



NORTE DE PORTUGAL: OS CAMINHOS DE
UMA REGIÃO INOVADORA

Porto, i3S | 6 de dezembro

Madalena Alves

*Linking Life and Technology
to shape the future*



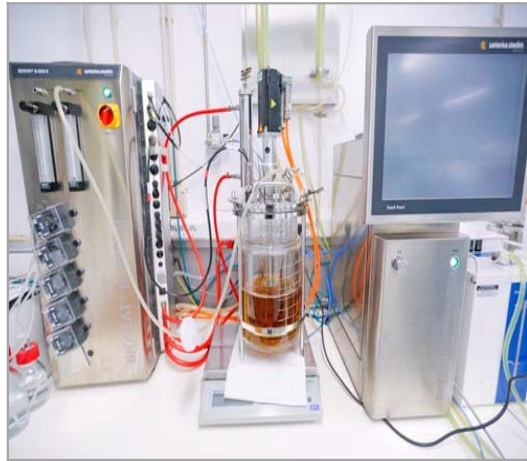
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Research Thematic Lines



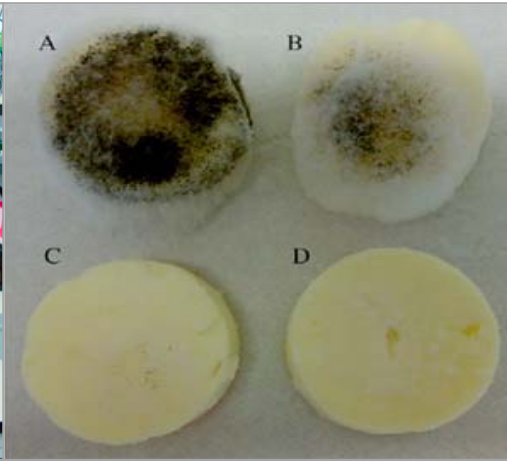
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Industrial



Environmental



Food



Health

Biotechnology and Bioengineering



Research Groups



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				Biotechnology & Bioengineering			
				Industrial	Environment	Food	Health
			Applied Mycology	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
			Bioprocess and Bionanotechnology	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
			Molecular Biotechnology, Bioreactors, and Biofuels	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
			Biofilm Science and Technology			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
			Sensor Research		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
			Bioprocess Engineering and Computational Biosystems	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
			Bioresources, Bioremediation, and Biorefinery	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
			Food Innovation & Technology	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
			FUNctional CARBohydrates and Nanobiotechnology	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

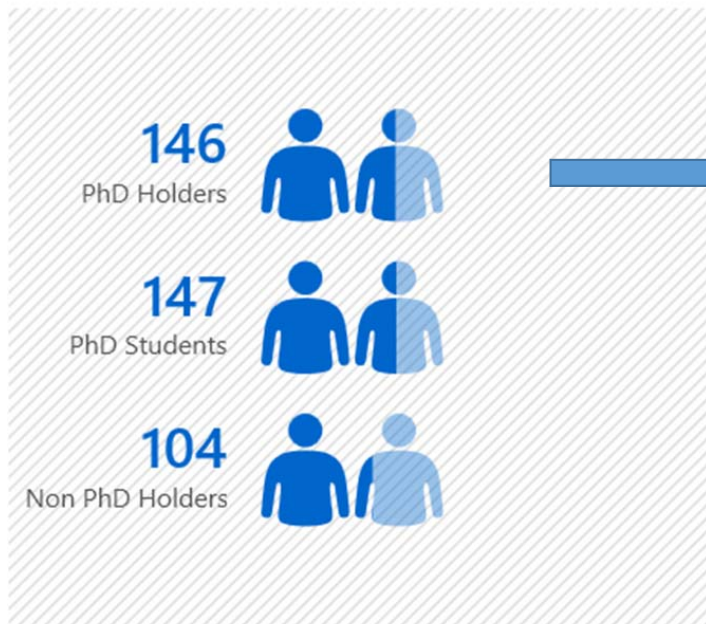


Team

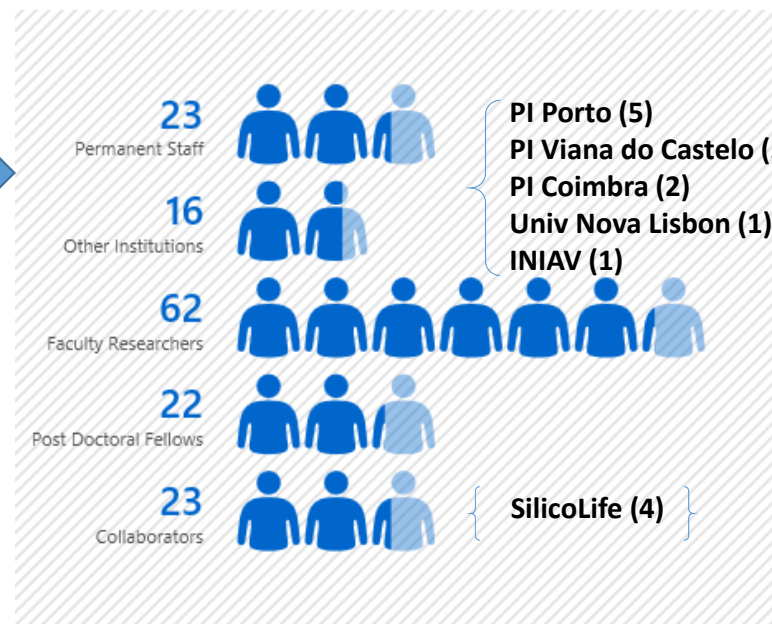
(as of March 2019)



397 Researchers



146 PhD Holders



17 *Technical/Admin Staff*



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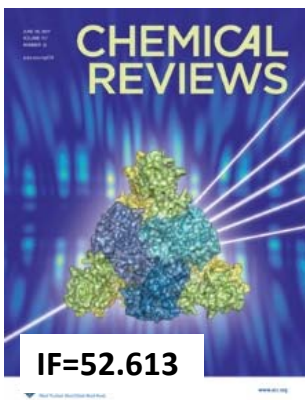
Our Infrastructures 5 sites on campus



Publications in Top Journals



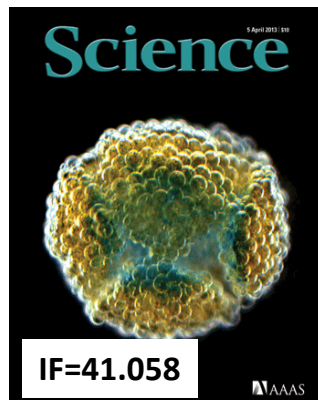
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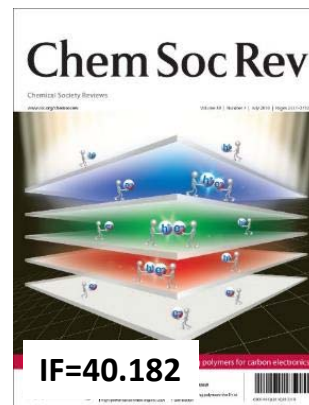
Krallinger et al. 2017



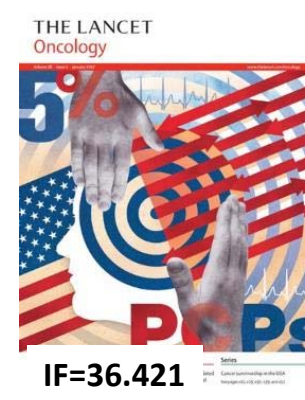
Hagai et al. 2018



Liebensteiner et al. 2013
Atashgahi et al. 2018



Shimanovich et al. 2014



Guinney et al. 2017



Svensson et al. 2017

- Other **top journals** (IF>10): *Advanced Drug Delivery Reviews* (13.660), *Trends in Biotechnology* (13.578), *Microbiology and Molecular Biology Reviews* (13.439), *Adv. Functional Materials* (13.325), *Trends in Pharmacological Sciences* (12.108), *Trends in Microbiology* (11.776), *Nucleic Acids Research* (11.561), *FEMS Microbiol. Rev.* (11.392)
- Several **Top** Hottest, Most Read and Most Viewed Articles: www.ceb.uminho.pt/Publications/HottestArticles

Highly Cited Researchers

11 in Portugal → 3 @ CEB



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Home to
**Highly Cited
Researchers**
2019





Internationalization



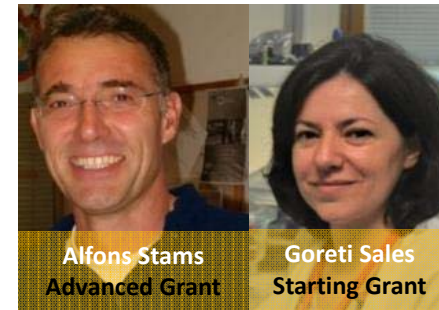
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2 ERC Grants

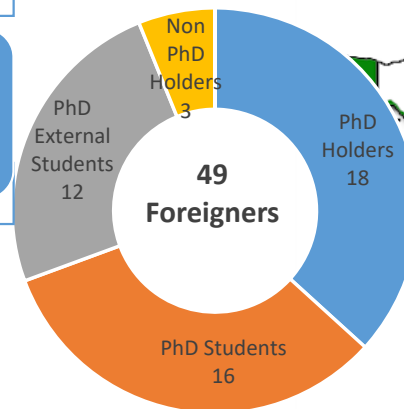
7 EC Projects

Mobility of researchers (incoming researchers from 47 countries)

45% of papers published in co-authorship with international teams



Countries of origin of incoming researchers: **at present (21)** and **past (26)**





Internationalization



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>80 institutions from 31 countries

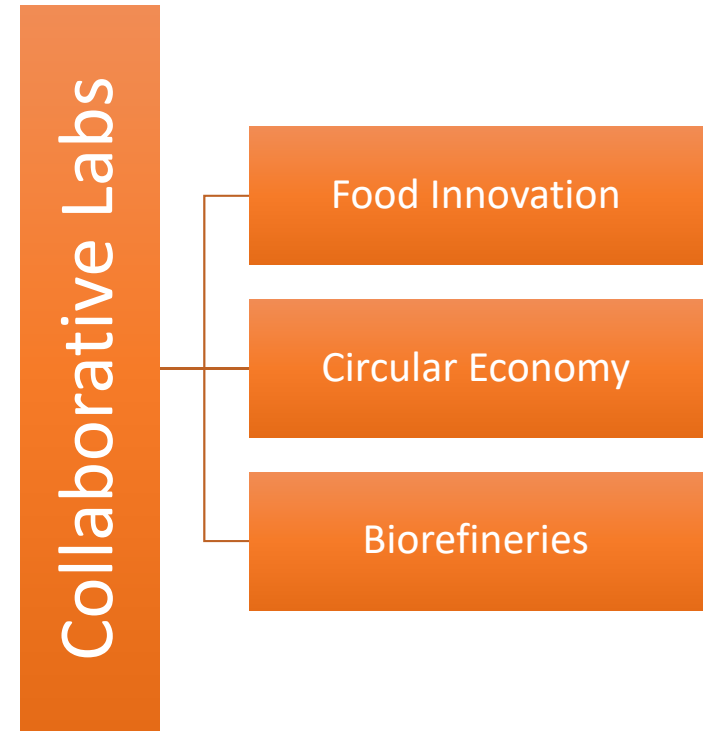




Industrial Partnerships



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Intrapreneurial CEB



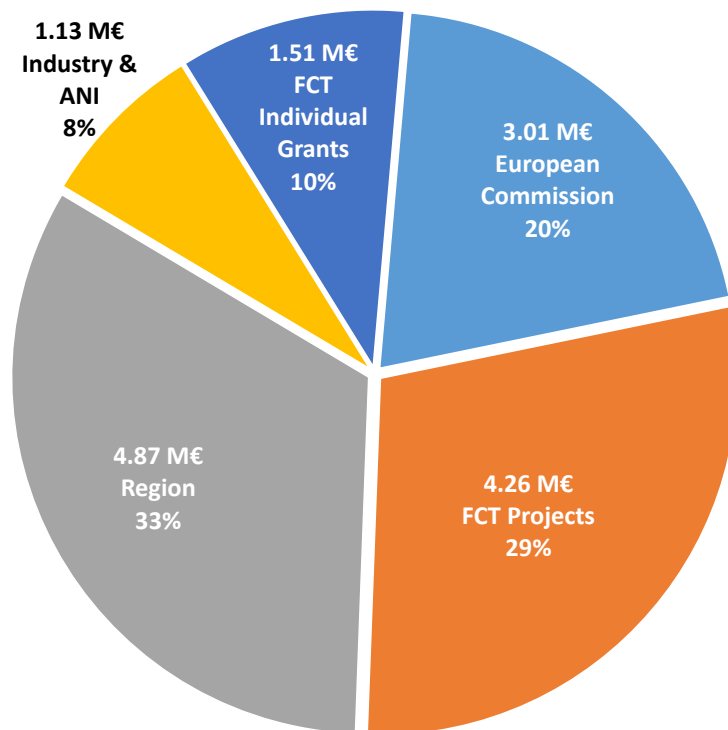


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Project Funding



15 M€ ongoing projects





European & PT Research Infrastructures





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European Research Infrastructures (RI)

	European RI for Microbial Resources , through Micoteca of the Universidade do Minho European Coordination hosted @ CEB
	European RI in Structural Biology through Portuguese Centre for Integrated Structural Biology
	European life sciences RI for Biological Information , through Biodata.pt , the Portuguese distributed infrastructure for biological data

Portuguese Roadmap of RI

	Biomass and Bioenergy RI aligned with the implementation plan of the European Industrial Bioenergy Initiative
	Biodata.pt the Portuguese distributed infrastructure for biological data



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Financiamento CEB Norte2020



2015	2016	2017	2018	2019
603 309 €	851 189 €	1 804 853 €	1 732 249 €	1 003 364 €

Financiamento total CEB (2015-2019) Norte 2020: 6 M€

Financiamento total CEB (2015-2019): 21 M€

} 28%



14 Projetos



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Essential oils, infusions, and silicon in crop protection. A study using tomato plants, as a model, to disclose the biopesticides induced defense mechanisms of plants, through an omics approach

Using computational and experimental methods to provide a global characterization of viral fusion peptides

Targeting pathogenesis and engineering cell factories: developing mixed regulatory-metabolic genomic models in yeasts

Fostering the development of new probiotic approaches for the treatment of candidiasis through the exploration of the *Candida actobacilli* interference mechanisms

Eco-efficient bioprocess for valorisation of saline resources towards the production of biopolymers

Comparative assessment of antimicrobial resistance in environmental biofilms through proteomics - towards innovative theranostic biomarkers



Projetos (14)



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Promoting Agri-food and Forestry Stakeholder Engagement for Knowledge Transfer and SMARTAgriFor partnerships

Underpinning Biotechnology to foster the north of Portugal bioeconomy (Biotecnorte)

Intelligent decision support system for Industrial Biotechnology

innovative therapies for bone regeneration

Centro de Segurança e Inovação Tecnológica no Setor Agro-Alimentar da Uminho

Biotechnology and Bioengineering approaches to improve health quality

Biotechnology and Bioengineering for improved Industrial and Agro-Food processes

Biotechnology and Bioengineering for a sustainable world



Programas Doutorais (5)



Doctoral Program in Biomedical Engineering

Doctoral Program in Applied and Environmental Microbiology

Doctoral Program in Food Science and Technology, and Nutrition

Doctoral Program in Bioengineering

Doctoral Program in Chemical and Biological Engineering



Ligação dos Projetos CEB à RIS3



- **Sistemas Agroambientais e Alimentação**
- **Sistemas Avançados de Produção**
- **Indústrias da mobilidade e ambiente**



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European Union
European Regional
Development Fund



- Water Technology Innovation Roadmaps
- Roteiros para a Inovação em Tecnologia da Água

www.interregeurope.eu/iwatermap

- 2 universidades
- 3 autoridades regionais
- 2 clusters (alimentar, energia)
- 1 ministério
- 1 Instituto de I&D (Wetsus)





Água na RIS3

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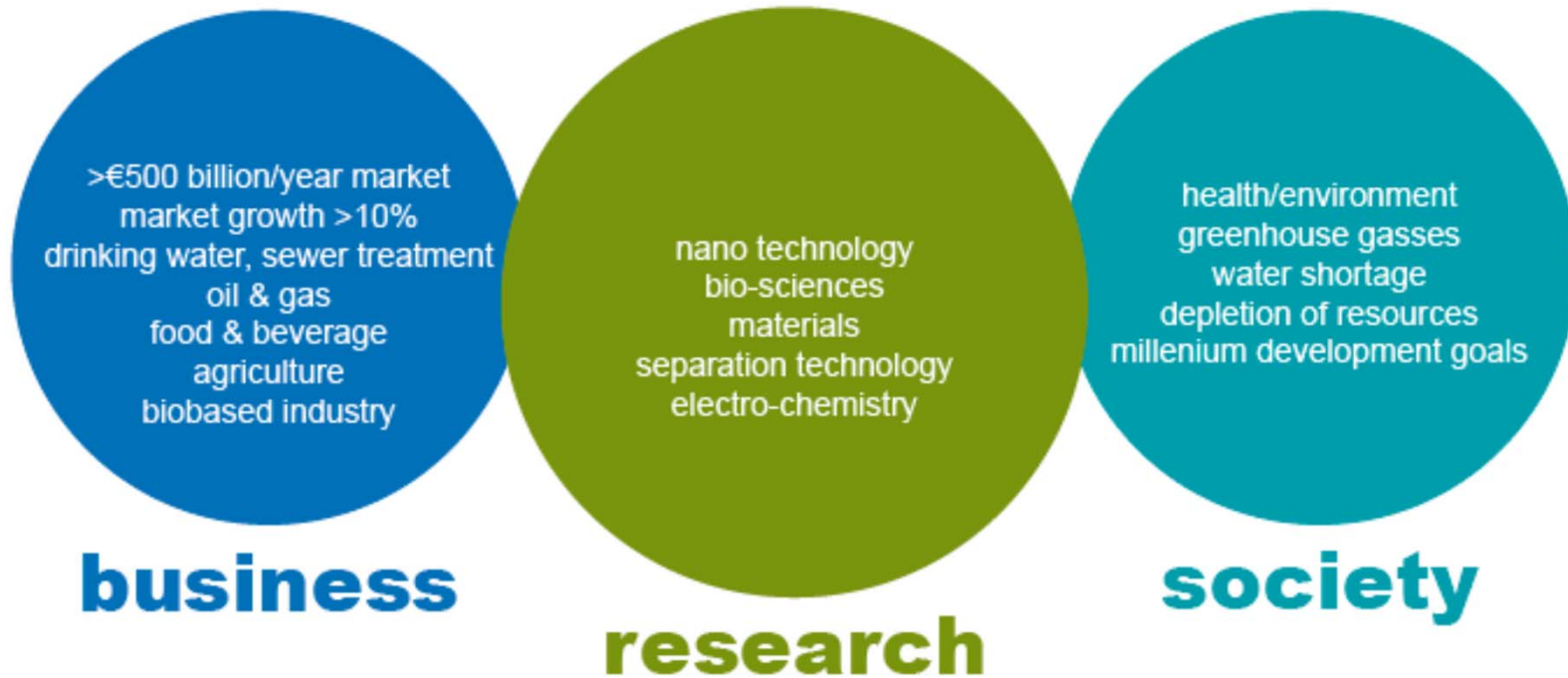
...”Em concreto, destacamos a água como um desses recursos (recurso não tecnológico) e sob duas vertentes. Por um lado, a extensa costa da Região do Norte, a morfologia e geologia da mesma potenciam o desenvolvimento de atividades de saúde e bem-estar associadas à talassoterapia e a tratamentos que recorram a recursos ambientais e biológicos marinhos.

Por outro lado, e com um carácter mais distintivo, as águas minerais e termais constituem um recurso natural relevante que pode ser potenciado no âmbito da medicina preventiva, em articulação com atividades turísticas e de exportação de serviços de saúde. “



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Water Technology aspects





iWATERMAP na região Norte de Portugal

- **Coordenado pela Universidade do Minho – Centro de Engenharia Biológica** (com o apoio da CCDRn que delegou na UMinho a coordenação do projeto na região)
- O iWATERMAP está alinhado com o eixo prioritário 1 do NORTE 2020, que promove a Investigação, Desenvolvimento e Inovação Tecnológica (I&D&IT), especificamente o Investimento Prioritário 1.2 que visa aumentar o investimento em I&D&IT pelas empresas, reforçando a ligação entre empresas e a ciência regional, assim como com as entidades do sistema tecnológico, promovendo o incremento de atividades económicas intensivas em conhecimento, bem como a criação de valor com base na inovação.



iWATERMAP
Interreg Europe





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Roteiros de Inovação e Plano de Ação



Ecosistema de inovação em massa crítica no setor da tecnologia da água e identificação das potenciais fontes de financiamento.

Recursos Humanos, abordando todo o pipeline educacional.

Internacionalização, abordando tanto as oportunidades de colaboração inter-regional, como a cooperação internacional para além da Europa.

Cada região envolvida no projeto de cooperação produz um Plano de Ação, especificando o que será feito na região para assegurar que as lições aprendidas com o iWATERMAP sejam postas em ação.





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iWATERMAP na região Norte de Portugal



- Centra-se na identificação de oportunidades de inovação em tecnologia da água com foco no setor agroalimentar e abrangendo todo o ciclo da água neste setor industrial, mas extensível ao ciclo urbano da água
- Inclui a recuperação de recursos a partir de subprodutos em linha com os desígnios da economia circular.
- Serão também identificadas tecnologias avançadas para produção de água eliminando ameaças escondidas, tais como resistência a antibióticos, presença de contaminantes emergentes ou de microplásticos.





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Plataforma temática de Modernização Industrial: “Territórios Inteligentes da Água”



A gestão sustentável da água é essencial para os principais setores europeus, como o turismo, a agricultura, a energia, mas também a indústria química, de papel e agroalimentar. A sociedade e a economia europeias em diferentes territórios devem abordar as seguintes tendências que determinarão a competitividade da indústria da água europeia.



Kickoff meeting WST



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Partnership Water Smart Territories

Water value chain & 2019 market trends

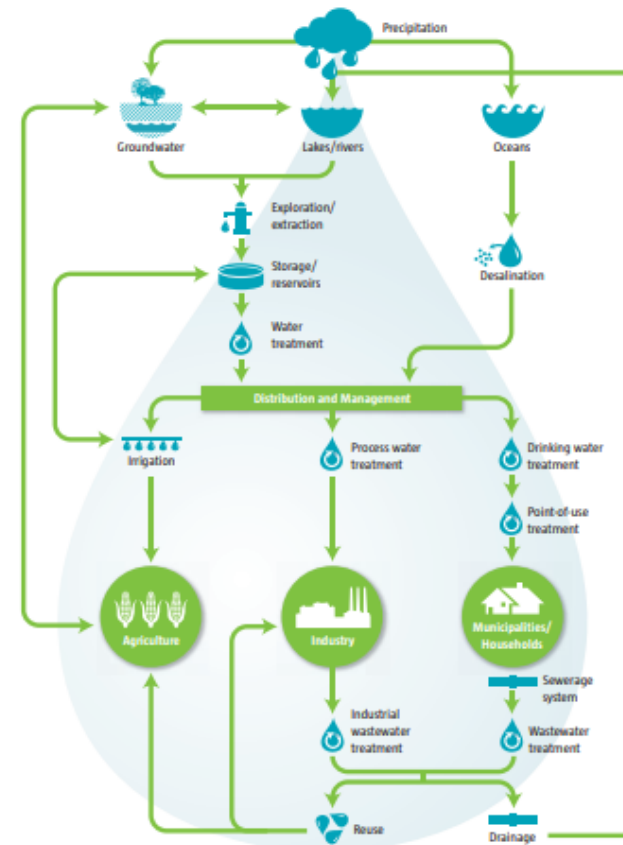
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Main water market trends:

- Advancing circular economy so that the water sector can actively participate to climate change mitigation
- Using digital technology to manage water in a more efficient manner
- Creating new governance and urban water economy for developing countries
- Meeting higher standards of water quality and innovating to treat new pollutants (e.g. microplastics)

Source: [Aquatech](#)



Source: [RobecoSAM](#)



Partnership Water Smart Territories

Technological trends



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Automation: using digital technologies to increase the level of automation in the water networks and enable real-time reactions (ex. Digital Twins)



Sensors: developing new sensors, using nanotechnology to improve water quality monitoring



Data analysis: using data modelling to improve water management

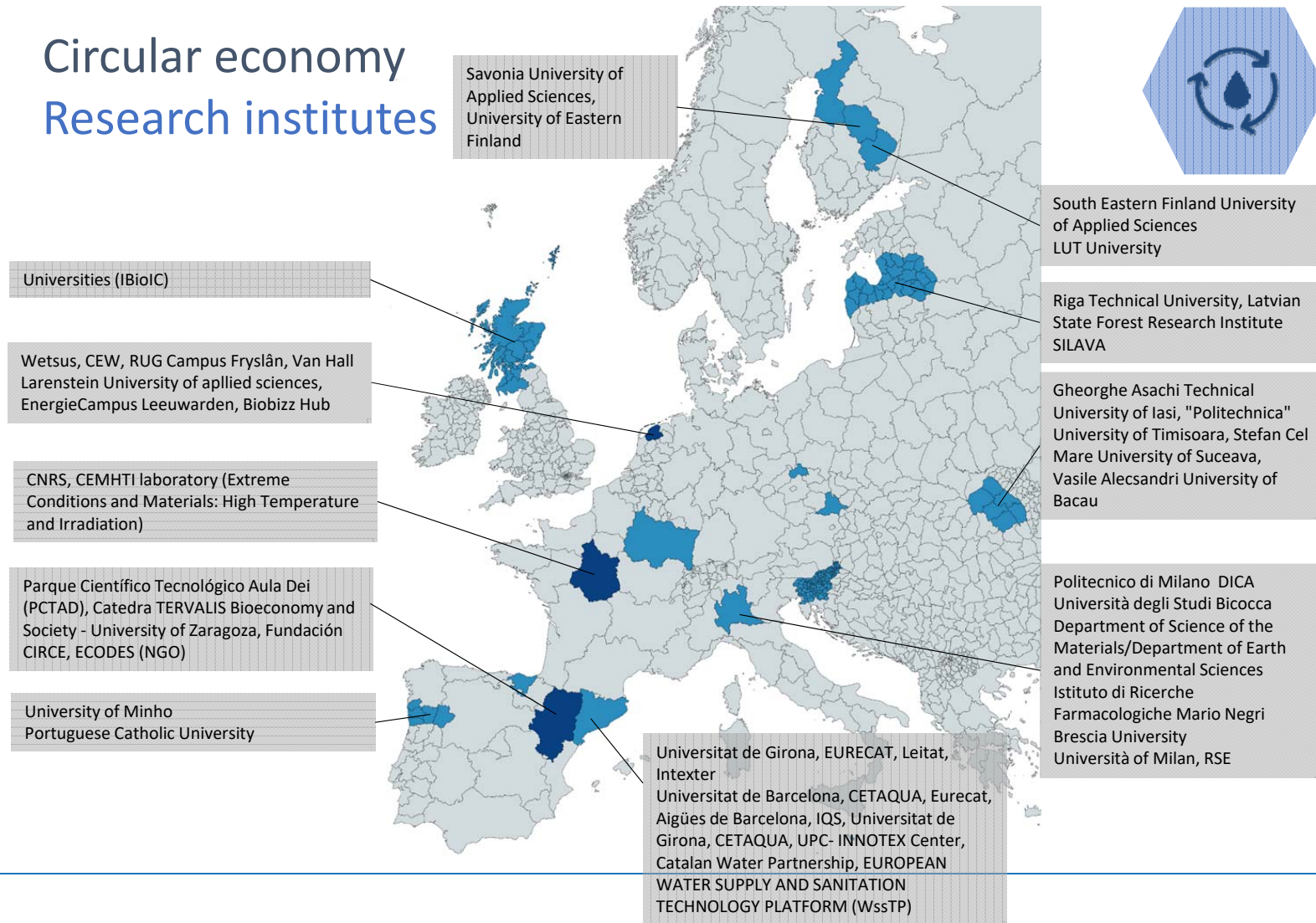
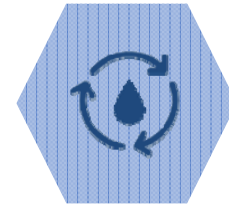


Artificial intelligence: enabling water systems to make predictions and anticipate issues



Satellites: enabling remote data collection and monitoring of water quantity (availability, leakages...)

Circular economy Research institutes






Partnership Water Smart Territories

Thematic areas proposed by WST




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Resilient water infrastructures

Increasing water demand or water quality standards; Aging infrastructure (O&M costs); Operation and maintenance; Persisting and emerging pollutants; water losses; extreme water events


- Novel biotechnological and other KET solutions
- Engineering and construction guidelines
- Integration of Grey and green infrastructure
- Water extreme events (droughts & Floods) management



Water services management & multi-stakeholder governance

Multiple water users that generate inefficiencies and externalities due to a lack of effective governance; shared resources, large water basins and disperse stakeholders combined with an increased vulnerability due to climate change


- Information and communication management
- Solutions for isolated areas - small municipalities
- Economic-financial-investment models



Circular economy

Fight against diffuse pollution; water consumption:

- Water reuse
- Sludge valorisation and nutrient recovery
- Energy efficiency and recovery in the water cycle



Digitalisation

Data acquisition of different water assets; Inter-operation of data; decision support systems; cybersecurity; data governance :

- Real-time monitoring of water physico-chemical parameters
- Decision Support Systems and Business intelligence in water sector
- Cybersecurity to secure critical infrastructures
- Inter-connected and inter-operable systems



WST – Potential Interregional projects



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Project	Coordinator-TBC	Regions-TBC								
Digitalization	Centre Val-de-Loire; Oulu	Aragón	Friesland	Catalonia	Pohjois Savo	North East Romania	Grand Est France	Latvia	North Portugal	Occitanie
New Biotech solutions	North Portugal	Aragón	South Savo	North East Romania	Latvia	Liberec	Malta	South Moravia		
Drinking water	North East Romania	Aragón	Friesland	Catalonia		Liberec	Malta	North Portugal	Luxemburgo	Occitanie
Sludges	Latvia; South Moravia		Friesland	Catalonia	Pohjois Savo	Liberec		North Portugal		Occitanie
Manure		Aragón	Friesland	South Savo			Malta	North Portugal		Occitanie
Micro and nano plastics	Occitanie	Aragón	Catalonia	South Savo	Pohjois Savo	Liberec			Luxemburgo	



Component 5



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O Component 5 é um programa de investimentos focado na comercialização e ampliação de projetos de inovação inter-regionais para o desenvolvimento de cadeias de valor europeias.

Trata-se de um programa de investimento puro, focado apenas em questões relacionadas à inovação, gerido diretamente pela CE.



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*Linking Life and Technology
to shape the future*



Obrigada pela Atenção

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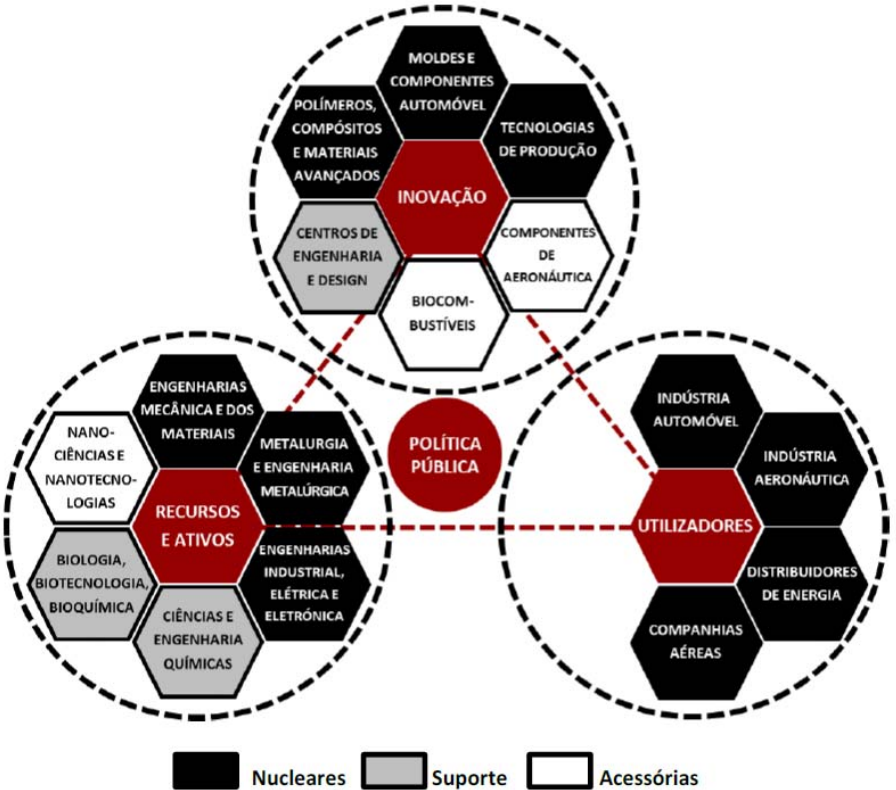


Figura nº 3.13 – Referencial analítico do domínio Indústrias da Mobilidade e Ambiente
Fonte: adaptado de CCDR-N (2014)



2 principais Objetivos Políticos



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“Uma Europa mais inteligente, através da inovação, digitalização e transformação económica, bem como do apoio às pequenas e médias empresas”

“Uma Europa mais verde, sem emissões de carbono, aplicando o Acordo de Paris e investindo na transição energética, nas energias renováveis e na luta contra as alterações climáticas”.