DEPARTMENT OF BIOSCIENCES (IBV) – STRATEGY 2020 REVISITED

ABOUT THE DEPARTMENT

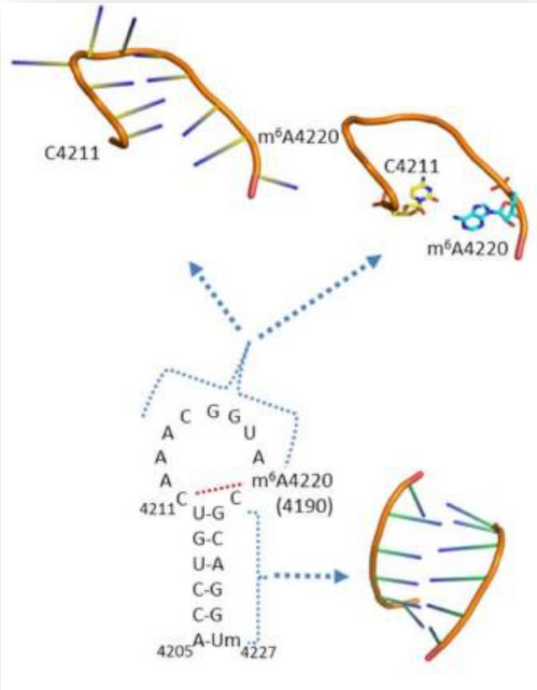
The Department of Biosciences (www.mn.uio.no/ibv/) was formed in 2013 by merging the Department of molecular bioscience with Department of Biology. The whole Department is located in Kristine Bonnevies*[1] house and is organized in **five research sections**:

- Section for Aquatic biology and toxicology (**AQUA**)
- Section for Biochemistry and Molecular Biology (**BMB**)
- Centre for Ecological and Evolutionary Synthesis (**CEES**)
- Section for Genetics and Evolutionary Biology (**EVOGEN**)
- Section for Physiology and Cell Biology (**FYSCELL**)

The research spans the whole domain of biology from biochemistry, molecular biology, physiology, cell biology and genetics to aquatic biology, toxicology, ecology, and evolutionary biology – and combinations thereof.

IBV operates 12 infrastructure core facilities for research and each core facility is affiliated and operated within its relevant Research Sections.

Education across these topics is offered for around 380 bachelor, 170 master, and 75 PhD students. With 52 permanent professors/associate professors as well as post-docs, researchers, technical, and administrative personnel, the Department has a total staff of about 300 from more than 30 different countries.



IBV operates a **Recourse Centre for Biology** connecting high school biology to University studies and being responsible for the national biology Olympiad.

The 21st century has been named "**the century for Biology**" and research is expected not only to take advantage of the information in the human genome, but also to gain insight on fundamental mechanistic insight from from molecular and cellular levels to populations and ecosystems. IBV includes biologists across disciplines with the ambition to create an impactful Department spanning the depth and breadth of biology.

IBV share the values and the strategies of the University of Oslo; **Knowledge – responsibility – commitment: For a sustainable world** (www.uio.no/english/about/strategy/strategy-2030/) and our Faculty; **Knowledge development in a changing world – science and technology towards 2030** (www.mn.uio.no/english/about/strategy/).

*[1]Kristine Bonnevie, (1872-1948) became the first female professor in Norway in 1912. Her research focused on cytology, genetics and embryology. Figures: top right, cured fish representing excellent research at IBV (CEES), bottom left, adenosine methylation at the 28S ribosomal RNA stem loop (Nucl Acids Res 2020, 48, 830-46)

I) Research

Biological research is fundamental for the management of natural resources, sustainable food production and future production of pure energy. The understanding of basic molecular mechanisms is the foundation of the design of novel disease medication and treatment modalities, and for the understanding of specie variation and interaction. Furthermore, the development of high-throughput data necessitate collaborations cross disciplines and the "grand challenges" of biological research is expected to require convergence science. IBV aim to strengthen its research position as a leading national research Department and to increase the number of international leading research groups.

- IBV shall have strong international research groups at several subject areas within the Departments width.
- International leading research groups should receive support to maintain this position.
- IBV shall support research groups with a realistic chance, and ambition, to reach top international level within 3-5 years.
- IBV shall attract candidates at high international quality for permanent and temporary positions.

IBV has some **research groups at high international level** that are highly competitive on the national and national arena for external research funding. The impact of these research groups must be maintained and this must include prioritized recruitment that complement their activity. At the same time, IBV has several smaller research groups that cannot compete for external funding. Internal resources should be used to strengthen their ability for obtaining external grants and reach their scientific potential. Smaller research groups, less than 3 100% positions, should integrate with larger complementary research groups to fully reach their scientific potential.

Many research groups at IBV are highly competitive for obtaining national research support and some compete well on the international arena. In recent years, young researchers at IBV has been very successful in obtaing **ERC starting grants**. IBV has to develop attractive support for these researchers to continue their work at IBV. With the proposed substantial reduction in funds from the Norwegian Research Council (the FRIPRO program), effective from 2022 until 2027, it becomes vital that IBV researchers obtain support elsewhere. The Faculties EU and horizon Europe office assist IBV for obtaining international support. The Faulty

One of the priorities of the University of Oslo is to deliver on the **UN sustainable development goals** that affect all sectors of society (https://sdgs.un.org/goals). IBVs research and educational profile is very well suited for this priority and we aim to further strengthen this position in the coming years with our recruitment policy and project development.

IBVs employees, at all position category, are required for the Department to reach its goal regarding research and research based education. More than half of the scientific employees are PhD students, post docs and researchers with temporary positions. Many temporary researchers obtain their own research funding, including their own salary. A Faculty working group is currently developing a strategy for career development of temporary scientific employees and IBV takes part in this work. IBV must develop the career of temporary employees for the UoH sector as well as for a scientific career.

Professional management must support scientific excellence and academic freedom. To achieve this, administrative and technical staff, students and scientists must join forces. Likewise, the Department is a swarm of people with different background, life experiences and cultural rising that must be respected and met with openness.

Modern biology research requires access to state-of-the-art infrastructure and environmental sampling. The department includes twelve **research Infrastructure** units with heavy equipment and/or highly competent technical staff that works closely with the scientists both for research and educational services (https://www.mn.uio.no/ibv/english/research/infrastructure/index.html). Most of these facilities can be hired for research activities. Three of these facilities are national research infrastructures; DNA sequencing (specializing in long reads), proteomics and advanced light microscopy. The advanced light microscopy

facility is also part of the euro-imaging network. These infrastructures are key to IBVs position in bioscience but also economical challenging. At present, the future of several infrastructures is being evaluated for being co-localized with complementary facilities from other Faculties in the Life Science Building and/or being administratively coordinated.

II) Research dissemination and Innovation

IBV shall actively disseminate bioscience for the understanding of its role in social and business development and for politicians and other leaders to make knowledge-based decisions.

- IBV shall have a systematic and outwardly directed dissemination activity.
- Employees must be encouraged and supported for their dissemination activities.
- Employees should participate public debates.
- Employees must be supported for bringing their research project to innovation, when possible.
- IBVs Recourse Centre for Biology have a unique profile that must be used to increase knowledge in bioscience in schools and to motivate and inspire youth.

Active dissemination of bioscience is crucial for attracting students and employees and to obtain funding for research dissemination. Moreover, it is also a key for connecting the Department to industry and for career development of our students.

In line with this, employees at IBV are frequently in the media, they contribute to the scientific and public debate regarding sustainability and biology in general. Several employees at have successfully launched books spanning from children's book (e.g. "The animal book of records" that is translated to more than 20 languages) to popular science books and science books. Recruiting students to science in general, and to bioscience, is one of the objectives of our dissemination activity.

At present, very few projects at IBV has been advanced for innovation (*probably some project I don't know off*). In order to improve on the gap from science to innovation that currently exist at the Department, and the Faculty, a newly established Life Science Growth House (www.uio.no/english/interfaculty-research-areas/life-science-growth-house/) will contribute to a stronger innovation culture. IBV need to stimulate all scientific staff, including MSc students, to apply for grants from the growth house and to mature their early-stage ideas.

III) Education

Teaching is one of the major assignment of IBV and IBV shall offer education at the highest level, being inspiring and occupationally relevant. Students should flourish and reach their individual potential. All employees should value teaching equal to research.

- Our educational program shall build on the knowledge and skills expected by relevant employers and for building advanced competence of research in bioscience.
- Our educational programs should cover the width of IBV and allow for convergence with other units at UiO.
- IBV shall have an inspiring learning environment.
- The loss of students from the 1^{at} to the 3rd semester must be reduced.

In 2017 a new BSc program in "Bioscience" was established by merging the two programs "biology" and "molecular biology and biological chemistry". This program includes modelling and computational biology, fundamental for all genus of bioscience. A working group representing all sections at IBV is currently revising the program. After 4 years of relatively few new bachelor students at IBV (100 every year), we are happy to have reached our full capacity with 160 new students autumn 2022. Most students at IBV starts with a **curiosity** for understanding nature as a whole physical universe and/or understand the small nature in a cellular or

biochemical scale. Our education and teaching should further boost this curiosity and provide basic and state-of-the-art knowledge in the depth and width of bioscience. Our students shall learn to reflect on their knowledge and be encouraged to participate in the public debate with knowledge-based information.

The **MSc** work is for most students their first meeting with independent research. Modern bioscience often requires complementary cutting-edge expertise in a group setting. MSc students therefore must be integrated in a group setting to also obtain experience in collaborative work, scientific presentations and writing.

PhD students must acquire solid research education that in addition to generic research skills should include communication skills to various audience, manuscript and application writing as well as project management. PhD students with 25% required duties should obtain teaching responsibilities, or other scientific work, to become a resource for IBVs educational program.

Internationalization should be pursued at all levels, including BSc, MSc and PhD students. In particular, PhD students should obtain international training, and vice versa; their supervisors should ideally be attractive hosts for getting national and international collaborators.

Picture: Finse Alpine Research Centre