



# Research Collaboration Thinking forward

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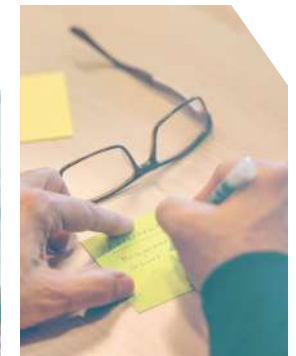
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# 1. Opening thoughts



## Carlos Montero General Manager of Cetaqua

The year 2020 changed the world's dynamics and has had a very severe impact on society and the economy. We know, we have lived through it together. But as I think about Cetaqua and how we have lived through this situation, I find many reasons to be optimistic, and that's what I'd like to talk about.

This situation has made us more resilient, and that is not a cliché: we've shown how quickly we're able to adapt to new situations. To accelerate the digitisation of our project management. We have gotten closer to operators, engineering companies and laboratories. And although we have not lived through the toughest moments of the operation with them—such as self-isolation in the plants themselves, which we must highlight and admire—we have built emblematic projects that had a direct impact on society and on activity in the industry. Among them, Reveal stands out for its great impact: as a solution

for monitoring SARS-CoV-2 in waste water and estimating its impact on the population using data analytics. This solution was built alongside several Agbar companies and leading universities we've been working with for decades: UB, UPC, USC, etc. It was an agile response that anticipated administrative needs and useful, as demonstrated by the massive adoption of the COVID-19 City Sentinel system, which draws on Reveal's methodology and data analysis.

And we have maintained our team spirit through it all, looking for ways to preserve our values, despite lockdowns and teleworking. We've shown a personal commitment to the Foundation and to research, which has in large part made it possible to overcome the delays and difficulties on projects that required in-person presence. This year, we submitted 50% more competitive proposals than our previous annual record, demonstrating

our maturity and inexhaustible drive for growth.

This difficult year has made the need for and the value of good relationships with the Academy and operators more evident than ever. The work and trust that have been built up over more than a decade were put to good use in identifying experts in new fields who have made enormous contributions. I would like to thank them all for their generosity. I extend my thanks to the entire team, and particularly to the Technical Director and the Director of Communications and Transfers, who responded to the new professional challenges at the end of 2020. Thank you for your dedication and support over the years.

In short, this year Cetaqua has grown in terms of flexibility, agility and results orientation. We will intensify our efforts in these areas, avoiding anything that limits us or holds us back, filling



**“We've shown how quickly we're able to adapt to new situations”.**

out our knowledge network with the help of our patrons: the CSIC, the UPC and Aigües de Barcelona. We'll continue our vocation of generating knowledge and transforming it into results that benefit people and the environment.

## Ciril Rozman Chair of Cetaqua's board of trustees



**“In 2020, it was imperative to reinforce alliances and place more value than ever on Cetaqua’s great scientific and human potential”.**

We are experiencing an exceptional situation in which, as a society, we have had to face new challenges, reorient our efforts and give specific answers. In uncertain times like these, it's necessary to act decisively and with an eye to the future. In 2020, it was imperative to reinforce alliances and place more value than ever on Cetaqua's great scientific and human potential as part of Aigües de Barcelona's ecosystem of innovation.

The European Union reacted decisively with the approval of the Next Generation EU Plan, whose colossal economic endowment and its preferential and supportive allocation to the countries most affected by the pandemic demonstrates the strength of the European project, as well as the validity and relevance of the brilliant vision of its Founders, as crystallised in the Schuman Declaration of 1950. Despite these hard times, we are encouraged by this reaction and it empowers

us to push forward transformative projects and continue moving towards an ecological, fair and inclusive transition.

The roadmap for economic recovery prioritises climate action and combines sustainability, digitalisation and public-private partnerships as strategic axes on which to build our collective future. This mirrors the strategy Cetaqua has had in place from the start, with the logical particularity of Cetaqua's specialisation and orientation towards processes associated with the water cycle.

The Centre continues to grow and increase its positive impact through the multiple projects and activities included in this Report, such as LIFE Nimbus, which promotes synergies between the water, energy and transport sectors to bring us closer to climate neutrality; the LIFE Conquer project, which promotes the use of reclaimed water to irrigate parks and gardens, reducing the water footprint and energy consump-

tion; and finally, the extremely important REVEAL project, which has made it possible to use the footprints we leave in waste water to carry out epidemiological monitoring of the pandemic, opening a new vector of added value in the water sector for health authorities, by providing a powerful indicator of the degree of prevalence of the coronavirus and to anticipate outbreaks of the disease.

All of these RD&I projects show that it's only through collaboration and common commitment between different actors (administrations, companies, universities and technology centres) that we can build a better future for new generations, which inspires hope, commitment and determined action in all of us.



## Rosa María Menéndez López President of the Spanish National Research Council (CSIC)



**“Public-private partnerships are more necessary today than ever”.**

As Spain’s leading scientific research organisation, one of the missions of the Consejo Superior de Investigaciones Científicas (CSIC, Spanish National Research Council) is to promote scientific and technological research of excellence and, in so doing, find new collaboration horizons between science and business with clear social benefits.

For this reason, public-private partnerships are more necessary today than ever, as demonstrated during the COVID-19 pandemic. It is only through joint efforts that we will be able to recover from its economic and social impacts.

The events of 2020 clearly showed the importance of investing in basic science and, at the same time, the need to strengthen mecha-

nisms and instruments that allow research to generate innovative applications through business and impact the well-being and progress of society as a whole.

In this sense, Cetaqua continues to be a shining example, as its clear commitment to scientific and innovative excellence makes it a benchmark in a field that is essential for life on our planet: efficiency in the water cycle. This activity is fully aligned with the objectives of the 2030 Agenda.

At this time, bringing together the greatest possible number of public and private efforts is surely one of the key instruments for generating top-level knowledge that can directly impact clear advances in the construction of a more equitable, supportive and sustainable society.

As president of the Consejo Superior de Investigaciones Científicas, I would like to close by highlighting the importance of Cetaqua in the CSIC community as a whole, which includes both its own institutes and those that collaborate with universities and other public agents or, as in the case of Cetaqua, that have an intense collaboration with and participation in the Spanish business innovation system.

## Francesc Torres Rector of the Universitat Politècnica de Catalunya

2020 has provoked profound and serious changes in our society, generating new dynamics that will not be easy to change—at least in the coming months—but which have served to highlight the fact that research is the only way to combat the virus that has changed everything.

Cetaqua, of course, has not been left on the side lines. This year, I would like to highlight the work carried out to use indicators obtained from the analysis of epidemiological and wastewater data as an early warning system, as well as the effort to study the relationship between the concentration of SARS-CoV-2 genetic material in waste water and the prevalence of COVID-19 in the corresponding population; thus determining the degree of risk and the evolution of the virus. I would like to highlight the collaboration of our Computational Biology and Complex Systems (BIOCOM-SC) research group's collaboration in the analysis of

the data obtained from the City Sentinel solution developed by SUEZ.

This confirmed that waste water measurements could anticipate the development of cases by a few days, thus facilitating health authorities' decision-making.

Among the many activities that Cetaqua has carried out in the fields of circular economy, biogas capture and renewable energy storage, I would like to highlight the creation of biofactories to obtain high added value bioproducts from sewage sludge and urban biowaste as a clear example of technological application in the circular economy.

For example, obtaining biomethane from the anaerobic digestion of sludge in the Baix Llobregat Waste Water Treatment Plant (WWTP) to be used as fuel for transport; recovering nutrients such as nitrogen and phosphorus for use as agricultural fertilisers; treating spills from mining oper-

ations to regenerate and reuse water and recover metals such as copper and zinc by combining electrochemical technologies and minimising discharges; or recovering organic waste to obtain volatile fatty acids or polyphenols for industrial applications, among others.

Finally, due to its involvement in the region, I would like to highlight Cetaqua's collaboration in the Gavà Circular project, establishing a system of its own indicators based on the City Blueprint Index, made up of a set of indicators grouped by themes of quality and basic water services, solid waste and wastewater treatment, water infrastructures, climate robustness and governance.

In addition to all this, artificial intelligence techniques were used to estimate the availability of water resources and the demand for water for urban, agricultural or industrial uses. AI also had an impact in different settings expe-



**“Cetaqua has not been left on the side lines”.**

riencing water stress and other situations, relating these to the prediction of hydrometeorological processes.

These advanced technologies and the many others that will be explained in the pages of this report demonstrate the callings toward technological and pioneering research in the global and holistic management of such a scarce and precious resource as water, with which we at the UPC are proud to collaborate.



# 2. Partnership model



## We are a ground-breaking model of public-private partnership for research and innovation

We are a foundation created in 2007 by Aigües de Barcelona, the Universitat Politècnica de Catalunya (UPC) and the Consejo Superior de Investigaciones Científicas (CSIC). A public-private partnership model that has subsequently been applied in other Cetaqua centres, which are independent but share strategies and work in collaboration.



## The board of trustees, governing body

The board of trustees, Cetaqua's main governing body, is made up of members of the organisations that created the Foundation.

It is responsible for:

- Defining annual strategy, plans and budgets.
- Approving research topics and key activities.
- Overseeing financial management.

It consists of:

**The public-private company Aigües de Barcelona**, Empresa Metropolitana de Gestión del Ciclo Integral del Agua, which manages integral water cycle services and supplies water to the more than 3 million people who live in Barcelona and its metropolitan area. Its more than 150 years of experience in the management of water resources make it a key player in the development and progress of the city and its surroundings.

**The Universitat Politècnica de Catalunya (UPC)** is a public higher education and research institution specialising in the fields of engineering, architecture and science. UPC's essential role in the transformation of society is based on its creativity and commitment to the environment, research, teaching and knowledge transfer.

**The Spanish National Research Council (CSIC)** is the top public institution devoted to research in Spain and the third largest in Europe. Its fundamental objective is to conduct and promote research for the benefit of scientific and technological progress and it is therefore open to collaboration with Spanish and foreign institutions.



**Aigües de Barcelona**



**UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH**



**CSIC**

CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS



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AGBAR



Deputy chairperson  
**Francesc Torres**  
UPC



Secretary  
**José Mª de Paz**  
AGBAR



Trustee  
**Manuel Cermerón**  
AGBAR



Trustee  
**Rosina López-Alonso Fandiño**  
CSIC

## The scientific-technical council, research strategy advisor

The scientific-technical council (STC), appointed by the board of trustees and periodically renewed, is the advisory body responsible for:

- Providing guidance on research policies and proposing new topics for research and

technological development.

- Providing technical advice on research programmes to be carried out and guidance on funding possibilities.
- Assessing business needs.



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**Joan de Pablo**  
UPC



Deputy chairperson 1  
**Maria Monzó**  
Aigües de Barcelona



Deputy chairperson 2  
**Antoni Ginebreda**  
CSIC

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CSIC



**Jesús Carrera**  
CSIC



**Xavier Obradors**  
CSIC



**Ernest Bladé**  
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**Ferrán Marqués**  
CSIC



**Joseba Quevedo**  
UPC



**Catalina Balseiro**  
Aigües de Barcelona



**Javier Lafuente**  
UAB



**Myriam García-Berro**  
Eurecat



**Guillermo Pascual**  
AGBAR



**Joaquín Pérez Novo**  
AGBAR



**Joan Morante**  
IREC



**Manel Poch**  
UdG

We welcome **Ferrán Marqués** as representative of CSIC and **Catalina Balseiro** as representative of Aigües de Barcelona in the scientific-technical council of Cetaqua from July and December 2020, respectively. We thank **Joan Jorge, Rubén Ruiz** and **David Hernández** for their collaboration.

# 3. Our research



## Our vision for a sustainable future

**Sustainability and the application of concepts such as digitalisation, resilience and circularity have become fundamental pillars of the European recovery plan “Next Generation EU”, which aims to contribute to economic and social progress and tackle the environmental crisis we are currently experiencing.**

At Cetaqua, we use our Sustainable Development Goals as a roadmap when facing these challenges, and apply them through our research topics. Our different areas have a common purpose: offering solutions that move water processes towards a circular economy. This vision of water and the resources involved in water processes, as well as the action it leads to, envisions a future that can only be sustainable in technical, economic, social and environmental terms.





## Biofactory and resource recovery



**Solutions for transforming treatment plants into biofactories: efficient installations for obtaining water, energy and materials.**

### Challenges

We are working on a paradigm shift by applying the circular economy concept to water treatment, developing processes and technologies that transform treatment plants into biofactories. The goal is to maximize the value of resources by promoting an energy-neutral model, which contributes to achieving zero waste and includes the elimination of emerging contaminants, microplastics and more. In this way, we promote the recovery and reuse of resources during reclaimed water production processes and treatment of urban and industrial waste water and other waste flow.

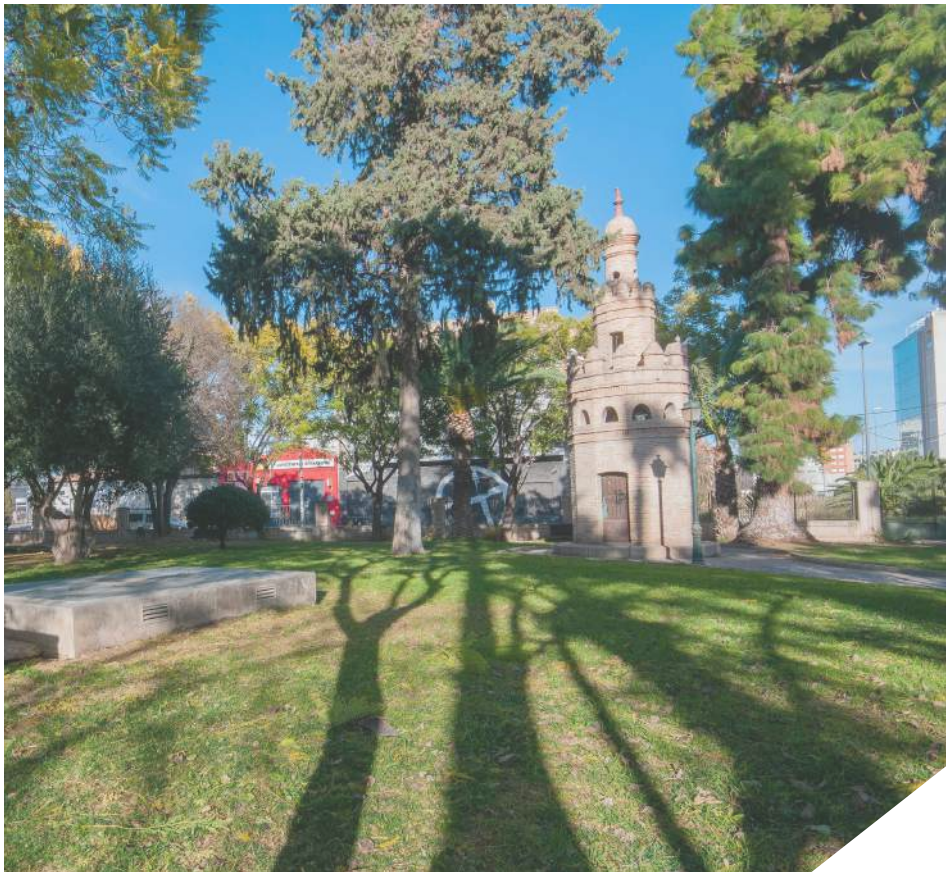
### Priority research topics

- Effective and efficient treatments for urban and industrial waste water, and for production of drinking water and reclaimed water.
- Treatments for emerging contaminants and microplastics.
- Recovery of energy and material resources from urban and industrial waste flows.



**“We are working to transform treatment plants into biofactories, promoting the circular economy strategy with the production of reclaimed water for new uses, energy self-sufficiency and obtaining valuable by-products.”**

**Celia Castro**, head of the Biofactory and Resource Recovery department



### Development of an innovative contaminated groundwater treatment system for urban irrigation

The European LIFE Conquer project was launched in 2020 with the aim of promoting sustainable irrigation in the region of Murcia, in order to prevent and mitigate water shortages.

The project will develop an innovative system that will make it possible to reuse phreatic water contaminated by nitrates and salts, maintaining the necessary nutrients and eliminating salinity, for the irrigation of parks and gardens.

This will contribute to the circular economy and zero waste through the use of different technologies. On the one hand, nanofiltration will separate the salinity from the nitrates, concentrating the salts in brines; on the other, reversible electro dialysis and electrochlorination will recover the brines generated and thus transform the concentrated salinity into valuable by-products such as sodium hypochlorite, known as bleach, overcoming the barriers that exist in the currently available systems.

#### Project

LIFE Conquer

#### Partners

Aguas de Murcia, Aquatec (Suez España)

#### Duration

November 2020 – January 2024

#### Coordinator

Cetaqua Barcelona



## Critical infrastructure management and resilience



**Solutions for the management and optimization of the urban water cycle infrastructures in the face of natural or intentional events.**

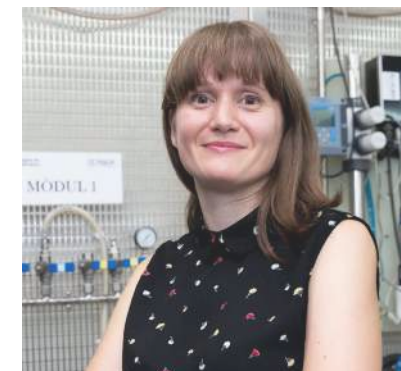
### Challenges

Natural events (caused by climate change or deterioration of infrastructure) and intentional events can affect the infrastructure of the urban water cycle.

To minimize risks and optimize asset management, we develop resilient systems and solutions focused on crisis event management. We work on methodologies that predict, detect and manage critical situations, and also invest in planning systems focused on reducing future impacts and protecting both people and the environment.

### Priority research topics

- Advanced control of water quality and its impact on consumers and the environment.
- Monitoring, automation and process control.
- Intelligent and resilient operations and asset management.



**“We work to promote advanced and safe operations within the urban water cycle that allow us to quickly detect events.”**

**Susana González**, head of Critical Infrastructure and Resilience Management



### REVEAL: Analysis of SARS-CoV-2 genetic material in the urban water cycle

The collaborative REVEAL project aims to collect data on the concentration of SARS-CoV-2 genetic material in waste water and assess possible correlations with the presence of the virus in the population to provide information that will help authorities better manage the pandemic.

The studies carried out in 2020 allowed the development of a PCR-based sampling and measurement methodology that has

confirmed the presence of the virus's genetic material in drainage water and at the inlet of Waste Water Treatment Plants (WWTP). This will be followed by further data processing to extract information on the pandemic's evolution.

The project's results helped create the City Sentinel solution, developed by Suez in Spain, which offers public administrations active monitoring of their waste water.

**Project**  
REVEAL

**Duration**  
April 2020 – February 2021

**Partners**  
Labaqua, Aigües de Barcelona, Universitat de Barcelona, Universidade de Santiago de Compostela, Aguas de Alicante, Aguas de Murcia, CASSA

**Coordinator**  
Cetaqua Barcelona



## Environmental, economic and social sustainability



**Solutions that ensure sustainable development and the well-being of citizens.**

### Challenges

The context of climate emergency forces us to focus on a circular economy, which is necessary to reduce the pressure on resources, improve the life cycle and contribute to waste recovery and recycling.

To this end, we develop methodologies, tools, strategies, plans and management models that ensure sustainable development when applied to regions and companies, including being environmentally aware, economically viable and focused on benefiting society.

### Priority research topics

- Design and implementation of circular economy models in companies and regions.
- Management of environmental and socio-economic impacts and risks.
- Demand management and water economics.
- Evaluation of benefits associated with biodiversity and the natural environment.



**“The world is changing, what about us? We’re working on innovative and sustainable solutions to guarantee future well-being”**

**Desirée Marín**, head of Environmental, Economic and Social Sustainability





### **CIRCULAB GAVÀ, the regional implementation of the circular economy model**

In addition to the implementation of 3 of the 10 measures identified for the “water-energy-waste” flows in its predecessor project “Gavà Circular,” the CIRCULAB GAVÀ project has encouraged a culture based on sustainable development.

The birth of two new initiatives is proof of this: the creation of a Circular Economy Innovation Hub, to contribute to and advance the transition towards the circular economy; and the participation

of Gavà and Castelldefels in the Intelligent Cities Challenge network, promoted by the European Commission.

The latter has positioned both territories as benchmarks in innovation in Europe and will enable the promotion of measures that guarantee the growth, sustainability and resilience of the municipalities for the benefit of their citizens. It has also led to the launch of a new two-year public-private partnership agreement within the framework of the Circular Data-Driven Cities (CDDC) project.

**Project**  
CIRCULAB GAVÀ

**Partners**  
Aigües de Barcelona, Ajuntament de Gavà

**Duration**  
Octubre 2020 – Setembre 2021

**Coordinator**  
Cetaqua Barcelona

### We implemented regional circular economy models

Population growth and its concentration in urban centres has generated a high demand for resources. This fact makes a transformation towards management models based on the circular economy increasingly necessary.

Sustainability Partners was created against this backdrop. This outstanding Cetaqua initiative offers administrations and companies circularity diagnostics and action plans so that they can implement a model aligned with the sustainable development objectives.

Through this programme, we are committed to collaboration between administrations, companies and citizens, to make a leap forward in the treatment and interactions between water, waste and energy management.

This ensures:

- The reduction of management costs and new business models.
- An environmental impact reduction.
- The anticipation and adaptation to current legislation.
- A positioning and leadership in sustainability.

They already rely on Sustainability Partners...



## Water 4.0



### Artificial intelligence for the water cycle and sustainability

#### Challenges

Artificial intelligence and state-of-the-art digital technologies are completely transforming the management of natural resources. Acquiring, processing and correctly analysing large volumes of data allows us to find new answers to the great challenges of the water cycle and to make productive and environmental processes more efficient and sustainable.

We use artificial intelligence and state-of-the-art software architectures to develop digital services that improve decision-making in multiple operating environments: from monitoring and predicting events that affect water quality to optimizing network efficiency and asset life cycles.

#### Priority research topics

- Machine Learning for the characterisation and prediction of events related to water quality and network operation.
- Deep Learning and computer visualization applications in the integral water cycle and environmental management.
- Processing of satellite images and generation of advanced environmental indicators.



**“We use data, algorithms and vast multidisciplinary expertise to develop future solutions for today’s needs: artificial intelligence for water from water”.**

**Rafael Giménez**, head the Water 4.0 department





### Computer Visualization techniques for sewage treatment plants

The iON Plant project arose from the need to raise the technological level of operations in wastewater treatment plants in order to achieve greater operational efficiency.

To this end, during 2020, smart cameras were installed at key points in the plants, allowing

operations staff to remotely track of the status of these critical areas.

In addition, the cameras were equipped with computer visualization algorithms that allow certain problematic operational events to be detected automatically, enabling rapid action to be taken when necessary. This capability is particularly beneficial for small plants with minimal operations staff.

**Project**  
iON Plant

**Partners**  
AGBAR

**Duration**  
Septiembre 2020 – Febrero 2021

**Coordinator**  
Cetaqua Barcelona

## Innovation and transfer in Aigües de Barcelona



La gestió responsable

We are the vehicle that enables Aigües de Barcelona to complete a large part of the research and innovation required to steer integral water cycle processes toward a circular economy, and to meet the needs of water users by looking toward the future.

We develop solutions that are applied directly to the infrastructures of Aigües de Barcelona. In addition, thanks to case studies in European projects we participate in at its facilities and to the organisation of events participated in by partners and other European entities, we have worked together to position the Barcelona area as one of Europe's top knowledge hubs in the water field.



Some examples of projects in direct collaboration with Aigües de Barcelona:

### **Critical infrastructure management and resilience**

Determination of origins in water mixtures - DOMA.

### **Environmental, economic and social sustainability**

Sustainability assessment of the activities of the AGBAR Foundation.

### **Biofactory and resource recovery**

Demonstration of a biological methanation plant to promote sustainable transport in Barcelona.

### **Water 4.0**

Analytical validation of pump predictive maintenance sensors.



## Critical infrastructure management and resilience



### Determination of origins in water mixtures - DOMA

The water distributed in Barcelona's network comes from different sources, such as the Llobregat River, the Ter or the Mediterranean Sea, through desalination.

The combination sources results in water with very different characteristics, which can cause changes in the organoleptic properties of the water supply or different alterations to components of the distribution network.

In order to provide a better response to these situations, the DOMA project has developed a chemometric model, based on physicochemical parameters of the water, which could potentially be implemented at points of interest in the Aigües de Barcelona distribution network. The model determines the origin of the water in real time, or the percentages of each origin in the case of binary mixtures.



**Project**  
DOMA

**Duration**  
July 2018 – January 2021

**Coordinator**  
Cetaqua Barcelona

**Partners**  
Aigües de Barcelona, ATL



## Environmental, economic and social sustainability



### Sustainability assessment of the activities of the AGBAR Foundation

We have evaluated a selection of AGBAR Foundation activities with Life Cycle methods in order to see their environmental and social impact. The impact of the Museu de les Aigües has been evaluated, as well as a selection of collaborative projects with different social organisations. For example, the Espigoladors Foundation's project seeks to reduce food waste and guarantee healthy food for vulnerable groups through activities to recover and distribute fruit and vegetables. In this case, 3,932 people have had access to 176,932 servings of fruit and vegetables, generating a large positive social impact on the local community valued at 1.5/2. In addition, the recovery of fruit and vegetables has led to a reduced water footprint (15,417 m<sup>3</sup>/year) and a reduction in associated emissions (632 kg CO<sub>2</sub> eq./year).

#### Project

AGBAR Foundation: Sustainability indicators visualization

#### Duration

June 2019 – February 2020

#### Coordinator

Cetaqua Barcelona

#### Partner

Agbar Foundation



## Biofactory and resource recovery



### Demonstration of a biological methanation plant to promote sustainable transport in Barcelona

The European LIFE Nimbus project began in 2020 with the aim of proposing a green energy and transport model in Barcelona by promoting the eco-factory or biofactory concept.

Through the recovery of waste water treatment plant waste (sludge) from the Baix Llobregat waste water treatment plant managed by Aigües de Barcelona, biomethane of sufficient quality will be produced, to be used as biofuel for public transport. At the same time, power-to-gas technology will be promoted as a solution for storing surplus renewable energy.

#### Project

LIFE Nimbus

#### Duration

September 2020 – November 2023

#### Coordinator

Cetaqua Barcelona

#### Partners

Aigües de Barcelona, Labaqua, Transports Metropolitans de Barcelona (TMB), Universitat Autònoma de Barcelona (UAB)

#### Website

[www.life-nimbus.eu](http://www.life-nimbus.eu)

**NIMBUS**





## Water 4.0

### Analytical validation of pump predictive maintenance sensors

The AcAnalytics project has analysed the use of five technological solutions available on the market, which allow progress towards predictive maintenance to improve the operation and maintenance processes of the Aigües de Barcelona network's assets.

These technologies, provided by different suppliers and based on the use of electrical sensors and/or vibrations, have been installed in different drive units and under

real operating conditions. The specifications of the installation, as well as the data collected and the reports generated by the supplier, have been analysed and audited by a group of experts from the Universitat Politècnica de Catalunya (UPC).

The project has provided insight into the strengths and weaknesses of each technology. A number of recommendations were provided for their strategic deployment in the main drive groups or in special case studies.



**Project**  
AcAnalytics

**Duration**  
December 2019 – December 2020

**Coordinator**  
Cetaqua Barcelona

**Partners**  
Aigües de Barcelona, Universitat Politècnica de Barcelona

# 4. Talent, knowledge and technology





## We attract talent and promote diversity



### People, the core of our value proposition

We believe that people are the key to achieving our objectives, and therefore we place them at the centre of our value proposition. We promote equal opportunities by creating inclusive environments that foster respect and diversity as corporate values and fundamental pillars for the development of society.

### We are committed to quality education

We promote the hiring of people with specialised training, including those who are pursuing or already hold a doctorate. Similarly, we favour the exchange of knowledge with local universities through the Scientific Technical Advisor position.

### We empower innovation through talent and collaboration

As a leading technology centre in Europe, innovation is part of our DNA. We have a highly qualified scientific ecosystem with first-hand knowledge of society's R&D+i needs, which is capable of proposing innovative solutions.

Through a collaborative ideation space, based on agile methodologies, we take talent a step further by encouraging the team's ideas and helping them materialize into projects that can be implemented.

## 57 people



16 PhDs  
2 PhDs students

3 Scientific  
Technical Advisors



UNIVERSITAT DE BARCELONA

Dra. Montserrat Termes



UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH

Dr. José Luis Cortina



CSIC

Dra. Gabriela Cembrano



## Knowledge and technologies

**Technological development and the application of knowledge are indispensable elements in tackling the major challenges linked to the climate emergency. We offer companies and regions services that allow them to apply them to real systems, based on the results that we obtain in the research projects.**

### We apply our research...

#### We evaluate urban water solutions

Design, validation, optimization and adaptation of treatment plans for the production of drinking water, urban waste water treatment and regeneration for reuse:

- Prototype tests on a laboratory and semi-industrial scale with the possibility of different types of real water.
- Operational analysis and strategy development to control treatments and infrastructure, including reclaimed water networks.
- Solutions for the recovery and reuse of by-products.

#### We evaluate industrial water solutions

Laboratory tests to evaluate the feasibility of treatments for complex industrial water to reach the necessary discharge limit or to promote reuse within industry.

Benchmarking of technologies and technical support in order to recommend the best solutions in terms of efficiency, cost and environmental footprint.

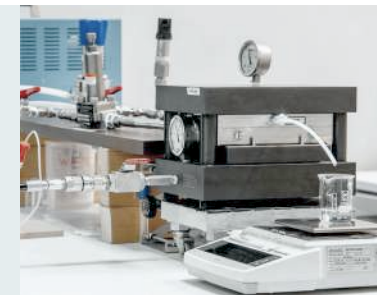
Obtaining design parameters for the implementation of full-scale treatment trains.

#### We evaluate sensor solutions

Comparison and validation of sensors to simulate real and extreme conditions on a controlled platform and in the field.

### ...Through the use of experimental platforms

Treatability laboratory with



Pilot plants



Sensor platform with





# 5. We bring knowledge closer to society

## We share our results

**So that the results generated have a real impact, we work on sharing and communicating our R&D+i, via the most appropriate and efficient channels for each type of message.**

### We organise awareness events and scientific webinars

At Cetaqua Barcelona we organise events, workshops and webinars to share the progress and the results of the projects we coordinated or participated in. We facilitate meetings between experts and stakeholders, where representatives from the academic world, public organisations and companies take part. In this way, we create opportunities that accelerate knowledge transfer, generate conversation and enable networking for future collaborations.

### We actively participate in congresses, conferences and online seminars

In order to solidify Cetaqua's position as a leader in the water and environmental sectors, we share our research advances with our counterparts in other organisations and countries, as well as with audiences interested in our field.

### We publish in scientific and technical journals

The publication of our results in prestigious peer-reviewed specialist journals allows us to be involved in science and technology issues as part of the international scientific community and demonstrates our experience in our main research fields.



**03**

awareness events



**08**

webinars organised



**11**

participations in conferences



**18**

scientific publications



**08**

technical publications

## We organise awareness events

The events we organise in collaboration with other organisations seek to open up the knowledge we've acquired to administrations, universities, technology centres and society as a whole.

This year, we organised a total of 3 events and 8 webinars. This allowed us to present our research, as well as that of other participating organisations, and to connect more than 1,500 people.



### Life Platform Meeting “Making Water Fit For Life” Barcelona, 29 and 30 January 2020

Event organised by the European Commission's LIFE programme and Cetaqua to discuss future waste water legislation. This technical conference brought together some 100 members of technological centres and scientific institutions from all over Europe, as well as representatives of the European Commission, to discuss future work topics for the “Urban Waste Water Directive” (UWWTD), taking into account technological evolutions and society's impending needs.



### URCC Conference “Urban Resilience in a context of Climate Change” Virtual event, 20-21 October 2020

Conference organised by UN-Habitat, Barcelona City Council, SUEZ and Cetaqua in the framework of RESCCUE, the first European R&D+i project on large-scale urban resilience. This international conference brought together more than 400 professionals from academia, administrations, business and local communities to exchange knowledge, share challenges and propose solutions in cities, with a focus on European urban areas.





### “Barcelona, a resilient city” Virtual event, 10 November 2020

As a result of the success of the URCC, UN-Habitat, Barcelona City Council, SUEZ and Cetaqua organised the meeting “Barcelona, resilient city” in the framework of the RESCCUE project. The main results of the Barcelona case study were presented to local stakeholders with the aim of promoting its application in other cities.



### “Combating COVID-19: analysis of epidemiological and waste water data for early warning in populations” Webinar, 2 December 2020

Webinar framed by the collaboration agreement between Cetaqua and the research group in Computational Biology and Complex Systems (BIOCOM-SC) of the Universitat Politècnica de Catalunya - BarcelonaTech (UPC) where experts from different disciplines discussed how data analysis and, specifically, the relationship between prevalence of COVID-19 in the population and the concentration of SARS-CoV-2 genetic material in waste water could work together to inform community decision-making.

## We participate in conferences

In 2020 we participated in 10 national and international congresses, conferences and workshops related to our fields, with papers, presentations and posters.



### 3rd edition of the conference “For a circular and competitive economy” Gavà, 5 March

We participated in the circular economy summit in the city of Gavà as part of the Gavà Circular project, in collaboration with Gavà City Council and Aigües de Barcelona. We gave an oral presentation about the use of indicator systems to measure circularity in municipalities.



### 14th edition of the UB Conference on MSW Biomethanisation 2020 Online, 26 November

With the virtual presentation “Towards renewable gas and energy storage. The LIFE Nimbus and CoSin projects.” Both projects aim to promote energy transition to contribute to environmental sustainability.

## We participate in initiatives that promote scientific careers



**We promote STEM (Science, Technology, Engineering and Mathematics) education by encouraging dialogue between Cetaqua's research staff and the younger generations.**

In 2020 we participated in the 100tífiques initiative, organised by the Fundació Catalana per a la Recerca i la Innovació and the Barcelona Institute of Science and Technology, in collaboration with

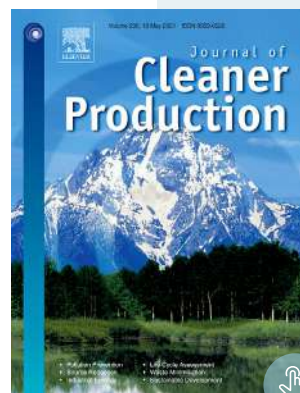
the Departament d'Educació de la Generalitat de Catalunya, to inspire the pursuit of scientific-technical careers among children, especially girls.



## We publish in scientific and technical journals

Our contribution to the collective construction of scientific knowledge has been reflected in our publication of 18 articles in peer-reviewed scientific journals and 8 technical articles in specialised media, related to the fields of water, environment, chemical engineering, health and energy.

Our publications in high-impact reference journals such as Sustainability, the Journal of Cleaner Production, the Journal of Environmental Management and the specialised journals Tecnoaqua and RETEMA, among others, stand out.



### Hybrid Sorption and Pressure-Driven Membrane Technologies for Organic Micropollutants Removal in Advanced Water Reclamation: A Techno-Economic Assessment.

C. Echevarría, C. Valderrama, J.L Cortina, I. Martín, M. Arnauldos, X. Bernat, A. De la Cal, M.R. Boleda, A. Vega, A. Teuler, E. Castellví (2020).

Journal of Cleaner Production 273:123108.

DOI: 10.1016/j.jclepro.2020.123108



### Analysis and surveillance of SARS-CoV-2 in the urban water cycle.

A. Serra, S. González, M. Arnauldos, B. Galofré, M. Paraira, E. Soria, A. Yanez, A. Bosch, R.M. Pintó, J.M. Lema, I. Casals, E. Mena, J. Vinyoles (2020).

Tecnoaqua, Digital Magazine, no. 43.



# 6. Partnerships to achieve goals



## Partnerships to achieve goals



**As a result of our collaborative network with universities, other research centres, companies, public entities and associations, this year we participated in more than 80 projects, 26 of them publicly funded, of which 13 fell within the framework of European Commission programmes.**

### The scientific rigour of universities and research centres

Working with institutions of recognized prestige assures us that the solutions we propose are scientifically sound.

### Solutions applied to the real economy

The vision of companies from different sectors (water, energy, waste, agriculture, etc.) helps

us to detect opportunities and translate them into viable and sustainable solutions (for both regions and organisations) from a social, economic and environmental point of view, adapting them to society's current and future needs.

### The value of public-private partnerships

Continuously involving public entities helps us ensure that the solutions we propose respond to

real societal challenges, ensuring that they can be carried out within current and future regional contexts and regulatory frameworks.

### The influence and positioning of associations

Participation in national and international associations puts us in touch with new trends and potential collaborations, and also promotes the exchange of knowledge.

In 2020, we collaborated with various prestigious Catalan universities such as the UPC (Universitat Politècnica de Catalunya), the UB (Universitat de Barcelona) and the UAB (Universitat Autònoma de Barcelona); as well as leading centres such as the ICRA (Institut Català de Recerca de l'Aigua), EURECAT and the BSC (Barcelona Supercomputing Center).

We also worked hand in hand with leading European R&D+i organisations such as the IWW in Germany (IWW Water Centre), KWR in the Netherlands (Watercycle Research Institute), CERTH in Greece (Centre for Research and Technology Hellas) and LNEC in Portugal (Laboratório Nacional de Engenharia Civil), among others.

**CETAQUA**  
WATER TECHNOLOGY CENTRE

60 Universities and research centres

71 Companies

9 Associations

25 Public entities

\*Consult the full list of 2019 projects and collaborations in the "Appendices" section.

## EsAgua, ground-breaking water footprint network in Spain



**EsAgua, Cetaqua's outstanding initiative in the field of sustainable development, is the first water footprint network in Spain through which we promote responsible consumption and production methods.**

**This tool arises from the growing demand for information on the water footprints of organisations, processes and products, to raise society's awareness of the concept through the web, social networks and conferences.**

In 2020, Cetaqua actively participated in water footprint outreach with:

**2 open seminars as part of the EsAgua webinar series:** Experts shared knowledge on how to use water sustainably in agriculture, a major consumer of natural resources.

**Participations in 2 conferences:** Together with other leading sustainability organisations, sharing the value of these indicators as a vehicle for meeting development goals.

Furthermore, in 2020, EsAgua was selected as a finalist in the XI Corresponsables Awards in the category "Small and Medium-Sized Non-Profit and Social Economy Entities".

EsAgua is currently promoted by the Water Footprint Network and DNV-GL and has 44 participating organisations.



Promoted by

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WATER TECHNOLOGY CENTRE





# 7. Annexes



## Annual accounts 2020

Income statement	3.312.297 €
Private funding	2.338.688 €
Public funding	973.609 €
Other income	2.513.328 €
<b>Total income</b>	<b>5.825.625 €</b>
Expenditure on projects	4.380.307 €
Expenditure on structures	1.445.318 €
<b>Total costes</b>	<b>5.825.625 €</b>

Balance sheet	
<b>Total assets</b>	<b>9.337.218 €</b>
Non-current assets	355.726 €
Current assets	8.981.492 €
<b>Net equality and liabilities</b>	<b>9.337.218 €</b>
Net equality	3.643.617 €
Non-current liability	1.774.185 €
Current liability	3.919.416 €

## List of participations in congresses and conferences 2020

**Álvaro Mayor, Adriana Romero, Núria Basset.** "LIFE ENRICH: Enhanced Nitrogen and phosphorus Recovery from wastewater and Integration in the value chain". Life Platform Meeting: Making Water Fit For Life. Barcelona (29 y 30 enero 2020)

**Marina Isasa, Sara Monasterio, Susana González.** "¿Por qué ciencias?" 100tífiques. Barcelona, España (11 febrero 2020)

**Marina Isasa.** "Sistema de indicadores para medir la circularidad en un territorio. El proyecto Gavà Circular". Jornadas de economía circular Gavà. Gavà, España (5 de marzo 2020)

**Naiara Sáenz.** "El desperdicio de alimentos, ¿conocemos su impacto ambiental?" 6º Punto de Encuentro AECOC contra el desperdicio alimentario. Virtual, España. (5 junio 2020)

**Eduardo Martínez-Gomariz.** "A novel expert opinion-based approach to

compute estimations of flood damages to property in dense urban environments, in: National and EU Dialogue" Allies For Climate: How Could the Insurance Industry and Local Authorities Team up to Help Bridge the Protection Gap? Virtual (8 junio 2020)

Jose Carrasco, **Filippo Alfonso Baldaro,** Fernando M. Cucchiatti, Fernando De Los Riscos García. "Detection of anomalous patterns in water consumption: an overview of approaches. El proyecto RIS3CAT – MODEM." Intelligent Systems Conference (IntelliSys) 2020. Virtual. (4 septiembre 2020)

**Naiara Sáenz.** "Uso sostenible del agua: huella hídrica y huella de agua. Red EsAgua". Wominar Agua y Minería. Virtual. (8 octubre 2020)

**Montserrat Termes.** "Desafíos tarifarios de la desalación en agua

potable: Hacia una tarifa Progresiva". Foro ALADYR: Políticas Públicas para garantizar el acceso al agua. Virtual. (19 noviembre 2020)

**Núria Basset.** "Hacia el gas renovable y el almacenamiento de energía. Los proyectos NIMBUS y COSIN" Jornadas Biometà UB. Virtual. (26 noviembre 2020)

**Núria Basset.** "Demonstration of a biological methanation plant for sustainable transport - NIMBUS" Presente y futuro del tratamiento biológico de gases. Virtual. (18 diciembre 2020)

**Marina Arnaldos.** "Potencial del análisis de datos en aguas residuales". Lucha contra la COVID-19: análisis de datos epidemiológicos y de aguas residuales para la alerta temprana en las poblaciones. Virtual. (2 diciembre 2020)

## List of scientific publications 2020

Russo, B., Velasco, M., Locatelli, L., Sunyer, D., Yubero, D., Monjo, R., **Edwar Forero-Ortiz, Eduardo Martínez-Gomariz**, Sánchez-Muñoz, D., Evans, B., Gómez, A.G. (2020). "Assessment of Urban Flood Resilience in Barcelona for Current and Future Scenarios. The RESCCUE Project." *Sustainability* 12(14): 5638. <https://doi.org/10.3390/SU12145638>

**Edwar Forero-Ortiz, Eduardo Martínez-Gomariz**, Porcuna, M., Locatelli, L., Russo, B. (2020). "Flood Risk Assessment in an Underground Railway System under the Impact of Climate Change—A Case Study of the Barcelona Metro". *Sustainability* 12, 5291. <https://doi.org/10.3390/su12135291>

**Edwar Forero-Ortiz, Eduardo Martínez-Gomariz**, Porcuna, M.C. (2020). "A review of flood impact assessment approaches for underground infrastructures in urban areas: a focus on transport systems". *Hydrological Sciences Journal/Journal des Sciences Hydrologiques* 65(11) <https://doi.org/10.1080/02626667.2020.1784424>

**María Guerrero-Hidalga, Eduardo Martínez-Gomariz**, Evans, B., Webber, J., Montserrat Termes-Rifé, Russo, B., Locatelli, L. (2020). "Methodology to Prioritize Climate Adaptation Measures in Urban Areas. Barcelona and Bristol Case Studies". *Sustainability* 12(12):4807. <https://doi.org/10.3390/SU12124807>

Locatelli, L., **María Guerrero-Hidalga, Eduardo Martínez-Gomariz**, Russo, B.; Sunyer, D., Martínez, M. (2020). "Socio-Economic Assessment of Green Infrastructure for Climate Change Adaptation in the Context of Urban Drainage Planning". *Sustainability* 12(9):3792 <https://doi.org/10.3390/SU12093792>

Locatelli, L.; Russo, B.; Acero Oliete, A.; Sánchez Catalán, J.C.; **Eduardo Martínez-Gomariz**, Martínez, M. (2020). "Modeling of E. coli distribution for hazard assessment of bathing waters affected by combined sewer overflows". *Natural Hazards and Earth System Sciences* 20(5):1219-1232. <https://doi.org/10.5194/nhess-20-1219-2020>

Russo, B., Velasco, M., Monjo, R., **Eduardo Martínez-Gomariz**, Sánchez, D., Domínguez, J.L., Gabàs, A., Gonzalez, A. (2020). "Evaluación de la resiliencia de los servicios urbanos frente a episodios de inundación en Barcelona. El Proyecto RESCCUE." *Ingeniería del Agua* 24(2):101. <https://doi.org/10.4995/ia.2020.12179>

**Eduardo Martínez-Gomariz, Edwar Forero-Ortiz, E, María Guerrero-Hidalga**, Castán, S., Gómez, M., 2020. "Flood Depth—Damage Curves for Spanish Urban Areas. *Sustainability* 12, 2666. <https://doi.org/10.3390/su12072666>

Sánchez-Muñoz, D., Domínguez-García, J.L., Eduardo Martínez-Gomariz, Russo, B., Stevens, J., Pardo, M., (2020). "Electrical Grid Risk Assessment Against Flooding in Barcelona and Bristol Cities". *Sustainability* 12(4):1527. <https://www.mdpi.com/2071-1050/12/4/1527>

**Edwar Forero-Ortiz, Eduardo Martínez-Gomariz**. (2020). "Hazards threatening underground transport systems". *Natural Hazards* 100,

1243–1261. <https://doi.org/10.1007/s11069-020-03860-w>

**Lucia Alexandra Popartan**, Ungureanu, C.; Velicu, I.; **Maria José Amores**; Poch, M. (2020). "Splitting Urban Waters: The Politicisation of Water in Barcelona between Populism and Anti-Populism". *Antipode*. 52(2). <https://doi.org/10.1111/anti.12630>

Congcong, S; Romero, L.; **Bernat Joseph-Duran, Jordi Meseguer**, Muñoz, J.; Guasch, R.; Martínez, M; Puig; V.; **Gabriela Cembrano**. (2020). "Integrated pollution-based real-time control of sanitation systems". *Journal of Environmental Management*. 269:110798. <https://doi.org/10.1016/j.jenvman.2020.110798>

**Carlos Echevarría**, Valderrama, C.; **José Luis Cortina, Ignacio Martín, Marina Arnaldos, Xavier Bernat**, De la Cal, A; Boleda, M.R.; Vega, A.; Teuler, A.; Castellví, E. (2020). "Hybrid sorption and pressure-driven membrane technologies for organic micropollutants removal in advanced water reclamation: A techno-economic assessment". *Journal of Cleaner*

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Roldán, M; Bouzas, A.; Seco, A.; Mena, E.; **Álvaro Mayor**, Brat, R. (2020). "An integral approach to sludge handling in a WWTP operated for EBPR aiming phosphorus recovery: Simulation of alternatives, LCA and LCC analyses". Water Research. 175:115647. <https://doi.org/10.1016/j.watres.2020.115647>

Tapia-Quirós, P; Montenegro-Landívar, M.F; Reig, M; Vecino, X; **Teresa Alvariño, José Luis Cortina**, Saurina, J; Granados, M. (2020). "Olive Mill and Winery Wastes as Viable Sources of Bioactive Compounds: A Study on Polyphenols Recovery". Antioxidants. 9(11):1074. <https://doi.org/10.3390/antiox9111074>

Queralt, E; **Xavier Bernat**; Custodio, E. (2020). "Improving Water Quantity and Quality Supply Security by Managed Artificial Recharge Technologies in the Lower Llobregat Aquifers

Integrated into a Conjunctive Surface and Groundwater Management Scheme for Barcelona, Spain". Journal of Environmental Science and Engineering. <https://doi.org/10.17265/2162-5298/2020.04.001>

Velasco, M., Russo, B., Monjo, R., Paradinas, C., Djordjević, S.D., Evans, B., **Eduardo Martínez-Gomariz**, María Guerrero-Hidalga, Cardoso, M.A., Brito, R.S., **David Pacheco**. (2020). "Increased Urban Resilience to Climate Change-Key Outputs from the RESCCUE Project". Sustainability. 12, 9881. <https://doi.org/10.3390/su12239881>

Velasco, M., Russo, B., **Eduardo Martínez-Gomariz**. (2020). "Integrated Assessment of Climate Change Impacts and Urban Resilience: From Climate and Hydrological Hazards to Risk Analysis and Measures." Sustainability Vol. 12, Page 6430 12, 6430. <https://doi.org/10.3390/SU12166430>



## List of technical publications 2020

Covenant of Mayors for Climate and Energy, 2020. Using insurance data to improve resilience to climate change in Barcelona. Covenant case Stud. 2.

**Eduardo Martínez-Gomariz, María Guerrero-Hidalga, Edwar Forero-Ortiz**, Castán, S., Velasco Droguet, M., Villanueva Blasco, Á., 2020. Inundaciones pluviales en zonas urbanas españolas: un modelo de estimación de daños basado en la experiencia pericial. Conseguros, Revista Digital 15.

Fernandez. S.; **David Baquero, Susana González**, Pereira A.; Granero S.; Galofré B. 2020. Nuevas tecnologías para la monitorización de biofilm en redes de distribución de agua potable. Tecnoaqua, Revista Digital.

**David Baquero, Susana González**, Minoves M., Boleda R.M.; Paraira M. 2020. Detección temprana de contaminaciones químicas en agua potable mediante el uso de sensores online. Retema, Revista Digital 223.

Roldán M.; Seco A.; Galdea A.; **Núria Basset**, Barat. R. 2020. Estudio de la gestión de corrientes en la depuradora Murcia-Este para promover la recuperación de fósforo. Retema, Revista Digital 223.

**Albert Serra, Susana González, Marina Arnaldos**, Galofré B; Paraira M.; Soria E.; Yanez A.; Bosch A.; Pintó R.M.; Lema J.M.; Casals I.; Mena E.; Vinyoles J. 2020. Análisis y vigilancia de SARS-CoV-2 en el ciclo urbano del agua. Tecnoaqua, Revista Digital.

**Carlos Montero**. 2020. L'anàlisi d'aigües residuals, clau per preveure nous rebrots de Covid-19. Camins. cat, Revista Digital.

Colprim J.; Puig S.; Balaguer M.D.; Magrí A.; García J.F; Tarancón A.; Cros Á. ; Batlle M. ; **José Luis Cortina**, Valderrama C. ; **Adriana Lucía Romero**, Licon E.; Rodríguez R. 2020. Proyecto DigesTake: recuperación de recursos en la depuración de aguas. Retema, Revista Digital, Especial Bioenergía.

## List of projects 2020

Subject: Critical infrastructure management		Total budget: 30.186.799€		Cetaqua's total budget: 3.680.174€	
Title	Start date	End date	Funding type	Cetaqua's role	
Operation and advanced asset management	1/3/18	31/3/21	Public	Partner	
Artificial intelligence for zero leakage (phase 1)	1/10/19	30/4/20	Private	Partner	
Advanced operation of urban drainage systems	1/12/18	30/6/21	Private	Partner	
Online analysis for the control of microbial health risks at the SJD DWTP	6/11/19	28/2/21	Private	Coordinator	
Burst Reduction (SPOT 2030)	18/2/20	26/3/20	Private	Coordinator	
Sanitation governance to incentivise industrial waste water source monitoring	15/1/20	30/4/20	Private	Coordinator	
Industrial discharge monitoring: development of an advanced quality monitoring platform for industrial effluents	1/7/20	15/12/20	Private	Coordinator	
Determination of origins in water mixtures	2/7/18	31/1/21	Private	Coordinator	
Evaluation of multi-parametric sensors for distribution networks	11/2/19	31/1/20	Private	Coordinator	
Study of the efficacy of methodology used for drainage planning at stagnant water points	16/9/19	15/2/20	Private	Coordinator	
Strategies for the monitoring and control of algae at the Sant Joan Despí DWTP	15/12/20	31/1/22	Private	Coordinator	
Intervention management support tool (GooglePipes - Optimatics application) (Phase 1)	4/2/19	31/1/20	Private	Coordinator	
Promotion and implementation of ETV as a voluntary EU scheme to verify the performance of environmental technologies	1/9/20	31/12/22	Public	Partner	
Pipe dating service for pipes of unknown age in the Aigües de Barcelona network	15/6/20	24/12/20	Private	Coordinator	
Multi-criteria optimisation model	3/2/20	30/6/20	Private	Coordinator	
Tool for microbiological risk management in reclaimed water	20/7/20	30/4/21	Private	Coordinator	
Pathogen contamination emergency response technologies	1/9/20	30/10/23	Public	Partner	
Characterisation of organic matter in the Barcelona metropolitan area urban water cycle by means of fluorescence spectroscopy	15/12/20	31/3/22	Private	Coordinator	
Sample pre-treatment systems for online analysis at the Sant Joan Despí DWTP	16/9/19	15/2/21	Private	Coordinator	
Real-time monitoring of measurement sensor technology	2/11/20	1/11/23	Private	Coordinator	
Reduced network operation activity	15/5/20	29/1/21	Private	Coordinator	

Continue on the next page →

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Subject: Critical infrastructure management		Total budget: 30.186.799€		Cetaqua's total budget: 3.680.174€	
Title	Start date	End date	Funding type	Cetaqua's role	
Management of health risks in reclaimed water	31/3/18	20/6/21	Public	Partner	
Assessment and understanding of the occurrence and risk of SARS-CoV-2 in the urban water cycle and in receiving bodies of water	6/4/20	31/7/20	Private	Coordinator	
Security and cyber-security solutions in utilities for the protection of critical infrastructure	1/3/18	31/3/21	Public	Partner	
Sensorisation and network inspection	1/3/18	20/3/21	Public	Partner	
Strategic, tactical and operational protection of water infrastructures against cyber-physical threats	1/6/17	1/6/21	Public	Partner	
Development of tools to support the implementation and management of reuse	28/1/20	31/7/22	Private	Partner	
Validation and implementation of an online THM formation potential model, based on UV spectra in the Sant Joan Despí DWTP	15/6/20	31/1/21	Private	Coordinator	
Microbiological risk assessment in drinking and reclaimed water	18/12/20	30/4/22	Private	Coordinator	
Benchmarking of online sensors	17/9/18	31/10/20	Private	Coordinator	

Subject: Biofactory and resource recovery		Total budget: 34.397.550€		Cetaqua's total budget: 5.364.001€	
Title	Start date	End date	Funding type	Cetaqua's role	
Accelerating water intelligence on Europe's coastline	1/4/20	31/8/24	Public	Partner	
Study of circularity options for DWTP sludge in the full water cycle	18/9/20	18/12/21	Private	Coordinator	
RD&i plans for urban WWTPs in Consorci de Besòs y Tordera	2/1/20	28/2/22	Private	Coordinator	
Recovery of urban digestate resources in the framework of the circular economy	4/5/18	31/3/21	Public	Partner	
Evaluation of the composition and characterisation of the screenings at the Besòs WWTP	1/1/20	1/7/21	Private	Coordinator	
Selective electro dialysis of nitrates	1/7/20	31/5/21	Private	Coordinator	
Ecological urban actions for fire resilient defence of the interface zone	14/1/19	1/2/22	Public	Partner	
Improved nitrogen and phosphorus recovery from waste water and integration into the value chain	1/9/17	28/2/22	Public	Coordinator	
Zero impact bus: Demonstration of a biological methanation plant for sustainable urban transport	1/9/20	31/1/24	Public	Coordinator	
New water solutions for the mining industry: towards minimum liquid emission and by-product recovery	1/10/18	1/3/23	Public	Coordinator	
Reducing fish canneries pressure on the marine environment with new effluence treatments and ecosystem monitoring	16/7/15	31/1/20	Public	Partner	
Improving the life cycle of reverse osmosis membranes	6/9/18	31/1/21	Private	Partner	
Technical-economic evaluation of ZLD technology to minimise brine discharge from the Sant Joan Despí DWTP	15/1/20	29/1/21	Private	Coordinator	
Nitrogen recovery DI	4/4/18	4/4/21	Public	Coordinator	
Evaluation and proposal for the optimisation of nutrient removal and recovery (N&P) at the Baix Llobregat WWTP and ERA	1/6/19	29/5/20	Private	Coordinator	
Evaluation of large-scale membrane recovery processes (spiral membranes)	2/11/20	15/2/21	Private	Coordinator	
Selection and evaluation of pre-treatments for the Sant Joan Despí DWTP	1/3/19	31/5/21	Private	Coordinator	
Technical support for pilot-scale trials for the treatment of brine solutions using reverse osmosis	22/7/19	31/12/20	Private	Partner	
Integrated modelling to improve WWTP and sewerage efficiency	19/1/18	20/1/20	Private	Partner	



Subject: Environmental, economic and social sustainability		Total budget: 10.394.799€		Cetaqua's total budget: 1.401.081€	
Title	Start date	End date	Funding type	Cetaqua's role	
Co-design of blockchain platform mock-up for management with Scope 3 carbon emissions suppliers	15/10/20	30/4/21	Private	Coordinator	
Managing direct GHG emissions in wastewater treatment	1/9/20	30/6/21	Private	Coordinator	
Implementation of a water reuse pilot and contribution to the establishment of an innovative ecosystem in Gavà to move towards a circular territorial model	1/10/20	1/11/21	Private	Coordinator	
Circular Gavà: Towards the implementation of circular opportunities in the region	10/12/18	26/10/20	Public	Coordinator	
Development of the water footprint web tool in the urban water cycle for Aigües de Barcelona	3/12/18	31/1/20	Private	Coordinator	
"Health of Cities" Index	17/7/20	30/6/21	Private	Coordinator	
SUEZ employee awareness and contribution to the carbon footprint	2/11/20	31/3/21	Private	Coordinator	
Predictive modelling and demand management (MODEM) - communities RIS3CAT - pack 4	2/4/18	20/7/21	Public	Partner	
RESCCUE - Resilience to cope with climate change in urban areas - a multi-sectoral approach with a focus on water	1/5/16	29/1/21	Public	Partner	
Assessment of sustainability indicators	13/6/19	28/9/20	Private	Coordinator	

Subject: Water 4.0		Total budget: 3.553.918€		Cetaqua's total budget: 773.473€	
Title	Start date	End date	Funding type	Cetaqua's role	
Remote reading in water services	1/9/20	14/3/21	Private	Coordinator	
"Digital twins" for the operation of water networks. Pilot development and definition of reference model	15/11/20	15/11/21	Private	Coordinator	
Analytical validation of pump sensors	9/12/19	31/12/20	Private	Coordinator	
Remote sensing of snow and glaciers coverage	1/10/20	31/12/20	Private	Coordinator	
Cavitation prevention in water pumps	1/12/20	1/6/21	Private	Coordinator	
Sewer cleaning optimisation tool (Phase 1)	2/11/20	31/3/21	Private	Partner	
iONPlant - remote monitoring of plant processes using cameras	10/9/20	28/2/21	Private	Coordinator	
Enhanced learning systems for the control of drinking water networks	13/4/20	1/10/21	Private	Coordinator	
Service customisation to improve customer experience	1/3/18	20/4/21	Public	Coordinator	
Industrialisation of a data-driven predictive cleaning model for the drainage network - Phase 1	1/10/19	30/12/20	Private	Coordinator	
Reverse osmosis data stream normalisation module	1/11/19	31/5/20	Private	Coordinator	
Software service for early warning of marine intrusion at the Besòs WWTP	13/1/20	6/7/20	Private	Coordinator	
Emergency lake water quality monitoring service supported by Copernicus	1/10/20	30/11/23	Public	Partner	
Data Management Toolbox for WTS	3/8/20	17/8/21	Private	Coordinator	

Subject: Water resources management		Total budget: 15.818.660€		Cetaqua's total budget: 2.151.834€	
Title	Start date	End date	Funding type	Cetaqua's role	
Governance tool for the sustainable allocation of water resources in the Mediterranean through stakeholder collaboration. Towards a paradigm shift in end-user groundwater management	1/1/20	31/7/23	Public	Third part	
Improved forecasting and management of hydrological events	1/10/15	31/12/20	Public	Partner	
DIVIDE & CONQUER: Closing the loop on water, nutrient and resource management for irrigation activities	1/11/20	31/1/24	Public	Coordinator	
Sustainable low-consumption agriculture	1/3/18	15/9/21	Public	Partner	
Model aggregation platform for integrated management of surface water quality data and the status of bodies of water	1/6/20	1/6/23	Public	Partner	
Landfill recovery for sustainable copper processing in Europe	1/11/16	31/3/20	Public	Partner	
Rejuvenation of reverse osmosis membranes	31/7/19	30/11/20	Private	Coordinator	
Assessment and understanding of the occurrence and risk of SARS-CoV-2 in the urban water cycle and its application for epidemiological purposes	17/4/20	3/5/21	Private	Coordinator	
Industrialisation of a real-time algorithm for the optimisation of ultrafiltration membrane cleaning operations	1/1/19	31/3/20	Private	Coordinator	
Pilot testing of ultrafiltration membranes for membrane improvement	1/7/19	31/1/20	Private	Coordinator	
2nd phase of the UFENIX WTS	14/2/20	30/6/20	Private	Coordinator	

# List of collaborations 2020

## Universities and research centres

### Cetaqua Technology Centres

CETAQUA ANDALUCIA

CETAQUA GALICIA

CETAQUA CHILE



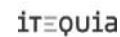


# List of collaborations 2020

## Associations



## Public entities



# List of collaborations 2020

## Companies



## We are carbon neutral

As part of our commitment to the environment, we have been offsetting the CO<sub>2</sub> we generate to combat global warming since 2015. For this reason, all of Cetaqua Barcelona's activity is emission neutral. In addition, we have also been calculating our water footprint since 2019.

CETAQUA  
BARCELONA

CO<sub>2</sub>



CO<sub>2</sub>

# Research Collaboration Thinking forward