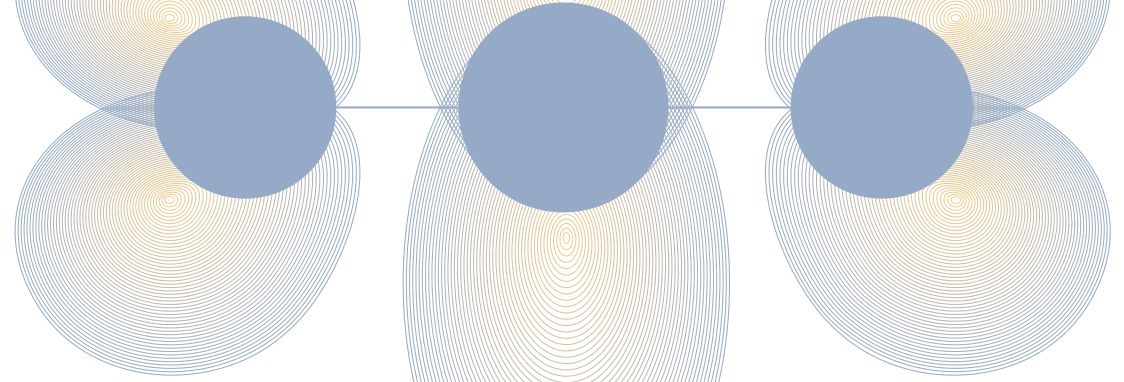
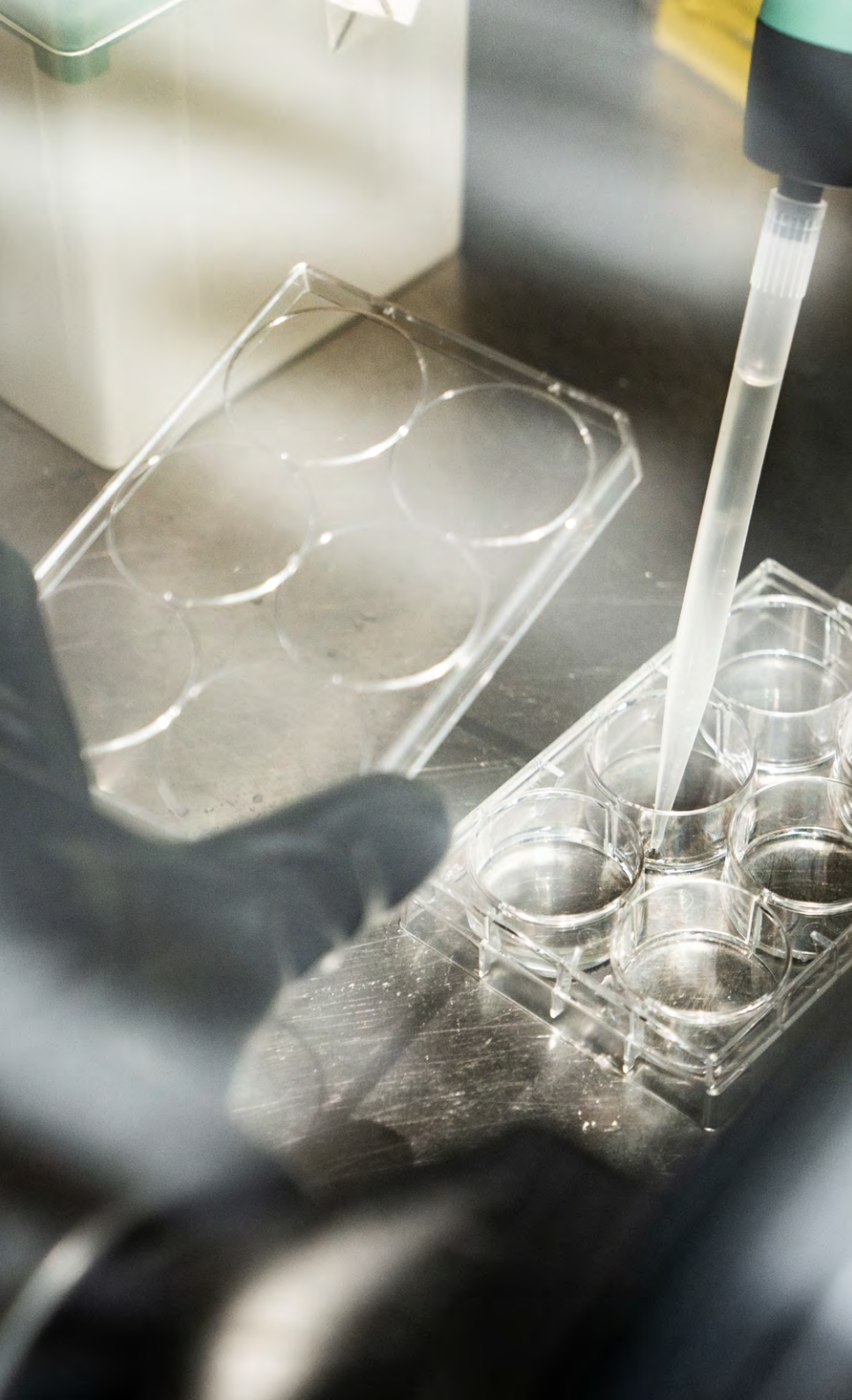


# CORC

ANNUAL  
REPORT  
2025





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# MESSAGE FROM CEO

“ 2025 was a year of change. A new leadership, a new way of working, and a new strategy for the second half of the grant period. On top of that, the final portion of funding within the Center was prioritized and allocated, and three new satellite institutions joined CORC. Meanwhile, excellent research continued, and 2025 brought not only change, but also significant progress in the research fronts of CORC. 2025 also saw the inauguration of our first research pilot facility, the CO<sub>2</sub>-to-Protein plant, setting the standard for others to come.

## mission driven approach

Having joined CORC in March 2025, I am myself new to the Center, though not to the field nor to mission-driven research. However, I am quite amazed at how adeptly the new mission organization was adopted by our PIs and researchers, and how everyone constructively brought their fields of expertise into play, as we developed – and continue to develop – the mission structure for CORC. This same constructiveness and dedication to advancing science and technology was brought into play as the roadmap and strategy were co-developed – an intense but also intensely rewarding process. This laid out the groundwork for our prioritization of the final tranche of funding, which was allocated during the latter part of the year. Transparency in the decision-making process was key to making this a success.

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Lasse Rosendahl, Professor, CORC CEO

The challenges within CCUS are interdisciplinary in nature, so seeing the boost in interdisciplinary collaboration between researchers across our satellite institutions has been very encouraging. For a hybrid center like CORC, with more than 100 researchers across 11 institutions spread over six countries on two continents, it can be a challenge to be truly collaborative across the breadth of the Center and not just have small clusters of fragmented collaboration. Community-building is key to this, and defining a strategy to support this has been a priority during 2025. Collaboration also extends beyond CORC, where we collaborate with others sharing our mission.

A major part of the roadmap work and strategy process has been to extend the scope of CORC to also reach into applied research. This decision was taken to ensure a more coherent support framework leading not just to excellent research results, but also to real-world scale-up and implementation of CCUS technologies; this is an important part of our mission. Bridging the “valley of death” requires research results and technology development to be relatively more mature to have a qualified conversation with the part of the ecosystem that brings in the necessary capital to move further. That being said, the funding and activity distribution of CORC still favors fundamental science, maintaining a “healthy funnel” approach to innovation. The Carbon Forum, held in November, marked the kick-off of this new additional focus on entrepreneurship and innovation, which will really take off next year.

The mission of CORC is uniquely meaningful and important, and it is a privilege to be a part of such a talented, skilled, and dedicated team of researchers and professionals.



# INTRODUCTION OF OUR INNOVATION ADVISORS

As the scope of CORC has been revised with a greater emphasis on innovation and scaling, a new Innovation Advisory Board was formed in 2025 to help guide the development of the necessary innovation governance and framework.

Three advisors form this board, chosen for their experience and expertise in innovative start-ups, deep tech bridging, and venture capital and entrepreneurial mindsets.



**Perry Toms**  
(Calgary, Alberta, Canada)

has three decades of experience in commercializing clean-tech companies and in leading the development of low-carbon projects across utility-scale renewable energy, advanced liquid transport fuels, waste valorization, and projects in the built environment. He has founded a variety of sustainable energy companies with leading edge projects delivering the energy transition since the early 1990s and has worked closely with the finance community through successful private and public equity raises.



**Tommy Ahlers**  
(Copenhagen, Denmark)

is a Danish entrepreneur, deep tech venture capitalist and former Minister for Higher Education and Science, with extensive experience at the intersection of innovation, business, and public policy. As an Innovation Advisor, he brings a practical, forward-looking perspective on entrepreneurship, digital transformation, and institutional change, and a strong ability to bridge the gap between academic research and real-world innovation.



**Andrea Kates**  
(San Francisco, California, USA)

is an innovation strategist and Senior Fellow at MIT, known for her work on how organizations move innovation from early ideas to scalable impact. As an Innovation Advisor, she brings her vast knowledge on overcoming organizational barriers to growth, and her experience with global companies, startups, and public institutions to ensure that our research can translate into promising solutions that scale in practice.



# MESSAGE FROM SCIENTIFIC ADVISORY BOARD

The CORC Scientific Advisory Board consists of seven prolific people stemming from a wide-ranging background in academia. In their 2025 report, the board highlights several key strengths of CORC, particularly the Center's integrated research model and the promising start of its new 2025 structure:

“CORC is a unique research center with strongly engaged academic researchers and institutions, collaborating in a highly interactive way. The projects are chosen for both basic and applied research to work toward solving societal problems, and the Board is impressed by the integrated nature of the Center's efforts, which cover basic to applied science, and yet maintain a clear focus on the four mission areas. This new structure for 2025 is off to a good start. It is one of the clear strengths of CORC. Most efforts like this rapidly devolve into individual research projects run by different faculties, but

CORC's strength lies in its integrated approach, which is improving every passing year.

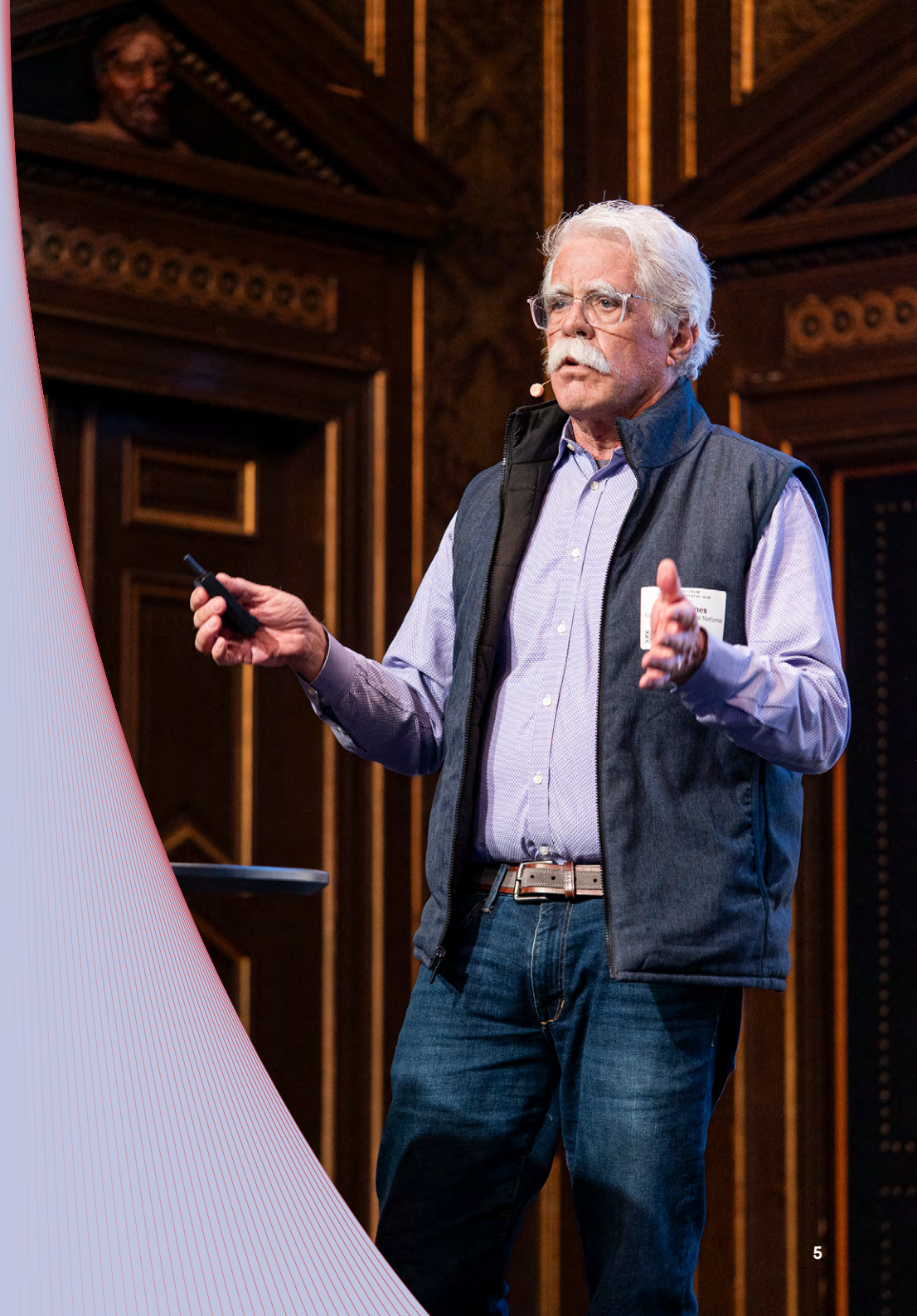
The Center's focus on integrating the efforts of students and postdocs into truly international teams is also a great success. The world needs many more competent scientists and engineers to solve the issue of climate change, and they must understand more than their own narrow field to have real impact. The student and postdoc efforts of CORC are clearly accomplishing that and creating the next generation. These young people will have a much larger impact because of their close coordination with other fields and other nations.”

from basic  
to applied science

**Roger D. Aines**

Energy Program Chief Scientist at Lawrence Livermore National Laboratory and Chairman of CORC Scientific Advisory Board

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# VISION

We imagine a fossil-free carbon cycle, with atmospheric CO<sub>2</sub> restored to safe, pre-industrial levels: A future where CO<sub>2</sub> becomes a valuable resource that drives innovation and supports a thriving, sustainable society, and one we reach by capturing excess CO<sub>2</sub> and transforming it into essential carbon materials that electrification cannot replace.



# MISSION

Our mission is to accelerate climate change mitigation by pioneering breakthrough technologies for carbon capture, sequestration, and utilization.

# MISSION-DRIVEN APPROACH

At CORC, we adopt a mission-driven approach to our everyday work. Our research activities are guided by a shared purpose and a clear understanding of the societal challenge they are intended to address. Rather than organizing research as a set of independent projects, we structure our efforts around interconnected Mission Streams that span fundamental science, enabling technologies, and system-level integration. The structure enables knowledge to move across disciplinary boundaries and supports the convergence of promising research results over time. In doing so, it strengthens our ability to translate scientific advances into scalable and innovative solutions.

Central to this approach is a strong commitment to high-quality research that embraces both scientific exploration and data-driven investigation. Curiosity-driven science forms the foundation of CORC's activities and is essential for sustaining a robust pipeline of ideas and technologies. At the same time, we place emphasis on early consideration of key value measures such as scalability, energy efficiency, and broader system implications. Rather than functioning as strict requirements, these considerations act as reflective tools that support researchers in making informed strategic choices about the potential future impact of their work as it evolves.

This mission-driven framework also shapes how the Center is organized and governed. CORC

operates as a distributed, international research center with a strong emphasis on collaboration, transparency, and shared ownership of the mission. Decision-making processes are designed to balance academic freedom with strategic alignment, enabling researchers to actively contribute to shaping research directions while maintaining coherence across the Center.

**collaboration**  
transparency  
shared ownership

Engagement beyond academia is an integral part of our mission-driven approach. The Center collaborates closely with industry partners, public institutions, and innovation actors to ensure that research is informed by real-world contexts and emerging needs. These interactions foster mutual learning and help bridge the gap between scientific discovery and societal impact, while fully maintaining scientific integrity.

Importantly, we view mission-driven research as an adaptive process. Research priorities are revisited as new knowledge emerges, technologies mature, and external conditions evolve. Continuous learning, reflection, and the willingness to adjust course are considered core strengths within CORC.



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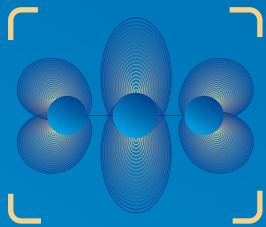
# OUR RESEARCH



# OUR MISSIONS

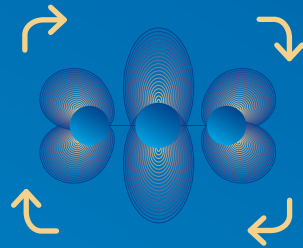
CORC is dedicated to developing scalable, science-based solutions that enable deep and lasting reductions in global CO<sub>2</sub> emissions, alongside durable carbon removal. Our mission is to advance carbon capture, utilization, and sequestration (CCUS) technologies from fundamental discovery to system-level deployment, transforming captured CO<sub>2</sub> into a valuable resource for a sustainable society.

To accelerate impact, we have organized our research portfolio into four Mission Streams, spanning the full innovation chain:



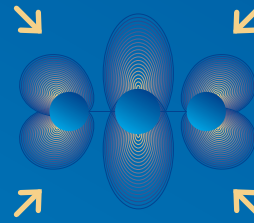
## CAPTURING CO<sub>2</sub>

Developing efficient, low-energy technologies for capturing CO<sub>2</sub> from biogenic point sources, air, and oceanwater.



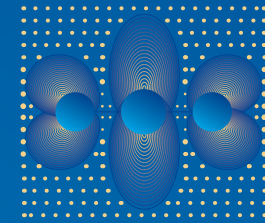
## CONVERTING CO<sub>2</sub>

Advancing chemical, biological, and electrochemical pathways that convert captured CO<sub>2</sub> into valuable products, including polymers, chemicals, carbon materials, proteins and other biomolecules.



## INTEGRATING SOLUTIONS

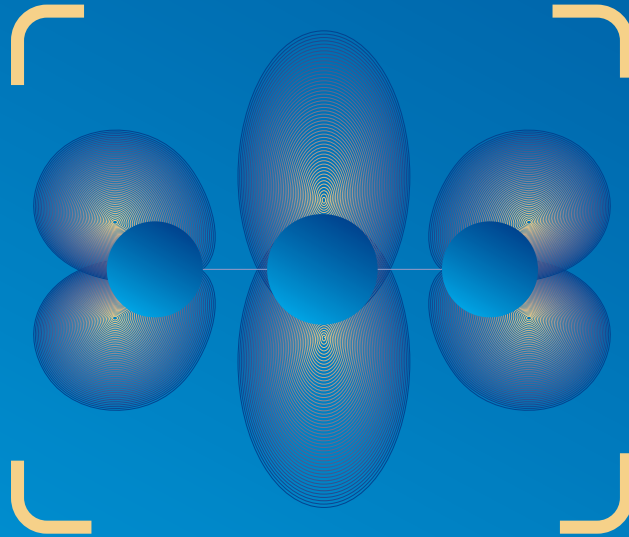
Developing combined capture and conversion systems, processes, and pilot-scale solutions that address real-world constraints related to efficiency, robustness, and scalability.



## MODELING AND DIGITALIZATION

Virtual experimentation and simulation enable the other missions by providing accelerated exploration and understanding of materials and processes, scaled systems, and macro-economic impact.

Together, these Mission Streams create a coherent, mission-driven research framework that enables us to prioritize interdisciplinary collaboration, allocate resources strategically, and deliver technologies with measurable climate impact on the path toward net-zero and carbon-negative solutions.



MISSION STREAM 1

# CAPTURING CO<sub>2</sub>

The Mission Stream on Capturing CO<sub>2</sub> focuses on reducing the cost, energy demand, and environmental footprint of CO<sub>2</sub> capture across different sources and technological environments. Research within this Stream addresses both near-term challenges in applied capture and longer-term exploratory capture concepts.

## THE STREAM IS ORGANIZED AROUND THE FOLLOWING PROGRAMS:

- **PLASTICS TO CAPTURE MATERIALS**  
exploring the upcycling of waste plastics into efficient solid and liquid CO<sub>2</sub> capture materials, thus utilizing a widely available existing resource and mitigating the challenge of unrecycled waste plastic.
- **OPTIMIZING APPLIED CAPTURE METHODS**  
addressing performance improvements and energy penalties associated with established capture technologies.
- **EXPLORATORY CAPTURE METHODS**  
including unconventional approaches such as gas-hydrate capture, enhanced rock weathering, and direct ocean capture.

This Mission Stream has been allocated 119 million DKK in the period 2022–2028.

In the following section we present an example project that encapsulates the essence of the Mission Stream.

These programs comprise

29

CORC-funded projects and

13

externally-funded projects spanning a range of TRLs from 1 to 7.

## CASE HIGHLIGHT

# TURNING PLASTIC WASTE INTO MATERIALS THAT CAPTURE CO<sub>2</sub>

Turning plastic waste into a material that captures CO<sub>2</sub> from the air sounds like a resource-upcycling dream.

But CORC researchers at satellite institution University of Copenhagen (KU), have developed a method to convert one of the world's most used plastics – used to make soda bottles, food containers, textiles and much more – into a resource for carbon capture.

“Basically, we are trying to give trash a second life as something useful for climate change mitigation,” says Margarita Poderyte who worked on the project together with researchers from Associate Professor and CORC PI Jiwoong Lee's group at KU.

The research focuses on the plastic polyethylene terephthalate (PET), which is turned into a new capture material called N1,N4-bis(2-aminoethyl) terephthalamide – or BAETA for short.

CO<sub>2</sub> capture commonly relies on chemicals with a strong ability to bind CO<sub>2</sub>, such as the compound ethylenediamine (EDA), which is relatively inexpensive to produce.

However, in conventional large-scale CO<sub>2</sub> capture plants, its use in liquid form is energy-intensive, difficult to recycle, and challenging to handle due to its volatility and toxicity.

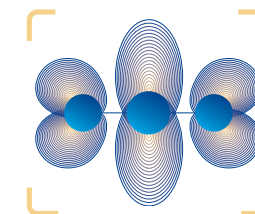
To address these limitations, CORC researchers use waste PET plastic as a support for EDA's carbon-binding ability. When reacted at mild

temperatures, PET and EDA form the BAETA compound – a solid, stable material that is easy to handle and efficiently captures CO<sub>2</sub> from diverse sources.

“It is a very versatile material with many promising characteristics compared to existing technologies. It can be reused with far less energy and works both at room temperature and in the hot air from factory flue-gas stacks,” explains Margarita.

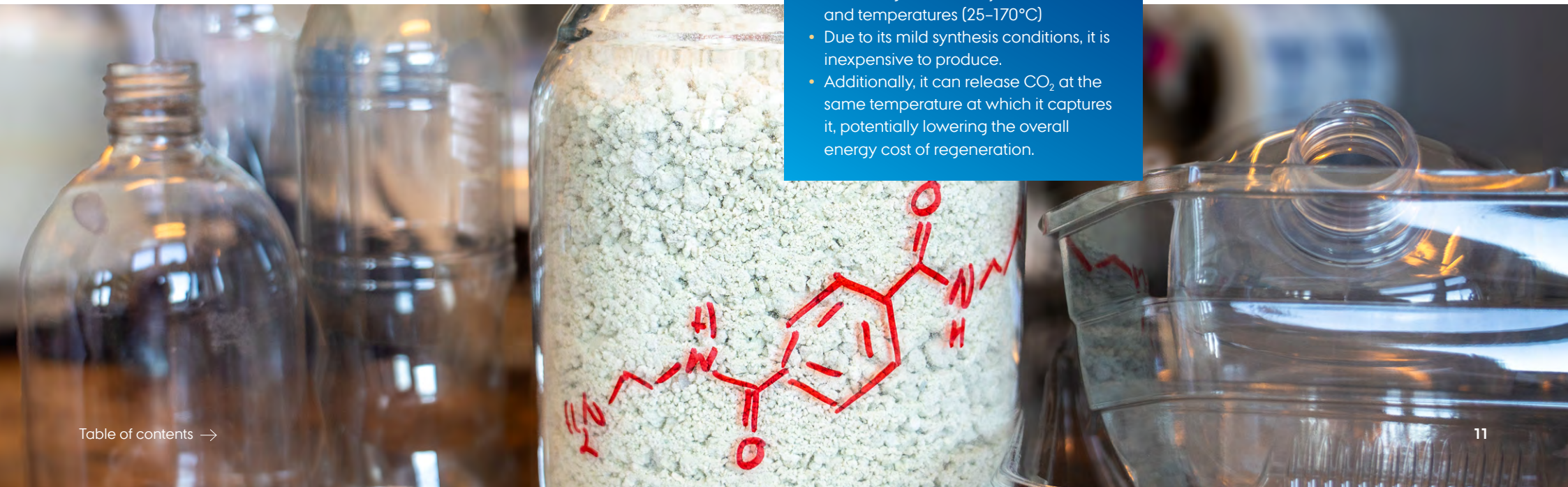
The [study](#) was published in the journal Science Advances.

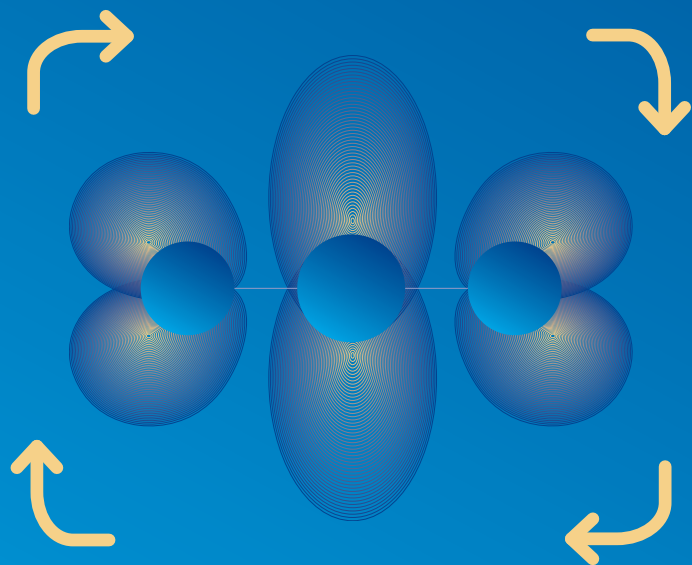
- BAETA operates effectively across a wide range of humidity levels (0–100%) and temperatures (25–170°C)
- Due to its mild synthesis conditions, it is inexpensive to produce.
- Additionally, it can release CO<sub>2</sub> at the same temperature at which it captures it, potentially lowering the overall energy cost of regeneration.



“With all the plastic waste in the world, we are throwing away a valuable resource so little is recycled,” says Margarita.

The team's ambition is ultimately to develop the invention into a venture that is both impactful and economically sustainable. The main challenge now is not with the technology, but rather in securing investment and gathering a diverse team to translate the upcycling of plastic waste to CO<sub>2</sub> capture materials from laboratory research into real-world applications.





MISSION STREAM 2

# CONVERTING CO<sub>2</sub>

The Converting CO<sub>2</sub> Mission Stream addresses the transformation of captured CO<sub>2</sub> into valuable products that can replace fossil-based carbon in key value chains. Research within this Stream integrates chemical, biological, and hybrid approaches to CO<sub>2</sub> conversion.

## THE STREAM COMPRISES THE FOLLOWING PROGRAMS:

- **POLYMERS AND PLATFORM CHEMICALS**

targeting the conversion of CO<sub>2</sub> into chemical building blocks such as ethylene, ethanol, aromatics, and polymer precursors, offering a more sustainable alternative to traditional fossil-fuel based production.

- **CARBON MATERIALS**

focusing on routes such as methane conversion and pyrolysis for conversion of CO<sub>2</sub> via methane into solid carbon materials (graphite, carbon nanotubes) to be used in products, as well as potential carbon storage opportunities.

- **PROTEIN AND OTHER BIO-COMPOUNDS**

advancing microbial and biochemical pathways for converting CO<sub>2</sub> to chemical precursors (e.g., acetate or caproate) and refining subsequent fermentation to proteins for consumption.

This Mission Stream has been allocated 198 million DKK in the period 2022–2028.

In the following section we present an example project that encapsulates the essence of the Mission Stream.

These programs represent

41

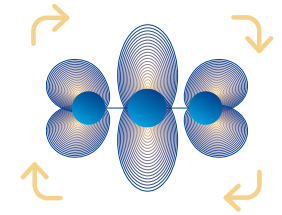
CORC-funded and

26

externally-funded projects, collectively establishing CO<sub>2</sub> as a versatile carbon source and enabling exploration of multiple carbon value chains, with differing time horizons and system requirements.

CASE HIGHLIGHT

# CONVERTING CO<sub>2</sub> TO PROTEIN WITH MINIMAL LAND USE



This year marked the opening of the CO<sub>2</sub>-to-Protein pilot plant at AU Viborg. The new facility paves the way for a new generation of sustainable foods.

It sounds like science fiction: transforming CO<sub>2</sub> from the air or the oceans into food we can eat; but through international partnerships, dedicated researchers, and multiple funding partners, the facility will serve as a real-world prototype of a future protein factory.

The process takes place in two stages: CO<sub>2</sub> and hydrogen are first converted into acetic acid in an oxygen-free reactor, after which yeast cells convert the acetic acid into a protein-rich biomass.

The pilot plant currently uses CO<sub>2</sub> from Aarhus University's nearby biogas facility, but the technology is designed to also use CO<sub>2</sub> from air, seawater, or industrial point sources like flue gas. This opens the door to producing food in places where conventional agriculture is challenging, such as deserts, urban areas, or small islands. All without the need for fertilizers, pesticides, or large quantities of water.

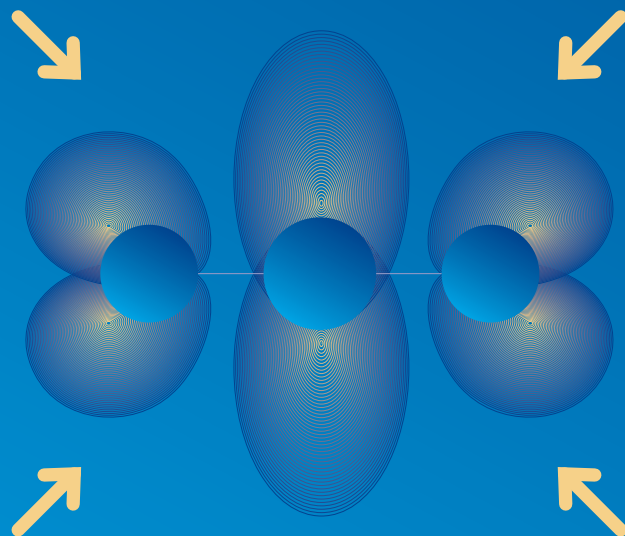
The next step is to explore how the biomass can be purified and applied in food production, and whether this can be done efficiently and cost-effectively – moving it from pilot plant to dinner plate.

In the long term, such proteins could potentially replace eggs or milk in ready-made meals or be developed into entirely new products with a climate-friendly profile.

“We want to create a setup that is internationally attractive and leading – supporting our researchers while also establishing a European powerhouse. With this platform, Danish food research holds something truly unique: a combined strength in sustainable food and protein production, and in carbon capture and utilization (CCU),” says Lasse Rosendahl, CEO of CORC.

2025 also saw new funding for the Acetate Consortium with 162.2 million DKK from Gates Foundation and the Novo Nordisk Foundation, meaning the project is now entering the next phase with an expanded consortium containing additional partners and researchers from both Denmark and the USA. At the same time, the technology will be optimized, and its climate and socio-economic potential will be evaluated in greater detail.





MISSION STREAM 3

# INTEGRATING SOLUTIONS

The Integrating Solutions Mission Stream addresses the interfaces between capture and conversion technologies, with a focus on improving overall system efficiency and reducing energy losses across process chains. Rather than optimizing individual steps in isolation, this Stream emphasizes integration and system-level performance.

## PROGRAMS WITHIN THIS STREAM FOCUS ON:

- **CHEMICAL CAPTURE & MICROBIAL CONVERSION**

integrating conventional amine capture of CO<sub>2</sub> with microbial release to directly convert the CO<sub>2</sub>, bypassing the energy-intensive desorption step and generating a less energy-intensive product.

- **ENZYMATIC CAPTURE & ELECTROCHEMICAL CONVERSION**

using the enzyme Carbonic Anhydrase to facilitate CO<sub>2</sub> capture and electrocatalytic conversion to CO.

This Mission Stream has been allocated 50 million DKK in the period 2022–2028.

In the following section we present an example project that encapsulates the essence of the Mission Stream.

This Stream provides a critical bridge between fundamental advances in capture and conversion, and the requirements for viable, scalable solutions by identifying efficiency increase through shorter energy pathways.

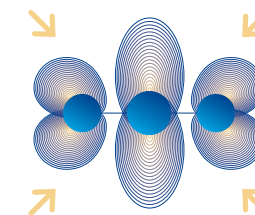
This Stream represents

T2

CORC-funded and four externally-funded projects.

## CASE HIGHLIGHT

# ENHANCING CO<sub>2</sub> TO E-METHANE THROUGH CHEMICAL ABSORPTION AND MICROBIAL CONVERSION



Through intensive cross-disciplinary research efforts, researchers at Aarhus University have made significant progress when it comes to integrating solutions to convert captured CO<sub>2</sub>.

Rethinking CO<sub>2</sub> capture with the concept of Bio-Integrated Carbon Capture and Utilization (BICCU), this project directly couples chemical CO<sub>2</sub> capture with bio-mediated conversion in a fully integrated dual-reactor system to reduce the significant thermal energy required (~3.5 GJ/tCO<sub>2</sub>) to release CO<sub>2</sub> from conventional amine-based capture solvents.

Throughout 2025, CORC researchers tested multiple reactor designs to rapidly convert captured CO<sub>2</sub>.

A modified packed-bed bioreactor was found to outperform bubble-dispersion designs, and three of these systems were installed at AU Viborg. In parallel, the team explored new capture agents, with a focus on biocompatibility and CO<sub>2</sub> capture capability.

Approximately 40 conventional capture agents were tested, and the three most promising candidates were applied in the scaled systems for

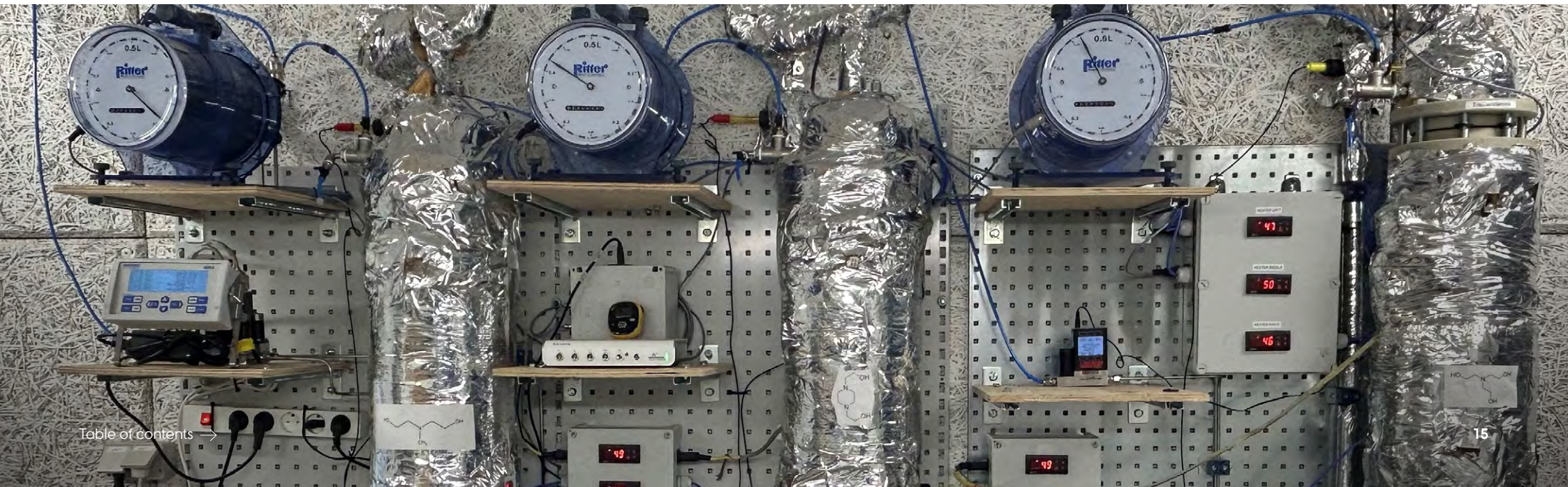
long-term operation (250 days), treating 600,000 L of raw flue gas.

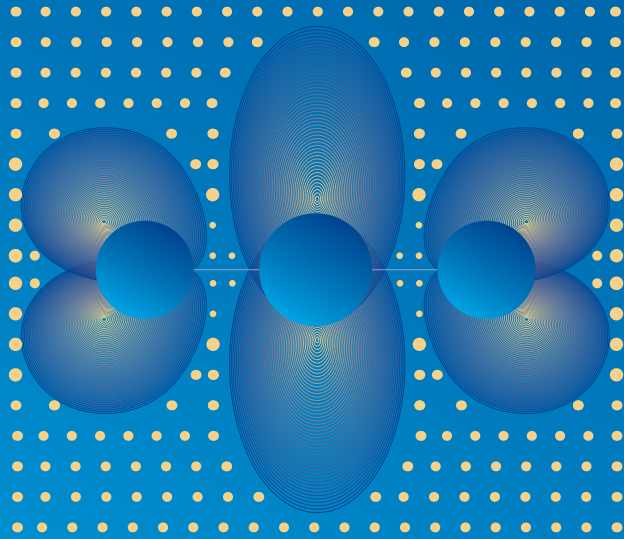
However, as conventional amine-based capture agents exhibit low biocompatibility, novel capture agents are being explored. Around 35 novel non-amine capture agents and ~10 newly synthesized capture agents have already been identified and evaluated.

Looking ahead, researchers will further develop the BICCU bioreactor and system design to integrate the new capture agents. A techno-economic analysis of the full BICCU process

will be completed in 2026 to assess its impact and identify key factors for improving cost-effectiveness.

Technological progress will continue through data-driven discovery of new biocompatible capture agent classes and the synthesis of novel agents. In parallel, researchers will engage with potential industrial partners to scale up the BICCU process to higher technology readiness levels, with the short-term goal of establishing a pilot-scale reactor at an industrial site.





MISSION ENABLER

# MODELING AND DIGITALIZATION

Supporting all Mission Streams is a dedicated Mission Enabler on Modeling and Digitalization, which provides cross-cutting capabilities essential for accelerating learning and improving research decision-making. This Mission Enabler provides shared tools, data, and capabilities, enabling better decisions and accelerated progress.

## KEY PROGRAM AREAS INCLUDE:

- **MATERIALS AND CHEMICAL MODELING**

developing models to support materials and chemical research, enabling new materials development at CORC.

- **PROCESS AND SYSTEMS MODELING**

including digital twins and pilot-factory modeling to generate faster learning loops between experiments and system performance.

- **MACRO SYSTEMS MODELING**

increasing the understanding of the frameworks in which CCUS technologies operate and to understand the requirements for the uptake of technologies within CCUS, including techno-economic analysis, life-cycle assessment, and scale-up considerations.

The Mission Enabler has been allocated 53 million DKK in the period 2022–2028.

In the following section we present an example project that encapsulates the essence of the Mission Stream.

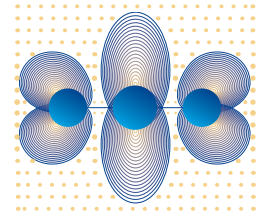
By embedding modeling and digital tools across the research portfolio, this Mission Enabler shortens feedback cycles and strengthens coherence between experimental research and system-level impact.

This Stream represents



CORC-funded projects and four externally-funded projects.

# MODELING THE CARBON CAPTURE AND UTILIZATION TECHNOLOGIES OF THE FUTURE



CORC-researchers located at Potsdam Institute for Climate Impact Research are exploring how new Carbon Capture and Utilization (CCU) technologies could fit into a future low-carbon energy and materials system.

Their work focuses on understanding which CCU technologies show the most promise, and under what conditions they could compete with existing solutions. This means looking closely at costs, energy use, and efficiencies, and asking what levels these technologies would need to reach to become economically viable.

The research covers both short-lived CCU products, such as synthetic gases and liquid

fuels, and long-lived materials like plastics. A key question is how much demand for hydrocarbons and materials will remain in the future, especially in sectors that are difficult to fully electrify, including aviation, shipping, and parts of the chemical industry.

Today, models often point to biofuels and bio-based materials as the main low-carbon options to meet this demand. However, biomass is not an unlimited resource. Producing bioenergy and bioplastics requires land, water, and healthy ecosystems, and it can compete with food production and biodiversity protection.

“These constraints make it uncertain whether bioenergy can sustainably scale to the levels assumed in many models. That is why we are trying to understand the trade-offs better,” postdoc Robert Salzwedel explains.

Together they are examining how bioenergy technologies are currently represented in the energy-economy model REMIND, through testing how robust the results are and comparing them with other modeling approaches such as PyPSA-Eur. At the same time, they are expanding the model to include a broader range of CCU options, including synthetic plastics and advanced bioenergy pathways.

The goal is to create a more realistic picture of how different low-carbon technologies compete and complement each other. This is important for designing climate-neutral pathways that are not only cost-effective, but also environmentally and socially sustainable in the long term.



# INNOVATION & O2 INFRASTRUCTURE



# AMBITION IN INNOVATION

At CORC, innovation refers to the structured progression from scientific discovery to technologies that can contribute meaningfully to climate mitigation. Addressing the climate challenge requires the ability to translate promising research into solutions that can operate at scale. CORC therefore works systematically to accelerate promising CO<sub>2</sub> capture and utilization (CCU) technologies toward higher levels of technological and market maturity, while maintaining a strong foundation in curiosity-driven research.

A central priority for the Center is strengthening the interface between research, innovation, and early-stage scaling. Advancing CCU technologies requires coordinated capabilities that enable emerging discoveries to be evaluated, matured, and positioned within realistic system contexts. To support this, CORC has developed a portfolio-based approach to innovation that allows research outcomes mission streams to be continuously assessed for their potential technological, industrial and societal value. This structure helps identify promising pathways early, while supporting informed prioritization as knowledge develops.

An important part of CORC's innovation capability lies in enabling the systematic maturation of technologies. Through access to pilot-scale infrastructure such as the CO<sub>2</sub>-to-Protein pilot plant, combined with advanced modeling and digitalization tools, and techno-economic and life-cycle assessments, researchers can investigate feasibility, energy efficiency, and system-level implications well before technologies reach deployment stages. These capabilities

allow research teams to explore how new processes might perform under realistic operating conditions and to identify both opportunities and limitations early in the development trajectory.

Early insights of this kind are essential for reducing risk and guiding subsequent research and investment decisions. By integrating scientific experimentation with modeling and system analysis, CORC supports more informed development pathways for emerging technologies.

Scaling carbon capture and utilization technologies also depend on strong collaboration beyond academia. CORC therefore engages actively with industrial partners, innovation actors, and public institutions to ensure that research trajectories remain connected to real-world constraints and emerging market needs. These partnerships contribute to the development of test pilots, validation environments, and innovation consortia that bridge the gap between laboratory research and industrial application.

Technologies mature at different speeds, and not all research outcomes are expected to progress toward application. CORC's role is therefore to maintain a strong and diverse innovation pipeline in which exploratory research, translational activities, and scaling efforts coexist and reinforce one another.

Through this integrated approach, CORC aims to build durable innovation capabilities that support the long-term development and deployment of carbon capture and utilization solutions at scale.

We must unlock what speeds up breakthroughs.

”

Sharper C  
Prosperity  
Entrepreneur





# CONSORTIUMS & PARTNERSHIPS

Achieving societal impact through cross-disciplinary research requires collaboration across disciplines, sectors, and geographies. From its outset, CORC has therefore prioritized building strong partnerships and fostering an open, international ecosystem that connects academia, industry, public institutions, and innovation actors around shared carbon capture and utilization (CCU) challenges.

Our collaborative model reflects the understanding that no single organization can provide the breadth of knowledge, infrastructure, and implementation capacity required to develop and scale CCU technologies. CORC therefore brings together leading academic groups across institutions and countries, creating a distributed research environment where expertise, facilities, and data can be shared and combined. This structure enables research questions to be addressed across multiple levels—from materials and processes to systems and value chains. In our 2025 funding round, approximately 40% of supported projects involved cross-disciplinary collaboration and/or collaboration across institutions.

Engagement with industry is also a central element of CORC's partnership strategy. The Center collaborates with companies across the carbon capture and utilization value chain, including technology developers, energy and materials companies, and downstream users of carbon-based products. These collaborations provide insights into industrial requirements, operational constraints, and market dynamics, helping ensure that research directions remain grounded in real-world conditions. At the same time, industry partners gain access to emerging technologies and specialized scientific expertise.

Beyond bilateral collaborations, CORC actively contributes to building a broader CCU innovation ecosystem. This includes partnerships with startups and scale-ups, participation in international research consortia, and engagement with public authorities, funding organizations, and policy-oriented institutions. Through these activities, the Center functions as a knowledge hub for connecting research, innovation, and policy discussions.

International collaboration is particularly important given the global nature of climate challenges and carbon cycles. CORC works with partners across Europe to address different regulatory environments, resource conditions, and deployment contexts. This global perspective enables technologies and system solutions to be evaluated beyond local conditions and supports the development of pathways relevant across regions and markets.

Partnerships at CORC are characterized by mutual learning and a long-term perspective. Rather than focusing solely on short-term project outcomes, the Center seeks to build durable relationships that enable continuous knowledge exchange, capacity building, and the co-development of solutions over time.

Through this partnership and ecosystem approach, CORC aims to amplify the impact of its research, accelerate innovation, and contribute to coordinated international efforts to advance carbon capture and utilization technologies.

# INFRASTRUCTURE & EQUIPMENT

State-of-the-art infrastructure and shared research equipment are critical enablers of CORC's mission-driven research. Access to advanced experimental facilities allows researchers across the Center to develop, test, and scale CO<sub>2</sub> capture and conversion technologies in a rigorous, efficient, and reproducible manner. As CORC's research portfolio spans multiple disciplines, institutions, and technology readiness levels, a strong and coordinated infrastructure framework is essential to ensure alignment, interoperability, and effective use of resources across the Center.

To strengthen collaboration and transparency, in 2025 we developed a comprehensive, Center-wide overview of available research equipment, designed to make available infrastructure visible and accessible to all researchers across CORC. The current inventory comprises 186 pieces of equipment, spanning 45 laboratories and facilities across participating institutions, and serves as a foundation for improved planning, shared usage, and future investments.

In parallel, we are working toward a unified data framework that supports consistent data handling, documentation, and analysis across laboratories working within the same research fields. This framework, which is the basis of a

newly-funded research project headed by Kim Daasbjerg (Aarhus University) in collaboration with Peter Westh (DTU), Jiwoong Lee (University of Copenhagen), Lars Angenent (University of Tübingen), Troels Skrydstrup (Aarhus University) and Michael V. W. Kofoed (Aarhus University), is a key step toward ensuring data quality, reproducibility, and comparability of results, while enabling more efficient collaboration and accelerated technology development across the Center.

45

laboratories and facilities connected

186

research instruments mapped across CORC



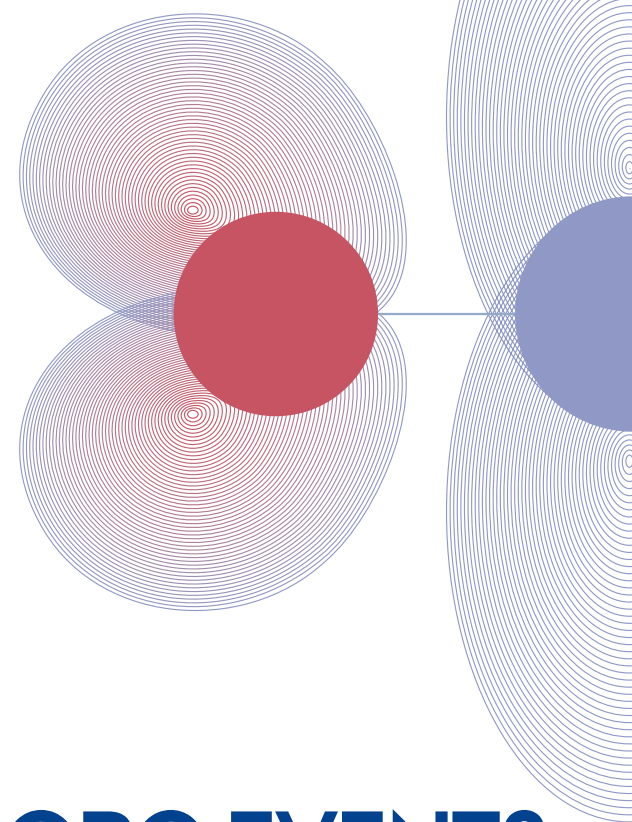
03

# NEWS & EVENTS





Professor,  
Stanford Univer



## CORC EVENTS & COMMUNITY ACTIVITIES

CORC's activities extend beyond research to include a wide range of events and initiatives that foster collaboration, knowledge exchange, and community engagement. Through workshops, seminars, conferences, and public-facing activities, the Center creates spaces where researchers and stakeholders can meet, share ideas, and develop new collaborations.

These initiatives play an important role in strengthening interdisciplinary dialogue and ensuring that the knowledge generated at CORC reaches relevant stakeholders in academia as well as industry. The highlights in the following segment represent a selection of events that reflect the Center's ongoing work and outreach.

# FOLKEMØDE

For the third year in a row, our engagement at Folkemødet proved highly successful and was marked by strong partnerships and engaging debates. Together with partners such as IDA, Dansk Industri, Klimate, Think Tank Europa, and others, we created a program that included a wide variety of topics.

We facilitated panel debates on the future of EU carbon pricing, the scaling of CCUS in Denmark, and the role of research and innovation in the green transition. Our researchers also presented emerging technologies that transform CO<sub>2</sub> and waste streams into fuels, materials, and food proteins, illustrating how carbon can become a valuable resource in a circular economy.

This attracted the interest of several relevant stakeholders and encouraged meaningful dialogue between a diverse audience in the general public and the CCUS ecosystem.

Our location, placed ideally at the harbor, proved highly valuable, giving us strong visibility and easy access to key audiences. The close proximity and good synergy with the neighboring tent – Novo Nordisk Fonden BIOscenen – strengthened the overall experience and flow of visitors.

Over three days we held 15 events with 38 speakers, with activities engaging the audience both inside and outside the tent.

# 15

## EVENTS

debating the future of CCUS

# 38

## SPEAKERS

from research, industry and policy

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# CARBON FORUM 2025

In November, we hosted for the third time our flagship event, the Carbon Forum, in Aarhus. This year's theme focused on fast-tracking climate innovation and moving from hype to hope, while bridging CCUS policy, innovation, entrepreneurship, and venture capital.

At Carbon Forum, CORC connects a strong international array of speakers within the CCUS ecosystem for a full day of talks and discussions with a two-fold purpose: Firstly, the Forum explores bridging the gap between traditional research funding from public and private sources, and capabilities and requirements for commercialization of technologies and processes. Secondly, the Forum supports CORC's ambition to develop an innovation-driven ecosystem with representation of the key stakeholder groups required to create the fossil-free carbon value chains of the future.

More than 100 participants were registered for the event, with the speakers counted as some of the most influential people within CCUS, entrepreneurship and accelerator formats, early seed funding and venture capital, both internationally and within Denmark.

## CARBON FORUM

# EDUCATIONAL ACTIVITIES

To create additional value beyond traditional education, we continued our focus on innovation training for students and postdoctoral researchers throughout 2025.

This year's highlights include a one-day workshop during the annual meeting, designed to train PhD students and postdoctoral researchers in agile ways of working. Inspired by the LEGO® Serious Play framework but tailored to CORC PhDs and postdocs, the workshop focused on collaboration in complex "team-of-teams" settings, with methods directly transferable to CORC's mission-driven structure and work practices.

The Carbon Forum Workshop, held ahead of the Carbon Forum, focused on how CORC moves from vision to execution, and how conditions for scientific and societal breakthroughs in climate innovation are created. Led by CORC Innovation Advisor Andrea Kates, the workshop introduced the Stuck to Scale framework and combined strategic reflection with a site visit to the heating facility in Aarhus called Kredsløb, where participants gained insight into current challenges related to the CCS tender process.

## stuck to scale framework

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# OUR PEOPLE



# BRINGING TOGETHER THE EXCEPTIONAL

The success of CORC is a collective effort. Alongside our many researchers, a wide range of colleagues contribute with invaluable expertise in administration, project management, innovation, and technical support. Their efforts create a foundation that enables our research to grow from the labs to real life.

A particularly important part of CORC's community is our younger researchers – PhD-students, postdocs, and early-career researchers. They play a central role in driving innovation, exploring new approaches, and shaping the future of their field. In the following segment, we highlight some of the researchers, whose collaborative scientific achievements are at the very core of what CORC is about.

33

PIs & FUNDED  
CO-PIs

6

COUNTRIES  
WE WORK IN

100

STUDENTS &  
RESEARCH STAFF

13

OPERATIONS  
STAFF



## OUR PEOPLE HIGHLIGHTS



# RUTH EBENBAUER

Postdoctoral researcher

“ We transform everyday plastic into materials that capture CO<sub>2</sub> ”

Originally from Austria, Ruth Ebenbauer is a postdoctoral researcher in the Interdisciplinary Nanoscience Center at Aarhus University, working with Professor and CORC PI Troels Skrydstrup.

Over the past few years, her research has focused on upcycling consumer plastics into sorbent materials for CO<sub>2</sub> capture.

Sorbents are materials that can bind CO<sub>2</sub> and are key components in carbon capture, utilization, and storage (CCUS) and direct air capture (DAC) technologies.

“In simple terms, we start out with everyday household plastic and transform it into materials that can capture CO<sub>2</sub> through targeted chemical modifications,” she says.

This approach offers a new route to sorbent production and requires the development of novel synthetic methods to achieve the desired CO<sub>2</sub>-absorbing properties.

Currently, most sorbents are derived from fossil feedstocks, making their production energy- and emission-intensive.

“Our work addresses how sustainable sorbents for carbon capture technologies can be produced at scale using existing resources,” she says.

As we aim for net-zero and net-negative emissions, it is crucial to reduce the environmental footprint of the materials used in these technologies. Moreover, it is desirable to move away from fossil and towards renewable resources. Ruth's research in this field shows that consumer plastics can be an alternative chemical resource.

On a personal level, the most important milestone for Ruth in 2025 was completing her PhD and successfully defending her thesis. This included bringing together several CO<sub>2</sub>-related research projects and finalizing manuscripts for publication.

Reflecting on 2025 in CORC, she highlights the dedicated and excellent researchers that are working together on challenging projects from different angles.

“It has been great being part of the CORC. The community makes it possible to easily reach out and collaborate across disciplines, and coming together in meetings and social events within CORC is motivating and inspiring,” she says.

Looking forward, she hopes her work can help pave the way toward a more scalable and sustainable sorbent production and lead to discussions about material demand and suitable resources for future carbon capture technologies.

## OUR PEOPLE HIGHLIGHTS

# ALBERTO ROBAZZA

Postdoctoral researcher

“ Turning captured CO<sub>2</sub> into sustainable protein



As a postdoctoral researcher in biotechnology at the Department of Biological and Chemical Engineering at Aarhus University, Alberto Robazza is working on the upscaling of the CO<sub>2</sub>-to-Protein process at the test site at AU Viborg.

He is exploring how captured CO<sub>2</sub> and renewable energy can be converted into sustainable protein at pilot and industrial scale, while addressing the upscaling and process integration challenges that limit its real-world implementation.

Upscaling the CO<sub>2</sub>-to-protein process addresses both technical and societal challenges associated with climate change and sustainable food production. If successfully scaled, it could support carbon capture and utilization, enable sustainable protein production from CO<sub>2</sub>, and contribute to low-carbon, resilient food systems, while helping overcome the technical bottlenecks that currently limit industrial deployment.

For Alberto and his colleagues, 2025 was an exceptional year marked by several important milestones: The CO<sub>2</sub>-to-Protein pilot plant was delivered to AU Viborg and, after several months of functional testing, they successfully produced the first samples of yeast biomass. At the same time, an analytical laboratory adjacent to the pilot plant was established to support pilot-scale operations and on-site analytical work.

“I also developed a steady-state reactor-scale model incorporating thermodynamic and gas-liquid mass transfer constraints to support pilot plant operations and inform scale-up decisions, with ongoing validation against experimental data, which is pretty exciting,” he says.

Throughout the project, CORC provided a collaborative and interdisciplinary environment that connects fundamental research with applied questions in carbon capture and utilization.

“This has been particularly valuable for situating my work within a broader CCU and climate-relevant research effort,” says Alberto.

Looking ahead, Alberto hopes to continue contributing to advancing CO<sub>2</sub>-to-protein technology, together with other researchers at CORC.

Through this work, he aims to help translate carbon capture into practical carbon utilization, demonstrating that sustainable protein production from CO<sub>2</sub> can be viable at scale.

## OUR PEOPLE HIGHLIGHTS



# EMILY DUNN

Postdoctoral researcher



**Restoring the ocean's capacity to absorb carbon from the atmosphere.**

Emily Dunn's research primarily focuses on gas exchange between the atmosphere and ocean water as a PhD candidate in Professor Harry Atwater's group at the California Institute of Technology (Caltech) in Pasadena, California. As recent efforts for mitigating global climate change have focused on removing carbon dioxide directly from ocean water, Emily furthers this research by investigating carbon dioxide drawdown into decarbonized ocean water.

Her work revolves around using a pH swing – which in essence, is making seawater temporarily more basic, turning CO<sub>2</sub> into stable dissolved carbon that stays in the ocean instead of the air – and then extracting the carbon dioxide from the ocean water and then returning the decarbonized ocean water to the ocean.

This decarbonized ocean water then has renewed capacity to take up carbon dioxide from the air.

For Emily and the CORC-related researchers at Caltech, 2025 marks the completion of the laboratory-based ocean atmosphere research simulator (OARS). The device has controllable convective flow in both the liquid and gas phases, and a water wheel to mimic breaking surface waves, as well as measurement equipment and opportunities for sampling in the design.

"We are very excited to have completed the building of OARS, as it will contribute to the monitoring, reporting, and verification of direct ocean capture," Emily says.

Looking back on her time working with CORC, she emphasizes the importance of the Center's strong research community and international outlook.

"It has been wonderful to be supported by CORC in my research. CORC not only facilitates interdisciplinary research and provides opportunities for collaboration, but also promotes international idea sharing and scientific communication," she says.

Going forward, Emily and her colleagues will continue working on the key research objectives for the OARS project, which are to evaluate the roles of chemical and physical processes on the gas transfer velocity and quantify drawdown under various conditions relevant to direct ocean capture.

## OUR PEOPLE HIGHLIGHTS

# MARGARITA PODERYTĖ

Postdoctoral researcher



“ Giving trash a second life  
for climate mitigation.

Margarita Poderytė has a background in organic chemistry and completed her PhD at the University of Copenhagen, working under the supervision of Associate Professor and CORC PI Jiwoong Lee. Her research focuses on transforming plastic waste into CO<sub>2</sub> sorbents for carbon capture – or in other words:

“Basically, I’m trying to give trash a second life as something useful for climate change mitigation,” she says.

Her work addresses two of today’s most pressing global challenges: plastic pollution and rising CO<sub>2</sub> emissions. While no single technology can solve either problem alone, Margarita’s research bridges the two by developing materials that are both efficient at capturing carbon dioxide and derived from plastic waste. This dual impact makes her work highly promising for real-world applications, as shown in the publication of her team’s work on the CO<sub>2</sub> sorbent BAETA, made from PET waste, in *Science Advances*.

“It was definitely a big moment publishing something we have put a lot of work into it, but what surprised me most was how much interest BAETA received. It’s always cool when something you’ve worked on for quite a while suddenly starts to matter to people outside the research group,” she says.

As part of CORC, Margarita has benefited from a collaborative and supportive research environment, with close interaction between principal investigators and researchers, as well as access to shared equipment and expertise.

“CORC has been a really nice community to be part of, and through CORC events I’ve met a lot of great people – not just smart, but also genuinely fun to be around. And the CORC team is always super helpful when you need connections or advice, which really makes a difference.”

Through CORC, she also completed an external research stay in Professor and CORC PI Lars T. Angenent’s group at the University of Tübingen and built a strong professional network across institutions.

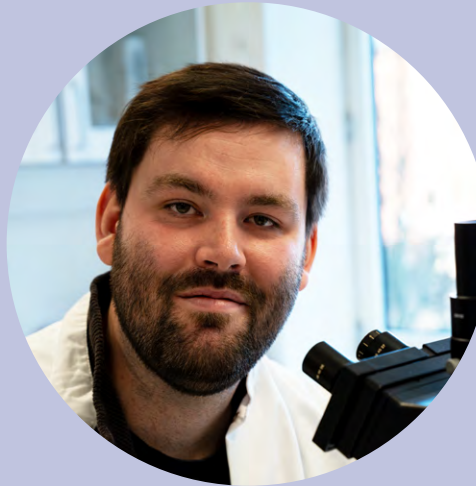
Looking ahead, Margarita hopes her research will contribute to carbon capture at a meaningful scale. If the technology continues to perform as it has so far, she sees potential for real-world deployment, company formation, and job creation. She also hopes her work helps demonstrate how chemistry and materials science can deliver practical climate solutions—and inspire more young people to pursue careers in the natural sciences.

## OUR PEOPLE HIGHLIGHTS

# MADS SIEBORG

Postdoctoral researcher

“Turning CO<sub>2</sub> into renewable methane using existing infrastructure.”



As a Postdoctoral Researcher in the Microbial Conversion Technology research group at Aarhus University, Mads Ujarak Sieborg splits his time between the AU main campus in Aarhus and AU Viborg.

Initially, his research revolved around utilizing off-peak electricity to capture CO<sub>2</sub> from biogas and converting it into renewable methane compatible with the international gas grid infrastructure. While promising, this approach only worked well for highly concentrated CO<sub>2</sub> sources, which make up a very small share of global emissions – and thus he switched focus.

“We needed better synergies, bigger impact, and to use existing infrastructure to avoid some of the barriers for CCU and PtX. That’s where BICCU offers a significant advantage,” he says.

Mads, alongside colleagues from Associate Professor and CORC PI Michael V. W. Kofoed’s group, developed a new approach in 2023 called Bio-Integrated Carbon Capture and Utilization (BICCU), which in essence, captures CO<sub>2</sub> from diluted gas streams and immediately converts it into methane using specialized microorganisms and capture compounds.

By combining chemical capture with biological conversion in one integrated process, BICCU avoids several costly and energy-intensive steps used in conventional technologies.

In 2025, they developed a close collaboration between the chemists at Professor and CORC PI Kim Daasbjerg’s group and the biotechnologists at Michael V. W. Kofoed’s group. This established the beginnings of a framework for tailoring capture agents specifically for microbial CO<sub>2</sub> utilization – a challenge Mads finds CORC uniquely positioned to solve, as it provides an interdisciplinary environment where complex climate challenges can be tackled collaboratively.

“I find it truly inspiring to be a part of a research center like CORC, and working alongside researchers from different disciplines creates a unique environment where complex challenges can be approached from multiple angles at once,” he says.

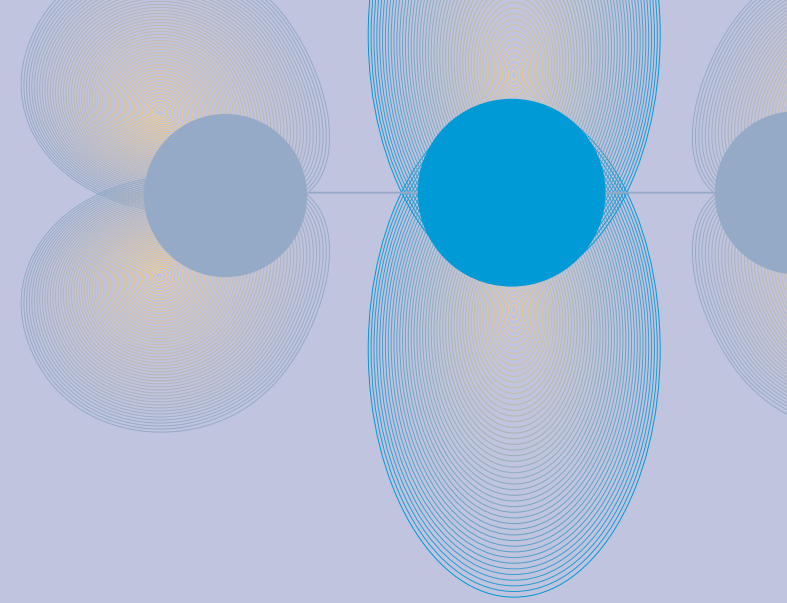
Many existing CO<sub>2</sub> utilization technologies depend on large new infrastructure for hydrogen production, transport, and storage. BICCU, in contrast, produces renewable methane that can be transported and stored using today’s natural gas grid, making the technology faster to deploy at scale.

Looking ahead, Mads hopes his research will help transform CO<sub>2</sub> from a waste product into a valuable resource, supporting the shift toward a circular carbon economy.

# CORC OPERATIONS

CORC Operations is headquartered at Aarhus University, sitting alongside some of the main laboratory spaces for CORC researchers. We are a team, currently of 13 people, with functions ranging from research support to finance, community outreach and communication, innovation, and management. Our main work is to facilitate the operational practices of the research center and to support our researchers and students across the hub and all the satellite institutions.

This past year brought about much change for the center of CORC Operations, with both a change in the executive leadership and an extensive hiring program, designed to ensure the administrative support in CORC is fully staffed and operationally sound.



# AN INTERNATIONAL RESEARCH CENTER

CORC is established as a distributed, international research center, organized through a hub-and-satellite model. The main hub is located at Aarhus University and is supported by satellite research groups at partner institutions in Denmark and internationally. This structure was deliberately chosen to combine strong institutional anchoring with the ability to connect leading experts across disciplines and geographies in pursuit of the CORC mission.

## Main hub & operations



AARHUS UNIVERSITY

Aarhus, Denmark

- Chemistry
- Life science



Copenhagen, Denmark

- Chemistry



Lyngby, Denmark

- Life science
- Modeling



Tübingen, Germany

- Life science



Potsdam, Germany

- Modeling



Edinburgh, Scotland

- Modeling



Lausanne, Switzerland

- Modeling



Milano, Italy

- Modeling



Houston, Texas, USA

- Chemistry



Palo Alto, California, USA

- Chemistry
- Life science



Pasadena, California, USA

- Chemistry

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# REPORTING 06



# ANNUAL FINANCIAL RESULT 2025

## by partner institution (MDKK)

Partner Institutions	Actual 2025
Center Operations	24.5
Aarhus University	30.9
Stanford University	6.8
University of Copenhagen	6.1
University of Tübingen	4.6
Technical University of Denmark	3.9
California Institute of Technology	2.4
Rice University	1.1
Potsdam Institute for Climate Impact Research	0.9
<b>Grand Total</b>	<b>81.1</b>

## by activity (MDKK)

Activity	Actual 2025
Center Operational Expenditures	13.9
Center External Administration	2.8
Center Infrastructure	7.7
Other Strategic Obligations	1.8
Mission Stream: Capturing CO <sub>2</sub>	17.9
Mission Stream: Converting CO <sub>2</sub>	32.0
Mission Stream: Integrated Solutions	2.1
Mission Stream: Modeling & Digitalization	2.8
<b>Grand Total</b>	<b>81.1</b>

## PORTFOLIO OVERVIEW

114

**PROJECTS**  
in CORCs research  
portfolio

33

**PIs**  
& Funded CO-PIs

100

**POST DOCS & PHDS**  
supporting  
projects

96

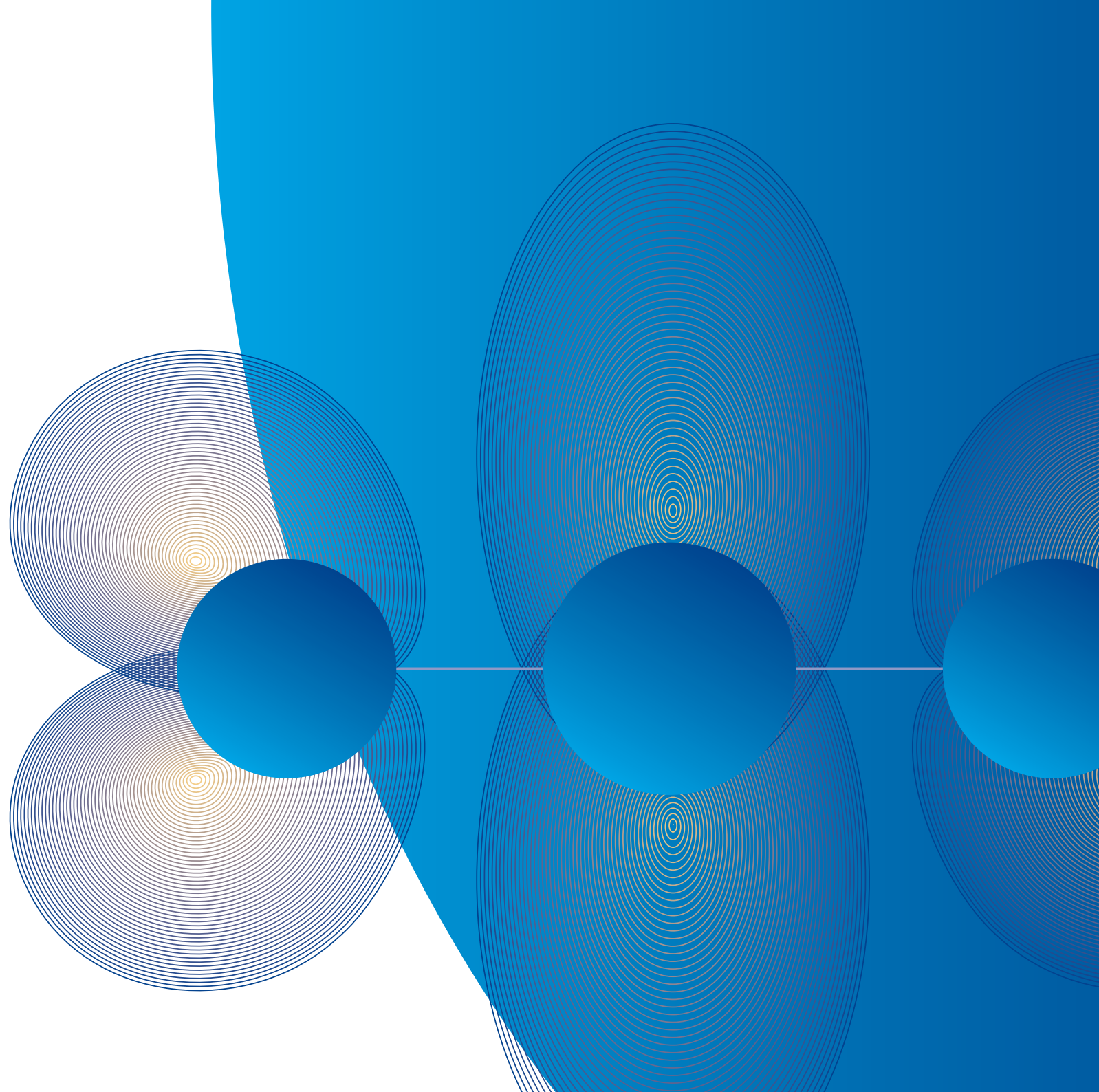
**PUBLICATIONS**  
across CORC  
from 2022-2025

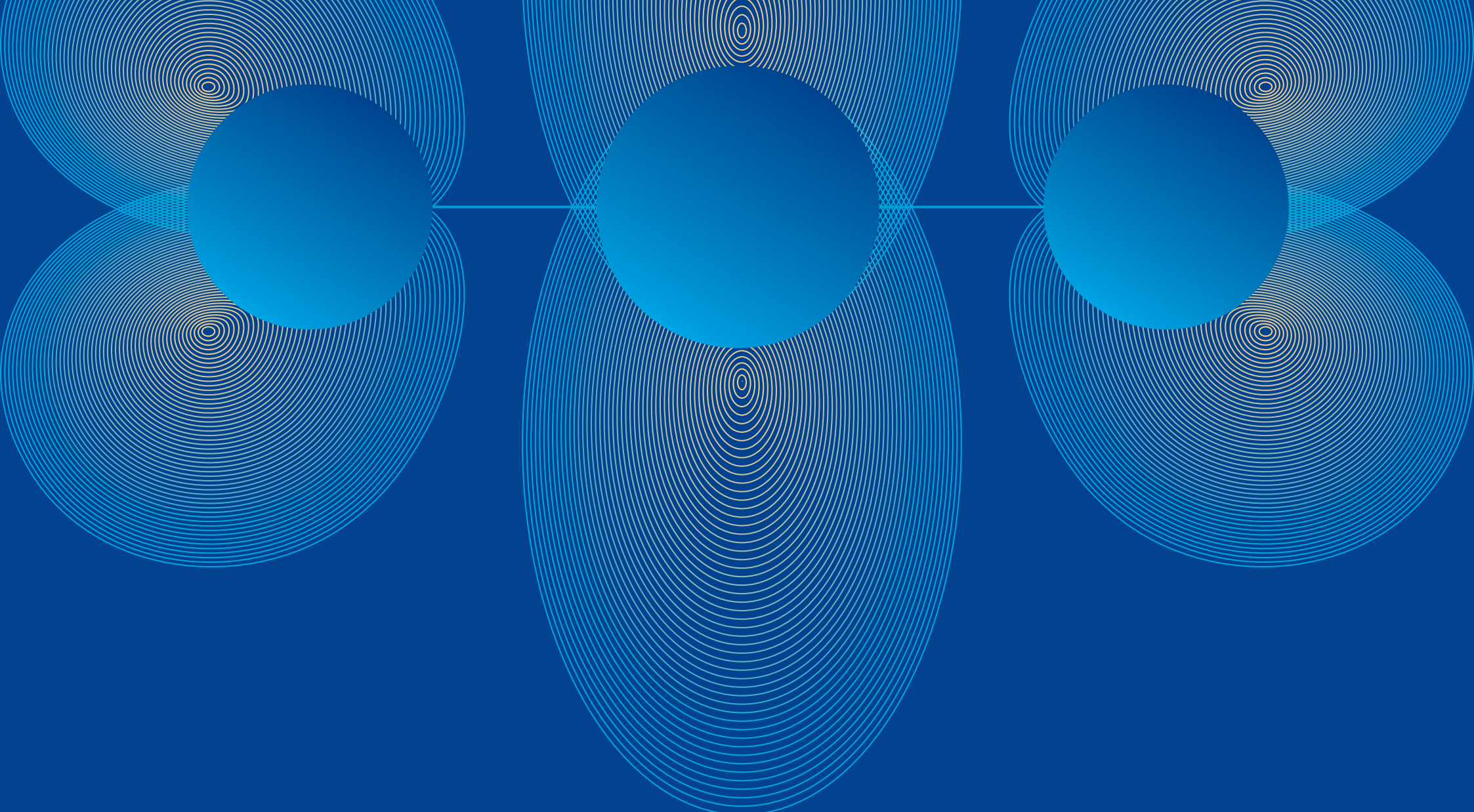
153%

**STRATEGIC  
LEVERAGE**

# INSPIRATION BEHIND THE CORC MOLECULE GRAPHIC

The graphic is inspired by the  $\pi^*$  orbital of  $\text{CO}_2$ ; the lowest unoccupied molecular orbital (LUMO) that accepts electrons during  $\text{CO}_2$  reduction. Populating this orbital activates the molecule by weakening the C-O bonds, enabling the chemical transformations that convert  $\text{CO}_2$  into useful products.





The Novo Nordisk Foundation CO<sub>2</sub> Research Center (C<sub>ORC</sub>)  
Aarhus University  
Gustav Wieds Vej 10C, DK-8000 Aarhus  
[info@corc.au.dk](mailto:info@corc.au.dk)  
[corc.au.dk](http://corc.au.dk)

 Novo Nordisk Foundation  
CO<sub>2</sub> Research Center