+," a manual on recent structural and material innovations in high-rise construction.

Editorial committee member for MD Material Design
Scientific committee member for DIID – disegno industriale, DIID Industrial Design.

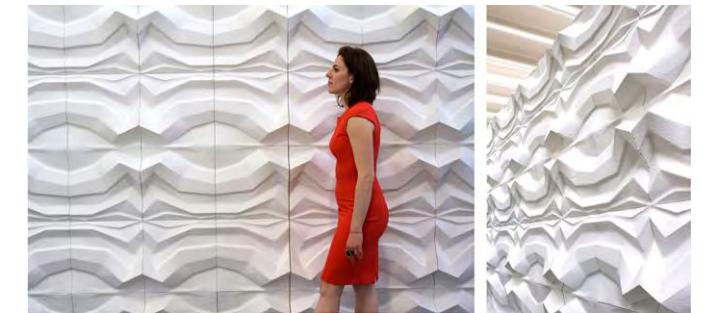
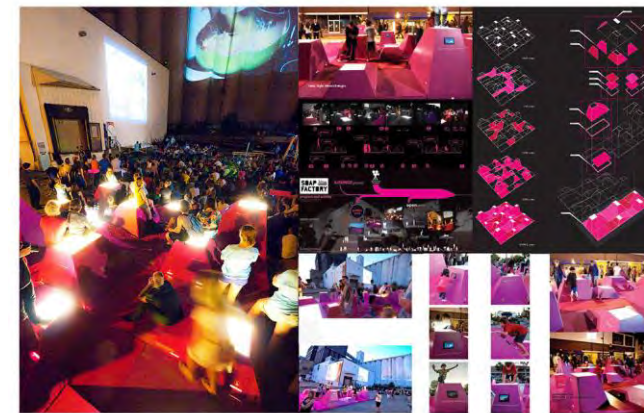


**Marcella Del Signore, MS
Associate Professor**

Marcella Del Signore is an architect and the principal of X-Topia, a design-research practice that explores the intersection of architecture and urbanism with digital practices. Her work concentrates on the relationship between architecture and urbanism by leveraging emerging technologies to imagine scenarios for the future of environments and cities. Her background in architecture and urban design has led her to explore and implement projects that investigate the relationships between contemporary architectural practice and the public/social/cultural scale in dialogue with technologically mediated systems. In her practice, she has been focusing on inter-scalar approaches to design, from small scale interventions, installations, and prototypes to buildings to the urban scale. This approach has led her to work across scales and protocols from material, morphological, spatial, and performative dimensions to the larger interlacement of spatial and urban systems. She holds a Master in Architecture from La Sapienza University in Rome and a Master of Science in Advanced Architectural Design from Columbia University in New York.

Del Signore is the author of *Urban Machines: Public Space in a Digital Culture* (ListLab, 2018, with Gernot Riether), which explores how information and communication technologies have radically changed the way we inhabit and operate in the urban space. She is the co-editor of *Recalibration: On Imprecision and Infidelity* (with Phillip Anzalone and Andrew J. Wit) paper and project proceedings, published during the 2018 ACADIA (Association for Computer Aided Design in

Architecture) Conference, where she served as Technical Co-Chair and part of the ACADIA Board of Directors from 2016-18.



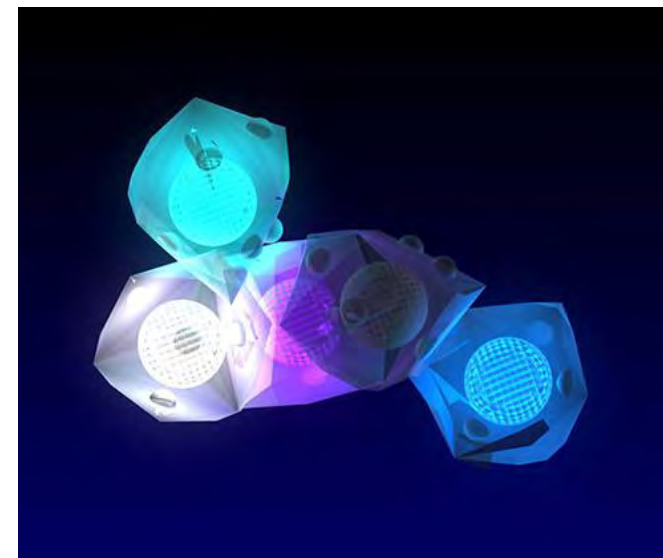
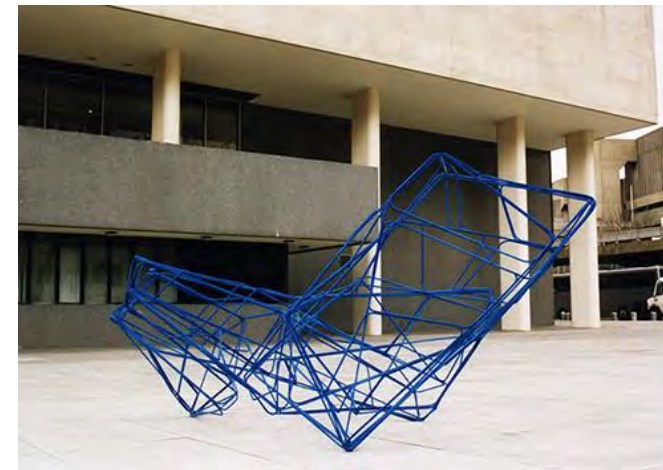
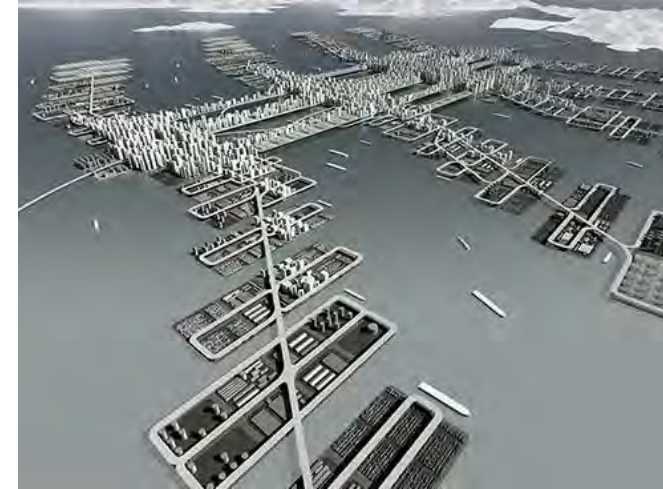


**Professor
Tom Verebes, PhD**

Tom Verebes, Ph.D., is the director of his own practice, OCEAN CN Limited, based in New York and Hong Kong. His former academic roles include serving as associate dean for teaching and learning as well as associate professor at the University of Hong Kong, co-director of the Design Research Lab at the AA in London, and most recently as the founding provost of Turenscape Academy. In addition, Verebes served as a guest professor at Akademie der Bildenden Künste ABK Stuttgart from 2004 to 2006, and has held visiting professor roles at University of Pennsylvania, Rensselaer Polytechnic Institute, Syracuse University, RMIT, Singapore University of Technology & Design SUTD, and University of Tokyo. He has directed AA Visiting School programs, including the AA Shanghai Summer School for 12 consecutive years, as well as AAVS Xixian and AAVS Shenzhen.

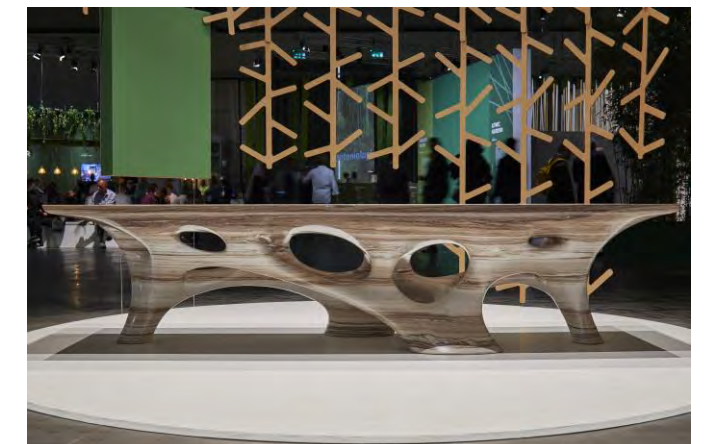
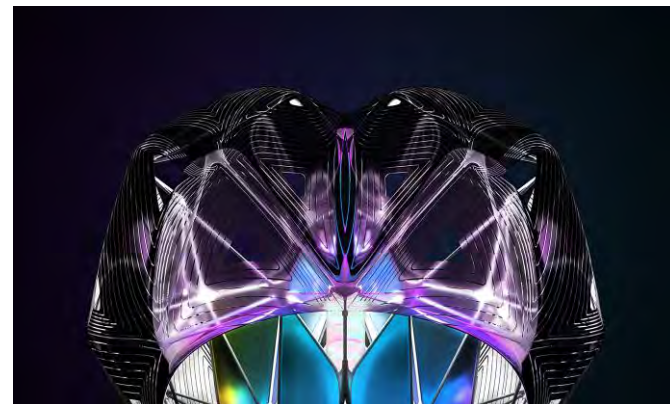
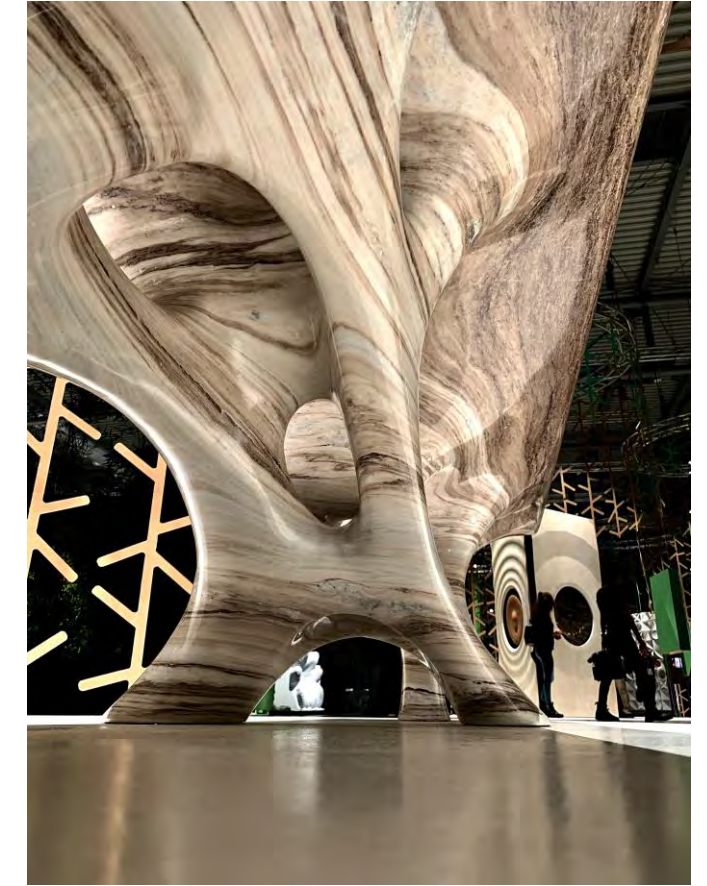
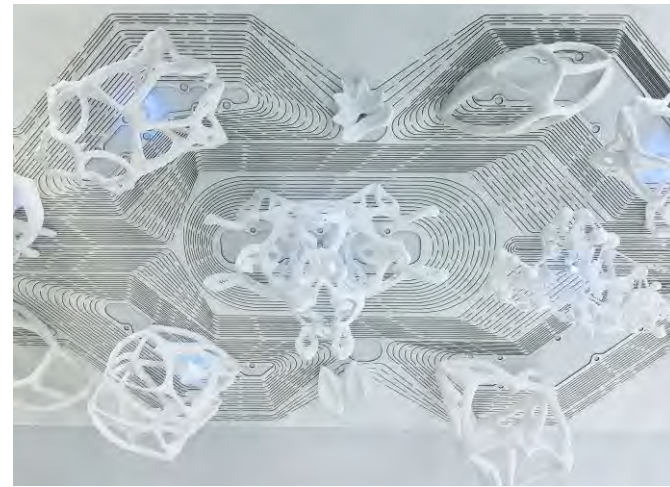
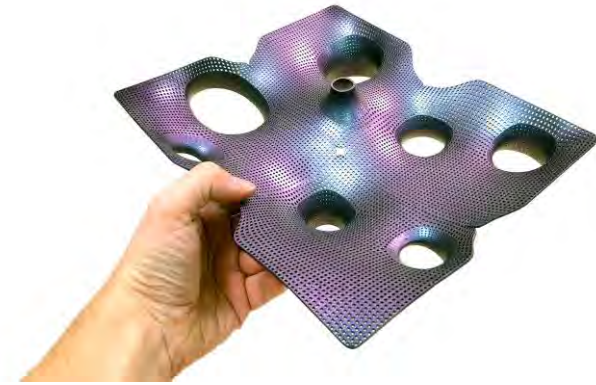
Verebes received his Bachelor of Architecture and Bachelor of Science (Arch.) from McGill University in Canada, a Research Certificate from the Laboratory of Primary Studies in Architecture in Paris, a Grad Dip (Design) from the Architectural Association in London, and a Ph.D. from RMIT in Australia. He has more than 150 publications, including *Masterplanning the Adaptive City: Computational Urbanism in the Twenty-First Century* (Routledge, 2013); a guest-edited issue of *AD* titled "Mass Customised Cities" (Wiley, 2015); *SHANGHAI TEN FOLIO* (ORO, 2017), and *DRL X: A Design Research Compendium* (AA Publications, 2008). Verebes' work has been exhibited in more than 50 venues

worldwide, and he has lectured extensively in Asia, Europe, North America, Australia, Africa, and the Middle East.





Director Digital Technologies and Fabrication
Dustin White, M.Arch





DESIGNING ARCHITECTURAL RESEARCH
02_COMPUTATIONAL TECHNOLOGIES
AUTHOR

TITLE: Elytra Filament Pavilion
AUTHOR: A. Menges, M. Dörstelmann, J. Knippers,
TEAM: Marshall Prado, Aikaterini Papadimitriou, Niccolò
Roberto Naboni, Dylan Wood, Daniel Reist, Valentin Kozlov,
Solly, Thiemo Fildhuth, Elmira Reisi, Boris Plotnikov

SENSORS: Sensor system to monitor user occupancy and canopy growth and reconfiguration
MATERIALITY: Robotically wound glass and carbon fiber filaments
AREA: 200 sqm - 2100 sqft

EXHIBITIONS LECTURES EVENTS

CAPTIONS:
MAIN IMAGE: Elytra Filament Pavilion at night (© NAARO).

The Elytra Filament Pavilion celebrates a truly integrative approach to design, a masterpiece of the V&A Engineering Season that demonstrates how architectural design, the synergy of digital fabrication, computational engineering and production can create a unique spatial experience. It showcases the practical impact of our conceptual design, engineering and making, by intensifying the vitality of the museum's central garden. But instead of being a static structure, it substitutes a dynamic space and an evolving structure. The fabric canopy grows from the museum and responds to the changing conditions of the garden and the surrounding city, creating a space that is both produced and grown.

MS_
ARCHITECTURE,
COMPUTATIONAL
TECHNOLOGIES

LECTURES
EVENTS
SYMPOSIUMS
EXHIBITIONS

**DESIGNING ARCHITECTURAL RESEARCH
EXHIBITION 2020**

“Designing Architectural Research” is an exhibition to celebrate the launch of two new Master Programs at the School of Architecture and Design at The New York Institute of Technology, conceived by Dean Maria Perbellini after a Grant by the IDC, and co-curated Tom Verebes and Pablo Lorenzo-Eiroa.

The Designing Architectural Research exhibition will serve to launch two new Master of Science in Architecture programs in the School of Architecture and Design at NYIT. These programs are a Master of Science in Architecture, Computational Technologies, and a Master of Science in Architecture, Health and Design.

NYIT New York City Campus
2020
NYIT Library
Ground Floor, 1855 Broadway

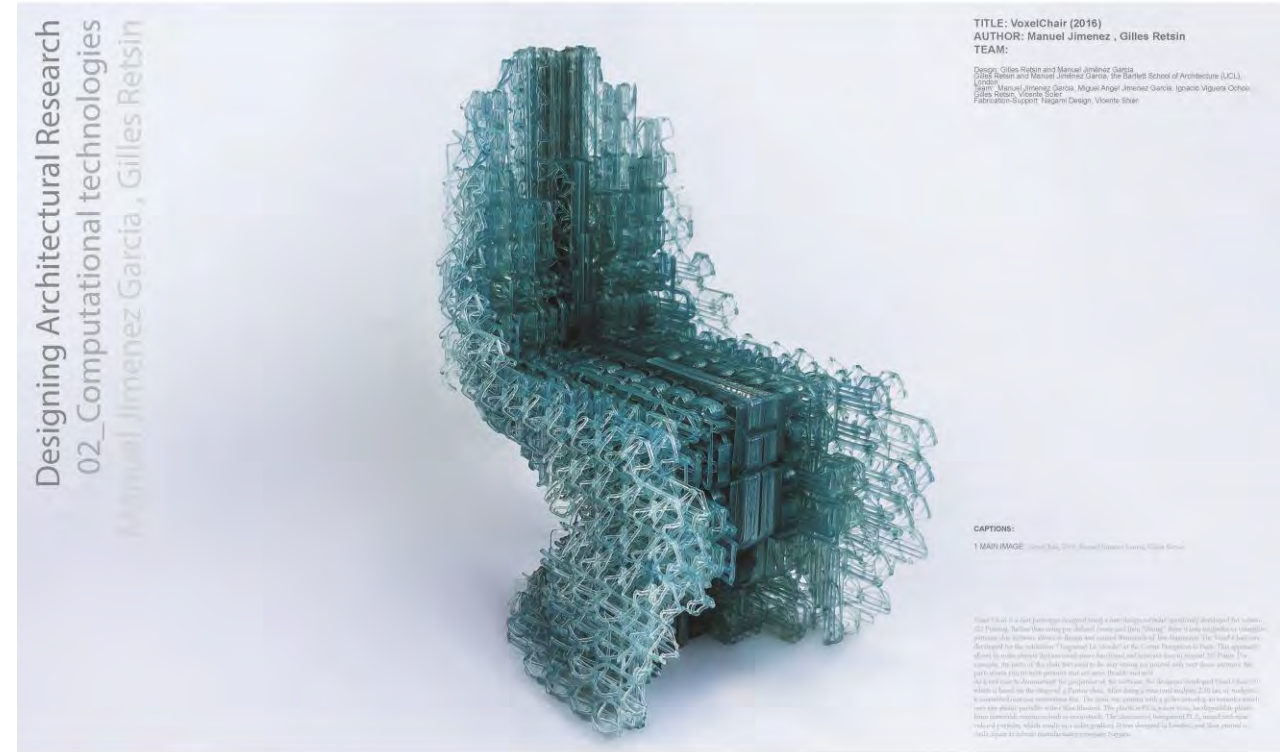
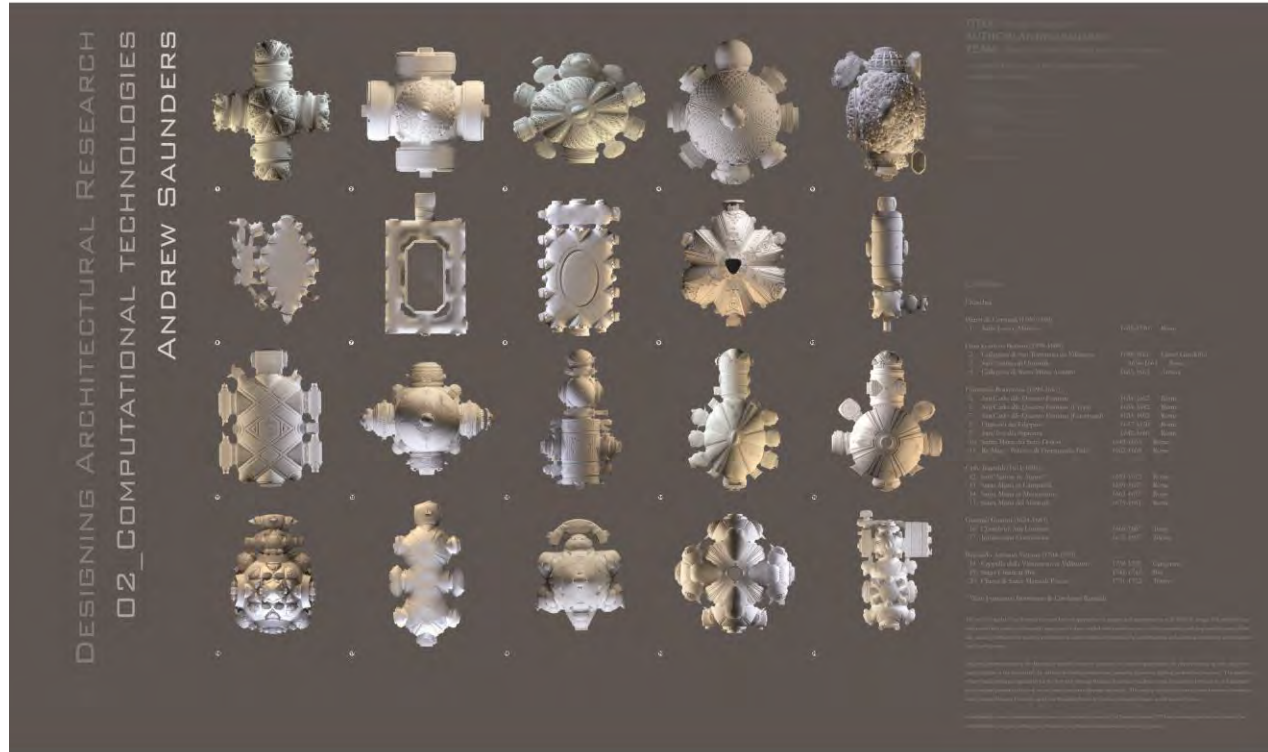
NYIT Long Island Campus
2020
Education Hall Gallery
Northern Boulevard, Old Westbury

Designing Architectural Research

The motivation of this exhibition is to mobilize the design research agendas of the two MS programs. This exhibition will have two sections of exhibitors, classified respectively as *Computational Technologies* and *Health & Design*. Experimenting with technologies at the frontiers of the discipline, this exhibition will bring together 12 exhibitors in each classification, with a total of 24 exhibitors, with the aim to survey innovations in these areas at the forefront of architectural practice. The 24 invitees represent the specialized areas of design which the MS programs aim to focus on in a post-graduate research-based context. Design research practices involve analytical and synthetic modes of investigation, in open, exploratory milieus. As such, this group exhibition gathers thinkers and makers who are reconsidering conventions at the frontiers of disciplinary practices

Computational Technologies

The next generation of designers will be focused on discovering possible futures through innovations in computational design, algorithms and interfaces, robotic systems, and materiality. New design trajectories are being charted in the authorship of emerging technologies. Integrating critical relationships between science and culture, computational design is rooted in digital humanities focusing on the history and theory of representation. Ultimately, an architecture of information is activated through transformative spatial conceptions, built ecological architectural prototypes, and interactivity at full virtual and actual scales.



MS_ ARCHITECTURE, COMPUTATIONAL TECHNOLOGIES

RESEARCH ENTREPRENEUR TECH TRANSFER START UP PATENTS

In general, MS students may also work within The School of Architecture and Design at The New York Institute of Technology as graduate assistants, research students, and build up towards a projected startup company incubator within the Master of Science in Architecture, Computational Technologies, and also do research towards transfer-technology projects in projected relationships with the industry.

The New York Institute of Technology has a dedicated OSPAR (Office of Sponsored Programs and Research)

office which has multiple mechanisms currently in place to support advanced research. OSPAR helps researchers access both external and NYIT-funded grants and works with both faculty and graduate students in various research projects, with a particular interest in technological innovation.

In conjunction with a fully realized entrepreneurship model, NYIT and SoAD have agreements in place to facilitate technological transfer of industrial applications, patent development and other types of developmental application.

NYIT's OSPAR office support includes:

- NYIT internal Grant funding application
- Federal Research Grants application
- NFS, NIH grant writing and application process
- Applied research
- Tech transfer
- Start Up Companies
- Patent development

New York Institute of Technology 's Office of Professional Development is another available resource. This office provides students with access to online and on-campus professional development presentations, internship possibilities, and other professional development opportunities.



NYIT FACILITIES
MOTION CAPTURE
VIRTUAL REALITY STUDIO
3D SCANNING

NEW YORK INSTITUTE OF TECHNOLOGY

COLLEGE OF THE ARTS AND SCIENCES

MOTION CAPTURE VR VR AR STUDIO

Part of the College of Arts and Sciences, the HIVE (Home for Innovation, Visualization, and Exploration) is a place for NYIT students, faculty, and partnering institutions to use advanced technologies to pursue creative research and expand their academic and professional development. Collaborative teams can invent, innovate, and creatively solve problems utilizing motion capture, 3-D printing and scanning, immersive environments, and other emerging technologies. High-end video conferencing connects our three NYIT digital art locations (New York City, Long island, and Beijing) and any other Wifi-enabled location into a single center, allowing users to remotely direct motion capture shoots at our 3-D Motion Capture studio in Old Westbury.

The HIVE welcomes projects from students and faculty from digital arts and all other NYIT disciplines, as well as community and industry professionals. Projects may take the form of dedicated courses and workshops, presentations, collaborative and/or commercial projects, and summer and intersession programs. New York City

Located at 16 W. 61st St. on the 9th floor, our facilities include open art studios, exhibition spaces, and advanced digital design tools, including:

The HIVE, with motion capture, 3D printing and scanning, virtual reality, and other visualization tools.

State-of-the-art Macintosh workstations.

Dell Precision 3-D graphics animation workstations.

Software, including Adobe Creative Suite, Autodesk Entertainment Creation Suite Ultimate, NUKE, Unity, and Toon Boom Harmony.

MOTION CAPTURE

32 Vicon camera motion capture studio
FaceShift Headgear
Synertial Motion Capture Gloves
Kinect for Windows

IMMERSIVE ENVIRONMENTS

Occulus Rift
Kinect for Windows

RAPID PROTOTYPING

Stratysis es1200
Makerbot 5th Generation Replicator
MakerBot Z18
Rostock
Form 1+
CubeDuo Pro

3-D SCANNING

Large and Small scale scanners.
NextEngine High End Scanner
Sense from 3D Systems Scanner
LIDAR scanner partners

Long Island

Our facilities in the Midge Karr Fine Arts Design Center and nearby Sculpture Studio building include:

3-D motion capture studio.

Advanced digital sculpture lab.

State-of-the-art Macintosh workstations.

Dell Precision 3-D graphics animation workstations.

Darkroom photography studio.

Software, including: Adobe Creative Suite, Autodesk Entertainment Creation Suite Ultimate, NUKE, Unity, and Toon Boom Harmony.



THE HIVE

MAKING THE BUILT ENVIRONMENT
SMARTER AND GREENER

NYIT ENTECH LAB - BEM

RESEARCH



NYIT SOAD FACILITIES
FAB LABS ROBOTICS

MS_ ARCHITECTURE, COMPUTATIONAL TECHNOLOGIES

SCHOOL OF ARCHITECTURE AND DESIGN FABRICATION LABORATORY

Director of Digital Technologies and Fabrication
[Dustin White](#)

The Fab Lab within the School of Architecture and Design at the New York Institute of Technology, has two facilities with double the machinery, one is NYC and the other in Long Island Campus.

In our architecture and design studios, our technology-infused facilities include:

workstations with design/drafting software

[laser cutters](#)

plot shop

[fabrication labs \(FabLabs\)](#) for wood and laser cutting

[3-D printers](#) for producing architectural models

designated studio space

Lighting Lab

AIAS and club offices

[Art and Architecture Library](#)

Materials Library

New Fab Lab

Fall 2020 Installation Completion

New York City campus

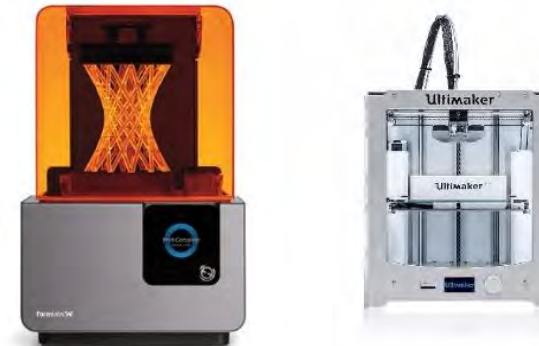
Long Island Campus

NYIT School of Architecture and Design is currently one of the top fabrication Lab facilities in New York City area thanks to the leadership work of Dean Maria Perbellini securing a \$2,000,000 Grant from the **IDC Foundation**.

The spreadsheet below (quantity first column) contains the new fab lab equipment including 7 robotic arms and several new 3d printers.

2	F	Laser Cutter/ Engraver	Epilog Fusion	52.5" x 33.75" x 40.75"
2	F	Laser Cutter/ ENgraver	Epilog Fusion M2	52.5" x 33.75" x 40.75"
1	F	CNC 3 axes	Techno HD Series 4848	HTT06021109 78" x 71" x 60"
1	C	CNC 3 axes	Carvey	
1	F	Dust Collector	Laguna 5 hp	22.2" x 37" x 22.5"
2	C	Wire Bender	Pensa Labs	DiWire Pro 9.5" x 14.5" x 6.75"
1	P	Combo plunge/fixed Router	Bosch	1617EVSPK
4	C	3D Printer	Makerbot	5th generation 20.5" x 21.5" x 22.7"

1	C	3D Scanner	Matter & Form	
1	C	3D Printer	Mark Forged	Carbon
Fiber				
5	C	3D Printer	Ultimaker	5Gen
2	C	3D Printer	Form Labs	Resin
1	C	3D Printer	Potter Bot	Clay
1	C	3D Printer	Wasp	Large Format
6	C	Computer Station	Dell	T5500
4+		Robot	Hydington	
3+		Robot	Kuka Agilus sixx	
1		Vacuum	FormerFormech	686



MS_ ARCHITECTURE, COMPUTATIONAL TECHNOLOGIES

ADMISSIONS REQUIREMENTS

Please review updates to the Admission Requirements in our web page.

This one-year 30-credit hour program, offered over three consecutive semesters, is designed for applicants who have graduated from undergraduate professional degree programs, with a background in Design and an interest in Architecture.

Program pre-requisites include:

4-year professional degree in one of the following disciplines:

- Architecture
- Urbanism
- Industrial Design
- Civil and Structural Engineering
- Material Sciences/Engineering
- Environmental Sciences/Ecology
- Design Technologies
- Robotics
- Computer Science
- Data Science

Portfolio of design work
at least 1 year of professional experience in design practice or research

Minimum GPA of 3.0

TOEFL/IELTS for international students

*If you do not meet all of the above criteria and are still interested, please call (+1) 212-261-1562 to discuss your application

Application Materials:

ALL APPLICANTS MUST PROVIDE THE FOLLOWING prior to submitting portfolio of creative work

- Completed NYIT online application.
 - Nonrefundable application fee.
- Completed NYIT Document Submission Form: Please submit the following documents through the NYIT Document Submission Form.

CV highlighting your titles, academic associations, professional associations, completed and current academic studies (institution, professors and courses completed, degrees, etc), technical skills (software, languages, machines, computational design, robotics, materials, fabrication, if any), projects, research, publications, exhibitions, professional work, experiences, and accomplishments.

References: Provide name, institution or employer, position, email addresses and phone number of three people who have direct knowledge of your professional and academic ability and potential., Your references will receive an email notification to submit their letters through the NYIT application portal.

Transcripts: Unofficial transcripts in progress are sufficient to make an admission decision but final, official transcripts will be reviewed prior to registration and are required. Final, official undergraduate transcripts are required for all university level schools attended. All final, official transcripts must be received prior to the start of your first semester.

Proof of degree: Official copy of college diploma or other proof of degree.

- [International student requirements](#): English proficiency, I-20.), and transcript evaluation (TOEFL/IELTS).

ADDITIONAL ADMISSION REQUIREMENTS / PORTFOLIO OF CREATIVE WORK

After submitting an online application, you will receive an application ID number and be asked to upload additional information in a single PDF document, including:

Resume. 1 page resume highlighting your CV credentials already submitted, portrait photo, name and last name, contact information, degrees, associations, skills, research, exhibitions, publications, projects, etc.

Biography (500-1500 words)

Personal essay/statement of interest (1000-2500 words).

A creative Portfolio of Design Work. The creative portfolio should consist of 20-40 pages of your visual work (format PDF/ MP4, size limit 35 MB)and can include assignment-based projects, self-directed work or pieces of a collaborative nature, multimedia work, computational work, 2d and 3d drawings, digital fabrication work, photos of models, digital paintings, digital sculpture, furniture design, research, collaborations, professional work, etc. Each work/project/publication should be identified with a date, title, medium, and a brief explanation of the artwork and its context. (Was it an academic project, work-related project, independent work, or research including all credits of the work, location, size, budget, whether it has been built or not and the name of the client.) For any team or collaborative projects, please identify each participant including your role and contribution to the overall project. Each PDF files should be use

the following naming format:

NYIT-MS_ACT-ApplicantPortfolio-LastName_FirstName.pdf .Maximum file size is 35 MB. Please be aware of this limitation when formatting files and resolution for your work. Files larger than 35 megabytes may be rejected by the NYIT server. Links to materials available through web links, Youtube, Dropbox, or other portals should be included in a table of contents on the first page of the portfolio (after your introductory resume and biography.)

Optional Interview: You are encouraged to contact Pablo Lorenzo-Eiroa, graduate program director to discuss the program and your specific interests. Contact the office to schedule an appointment.

[International student requirements](#): English proficiency, I-20 (We are also awaiting approval from SEVP to be able to issue I-20s for international students), and transcript evaluation

To upload your documents, you must first [submit an NYIT application](#) and obtain an application ID number. If you do not know your application ID number, please contact the Office of Graduate Admissions at nyitgrad@nyit.edu or 800.345.NYIT (6948).

Deadline: Fall Admissions Deadline: January 15

Applications may be accepted after the January 15 deadline, if space is available.

Contact: If you have any questions about admissions or eligibility, please contact the [Office of Graduate Admissions](#) at nyitgrad@nyit.edu or 516.686.7520.

If you have questions about the program that will help you in your decision to apply and attend, please email Pablo Lorenzo-Eiroa, Director, MS in Architecture, Computational Technologies, at ms.act@nyit.edu or by telephone to Kesia Persaud Administrative Specialist, Graduate Programs at 212-261-1562 or grad.arch@nyit.edu

LAPTOP POLICY

See updates in web site.

The School of Architecture and Design requires all incoming undergraduate freshman and masters of architecture students to purchase a personal laptop computer powerful enough to support the demanding video and computational requirements necessary for academic course work, as well as adequate storage to accommodate new and future software releases. It is crucial for the SoAD to guarantee that all our students acquire the highest level of expertise and knowledge required to perform competitively in the evolving architecture, design and technology professions.

The SoAD has coordinated with IT services and Dell to offer a laptop model capable of lasting the duration of the student's time in the program, and that can be purchased at an educational discount. This option provides support from NYIT's IT department and future software updates. Dell has optimized the laptop specifications to run the latest CAD, BIM, graphic design, and 3D modeling software. The SoAD strongly recommends that students consider purchasing the specified Dell XPS 15 laptop model through the link below.

Recommended Computer

[DELL 15" PRECISION MOBILE WORKSTATION 7540](#)

Minimum Required Computer Specification	Intel® Core™ Processor i9-9880H (8 Core, 16MB Cache, 2.30GHz up to 4.80GHz Turbo, 45W, vPro)
Processor	Operating System
Operating System	Windows 10 Pro, 64-bit, English Memory

Memory	32GB, 2x16GB, DDR4 2666MHz Non-ECC Memory LCD
LCD	15.6"UltraSharp™ UHD 3840x2160 AG,NT,w/Prem Panel Guar 100% Adobe Aluminium, IGZO, IR Cam/Mic
Hard Drive	No WWAN Hard Drive
Wireless	M.2 1TB PCIe NVMe Class 40 Solid State Drive Wireless
Video Card	Intel® Wi-Fi 6 AX200 2x2 .11ax 160MHz + Bluetooth 5.1 Video Card
MS ACT Video Card	NVIDIA Quadro RTX 5000 w/16GB GDDR6 Insurance Theft and damage insurance (recommended)

*Students will use cloud computing as well

Required Software

Students will have access to a computer software image provided by NYIT for the computer labs. Students are required to purchase licenses and install in their laptops the following software. Be aware that if you plan on purchasing a Mac computer, the software is required to be purchased for Windows. Note that Google Drive is available for all NYIT students as a storage and file backup.

[NYIT Software Downloads](#)

MS Architecture Computational Technologies Software common with SOAD NYIT:

[Adobe Software](#) (fee based - PC only)

- Illustrator
- Photoshop
- InDesign

- Acrobat Pro
- Premiere Pro
- After Effects
- Dreamweaver

Autodesk Software

- [AutoCAD](#) (free) – Windows only
- [Revit Architecture](#) (free) – Windows only
- Fusion 360
- Slicer for Fusion 360
- Maya 2020 (Python)
- Autodesk CFD

[Microsoft Software](#) (free; New York Tech login required)

- Word
- PowerPoint
- Excel

Rendering Platforms (fee-based)

- [VRay Plug-in for Rhino](#)

Programming Languages

- Python
- JavaScript (TBC)

3D Modeling Platforms

- MatLAB (free; New York Tech login required)
- Wolfram Alpha (free; New York Tech login required)
- Wolfram Mathematica 12 (free; New York Tech login required)
- [Rhinoceros 3d 6](#) (fee-based) – Windows only
- Rhinoceros 3d 7 (WIP)
- Rhinoceros 3d Grasshopper Plug Ins (GHPYTHON, Kangaroo Physics, Karamba, FireFly, Culebra, Volvox, Millipede, Rabbit, SandBoxTopology, tOpos, Cocoon, MinSurf, RemoteSlider, Slikworm, GHPython, kangaroo, Heliotrope, Parakeet, LyreBird - LadyBug, Paneling Tools, SmartForm, Wavebird-, Pufferfish, LunchBox, DoodleBug, Caterpillar, Animation for Grasshopper)

- Rhinoceros 3d Plug Ins (RhinoCAM, RoboDK, Rhino Vault)
- Processing (free)
- Reality Capture (free, with PPI when exporting)
- Unity 3d (Python)

CAM Fabrication

- Maker Bot Print
- Nefabb
- Pepakura
- Octopuz (octopuz.com) [TBC]
- Rhinoceros Grasshopper Robotics (Kuka PRc + Robots in Architecture Membership TBC, TacoCAM, ABB programming: TBC)

Physical Computation

- Arduino
- Raspberry Pi
- Mach3 CNC (Console Machine Controller Software, Optional CAM design)

GIS

- ArGIS (PRO)
- Google Earth Pro
- Google Earth Engine

Other Software, Platforms, Robotics to be installed depending on instructors. MS ACT will use for scripting mostly Python.

IMPORTANT NOTE

Students who wish to purchase a Macbook Pro should be advised of the following issues related to owning and operating a Mac:

- The SoAD recommends only the highest end model of a Macbook Pro in order to support adequate 3D modeling and rendering software capabilities for all SoAD academic coursework.
- The NYIT Program Dell laptop discounted price and IT Support plan will not apply to Mac or other alternative laptop model purchased.
- To purchase an adequate and properly equipped Macbook Pro will require additional

- initial and maintaining costs including:
purchase and download of Bootcamp or VM
Ware, a copy of Windows 10x64, and increased
or upgraded hardware for to the PC
performance equivalency.
- Purchasing a Mac laptop will not permit
upgrades to any of the components in the
future.
 - All required SoAD software should be PC
based. Most Mac format software does not
allow the same functionality as PC.
 - The performance specification for the Mac will
require 200% more power than the required
PC. The Mac laptop will require a partition to
run both Mac and PC. This splits the computers
performance in half.

[NYIT IT Computer Support](#)

Please contact [Service Central](#).

Long Island Campus – Marie Odile Baretzky
Education Hall Rm. 274
mbaretzky@nyit.edu

School of Architecture and Design Point of Contact

New York City Campus – Mauricio Tacoaman
Workshop Supervisor
Edward Guiliano Global Center Rm. 1010
mtacoama@nyit.edu

Common Concerns

We understand that the cost of the laptop seems high when compared to off-the-shelf models, but the specified model is planned to last the duration of the program, and to guarantee the right performances to fulfill the assignments required in your courses. The text below will help clarify the reasons to purchase a well-equipped machine from the beginning. If you have additional questions please direct them to the point of contact listed above for each campus location.

Some laptops do not allow after-market upgrades of memory, so it is necessary to purchase a computer which will perform well throughout the program, as software updates require more memory with updates and newer versions. Some laptop manufacturers split storage into a small initial partition, and a larger secondary partition. A laptop must have a 512GB initial partition (the C: drive on Windows) to meet the computer requirements.

Laptops do not allow the addition of new video hardware. In order to run all of the required 3D modeling software programs, it is important to have a computer that has a video card that meets the minimum specifications.

SCHOOL OF ARCHITECTURE AND DESIGN

Programs:
Bachelor of Architecture
BSAT
Interior Design, BFA
Master of Architecture, M.Arch I
Urban Design, MS
Computational Technologies, MSA
Health and Design, MSA

The School of Architecture and Design is located in two campuses: New York City and Long Island approximately 45min by car from each other with access to public transportation via subway and long island railroad.

The New York City campus is currently located in the Upper West Side, with its main building at 1855 Broadway at Columbus Circle. The School of Architecture and Design in the NYC Campus is located at 1855 Broadway 11th floor with classrooms and studios in other floors and neighbor buildings. The Long Island campus is located in Old Westbury, Long Island, New York. The School of Architecture and Design in the LI Campus is located at the Education Hall building (Ed Hall). Both campus are part of the same school with double programs and facilities.

School of Architecture and Design Rankings

The School of Architecture and Design (SoAD) has graduated more licensed architects in New York State than any other architecture school. In the recently announced [2019-2020 Design Intelligence \(DI\) rankings](#) of America's Top Architecture and Design Schools, New York Institute of Technology's School of Architecture and Design moved up the ladder!

- In the category for [most-hired graduates among architecture schools](#) with 70-99 graduates, SoAD moved from no. 19 to no. 11.

- In the category for [most-hired graduates in Interior Design](#) with less than 20 graduates New York Tech jumped from no. 19 to no. 5.
- In addition, the School of Architecture and Design is ranked no. 32 in the [most-admired category by Design Intelligence in 2019-2020](#).

Events

<https://www.nyit.edu/architecture/news>

Atmosphere 02 2020

School of Architecture and Design Yearly Publication

<https://drive.google.com/open?id=18Daufbrlxf-pbWw2RvuSGXWOKtK5JXeD>

New York Institute of Technology COLLEGE OF ARTS AND SCIENCES

Applied and Computational Mathematics
Biotechnology
Digital Arts and Design
Digital Film and TV Production
Graphic Design

COLLEGE OF ENGINEERING AND COMPUTING SCIENCES

Computer Science, BS
Computer Science, MS
Computer Science, Network Security
Computer Science, Big Data Management and Analytics
Data Science
Electrical and Computer Engineering
Technology
Energy Science
Environmental Management
Information Technology

COLLEGE OF OSTHEOPATHIC MEDICINE

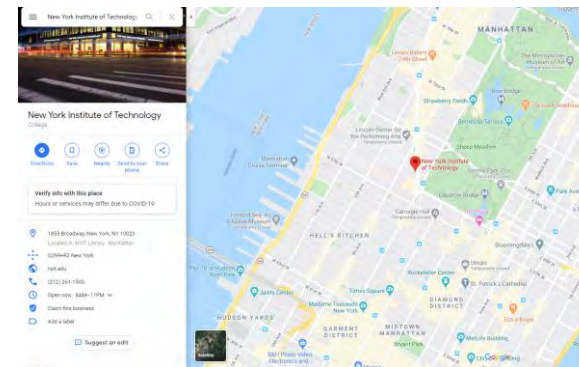
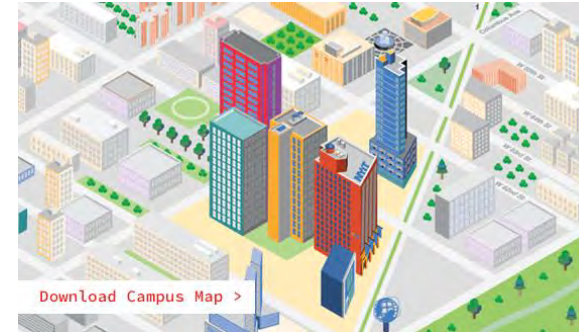
Global Health, Certificate
Biological Sciences, PhD
Medical/Health Care Simulation, MS

New York Tech Campus Locations:

[Long Island, N.Y.](#)
[New York, N.Y.](#)
[Jonesboro, Ark.](#)
[Vancouver, Canada](#)
[Abu Dhabi, UAE](#)
[China](#)

SoAD NYC Campus:

[1855 Broadway, Columbus Circle,
New York, NY 10026](#)



New York City Campus:

Madina Seldina,
Administrative Assistant
School of Architecture and Design
New York City Campus (Manhattan)
1855 Broadway, room 1113
PHONE: 212.261.1629
mseldina@nyit.edu

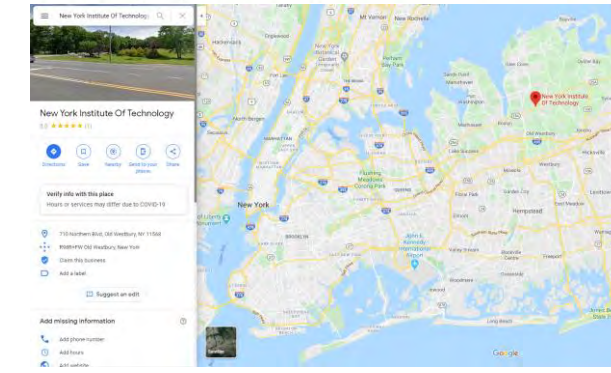
Kesia Persaud,
Administrative Specialist, Graduate Programs
School of Architecture and Design
New York City Campus (Manhattan)
1855 Broadway, room 1118
kpersa09@nyit.edu
Phone: (212) 261-1562

SoAD LI Campus:

[710 Northern Blvd,
Old Westbury, NY 11568](#)



NYIT's Westbury campus: career-oriented education



Long Island Campus:

Staci Kirchner,
Manager Administrative Operations,
School of Architecture and Design,
Office of the Dean
Education Hall, 112, Long Island Campus
Building, Room #, Campus
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New York Institute of Technology
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