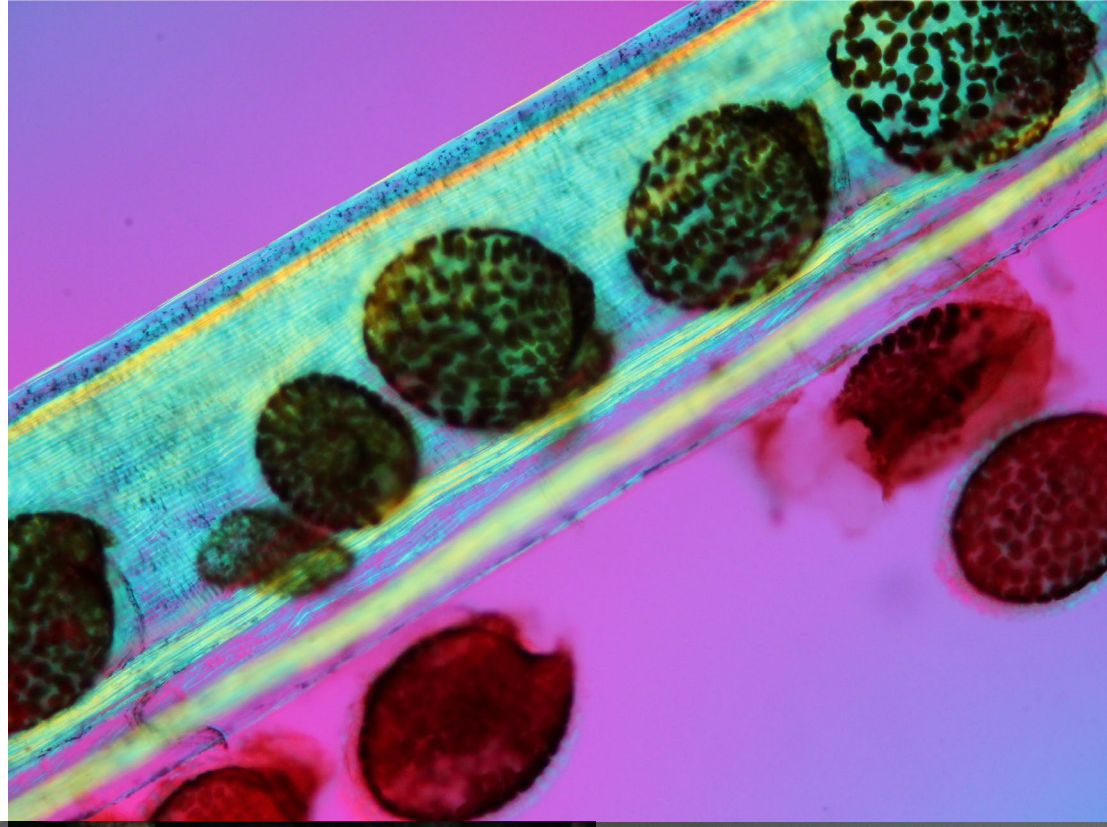
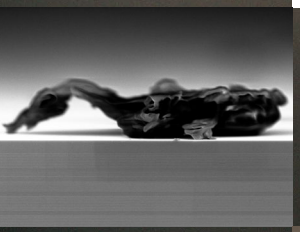
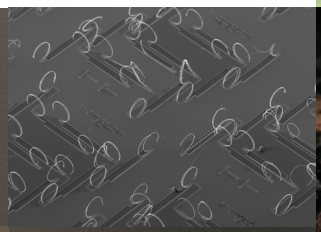
Danmarks
Grundforskningsfond
Danish National
Research Foundation

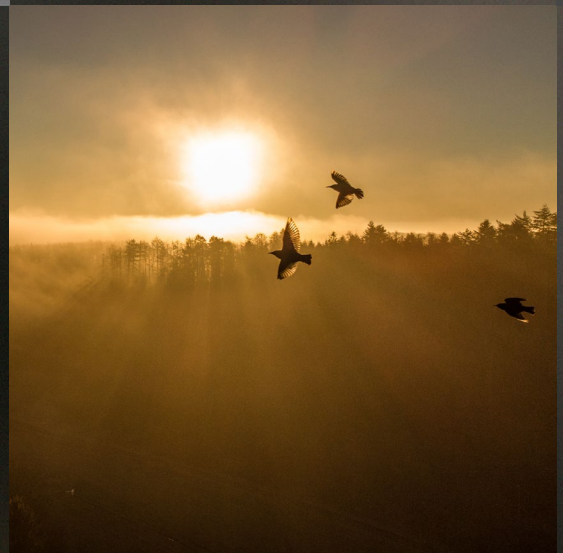
ANNUAL REPORT

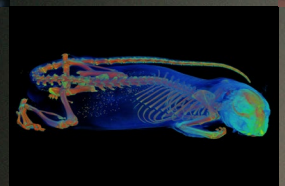
2021











Key figures

	2021	2020	2019	2018	2017
Grants and distributions					
Total grants at year-end, centers, DNRF Chair and Niels Bohr professors	52	49	47	53	59
Annual distributions, million DKK	360.0	335.2	414.4	409.3	384.8
Return on investment					
Bonds and cash, million DKK	-8.7	104.1	140.2	-12.6	128.6
Equities, million DKK	441.4	251.5	484.4	-179.1	293.4
Total return, million DKK	432.7	355.5	624.6	-191.7	422.0
Administrative costs					
Administrative costs including depreciation, million DKK	12.8	12.3	13.9	13.2	11.3
Administrative costs compared to distributions, %	3.6	3.7	3.4	3.2	2.9
Administrative costs per grant, million DKK	0.2	0.3	0.3	0.2	0.2
Capital					
Net capital at year-end, million DKK	5,903.0	5,846.0	5,841.0	5,468.5	6,086.2

See key figures for performance and activity in 2020 at page 47

Content

Preface

Danish excellence in research: World leading without elite universities

Danish research frequently makes international headlines. Despite lacking elite universities such as Oxford and Harvard, we have been able to build world-leading academic environments: environments that break new ground, change our fundamental understanding of the world and set the stage for innovation. Danish research competes with the best universities for publications and talent.

This outcome is not to be taken for granted. Over the course of one generation, Danish research has been transformed. Science has become more international, and in ever larger multi-country and multi-foundation research consortia, Danish researchers increasingly compete for publications and positions head-to-head with global scientific talent. On top of this, we have seen Asian academic environments grow to prominence, entering the competition at full speed.

It is fair to say that the academic culture as such has changed and, with this, the output capabilities of Danish research have also changed. The DNRF asked its grant holders how they experience this development, and this topic was the main theme of the DNRF annual meeting 2021: "Where is the culture of academia headed?"

Read more about the DNRF annual meeting 2021 on page 39.

Danish research has tackled this dynamic development extremely well. Danish researchers are now cited 1.8 times more than average in their fields. DNRF Centers of Excellence — involving flexible, long-term funding of promising and original ideas in all academic fields and led by talented Danish scientists — measure up well to the best universities in the world. Indeed, some DNRF Centers of Excellence are world leading — a testimony to the impressive level of Danish excellence in research.

The DNRF and Centers of Excellence: Forging and refining excellence over 30 years

The DNRF supports basic science with a focus on conducting excellent and groundbreaking research.

The DNRF Center of Excellence (CoE) concept was developed in 1991 with the birth of the DNRF and has been continually fine-tuned in the years since.

Twice — in 2003 and again in 2013 — the foundation was evaluated by international panels of experts[1]. Both times, the panels concluded that the DNRF and its CoE instrument have proven to be extremely successful and have had an enormous impact on the quality of Danish research.

[1] Find the evaluations at dg.dk

“ The societal impact from basic science has many faces and even short timelines

The foundation’s success with the Center of Excellence concept has inspired other foundations in Denmark and abroad to establish similar research programs; thus, its influence reaches far beyond the sphere of the DNRF’s grantees.

In this annual report, we will offer an insight into the centers’ inner workings and accumulated lessons: their principles, organizational setup, interaction with the DNRF, and enduring impact on research, education, and the wider society.

Read more about the DNRF and Center of Excellence instrument on page 18.

We have also taken the opportunity to improve our collection of information about the performance of the DNRF in the form of key indicators for activity and performance. Figures for 2020 are presented on page 47, and figures for 2021 will be available at www.dg.dk in June.

However, it is well-known that such numbers do not do justice to the actual value produced by the researchers. For instance, the effects of a center, by far, outlast the active centers or grants themselves. In this report we give examples of the wider and longer-term value created by two former Centers of Excellence.

Read more about the long-term value of the DNRF Center of Excellence instrument on page 24.

Short-term societal impact of Centers of Excellence

We furthermore highlight the often-overlooked short-term benefits to society produced continually by the centers even though their focus is basic science. The publication “Curiosity Benefits Society,” published in September 2021, demonstrates that basic science benefits society in many ways and often in the short term.

Examples include the counseling of and transfer of knowledge by scientists to private companies to help them foster solutions and products to tackle the green transition; to develop new therapeutic possibilities; and, of course, to contribute to universities’ education of candidates and new researchers and research leaders in public or private environments.

The publication, in short, brings to the fore basic scientists’ contributions to the cultural, economic, and intellectual betterment of society.

In our ongoing dialogue with young researchers, they express a strong interest in benefitting society. “Curiosity Benefits Society” shows them that there are ample opportunities to do just that, both short and long term, in basic science.

Read more about the short-term benefits from DNRF Centers of Excellence on page 29.

Chairs and Pioneer Centers
The DNRF continues to develop and refine research instruments that are in sync with a highly dynamic international research sphere. In 2020, the first DNRF Chair grants – whose aim is to support Danish universities to attract and recruit particularly outstanding researchers from abroad – were endowed. In 2021, two more Chairs were awarded.

Read more about the new DNRF Chairs on page 13.

The first Pioneer Center grant was awarded in 2021. The ambition of the Pioneer Center initiative is to establish excellent research units that conduct basic research with a strategic aim of finding solutions to some of the great societal challenges within two selected areas: artificial intelligence and climate/energy.

As of July 1, 2021, the Pioneer Center for Artificial Intelligence, led by professor Serge Belongie, became the first Pioneer Center; the center has a budget of DKK 350 M over 13 years. We expect that 2022 will see the opening of at least two more Pioneer Centers.

Read more about the new Pioneer Center on page 10.

From our point of view, the first Pioneer Center grant represents an extremely ambitious and promising research endeavor. The Pioneer Center concept is the result of a unique collaboration between the DNRF and four leading private research foundations: the Carlsberg Foundation, the Lundbeck Foundation, the Novo Nordisk Foundation, and the Villum Foundation. It demonstrates the feasibility and potential of the pioneer center idea. This collaboration between private and public foundations has in itself broken new ground, and we wish to express our gratitude to the private foundations for their engagement, persistence, and flexibility.

The Board
Four experienced board members left the DNRF at the end of 2021: Professor Bart de Moor, Professor Christina Moberg, Professor Clivia M. Sotomayor Torres, and Professor emeritus Eero Vuorio have done a tremendous job carrying out the duties of the DNRF board, including the critical appraisal and prioritization of grant recipients and participating in the annual follow-up meetings where grant holders present their progress and discuss challenges and solutions. We are grateful to these board members for their service.

We are pleased to welcome four new members to the board:

- **Janet M. Thornton**, Senior Scientist and Director Emeritus at the European Bioinformatics Institute (EBI)
- **Sirpa Jalkanen**, Professor, Department of Immunology at the Medical Faculty, Turku University, Finland
- **Tine Brink Henriksen**, Professor, Department of Clinical Medicine, Aarhus University, Denmark
- **Christian S. Jensen**, Professor, Department of Computer Science, Aalborg University, Denmark

Read more about the board on page 53.

On May 9-11, 2022, the board will meet to evaluate the 25 applications of interest that have been shortlisted from the 11th round's total of 149 outline proposals. Twenty-five full applications have now been submitted and reviewed, and the board will have the challenging task of deciding which ones of the suggested research programs – all of them very promising – should be included among the DNRF's 11th round Centers of Excellence.

Read more about the expressions of interest from the 11th round on page 21.

In 2021 we welcomed Jesper Petersen as the new minister of Higher Education and Science. He has endeavored to continue the work of the previous minister, Ane Halsboe Jørgensen, pertaining to some of the highly ambitious undertakings, including, among other things, the green transition. We are looking forward to contributing to the accomplishment of those ambitions, together with the public and private research foundations.

Professor Søren-Peter Olesen
CEO of the DNRF

Professor Jens Kehlet Nørskov
Chair of the board of the DNRF

New grants 2021

The Pioneer Center initiative

The establishment of the Pioneer Centers is an ambitious national undertaking initiated by the Ministry of Higher Education and Science and developed in close cooperation (and co-financing) between the Ministry, the Danish National Research Foundation, the Carlsberg Foundation, the Lundbeck Foundation, the Novo Nordisk Foundation, and the Villum Foundation, as well as the universities.

The ambition is to attract the very best individual researchers from around the world and to establish co-funded world-class research centers that carry out basic research aimed at transformative solutions to major societal challenges.

The Pioneer Centers are given considerable freedom in terms of their research, financial continuity, and a long-term grant period.

Using the resources made possible by the grant, the Pioneer Centers, during the grant period, are expected to carry out well-defined, high-risk sub-projects that have a particularly high potential to advance research in their particular fields at the highest international level.

The Pioneer Center initiative is not expected to lead to new grants after 2022.

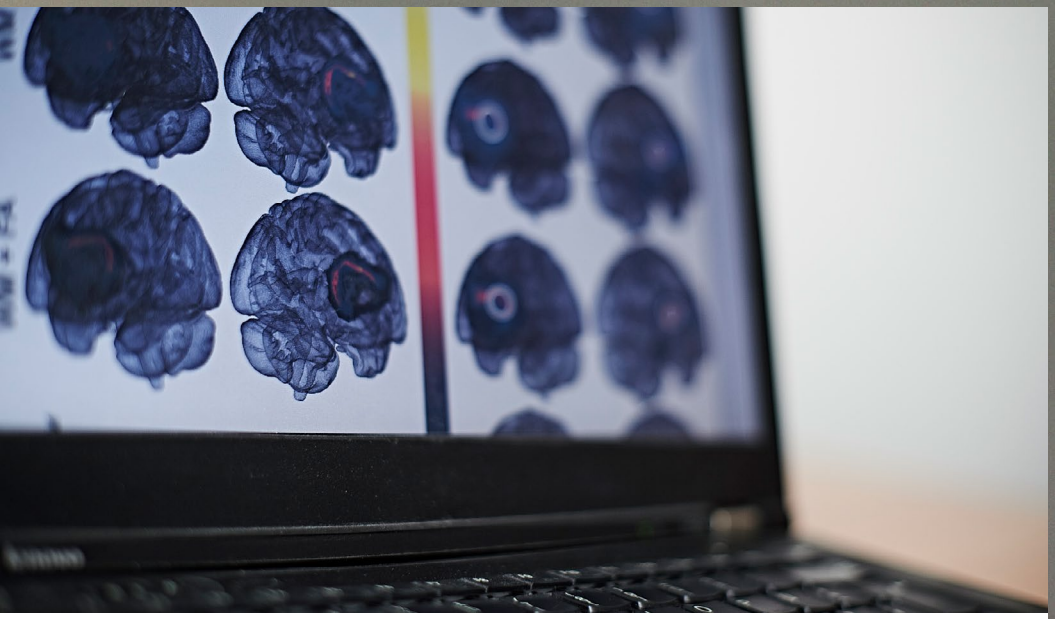
Direct recruitment
A direct recruitment process is used to identify the research directors. This process is inspired by international universities, in particular in the US, where it is widely known and accepted that the most qualified research directors do not actively apply for new positions but are recruited directly. The direct recruitment process is considered necessary to achieve the very high ambitions set for the initiative.

In direct recruitment, candidates are asked directly about their interest in a position as research director. Interested candidates will then be introduced to one or more Danish universities to ensure that the center activities will be well embedded in the Danish research community. When there is a match between candidate and universities, the candidate will be encouraged to work with the anticipated host university and other participating universities to send a phase 1 project description. On the basis of this initial description, the foundations may invite the applicant to write a phase 2 project description, adding detail to the proposal.

The foundations' grant decision is based on the phase 2 project description, peer reviews, and the recommendation of the steering group.

Read more about the Pioneer Center initiative here

Read more about the first active Pioneer Center below.



PIONEER CENTER

Pioneer Center for Artificial Intelligence

Center leader: Serge Belongie
Host institution: University of Copenhagen
Period: 2021 - 2034
Grant: 352 million DKK
Website: di.ku.dk/ai-centre/

The Pioneer Center for Artificial Intelligence pursues fundamental AI research within an interdisciplinary framework. Organized into seven research collaboratories, researchers from the University of Copenhagen, The Technical University of Denmark, IT University, Aalborg University, and Aarhus University co-lead these efforts, along with the director, Professor Serge Belongie.

> “I am both happy and proud that the University of Copenhagen may be expected to host the pioneer centre. It is a unique collaboration between foundations and universities who will unite forces to do research in one of the greatest technologies of our time, one that has the potential to solve a wide range of societal challenges.
>
> Katrine Krogh Andersen, Dean of the University of Copenhagen's Faculty of Science

> If we are to solve some of the enormous challenges facing the world today, there is a need to strengthen basic research in areas of interest, where research breakthroughs are the prerequisite for finding new solutions. For instance, we need to find new ways to store renewable energy if we are to solve the climate challenges while maintaining our standard of living. And artificial intelligence will, in many ways, shape our society in the future. We must help develop the technology and ensure that it is ethically sound.

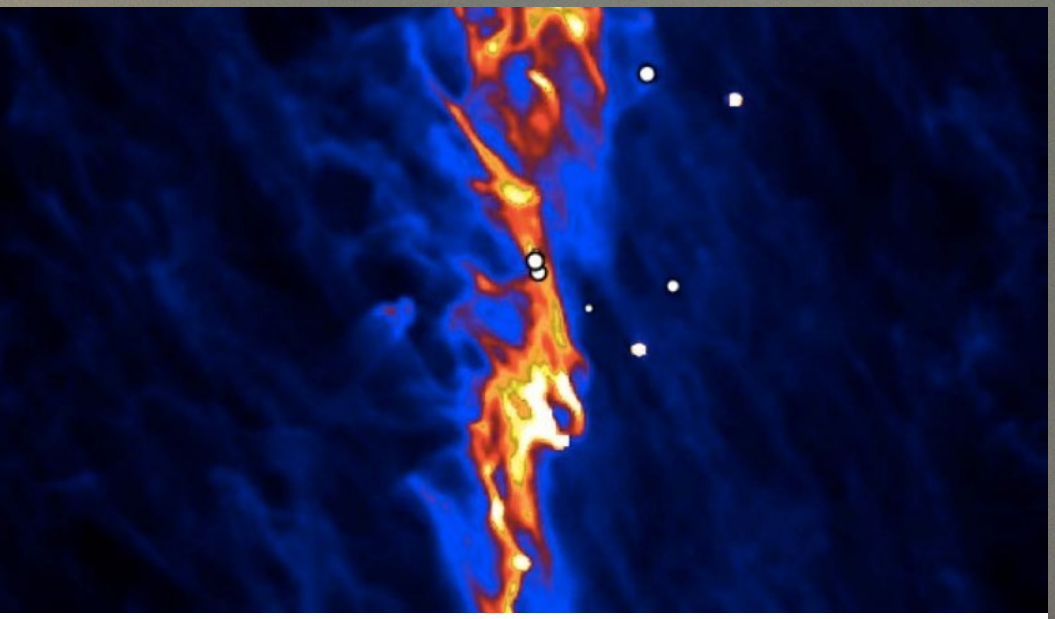
Professor Jens Kehlet Nørskov, chair of the DNRF board

Two new DNRF Chair grants

With the overall purpose of strengthening and enriching Danish research communities, the aim of the DNRF Chair grant is to support Danish universities in attracting and recruiting particularly outstanding researchers from abroad, including Danes wishing to return from an international position.

The objective of the DNRF Chair grant is to support and boost the start-up research activities of potential or newly recruited outstanding tenured professors at Danish universities right from the beginning of their employment.

Read more at dg.dk/en/what-is-the-dnrf-chair



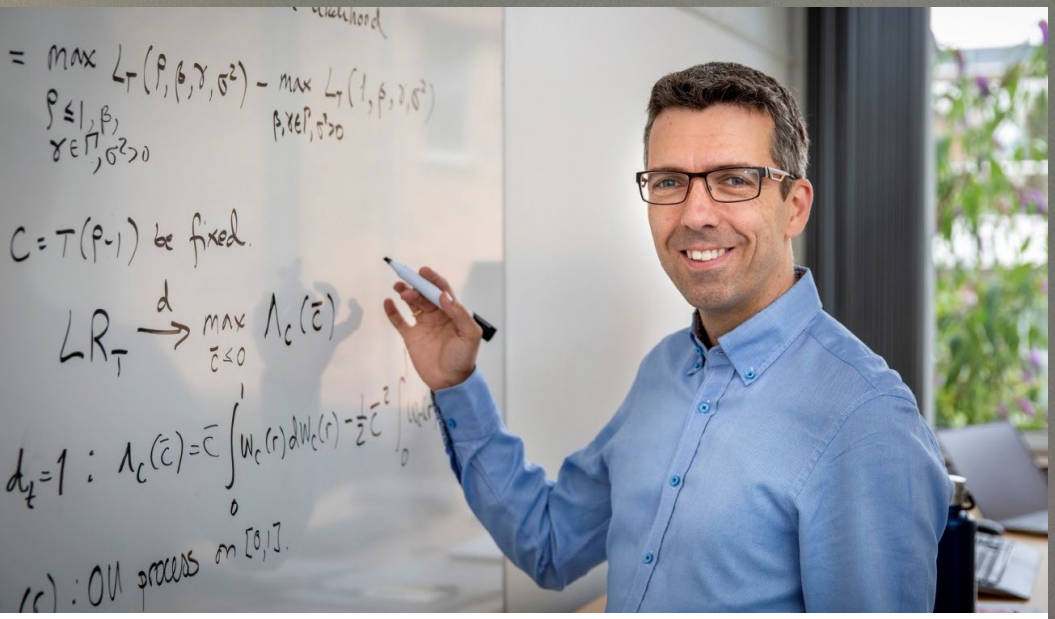
DNRF CHAIR

Anders Johansen

DNRF Chair: Professor Anders Johansen
Host institution: University of Copenhagen
Period: January 1, 2022 – December 31, 2024
Grant: 8.5 million DKK
Website: sites.google.com/view/planet-formation-group

As a DNRF Chair, Anders Johansen will study how terrestrial planets similar to Earth form by rapid accretion of small pebbles, and how they heat up and differentiate during their formation; what is the composition of the first outgassed atmosphere; and what are the conditions for the origin of life on the surface.

> We are proud and happy that with this grant we can recruit a particularly excellent researcher from abroad. The Faculty of Health and Medical Sciences is concerned with research in a broad sense, and that also means research on life's basic conditions and how life was created. Anders, with his research on planet formation and his use of supercomputers, will be able to contribute to this area, not just for the benefit of the GLOBE Institute and our faculty, but for all of the University of Copenhagen.
>
> Dean Ulla Wewer from the University of Copenhagen



DNRF CHAIR

Morten Ø. Nielsen

DNRF Chair: Professor Morten Ørregaard Nielsen
Host institution: Aarhus University
Period: February 1, 2022 – January 31, 2025
Grant: 7.1 million DKK

Econometric methods are used in the analysis of data in economics and related disciplines. These data are typically not from controlled experiments, so it becomes necessary to deal with complicated dependence structures. DNRF Chair Morten Ørregaard Nielsen develops econometric methods that are applicable in these cases, with the overall goal of producing more credible inferences.

> “ The Danish National Research Foundation’s latest funding instrument, the DNRF Chair, is an excellent initiative that really makes a difference when it comes to attracting top international researchers. We are very happy and proud that Professor Morten Ø. Nielsen is returning to Aarhus University and will draw on his vast experience in the leading North American research environments.
>
> Niels Haldrup, head of the Department of Economics and Business Economics at Aarhus University

The DNRF and Centers of Excellence: Forging and refining excellence over 30 years

The Danish National Research Foundation was established in 1991 with the objective of strengthening Danish research. It is explicitly stipulated in the law that the foundation must finance exceptional research at an international level.

Twice — in 2003 and again in 2013 — the foundation was submitted to a rigorous evaluation by international panels of experts. They concluded that the DNRF and its CoE program have proven to be extremely successful and have had an enormous impact on the quality of Danish research. The foundation's success with the Center of Excellence concept has inspired other foundations in Denmark and abroad to establish similar research programs; thus, its influence reaches far beyond the sphere of the DNRF's grantees.

On the following pages, we offer an insight into the instrument's inner workings and accumulated lessons: their principles, organizational setup, interaction with the DNRF, and enduring impact on research, education, and the wider society.

Introduction: Nurturing excellence

The Center of Excellence: More than a sum of its parts

The DNRF's main funding instrument is the Center of Excellence. A Center of Excellence is a creative research environment where ideas are exchanged across generations and disciplines.

The centers differ in size and organization and may consist of one or more research teams, which, armed with ambition and vision, join forces to solve complex research questions. Some centers employ more than 60 people, while others have 15 employees or less. The crucial point is that a center's researchers share an overall idea or vision and work under a well-defined and relevant framework. In short, the whole is greater than the sum of its parts, and complementary competencies are put into play. To date, a total of 120 centers have been awarded grants, and of these, 41 are currently active.

Excellence across academia

Original and ambitious ideas, coupled with top scientific leadership, leverages the potential to become world leading in any academic field

Trust

Risk taking, flexibility and patience nourish originality, output and impact in the long run

Long-term funding

Up to 10 years and DKK 10 M per year allow for ambitious plans to be realized and for interdisciplinarity to develop and break new ground

Commitment

Support and knowledge sharing between centers underpinned by the DNRF promotes the continuous build-up and maintenance of successful centers

Aiming to be groundbreaking
When selecting new Centers of Excellence, the board looks for outstanding researchers with ideas that are ambitious, highly creative, truly novel, and scientifically daring, and that have the potential for producing groundbreaking basic research. Excellence is the main criterion when assessing applications for new centers. The foundation strongly believes that providing talented researchers with long-term funding (for up to 10 years) and giving them considerable trust and freedom in handling the large and flexible grants at their disposal are key factors in a center's success.

The right organization
Centers should have a clear identity and one that is in harmony with the host institution. Grants must be large, but not necessarily of the same size. There are different modes of organization and different resources needed, depending on the field of endeavor and a center's objectives. However, it is important that grants be of a size that makes it possible to create an environment with critical mass for excellent research and research education.

Fine-tuning
Over the years, the Center of Excellence concept has been continually monitored, adjusted, and fine-tuned to ensure that the instrument, at all times, provides the best possible working conditions and organizational set-up. There is no doubt that the Center of Excellence funding instrument has proven to be a tremendous success. Although there is no fixed formula for how to succeed, the foundation believes that several factors play a significant role, some of which are described below.

Long-term funding
First, the DNRF strongly believes that providing the best researchers with long-term funding in a stimulating and creative environment sets the stage for outstanding and groundbreaking research and that this strategy has been crucial to the foundation's success with the Centers of Excellence concept. The foundation's philosophy is that by letting the best people grapple with the problems they are passionate about, we set the stage for real scientific breakthroughs. Often, new ground is broken when specialists from different disciplines have adequate time and resources to develop an understanding of each other's skills and language, allowing them to solve common scientific challenges.

Team effort with strong leadership
A center consists of a strong team of researchers that in a creative and dynamic international research environment will provide an inspirational training ground for young researchers.

Obviously, the center leader is of crucial importance to a center's success, and achieving exceptional results in a Center of Excellence rests on scientific leadership combined with strong research management. Thus, the center leader needs to be not just an outstanding researcher but also a visionary leader. To facilitate good leadership, the foundation, since 2007, has conducted annual courses in research management specifically targeted to issues that a leader of a Center of Excellence typically faces during a center's lifetime. This course has proven to be a good investment, a way of promoting knowledge sharing and a source of inspiration. Furthermore, the foundation regularly conducts retreats for the center administrators to address relevant topics and for the administrators to meet and network with each other.

Commitment and support
Another key to the success of the Center of Excellence program is the foundation's commitment once the centers are established. During annual site visits, the foundation maintains a running dialogue with its grant holders. The DNRF meets with as many center members as possible in order to get a feel for the center's atmosphere, and further meets with the centers' Ph.D. students and post-docs. Usually, the dean and/or the head of department also participate in the meetings. This direct contact with and knowledge of each individual center are one of the absolute strengths of the Center of Excellence instru-

ment, and one that also gives the foundation an important insight into how the funding mechanism works and how it can be best applied in different environments.

Each year, the foundation selects one or more topics to be discussed with the centers at the annual meeting. Post-docs, gender, infrastructure, internationalization, and novel ways of engaging the public in scientific results are examples of topics that have been discussed. The chance to meet with the researchers and discuss topics of importance to them provides an opportunity to obtain a basic understanding of relevant topics and challenges facing the research communities. These meetings help the foundation to continually develop its support and the outcomes of these meetings are shared publicly via an annual publication.

Integration at universities

A grant from the DNRF can have an enormous impact not only on an individual's career but also on the development of an entire field of research. Centers are created as individual units with their own distinct identities, but they are established at and co-funded by existing research organizations (primarily universities), with which they interact closely. The foundation expects the centers to play an important role at the host institutions through educating the next generation of researchers, attracting and recruiting top international researchers, hosting conferences, etc. In particular, the foundation expects that research and new results from the center will spill over to the host environment and that knowledge generated in the centers will be transferred to the next generation of students. Hence, the foundation considers it highly important that research-based training plays a key role in the centers and that center members participate in educational activities.

Many of the Ph.D. students will not continue their careers at the centers, but they will continue to act as ambassadors and to find networking opportunities for the center, regardless of whether the Ph.D. candidate pursues a career in industry or in academia, either in Denmark or abroad. This applies even more to post-docs.

Trust

Funding outstanding research through large grants for up to 10 years enables researchers to conduct new research, pushing and going beyond the existing front lines. Among the centers funded by the foundation, some produce results that are immediately useful, while others pursue pure "blue sky" research. What matters is that the research is considered truly novel and highly ambitious, with a clear potential for generating advancements in knowledge. This strategy has not only led to excellent research but also to unexpected groundbreaking discoveries and immediately useful results, as described in the publication "Curiosity Benefits Society" launched in September 2021. By making long-term investments in outstanding researchers with ambitious ideas, the DNRF is confident that it is investing wisely in our common future.

Status: 11th round of Centers of Excellence

The call for proposals for new Centers of Excellence was launched in the autumn of 2020, and informational meetings were held with researchers at all universities. The foundation has encouraged all fields to submit proposals.

What is a Center of Excellence?
The Center of Excellence initiative, the foundation's flagship program and its primary funding mechanism, has the objective of strengthening Danish research by providing the best possible working conditions and organizational set-up for selected top researchers.

The centers are funded through large and flexible grants for up to ten years over two grant periods of six and four years, respectively. The centers are based at research institutions, the vast majority at universities.

There is no standard template for creating a Center of Excellence. Centers can be established within and across all fields of research. The centers differ in size and organization and may consist of one or more research teams. Some centers become large during the grant period, employing more than 60 people, while others may have 15 members or less.

A Center of Excellence is headed by a center leader who is not only a distinguished researcher able to demonstrate excellence in his or her own research, but also a visionary leader able to create a dynamic and thriving research environment. It is crucial that center researchers share an overall idea or vision and that the center has a well-defined and relevant framework and composition, under which outstanding research of a high international caliber is conducted — research that may be described as ambitious, highly creative, original, scientifically daring, and potentially groundbreaking.

So far, the foundation has established 120 Centers of Excellence. Of these, 41 were receiving funding from the DNRF in 2021.

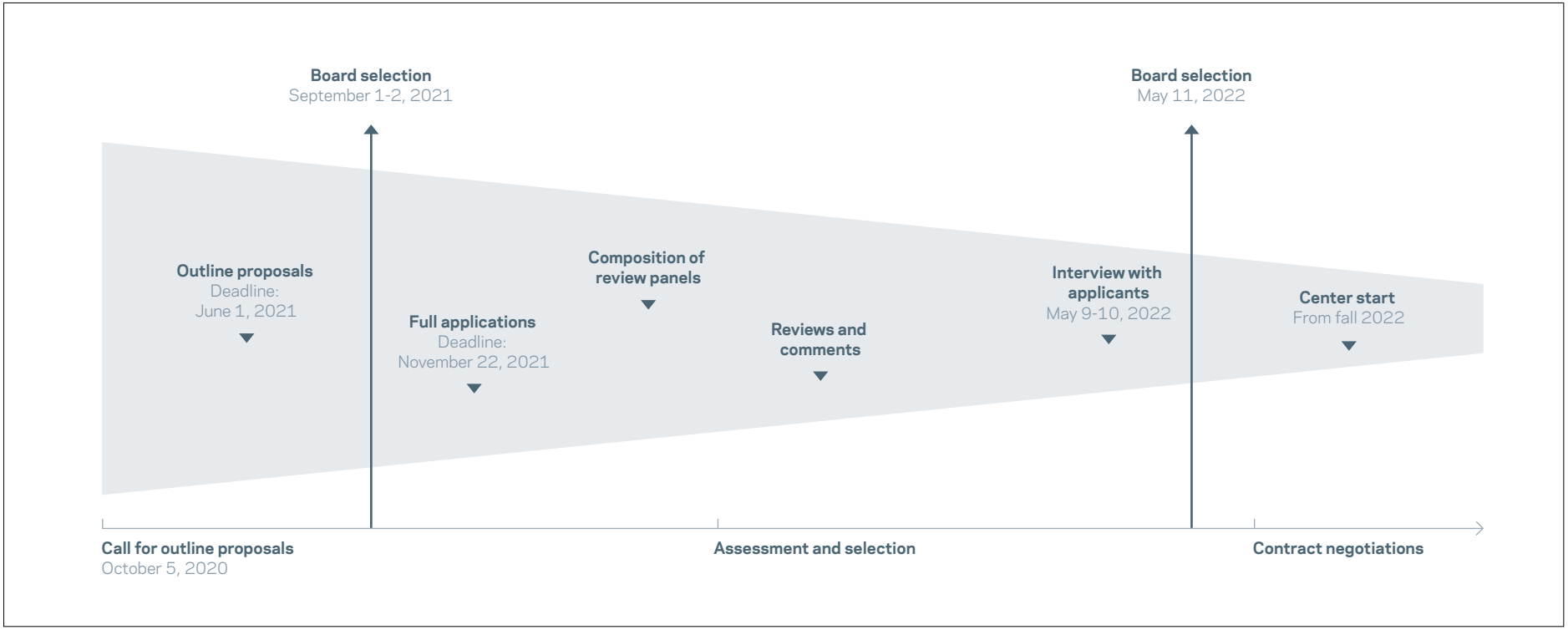
Centers of Excellence are established in so-called application rounds. The first application round was in 1992/93. The 11th application round is currently under way, with the establishment of new centers to be announced in the spring of 2022.

Selection and assessment of Centers of Excellence
Calls for new centers are announced approximately every two-and-a-half years and involve a two-stage application process. In the first stage, researchers from all scientific fields are invited to submit short outline proposals. These proposals are processed solely by the DNRF board. In the second stage, selected applicants are invited to submit full proposals, each of which is reviewed by three international experts within the relevant research areas(s) in an open review process. Prior to the final selection, the board meets with each applicant for an interview.

An overview of the assessment and selection process illustrating the time frame of the current 11th application round is provided in the figure below. For the 11th application round, the DNRF received 149 outline proposals; 25 of those applicants were selected to submit a full proposal by November 22, 2021. At its meeting in May 2022, the board will make its final decision and new centers may start operation by the fall of 2022.

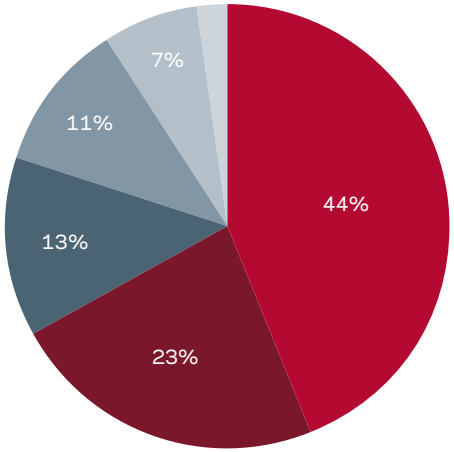
Evaluation criteria
The same criteria are applied throughout the assessment and selection process. The criteria used in the application rounds rest on four pillars and are formulated as follows:

- The research idea is ambitious and original and has the potential for real scientific breakthroughs in the relevant research field(s).
- The proposed center leader has a high standing in the international research community as well as managerial skills.
- The center includes high-quality personnel in order to establish a creative and dynamic international research environment that will provide an inspirational training ground for young researchers.
- The focus, structure, and size of the proposed center are such that they set the stage for scientific ventures that are not feasible within conventional funding from other sources.



Outline proposals distributed based on field of research

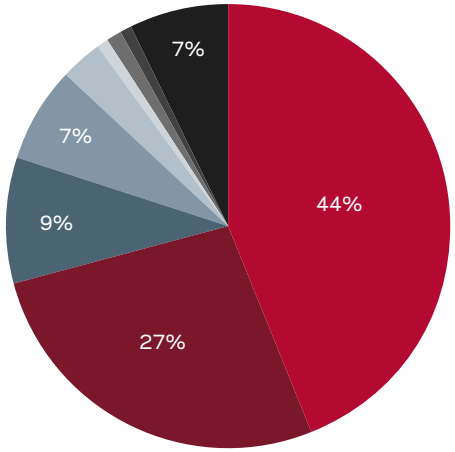
The foundation welcomes proposals from all fields of research. A majority of the centers can be described as interdisciplinary and, therefore, do not readily fit into one of the six fields of research. However, the figure below shows how the applicants of the outline proposals categorize their main research field.



- Natural Sciences (44%)
- Medical and Health Sciences (23%)
- Humanities and the Arts (13%)
- Social Sciences (11%)
- Engineering and Technology (7%)
- Agricultural and Veterinary Sciences (2%)

Outline proposals distributed based on host institution

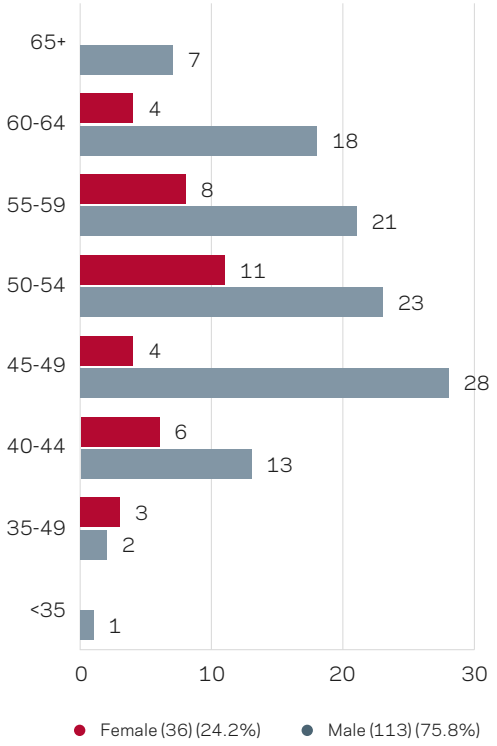
The distribution of the 149 outline proposals in the 11th application round based on host institution does not differ much from that in previous rounds.



- UCPH (44%)
- AU (27%)
- DTU (9%)
- SDU (7%)
- CBS (3%)
- AAU (1%)
- RUC (1%)
- ITU (1%)
- Other (7%)

Outline proposals distributed based on Gender and age

In the 11th application round, the distribution of the outline proposals based on gender and age is shown in the figure.



The less visible tail of impact from DNRF Centers of Excellence

It is a common assumption about basic science that its effects appear in subtle ways and in the longer term, and that they can be transformative.

DNRF Centers of Excellence, while small in the context of global academic fields, are meant to be large enough to produce groundbreaking results; to be agenda setters and potentially world leaders within this agenda; and to have lasting effects.

Previous evaluations of the DNRF suggest that this is indeed the case. Most DNRF Centers of Excellence succeed in delivering on their promised potential and mid-term evaluations suggest that they are, after five years, seen as leaders in their fields. This is also in line with the centers' impressive publication output. Furthermore, we can see their success mirrored in the comprehensive production of short-term benefit in terms, e.g., of the education of students and new generations of researchers, as well as their innovation and their advice to companies, authorities and cultural institutions.

Read more about this on page 29.

But, of course the effects, by far, outlast the centers or grants themselves; as a consequence, when we review the performance of the active centers, we capture only a part of the value they give rise to.

To get an impression of this less visible tail of centers' impact, on the following pages we illustrate some of the significant lasting effects of two previous centers. They are very different: One pursued research in the social sciences and began operation in 1993 as one of the first DNRF Centers of Excellence; the other pursued research in the life sciences/natural sciences and began operation in 2007 as one of the centers opened after the fifth round.

The two examples cannot necessarily be seen as typical in any given sense; however, we have no reason to believe that they were any more or less productive than other centers that operated in the past. Hence, the story of these centers serves to give an impression of the less visible tail of the benefit created by any given DNRF Center of Excellence.

“ But, of course the effects, by far, outlast the centers or grants themselves; as a consequence, when we review the performance of the active centers, we capture only a part of the value they give rise to.

IN BRIEF

Economic Policy Research Unit (EPRU) (1993-2005)

EPRU was elected in the first round of Centers of Excellence funded by the Danish National Research Council. EPRU gathered some of the best Danish economic researchers at the time with the purpose of strengthening the scientific basis for the evaluation of economic policies.

A main contribution of the centre was to construct a new computable general equilibrium model of the Danish economy designed to evaluate the economic effects and the intergenerational distribution effects of structural economic policies like tax policy and labour market policy and to assess the long-run sustainability of fiscal policy against the background of population ageing. This EPRU model formed the basis for the later development of the more elaborate DREAM model of the Danish economy which has been used for economic policy analysis by the Ministry of Finance, the Danish Economic Council and the Danish Welfare Commission, among others.

> “ The modelling expertise for which EPRU laid the groundwork has most recently resulted in the development of the dynamic GREEN REFORM model of the Danish economy

The modelling expertise for which EPRU laid the groundwork has most recently resulted in the development of the dynamic GREEN REFORM model of the Danish economy which describes the effects of economic activity on greenhouse gas emissions and emissions of other pollutants; a research effort highlighted by the OECD as an example for other countries to follow. EPRU research has also contributed to making Public Economics, as a basic research field, a Danish research stronghold.

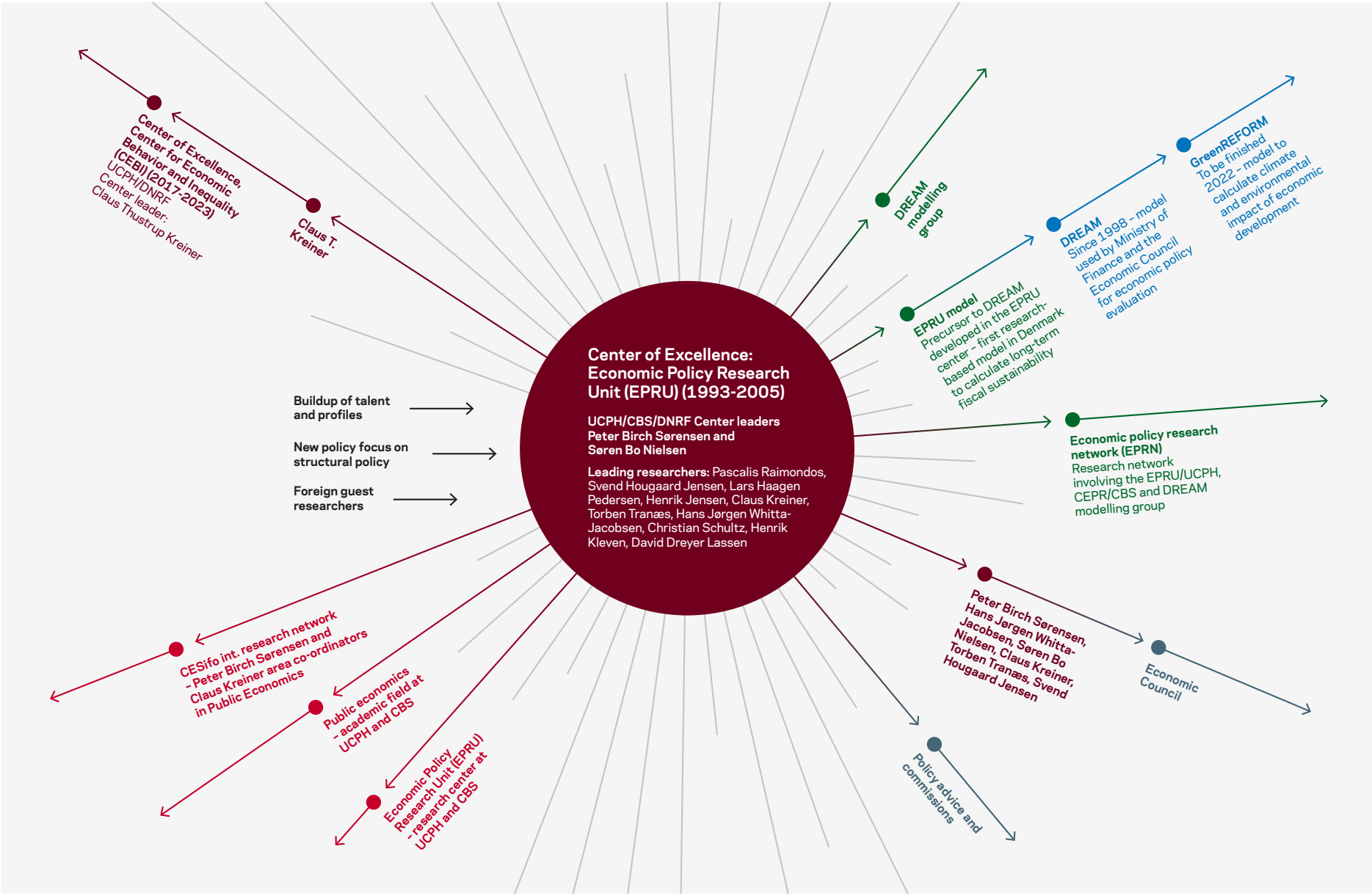
The tail of long-term effects of the EPRU-center is illustrated in the graphic on the next page.

Peter Birch Sørensen

Peter Birch Sørensen is a professor of economics at the University of Copenhagen. He is an International Research Fellow in the CESifo research network and a member of the Royal Danish Academy of Sciences and Letters.

He was the director of the Economic Policy Research Unit, supported by a grant from the Danish National Research Foundation in the period 1993-2005. From 2004 through 2009 he was head chairman of the Danish Economic Council, and from 2007 through 2009 he also chaired the Danish Environmental Council. From 2012 to 2014 he served as chairman of the Danish Productivity Commission, and from 2014 through 2018 he was chairman of the Danish Council on Climate Change.

He has served on several international public policy committees and has acted as a consultant on tax policy to the OECD, the International Monetary Fund, the European Commission, and several national governments. Since 2021 he has been a member of the Danish government’s Expert Group on Green Tax Reform and the Norwegian Tax Reform Committee.


Center of Excellence: Economic Policy Research Unit (EPRU) (1993-2005)
UCPH/CBS/DNRF Center leaders Peter Birch Sørensen and Søren Bo Nielsen
Leading researchers: Pascalis Raimondos, Svend Hougaard Jensen, Lars Haagen Pedersen, Henrik Jensen, Claus Kreiner, Torben Tranæs, Hans Jørgen Whitta-Jacobsen, Christian Schultz, Henrik Kleven, David Dreyer Lassen
Buildup of talent and profiles
New policy focus on structural policy
Foreign guest researchers
Center of Excellence, Center for Economic Behavior and Inequality (CEBI) (2017-2023)
UCPH/DNRF
Center leader:
Claus Thustrup Kreiner
Claus T. Kreiner
DREAM modelling group
EPRU model
Precursor to DREAM developed in the EPRU center – first research-based model in Denmark to calculate long-term fiscal sustainability
DREAM
Since 1998 – model used by Ministry of Finance and the Economic Council for economic policy evaluation
GreenREFORM
To be finished 2022 – model to calculate climate and environmental impact of economic development
Economic policy research network (EPRN)
Research network involving the EPRU/UCPH, CEPR/CBS and DREAM modelling group
Peter Birch Sørensen, Hans Jørgen Whitta-Jacobsen, Søren Bo Nielsen, Claus Kreiner, Torben Tranæs, Svend Hougaard Jensen
Economic Council
Policy advice and commissions
CESifo int. research network – Peter Birch Sørensen and Claus Kreiner area co-ordinators in Public Economics
Public economics – academic field at UCPH and CBS
Economic Policy Research Unit (EPRU) – research center at UCPH and CBS

IN BRIEF

Centre for Membrane Pumps in Cells and Disease (PUMPkin) (2007-2017)

PUMPkin started in 2007 as part of the fifth round of Centers of Excellence funded by the Danish National Research Foundation. Its bold idea was to reach a deep mechanistic understanding of an important class of proteins – membrane pumps – by characterizing their molecular structure and correlating this with their function.

> “ The numerous scientists trained at PUMPkin have subseqently established many new research programs, centers, and private research organizations

Combining promising techniques such as X-ray crystallography, bioinformatics, molecular biology, and animal and plant models and applying them across humans, animals, and plants, the center became a world leader in the field of so-called P-type ATPases and created a burst of further research and innovation and created stepping stones for many new initiatives.

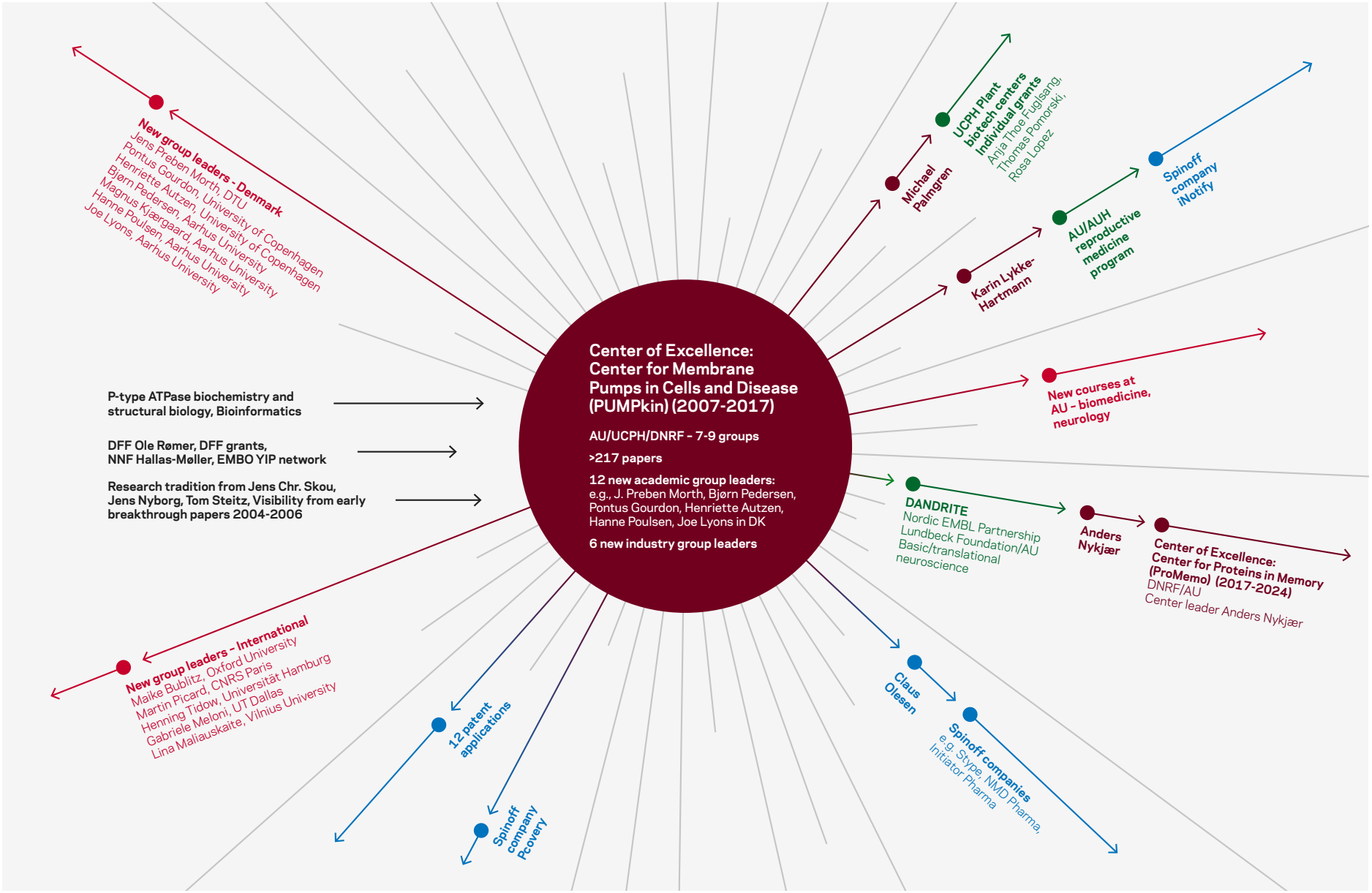
The research into membrane proteins builds on a strong Danish research tradition initiated by the Nobel laureate Jens Christian Schou. The numerous scientists trained at PUMPkin have subseqently established many new research programs, centers, and private research organizations working on membrane proteins at the highest international level.

The tail of long-term effects of the PUMPkin-center is illustrated in the graphic on the next page.

Poul Nissen

Poul Nissen is Professor of protein biochemistry at Aarhus University. He received his Ph.D. in 1997 from Aarhus University, with Jens Nyborg as his supervisor, followed by a post-doctoral stipend from the Danish Council for Independent Research (DFF) to work at Yale University with Peter Moore and Tom A. Steitz (Nobel Prize 2009). In 2001 he established his own lab at Aarhus University based on an Ole Rømer stipend from the DFF. He was the director of the Danish National Research Foundation’s PUMPkin Center of Excellence 2007-2017, and is currently the director of DANDRITE of the Nordic EMBL Partnership and of the national research infrastructure of cryo-electron microscopy (EMBION).

Nissen’s research focuses on the structure, dynamics, and mechanism of membrane transport proteins and also addresses the ultrastructural organization in biomembranes. Other major topics include P-type ATPases, including ion pumps and lipid flippases, and sodium-dependent transporters. His laboratory investigates the formation of action potentials, regulation of calcium signaling, and synaptic functions.


Center of Excellence: Center for Membrane Pumps in Cells and Disease (PUMPkin) (2007-2017)
AU/UCPH/DNRF - 7-9 groups
>217 papers
12 new academic group leaders:
e.g., J. Preben Morth, Bjørn Pedersen, Pontus Gourdon, Henriette Autzen, Hanne Poulsen, Joe Lyons in DK
6 new industry group leaders
P-type ATPase biochemistry and structural biology, Bioinformatics
DFF Ole Rømer, DFF grants, NNF Hallas-Møller, EMBO YIP network
Research tradition from Jens Chr. Skou, Jens Nyborg, Tom Steitz, Visibility from early breakthrough papers 2004-2006
New group leaders - Denmark
Jens Preben Morth, DTU
Pontus Gourdon, University of Copenhagen
Henriette Autzen, University of Copenhagen
Bjørn Pedersen, Aarhus University
Magnus Kjærgaard, Aarhus University
Hanne Poulsen, Aarhus University
Joe Lyons, Aarhus University
New group leaders - International
Maike Bublitz, Oxford University
Martin Picard, CNRS Paris
Henning Tidow, Universität Hamburg
Gabriele Meloni, UT Dallas
Lina Maliauskaite, Vilnius University
12 patent applications
Spinoff company Pcovery
Michael Palmgren
UCPH Plant biotech centers
Individual grants
Anja Thoe Fuglsang,
Thomas Pomorski,
Rosa Lopez
Karin Lykke-Hartmann
AU/AUH reproductive medicine program
Spinoff company iNotify
New courses at AU - biomedicine, neurology
DANDRITE
Nordic EMBL Partnership
Lundbeck Foundation/AU
Basic/translational neuroscience
Anders Nykjær
Center of Excellence: Center for Proteins in Memory (ProMemo) (2017-2024)
DNRF/AU
Center leader Anders Nykjær
Claus Olesen
Spinoff companies
e.g. Stype, NMD Pharma, Initiator Pharma

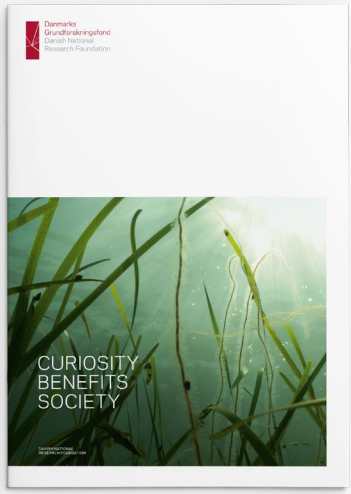
Short-term societal benefit goes hand-in-hand with DNRF Centers of Excellence

How does society benefit when its smartest citizens spend many years and lots of money going down new roads in search of understanding how the world is organized down to the smallest detail? Since 1991, the Danish National Research Foundation has supported research that, in the long run, has played a central role in meeting many of the challenges facing society. But what about the usefulness of basic research to society in the short term? In a new publication, the Danish National Research Foundation illustrates that there are indeed significant gains in the short run – a fact that is not surprising but rarely in focus.

In its new publication "Curiosity Benefits Society" launched in September 2021, the foundation demonstrates how curiosity-driven research affects society here and now, and not just in the long term. In the long term, basic research leads to patents, new products, growth, transformation, and industrial activity. However, it also continuously enriches society through a variety of activities, a statement that may surprise those who imagine that basic science does not affect day-to-day societal issues and practices.

Søren-Peter Olesen, CEO of the Danish National Research Foundation, comments: "At the Danish National Research Foundation we are very impressed with the intense dedication shown by researchers. The results of this dedication are directly useful to society, and we are very proud to highlight examples of this in the publication."

The main idea behind the publication is that the usefulness of basic research to society has many facets, and it is seldom that the breakthroughs society needs happen without first building a base. Therefore, the DNRF finds it important to highlight the research activities that are a part of creating this base, activities that, in turn, might lead to indispensable new knowledge and technological breakthroughs; for example, creating a network of the smartest people in the world.



You can read the whole publication "Curiosity Benefits Society" here.

In "Curiosity Benefits Society," we talk about activities by focusing on six research areas.

Focus areas in the "Curiosity benefits society" publication:

Health care
DNRF Centers contribute to better diagnostics, improved therapy, new medicine, and counseling.

> Our research results need to be of use for the public, the patients, and the health-care staff. I believe you are also mediating research when you get politicians to speak about different aspects of health care and when you become involved in committees under the auspices of the National Health Board.

Professor Bente Klarlund Pedersen,
University of Copenhagen

Green transition
Technology-oriented DNRF centers work with new technologies to reduce energy consumption and catalytic processes that are essential to storing energy without big energy losses.

> The distinction between basic and applied research is in many ways artificial. The research field I work in is very application-oriented, and many people are working toward specific products. But to see the bigger picture requires a long-term commitment to basic research.

Professor Leif Katsuo Oxenløwe,
Technical University of Denmark

The second quantum revolution
Quantum-based technologies could revolutionize society, and a handful of DNRF centers and several Danish research institutions are currently working on this challenge.

> Numerous ties are being built between universities and the business community. It's interesting that right away you can see the technology being used for something. We clearly expect that we will be part of creating the foundation for the development of a whole new technology. It is interesting to see how new, innovative ideas have been developed at the crossroads between basic research and commercial thinking.

Professor Ulrik Lund Andersen,
Technical University of Denmark

Focus areas in the "Curiosity benefits society" publication:

Cultural heritage
Museums are pursuing new ways to disseminate information about their collections and relate them to present-day challenges. Within this area DNRF centers contribute to mutually beneficial collaborations between researchers and curators.

> We are in the midst of a huge biodiversity crisis, which is connected to the crisis of the Earth's ecosystems and climate in general. With DNA mapping of the genome, we can renew our knowledge of evolutionary incidents and processes of the past, which are important for understanding the global situation today. I couldn't do this kind of basic research were it not for the museums' collections.

Professor Carsten Rahbek,
University of Copenhagen

Counseling of Danish and international institutions
DNRF centers' leading employees mediate research knowledge to both Danish and large international institutions and governments, knowledge that forms the basis for political and financial decisions.

> The overall aim of our research is to improve decision-making in the context of political decisions. As far as redistribution policy goes, which is one of the areas we are looking at in my center, we can explain to the politicians which compromises in relation to different political measures they realistically need to decide on, and how the interventions may work out. And that is often different from what the politicians originally thought.

Professor Claus Thustrup Kreiner,
University of Copenhagen

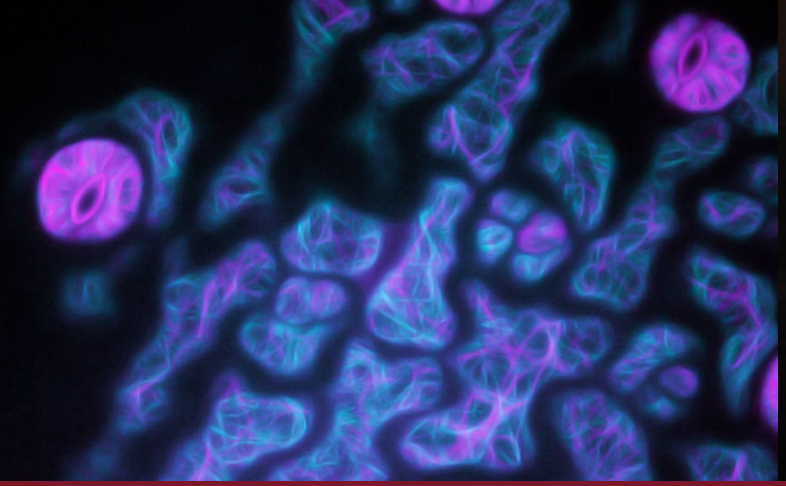
New innovative companies
Researchers who seek new paths are often good at both creating research breakthroughs and finding immediate uses for their discoveries. Therefore, several companies stem from the discoveries made by the DNRF Centers.

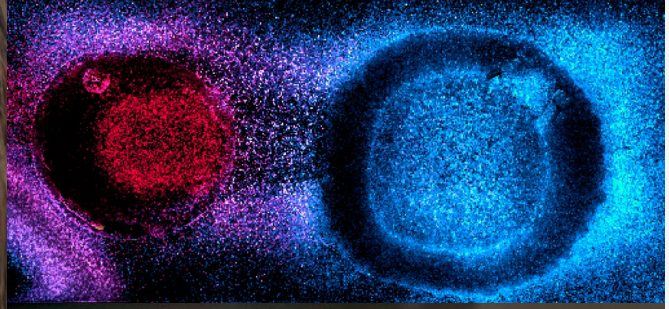
> There is no doubt that without the basic research in cardiac physiology conducted at the center, the company and the new approach to the treatment of atrial fibrillation would never have happened. It was a fortunate situation whereby pharmacological knowledge, clinical genetics, and animal experimental knowledge all came together in the center. The environment at the center was characterized by a keen interest in innovation.

Professor Søren-Peter Olesen,
CEO of the DNRF

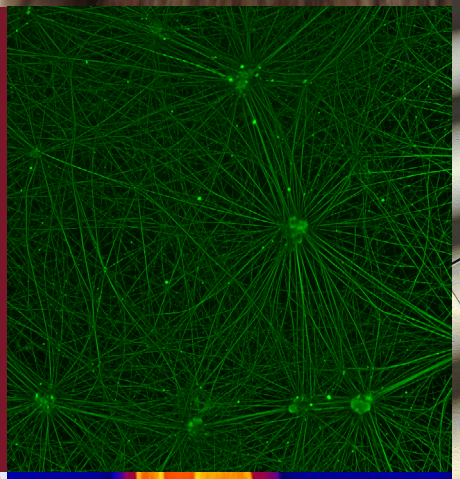
> At the Danish National Research Foundation we are very impressed with the intense dedication shown by researchers. The results of this dedication are directly useful to society, and we are very proud to highlight examples of this in this publication.

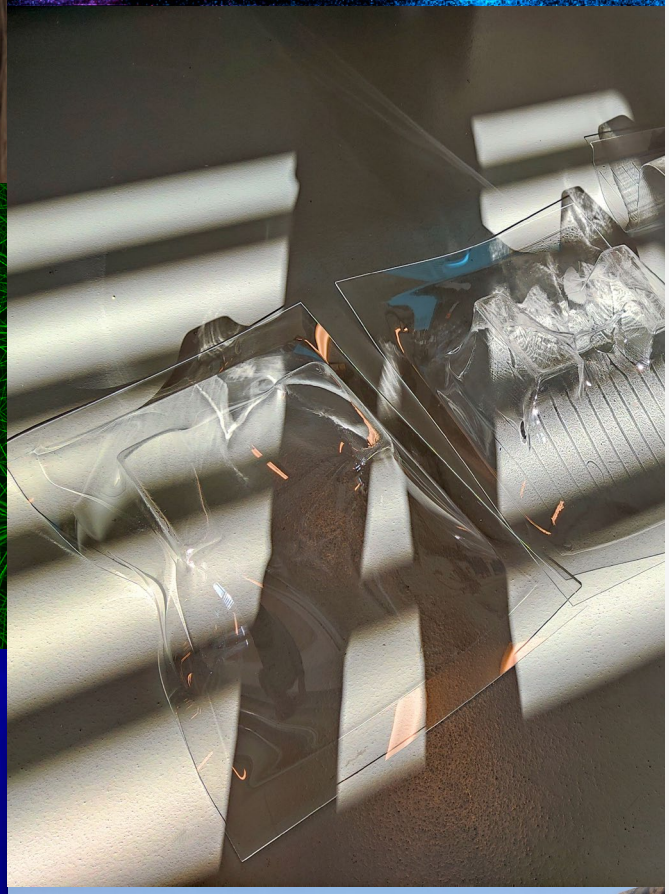
Professor Søren-Peter Olesen, CEO of the Danish National Research Foundation

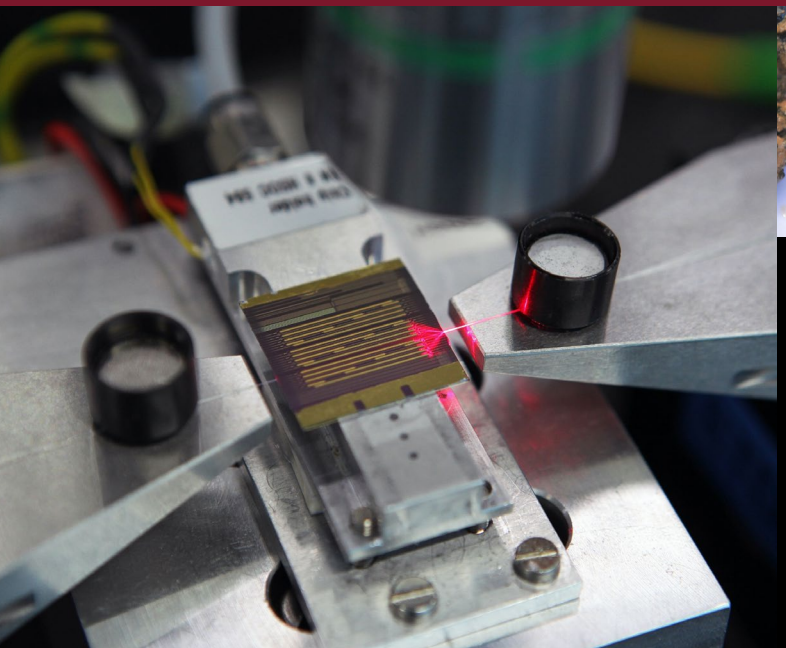


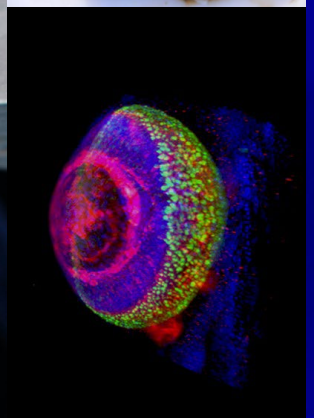


The DNRF Photo Competition









The DNRF Photo Competition

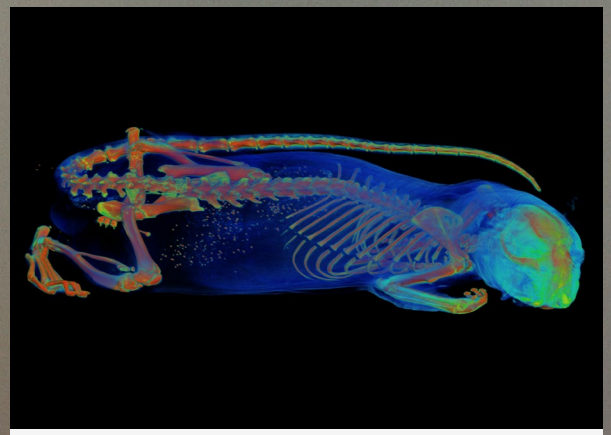
Photos have the ability to uncover the world of science in a surprising and inviting way, by revealing its beauty and fascinating appeal. The DNRF would like to share with a broader audience how, each day, scientific discovery advances our knowledge of ourselves and the world we live in.

We do this by telling the stories of scientific advances or discoveries with a photo as a visual entry point. To this end, each year the foundation launches a photo competition based on the photograph's potential as documentation and communication of scientific research. In 2021, the competition invited the research community at large to submit photos.

The selection criteria were as follows:

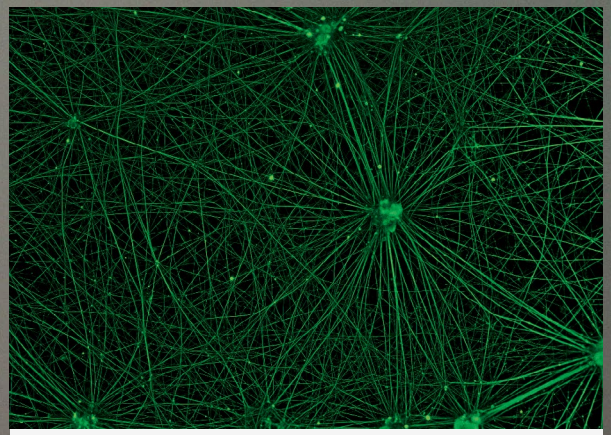
- Degree to which the photo evokes emotions in the observer
- Degree to which the photo works as a visual entry point to the story behind the specific research result
- Aesthetic quality of the photo

The selection panel, consisting of Christine Buhl Andersen, Chair of the New Carlsberg Foundation; Louise Wolthers, Research manager/curator at the Hasselblad Foundation; and Minik Rosing, Professor at GLOBE Institute, vice chair of the DNRF board and member of the board of the Louisiana Museum of Modern Art, — chose the following photographs for first, second, and third prize:



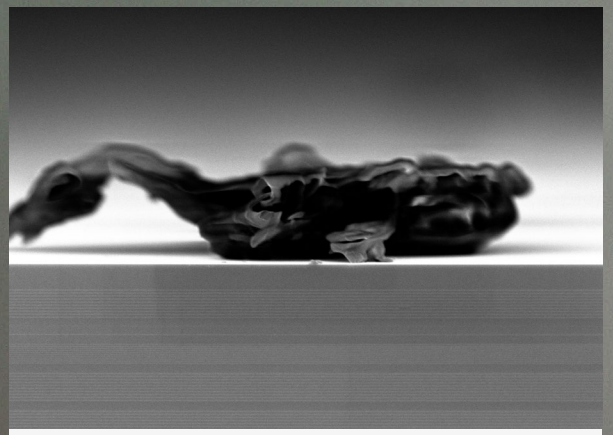
First prize
By Rolf Bech Kjeldsen

A visually striking and aesthetically pleasing image in both format and color. The rat skeleton defines a harmonious and peaceful composition. Paradoxically, at closer inspection, the image is slightly troubling, as the rat might express pain in its body language. In a symbolist interpretation the image could signal loss and despair.



Second prize
By Christina Mortensen

This remarkable image of a network of cells also serves on a general level as an allegory of connectedness in nature. It is a poetic and elegant composition – full of energy and life.

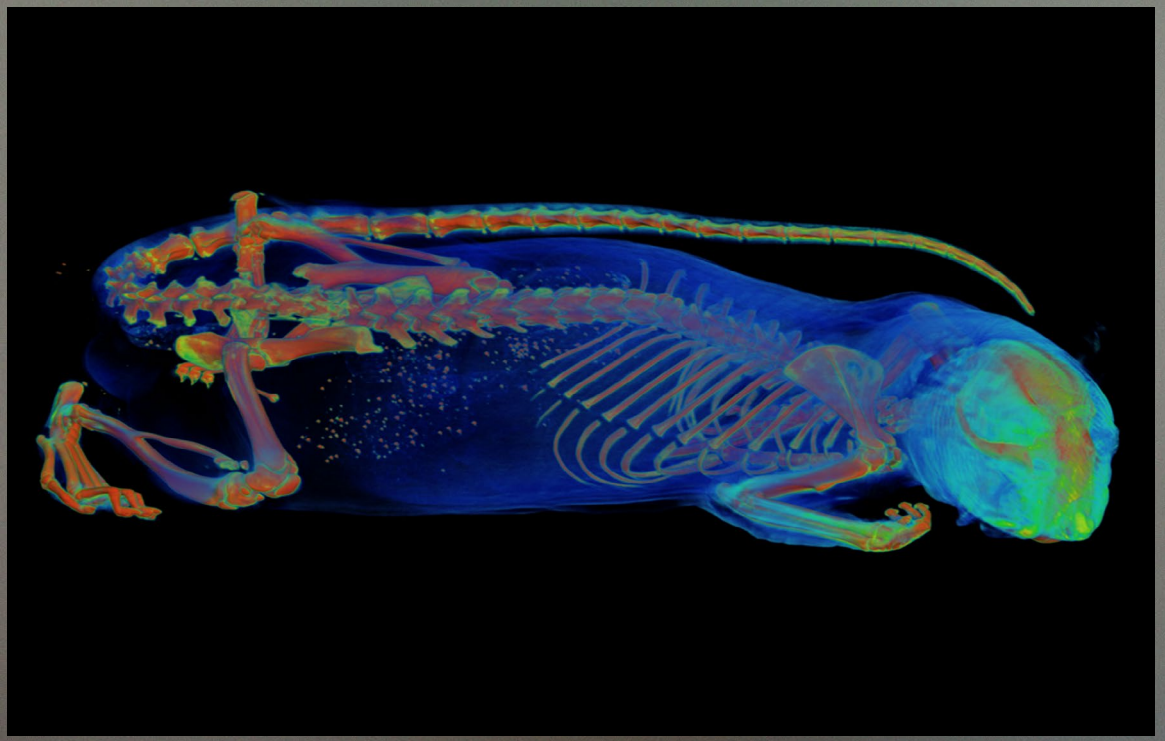


Third prize
by Steffen Zelzer

This entry shows a high quality of representation of the research topic, while the interesting feature is an inadvertent pollution of the sample. The scale triggers our imagination. The object could be a dried fish or a model for a modern sculpture.

1

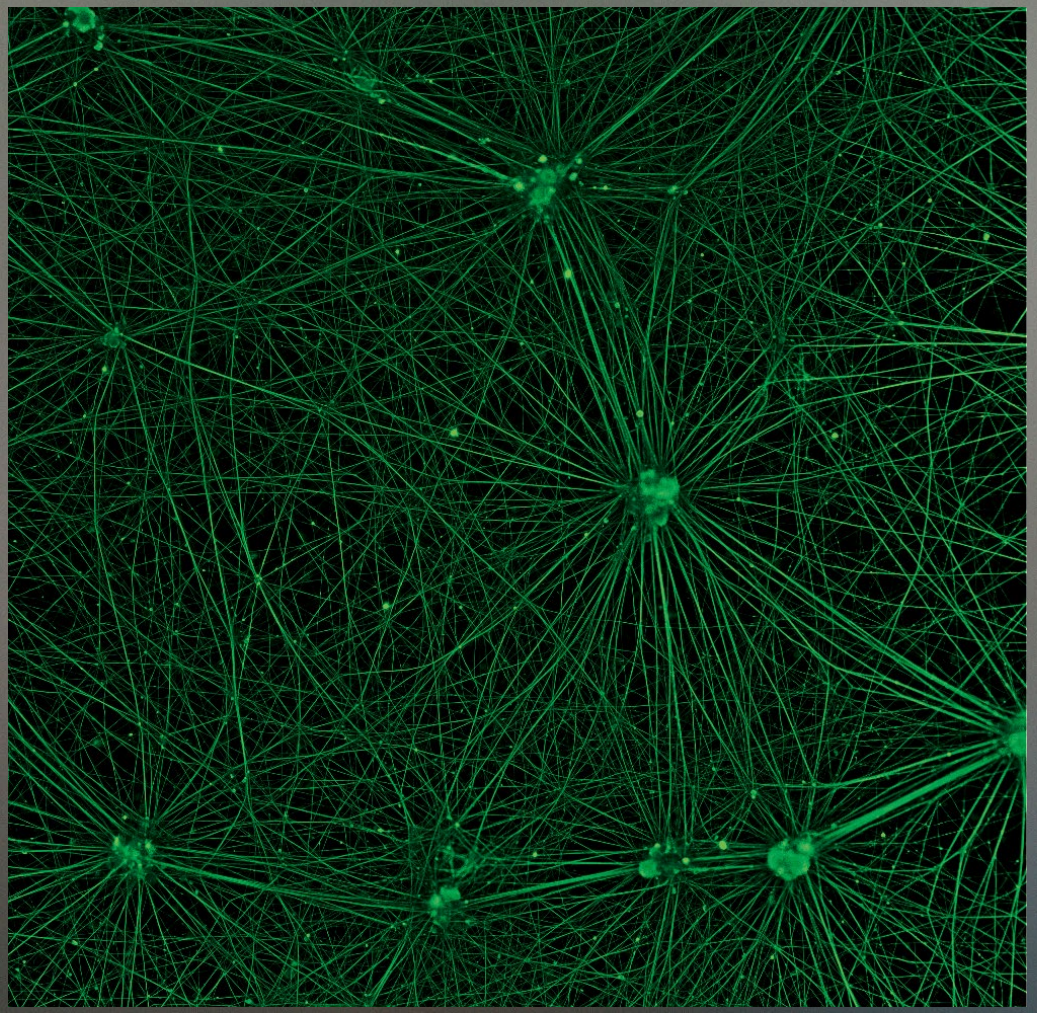
“ This computed tomography scan image very simply illustrates how so-called microcontainers (loaded with an x-ray contrast agent) used for oral drug delivery distribute in the gastrointestinal tract of a rat (5 hours after oral administration). The image reminds you about the general complexity of skeletal anatomy, while it reveals the gorgeous beauty obtainable with x-ray imaging.



First prize
Rolf Bech Kjeldsen, Ph.D. fellow, IDUN Center of Excellence
Technical University of Denmark

2

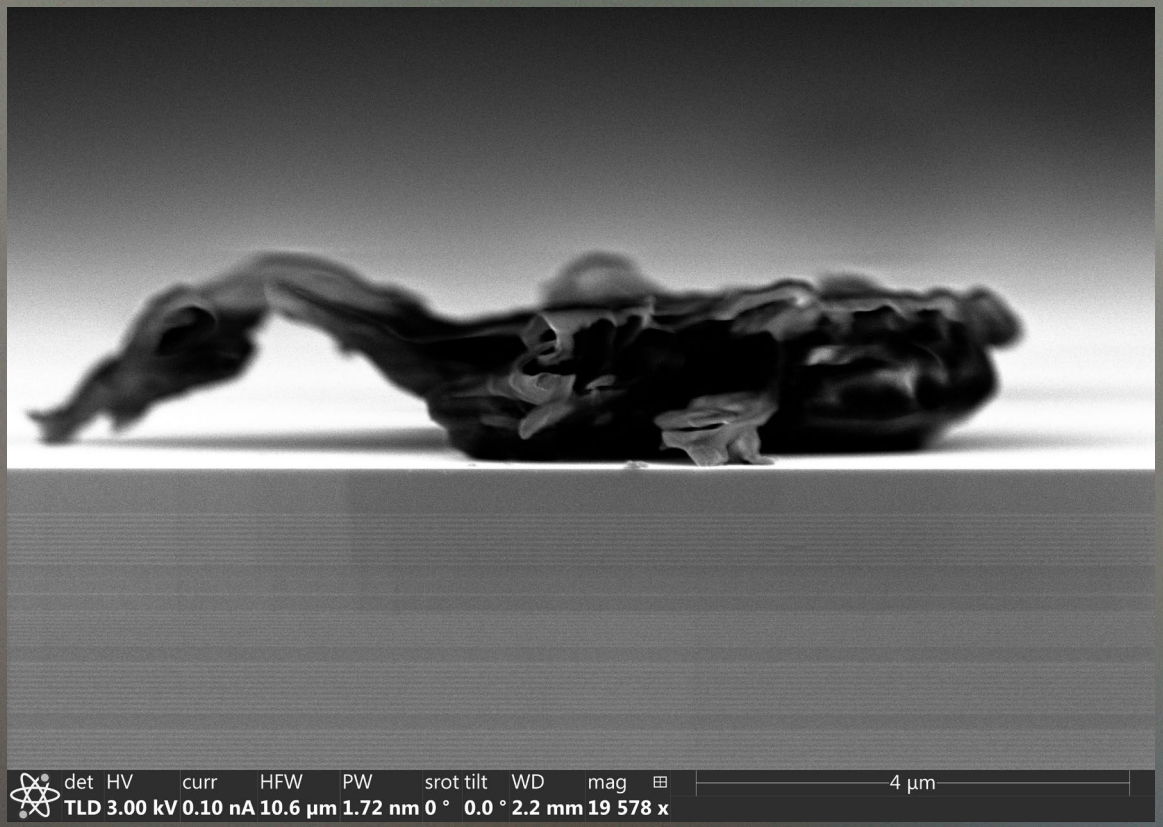
“ The image shows the pain-sensing nerve cells that are normally found in the skin where they allow us to feel sensations like pain, cold and touch. In our laboratory, we have developed pain-sensing nerve cells from human stem cells. The nerve cells are connected in a complex network visualized with green color. The cells on the image are important in our research. We treat these cells with chemotherapy to try to understand how and why chemotherapy causes persistent pain and sensory disturbances among cancer patients.



Second prize
Christina Mortensen, Ph.D. fellow, Clinical Pharmacology, Pharmacy and Environmental Medicine, The University of Southern Denmark

3

“ It shows a scanning electron image of the cross-section of a sample with different super-lattice structures (the horizontal grey lines) and some “dirt” on the surface of the sample that looks very much like an animal from another world. We discovered this during a routine check of how well we can cleave these samples that are grown in a molecular beam epitaxy chamber on indium arsenide wafers with layers of gallium antimony (the brighter lines). I think the image shows what fascinates me about science, that you sometimes can start a seemingly mundane task of checking the quality of a sample and encounter the most beautiful and surprising results. It also shows humanities ability to see life in form of shapes that remotely remind of a face immediately.



Third prize
Steffen Zelzer, Ph.D. fellow, Center for Quantum Devices
Niels Bohr Institute, University of Copenhagen

The DNRF Annual Meeting 2021

Where is the culture of academia headed?

The DNRF annual meeting 2021

On Monday, October 25, 2021, the Danish National Research Foundation welcomed guests to the foundation's first annual meeting in two years at the IDA's conference rooms. This year's theme was academic culture. The foundation had invited grant holders, the foundation's board, and political stakeholders to a day of presentations and a debate moderated by Stinus Lindgreen.

This year's theme was "Where is the academic culture headed?" The Danish National Research Foundation invited attendees to participate in a discussion about academic culture, its development over time, and where it is headed. In particular, the discussion focused on globalization and internationalization, and different perspectives were shared during the Q&A and the panel discussion at the end of the meeting.

Where do you think the culture of academia is headed?

The meeting was opened by chairman of the DNRF board, Professor Jens Kehlet Nørskov,

who introduced the agenda for the day. Next, the DNRF's CEO, Professor Søren-Peter Olesen, outlined the day's theme and pointed out how the question of where the culture of academia is headed doesn't have a straightforward and easy answer.

"We started getting curious about the culture in research and how much it has changed. Every year we ask a question, and this time we decided to ask: where do you think the culture of academia is headed? It turned out to be a difficult question. Everyone thinks three years ahead. That is our basic time horizon. But we want to think further ahead. We learned a lot about the dynamic that exists and we have combined it with data and written about it," said Professor Olesen, referencing the latest publication "Where Is the Culture of Academia Headed?"

He highlighted globalization, how much it has changed over the last few years, and how much it affects the culture. For example, this change can be seen in the fact that we no longer depend on collecting our own data, but rather there are global data banks that researchers can use. Globalization is the dominant driving force in the changed culture of academia. The opportunity to bring international talent into play and increased diversity were also mentioned as some of the big changes in academic culture. Professor Olesen ended by talking about potential problems with grants and how the Danish National Research Foundation prioritizes quality research and longer-term grants.

Talent, stress, and acknowledgement

The first speaker was Associate Professor Katrine T. Schjoldager, from the Center of Excellence Center for Glycomics (CCG) at the University of Copenhagen, focusing on the topics of stress, talent, and acknowledgement:

"We all know stress. It limits us. It reduces creative output. My experience is that stress is related to pressure: pressure to publish and limited time for reflection and focus. Unfortunately, this leads us to make safer and more conservative choices rather than the more risky and ambitious ones that produce excellent science."

Schjoldager then went on to talk about the importance of role models and the problems associated with an academic career path, for example, the pressure that comes with having a family and at the same time being mobile researchers. She went on to discuss the mentality that believes the strongest will win in the research world and how this could mean the loss of talent. Schjoldager ended by mentioning some new initiatives being taken to support better transparency in the culture and finished with some encouraging words:

"We are on the right track, even though we aren't there yet."

Internationalization, organization, and funding

The next speaker was Professor Poul Nissen, who previously was the head of the Center of Excellence PUMPkin at Aarhus University from 2007-2017. Professor Nissen talked about the topics of internationalization, organization, and funding from PUMPkin's perspective and its ten-year development, which, among other things, led to spin-offs and international collaborations. After the DNRF grant ended, Professor Nissen moved to the Danish Research Institute of Translational Neuroscience (DANDRITE), where he leads a group studying membrane proteins in the brain.

Professor Nissen also discussed the changed culture in recruitment, which has become much more international. He ended the discussion by mentioning the importance of working together internationally by acknowledging a united spirit.

This led the meeting to the next guest speaker, Professor Søren Brunak, who was head of center at the Center for Biological Sequence Analysis (CBS) at the Technical University of Denmark (DTU). CBS was part of the foundation's first round of grants. He recounted how the center's topic – today the vastly important

area of bioinformatics – was then a small area whose agenda met widespread resistance. With the DNRF Center of Excellence grant, Professor Brunak was able to leverage his groundbreaking work.

> Individuals will recognize the value of their knowledge from day one. Establish an infrastructure that can empower people to do more than they expected early on; new projects that nobody planned will emerge.

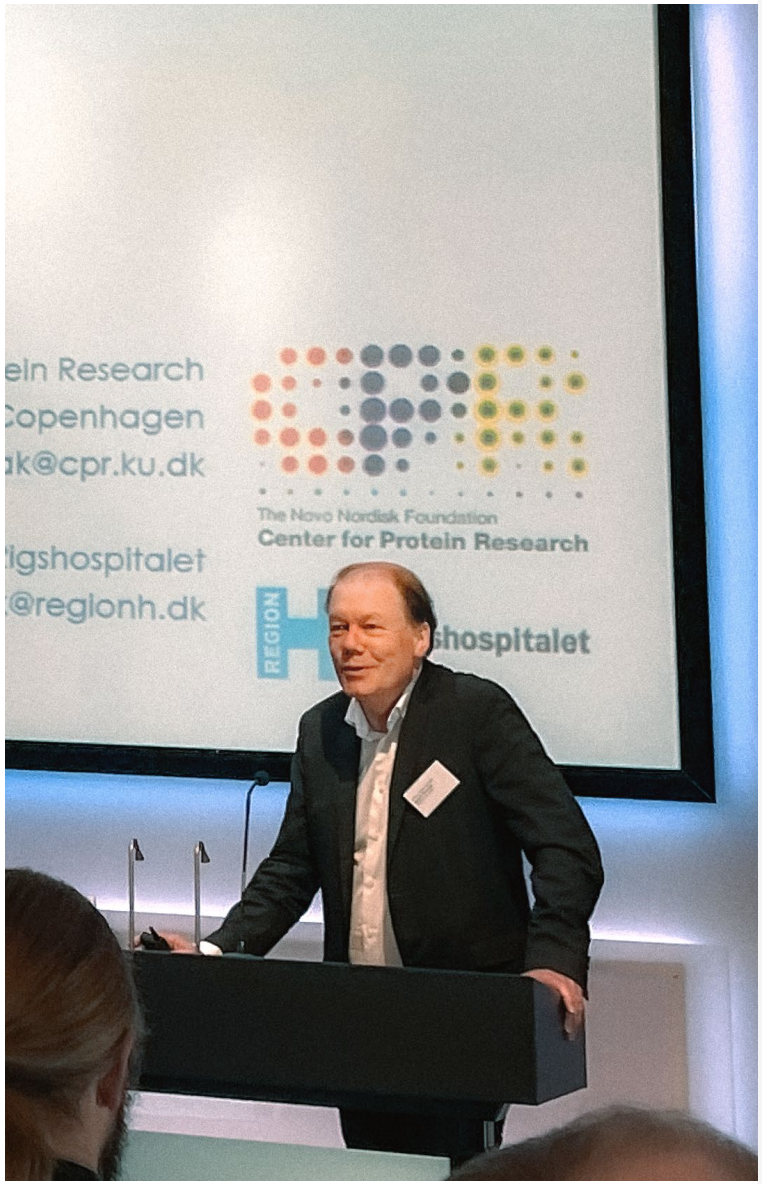
Professor Brunak talked about the importance of nurturing excellence. He asked rhetorically: how do you nurture different international talent and people with different competencies? He answered the question by talking about how the culture at CBS had to change to adapt to a diverse research environment. The solution, in other words, was to put different talent together and let them "barter." He added, "Individuals will recognize the value of their knowledge from day one. Establish an infrastructure that can empower people to do more than they expected early on; new projects that nobody planned will emerge."

International trends, drivers, and implications

The annual meeting's second session focused on national and international trends and outlooks. The session was opened by the DNRF's chair, Professor Jens Kehlet Nørskov, who this time invited people from outside the Danish National Research Foundation to talk to get a wider and more varied perspective on the theme of the day.

Professor Ken Arnold from the Medical Museion and Wellcome was the first to speak. He talked about developments in academic culture by looking at studies and statistics from reports. The studies paint a negative image, with a lot of uncertainty and pressure among researchers, especially younger ones.

"So how do we re-imagine research? Well, it is at our disposal to recreate what research may be like. The first positive sign is to recognize that things aren't positive. Then organizations, like those here and in London, that are involved in research must say, 'Yes, there are things that need to change.' That is a very positive sign as well. And I think the topic of diversity and inclusion is difficult to miss these days, and I do think organizations are taking the need to shift attitudes very seriously."



Professor Søren Brunak

Chair of the board at the University of Copenhagen, Merete Eldrup

Professor Frede Blaabjerg

Merete Eldrup, chair of the board at the University of Copenhagen, took the stage to offer the perspective of a university. She introduced herself by pointing out how she was different from everyone else today, given her non-academic career. Her CV includes positions as CEO at Politikens hus and CEO at TV2/Danmark.

Eldrup also called the debate about research freedom problematic and expressed the importance of keeping politicians at arm's length. "I'm worried that the debate about research activism creates some self-censorship."

She continued: "The purpose of the board, in my eyes, is to oversee the operation. The board should never get into academic disputes. Disputes should be talked about among peers, and it is not for the board to discuss them. But at the same time, knowledge is power, and once we are aware of a problem, we need to act on it."

The day's final guest speaker was Professor Frede Blaabjerg, who is chair of the board at the Danish Council for Research and Innovation Policy (DFiR).

"When we talk about the culture of academia, there are some fundamental things we should always care about and make sure they are considered at a high level. If I look at the changes over the last 30 years, academia has become much bigger and much more international. But a lot of other elements have also come into play, such as open data and open access."

> "The purpose of the board, in my eyes, is to oversee the operation. The board should never get into academic disputes. Disputes should be talked about among peers, and it is not for the board to discuss them. But at the same time, knowledge is power, and once we are aware of a problem, we need to act on it.

Professor Blaabjerg ended the talk by presenting statistics that highlight the changing academic culture. Funding is relatively good in Denmark compared with other countries, thanks to the private foundations. Challenges remain, however, including diversity and internationalization.

"Research is becoming more and more international, but are we ready as a society to become more international? I think we should always challenge ourselves about how we can do better, and we must never say we are satisfied."

Panel debate: Change can be frustratingly slow

The panel discussion started with an introduction to Stinus Lindgreen, who added his own thoughts on the discussion so far:

"I used to be a researcher, and I'm now a member of parliament. All that has been said today reflects back on my own journey. I was stressed about the constant search for money. But also the topics that were discussed today such as diversity and how to evaluate: all of these are the same as they were fifteen years ago, and we haven't really moved, which is frustrating. We need to do something to change this now."

He then went on to discuss the problems of short-term funding before moderating the rest of the panel discussion. During the discussion, the view was expressed that longer timelines in research are needed, to avoid changing direction every year.

In the following discussion, the topic of the day was rephrased as the question: "How can researchers maximize the system the best way in order to get the best results?" There was talk of a career grey zone with problems such as insecurity, but the overall conclusion was that while it is not perfect, the culture of academia is moving forward in the right direction.

The panel from left to right: Katrine Schjoldager, Søren Brunak, Poul Nissen, Frede Blaabjerg, Merete Eldrup, Ken Arnold, Thomas Bjørnholm and Stinus Lindgren.

DNRF annual meeting 2021 publication: Where is the culture of academia headed?

A fast-changing culture of academia: What do the researchers think?

It is obvious that there is a strong connection between what is produced in research and how it is produced. This "how" points to the importance of the values, norms, and, more generally, conditions of academia that are regularly referred to as the culture of academia, of research, or of science. Academia has gone through quite extraordinary changes over the past decades regarding, for instance: external research funding; international collaboration; international competition for positions; the use of and focus on research quality measurements; digitization and large-scale data generation and use; the pace of the dissemination of scientific knowledge; and the number of positions. In this year's annual publication, an enquiry with perspectives on this development from DNRF grant holders is presented.

Read the publication at dg.dk.

Close contact with its grant holders continues to be part of the Danish National Research Foundation's DNA. Annual follow-up meetings at the sites of each grant holder are a way of supporting the ambitious research centers through continual dialogue. At the meetings, the DNRF takes the opportunity to interview the center staff about how they view the broader issues that are directly consequential to the continued well-being of research and researchers. Themes emerging from these interviews are collected in the annual meeting publications. In this way, researchers' perspectives become available to other actors in the research landscape who share the ambition of promoting Danish research and innovation.

Previous reports:

2019: Transformative research

2018: Diversity and excellence

2017: Open access to data

Reports

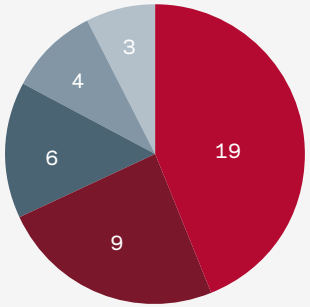
Activity and performance in 2020

Figures for 2021 will be available at dg.dk in June 2022.

Instruments

41

Active Centers of Excellence
Average grant: DKK 10 M per year.
Length: 6-10 years



6

Active Niels Bohr Professorships
Average grant: DKK 6.1 M per year.
Length: 5 years

4

Active DNRF Chairs
Average grant: DKK 7.2 M per year.
Length: 3 years

1

Active Pioneer Centers[1]
Grant: DKK 27.1 M per year.
Length: 13 years

Research and innovation activity (DNRF-financed)

Articles:	1,066
Book chapters:	148
Proceedings:	92
Monographs:	27
Other publications:	167

Education activity (DNRF-financed)

ECTS - Total:	**4,321**
B.Sc. level:	1,752
M.Sc. level:	2,179
Ph.D. level:	391
Ph.D. theses:	92 (active Ph.D.'s 441)
B.Sc. theses:	244
M.Sc. theses:	304

[1] Funded by the National Danish Research Foundation, the Carlsberg Foundation, the Lundbeck Foundation, the Novo Nordisk Foundation and the VILLUM foundation.

Ongoing activities

CENTERS OF EXCELLENCE ESTABLISHED IN 2012

Centre for Medieval Literature (CML)

Location:	University of Southern Denmark
Center leader:	Professor Lars Boje Mortensen
Total grant:	60.0 million DKK

Center for Dynamic Molecular Interactions (DynaMo)

Location:	University of Copenhagen
Center leader:	Professor Barbara Halkier
Total grant:	81.7 million DKK

Center for Permafrost Dynamics in Greenland (CENPERM)

Location:	University of Copenhagen
Center leader:	Professor Bo Elberling
Total grant:	99.7 million DKK

Center for Quantum Devices (QDev)

Location:	University of Copenhagen
Center leader:	Professor Karsten Flensberg
Total grant:	111.3 million DKK

Center for Financial Frictions (FRIC)

Location:	Copenhagen Business School
Center leader:	Professor David Lando
Total grant:	80.0 million DKK

Center for Nanostructured Graphene (CNG)

Location:	Technical University of Denmark
Center leader:	Professor Antti-Pekka Jauho
Total grant:	90.1 million DKK

Center for International Courts (iCourts)

Location:	University of Copenhagen
Center leader:	Professor Mikael Rask Madsen
Total grant:	70.0 million DKK

Stellar Astrophysics Centre (SAC)

Location:	Aarhus University
Center leader:	Professor Jørgen Christensen-Dalsgaard
Total grant:	91.7 million DKK

Copenhagen Center for Glycomics (CCG)

Location:	University of Copenhagen
Center leader:	Professor Henrik Clausen
Total grant:	103.5 million DKK

CENTERS OF EXCELLENCE ESTABLISHED IN 2015

Center for Chromosome Stability (CCS)

Location:	University of Copenhagen
Center leader:	Professor Ian D. Hickson
Total grant:	110.0 million DKK

Center for Stem Cell Decision Making (StemPhys)

Location:	University of Copenhagen
Leader:	Professor Joshua Brickman
Total grant:	55.0 million DKK

Center for Music in the Brain (MIB)

Location:	Aarhus University
Center leader:	Professor Peter Vuust
Total grant:	98.2 million DKK

Centre for Carbon Dioxide Activation (CADIAC)

Location:	Aarhus University
Center leader:	Professor Troels Skrydstrup
Total grant:	85.0 million DKK

Center for Urban Network Evolutions (UrbNet)

Location:	Aarhus University
Center leader:	Professor Rubina Raja
Total grant:	105.0 million DKK

Center for Bacterial Stress Response and Persistence (BASP)

Location:	University of Copenhagen
Total grant:	34.8 million DKK

Center for Neuroplasticity and Pain (CNAP)

Location:	Aalborg University
Center leader:	Professor Thomas Graven-Nielsen
Total grant:	85.2 million DKK

Center for Intelligent Oral Drug Delivery and Sensing using Microcontainers and Nanomechanics (IDUN)

Location:	Technical University of Denmark
Center leader:	Professor Anja Boisen
Total grant:	96.0 million DKK

Center for Silicon Photonics for Optical Communications (SPOC)

Location:	Technical University of Denmark
Center leader:	Professor Leif Katsuo Oxenløwe
Total grant:	100.6 million DKK

Center for Hyperpolarization in Magnetic Resonance (HYPERMAG)

Location:	Technical University of Denmark
Center leader:	Professor Jan Henrik Ardenkjær-Larsen
Total grant:	55.0 million DKK

Center for Autophagy, Recycling and Disease (CARD)

Location:	The Danish Cancer Society
Center leader:	Professor Marja Jäättelä
Total grant:	95.4 million DKK

Center for Personalized Medicine Managing Infectious Complications in Immune Deficiency (PERSIMUNE)

Location:	Rigshospitalet
Center leader:	Professor Jens Lundgren
Total grant:	100.1 million DKK

NIELS BOHR PROFESSORSHIPS ESTABLISHED IN 2016 AND 2017

Professor Rita Felski, University of Virginia

Location:	University of Southern Denmark
Total grant:	28.0 million DKK

Professor Matthew Collins, The University of York

Location:	University of Copenhagen
Total grant:	30.9 million DKK

Professor John McGrath, University of Queensland

Location:	School of Business and Social Science, Aarhus University
Total grant:	29.9 million DKK

Professor Thomas Pohl, Max Planck Institute for the Physics of Complex Systems

Location:	Aarhus University
Total grant:	25.3 million DKK

Professor Morten Bennedsen, INSEAD

Location:	University of Copenhagen
Total grant:	29.9 million DKK

Professor Professor Enrico Ramirez-Ruiz, University of California

Location:	University of Copenhagen
Total grant:	21.7 million DKK

CENTERS OF EXCELLENCE ESTABLISHED IN 2017 AND 2018

Center for Proteins in Memory (PROMEMO)

Location:	Aarhus University
Center leader:	Professor Anders Nykjær
Total grant:	62.0 million DKK

Center for Economic Behavior and Inequality (CEBI)

Location:	University of Copenhagen
Center leader:	Professor Claus Thustrup Kreiner
Total grant:	57.0 million DKK

Center for Cellular Signal Patterns (CellPAT)

Location:	Aarhus University
Center leader:	Professor Jørgen Kjems
Total grant:	61.0 million DKK

Center for Electromicrobiology (CEM)

Location:	Aarhus University
Center leader:	Professor Lars Peter Nielsen
Total grant:	56.0 million DKK

Center for Microbial Secondary Metabolites (CeMiSt)

Location:	Technical University of Denmark
Center leader:	Professor Lone Gram
Total grant:	58.0 million DKK

Center for Privacy Studies (PRIVACY)

Location:	University of Copenhagen
Center leader:	Professor Mette Birkedal Bruun
Total grant:	50.0 million DKK

Center for Hybrid Quantum Networks (Hy-Q)

Location:	University of Copenhagen
Center leader:	Professor Peter Lodahl
Total grant:	62.0 million DKK

The Cosmic Dawn Centre (DAWN)

Location:	University of Copenhagen
Center leader:	Professor Sune Toft
Total grant:	66.2 million DKK

Center for Functional Genomics and Tissue Plasticity (ATLAS)

Location:	University of Southern Denmark
Center leader:	Professor Susanne Mandrup
Total grant:	65.0 million DKK

Center for Macroscopic Quantum States (BigQ)

Location:	Technical University of Denmark
Center leader:	Professor Ulrik Lund Andersen
Total grant:	63.0 million DKK

National Science Foundation (NSF)

(1.6 million DKK, which is included in the above mentioned center grants).

CENTERS OF EXCELLENCE ESTABLISHED IN 2020 AND 2021

Center for Evolutionary Hologenomics (CEH)

Location:	University of Copenhagen
Center leader:	Professor Marcus Thomas Pius Gilbert
Total grant:	67.7 million DKK

Center for the Experimental-Philosophical Study of Discrimination (CEPDISC)

Location:	Aarhus University
Center leader:	Professor Kasper Lippert-Rasmussen
Total grant:	62.6 million DKK

Danish Center for Hadal Research (HADAL)

Location:	University of Southern Denmark
Center leader:	Professor Ronnie Nøhr Glud
Total grant:	54.6 million DKK

Center for Visualizing Catalytic Processes (VISION)

Location:	Technical University of Denmark
Center leader:	Professor Stig Helveg
Total grant:	85.8 million DKK

Center for Nanophotonics (NanoPhoton)

Location:	Technical University of Denmark
Center leader:	Professor Jesper Mørk
Total grant:	62.9 million DKK

Center for Molecular Prediction of Inflammatory Bowel Disease (PREDICT)

Location:	Aalborg University
Center leader:	Professor Tine Jess
Total grant:	68.5 million DKK

Center for High Entropy Alloys Catalysis (CHEAC)

Location:	Technical University of Denmark
Center leader:	Professor Jan Rossmeisl
Total grant:	61.4 million DKK

Center for Interstellar Catalysis (InterCat)

Location:	University of Copenhagen
Center leader:	Professor Liv Hornekær
Total grant:	67.4 million DKK

Copenhagen Center for Geometry and Topology (GeoTop)

Location:	University of Copenhagen
Center leader:	Professor Nathalie Wahl
Total grant:	60.2 million DKK

Center for Complex Quantum Systems (CCQ)

Location:	Aarhus University
Center leader:	Professor Thomas Pohl
Total grant:	66.6 million DKK

DNFR CHAIR ESTABLISHED IN 2020 AND 2021

Professor Jesper Svejstrup

Location:	University of Copenhagen
Total grant:	15.0 million DKK

Professor Morten Ørregaard Nielsen

Location:	Aarhus University
Total grant:	7.1 million DKK

Professor Steffan Persson

Location:	University of Copenhagen
Total grant:	8.0 million DKK

Professor Peter Jørgensen

Location:	Aarhus University
Total grant:	7.9 million DKK

Professor Vivek Shende

Location:	University of Southern Denmark
Total grant:	8.0 million DKK

Professor Anders Johansen

Location:	University of Copenhagen
Total grant:	8.5 million DKK

PIONEER CENTERS ESTABLISHED IN 2021

Pioneer Center for Artificial Intelligence

Location:	University of Copenhagen
Leader:	Professor Serge Belongie
Total grant:	144.0 million DKK (352 million DKK including funding from private foundations)

COURSE ACTIVITIES FOR CENTER LEADERS/ OUTREACH PROGRAM FOR CENTERS

Total grant:	11.2 million DKK

The board

In 2021, the board conducted seven board meetings and was represented at 42 follow-up meetings with the grant holders. The composition of the board March 2022 was as follows:

Jens Kehlet Nørskov (Chair)

Professor, Technical University of Denmark

Appointed by the Minister for Higher Education and Science (01.01.19-31.12.24)

Christian S. Jensen

Professor, Aalborg University

Appointed by the Minister for Higher Education and Science (01.12.21-30.11.25)

Sirpa Jalkanen

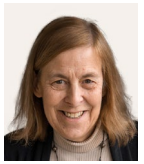
Professor, University of Turku

Nominated by the Independent Research Fund Denmark (01.12.21-30.11.25)

Minik Thorleif Rosing (Vice Chair)

Professor, University of Copenhagen

Nominated by the Joint Committee of Directors at the Governmental Research Institutes (01.01.16-31.12.23)



Janet M. Thornton

Senior Scientist and Director Emeritus, European Molecular Biology

Nominated by Danish Academy of Technical Sciences (01.12.21-30.11.25)

Tine Brink Henriksen

Professor, Aarhus Universitet

Nominated by the Independent Research Fund Denmark (01.12.21-30.11.25)

Anne Scott Sørensen

Professor, University of Southern Denmark

Nominated by the Independent Research Fund Denmark (01.01.16-31.12.23)

Morten Overgaard Ravn

Professor, Department of Economics, University College London

Nominated by Universities Denmark (01.01.16-31.12.23)

Vigdis Broch-Due

Professor, University of Bergen

Nominated by the Royal Danish Academy of Sciences and Letters (01.01.20-31.12.23)

Statement by management on the annual report

The board and the CEO have today considered and approved the annual report of the Danish National Research Foundation for the financial year 2021.

The annual report is presented in accordance with the Consolidated Act on the Danish National Research Foundation, the Danish Executive Order on the Administration of the Funds of the Danish National Research Foundation, the Royal Decree on the Charter of the Danish National Research Foundation and the provisions of the Danish Financial Statements Act with the adjustments resulting from the special nature of the Danish National Research Foundation.

In our opinion, the annual accounts give a true and fair view of the foundation's financial position at December 31, 2021 and of the results of its operations for the financial year January 1 to December 31, 2021. In addition, we believe that the management commentary contains a fair review of the affairs and conditions referred to therein.

Finally, it is our opinion that the established administrative procedures and internal controls covered by the financial statements comply with the appropriations granted, statutes, other regulations, agreements and usual practice, and that sound financial management is exercised in the administration of the funds and activities covered by the financial statements.

Copenhagen, March 18, 2022.

Søren-Peter Olesen (CEO)

Board members:

Jens Kehlet Nørskov (Chair)

Minik Thorleif Rosing (Vice chair)

Anne Scott Sørensen

Christian S. Jensen

Janet M. Thornton

Morten Overgaard Ravn

Sirpa Jalkanen

Tine Brink Henriksen

Vigdis Broch-Due

Financial reports

Total assets and return on investment

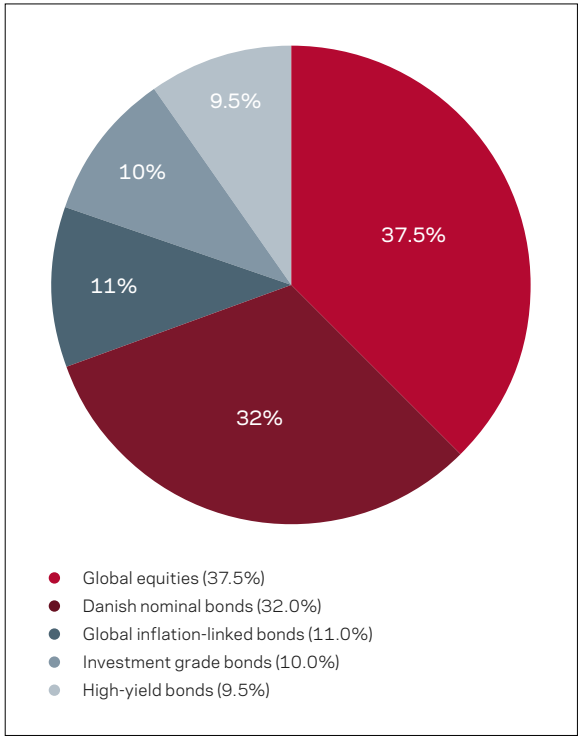
In 2021, the foundation realized a return on investment of 7.5%, and total return on investment was 433 million DKK. Broken down into asset classes, return on equities amounted to 441 million DKK while the return on the fixed income portfolio was negative with a loss of 9 million DKK. Administrative expenses, including depreciation, were 12.8 million DKK in 2021.

The net capital end of 2021 was 5,903 million DKK, compared to the net capital of 5,846 million DKK at the end of 2020. The foundation distributed 360 million DKK to its grant holders in 2021, which is lower than the goal of an average distribution level in the Act on the DNRF of 489 million DKK (in 2021 prices). The reason for this is the grant holder's lower-than-expected level of activity in 2021 due to the consequences of COVID-19 – as in 2020. For the same reason, the grant holders were offered a three-month extension of the grants in 2020, and an additional 3-month extension in 2021.

360 mill. DKK

Distributed to the grant holders in 2021

Following the Board's decision to change the strategic asset allocation effective in



2021, whereby the equity exposure was increased to 37.5% from 35% and the exposure to high-yield bonds was increased to 9.5% from 7%. Correspondingly, the exposure to Danish nominal bonds was reduced by 5 percentage points, to 32% in the beginning of 2021.

Total return

Calculated as a time-weighted return, the total return on investment in 2021 was 7.5%, which was lower than the benchmark return of 7.7%. The primary reason for the underperformance is the lower than benchmark return of the emerging markets equity portfolio.

From a five-year perspective, covering the period 2017 to 2021, the foundation's annual return of 5.7% per year was a bit higher than the annual benchmark return of 5.4% per year.

The return in 2021 on the different asset types is presented in the table. Comments on the 2021 return for the different assets is presented in the following section.

Return on investment	2021	2020	2019	2018	2017
Bonds and cash, million DKK	-8.7	104.1	140.2	-12,6	128.6
Equities, million DKK	441.4	251.5	484.4	-179.1	293.4
Total return, million DKK	**432.7**	**355.5**	**624.6**	**-191.7**	**422.0**
Foundation return, % [1]	7.5	6.4	11.1	-3.1	7.1
Benchmark, %	7.7	5.7	10.7	-3.3	6.9
Foundation 5 years p.a. return, % [2]	5.7	5.6	4.6	4.2	6.0
Benchmark 5 years p.a. return, % [2]	5.4	5.3	4.4	4.1	6.0

[1] The annual return on the total investment is a weighted average of each portfolio's return.
[2] The geometric mean.

Return on equities

The foundation's equity portfolio consists of a combination of equities in developed countries and emerging markets countries. The emerging markets countries include China, South Korea, Brazil, Mexico, Taiwan, India and others. The split between the developed and emerging countries in the portfolio follows the breakdown in MSCI's benchmark for global equities (MSCI ACWI). The allocation to equities was increased from 35% to 37.5% at the beginning of 2021.

The return from the developed markets equity portfolio was 31.5% compared to a benchmark return of 31.0% (MSCI World).

The developed markets equity portfolio is invested in the following passively managed funds: Danske Invest Global Indeks, klasse DKK W d, Northern Trust World Custom ESG Equity Fund, Northern Trust World Custom ESG EUR hedged Equity Fund, and Nykredit Invest Globale Aktier Basis.

Eighty percent of the exposure to USD (United States dollar) and JPY (Japanese yen) in the developed markets equity portfolio is

hedged to EUR except for the investment in the Northern Trust World Custom ESG EUR hedged Equity Fund, where all the currency exposure is hedged to EUR.

During 2021 the USD strengthened 8.3% against DKK and EUR while the JPY weakened, which in total resulted in a negative return from the currency hedging of minus 5.0% since the exposure to USD is much higher than the JPY-exposure. This resulted in a return on the developed markets equity portfolio, including the currency hedge, of 26.5%.

The emerging markets equity portfolio represented an average of 4.3% of the total assets during the year. This investment took place through the mutual fund GW&K Emerging Markets Equity Fund. The return on the emerging markets equity portfolio in 2021 was -2.4%, which is much lower than the benchmark (MSCI emerging markets) return of 4.8%. The sector exposure in the portfolio was a key factor in the performance shortfall. The portfolio had an overweight of consumer related companies while the more cyclical sectors such as mining and energy sectors did well. Furthermore, investments in Chinese internet-related companies have been hard affected by the Chinese authorities' tightening of the regulatory in this area.

The total return of the equity portfolio in 2021 including both the developed markets and emerging markets equity portfolio was 27.2% compared to the benchmark return of 27.4%.

Return on bonds

Danish government and mortgage bonds make up 32% of the strategic asset allocation. This allocation was reduced from 37% to 32% in the beginning of 2021.

The rising of inflation to historical high levels in 2021 resulted in rising bond yields and consequently a negative return from the nominal bond portfolios. In contrast the inflation-linked bond portfolio benefited from the rising inflation and resulted in a positive return for this part of the portfolio.

The Danish nominal bond portfolio is managed by Nykredit Asset Management (Nykredit) and the portfolio gave a return of minus 3.1%, which is lower than the benchmark return of minus 2.9%. The overweight of callable mortgage bonds added negatively to the performance of the portfolio relative to the benchmark. The prices on the mortgage bonds fell more than similar government

Return in percent

Asset type	DNRF	Benchmark	Benchmark name
Global equities	**27.2**	**27.4**	MSCI ACWI (DKK)
Currency hedge (equities)	**-5.0**	**-**	-
Danish nominal bonds	**-3.1**	**-2.9**	25% Nordea GCM DK Gov. Bonds CM 5 75% Nordea Mortgage bonds
Global inflation linked bonds	**5.0**	**4.6**	Barclays Global Inflation-linked Bond index 1-10 Y (95% Hedged)
European investment grade bonds	**-1.0**	**-1.0**	Barclays Capital Euro Major Corporate (ex. tobacco & weapon)
US high-yield bonds	**3.9**	**4.5**	ML US Cash Pay HY Constrained TR H (Hedged to DKK)

bond prices because foreign investors sold out of Danish Mortgage bond and the high activity on the Danish housing markets resulted in a high supply of mortgage bonds.

The strategic allocation to global inflation-linked bonds is 11% and this part of the portfolio is managed by Danske Bank Asset Management. The non-EUR currency exposure is hedged to EUR. The portfolio's return in 2021 benefitted from the higher inflation and was 5.0% compared to the benchmark return of 4.6%. An EU tender regarding the inflation-linked bond portfolio was completed in 2021, wherein Danske Asset Management was reappointed as portfolio manager.

The return on the European corporate bond portfolio (investment grade) in 2021 was minus 1.0% as the benchmark return. The return for this asset class is affected negatively by the rising interest rate but the continued support to the market from the central banks (the European central bank purchased investment grade corporate bonds for 7 billion EUR per month in 2021) was a contributing factor to the credit spreads staying within a relatively narrow band throughout the year. The foundation's allocation to European corporate bonds is 10% and the benchmark is Barclays Capital Euro Major Corporate Index. The portfolio is managed by Danske Bank Asset Management.

The allocation to US high-yield bonds was raised from 7% to 9.5% of the strategic allocation in the beginning of 2021. The portfolio is managed by the American investment company Columbia Threadneedle. During 2021, the high-yield bond portfolio gave a return of 3.9%, which is lower than the benchmark return of 4.5%. The portfolio manager of the high-yield bond portfolio underperformed the benchmark, primarily due to the management cost.

Responsible investment policy
The DNRF's responsible investment policy is available at dg.dk/en/investments.

The responsible investment policy and the goal of acting as a responsible investor are an integral part of the foundation's overall investment principles and strategy. The DNRF acts as a responsible investor by investing in companies that live up to common internationally accepted principles and norms for treating environmental, social, and governance (ESG) issues and by not investing in companies involved in the production of controversial weapons.

The guidelines are based on well-recognized principles, guidelines, conventions and international ESG standards. When investing, the portfolio managers of equities and credit bonds must:

- strive to live up to the United Nations Global Compact principles and/or OECD Guidelines for Multinational Enterprises.
- not invest in companies that violate broadly accepted international weapons-related conventions.
- not invest in producers of nuclear weapons, who act in violation of the Treaty on Non-Proliferation of Nuclear Weapons.

Furthermore, when investing, most of the portfolio managers of equities and credit bonds live up to the following:

- The ILO conventions on labor rights.
- Exclusion of companies with high extraction of thermal coal.

The individual portfolio managers may have other criteria they use when investing.

The responsible investment policy for each of the DNRF's investment mandates or mutual funds varies. For example, some of the DNRF's mutual fund/portfolio managers do not invest in companies involved in the production of tobacco, while others do. An overview of the portfolio managers' responsible investment policies is in the table below.

Investment committee

The investment committee's tasks are to give the board recommendations about the investment strategy, risk management, portfolio managers, the responsible investment policy, and the long-term forecast. The members of the investment committee are CIO Per Skovsted (chair), Professor Peter Løchte Jørgensen and CEO Torben Möger Pedersen. The committee held three meetings in 2021.

Portfolio/mutual fund	Danske Invest	Nykredit Invest	Northern Trust	GW&K Investment Management	SEB Invest	Danske AM
Asset type	Equities	Equities	Equities	Emerging markets equities	High-yield bonds	Investment grade bonds
UN Global Compact	✓	✓	✓	✓	✓	✓
UN Guiding Principles on Business and Human Rights	✓	✓	✓	✓	✓	✓
OECD Guidelines for Multinational Enterprises	✓	✓	Partial [4]	✓	✓	✓
The ILO conventions on labor rights	✓	✓	Partial [5]	✓	✓	✓
Weapons-related conventions	✓	✓	✓	✓	✓	✓
Exclude tobacco producers	✓	-	✓	-	-	✓
Exclude producers of nuclear weapons and depleted uranium weapons	✓[1]	✓[2]	✓	✓	✓	✓[1]
Exclusion of companies with high extraction of thermal coal	✓	✓[3]	✓	✓	✓	✓
Exercises voting privileges	✓	✓	✓	✓	-	-
Engages	✓	✓	✓	✓	-	-

[1] Danske Invest does not automatically exclude depleted uranium weapons but does exclude companies directly involved in R&D, the production of nuclear warheads, or related activities.
[2] Nykredit Invest excludes companies in violation with the Non-Proliferation-Treaty.
[3] Nykredit Invest exclude several companies involved in production of thermal coal producers, however not all companies are excluded.
[4] Northern Trust comply with OECD Guidelines in terms of Human rights, Employment and industrial relations, environment, combating bribery, bribe solicitation and extortion and consumer interests.
[5] Northern Trust's screening flags instances of violations of internationally recognized human rights such as those expressed in the International Bill of Human Rights and the principles concerning fundamental rights set out in the ILO's Declaration on Fundamental Principles and Rights at Work.

Donation of 500,000 DKK from the J.H. Schultz Foundation
In 2021 the board of the J.H. Schultz Foundation decided once more to donate 500,000 DKK to the DNRF. J.H. Schultz Foundation is the main shareholder in the Schultz Group.

Independent auditor's report

TO THE BOARD OF THE DANISH NATIONAL RESEARCH FOUNDATION

Opinion
We have audited the financial statements of The Danish National Research Foundation for the financial year 01.01.2021 – 31.12.2021, which comprise the income statement, balance sheet, statement of changes in equity, and notes, including a summary of significant accounting policies. The financial statements are prepared in accordance with the Danish Financial Statements Act subject to the adjustments caused by the special nature of the Foundation.

In our opinion, the financial statements give a true and fair view of the Foundation's financial position at 31.12.2021 and of the results of its operations for the financial year 01.01.2021 – 31.12.2021 in accordance with the Danish Financial Statements Act subject to the adjustments caused by the special nature of the Foundation.

Basis for opinion
We conducted our audit in accordance with International Standards on Auditing (ISAs) and additional requirements applicable in Denmark. Our responsibilities under those standards and requirements are further described in the "Auditor's responsibilities for the audit of the financial statements" section of this auditor's report. We are independent of the Foundation in accordance with the International Ethics Standards Board for Accountants' International Code of Ethics for Professional Accountants (IESBA Code) and the additional ethical requirements applicable in Denmark, and we have fulfilled our other ethical responsibilities in accordance with these requirements and the IESBA Code. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Management's responsibilities for the financial statements
Management is responsible for the preparation of financial statements that give a true and fair view in accordance with the Danish Financial Statements Act subject to the adjustments caused by the special nature of the Foundation, and for such internal control as Management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, Management is responsible for assessing the Foundation's ability to continue as a going concern, for disclosing, as applicable, matters related to going concern, and for using the going concern basis of accounting in preparing the financial statements unless Management either intends to liquidate the Foundation or to cease operations, or has no realistic alternative but to do so.

Auditor's responsibilities for the audit of the financial statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with ISAs and the additional requirements applicable in Denmark will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As part of an audit conducted in accordance with ISAs and the additional requirements applicable in Denmark, we exercise professional judgement and maintain professional scepticism throughout the audit. We also:

As part of an audit conducted in accordance with ISAs and the additional requirements applicable in Denmark, we exercise professional judgement and maintain professional scepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Foundation's internal control.

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by Management.

- Conclude on the appropriateness of Management's use of the going concern basis of accounting in preparing the financial statements, and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Foundation's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Foundation to cease to continue as a going concern.

- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures in the notes, and whether the financial statements represent the underlying transactions and events in a manner that gives a true and fair view.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

Statement on the management commentary
Management is responsible for the management commentary.

Our opinion on the financial statements does not cover the management commentary, and we do not express any form of assurance conclusion thereon.

In connection with our audit of the financial statements, our responsibility is to read the management commentary and, in doing so, consider whether the management commentary is materially inconsistent with the financial statements or our knowledge obtained in the audit or otherwise appears to be materially misstated.

Moreover, it is our responsibility to consider whether the management commentary provides the information required under the Danish Financial Statements Act subject to the adjustments caused by the special nature of the Foundation.

Based on the work we have performed, we conclude that the management commentary is in accordance with the financial statements and has been prepared in accordance with the requirements of the Danish Financial Statements Act subject to the adjustments caused by the special nature of the Foundation. We did not identify any material misstatement of the management commentary.

Statement on compliance audit and performance audit
Management is responsible for the transactions covered by the financial statements complying with the appropriations granted, laws and other regulations, and with agreements entered into and usual practice, and for ensuring that sound financial management is exercised in the administration of the funds and activities covered by the financial statements. Management is also responsible for setting up systems and processes supporting financial prudence, productivity and efficiency.

As part of our audit of the financial statements, it is our responsibility to perform compliance audit procedures and performance audit procedures on selected subject matters in accordance with the public auditing standards. In our compliance audit, we test the selected subject matters to obtain reasonable assurance about whether the examined transactions covered by the financial statements comply with relevant provisions of the appropriations granted, laws and other regulations, and with agreements entered into and usual practice. In our performance audit, we make an assessment to obtain reasonable assurance about whether the systems, processes or transactions examined support the exercise of sound financial management in the administration of the funds and activities covered by the financial statements.

If, based on the procedures performed, we conclude that material critical comments should be made, we are required to report this in this statement.

We have no material critical comments to report in this connection.

Copenhagen, March 18, 2022

The auditor general (Rigsrevisionen)
Henrik Lange
Head of division

Heidi Demant Helander
Accountant

Deloitte
Statsautoriseret Revisionspartnerselskab
Business Registration No 33 96 35 56

Jens Sejer Pedersen
State-Authorised Public Accountant
Identification No. (MNE) 14986.

Jacob Medard Frederiksen
State-Authorised Public Accountant
Identification No. (MNE) 44110.

Accounting policies

The annual report is presented in accordance with the Consolidated Act on the Danish National Research Foundation, the Danish Executive Order on the Administration of the Funds of the Danish National Research Foundation, the Royal Decree on the Charter of the Danish National Research Foundation and the provisions of the Danish Financial Statements Act governing reporting class C enterprises (large) with the adjustments resulting from the special nature of the foundation.

The provisions of the Danish Financial Statements Act governing reporting class C enterprises (large) prescribe preparation of a cash flow statement. Due to the nature of the foundation's activities, the cash flows cannot reasonably be broken down by cash flows from operating, investing and financing activities, for which reason the cash flow statement has been omitted, referring to Section 11(3) of the Danish Financial Statements Act. In addition, the foundation has decided to derogate from the format requirements laid down by the Danish Financial Statements Act for the income statement in order to illustrate the special nature of the foundation.

The accounting policies applied are consistent with those applied last year.

INCOME STATEMENT

Interest income
Interest income from bonds and bank deposits are accrued so it relates to the financial year under audit.

Dividend
Dividend received on shares is included in the income statement at the time of distribution.

Realized capital gains and losses on and market value adjustments of securities
Realized capital gains and losses on and market value adjustments of securities (bonds and equities) are included in the income statement.

Other income
Other income comprises general donations from private donors. The funds are recognized when transferred to the foundation.

External expenses for the scientific activities of the Foundation
Such expenses comprise expenses for the foundation's scientific activities, including expenses for the consideration of applications and evaluation of grants.

Income tax
The foundation is not liable to tax.

BALANCE SHEET

Fixed assets
Leasehold improvements are recognized in the balance sheet at cost less accumulated depreciation. Fixed assets are depreciated straight-line over their estimated useful lives of five years.

Office equipment and furniture is recognized at cost less accumulated depreciation. Office

equipment and furniture is depreciated straight-line over their estimated useful lives, meaning three years for IT hardware and software and five years for other office equipment.

Assets costing less than DKK 25,000 per unit are expensed in the year of acquisition.

Securities
Listed securities (bonds and equities) are measured at fair value (quoted price) at the balance sheet date.

Bonds redeemed at the time of presentation of the annual accounts are recognized at par value.

Other investments are measured at the lower of the value at the date of acquisition and fair value.

Net capital
Distributions by the foundation mainly take the form of multiannual total grants awarded over a number of years concurrently with, and conditional on, the actual completion of the research projects. An amount corresponding to the unpaid share of such total grants is recognized as predisposed capital under the net capital. Other net capital is classified as non-predisposed capital. An amount corresponding to the total grants provided during the year is transferred from the non-predisposed capital to the predisposed capital. The grants paid during the year are deducted from the predisposed capital.

Foreign currency translation
Foreign currency transactions are translated into DKK applying the exchange rate at the transaction date.

Realized and unrealized gains and losses are recognized in capital income in the income statement.

Bank deposits and securities denominated in foreign currencies are translated into DKK applying the balance sheet date exchange rate. Realized and unrealized foreign exchange gains and losses are recognized in capital income in the income statement.

Derivative financial instruments
The Danish National Research Foundation only applies derivative financial instruments to hedge the currency and interest rate risks involved in the portfolio of securities.

Changes in the fair value of derivative financial instruments classified as and complying with the requirement for hedging the fair value of a recognized asset or a recognized liability are recorded in the income statement together with changes in the value of the hedged asset or the hedged liability. In doing so, symmetrical recognition of gains and losses on the item hedged and the hedging instrument, respectively, is ensured.

Premiums received or paid as well as forward premiums and discounts are recognized in the income statement over the terms of the instruments.

The fair value of derivative financial statements classified as and qualifying for hedging of an instrument to hedge a recognized asset or liability is recognized in the balance sheet along with the asset or liability to which hedging relates.

INCOME STATEMENT
JANUARY 1 – DECEMBER 31

	Note	2021	2020
Return on investment			
Realized gains and losses, bonds		3,735,591	59,901,055
Unrealized gains and losses, bonds		-12,145,063	44,335,859
Realized gains and losses, equities		3,445,377	92,386,723
Unrealized gains and losses, equities		437,965,928	159,070,551
Interest, bank deposits		-339,351	-181,340
Return on investment, total		**432,662,482**	**355,512,848**
Other receipts, net	1	**500,000**	**500,000**
Costs			
Custody and bank fees etc.	2	-3,416,443	-3,489,784
Salaries etc.	3	-8,992,654	-8,833,171
Office expenses	4	-577,789	-536,558
Premises	5	-1,005,358	-1,005,158
Accountant/attorney remuneration etc.	6	-1,172,085	-1,071,503
External expenses, research activities	7	-607,795	-408,910
Other expenses	8	-341,930	-332,570
Depreciation	9	-92,682	-102,432
Costs, total		**-16,206,736**	**-15,780,086**
Result for the year		**416,955,746**	**340,232,762**
Predisposed capital:			
Predisposed capital, January 1		1,462,427,915	972,116,449
Distribution disbursed in the year	14a	-359,966,522	-335,205,231
Grants transfered from non-predisposed capital	14a	236,795,504	825,516,697
Predisposed capital, December 31		**1,339,256,897**	**1,462,427,915**

BALANCE SHEET
AS OF DECEMBER 31

	Note	2021	2020
ASSETS			
Fixed assets			
Tangible fixed assets	10		
Leasehold improvements		98,920	160,630
Office equipment and furniture		8,071	39,043
		106,991	199,673
Fixed asset investments			
Deposits		263,064	258,652
		263,064	258,652
Fixed assets, total		370,055	458,325
Current assets			
Receivables			
Accrued interest		12,234,546	13,769,528
Other receivables		1,225,555	557,195
Deferred charges		114,725	186,844
		13,574,826	14,513,567
Liquid assets			
Securities, bonds	11	3,619,077,321	3,719,381,050
Securities, equities	12	2,238,719,645	2,075,469,061
Bank deposits	13	34,679,080	38,493,796
		5,892,476,046	5,833,343,907
Current assets, total		5,906,050,872	5,847,857,474
ASSETS, TOTAL		**5,906,420,927**	**5,848,315,799**
EQUITY AND LIABILITIES			
Net capital		5,902,979,409	5,845,990,185
Payables			
Short-term payables			
Payables and back costs		3,441,518	2,325,614
Payables, total		**3,441,518**	**2,325,614**
EQUITY AND LIABILITIES, TOTAL		**5,906,420,927**	**5,848,315,799**
Distribution obligations	14c		
Contingent liabilities	15		

STATEMENT OF CHANGES IN NET CAPITAL FOR 2021

	Non-Predisposed capital	Predisposed capital	Total Net Capital
Net Capital at January 1, 2021	4,383,562,270	1,462,427,915	5,845,990,185
Result for the year	416,955,746	0	416,955,746
Distribution disbursed in the year	0	-359,966,522	-359,966,522
Grants transferred from non-predisposed capital	-236,795,504	236,795,504	0
Net Capital at the end of the year	**4,563,722,512**	**1,339,256,897**	**5,902,979,409**

According to the Danish Executive Order no. 325 of March 29, 2016 on the financial management of the funds of the Danish National Research Foundation, the foundation's net capital consists of the capital contributed at the formation of the Danish National Research Foundation, the return on this capital and public grants less subsequent spending and losses.

The predisposed capital includes the commitments given to the grantees of the Danish National Research Foundation to carry out the operating activities, which have not yet been paid at the balance date; see the specification in note [14a].

NOTES 1-4

	2021	2020
1 OTHER RECEIPTS, NET		
Private donation	500,000	500,000
Other receipts, total	**500,000**	**500,000**
2 CUSTODY AND BANK FEES, ETC.		
Bonds	3,205,504	3,259,165
Equities	160,011	207,416
Fees, portfolio managers	**3,365,515**	**3,466,581**
Bank	8,408	7,937
Other	42,520	15,266
Custody and bank fees, total	**3,416,443**	**3,489,784**
3 SALARIES ETC.		
CEO and board members	2,784,897	2,678,404
Severance pay provision	692,257	0
Salaries, other employees	4,793,706	5,321,560
Wage reimbursement	-27,523	-8,837
Pension costs	711,082	776,827
Danish Labor Market Supplementary Pension Scheme (ATP)	38,235	65,217
Salaries etc., foundation staff, total	**8,992,654**	**8,833,171**
Average staff number, accounting year	10	11
4 OFFICE EXPENSES		
Office supplies	10,748	17,106
Postage and freight	4,980	12,551
Telephone, Internet	216,005	148,099
Minor acquisitions	77,212	90,782
Journal, books, etc.	18,634	17,829
Servicing contracts etc.	250,210	250,191
Office expenses, total	**577,789**	**536,558**

	2021	2020
5 PREMISES		
Rent of office	789,189	775,956
Electricity, heating	60,669	68,518
Cleaning	154,528	148,012
Repairs and maintenance	972	12,672
Premises, total	**1,005,358**	**1,005,158**
6 ACCOUNTANT/ATTORNEY REMUNERATION ETC.		
Accountant remuneration, Deloitte	242,500	239,375
Accountancy consultation, Deloitte	0	2,312
Attorney's remuneration	715,531	419,172
Other consultancy services	214,054	410,644
Accountant/attorney remuneration etc., total	**1,172,085**	**1,071,503**
7 EXTERNAL EXPENSES, RESEARCH ACTIVITIES		
Peer review expenses	10,891	203,065
Preparation of publications	378,153	133,750
Research presentations, meetings etc.	184,315	7,643
European Science Foundation, Science Europe membership fee	34,436	64,452
External expenses, research activities, total	**607,795**	**408,910**
8 OTHER EXPENSES		
Travelling and accomodation	134,948	118,431
Advertising	7,081	2,681
Entertainment expenses, gifts	240	510
Courses	29,878	50,738
Insurance	107,923	89,929
Cost of staff and board	61,860	70,281
Other expenses, total	**341,930**	**332,570**
9 DEPRECIATION		
Leasehold improvements, see note 10	61,710	61,710
Office furniture and equipment, see note 10	30,972	40,722
Depreciation, total	**92,682**	**102,432**

	Leasehold improvements	Office equipment and furniture	Total
10 TANGIBLE FIXED ASSETS			
Acquisition cost, January 1, 2021	2,327,492	1,275,321	3,602,813
Additions	0	0	0
Disposals	0	0	0
Acquisition cost, December 31, 2021	**2,327,492**	**1,275,321**	**3,602,813**
Depreciation, accumulated, January 1, 2021	-2,166,862	-1,236,278	-3,403,140
Depreciation for the year	-61,710	-30,972	-92,682
Reversed depreciation, disposals for the year	0	0	0
Depreciation, accumulated, December 31, 2021	**-2,228,572**	**-1,267,250**	**-3,495,822**
Book value at year-end	**98,920**	**8,071**	**106,991**

	2021	2020
11 SECURITIES, BONDS		
Asset classes		
Danish bonds	1,847,902,156	2,101,684,215
European corporate bonds	562,107,117	547,607,262
Global inflation-linked bonds	646,352,495	643,043,448
US High yield bonds *	562,715,553	427,046,125
Bonds, total	**3,619,077,321**	**3,719,381,050**

* Option adjusted duration, December 31, 2021: 4.03 (December 31, 2020: 3.54)

Danish bonds

Distribution by type of security:		
Mortgage bonds	1,847,197,874	2,071,940,060
Government bonds	0	29,006,509
Other bonds	704,282	737,646
	1,847,902,156	**2,101,684,215**

Option adjusted duration December 31, 2021: 5.37 (December 31, 2020: 3.50)

	2021	2020
11 SECURITIES, BONDS (CONTINUED)		
European corporate bonds **Distribution by rating category and forward currency contract:**		
AA	7,307,393	38,968,648
A	135,074,340	124,623,051
BBB	419,725,384	383,720,778
Collateral	0	294,785
	562,107,117	**547,607,262**

Rating category according to Standard & Poor's Long-Term Credit Rating.
Option adjusted duration, December 31, 2021: 5.14 (December 31, 2020: 5.20).

Global inflation-linked bonds **Distribution by country and forward currency contract:**		
Canada	9,553,826	14,707,210
Germany	21,174,471	24,314,744
France	70,410,798	76,247,716
Great Britain	61,262,403	75,559,689
USA	438,217,167	416,815,498
New Zeeland	21,138,369	21,886,564
Sweden	3,495,638	3,319,483
Australia	22,740,621	5,128,163
Forward currency contracts	-1,640,798	5,064,381
	646,352,495	**643,043,448**

Adjusted duration, December 31, 2021: 2.72 (December 31, 2020: 2.71).

	2021	2020
12 SECURITIES, EQUITIES		
Nykredit Invest Globale Aktier Basis	291,047,470	110,527,251
NT World Custom ESG Equity Fund	573,175,253	547,610,812
NT World Custom ESG EUR HDG EQY	571,702,621	553,109,475
Danske Invest Global Indeks, klasse DKK W d	553,397,183	566,447,900
GW&K Emerging Markets Equity Fund	248,803,781	288,131,743
Forward currency contracts and swaps	593,337	9,641,880
Equities, total	**2,238,719,645**	**2,075,469,061**

13 LIQUID ASSETS		
Cash	5,228	2,422
Current bank accounts	1,784,431	373,190
Portfolio accounts	32,889,421	38,118,184
Liquid assets, total	**34,679,080**	**38,493,796**

14a DISTRIBUTION OBLIGATIONS

2021 distributions and total grants, DKK thousand

Grant No		Grant 1st period	Grant 2nd period	Changes in 2021	Grants total	Disbursed 2021	Residual disbursement, expected
Closed grants		3,558,175	2,581,695	0	6,139,870	0	0
Course activities for center leaders/outreach program							
88.	Management course/communication	3,550	7,600		11,150	439	3,066
Centers established 2012							
98.	Centre for Medieval Literature	36,000	24,000		60,000	4,780	2,918
99.	Center for Dynamic Molecular Interactions	49,000	32,700		81,700	6,508	2,313
100.	Center for Permafrost dynamics in Greenland	60,242	39,500		99,742	6,983	3,204
101.	Center for Quantum Devices	64,408	46,900		111,308	7,542	15,980
102.	Center for Financial Frictions	48,000	32,000		80,000	5,473	3,751
103.	Center for Nanostructured Graphene	54,138	36,000		90,138	5,501	3,339
105.	Center for International Courts	42,000	28,000		70,000	7,314	3,393
106.	Stellar Astrophysics Centre	55,000	36,700		91,700	8,357	4,860
107.	Copenhagen Center for Glycomics	62,000	41,507		103,507	8,629	4,882
Centers established in 2015							
115.	Center for Chromosome Stability	65,000	45,000		110,000	11,960	38,374
116.	Center for Stem Cell Decision Making	54,986			54,986	6,013	0
117.	Center for Music in the Brain	52,207	45,946		98,153	9,153	41,997
118.	Center for Carbon Dioxide Activation	60,000	25,000		85,000	6,476	21,616
119.	Center for Urban Network Evolutions	65,000	40,000		105,000	6,795	34,519
120.	Center for Bacterial Stress Response and Persistence	34,814			34,814	918	187
121.	Center for Neuroplasticity and Pain	60,242	25,000		85,242	5,229	23,060
To be carried forward		4,424,762	3,087,548	0	7,512,310	108,070	207,459

14a DISTRIBUTION OBLIGATIONS

2021 distributions and total grants, DKK thousand

Grant No		Grant 1st period	Grant 2nd period	Changes in 2021	Grants total	Disbursed 2021	Residual disbursement, expected
Brought forward		4,424,762	3,087,548	0	7,512,310	108,070	207,459
Centers established in 2015 (continued)							
122.	Center for Intelligent Oral Drug Delivery and Sensing using Microcontainers and Nanomechanics	56,000	40,000		96,000	7,796	36,105
123.	Center for Silicon Photonics for Optical Communications	59,000	41,594		100,594	5,581	37,932
124.	Center for Hyperpolarization in Magnetic Resonance	55,000			55,000	5,611	6,550
125.	Center for Autophagy, Recycling and Disease	50,000	45,372		95,372	15,711	30,161
126.	Center for Personalized Medicine Managing Infectious Complications in Immune Deficiency	60,000	40,055		100,055	9,799	31,078
Niels Bohr Professorships established in 2016 and 2017							
127.	Rita Felski, University of Southern Denmark	27,997			27,997	2,138	931
128.	Matthew Collins, University of Copenhagen	30,860			30,860	7,203	986
129.	John McGrath, Aarhus University	29,948			29,948	5,408	2,070
130.	Thomas Pohl, Aarhus University	25,255			25,255	1,016	387
131.	Morten Bennedsen, University of Copenhagen	29,909			29,909	8,151	1,593
132.	Enrico Ramirez-Ruiz, University of Copenhagen	21,666			21,666	966	138
Centers established in 2017 and 2018							
133.	Center for Proteins in Memory	62,000			62,000	10,534	25,450
134.	Center for Economic Behavior and Inequality	57,000			57,000	9,727	28,357
135.	Center for Cellular Signal Patterns	61,000			61,000	8,379	20,157
136.	Center for Electromicrobiology	56,000			56,000	8,240	13,998
137.	Center for Microbial Secondary Metabolites	58,000			58,000	10,600	28,752
138.	Center for Privacy Studies	50,000			50,000	9,895	15,417
To be carried forward		5,214,397	3,254,570	0	8,468,967	234,825	487,521

14a DISTRIBUTION OBLIGATIONS

2021 distributions and total grants, DKK thousand

Grant No		Grant 1st period	Grant 2nd period	Changes in 2021	Grants total	Disbursed 2021	Residual disbursement, expected
Brought forward		5,214,397	3,254,570	0	8,468,967	234,825	487,521
Centers established in 2017 and 2018 (Continued)							
139.	Center for Hybrid Quantum Networks	62,000			62,000	11,305	19,023
140.	The Cosmic Dawn Centre	66,173			66,173	11,670	39,054
141.	Center for Functional Genomics and Tissue Plasticity	65,000			65,000	10,876	27,268
142.	Center for Macroscopic Quantum States	63,000			63,000	9,749	24,230
Centers established in 2020 and 2021							
143.	Center for Evolutionary Hologenomics	67,654			67,654	14,914	43,845
144.	Center for the Experimental-Philosophical Study of Discrimination	62,626			62,626	5,098	55,859
145.	Danish Center for Hadal Research	54,612			54,612	7,117	46,592
146.	Center for Visualizing Catalytic Processes	85,826			85,826	4,381	79,486
147.	Center for Nanophotonics	62,496		360	62,856	7,349	51,782
148.	Center for Molecular Prediction of Inflammatory Bowel Disease			68,470	68,470	4,826	63,644
149.	Center for High Entropy Alloys Catalysis	61,056		351	61,407	5,122	52,313
150.	Center for Interstellar Catalysis	67,382			67,382	10,478	52,829
151.	Copenhagen Center for Geometry and Topology	60,169			60,169	4,792	52,978
152.	Center for Complex Quantum Systems	66,576			66,576	8,308	57,403
DNRF Chair established in 2020							
153.	Jesper Svejstrup, University of Copenhagen	15,000			15,000	5,916	5,129
155.	Steffan Persson, University of Copenhagen	8,000			8,000	693	7,307
156.	Peter Jørgensen, Aarhus University	7,928			7,928	503	7,425
To be carried forward		6,089,895	3,254,570	69,181	9,413,646	357,922	1,173,688

The number of grants listed in the key figures includes the grants for which the foundation has disbursed in 2021

14a DISTRIBUTION OBLIGATIONS

2021 distributions and total grants, DKK thousand

Grant No		Grant 1st period	Grant 2nd period	Changes in 2021	Grants total	Disbursed 2021	Residual disbursement, expected
Brought forward		6,089,895	3,254,570	69,181	9,413,646	357,922	1,173,688
DNRF Chair established in 2021							
154.	Morten Ørregaard Nielsen, Aarhus University			7,114	7,114		7,114
157.	Vivek Shende, University of Southern Denmark			8,000	8,000	958	7,042
159.	Anders Johansen, University of Copenhagen			8,500	8,500		8,500
Pioneer Centers established in 2021							
158.	Pioneer Center for Artificial Intelligence			144,000	144,000	1,087	142,913
Grant and distribution, total		**6,089,895**	**3,254,570**	**236,795**	**9,581,260**	**359,967**	**1,339,257**

The number of grants listed in the key figures includes the grants for which the foundation has disbursed in 2021

14b ANNUAL DISBURSMENTS

Annual disbursments, DKK thousand

Year	Disbursed	Expected disbursements to activities listed above
1993	19,133	
1994	141,708	
1995	154,509	
1996	176,194	
1997	200,876	
1998	247,751	
1999	243,346	
2000	224,484	
2001	228,789	
2002	256,877	
2003	239,915	
2004	173,489	
2005	195,185	
2006	195,225	
2007	242,803	
2008	321,277	
2009	274,998	
2010	387,270	
2011	358,754	
2012	390,990	
2013	423,039	
2014	435,944	
2015	424,512	
2016	381,286	
2017	384,769	
2018	409,291	
2019	414,417	
2020	335,205	
2021	359,967	
To be carried forward	8,242,003	

Year	Disbursed	Expected disbursements to activities listed above	Total
Brought forward	8,242,003		
2022		447,391	
2023		394,621	
2024		245,107	
2025		122,799	
2026		55,503	
2027		15,245	
2028		14,158	
2029		13,115	
2030		12,419	
2031		10,302	
2032		4,298	
2033		2,863	
2034		1,436	
	8,242,003	**1,339,257**	**9,581,260**

The disbursements specified above are distributed according to the expected year of disbursement.

Disbursements are made on the basis of the grant holders' revised budgets. In consequence, the final presentation of accounts to the foundation may result in adjustments of the disbursements for the following years.

14c EXPECTED DISTRIBUTIONS 2022-2026

In addition to the distribution obligations listed in notes 14a and 14b, new grants are expected to be established as a result of application rounds for Centers of Excellence, DNRF Chair and Pioneer centers. Total (including given and planned) distributions are expected to be as follows:

Year	Million DKK
2022	493
2023	519
2024	458
2025	589
2026	539
	2,598

15 CONTIGENT LIABILITIES

The foundation has to give six months' notice to terminate the tenancy agreement. The obligation amounts to DKK 405,048

The foundation has entered into forward currency contracts and swaps for the purchase and sale of the following currencies (amounts calculated in the currencies in question):

		2021
Currency	Purchase	Sale
USD	11,860,543	193,972,661
JPY	127,741,307	1,403,284,434
CAD	1,240,000	3,073,000
EUR	201,678,963	15,854,461
GBP	423,000	7,300,000
NZD	1,360,000	6,030,000
AUD	48,000	4,779,000
DKK	16,302,000	16,302,000
SEK	58,000	4,830,000

		2020
Currency	Purchase	Sale
USD	3,167,108	177,951,768
JPY	35,646,319	1,362,697,815
CAD	0	3,075,000
EUR	175,899,068	4,128,631
GBP	97,000	9,280,000
NZD	0	4,990,000
AUD	1,571,000	2,675,000
DKK	0	9,900,000
SEK	52,000	4,517,000

The market price of the forward currency contracts and swaps as of December 31 is set at the value of the securities in question, see notes 12 and 13.

The foundation has entered into interest-rate futures for the purchase and sale of the following, calculated in the currencies in question:

		2021
Currency	Purchase	Sale
EUR	4,300,000	0

		2020
Currency	Purchase	Sale
EUR	4,100,000	600,000

The market price of the interest-rate futures as of December 31 is set at the value of the securities in question, see note 12.

Secretariat

The composition of the secretariat March 2022 was as follows:

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Audit
The Office of the Auditor General and a chartered accountant shall audit the foundation's annual accounts. The board appoints the chartered accountant for a three-year term and the chartered accountant has to be approved by the Minister for Higher Education and Science. Jens Sejer Pedersen (Deloitte), State Authorized Public Accountant is appointed for the period May 1, 2019 to Maj 31, 2022.

Editors
Morten Andreasen
Steen Marcus
Søren-Peter Olesen
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