

Iaac

Institute for
advanced
architecture
of Catalonia

BARCELONA

Challenge the traditional
approach to design and
building with IAAC's new
Master in Robotics and
Advanced Construction



Master in

ROBOTICS &

ADVANCED

CONSTRUCTION

BARCELONA 2018 - 2019

Directed by: Alexandre Dubor - Aldo Sollazzo

Iaac | Institute for
advanced
architecture
of Catalonia | BARCELONA

MASTER IN ROBOTICS AND ADVANCED CONSTRUCTION

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CONTEXT

Today's construction sector is facing a need for change able to take a new approach to our built environment. Growing cities are challenging the sector to find better ways to build more and at a lower cost, furthermore, the limited resources on this planet push us towards a more sustainable way of building, inhabiting and reusing our constructions. On top of this, aberration from mass-produced cities indicates a need for a more holistic design, integrating the various needs and desires of the inhabitants.

On the other hand, the construction sector has not yet taken advantage of the digital revolution that is happening in other manufacturing sectors, such as in the automobile and aerospaceal engineering.

While studies predict that Automation, Robotics and AI will possibly increase productivity by 60% in the construction sector, they also open new opportunities for design and for the increased performance of buildings.

In this context, IAAC proposes a new interdisciplinary Master, in an effort to train a new generation of professionals capable of answering the challenges of a more sustainable and customised construction ecosystem. Master Candidates can expect to learn about the state of the art in Robotics and Advanced Manufacturing technologies, as well as theory and practical tools of computational design and artificial intelligence.

Master candidates will become fluent in the use of these technologies through continuous hands-on experiments, methodology and a series of workshops and pilot projects with research and industry partners.

Students will learn to manipulate and integrate robotics and advanced manufacturing processes; create and generate parametric design for mass customisation in the connected industry 4.0; integrate computer vision and sensor feedback for complex material systems and fabrication processes; explore the potential of computational optimisation, artificial intelligence and machine learning; understand and integrate the potential of autonomous robot systems; develop new

application of augmented reality and connected mobile devices; and propose new digital design and building technologies for both prefabrication and on-site construction.

By bringing together international researchers and industry partners from a wide variety of fields and cultures, IAAC seeks to create a multidisciplinary and multicultural environment, a place to rethink the construction sector and train the new generation of professionals capable of having a positive impact on our future built environment and economy.





Master in **ROBOTICS AND ADVANCED CONSTRUCTION**

The Master in Robotics and Advanced Construction (MRAC) seeks to train a new generation of interdisciplinary professionals capable of facing our growing need for a more sustainable and optimised construction ecosystem. The Master is focused on the emerging design and market opportunities arising from novel robotic and advanced manufacturing systems.

Through seminars, workshops and studio projects, the master programme challenges the traditional processes in the Construction Sector; it investigates how advances in robotics and digital fabrication tools change the way we build and **develop processes and design tools** for such new production methods.

The master offers an international and multidisciplinary environment where Engineers, Designers, Architects, Craftsmen, Academics and Industry partners have the opportunity to rethink the construction industry. The master will take place in IAAC, a creative space, fully equipped with the most recent manufacturing technologies; and in Barcelona, an International hub for innovation in a traditionally rich industrial region.



STUDENT PROFILE

This master is aimed at engineers, designers, architects and craftsmen willing to push the boundaries of robotics and advanced manufacturing. An undergraduate degree in a field related to the above disciplines will be required.

Once successfully finished the master programme, IAAC students will join the IAAC Alumni Community. This is an active and dynamic network of visionary professionals spread around the world, promoting the principles and applications of Advanced Architecture, exploring new academic and research initiatives, leading award-winning practices or successful start-ups and working for internationally acclaimed firms and institutions.

The aim of IAAC is to form graduates who, after the completion of the programme, will be able to develop their acquired skills in a diversity of professional environments, related to the transformation and management of the construction sector.



MODALITIES

The programme offers students the possibility of pursuing this Master's degree through both **full-time and part-time* modalities**. Specific dates detailed below:

FULL-TIME PROGRAMME (9 MONTHS):

9 months - From October 2018 to June 2019.

PART-TIME PROGRAMME (18 MONTHS):

9 + 9 months - From October 2018 to June 2020.

INDIVIDUAL TERMS (3 MONTHS):

Qualified* students can also apply for

Term 1: 3 months - From October 2018 to December 2018.

Term 2: 3 months - From Jan 2019 to March 2019.

Term 3: 3 months - From April 2019 to June 2019.

***Note:**

- Terms can be taken separately (if the candidate's profile and skills allow it).
- Studio and Thesis can only be taken by candidates that have also taken all 3 learning modules (during the same year or in the previous ones).
- Seminars and workshop classes requiring physical attendance are held during one week of every month. This format allows people with part-time jobs from abroad to attend the courses.



PROGRAMME ORGANISATION

MASTER IN ROBOTICS AND ADVANCED CONSTRUCTION

CREDITS: 75 ECTS

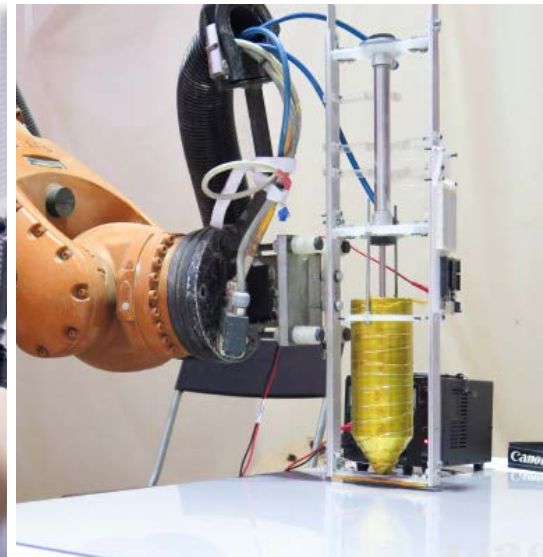
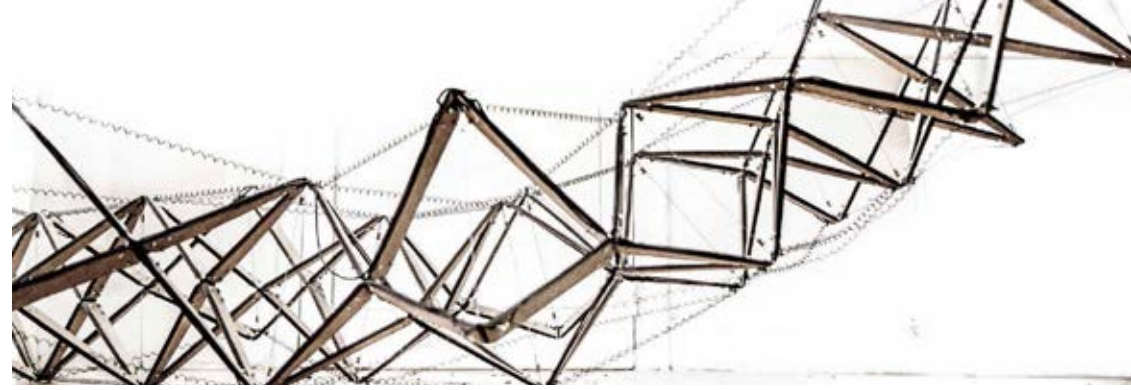
The Master Programme in Robotics and Advanced Construction is an innovative educational format that offers interdisciplinary skills and understanding through a series of class seminars that are put into practice through hands-on workshops. IAAC gives students the opportunity to create individual studio agendas and develop Pilot Thesis Projects based on the knowledge acquired during the seminars and workshops split into 3 Modules. In this way, IAAC puts together an experimental learning environment for the training of professionals with both theoretical and practical responses to the increasing complexity of the construction sector.

The master offers a flexible structure to allow both full time or part-time dedication to the master. Full time students can complete the programme in 1 academic year (October to July) while part time students can complete it in 2 academic years. Monthly encounters with professionals and researchers are condensed into one week of seminar lectures and hands-on workshops per month, and are combined with online classes and video conference reviews to offer the possibility for students to study from abroad with part-time jobs. Full time students will have the possibility to develop their own studio and thesis project during the 3 remaining weeks of each month, while part time students can extend their study over 2 years to complete the studio and thesis project and acquire the master degree.

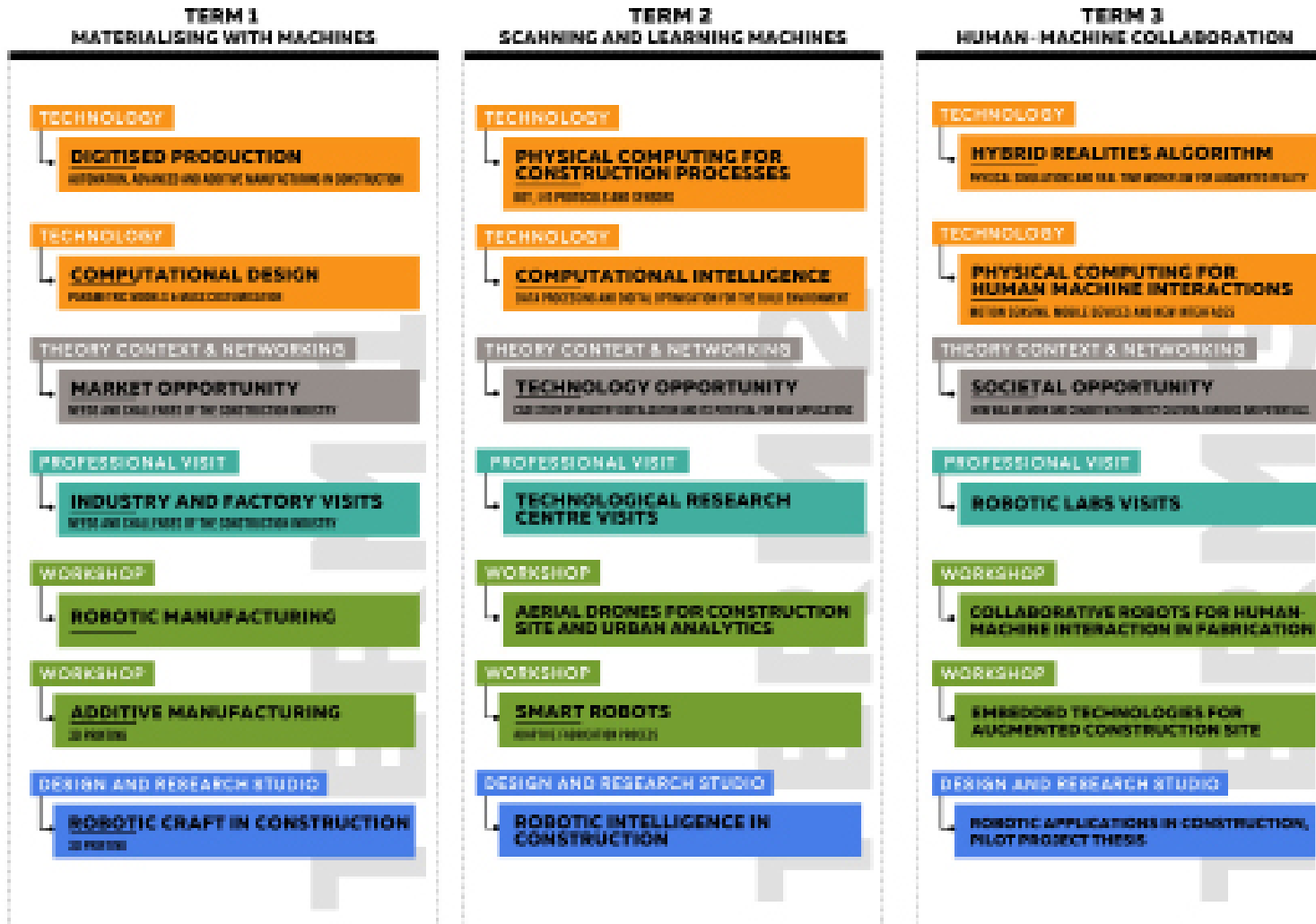
Students will be part of a highly international group, including faculty members, researchers and lecturers from all over the world, this environment will encourage them to develop collective decision-making processes and materialise their project ideas.

The Master in Robotics and Advanced Construction (MRAC), comprises the following elements:

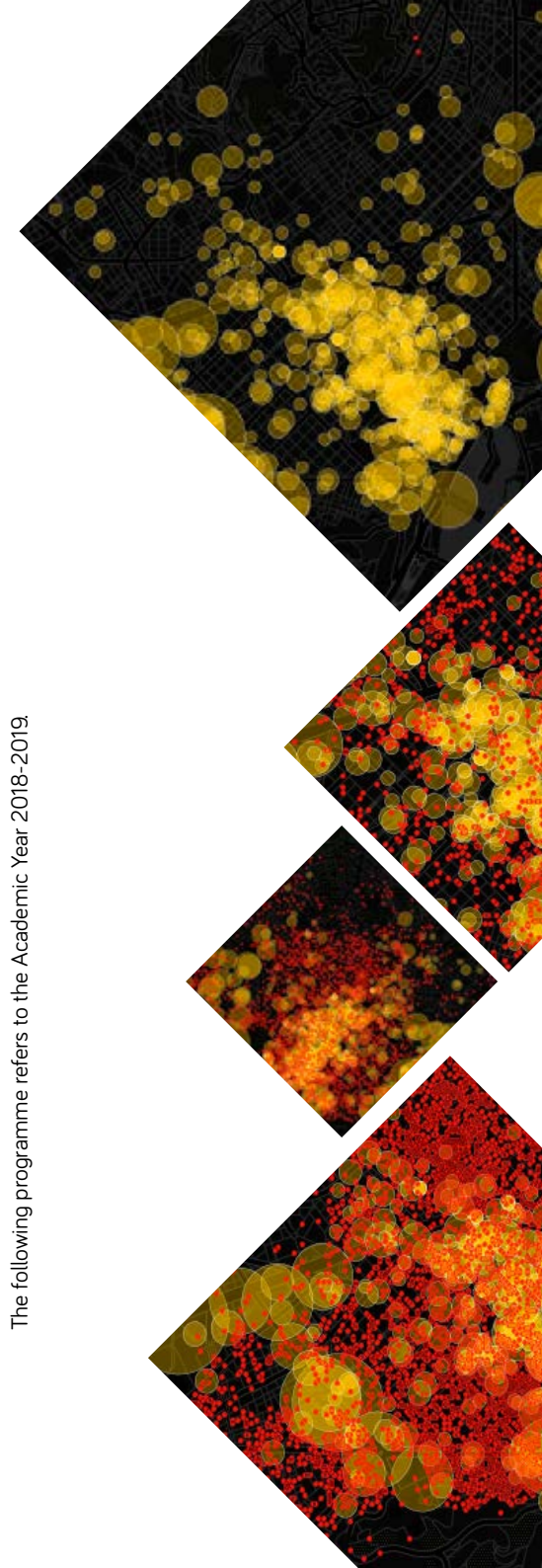
- Technology - **TE** (master classes and online seminars)
- Theory Context & Networking - **TH** (master classes, guest lecture and readings)
- Workshop - **WS** (hands-on intensive seminars)
- Design and research Studio - **ST**
- Professional Visit - **PV**



PROGRAMME ORGANISATION



The following programme refers to the Academic Year 2018-2019.



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MRAC

TERMS
Programme Organisation

The following programme refers to the Academic Year 2018-2019.

TERM 1 / MATERIALISING WITH MACHINES

23 ECTS FULL TIME

15 ECTS PART TIME

Human to Robot, From Digital to Physical

Advances in File to Factory workflow allows for precise and complex constructions. In this new paradigm, architecture will be mass customized, constructive logic will be encoded, new materials will be introduced and materiality will be programmed.

During this first semester, students will explore the possibilities being already offered by digital fabrication and computational design to gain control over the entire process of materialisation from digital to physical, from the human intention to the robot execution. A special focus will be given on the challenges and opportunities raised by Robotic and Additive Manufacturing for construction.

TE | DIGITISED PRODUCTION: AUTOMATION, ADVANCED AND ADDITIVE MANUFACTURING IN CONSTRUCTION

TE | COMPUTATIONAL DESIGN: PARAMETRIC MODELS & MASS CUSTOMISATION

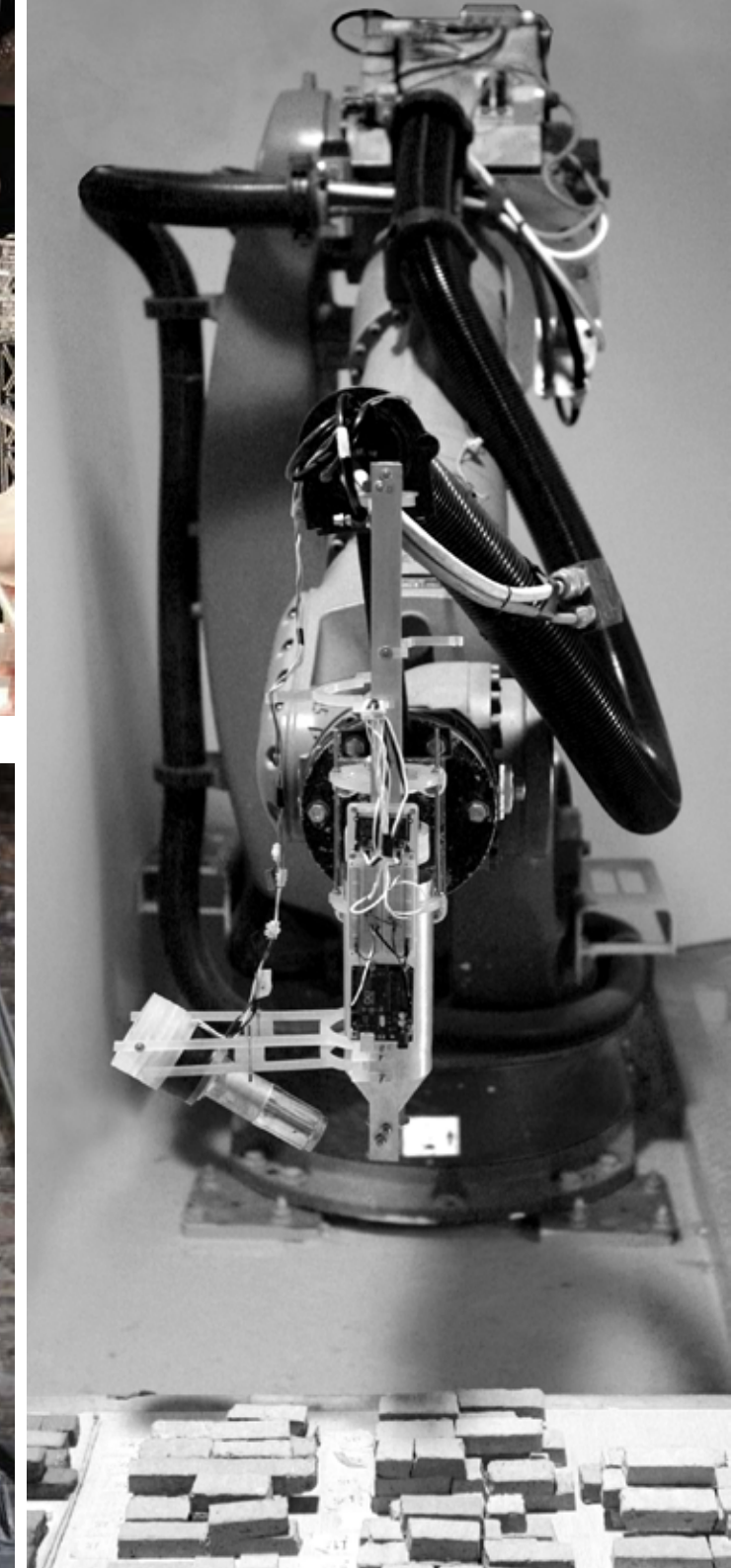
TH | MARKET OPPORTUNITY: NEEDS AND CHALLENGES OF THE CONSTRUCTION INDUSTRY

PV | INDUSTRY AND FACTORY VISITS

WS | ROBOTIC MANUFACTURING

WS | ADDITIVE MANUFACTURING (3D PRINTING)

ST | ROBOTIC CRAFT IN CONSTRUCTION - DESIGN STUDIO



TERM 2 / SCANNING AND LEARNING MACHINES

23 ECTS FULL TIME

15 ECTS PART TIME

Robot to Human, From Physical to Digital

Advances in data collection (sensors, drones, ...) and analysis (optimisation algorithm, AI, ...) allows for better integration of the construction specific challenges such as site monitoring and adaptability, heterogeneous materials, inventory management, assembly tolerances, changing climate conditions and team coordination.

During the second semester, students will integrate increasing amounts of data in their workflow, using robotic sensing and digital simulation to get new information of the construction process. Physical computing and analytics will help drive new decision making processes including iterative logics, computational optimisation and artificial intelligence.

TE | PHYSICAL COMPUTING FOR CONSTRUCTION PROCESSES : IIOT, I/O PROTOCOLS AND SENSORS

TE | COMPUTATIONAL INTELLIGENCE: DATA PROCESSING AND DIGITAL OPTIMISATION FOR THE BUILD ENVIRONMENT

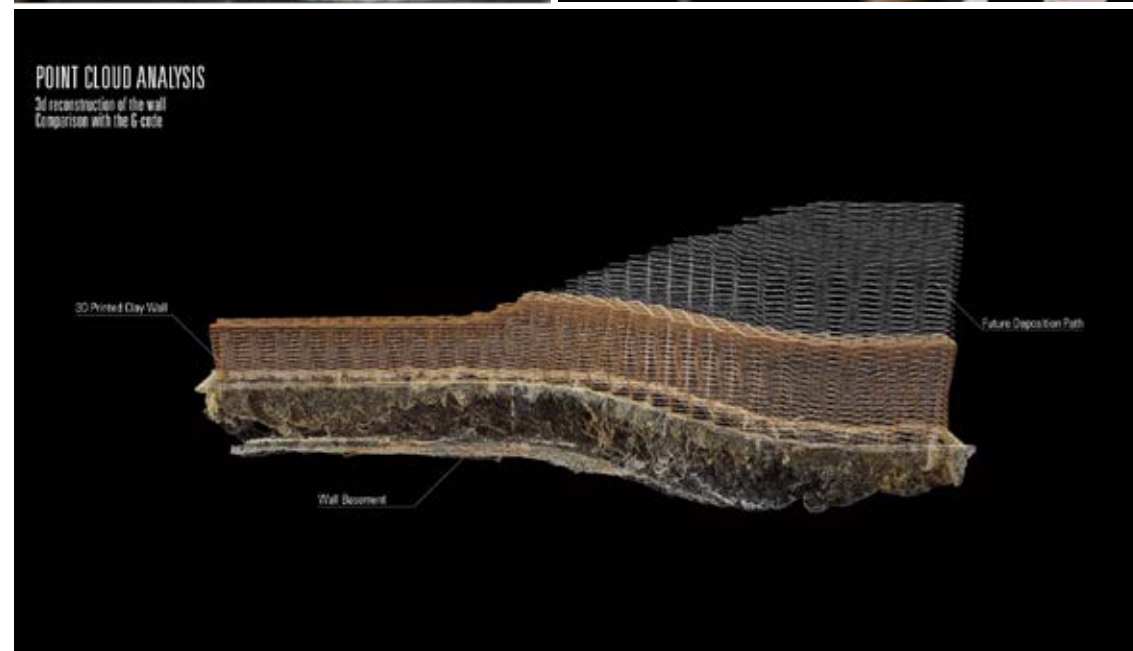
TH | TECHNOLOGY OPPORTUNITY : CASE STUDY OF INDUSTRY DIGITALISATION AND ITS POTENTIAL FOR NEW APPLICATIONS

PV | TECHNOLOGICAL RESEARCH CENTRE VISITS

WS | AERIAL DRONES FOR CONSTRUCTION SITE AND URBAN ANALYTICS

WS | SMART ROBOTS : ADAPTIVE FABRICATION PROCESS

ST | ROBOTIC INTELLIGENCE IN CONSTRUCTION - RESEARCH STUDIO



TERM 3 / HUMAN-MACHINE COLLABORATION

29 ECTS FULL TIME

15 ECTS PART TIME

Robot with Human, Mixed Realities

Advances in Human-Machine Interactions and mixed realities allows for a seamless collaboration between humans and robots in factory and construction sites, taking advantages of the best of both virtual and real world.

During the third semester, students will extend their skills and perspectives towards new devices and strategies that combine existing manual constructive methods with the digital and robotic ones. This new digital craftsmen in factories and construction sites will be the scenario students will use to explore the potential of collaborative robots and Augmented Reality for the construction sector.

TE | HYBRID REALITIES ALGORITHM: PHYSICAL SIMULATIONS AND REAL TIME WORKFLOW FOR AUGMENTED REALITY

TE | PHYSICAL COMPUTING FOR HUMAN-MACHINE INTERACTIONS: MOTION SENSING, MOBILE DEVICES AND NEW INTERFACES

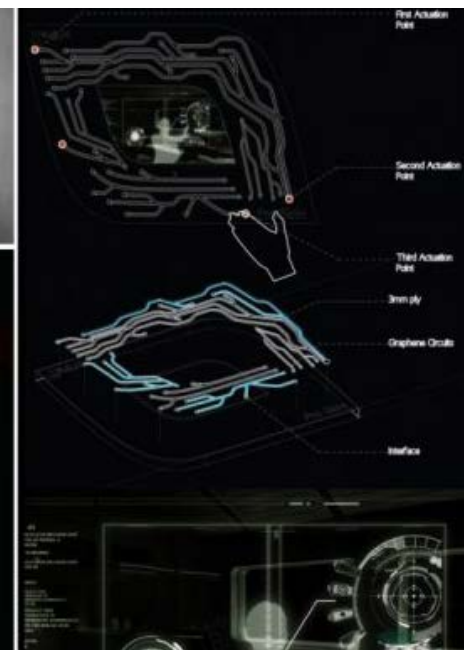
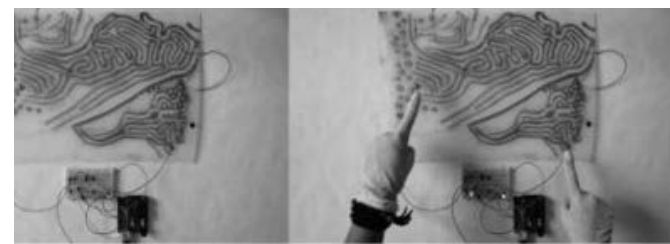
TH | SOCIETAL OPPORTUNITY: HOW WILL WE WORK AND COHABIT WITH ROBOTS? CULTURAL BARRIERS AND POTENTIALS.

PV | ROBOTIC LABS VISITS

WS | COLLABORATIVE ROBOTS FOR HUMAN-MACHINE INTERACTION IN FABRICATION

WS | EMBEDDED TECHNOLOGIES FOR AUGMENTED CONSTRUCTION SITE

ST | ROBOTIC APPLICATIONS IN CONSTRUCTION, PILOT PROJECT THESIS



MRAC

PREVIOUS PROJECTS

IAAC is a leading education and research centre on Robotics and Advanced Construction. Some of the latest projects of IAAC following parts of the agenda of the MRAC include

ON SITE ROBOTICS

BIG SCALE SUSTAINABLE 3D PRINTING

A collaborative project between IAAC and TECNALIA, featured in the 2017's edition of Barcelona Building Construmat. On Site Robotics demonstrates the potentials of additive manufacturing technology and robotics in the production of sustainable low-cost buildings that can be built on site with 100% natural materials. Combining technological advances in robotics (cable robot), natural materials and CAD/CAM software, the aim of the project is to bring automation to the construction site, as well as allowing the production of high-performance buildings and their monitoring in real-time during the construction.

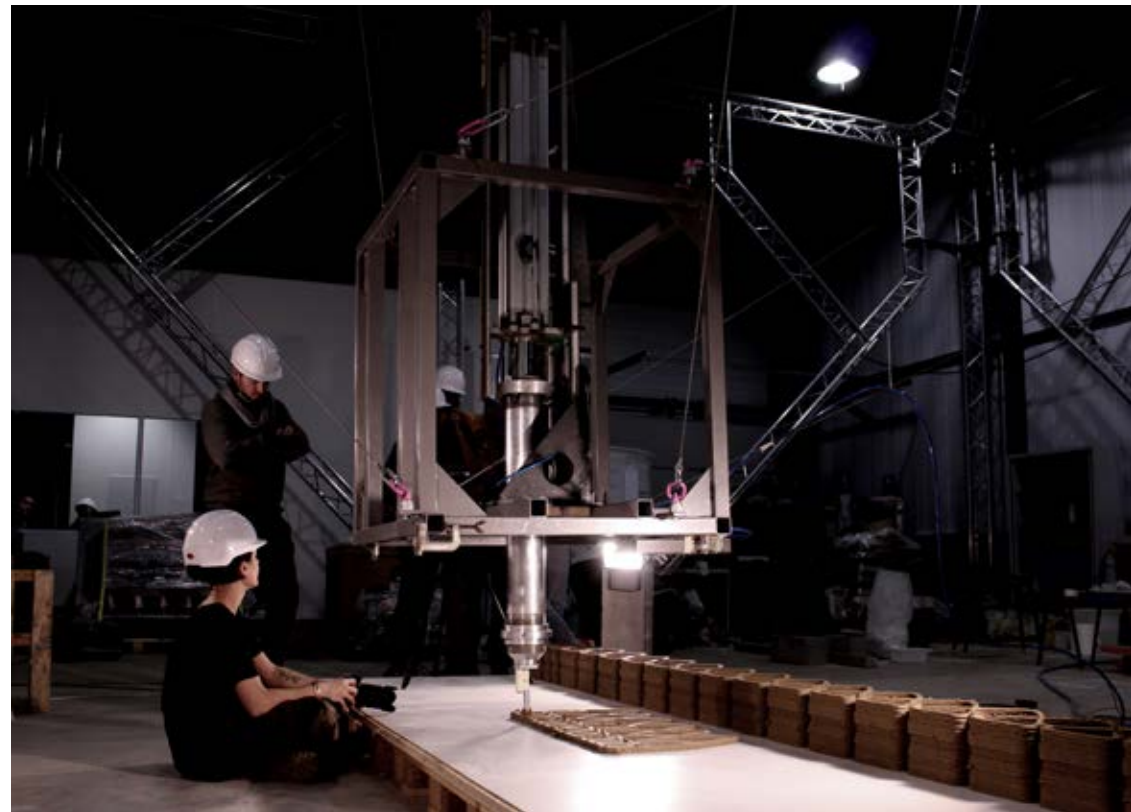
The 3D Printing System presented is introduced to 3D print large scale construction parts, and even small scale buildings, made from 100% natural materials. This system includes the cable robot COGIRO (<https://goo.gl/g5EshS>) with an integrated CNC control, which is able to automate the movement of the 3D extruder with precision. Thanks to the use of cables operated by

servo-controlled winches with easy assembly, maintenance and reconfiguration, the printing can happen in a very wide range of workspaces, and even directly on the construction site.

The system also integrates an extruder and a natural, biodegradable, recyclable and local clay-based extrusion material, based on the Pylos project (<https://iaac.net/research-projects/large-scale-3d-printing/Pylos/>). In addition, a custom script integrated in the CAD software allows to easily translate the complex forms of 3D design in the robotic trajectories.

The Construction sector, which has traditionally been slow in integrating technology, is now opening up to digital manufacturing, 3D printing, and robotics. The possibility of printing anything that has been previously modeled in our computer, lays the groundwork for a true change in the conception architectural production, and in the possibilities of personalizing the final product.

IN COLLABORATION WITH
tecnalia
Corporación Tecnológica

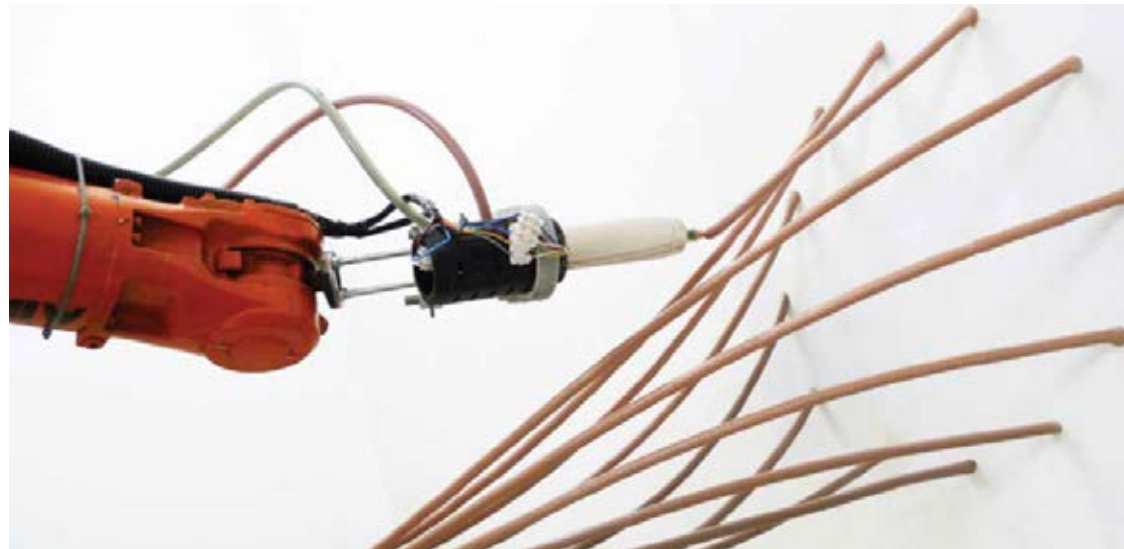
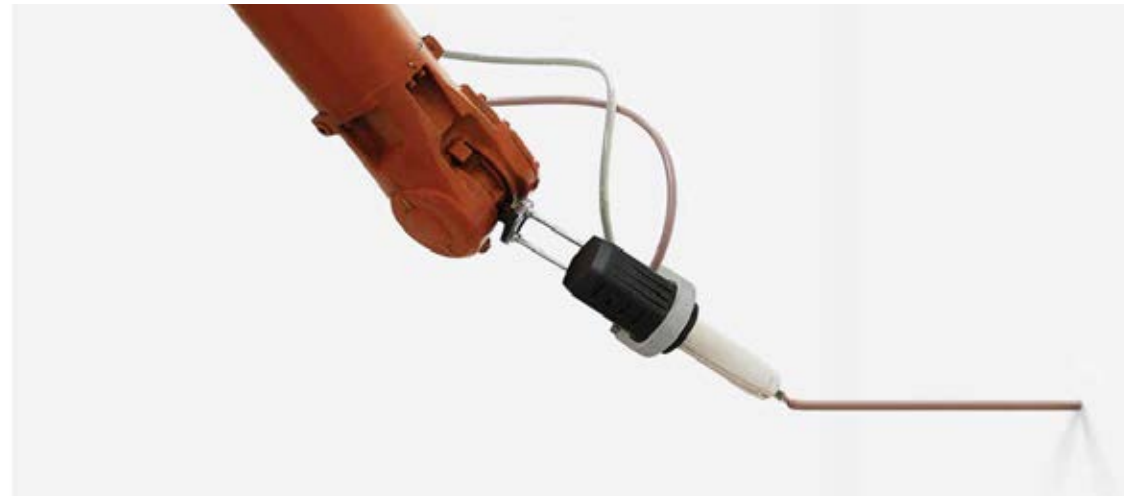


MATAERIAL

LARGE SCALE MANUFACTURING

Mataerial - a new method of additive manufacturing. This patent-pending method allows for creating 3D objects on any given working surface independently of its inclination and smoothness, and without a need of additional support structures. Conventional methods of additive manufacturing have been affected both by gravity and printing environment: creation of 3D objects on irregular, or non-horizontal surfaces has so far been treated as impossible. By using innovative extrusion technology we are now able to neutralize the effect of gravity during the course of the printing process. This method gives us a flexibility to create truly natural objects by making 3D curves instead of 2D layers. Unlike 2D layers that are ignorant to the structure of the object, the 3D curves can follow exact stress lines of a custom shape. Finally, our new out of the box printing method can help manufacture structures of almost any size and shape.

IN COLLABORATION WITH
JORISLAARMANLAB



3D PRINTED BRIDGE

LARGE SCALE MANUFACTURING

The first pedestrian bridge printed in 3D in the world was inaugurated last December 14 in the urban park of Castilla-La Mancha in Alcobendas, Madrid. The Institute of Advanced Architecture of Catalonia (IAAC) was in charge of the architectural design of the bridge, which has a total length of 12 meters and a width of 1.75 meters and is printed in micro-reinforced concrete.

With the design of the bridge printed in 3D, the Institute for Advanced Architecture of Catalonia (IAAC) remains committed to innovation and becomes a global pioneer in the use of large-scale 3D printing. The 3D printed footbridge of Alcobendas represents a milestone for the construction sector at international level, since, to date, this technology has not been applied in the field of civil engineering.

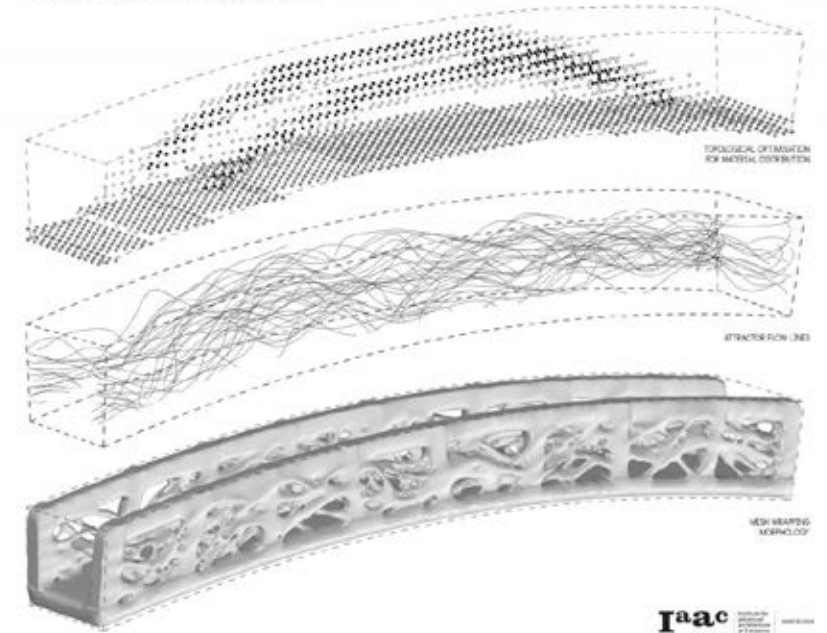
The 3D printed bridge, which reflects the complexities of nature's forms, was developed

through parametric design, which allows to optimize the distribution of materials and minimize the amount of waste by recycling the raw material during manufacture. The computational design also allows to maximize the structural performance, being able to dispose the material only where it is needed, with total freedom of forms, maintaining the porosity thanks to the application of generative algorithms and challenging the traditional techniques of construction.

In addition, the design responds to the challenges posed by the legislation, being implemented in a public space: anyone can now cross the bridge, which will be installed in Alcobendas as an urban infrastructure integrated in the park.



DESIGN DEVELOPMENT PROCESS DIAGRAM



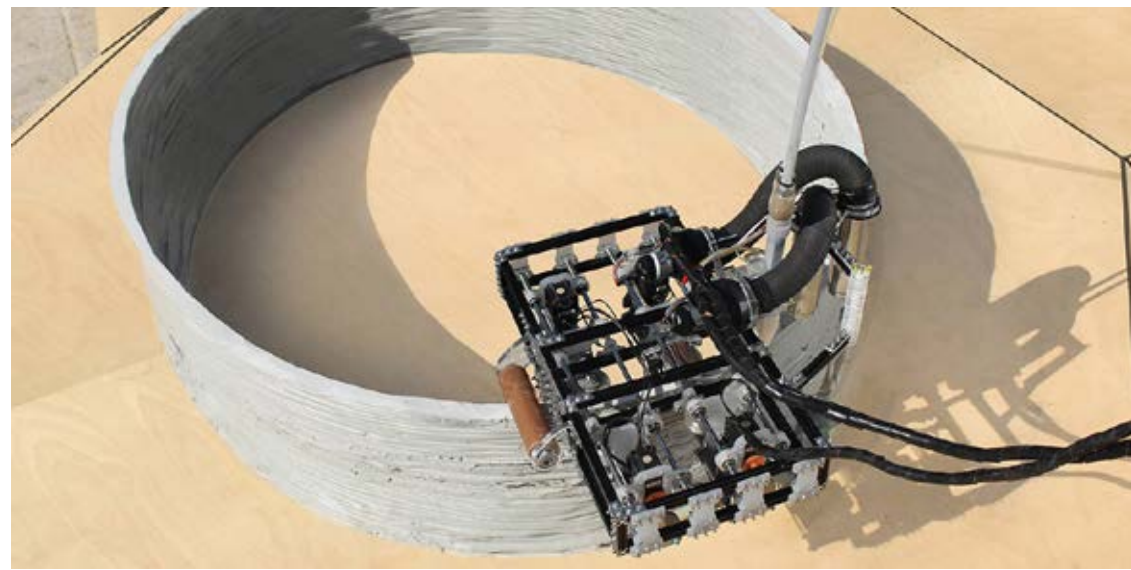
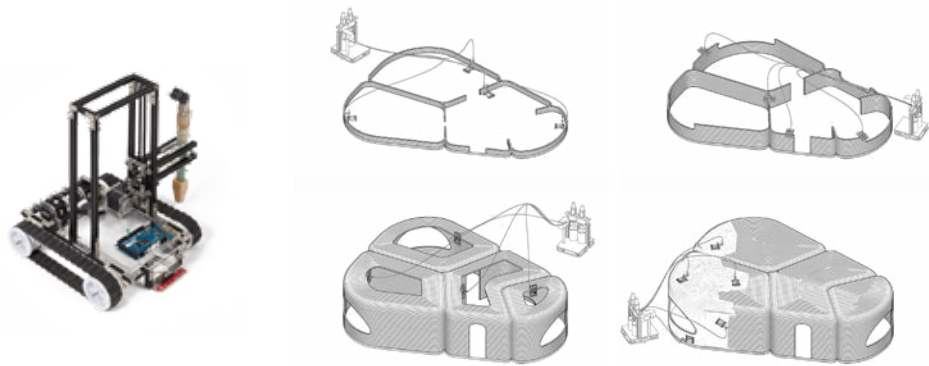
MINIBUILDERS

SMALL ROBOTS PRINTING BIG STRUCTURES



There has always been a close relationship between architecture and technology. Yet, in recent times, architecture has stagnated and the construction industry has been slow to adopt technologies that are already well established in other fields. Robotics and Additive Manufacturing offer great potential towards innovation within the construction industry. A research group at the Institute for Advanced Architecture of Catalonia, based in Barcelona, set on a goal of re-elaborating 3D-printing techniques so as to overcome existing limitations of this technique in large-scale. The objective was to develop a family of small scale construction robots, all mobile and capable of constructing objects far

larger than the robot itself. Moreover, each of the robots developed was to perform a diverse task, linked to the different phases of construction, finally working together as a family towards the implementation of a single structural outcome. Hence, instead of one large machine, a number of much smaller robots working independently, but in coordination, towards a single goal.

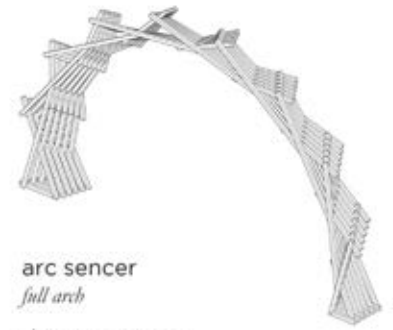
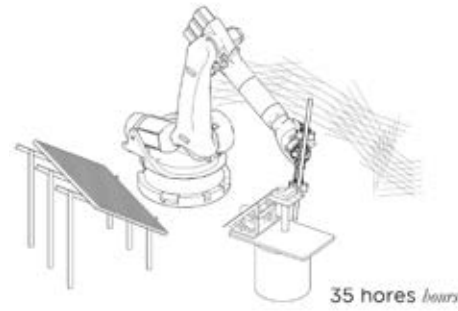


FUSTA ROBOTICA

LARGE SCALE MANUFACTURING

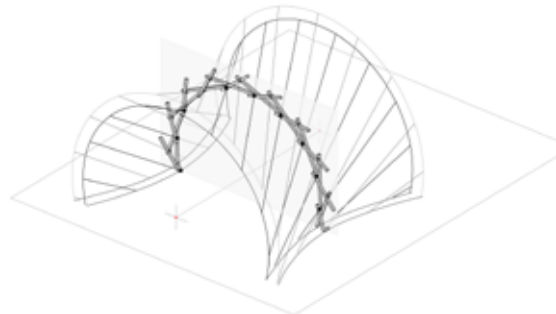
This robotic fabricated pavilion is made exclusively out of Catalan wood. Although it is local and low-impact “zero kilometre” material, the wood is low quality and solely used for palettes. The challenge is to build a stable structure by using this wood. The design solution is based on incorporating thin pieces, as well as several diverse joints and triangulations implemented through digital computation. The fabrication is done with a KUKA robot, allowing to automate the assembly process and reduce any manual workload.

IN COLLABORATION WITH



arc sencer
full arch

1/8 pavelló *pavilion*



INDUSTRY PARTNERS

Master is being developed in close collaboration with industrial partners. Detailed list of partners to be announced.

Industry Partner collaboration within previous IAAC masters editions includes:

- Tecnalia (Cable Robot)
- ABB (Industrial Robots)
- Cricursa (Curved Glass)
- Ceramica Cummella (Custom Ceramic)
- Meretsa (Silicone)
- Santa & Cole (industrial design)
- Breinco (Concrete product)
- Eurecat (Technological Center)
- Design to Production (file to factory process)
- TallFusta (Wood prefabrication)
- Acciona (Infrastructure company)
- Autodesk Build (Software company)

Are you interesting in collaborating with the MRAC programme?

Contact us at:

alex@iaac.net



FACULTY

DIRECTORS



**ALEXANDRE
DUBOR**

CO DIRECTOR MRAC

Alexandre Dubor is an architect and researcher combining new technologies in an attempt to improve how we build and live in our cities.

He holds a Master degree of Architecture & Engineering from EAVT & ENPC (France) and a Master Degree of Architecture from IAAC (Spain), with a specialization in robotic fabrication and large scale additive manufacturing (FabBot 3.0). He holds as well a French architectural licence (HMONP) and has worked in various architectural offices from competition stage to delivery (Libeskind, Atenastudio, iDonati, AREP) while exploring the potential of scripting and coding in a separate practice (Collectif277).

Since 2012, he is working at IAAC as expert in digital and robotic fabrication. He is now leading the Open Thesis Fabrication program as well as the Master in Robotic and Advanced Construction at IAAC. Together with IAAC staff, students and industrial partners, he is investigating how new advances in material, digital fabrication and computational design could lead to a better construction ecosystem, toward a more efficient, affordable, sustainable and personalized built environment.



**ALDO
SOLLAZZO**

CO DIRECTOR MRAC

Aldo is an architect and researcher, expert in computational design and digital fabrication. Master in Architectonic Design in 2007, Master in Advanced Architecture at IAAC [Institute for Advanced Architecture of Catalunya] in 2012, Fab Academy diploma in 2014 in the Fab Lab Barcelona, Aldo is currently involved in several projects running in parallel.

Since 2011, he is manager of Noumena, a firm embracing data-driven design, investigating between the boundaries of new digital paradigms and design strategies applied to architecture, robotics and fabrication, through a hands-on and experimental approach.

He is also founder of Fab Lab Frosinone and Director of Reshape, a digital platform promoting interdisciplinary and collaborative approach, towards the definition of new cutting-edge practices and disruptive ideas in the field of wearable tech and fashion design. Since 2015 he is faculty at IaaC, covering the positions of Director of IaaC Global Summer School, co-Director of the new Master of Robotics and Advanced Construction, and instructor of digital tools.

He is one of the Supernode of Fab Academy, the educational platform founded by Neil Gershenfeld from the MIT's Center of Bits and Atoms. For the same program he is also local coordinator for Fab Academy Paris.

SCIENTIFIC COMMITTEE



**SIGRID
BRELL-COKCAN**

RiA ; RWTH Aachen



**KASPER
STOY**

ITU REAL



**ROLAND
SNOOKS**

Kokkugia ; RMIT



**FABIAN
SCHEURER**

Design to Production



**JOSE DANIEL
GARCIA ESPINEL**

Acciona Innovation

GENERAL INFORMATION

TUITION FEES

TUITION FOR STUDENTS ATTENDING MRAC (75 ECTS)

MRAC full-time Master's Degree Tuition for the year 2018/2019-20 is 16,000€ for Non EU students and 11,200€ for EU students. The selected candidates must send a scanned proof of a down payment of 2.500€ to the Institute to confirm participation, maximum 4 weeks after their acceptance. The remaining part of the tuition fee may be paid either in one or two instalments, 60% before September 1st, 2018 and 40% before December 1st, 2018.

MRAC part-time Master's Degree Tuition for the year 2018/2020 is 16,000€ for Non EU students and 11,200€ for EU students. The selected candidates must send a scanned proof of a down payment of 2.500€ to the Institute to confirm participation, maximum 4 weeks after their acceptance. The remaining part of the tuition fee may be paid either in one instalment; or divided it into 3 instalments: 35%, before September 1st, 2018; 30% before December 1st, 2018 and 35% before September 1st, 2019.

The tuition fee for any individual term is 6,000€. The selected candidates must send a scanned proof of a down payment of 500€ maximum 4 weeks after their acceptance. The remaining part of the tuition fee should be paid:

Term 1 students: no later than 1st of September 2018.

Term 2 students: no later than 1st of December 2018.

Term 3 students: no later than 1st of March 2019.

All payments of the selected programme must be paid by bank transfer only to:

Bank: Santander

Agency: 6784

IBAN - ES55 0049 6784 3226 1615 5632

SWIFT - BSCHEMXX

Holder : Institut d'Arquitectura Avançada de Catalunya.

Address: Via Augusta, nº182 (Es 08021 Barcelona)

Note: Make sure that bank transferring SUBJECT is the applicant's name, and not the person who orders the transfer. Also make sure to select the SWIFT instructions code "OUR" when ordering the bank transfer. This means that you have to pay the transfer charges.

APPLICATIONS, GRADING SYSTEM AND MORE

APPLICATIONS

To apply for IAAC, please fill out and submit the online applications form (www.iaac.net/iaac/apply) for the programmes: MAA01, MAA02, MaCT01, MaCT02, MAI, MAA01 + OTF, OTF, MAEB, MRAC, MDEF.

For the online application, the following required documents should all be submitted in English, with the exception of the undergraduate diploma (All documents must be uploaded onto the designated space on the online application form in PDF format).

A letter of intent expressing the reasons for which you wish to attend the chosen master - Written in English, PDF and with a maximum of two A4 pages.

Curriculum vitae

Portfolio, showing samples of your work -maximum of 10MB.

Two letters of recommendation (from professional or academic referees) - In English, PDF and with the corresponding referee contact information.

A copy of your highest academic degree.*If you haven't graduated and therefore your diploma is not available at the moment of your application, you will need to send a letter in English or Spanish emitted by your University acknowledging that you are currently studying (name of the programme) and will graduate in (specific date).

A copy of a valid passport (copy of valid I.D. is accepted for citizen of member states of the EU)

*If you hold more than one passport bear in mind that the one you provide in the application form

is the one IAAC will use for your acceptance letter and therefore the one you will use to apply for your Spanish visa (non EU students) and NIE (all students).

*Bear in mind that you can apply with a copy of your title but if you are accepted you will be required to send a legalised copy of your degree and an official SWORN translation of it in Spanish. More info about SWORN translation and legalisation in the "FAQ" section in IAAC's website.

* If you have not yet graduated, but will be graduating before the commencement of the academic year to which you are applying at IAAC, you are still eligible to apply. However, to complete the application process, you will need to provide the document explained in the section 5 above.

If you have any questions or doubts with regards to the application process, please feel free to contact us at applications@iaac.net

GRADING SYSTEM

Class attendance is obligatory for studios and seminars. In both cases, courses are graded as follows:

- 0-4.9 Fail (this means that the student is not going to get his/her Master's Degree, this grade will be justified and well explained)
- 5.0-6.9 Passed
- 7.0-8.9 Good
- 9.0-10 Excellent/Distinction

- Under no circumstances will students be excused from presenting their design work at the final review of a project.

- Diplomas will not be delivered to students with any incomplete in their final grades. In addition to the above, Midterm Reviews will be held with the members of the faculty in order to inform each student briefly of the general feelings of the faculty about his or her work. Suggestions may be given on how to prepare for the Final Review

STUDENT FEEDBACK AND EVALUATION

The usual procedure IAAC uses for the collection and analysis of information to ensure the quality of the programme is the student surveys and evaluation reports. IAAC performs two different types of surveys: one survey is specific for each course, and is being made immediately after a course finishes, and the second survey is a general survey, which is conducted at the end of the academic year. Course Survey: The surveys contain questions related to course content and structure of the class, the methodology used and the level of facilities where the course has been conducted. There are also questions about the faculty, allowing the student to evaluate the faculty's communication capabilities, the capacity of synthesis and organise the content structure as well as the faculty's competence in assessing and explaining the results obtained. The survey also include questions about the relevance of the class with respect to the students own interests and the relevance with the general research agenda of the Master programme. Students are also asked within this survey to suggest improvements in the courses that IAAC takes into consideration for the future editions. General Survey: The general annual survey refers to the overall management of the programme and the efficiency of the entire organisation. It includes questions of whether students had difficulties in the application and admission process, whether they had problems in acquiring all necessary certificates and/or other documents and more. It also includes question of satisfaction in relation with the efficiency level of IAAC staff, whether faculty

and content have met their expectations, and whether they were satisfied with the level of access to facilities and material resources at the Institute. Also, students are asked what course or activities considered more interesting and relevant to the programme and they are also asked to express ideas for overall improvement.

STUDY EXPENSES

Study-related expenses such as the purchase of books, graphic reproduction, printing and modeling are not included in the tuition fee. For field trips and excursions an individual financial contribution may be required.

MATERIALS

Students are expected to bring their own a laptop computer no more than two years old, with the following specifications:
 PIV at 2.4 GHz (or similar in the case of an AMD processor).
 8GB RAM.
 WIFI internet connection.
 1280 x 1024 screen display resolution

NON EUROPEAN STUDENTS

Non European students accepted to the programme are advised to contact the nearest Spanish Embassy to start the Visa procedure. Be aware that the application procedure for a Student Visa can take up to 3 months.

MEDICAL INSURANCE

Participants are responsible for their own health insurance and other personal insurance. It is mandatory to acquire a Medical Insurance to cover your stay here in Barcelona. The Catalan Public Health System does not cover students, and will charge you for any visit or consultation. Please note that the IAAC is not liable for loss or damage to personal belongings.

THE
INSTITUTE



IAAC Students 2000-2016

THE INSTITU _ _

The Institute for Advanced Architecture of Catalonia – IAAC is an international centre for Education, Fabrication and Research dedicated to the development of architecture capable of meeting the worldwide challenges in constructing 21st century habitability. Based in the 22@ district of Barcelona, one of the world's capitals of architecture and urbanism, as well as the European Capital for Innovation (2014), IAAC is a platform for the exchange of knowledge with researchers, faculty and students from over 60 countries around the world.

IAAC is Education, with the Master in Advanced Architecture, Advanced Interaction and the Master in City & Technology giving the next generation of architects and professionals the space to imagine, test and shape the future of cities, architecture and technology. This is possible through Open Thesis Fabrication, the implementation of Applied Research and allowing learning by doing, as well as through short programmes, implementing global agendas developed through local solutions, such as the Global Summer School.

IAAC is Fabrication, with the Fab Lab Barcelona, the most advanced digital production laboratory in Southern Europe, a laboratory where you can build almost everything, that recently hosted Fab10, the 10th annual worldwide Fab Lab conference.

IAAC is Research, with Valldaura Labs, a self-sufficient research centre located in the Collserola Metropolitan park, 20 minutes from the centre of Barcelona, where a series of laboratories are implemented for the production and testing of Energy, Food and Things.

And IAAC is also Barcelona, the European Capital for Innovation (2014)¹, the city that aims to be a self-sufficient city, a Fab Lab city, a smarter city. Thanks to its innovative visions, IAAC is strategically aligned to the new urban policies of the city, developed in close collaboration and mutual inspiration between the two entities.

The Institute develops multidisciplinary programmes that explore international urban and territorial phenomena, with a special emphasis on the opportunities that arise from the emergent territories, and on the cultural, economic and social values that architecture can contribute to society today.

IAAC sets out to take R+D to architecture and urbanism and create multidisciplinary knowledge networks. To this end the institute works in collaboration with several cities and regions, industrial groups, research centres, including the City Council of Barcelona, the Collserola Natural Park, the Massachusetts Institute of Technology (MIT), the Centre for Information Technology and Architecture (CITA), the Southern California Institute of Architecture (Sci-Arc), as well as diverse companies among which CISCO, Endesa, Kuka Robotics and many others. Together with these the Institute develops various research programmes bringing together experts in different disciplines such as architecture, engineering, biology, sociology, anthropology and other fields of investigation.

IAAC has made its name as a centre of international reference, welcoming students and investigators from over 60 different countries among which Australia, the USA, India, Brazil, Russia, Ethiopia, all European countries and many others.

1. http://ec.europa.eu/research/innovation-union/index_en.cfm?section=icapital

MISSION, VISION & VALUES

MISSION

The Institute for Advanced Architecture of Catalonia (IAAC) is a vanguard academic and research centre whose mission is to promote scientific and technological innovation in the conception, design and construction of the human habitat, at all scales (from bits to geography), integrating technological, social and cultural innovations of our time and contributing to the consolidation of Barcelona as a global platform for the urban habitat.

To this extent IAAC works with a multidisciplinary approach, facing the challenges posed by our environment and shaping the future of cities, architecture and technology.

This is obtained through the focus on select criteria:

- Design for Self-sufficiency
- Application of ICT (Information and communication technologies) at all levels of daily life.
- Contribution to the distributed networks in the conception of the environment.
- Advanced digital and parametric design.
- Digital and Robotic Fabrication

VISION

IAAC encourages innovation and construction of the human habitat, offering a working environment in the following areas:

- Education through academic programmes for graduate students and international faculty and students, continuous education programmes in design, interaction, architecture, urbanism and landscape.

- Research by developing projects to expand the boundaries of architecture, in collaboration with experts from multiple disciplines.

- The development of innovation projects with companies and institutions that define role models, responding to global realities.

- The promotion of projects through publications, exhibitions and competitions developed physically and virtually.

For all this, IAAC works with local and global organisations participating in multidisciplinary knowledge networks. It promotes transformation from its humanistic ideology based on learning by doing.

The Institute for Advanced Architecture of Catalonia (IAAC) is a vanguard academic and research centre whose mission is to promote scientific and technological innovation in the conception, design and construction of the human habitat, at all scales (from bits to geography), integrating technological, social and cultural innovations of our time and contributing to the consolidation of Barcelona as a global platform for the urban habitat.

To this extent IAAC works with a multidisciplinary approach, facing the challenges posed by our environment and shaping the future of cities, architecture and technology.

This is obtained through the focus on select criteria:

- Design for Self-sufficiency
- Application of ICT (Information and communication technologies) at all levels of daily life.
- Contribution

VALUES

COMPACT

An organisation that is flexible, agile, quick and able to anticipate new challenges of our time.

INDEPENDENT

Private foundation that collaborates with individuals, universities, companies and public organisations to innovate the human habitat and interaction.

GLOBAL

In thought and action, in the origin of human capital, learning from the diversity of the world, promoting the construction of local realities with very specific identity.

INFORMATIONAL

Recognition of digital systems as a technological base that transforms our world today, integration of technologies and processes associated in all areas of their action.

NATURAL

Promoting connected self-sufficiency, according to the rules of biological ecosystems, to help build a more ecological and social world.

HOLISTIC

Broad overview of the conception, design and construction of the human habitat, and this works at all scales, in interaction with multiple disciplines.

SOCIAL

Important social base, from interaction with individuals, companies and organisations that promote innovation in the construction of the human habitat, prioritising talent and avoiding social and economic stigmatism.



IAAC OBJECTIVES

- To underline and reinforce our position as a worldwide reference for education and research, as well as for self-sufficiency and digital fabrication, through the consolidation and expansion of research projects, as well as offering up to date and evolving academic programmes.
- To expand our collaborations with strategic public and private partnerships both nationally and internationally.
- To strengthen our consultancy role by creating specific alliances with industries that promote and support applied research.
- To actively pursue an agenda of activities related to green architecture, sustainability and renewable energies through the development of the Green Fab Lab, the Food Lab and the Energy Lab.
- To enhance our current work and profile as a specialised think tank for innovative strategies within the fields of urban planning and urban design with particular attention to the Smart Cities challenge.



BARCELONA IS...

MODERNISM: 7 works by Gaudi are UNESCO World Heritage sites.

IMAGE: Almost 2.500 film shoots took place in the city during 2015.

CULTURE: 50 museums and exhibition centers, Palau de la Musica, Sonar, Primavera Sound etc. Barcelona is part of the Network of UNESCO Creative Cities as City of Literature since 2015.

SPORT: In addition to the pulling force of FC Barcelona, the city also hosts several international sporting events each year; these include the X Games, the World Swimming Championship etc.

PROFITABLE: Since 2000, Barcelona has been the top European city in terms of the quality of life of employees (Report by Cushman & Wakefield and Cinco Dias).

TOURISM: More than 15,5 million foreign tourists visited Barcelona in 2015.

AFFORDABLE: Barcelona is not among the world's 50 most expensive cities (according to Mercer Human Resource Consulting).

MOBILE: The city will continue to host the Mobile World Congress (MWC) until 2018. Barcelona welcomes more than 70.000 visitors during this annual event.



22@ CAMPUS

The Institute for advanced architecture of Catalonia is located in the Poblenou neighbourhood of Barcelona, in the recently created district known as 22@, a focus for companies and institutions oriented toward the knowledge society. The neighbourhood is close to the historic centre, the seafront, the Plaça de les Glòries and the Sagrera APT station, making it the most dynamic enclave in the city.

IAAC is housed in an old factory building, with 2,000 m² of space for research, production and dissemination of architecture, so that the space itself is a declaration of principles, embodying an experimental and productive approach to architecture. The IAAC premises include the Fab Lab Barcelona, an architecture and design oriented fabrication laboratory which is part of the global network of Fab Labs set up by The Center for Bits and Atoms at MIT. The Green Fab Lab, hosted in IAAC's forest campus in the Valldaura Labs, is also part of the same global network, a fabrication laboratory this time oriented towards self sufficient and productive solutions.



VALLDAURA CAMPUS



Valldaura is IAAC's second campus located in the Collserola Park, the natural centre of the metropolitan area of Barcelona. Valldaura campus is a large park and testing ground for innovation that features the latest technologies in the fields of energy, information and fabrication. The core of this innovative project developed by IAAC is a laboratory to implement investigation and set a new bench mark for self-sufficiency. The Valldaura Self Sufficient Labs express a new concept for sustainability established by IAAC. Its aim is to create a sustainable, consciously designed ecology using both cutting edge technology and traditional craftsmanship.

Valldaura Self Sufficient Labs Centre is at the forefront of developing a new concept of habitability placing people as the centre of all actions.

Local self-sufficiency is promoted in the use of the environment, and the expansion of knowledge is promoted through the participation in global information networks to share and generate progress.

The Valldaura Self Sufficient labs and its three Laboratories, Food Lab, Energy Lab and Green Fab Lab; allow to research the specificities of the production of key elements involved in self-sufficiency: food, energy and things, combining ancestral knowledge that connects us to nature with the latest advanced technology.

EDUCATIONAL PROGRAMMES

LONG TERM

IAAC Educational Programmes give the next generation of architects the space to imagine, test and shape the future of cities, architecture and technology through applied research, learning by doing, and implementing global agendas developed through local solution.

IAAC is also part of the European consortium InnoChain, a consortium of six renowned research institutions and 14 leading industry partners: an interdisciplinary network developing PhD research in innovative building design practice under the Horizon 2020 programme.

MAA01 - 1 YEAR, 75 ECTS MASTER IN ADVANCED ARCHITECTURE

The MAA01 - Master in Advanced Architecture Programme is oriented to graduates who wish to commit and develop their design research skills in the context of new forms of practice within architecture and urbanism, ranging from large scale environments to tectonic details and material properties. In order to allow the highest quality and applied research, the Masters in Advanced Architecture proposes a multidisciplinary approach, considering architecture as a transversal field, for which it is imperative to integrate all research and applications with the knowledge of specialists from a diversity of fields of expertise.

The MAA01 emerges as an Innovative Structure focusing on five select Research Lines all led by Internationally renowned experts, and bringing together students and faculty from different disciplines and origins, towards the creation of a Networked Hub dedicated to Research and Innovation for the habitability of the 21st Century. The programme is organised in four phases: three terms and the final project development phase.

MAA02 - 2 YEARS, 130 ECTS MASTER IN ADVANCED ARCHITECTURE

The MAA02 programme combines the first year Master (MAA01) with a second year of investigation towards the development of a thesis project. This programme allows senior students, already having developed the appropriate sensibility and tools from MAA01, to get further a personal investigation, around the themes of the advanced technology, architecture and urbanism. During this second year students are required to deal with a project counting on the possibility of developing it with international faculty and enterprises, highly specialized in different fields.

During the second year each student will propose and develop his/her Individual Thesis Project through an academic programme structured in:

- Individual Tutoring with internationally renowned experts that will support the student in the development and in the theoretical definition of the thesis project
- Seminars focused on the topics of Advanced Digital Tools, Research Methodology and 1:1 Fabrication

The thesis, submitted in publication format, can be developed according to diverse research methodologies.

MAI - 1 YEAR, 75 ECTS MASTER IN ADVANCED INTERACTION

The Master in Advanced Interaction is a unique opportunity for Designers, Visual and Performing Artists, Choreographers, Dancers, Interaction Designers, VJs and DJs, Sound Artists, Scenographers, and profiles from related backgrounds to explore creative uses of technology for experimental and practical purposes. The course is aimed at developing and exhibiting projects which define meaningful interaction through a series of installations and performances. The ambition of these projects go well beyond digital media and are communicated through software and hardware development, solid theoretical foundations, and prototypes completed in IAAC's digital fabrication laboratory. The theoretical basis of the course is to question how current technology can augment the agency and impact of all kinds of interactions around us. Our learning-by-doing research integrates methods used in design, programming and social sciences to produce projects prototypes and products that will define the outer limits of what is possible to do imaginatively with technology today. Students who attend the Master in Advanced Interaction join an international group, including faculty members, researchers and lecturers investigating critical issues facing modern society with the aim of developing the skills necessary to implement practical solutions in diverse professional environments.

MACT01 - 1 YEAR, 75 ECTS MASTER IN CITY & TECHNOLOGY

The Institute for Advanced Architecture of Catalonia (IAAC) is launching an EU accredited Master programme in City & Technology (MaCT). In an effort of understanding the needs for the habitability of the 21st century cities and the significant role of technology for the formation of the new urban environments IAAC proposes a new Master programme oriented in training Change Makers that City Government Administrations, the Industry and Communities need in order to develop projects for the transformation of the cities.

The Master programme represents an effort of facilitating the exchange of knowledge and the mutual learning of urban experiences among cities.

MaCT foresees new city economy and new city management models for the creation of a decentralized, productive and social city of the future.

EDUCATIONAL PROGRAMMES

LONG TERM

MaCT02 - 2 YEAR, 130 ECTS MASTER IN CITY & TECHNOLOGY

With the objective of furthering the research developed in the first year of the MaCT01 programme, IAAC launches the MaCT02. Throughout the MaCT02 programme students will have the opportunity to work on an individual thesis focused on the development of a pilot project, allowing them to fully engage with both the theoretical and practical aspects of the project. The students will also follow associated seminars amplifying their knowledge of technologies associated to the urban context, allowing them to integrate these in the development of holistic projects, mixing technology with social, economic and environmental benefits.

The individual thesis, or pilot project, will allow the students to gain in depth knowledge on elaborating disruptive urban proposals that use technology to better citizens' quality of life. Additionally, through the development of the individual thesis based on a real case study, students will have the opportunity to collaborate with industrial and governmental representatives, among the collaborative entities of the MaCT programme, giving students the necessary support and knowledge to develop solutions for the real world.

MAEB - 12 MONTHS, 90 ECTS / 140 ECTS MASTER IN ADVANCED ECOLOGICAL BUILDINGS IMMERSIVE PROGRAMME

Current discourses on sustainability and design do not yet adequately frame questions of energy and ecology. Whether you consider how building design overlooks landscape and urbanisation interdependencies; or incomplete interpretations of the ecological processes that could otherwise better support building, urbanisation, and life today; or how the material choices in buildings are governed by stylistic abstract notions instead of something ecologically more powerful, the Master in Advanced Ecological Buildings aims for a more ambitious and comprehensive approach of energy and ecology for the built environment.

Following up the urban research carried out by IAAC in the last years in fields like Solar Housings, Eco neighbourhoods, Internet of Energy, Hydrogrid, Digital Fabrication, the immersive Master in Advanced Ecological Buildings (MAEB) aims at training professionals in the design, prototyping, and fabrication of buildings as ecological and thermodynamic systems. The immersive programme takes place in Valldaura Labs, IAAC's campus located inside Collserola Natural Park in Barcelona.

MRAC - 1 YEAR, 75 ECTS MASTER IN ROBOTICS AND ADVANCED CONSTRUCTION

With the Master in Robotics and Advanced Constructions (MRAC), IAAC seeks to train a new generation of interdisciplinary actors capable of facing our growing need for a more sustainable and optimised construction ecosystem. The Master is focused on the emerging design and market opportunities arising from novel robotic and advanced manufacturing systems.

Through seminars, workshops and studio projects, the master programme challenges the traditional processes in the Construction Sector; it investigates how robotics and new digital fabrication tools change the way we build, and develops the design tools and processes for such new productions methods.

The master offers an international and multidisciplinary environment in which Engineers, Designers, Architects, Craftsmen, Academics and Industry partners must rethink the construction industry. The master will take place in IAAC, a creative space fully equipped with the latest manufacturing technologies, based in Barcelona, an International hub for innovation in a traditionally rich industrial region.

MDEF - 1 YEAR, 75 ECTS MASTER IN DESIGN AND EMERGENT FUTURES

The aim of the Master in Design for Emergent Futures (MDEF) is to provide the strategic vision and tools for designers, sociologists, economists and computer scientists, to become agents of change in multiple professional environments. This programme focuses in the design of interventions in the form of products, platforms and deployments in the context of emerging future scenarios in society and industry.

Students will be encouraged to work at multiple scales (product, platforms, strategic planning and distribution strategy) in order to create prototypes to be tested in the real world. The theoretical and practical contents in this programme propose an exploratory journey aimed to comprehend and critique the role of disruptive technologies -including digital fabrication, blockchain, synthetic biology, Artificial Intelligence, among others, in the transformation of the established order.

The programme is recommended for designers, sociologists, computer scientists, economists, anthropologists, technology entrepreneurs and changemakers who are looking to develop an interdisciplinary career path to conceive and produce impactful ideas to transform the world. This Master has a high component of hands-on learning and project-based learning where students will be requested to turn big ideas into design strategies, prototypes and interventions to be tested in the real world, focused in Barcelona but connected globally with other cities.

EDUCATIONAL PROGRAMMES

SHORT TERM

OTF - 6 MONTHS, 25 ECTS OPEN THESIS FABRICATION

The aim of the programme, in line with the opportunity of making a difference, is to develop research to be applied through patents or products for marketing. This will be obtained through the common goal of researching of different fabrication techniques, materials and form, towards the implementation of a large scale prototype, understanding the potentials of digital fabrication together with new needs of current society and the market. All the IAAC BUILDs researchers will be working together in 1 group towards a collective goal and project, in turn subdivided into different specialized research teams each focusing on a specific aspect of the project's development. Hence the implementation of a 1:1 scale prototype allowing to test techniques and materials on real scale. IAAC BUILDs follows in the footsteps of OTF developing the applied research in partnership companies, whose involvement will vary according to project focus. The program mealso counts on the collaboration of experts in various fields such as engineering and structures, materials, technical components, and much more, allowing the development of a full scale and fully functioning prototype.

GSS GLOBAL SUMMER SCHOOL

The Global Summer School (GSS) is a platform defined by ambitious, multiscalar investigation into the implications of emergent techniques on our planned environments. The programme develops a global agenda in various institutions around the world, each focussing on developing localised solutions. International teams located in key cities around the globe explore a common agenda with projects that are deeply embedded in diverse local conditions. This intensive two week course connects each participant to ongoing research agendas in robotics, simulation, physical computing, parametric design, digital fabrication, and other relevant emerging design methodologies. The programme focuses on a global agenda developing local solutions.

VISITING PROGRAMS

Every year, IAAC organises and takes part in a number of international educational programmes and projects. IAAC annually participates in Global Architecture & Design exchange programme organised by CIEE, international education and exchange centre. Global Architecture&Design Programme simultaneously runs in three locations: Barcelona, Berlin and Prague. Students are working with leading architecture and design experts and innovators to complete a real world design project within an emerging global context. This programme aims to pursue hands on design work in a state of the art studio using the latest technology to address an aspect of the current global environmental crisis.



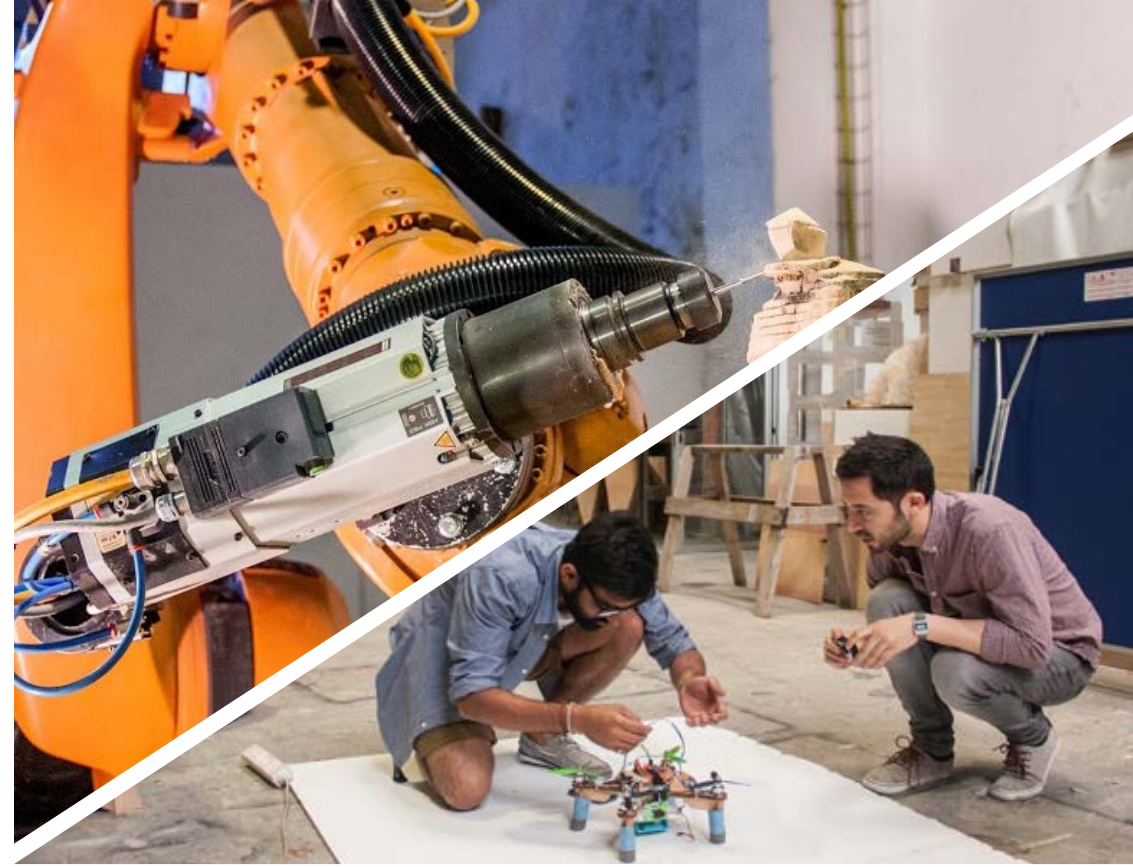
FAB LAB BARCELONA

FabLab Barcelona is one of the leading laboratories of the worldwide network of Fab Labs, a small scale production and innovation centre equipped with digital fabrication tools and technologies for the production of objects, prototypes and electronics.

Fab Lab Barcelona is part of the Institute for Advanced Architecture of Catalonia, where it supports different educational and research programmes related with the multiple scales of the human habitat. It is also the headquarters of the global coordination of the Fab Academy programme in collaboration with the Fab Foundation and the MIT's Center for Bits and Atoms; the Fab Academy is a distributed platform of education and research in which each Fab Lab operates as a classroom and the planet as the campus of the largest University in construction in the world, where students learn about the principles, applications and implications of digital manufacturing technology.

The Fab Lab Barcelona has produced projects such as Hyperhabitat IAAC (official selection for the Venice Biennale XXI) or the Fab Lab House (Audience Award in the first Solar Decathlon Europe in Madrid). It is currently developing projects of different scales, from smart devices for data collection by individuals (Smart Citizen innovative project award in the Smart City Expo and World Congress in Barcelona), the development of the new generation of Fab Labs in the Green Fab Lab project, to the new production models for cities with the Fab City project being implemented in Barcelona in collaboration with the city council.

Fab Lab's mission is to provide access to the tools, the knowledge and the financial means to educate, innovate and invent using technology and digital fabrication to allow anyone to make (almost) anything, and thereby creating opportunities to improve lives and livelihoods around the world. Community organisations, educational institutions and non-profit concerns are our primary beneficiaries.



VALLDAURA GREEN FAB LAB

“ LEARNING FROM NATURE TO CHANGE THE WORLD ”

As a part of the Fab City network, the Green Fab Lab works towards the creation of a self-sufficient habitat and research centre at Valldaura Self Sufficient Labs, one of IAAC's campus locations. Located in the Collserola Natural Park, in the heart of the metropolitan area of Barcelona, it has laboratories for the production of energy, food and things, and develops projects and academic programmes in association with leading research centres around the world.

As part of IAAC's commitment to promoting and advancing habitability in the world based on ecological principles and making the fullest use of all available technologies and resources, we have created a research centre focused on the idea of self-sufficiency, with a view to provide a worldwide point of reference. The Green Fab Lab offers an opportunity to learn directly from nature to bring that understanding to the regeneration of 21st century cities.



FAB LAB PROGRAMMES

FAB ACADEMY

The Fab Academy Diploma consists of a 5 month part time student commitment, from January to June 2017.

Each Fab Lab that participates in the Fab Academy programme is part of a global Fab Lab / Fab Academy network. These Fab Labs are Nodes that offer the Fab Academy programme.

Fab Academy faculty, who are leaders in their respective fields, provide global video lectures, supervise academic content and guide research. Hands-on instruction in the labs is provided by instructors who supervise and evaluate Certificates, develop and disseminate instructional material, and assist with projects

The Fab Academy is directed by Neil Gershenfeld, produced by Sherry Lassiter and coordinated by Tomas Diez.

Students at the Fab Academy learn:

- How to use a Fab Lab's digital fabrication tools for rapid prototyping: Epilog Mini Laser Cutter, Roland MDX-20 Milling Machine, 3D printers, Roland CAMM-1 Servo GX-24 Desktop Vinyl Cutter, ShopBot CNC Milling Machine

- Electronics design and production by producing circuit boards using a variety of sensors and output devices.

- How to programme AVR microcontrollers on the boards they have produced

- Moulding and casting

- 3D scanning and printing

The programme requires a minimum of 30 hours per week.

FAB KIDS

The Fab Kids, is a creative laboratory that favours the development of intelligence, creativity and imagination of children and youth. It is a place where thinking is encouraged and innovation occurs, a space where educational and recreational activities take place, focused on design and digital fabrication.

FABRIACADEMY

Fabricademy is a transdisciplinary course that focuses on the development of new technologies applied in the textile industry, in its broad range of applications, from the fashion industry and the upcoming wearable market. The two phase program will last 6 months, with approximately 3 months of seminars and learning modules and three months focusing on individual in depth applied project research.

The methodology and network developed in Fab Academy platform has subsequently been used to add classes (collectively called Academany) that share the model of hands-on instruction to students in workgroups, with local mentors, linked by shared content and interactive lectures by global leaders.

WORKSHOPS

Fab Lab Barcelona offers a programme of workshops focused both on specific aspects of Advanced Digital and Robotic Fabrication, as well as spreading knowledge and empowering citizens and creative people. Some of the latest workshops include: Computational couture, 3d printing, building with robots, cutting and blending, extreme manufacturing, making things talk, mould's fabrication and object production, networking environmental robotics (NERO), and much more.

SPECIAL PROJECTS

As part of IAAC's commitment towards the investigation of new and emerging areas of the Architectural discipline, pilot projects are launched on a yearly basis. These projects, such as the Fab Lab House (1), the Endesa Pavillion (2), Hyperhabitat (3) and Smart Citizen Kit (4), operate in the field between academia, architectural practice and information technologies, and are designed and fabricated by IAAC faculty, students and collaborative companies.

These projects operate on several scales, from 1:1 architectural interventions to pocket sized micro-processors, all sharing a common vision of investigation towards a more sustainable and socially empowering design approach. All projects have been welcomed with considerable success, with various distinctions in events such as the Solar Decathlon and the Venice Biennale, as well as being published in several reviews and publications. In the development process of these pilot projects, IAAC collaborates with a network of partners from various disciplines, including leading universities and innovative companies.



SPECIAL PROJECTS

2014/2017

2017 - CONSTRUMAT

The twentieth edition of Barcelona Building Construmat, put a particular emphasis on innovation and new technologies. IAAC played a central role in the Future Arena of the fair, where the Institute could showcase its most recent research projects about additive and robotic manufacturing applied to the construction sector: **On Site Robotics**, the project born from the collaboration between IAAC and Ternalia with the participation of Noumena, on-site construction of a 3D printed pavilion made with 100% natural materials, which has been completed in only four days.

2016 - IN3DUSTRY

This is an international event, focusing on the current state and future of Additive and Advanced Manufacturing. The event, co-organised by IAAC Fab City Research Laboratory and Fira Barcelona, is a global hub bringing together all components of the Additive Manufacturing ecosystem to showcase the latest technologies and innovations.

2015 - BEYOND // INNOVATION PAVILION

The Pavilion of Innovation 2015 in Beyond Building Barcelona, curated by IAAC | Fab Lab Barcelona, presented new ideas and construction paradigms emerging from international excellence in research and pilot projects, forming the basis of future buildings and cities. Novel and reactive materials, advanced digital/robotic manufacturing techniques and responsive environments were the key topics presented, towards shaping the future of the building industry.



SPECIAL PROJECTS

2014/2017

2017 - BRILLEN EN LA FOSCOR // LLUM BCN

Located in an enclosed patio in the Gothic quarter of Barcelona, the installation, an interactive audiovisual instrument, transforms the space through a musical performance based on citizen participation. The visitor enters the patio space and is invited to play with the strings of light, composing musical melodies based on the citizens' real time interaction.

2016 - LLUM TAFANERA // LLUM BCN

La Llum Tafanera, The Curious Light, was an interactive kinetic light installation that wanted to make technology more friendly and closer to the public through the simulation of the personality of a star. IAAC once again had the honour of being invited to participate in the Llum BCN Urban Light Festival in Barcelona.

2015 - PLUJA DE LLUM // LLUM BCN

The Llum Bcn festival of lights takes place each year in February. For the 2015 edition, IAAC created an illuminated installation that combines art, tradition and technology. The concept of the installation follows a mixture of the elements of the tale of Santa Eulalia, in particular her tears, transforming these into conceptual rain. A rain of light, emanating from translucent vertical elements interacting with sounds and music.

2014 - DATANET // LLUM BCN

For the Llum Bcn 2014, in the courtyard of the Museu Frederic Marés in Barcelona, IAAC 'plants' DATA NET, a new artificial tree, forming an interactive mesh. The intensity of light of the installation changes, reacting to the location and the density of the visitors through a series of sensors that track peoples' movement.



LLUM BCN
INSTALATIONS

SPECIAL PROJECTS

2014/2017

2017 - SUPERBARRIO // SUPERILLA

SuperBARRIO is a videogame that boosts participatory design processes. Developed as an open source video game for smartphone and tablets, it is a tool for architects and public entities to engage the citizens in the design of the public space, to educate to sustainability and inclusiveness, and to collect data about the citizens' needs, desires and proposals.

SuperBARRIO is a flexible tool that can be applied to different neighborhoods. Pilot projects have been developed for the Superilla Pilot Barcelona, and for the Gavoglio area in Genoa, Italy.

2016 - PLOBEJOC // SUPERILLA

Poblejoc, an interactive installation conceived during the Active Public Space workshop, was designed as an Urban Game with the aim of activating public space. Poblejoc was created in the framework of the #Superilla (Super-block) workshop, a pilot test of the Superilla plan for Barcelona, that was developed in the Sant Martí district. The plan aims to close a part of the city's roads to traffic, allowing to use these new pedestrianised areas as public space.

2014 - LIBERTY

Designed and fabricated for the Re.Set festival, a circuit of ephemeral architecture in the streets of Barcelona, Liberty follows the concept of FREEDOM. Knowledge provides freedom and progress; and the power of freedom is expressed through reading. This installation consists of three different trees whose trunks and branches are made of steel, while the leaves are made of books, and the earth made of concrete. Liberty activates a new public space; a shady bench and a new interactive area in the city centre.



ACTIVE
PUBLIC SPACES

SPECIAL PROJECTS

2014/2017

2017 - NOMAD FOLDING FLAX PAVILION

Castejón de Monegros has once again hosted the **Nowhere Festival**, the one-week festival promotes cultural and educational activities focused on the self-expression. **The Nomad Folding Flax Pavilion**, result of the Lightweight Bio Composite Seminar, was among the installations presented at the event, developed around the structural value of origami shapes,

2014 - BB MAKE

The BB Make structure, developed by IAAC for the Beijing Design Week 2014, explored the potentials of new technologies applied to design, through the generation of a participative collaborative structure, enhancing local materials with advanced technologies. The structure consisted of bamboo beams, a well known local construction material, held together with digitally fabricated joints, in particular 3D printed joints and CNC milled joints, fabricated onsite.

2014 - ENDESA WORLD FAB CONDENSER

Pavilion for the FAB10 Symposium (July 2nd to 8th, 2014). Initial design by Margen-Lab, produced by IAAC and collaboratively designed, built, and customized by the Fab Lab Network.

2014 - CATALAN VAULT

IAAC MAA01, in collaboration with Map13 Architects built a Parametrized Catalan Vault, fruit of a 2 week long workshop in Valldaura Labs. Using digital tools along with traditional century old Catalan masonry techniques, with students seeking to re-engineer, compute, and construct a Vault in the forest.

IAAC is also furthered this research investigating in the field of advanced robotic fabrication techniques towards the implementation and autonomation of these complex Catalan vault forms.



1:1
FABRICATION

SPECIAL PROJECTS

2016 - 2017

LIVING IN FUTURE CITIES

The exhibition Living in Future Cities is a product of work developed by the international architectural researchers of IAAC. The work examines issues of the near future and proposes a series of solutions in the era of experience, where technology can aid us to positively define the spaces and cities we live, grow and thrive in.

VENICE BIENNALE

The Institute for Advanced Architecture of Catalonia took part in the 15th Venice Biennale, titled "Reporting From the Front" and curated by Alejandro Aravena, with an interactive installation made in collaboration with the Indian architect Anupama Kundoo. Information Technology has opened up new ways of sharing knowledge, moving towards faster and more inexpensive ways, making knowledge more accessible, and making it easier to gather people around common topics of interest.

TRACES / SCRIPTS

Traces was an exhibition was a collaboration between the Institute for Advanced Architecture of Catalonia and the Cercle Artístic de Sant Lluc curated by Edouard Cabay. The exhibition unveils a series of drawings that translate natural forces into graphical manifestations. The exhibition Scripts hosted at La Casa Elizalde in Barcelona, displays an extensive series of drawings produced without the hand, emerged by the relentless gesture of a mechanical device, alimeted by an external source of information.

CORRETGER 5

On the 27th and 28th of June 2016 we had the MAA Individual Thesis Final Presentations at IAAC and Corretger5 Gallery. The two-day presentation was divided into 5 sessions, each linked to thesis projects developed under one of the Individual Thesis Supervisors: Marcos Cruz, Areti Markopoulou, Vicente Guallart, Manuel Gausa, Jordi Pagès and Lluís Viu.



EXHIBITIONS

RESPONSIVE CITIES 2016

URBANISM IN THE EXPERIENCE AGE

Some of the brightest minds in the fields of Sociology, Urban Sciences, Technology and Architecture gathered in Barcelona to discuss the Future of our Cities.

The first edition of the Responsive Cities Symposium, chaired by Areti Markopoulou, with programme chairs Chiara Farinea and Mathilde Marengo, established itself as a major event in the architectural debate.

Fifteen outstanding keynote speakers, fifty-four international panellists and more than 400 visitors animated the two-day gathering, held in Barcelona Caixa-Forum on the 16th and 17th of September 2016 and followed online by more than 700 spectators.

What is the most important challenge for the future Urbanity? What should the role of technology be in the Future City?

Saskia Sassen, Carlo Ratti, Philippe Rahm, Janet Sanz Cid, Areti Markopoulou, Tomás Díez, Albert Cañigüeral, Mariina Hallikainen, Lydia Kallipoliti, Maïta Fernández-Armesto, Mar Santamaria, Manuel Gausa, Ethel Barona Pohl and Daniele Quercia were among the international speakers and panellists who met in Barcelona to join the debate about the Urbanism in the Experience Age.

The Symposium was organised by the Institute for Advanced Architecture of Catalonia as one of the main activities carried out under the Knowledge Alliance for Advanced Urbanism – KAAU, the EU co-funded project seeking to promote the innovative education and training that emerging technologies require.



Tomas Díez



Philippe Rahm



Janet Sanz Cid



Mar Santamaria

RESPONSIVE CITIES 2017

ACTIVE PUBLIC SPACE

The second edition of the Responsive Cities Symposium, chaired by Areti Markopoulou, with programme responsables Chiara Farinea and Mathilde Marengo. More than a dozen outstanding keynote speakers, 30 international panelists and more than 400 visitors animated the two-day gathering, held in Barcelona CaixaForum and Smart City Expo on the 13th and 14th of November 2017.

On the first day of the symposium the opening of the APS exhibition “Implementing Technology Towards Active Public Space” aimed to promote the knowledge generated in the framework of the Active Public Space Project. At the show, visitors were able to explore best examples of implementation of innovative technologies for public space activation.

How do we design and inhabit our Public Space? How does it perform? What does it produce? These were some of the questions and discussion topics raised during the roundtables and debates taking place at CaixaFòrum and Smart City Expo. Through transversal viewpoints, the 2nd edition of the Responsive Cities Symposium combined disciplines such as urban planning, biology, advanced architecture, interaction, participatory technology and even performing arts to respond to the challenge of how cities can shape their public spaces towards more dynamic, productive and active citizen meeting places.

The Symposium was organised by the Institute for Advanced Architecture of Catalonia as one of the main activities carried out under the Knowledge Alliance for Advanced Urbanism – KAAU, the EU co-funded project seeking to promote the innovative education and training that emerging technologies require.



LECTURE SERIES

Since the year 2000, the Master's in Advanced Architecture runs an international lecture programme in which architects and experts from a variety of different disciplines present their work at IAAC. The lectures are open to the public, making it a high quality cultural activity open to the city of Barcelona.

2014/2016 LECTURERS

Elizabeth Diller
Bob Sheil
Laura Andreini
Li Xiangning
Izaskun Chinchilla
Oscar Tomico
Mitchell Joachim
Farshid Moussavi
Giovanna Carnevali
Rodolphe el-Khoury
Alberto Diaspro
Alfredo Brillembourg
Hubert Klumpner
Andrew Watts
Jose Luis de Vicente
Dave Pigram
Jelle Feringa
Aaron Betsky
Ali Basbous + Luis Fraguada
Kengo Kuma
Jan Knippers
Yael Reisner
Manuel Jimenez Garcia
Winy Maas



LECTURE SERIES

PREVIOUS LECTURERS

Shigeru Ban
 Michel Rojkind
 Matthias Kohler
 Peter Eisenman
 Farshid Moussavi
 Bjarke Ingels
 Peter Cook
 Ricardo Bofill
 Ben Van Berkel
 Gunter Pauli
 Enric Ruiz-Geli
 Brett Steele
 Pepe Ballesteros
 Laura Cantarella
 Santiago Cirugeda Parejo
 Luca Galofaro
 Lourdes García Sogo
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 Xaveer de Geyter
 Toyo Ito
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 Jaime Salazar
 Max San Julián
 Charles Renfro
 Amadeu Santacana
 Mark Wigley

Yung Ho Chang
 ILSA & Andreas Ruby
 Jacob Szczesny
 Jou Min Lin
 Lucy Bullivant
 Momoyo Kaijima
 Manuel Bailo + Rosa Rull
 Andres Cánovas
 Andrés Jaque
 Carlos Arroyo
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 Winka Dubbeldam
 Hanif Kara
 Neil Leach
 Minsuk Cho
 Alfonso Vegara
 Behrok Khoshnevis
 Stephen Wolfman
 Caterina Tiazzoldi
 Jaime Lerner
 Massimiliano Fuksas

Rajendra Kumar
 Ariadna Alvarez Garreta
 Manuel de Landa
 Manuel Gausa
 John Palmesino
 Maurizio Carta
 Philippe Rahm
 Eva Franch
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 Ethel Baraona
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 Mette Ramsgaard Thompsen
 David MocarSKI
 Neil Leach
 Richard Blythe
 Ben Flanner
 Marco Poletto
 Anupama Kundoo
 Arndt Goldack
 George Jeronimidis
 Eric Owen Moss
 and many others...



MAA 2014-15- Opening Lecture
 Winy Maas



MAA 2015-16 CLOSING LECTURE
 WOLF D. PRIX



MAA 2015-16- Lecture Series
 Alfredo Brillembourg



MAA 2014-15- Lecture Series



MAA 2014-15- Lecture Series
 Rodolphe El-Khoury

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