bioCEED

Centre for Excellence in Biology Education

Annual report 2019

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Front page photos: Ine Moksness, Jonathan Soulé, RealfagUiB

SUMMARY

In 2019, bioCEED has continued to develop biology educations to fill future needs in science and society, and to facilitate the scholarship of teaching and learning across higher education in Norway and beyond. We are continuing to develop and researching the impacts of various bioCEED projects and innovations, mainstreaming successful innovations into institutional structures and processes, and constructively aligning different initiatives across courses and programs. These activities are guided by our four focus areas – learning culture, innovative teaching, practical training, and outreach.

The development and promotion of a collegial teaching culture – *a learning culture*, based on SoTL and inspired by the research culture, is a major success and impact of bioCEED. We use this culture as a tool to motivate a systematic development of education through teacher and student driven activities and projects. In all projects, we aim to involve students and staff to ensure quality and systematic development, as well as involve, inform and include students and staff as part of the teaching and learning community. An important 2019 priority has been to mainstream bioCEED innovations into the relevant formal structures and fora (e.g., programs, institutional strategies and systems, decision-making structures, policies, rules and regulations at local to national levels) to secure continuity beyond the center period and application beyond the center and our host departments. At the same time, bioCEED has branched out to include students and staff from across disciplines in our activities and projects. For example, a new priority at bioCEED, driven in part by the faculty's redesign process, has been to work more systematically with how we train and make use of teaching assistants of various kinds in our educations. Mainstreaming and synchronizing the feedback that students get across the curriculum, e.g., with respect to writing, research skills, and self-guidance, is a key component of this. Toward this end, the bioCEED Collegial Project course 2019/20 was specifically designed to support the Faculty of Mathematics and Natural Sciences` (UiB) process to redesign bachelor`s programs to strengthen generic skills and competences. The course has participants from several departments representing a range of education and teaching staff positions, from administration, postdocs, PhDs, librarians to professors.

We have added to our portfolio of *innovative teaching and practical training* research and development projects, both with internal and external funding and cooperation.

We continue to develop, test, and research innovations such as digital learning tools, learning platforms, and various forms of practice to support student learning. bioCEED currently has 3 PhD students researching different aspects of learning and educational development. We research education locally within biology and STEM educations, and nationally and internationally with partners in other disciplines and at other institutions. In 2019, Torstein Nielsen Hole completed his PhD degree with the dissertation «Learning through practice in biology education». PhD student Marius Ole Johansen research learning and teaching resources in mathematics, statistics and modelling in biology education, while PhD student Anja Møgelvang Jacobsen will research cooperative learning in STEM courses at UiB. Within the ArtsAPP project, Lucas Jeno research m-learning, in addition to his research on student and teacher motivation. Within RECITE and associated projects, Vigdis Vandvik and partners are researching student practice in research, and its impact on learning. Adjunct professor Sehoya Cotner investigate how different teaching methods affect

student learning and engagement in STEM courses at UiB and UNIS, and Oddfrid Førland (PhD, Lund University) researches change processes in higher education. Jorun Nylehn supervise a group of teacher education master projects on learning in biology. bioCEED support and champion development and knowledge production locally and nationally through leading and participating in projects and contributing to developing skills and competences of staff and students. In 2019, bioCEED secured funding from DIKU for two Active Learning development projects[1]. In addition, two student active research projects were funded by the Thon Foundation[2].

Our *outreach* activities progress through standard channels such as workshops, presentations, and publications, but also through digital tools and platforms and through working towards educational policy. As part of this research and development, we

develop a variety of tools and platforms in collaboration with students and staff – these resources are open and free for all to use. In 2019, the platform bioWRITE has been developed and gone live, and bioSTATS is now going through a major revamp and will be developed in collaboration with a national development team – promising for a continued to expansion of content and audience. Students-as-partners are an important and essential priority for bioCEED. Students are involved in bioCEED in a variety of roles; they initiate, participate, contribute to and lead projects and activities in collaboration with bioCEED, and with our partner institutions. Our students continue to run and develop bioBREAKFAST, biORAKEL, bioSPIRE and UNISprout with increasing impact and success. A 2019 highlight is the dispersals and successful sprouting of related initiatives at other departments and institutions! The work placement and research placement courses are running at both BIO and UNIS to provide students with relevant and authentic experience as part of their education. bioCEED is an active voice in policy development. bioCEED, along with BIO and UNIS staff, has lifted discussions on assessment regulations at several national conferences, and in op-eds and discussion papers nationally and internationally. bioCEED was invited to provide feedback and suggestions for a White Paper on Work Relevance (Arbeidsrelevansmeldingen). Our reply to the Ministry can be read here.

Planning exit and continuation strategy has required significant focus and resources in 2019. As we are the first SFU at our host institutions, and among the first SFUs to reach the end of the center period nationally, we need to break new ground in terms of how institutions and local academic environments should think about and work towards the post-SFU period. We have had fruitful discussions with our largest host, UIB, at all levels, and are discussing our own activities, and more generally how academic development units and activities could and should be organized and developed longer-term. bioCEED work to sustain and mainstream the academic development focus that the SFU has created locally, and also to creating win-win opportunities between central resources and local needs and opportunities in the institutions.

[1] UiB: Student active research and generic skills in redesign of the biology education, and UNIS: Development, testing and evaluation of tools and assessment forms that promote constructive alignment in field teaching
[2] UiB: studentaktiv forskning – fra vugge til grad, and UNIS: Field laboratory for education and research

Focus area 1: Learning culture and educational leadership

The development and promotion of a **collegial teaching culture**, based on SoTL and inspired by the research culture, is a major success and impact of bioCEED. In 2019, we have continued our effort to broaden and deepen, assess, document and disseminate, and institutionalize activities and processes towards strengthening the collegial SoTL learning culture within our host institutions[3]. Nationally and internationally, we have moved from case-based sharing of experiences with various actors towards more general and wide-reaching impacts on the HigherEd community and policy through participation in various fora and processes. This engagement beyond our host institutions is now involving an increasing number of bioCEED staff and students.

A second important bioCEED outcome is our role in stimulating and guiding the development of **strong educational leadership** that recognizes and explicitly values effective teaching practices and high-impact contributions to the learning culture. We work to strengthen the evidence-base, identify success factors, and promote development of mechanisms locally and across the HigherEd sector in Norway and internationally.

For both teacher culture and educational leadership, specific actions are described and monitored through our Phase 2 Action plan. An overview over activities and outputs can be found in the project and dissemination lists in the Appendix.

HIGHLIGHTS FROM ACTIVITIES AND RESULTS WITHIN FOCUS AREA 1 IN 2019:

Collegial activities and local development projects

bioCEED has a number of collegial activities aimed primarily on our local teaching and learning staff and students, but open to other interested audience from UiB and other HE institutions. Activities are announced through our newsletter and other channels and streamed if possible and appropriate. The bioCEED seminar series deal with different teaching and learning topics, and we arrange workshops for teaching staff to work on topics like supporting students develop as academic writers, digital tools, the use and usefulness of student evaluations and writing teaching portfolios (see Appendix for overview).

We offer support and encourage teachers and students to participate in national and international conferences, seminars and workshops on teaching and learning.

bioCEED also support teachers that work to develop, test and document the impacts of new teaching and learning methods in biology. Teachers can apply for small grants of up to 50 KNOK from bioCEED to support research and development projects in biology education. In addition, we provide support, supervision and funds for master students in teacher education and pedagogy with projects related to bioCEED and learning in Biology. These projects are described under Focus area 2.

[3] see the description of Collegial Project Course, Learning Forum, Teachers retreat, BIO100-club etc [Focus Area 2] below

"The BIO100-club"

The BIO100-club consists of the course leaders for BIO-courses in the BIO BSc in biology at UiB. The club has monthly meetings, discussing teaching and learning in biology, focusing on aligning the introductory level (100-courses) in particular. The 100-club has worked on a thorough curriculum mapping of the competence academic writing, focusing on writing as a general skill, and the IMRaD structure in particular. The work was presented to the BIO Education Committee (Programstyret) and at the Annual Teachers Retreat. Members of the 100-club has taken this work further in collaborating with bioWRITE. The club continues the process of curriculum mapping topics of importance for biology education, and defining a "learning ladder" for knowledge, skills and competences throughout the program, while at the same time contributing to the development of a common, shared platform of resources (bioSKILLS, including bioSTATS, bioWRITE, bioLAB etc.) to use in the bachelor courses taught at BIO. The course leaders of BIO100, BIO101, BIO102, BIO103, BIO104, MOL100 are represented in the BIO100-club, together with the head of educational development at BIO and an administrative secretary.

The Collegial Project course - Teaching and Learning in Biology/STEM

2019/20

Led by adjunct associate professor Roy Andersson, bioCEED has run the Collegial Project Course since 2015. In the 2019/20 version the course was co-taught by associate professor Jorun Nylehn (BIO). The 2019/20 course was designed to support the Faculty of Mathematics and Natural Sciences` (UiB) project to redesign bachelor`s programs to strengthen generic skills and competences[4]. A major component of the course is educational development SoTL group projects relevant to different aspects of the generic skills project and the teachers own interest and teaching practice.

The course was announced to all department at the MN-Faculty, and participants were recruited from Earth Science, Chemistry, Informatics, the MN Faculty administration and the University library, in addition to BIO. This year's participants represent a range of educational and teaching staff from administration, postdocs, PhDs, librarians and professors.

2018/19

The MNT Conference 2019 in Tromsø was chosen to be the venue for the final project presentations in the 2018/19 bioCEED Collegial Project Course – Teaching and Learning in STEM. The participants submitted their proposals to the conference and passed through the conference peer-review process and were all accepted! Our four course groups presented their projects in the parallel sessions, and also participated in the full conference. The course leader reports that they all passed with distinction! You will find their full papers in the MNT2019 Conference proceedings.

- Use of Active Learning Methods and Technologies – Obstacles, Incentives, and Bottlenecks, by Katja Enberg, Ståle Ellingsen and Ida Helene Steen (BIO UiB)

Figure 1. Katja Enberg presenting the group project at MNT Conference2019. Photo: bioCEED

[4] More about the Generic Skills Project at MN-UiB: https://www.uib.no/matnat/128145/prosjekt-generiske-ferdigheter-ved-det-matematisk-naturvitenskapelige-fakultet#praksisemne

- Learning by doing and reflection: the redesign of an alpine ecology field course, by Ragnhild Gya, Siri V Haugum, Franscesca Jaroszynska and Jorun Nylehn (BIO UiB)
- Entry and Exit Surveys As a Tool for Aligning Learning Goals, Alexander Eiler, Tom Andresen, Stein Fredriksen, Kyrre Grøtan, Karoline Saubrekka, Josefin Titelman (IBV, UiO)
- Learning Outcomes at Master Level in Biology. Current Expectations and Guidelines for the Future, by Selina Våge, Aina-Cathrine Øvergård, Mariann Eilertsen, Florian Berg and Jorun Nylehn (BIO UiB)

To investigate how course participants experience the method of using educational conferences as a venue to present their course projects, Roy Andersson and Oddfrid Førland conducted a small qualitative follow-up study with the course participants from two course cohorts. Teachers reported that presenting their course work at a real conference had great added value for them, and that sharing their work with a community that had an interest in teaching and learning was a very positive experience. However, they also reported a high workload and a feeling of insecurity when presenting work within a field that was not their home turf. The overall experience was highly appreciated, and participants reported that the fact that their work was to be presented at an educational conference ("it was for real!") increased both effort and quality of the work and added meaning to the course project.

Learning Forum at UNIS and Teachers Retreat at BIO-UiB

bioCEED continues to support a professional and scholarly teacher culture at our institutions and departments through the annual Learning Forum at UNIS and Teachers Retreat at BIO. Both these happenings are now well established, and participation is high. Teachers contribute to the knowledge and experience exchange and development, supported and inspired by invited speakers that offer new perspectives and knowledge.

In October, the sixth annual UNIS Learning Forum[5] took place with 65 participants from across all departments, including administrative and technical staff. For the first time student representatives from all departments were invited to participate on some of the joint session in addition also having their own workshop on group dynamics in collaborative work. Also, this year's Learning Forum was aimed primarily at promoting a collegial sharing practice over teaching. Through sharing sessions staff talked about their experiences and thoughts on different teaching and learning methods and aspects of course planning – like use of virtual and digital tools in classroom and field teaching, new assessment methods and preparation and structuring of fieldwork. The interdepartmental DIKU-founded research project on field teaching (FieldPass) was a part of the program as well involving a workshop on assessing learning outcomes achieved through field teaching.

At the annual Teachers Retreat at BIO-UiB[6], the overarching topic was redesign of the bachelor`s program in Biology. This represents the one of the steps in the Texas A&M redesign-model[7] that are tested at BIO; the first step being *Defining goals and visions for the study program and teaching environment with the teaching staff,* and this was the theme for the teachers retreat. The retreat was organized as a design thinking workshop, facilitated by Linda Herfindal Lien. A student panel was

[5] More on Learning Forum: *https://bioceednews.w.uib.no/2019/11/04/the-annual-learning-forum-at-unis-october-2019/*
[6] More on Teachers retreat: https://bioceednews.w.uib.no/2019/12/09/annual-teachers-retreat-at-bio/
[7] (RE)design model Texas A&M: https://cte.tamu.edu/Program-ReDesign

invited to present their work from the student-workshop held before Teachers Retreat: how to create the best biology education for the future. This led to a fruitful discussion amongst students and teacher about the current bachelor's degree in biology, and what out aims for the future are.

Although these collegial meeting places are well established and has become part of the annual routine at UNIS and BIO, we need to stay relevant and interesting to secure continued participation and engagement. bioCEEDs requirement is that the forum/retreat must have an educational development focus, and we support and contribute with funds and competence to the program. Our departments identify the topics most relevant and needed each year, and adapt working plans and teaching schedules to allow for participation (e.g. at UNIS there is no scheduled teaching during Learning Forum).

Participation and engagement are high. We have now found a good balance of external input from invited speakers, and contributions and experience sharing from our own staff. Feedback from the participating teachers and staff indicate that they value the activity.

bioCEED contribution to quality work in Higher Education

Excellent teaching practitioner and the Pedagogical Academy – our merit system for teaching

bioCEED continues to be a resource for our institutions in developing merit system for teaching – the Excellent Teaching Practitioner and the Pedagogical Academy at the Faculty of Mathematics and Natural Sciences, UiB, beyond the flagship and testbed. bioCEEDs contribution to developing, establishing and running merit systems elsewhere is growing – both locally, nationally and internationally:

- bioCEED staff participate in the administration of the merit system at MN-UiB
- bioCEED staff support and advice other departments and institutions in developing their merit systems
- bioCEED staff give workshops, courses and guidance for teachers developing their teaching portfolios and applications
- bioCEED staff research the merit systems in collaboration with Centre for Engineering Education, LTH.

National Forum for Educational Leadership in Biology

The National Forum for Educational Leadership in Biology was initiated by bioCEED as a forum under the *Biofagrådet* to provide educational leaders in at Norwegian HE institution with a forum dedicated to sharing experience and collaborate over biology education and educational leadership.

In 2019, there have been little activity in the national forum for educational leadership in biology. Center leader Vigdis Vandvik led a session for Biofagrådet on Quality Culture in Education.

In 2020 bioCEED will take a more active in the forum to increase activity and establish joint projects across biology education in Norway.

Educational strategy work UNIS - Quality Assurance and course evaluation

Through 2019 we have continued with our contributions to the developmental work within the Quality Assurance System at UNIS. The guideline "Writing Learning Outcomes" is launched on UNIS's resource page "Educational Quality in Teaching and Learning". The guideline gives teachers at UNIS the opportunity a better understanding of how to write good learning outcome descriptors when revising or planning new courses. As a part of the toolbox also a guideline on how to film lectures have been developed and made available through the resource page.

bioCEED has contributed within the work of a new standardized research-based student course evaluation form that will be tested out in 2020 at UNIS. The form mainly measures the different aspects of students learning experience connected to deeper learning. The aim with the new evaluation form is to give important feedback to the teacher developing the course as well be an important part of the quality assurance system.

MN-UiB Generic skills in BSc

The faculty of Mathematics and Natural Sciences (UiB) project to strengthen and align generic skills in the bachelor's degrees is progressing[8]. bioCEED nominated the process to UiBs Educational Quality Prize (Ugleprisen) for 2019. bioCEED staff and students continue to contribute to the process both locally and at Faculty level. The Pedagogical Academy hosted a kick-off seminar for teaching staff across the Faculty, where bioCEED contributed with a talk on program design. To strengthen the process of program redesign focusing on generic skills at BIO, and secure alignment between our redesign process and the Faculty redesign process, bioCEED hired Birthe Gjerdevik (education admin advisor at MN Faculty) 20% in 2019.

Contributions to national policy and regulations

As teaching and assessment methods develop to be more student active and constructively aligned, we find that the policies and regulations sometimes can be a hinder for this development. We wish to contribute to a change in our local and national regulations that support educational quality and development. We also advocate a knowledge-based approach to decision making and evaluation of Higher education.

- bioCEED, along with BIO and UNIS staff, has lifted discussions on assessment regulations at several national conferences.
- bioCEED was invited to provide feedback and suggestions for a White Paper on Work Relevance (Arbeidsrelevansmeldingen). Our reply to the Ministry can be read here.
- bioCEED staff had an op-ed in Khrono on the annual Study Barometer (student survey on education) encouraging NOKUT to revise the current survey to make it more knowledge-based and useful for the HE Institutions. This op-ed was part of an ongoing discussion about Studiebarometeret. Nokut will invite us to a development discussion in June.
- BioCEED has sent hearing comments to The Norwegian Research Council's policy on open science (https://www.forskningsradet.no/siteassets/tall-og-statistikk-seksjonen/apen-

[8] More about the Generic skills project at MN-UiB (in Norwegian) : https://www.uib.no/matnat/128145/prosjekt-generiske-ferdigheter-ved-det-matematisk-naturvitenskapelige-fakultet#praksisemne

forskning/forskningsradets-policy-for-apen-forskning.pdf) and we will send hearing comments strategy (https://www.forskningsradet.no/nyheter/2020/innspill-strategi/)

- We are also planning to comment during the 2020 hearing of the new university and higher education law (UH-loven;https://www.regjeringen.no/no/dokumenter/horing-nou-202-3-ny-lov-om-universiteter-og-hoyskoler/id2690685/).

PhD project Oddfrid Førland

The overarching topic of the PhD project will be change processes in higher education, studied through the interactions and actions of individuals. The project includes studies on reward systems, communities of practice and structured redesign processes at program level. Studies on reward systems support effects on educational quality, institutional policy and culture. However, questions remain on whether – and how - these rewarded individuals influence the culture in their working context. Understanding how rewarded teachers influence teaching and learning cultures has implications for how institutions can use reward systems to support a collegial and scholarly teaching culture. I will investigate the potential influence of rewarded teachers on their peers, by looking at their personal networks to gain insight in *with who* they have conversations about teaching and learning, and whether they experience a change in conversational partners and interactions after the reward. In the second study we explore the role of local leaders and how they, while working with their peers contribute to emerging communities of practice. We will study leadership actions that result in the formation of a Community of Practice. The third study will follow a 3-year structured change process of redesigning a bachelor`s program at BIO-UiB. The model applied - *Program (Re)Design Model for a Learner-Centered Curriculum* has eight distinctive stages where different groups of participants and stakeholders are involved in designing and re-designing course modules and make a coherent whole of the program. This research project will follow the redesign project to investigate how, and to what extent students and the student perspective, are involved, and have agency and ownership of the process.

Students as partners – representatives, leaders and developers

Students-as-partners are an important and essential priority for bioCEED. Students are involved in bioCEED in a variety of roles; they initiate, participate, contribute and lead projects and activities in collaboration with bioCEED, and with our partner institutions. In addition, they are part of bioCEED core team and Board. The core team make day to day decisions and priorities, and the Board oversee our activity and progress. In 2019, we doubled the number of student representatives (from 2 to 4) in Bergen, to ensure a more reasonable workload and broaden representation. Our students continue to run and develop

Figure 2. A model for student partnership – ways of engagement (Healey et al. 2014)

bioBREAKFAST, biORAKEL, bioSPIRE and UNISprout with increasing impact and success[9].

Our student representatives (and staff) have become strong advocates both locally and nationally for a stronger student involvement in the teaching and learning practice and development. They have been invited to speak in different fora, sharing their experience and expertise as student partners. Especially, their experience and knowledge on initiating and running the larger student projects (e.g. biORAKEL) is sought by many, resulting in invitations to present to University leadership, mentor training programs etc. The student representatives have also shared experience with other SFUs[10], and participated in student representative networking sessions, resulting in a closer bond between representatives from different SFUs. The wider student body at BIO was invited to contribute to redesign process for the BSc BIO, through a 2-day workshop. The result of the workshop was presented by a student panel at the Teachers retreat[11]. Students are employed as developers in the bioSKILLS modules (bioSTATS, bioWRITE), and as project assistants on our research projects (e.g. student attitudes, PI Sehoya Cotner; ArtsAPP, PI Lucas Jeno). In other projects, like the Thon funded student active research project Vugge til Grad and the DIKU funded redesign project, students are project leaders and core team members.

Figure 3. bioCEED student representatives Mari Sofi Brekke Brastad (bottom left), Pernille Eyde Nerlie (bottom middle), Ørjan Vabø (bottom right), Anne Bruls (top left) and Sondre Olai Spjeld (top right).

[9] See description under each project in Focus area 2.
[10] https://bioceednews.w.uib.no/2019/11/18/bioceed-goes-to-trondheim-experience-of-the-student-representatives/
[11] See description under *Student active research and generic skills in redesign of the biology education,* Focus area 2

Focus area 2: Innovative teaching

One important priority in Focus Area 2 has been to **mainstream bioCEED innovations** into the formal structures and processes at our host institutions. This is essential for broad, lasting and sustainable local impact, and it requires moving beyond the project phase and the 'coalition of the willing' to involve staff and structures at the broader departmental and program level.

In 2019, we focused this work through projects aiming to align different aspects of educational development (e.g. structured redesign of the BIO BScand aligning field teaching[12]). We continue to develop the bioSKILLS platform and more generally supporting students in developing learning and professional skills[13].

The **educational development and research** work continues, both regarding our main thematic priorities such as math in biology (see Marius Ole Johansen's PhD project), cooperative learning (see Anja Møgelvang Jacobsen`s PhD project), digital tools for species identification (see ArtsApp) and online learning more generally (see bioSTATS, bioWRITE and Learning Arctic biology). These tools and platforms are core to our ongoing educational research and outputs, and they also offer opportunities for external national and international collaboration and impact.

Students and staff at our host institution continue to implement innovative and student active elements in courses. BIO has taken an active role in educating students in UNs Sustainable Development Goals, by starting UiBs first SDG-courses in SDG 14 Life below water and 15 Life on land. In addition, the course SDG110 Perspectives on Sustainable Development addresses aspects of the global development and the connection between human activity and global changes in the environment. A highlight in 2019 was the poster session where students from several BIO and SDG courses presented their course work at a joint poster open session at BIO[14], with an impressive audience of students and staff. This will now be a biannual happening.

2019 also brought new toys to bioCEED! We invested in a 3D-printer, which has been used to produce learning material for a range of BIO courses, for instance 3D-printed pollen grains for teaching Palaeoecology[15] and skulls for teaching human evolution[16]

UiB plan to increase the number of active learning rooms, as the demand for such rooms is growing as a result of a long-term focus on student active teaching and its importance for student learning.

BIO and bioCEED staff have used the active learning rooms actively and shared experience and knowledge through different fora and activities.

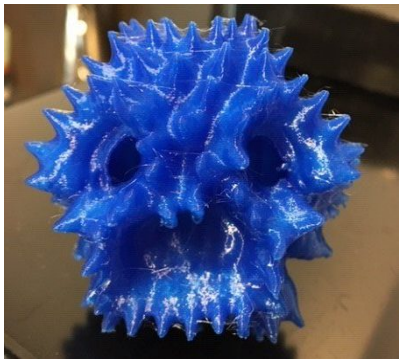

Figure 4. Is it a monster? No! It is a 3D-printed model of a *Scorzoneroides autumnalis* pollen grain. Photo: J. Soule

[12] See project description of Redesign project and FieldPASS project p. 23
[13] (see the student projects biORAKEL, bioBREAKFAST, bioSPIRE).
[14] https://bioceednews.w.uib.no/2019/05/29/great-success-with-student-poster-symposium/

[15] https://bioceednews.w.uib.no/2019/10/15/using-3d-printed-models-of-pollen-grains-as-teaching-material/
[16] https://bioceednews.w.uib.no/2019/11/23/on-the-use-of-skulls-and-bones-in-higher-education/

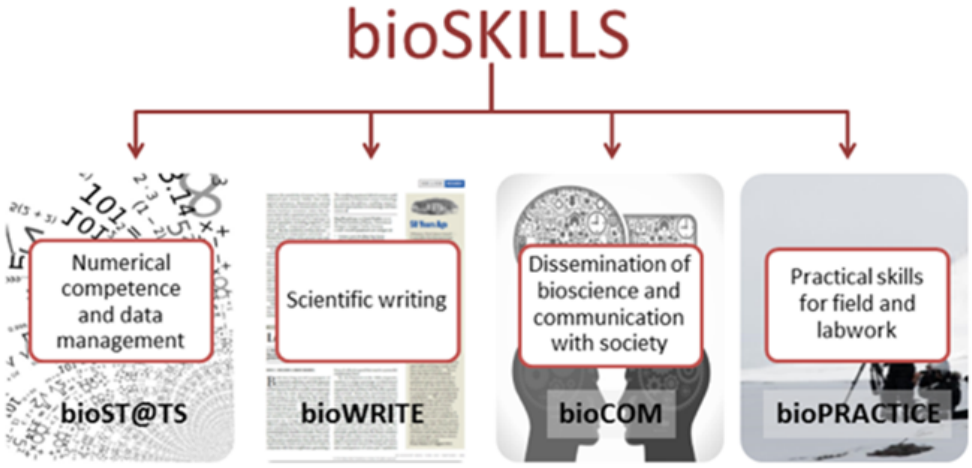

Figure 5. Conceptual diagram of the bioSKILLS framework for program-level alignment of core competences in biology. We develop a digital learning platform that focuses on core transferable skills in the biology education including subject-specific skills, communication skills, and numerical competences. The aim is to provide relevant resourses for students and teachers both in courses, across the curriculum and in independent work.

Specific actions relating to Innovative teaching are described and monitored through our Phase 2 Action plan, and an overview over activities and outputs can be found in the project and dissemination lists in the Appendix.

HIGHLIGHTS FROM ACTIVITIES AND RESULTS IN FOCUS AREA 2 IN 2019:

In 2016, bioCEED released bioST@TS, a web-based learning platform dedicated to helping biology students understand the basics of data management and statistical analysis. Directed towards both BSc- and MSc students, bioST@TS provides tutorials and instructive videos that are relevant primarily, but not exclusively, to biology courses at UiB and UNIS. The platform uses videos, as this media has been found to increase student achievement, competence, learner satisfaction and engagement. Learning modules for undergraduate students focus on the basics of data management and visualization through tables and charts in MS Excel 2016. Modules for master students include statistical analysis using the open source programme R, with instructions for coding needed in this program. bioST@TS also offers videos that explain key concepts in statistics using simple, concrete biology examples. bioST@TS is also a repository for resources created in collaboration with both teachers and students. We see a clear increase in the use of our platform in 2019 (Fig. 6).

bioST@TS' audience keep expanding

In the past few years, bioST@TS' audience has kept growing at an impressive rate. While having merely 6100 users throughout 2017, bioST@TS counts today more than 100000 yearly users across the world. Here is a quick graphic overview over the site usage (pageviews) in 2019 vs. 2018.

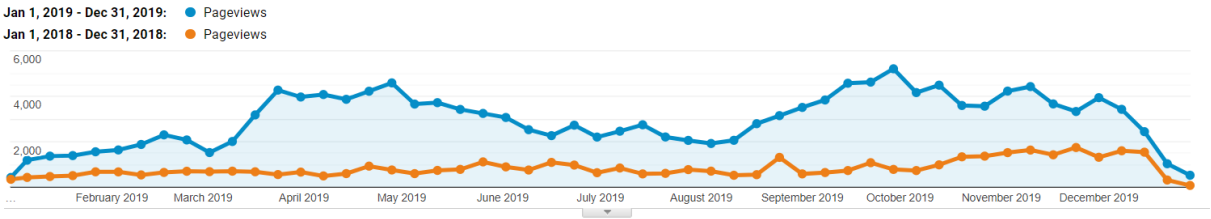

Figure 6. Number of pageviews measured weekly throughout 2018 (orange) and 2019 (blue). In total, 156353 pageviews were registered for 2019, approx. 3.5 times more than 2018. Data from Google Analytics.

bioST@TS' content keep expanding

Two full chapters have been added to "Up in the R...", the section dedicated to learning statistics and data management in R: "Visualizing data with ggplot2" and "Transforming data with dplyr". "Visualizing data with ggplot2" focuses on the design of meaningful plots using the package ggplot2. This section gives all the necessary tools (code and examples) to build a proper visual representation of a data set. It also introduces a key ("Which plot for which data") for defining the plot type that it is best fitted to the variables to represent. "Transforming data with dplyr" introduces the package dplyr, which provides R users with a handful of functions for sorting, rearranging, filtering variables in larger data sets. bioST@TS users learn about how to efficiently reduce and clean large amounts of data prior to statistical analysis.

To expand the recourses for transferrable skills training, we have focused on academic writing in biology during 2019. The aim is to align academic writing training across our programs and implement bioWRITE as a web based resource for students and teachers. Courses will focus on different aspects of academic writing and use bioWRITE as a common reference and resource to ensure a clear progression throughout the program.

In 2018 we did a thorough mapping of academic writing in the core biology courses in the 1st and 2nd year of the BIO BSc program (curriculum mapping) and formulated specific learning goals for different competences in writing and communication. In 2019, we have developed digital resources that translate those conclusions of our curriculum mapping.

bioWRITE is now alive and available at http://biowrite.w.uib.no. The platform contains resources in English, while its twin sister bioSKRIV offers similar content in Norwegian. Development of both platforms is coordinated with the "BIO100 club" and UiBs project for academic writing, to ensure that the resources produced for different levels will be useful and available for other programs. The current websites will be progressively supplemented with course-specific resources, subject specific examples, illustrations and tasks.

The figure below shows the website use of bioWRITE since its opening in April 2019 and as of February 10th, 2020.

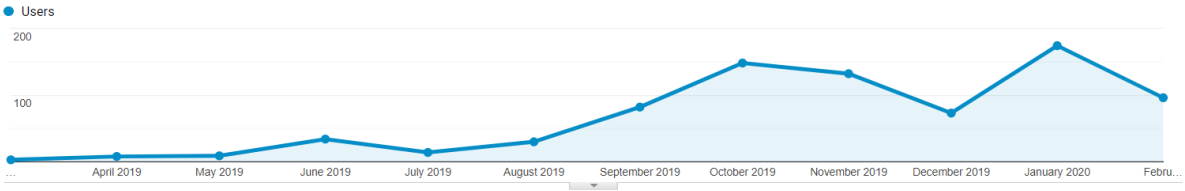

Figure 7. The number of users measured monthly in the period April 2019-February 2020. Approximately 600 users (60% of which are in Bergen Municipality) have visited the website and made use of the resources (source: Google Analytics).

biORAKEL at BIO (UiB) is where 'oracles' (experienced biology students) advise, help and support younger students in their efforts to learn biology – and being a student at the Department of Biological Sciences (BIO). biORAKEL-meetings happen weekly at BIO, and the oracles welcome their fellow students with knowledge, friendship, advise and waffles. Read more about biORAKEL at http://biorakel.w.uib.no/.

biORAKEL started IN 2016 as a bioCEED project funded through NOKUTs Scholarship for student led projects, with co-funding from bioCEED. It has now been transferred to BIO, as part of our goal to 'mainstream' our projects into normal departmental operation. bioCEED continue to support and train oracles – and provide storage space for waffle ingredients. While now past the juvenile phase, biORAKEL continues to be closely linked to and a major pride of bioCEED.

2019 was a record-breaking year for biORAKEL. With 183 reports sent in for peer-reviewing by the oracles during the spring semester, and an average number of 35 visitors each session in the autumn semester, it is safe to say that biORAKEL was highly relevant for biology students in 2019. During the autumn semester, visitors at biORAKEL were not limited to bachelor students - master students were also present most sessions - a lot of them familiar with the biORAKEL-project after actively using it during their bachelors.

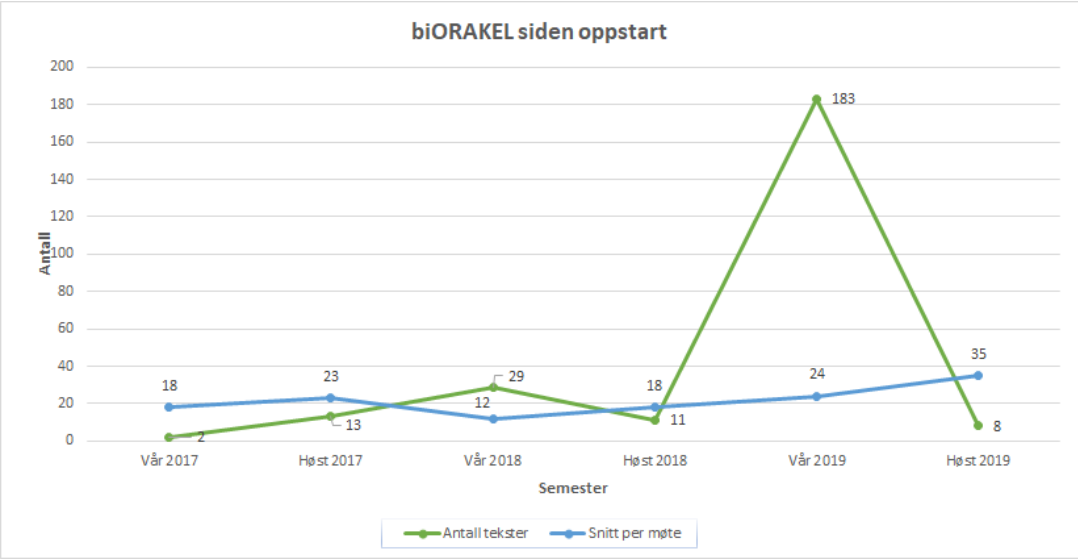

Figure 8. A total overview of biORAKEL since the beginning in spring 2017, each semester is shown with the average number of students each meeting (blue) and the total number of peer reviews (green).

bioBREAKFAST is a student-led project, run by the bioCEED student representatives at UNIS. The initial idea behind bioBREAKFAST was to create an informal meeting place for biology students at bachelor, master and PhD levels where students could meet, interact and learn from each other. bioBREAKFAST meetings are held twice each semester in the morning, where students are served breakfast and Master and PhD students give talks to their fellow bachelor students about their research projects, their educational choices and some of the challenges that they have met along the way.

The project started up in 2017 and have now been running for three years. In 2018, bioBREAKFAST opened up for students from all disciplines at UNIS and this has created an common arena for all UNIS students to meet across multiple disciplines of studies and academia to interact and exchange knowledge with one another in a relaxed learning environment. bioBREAKFAST have increased in popularity. In 2019, a total of 147 participants from four different disciplines at all levels were registered which is an increase from 124 participants in 2018. Half of the students that participated in 2019 are biology students and most students that attend are at the bachelor level, but there is an increasing interest from 2018 to 2019 also for master and PhD students to attend the bioBREAKFAST meetings. Read more about bioBREAKFAST in the bioCEEDNews[17].

bioSPIRE is a student-led project which offers practical experience for undergraduates by letting them join an ongoing project at BIO, in the field or at the lab, mentored by MSc- or PhD-students, or other staff at UiB.

bioSPIRE aims to provide an arena for undergraduates at BIO to gain practical (research) experience. The project builds a bridge between undergraduates hungry for experience, and MSc- and PhD-students eager to share their knowledge (and in need of a helping hand). bioSPIRE thus creates a network within BIO and across levels of education. In addition, it helps students find their way in the ocean of educational possibilities available to them.

MSc- and PhD-students who submit a bioSPIRE project offer to take the role of an academic mentor, and the project provides them with the opportunity to disseminate their field of study to possible future academic colleagues. MSc- and PhD-students get experience in guiding and supervising someone in a work-situation, in addition to explaining their project and the importance of its individual tasks. Besides, an extra pair of helping hands in this kind of setting might be beneficial for the scope of their work and teaching outcome for the MSc- or PhD-student. bioSPIRE also encourages other employees such as postdocs, technicians, and others to offer projects that an

[17] https://bioceednews.w.uib.no/2019/03/28/came-for-the-food-stayed-for-the-talk/, https://bioceednews.w.uib.no/2019/10/18/students-enjoying-biobreakfast/, https://bioceednews.w.uib.no/2019/12/06/dark-season-biobreakfast/

undergraduate student could benefit from participating in. Since bioSPIRE started, 35 BSc students have had the opportunity to join one of the 22 projects advertised at BIO.

Figure 9. UNISprout students 2019. Photo: Tina Dahl/UNIS

In 2019, UNISprout was initiated and run at UNIS by the bachelor students at the Department of Arctic Biology. The idea behind UNISprout is to give BSc students in biology relevant practical training through assisting MSc students, PhD students, Professors or technical staff with research work within a 40-hour limit framework. The project is run through a web-based platform and the platform enables MSc students and staff to get in contact with BSc students, by offering and posting their projects on this site[18]. 19 five projects were advertised through UNISprout and two students joined in. The project will run through 2020 and be evaluated in the end of 2020. Currently, five projects are advertised and 5 students involved in the projects. Read more in the bioCEEDNews[19].

Online learning platform for Arctic Biology

The online learning platform Learning Arctic Biology at UNIS is a teaching and learning resource for students and teachers containing scientific knowledge, teaching material and an external resource library on arctic ecosystems and organisms. The teaching material is aimed mainly at UNIS courses but can also be used by secondary schools, nature guides and others who want to learn more about arctic biology. The platform was launched in 2019 but part of the material will be developmed in 2020.

[18] UNISprout annual project report 2019

[19] https://bioceednews.w.uib.no/2019/06/21/unisprout-a-possibility-for-practical-training-for-students-in-the-field-of-biology-at-unis/

PhD project on mathematics in biology education – Marius Ole Johansen

My project will encompass the development and implementation of teaching resources in mathematics, statistics and modelling in the biology education. Surveys will be constructed and conducted to assess biology student's motivation competence and relatedness regarding mathematics. Introducing more relevant mathematical examples and exercises has the potential of inducing an intrinsic motivation, according to self-determination theory (SDT), as opposed to an externally regulated motivation. Studies indicate that intrinsically motivated students in general not only perform better at tests, but they are also more creative when facing challenges. Several experiments are to be conducted in which students are to be introduced to interactive mathematical models in various biology courses as well. Using SDT, any potential changes in motivation, competence and relatedness are to be assessed and compared to control groups. As of fall semester of 2019, all biology students are obliged to have completed the same mathematical course (R2) from Norwegian high schools, i.e. all students will have a similar mathematical background. Thus, this will be a perfect time to measure motivational aspects regarding the use of mathematics in the biology education as well as performing experiments and testing any effects this will introduce.

Based on the theoretical framework provided by SDT, 2 separate studies were conducted in 2019. The first study aimed to measure intrinsic motivation among first semester students regarding the mandatory calculus courses. A survey was designed with a pre-made path-way model in mind and conducted during lectures at the end of the semester.

The second study had an experimental design in which the effects of introducing relevant exercises was measured in a mandatory statistics course for biology students. A significant part of the course entail exercises in the statistical software package RStudio, and new tasks were designed and implemented with the aim of providing a rationale for students by having a relevant and more interesting profile. The experimental setup had a pretest posttest design in which students were randomly split in 2 groups and then given either the old or the new exercises.

PhD project – Anja Møgelvang Jacobsen

Preparing students for an uncertain future is a topic of discussion worldwide and the main questions include what skills the students need and how the educational system may help the students develop these skills. In Norway, the White Paper "Working Life Relevance", which is to be presented in 2021, is a clear testimony to the responsibility of higher education to address these questions. In order to meet these changing needs, the Faculty of Mathematics and Natural Sciences at UiB is now redesigning its bachelor programs. This redesign has as a specific aim to strengthen the generic skills taught at the faculty through three learning outcomes: 1) Cooperation, 2) Informational competence and ethics, and 3) Oral and written communication.

Building on Cooperative Learning (CL) theory, research and the ongoing redesign process at the faculty, this PhD project will contribute with knowledge on the uses and effects of CL in higher STEM education. The first step in this process is to conduct a literature review to obtain insight into the field of CL in higher STEM education. The findings of this review will determine the further two research steps in select courses at the Faculty of Mathematics and Natural Sciences, UiB: 1) a survey methodology, mapping the existing uses and effects of CL and 2) an intervention and implementation of CL structures.

The literature review is in progress and so far, the review question has been developed and literature searches and screenings of titles and abstracts conducted. The next step is to read full texts to determine which studies should be included before initiating the process of synthesizing. In order to map the existing uses and effects of CL, a survey is now being developed. The pilot survey is planned to take place in the final week of February and the main survey will be conducted in select courses in April to May 2020.

Examining student attitudes – Sehoya Cotner

bioCEEDs adjunct professor Sehoya Cotner is currently doing a project examining student attitudes. The students in the BIO100 (Introductory course in BSc Biology) are part of this study. Students have been asked to do a survey before, and after, following the course. The aim is to investigate how students perceive their participation in the course, and how different teaching methods affect student learning and engagement. Students are also observed in class to map participation. This study will contribute to shape learning strategies that will benefit future students.

Sehoya Cotner has now broadened the project in surveying several courses at the MN Faculty UiB. Students are surveyed pre and post course about how they perceive their participation in the course, and how different teaching methods affect student learning and engagement. During spring 2020, the work-placement courses and the research-practice course will also be added to the research.

In 2019, Sehoya Cotner and colleagues, published the the paper “Smaller Classes Promote Equitable Student Participation in STEM” in BioSciences” including data and co-authors from BIO[20].

ArtsAPP

ArtsAPP develops and grows as an app, and as an educational research and development project. The goal is to optimize an interactive learning tool (mobile application) for learning biological species. We are currently working on four research projects examining different questions. Specifically, we have an experiment under review where we look at how messages within ArtsApp can enhance students´ motivation and learning.

[20] https://bioceednews.w.uib.no/2019/09/29/new-paper-smaller-classes-promote-equitable-student-participation-in-stem/

We are analyzing qualitative focus group interviews were students´ in-depth perception of ArtsApp is evaluated. Colleagues from University of Stavanger are developing a questionnaire to assess elementary teachers desires for biology apps for children. Finally, we are writing the results of an investigation in which we have looked at the user interface of different digital learning tools and how this in turn affect students´ engagement and learning. The results of these investigations will help us further understand which mechanisms contribute to increase students´ motivation and learning. The project group is currently expanding, and we are looking for an IT-technician and research assistant that will further help us improve the quality of ArtsApp and research. Read more about ArtsAPP in bioCEEDNews.

Artsapp for Svalbard

With funding from bioCEED and Svalbard Environmental Fund, we are in the process of developing an application for identifying plants in Svalbard using the framework developed within the ArtsAPP project. Developing new keys are partly done as student projects within two UNIS courses (AB-326 Arctic Plant Ecology (10 ECTS Ph.d./master course) and AB-201 Terrestrial Arctic Biology (15 ECTS bachelor course).

BioCEED survey II

The bioCEED survey 2018 was carried out in the spring of 2018 targeting biology students and teachers in higher education in Norway. It is a follow-up study from the previous national survey (see Hole et al 2016[21]). The aim of bioCEED survey 2018 was to map changes in biology higher education in Norway. In addition to be a follow-up survey, the bioCEED survey 2018 addresses new questions, and for instance investigates teachers´ motivation for teaching, and students´ well-being. We got an acceptable response rate, and this survey will be an important contribution to further understand biology education in Norway.

Researchers at bioCEED are currently revising a manuscript submitted to *Learning and Individual Differences*. We found that biology students´ initial intrinsic reasons for starting a biology degree, positively predicted students´ self-determined motivation. Having a self-determined motivation for studying and mastering biology was positively related to grades vitality at the university, and less intentions of dropping out. The results of this study are important as it provide a framework for understanding different outcomes for student success. Moreover, we go beyond looking at student success as only achievement, but include indicators of psychological well-being and dropout.

Current teacher-initiated projects will support through bioCEEDs small grants

Active student learning for better education in AB327/AB827 Arctic Microbiology at UNIS, project leader Lise Øvreås

In 2018, we applied for a project on “Active student learning for better education in AB327/AB827 Arctic Microbiology at UNIS”. Through this project, we wanted to prepare for a more student-active learning form where students were active participants and had the opportunity to prepare for laboratory courses digitally through videos, and literature before they arrived at the field and to the

[21] http://bora.uib.no/handle/1956/11952

laboratory. The students were provided literature two weeks before the course and were asked to decide on a topic for presentation for the other students at the beginning of the course.

During the course in 2018 we generated a few videos demonstrating the work that were done in the field (CTD measurements, drilling of permafrost and incubation experiments for measuring Nitrogen fixation rates in the field). The students were also provided links to topics that could help them in understanding what they can do in research-based education and how they prepare for it. During the course in 2018 we also collected samples that were prepared and analyzed for generation of datasets (sequencing analyses) that then were made available for the next group of students assigned to the course in 2019. The videos and datasets will also be applied for the summer course in 2020.

Student learning strategies, personality and mindset, project leader Jorun Nylehn

The project maps the learning strategies and mindset among biology students, and how the learning strategies and mindset correlates with personality. The project also intends to investigate the students' reasons for their choice of learning strategies (and the degree of being a conscious choice). The project has focus on the variation among the students. An underlying question is also which information about learning and effective study strategies that might be useful for (some of) the students, and when and how this information should be available. The results will be published in international journals.

Questionnaires were distributed among the students at BIO101 in January 2019 and January 2020, and more than 110 students have hitherto answered questions about their learning strategies, personality and mindset. Only validated questionnaires were used (translations and a pre-pilot were undertaken in 2018). Personal interviews have been undertaken with 5 students about their mindset, and focus group interviews have been undertaken with 3 groups with 4 students in each group. The combined approach (questionnaires and interviews) is intended to give an overview of the students as well as in-depth information. Altogether 7 master students are involved in the project, three have finished their master theses and four have started in January 2020. The master students are writing 30 ECTS theses for the lector program at UiB in biology didactics. The results will later be combined and published in international journals. Two students have also presented their results at an international conference, EuroSoTL in Bilbao June 2019[22]. All of the involved students also give small presentations at bioCEEDs research group.

Field learning evaluation workshop, project leader Lena Håkansson

Through this project one wanted to survey and evaluate the student learning during the fieldwork component in the courses at the Arctic Geology (AG) and Arctic Biology (AB) departments at UNIS. Six previous guest master students were invited to share, discuss and evaluate their field learning through a two-day workshop. Participants were asked to plot on a timeline when they learned different skills and competences, both related to fieldwork and other activities during their time as Master students. The data show that the timelines offered an opportunity for alumni to reflect over what they actually learnt during their time as Master students. This reflection made them more aware of which knowledge, skills and competences were particularly useful for their careers. It was suggested that such reflections through work with timelines has the potential to help graduate students during their project work. We suggest that this type of reflection is incorporated into the supervision of graduate students. This is a pilot study waiting for more data collection within the

[22] https://bioceednews.w.uib.no/2019/06/21/students-and-teachers-from-uib-at-eurosotl-in-bilbao-spain/

consortium of iEarth. The final results will be presented at Learning Forum in 2020 and published in a peer-reviewed journal.

Glacial microbiomes – in light and darkness (GLAD). Course alignment and cooperation, project leader Simone Lang

At UNIS we are currently offering two master/PhD courses, AB329/829 (Arctic Winter Ecology) and AB327/827 (Arctic Microbiology) both of which carry out research on Foxfonna glacier located in the vicinity of Longyearbyen, Svalbard. Both courses explore microbial life on glaciers, albeit in contrasting seasons, winter and summer. Through this project, we will align these two courses, focusing on the topic "Glacial microbiomes". We will coordinate sampling and use of methods which will allow us to build a dataset that can be used across different courses for student active research. Specifically, we will incorporate real-time DNA sequencing in class activities. These include not only hands-on experience of state-of-the-art research techniques for students, but also the generation of rich datasets which students can claim a real sense of "ownership". We will also produce methodical videos that can be used to prepare the students for field and lab work and to enable them to understand the different conditions that exist on the glacier during summer and winter season. Through collegial cooperation across courses the aim is to involve students in a time series throughout out the year, thus students experience their own course work as more meaningful when seen in a larger context. The students participating will gain insight and experience from research in the early career stage and thus lay the foundation for a scientific career. The results on how course alignment can increase pedagogical benefits will be presented at the UNIS Learning Forum 2020 and the methodical videos will be available at the homepage of bioCEED.

New projects

bioCEED was involved in two larger projects funded through Program for student active learning (DIKU).

FieldPass

FieldPass, or "Development, testing and evaluation of tools and assessment forms that promote constructive alignment in field teaching" is an interdisciplinary project that aim to develop and test alternative ways of assessment suitable for assessing/evaluating knowledge, practical skills or general competences achieved through field work. In partnership with The University of Bergen, we will use UNIS as a study object and test arena for innovative field preparations and assessment of learning in the field. We have also cooperation with University of Otago, New Zealand. The project got funded with NOK 4,776,000 from DIKU over 3 years.

Field teaching is important in a number of disciplines, including biology, and a highly valued student active learning form. At the same time, we face some clear challenges when it comes to assessment forms. Traditional forms of assessment (e.g. like a written exam) is not suited. To ensure constructive alignment, we need other alternatives for assessment. We have identified three development areas we will focus on in this project 1) digital tools for preparation and assessment, 2) certification as assessment of practical skills, and 3) reflection as assessment tool. Combined knowledge from these three focus areas will form the basis for developing an overall design for assessment of field learning in line with the principles of constructive alignment. We will especially focus on the design of semester packages, where different courses with field teaching are combined so that they together

secure verification of the program-related learning outcomes. The project will hire a technician and a postdoc that will start in 2020.

Student active research and generic skills in redesign of the biology education

Student active research and generic skills in redesign of the biology education is a 3 year DIKU funded project (4500 KNOK over 3 years). The redesign of the bachelor's degree of biology will be done after a 8-step model from the Texas A&M[23], and part of the project is to translate this model to the Norwegian context. This project is in partnership with the UiB Learning Lab. A major focus of the project is student active research, active teaching methods and generic skills training. A core team consisting of BIO teachers, students, administrative coordinator, didactics expert and UiB learning lab is formed. A post-doc will also be affiliated with the project. In 2019, the main focus has been step one; establishing team and working on background information. As part of this, a 2 days student workshop was conducted in October to get the students' perspective, and the redesign process was also the theme for the BIO teacher's retreat 2019.

BIO students were invited to a two-day workshop[24] on how to make the best biology education for the future. On October 28th and 29th, in the midst of a busy semester, 18 students spent two days working on the Bsc in biology. They used a 5-step model of Design Thinking, providing us with valuable insight on the student perspective of the BSc degree. They collaborated in groups on the topics *learning environment, research activity in education*, and *generic skills and employability*. During the workshop, students interviewed their fellow students, professors at BIO and representatives of the workforce. They made prototypes suggesting solutions to what they saw as challenges in the BSc degree as it is today, presenting these solutions to a panel on the final day. This was the first workshop in the newly started redesign project. The students' feedback during this workshop is part of the data gathering process to ensure sufficient knowledge a good process of (re)design, and give us a valuable insight in the student's perspective.

Figure 10. Design thinking workshop with BIO students - Making the best biology education for the future. Photo: bioCEED/UiB

[23] https://cte.tamu.edu/Program-ReDesign

[24] https://bioceednews.w.uib.no/2019/12/09/student-workshop-the-students-perspective-on-the-bachelors-program-in-biology/

BioCEED was involved in two larger projects funded by the Olav Thon Foundation

Figure 11. Pernille B. Eidesen receiving her award from Olav Thon and Lise Øvreås. Photo: UiO/Terje Heiestad

The AB Department at UNIS got a funding of NOK 1,500,000 over 3 years to establish a Field laboratory close to Longyearbyen for education and research. Arctic fieldwork is costly and logistically challenging. We can optimize research output and teaching by co-location of projects and student fieldwork and invest in common instrumentation and rigid systems for registration and sharing of data. A field laboratory where many variables are known, makes it easier to initiate inquiry-based student projects and provide authentic learning experiences. All new findings are registered in a common data base. By constantly adding pieces of information, we increase the overall knowledge of the study system over time.

Funding was also given for the project *Studentaktiv forskning – fra vugge til grad*. The project is developed and led by students and staff at BIO-UiB. It is an important goal and principle that universities should conduct research-based education. Traditionally, this has been interpreted to mean that the students, through their education, will gain knowledge of and experience with the academic research front in the subject area they are studying. However, recent years' focus on more student-active learning has clear consequences for how to understand and set up research-based education. Developing student-active teaching methods is in itself an expression of the fact that not only the content, but also the learning methods must be research-based, that is, based on what educational research shows gives the best learning. This project wants to build on both of these understandings of research-based education, but also add a third dimension, namely that the education must be research-based in the sense that the students get authentic experiences with research as practice, i.e. with the working methods and not least the forms of collaboration and collegial culture that characterize the research. This project wants to develop, test, and document the effect of three learning programs in biology that actively use the opportunities that lie in the three understandings of research-based education. The three learning programs complement each other in that they meet the student at different levels, put different demands on the students, set up diverse forms of collaboration between students and between students and supervisors/mentors, and thus they also provide diverse learning outcomes. The project is supported by NOK 1.5 million over 3 years.

Figure 12. Ragnhild Gya, Oddfrid Førland and Vigdis Vandvik receiving their award from Olav Thon. Photo: UiO/Terje Heiestad

MOVUL: MObilbasert VUrdering som Læring

Associate professor Lucas Jeno (University Pedagogy) and professor John-Arvid Grytnes (BIO) received a funding of NOK 550 000 for two years for the project "*MOVUL: MObilbasert VUrdering som Læring*". Using the introductory biology course BIO102, the project aim to create more constructive alignment between assessment, teaching, and learning outcomes. By using established technological and motivational theories to create the underlying pedagogy of the mobile based assessment, the goal is to create a more authentic, engaging, and motivating course for the students. The project is a collaboration between University Pedagogy (UiB), BIO (UiB), and bioCEED (UiB).

Applications for project funding 2019

bioCEED UNIS applied and got funding to "Artsapp for Svalbards flora" from Svalbard Environmental Fund. Allocated funding 200 000 NOK, total budget 378 000 NOK.

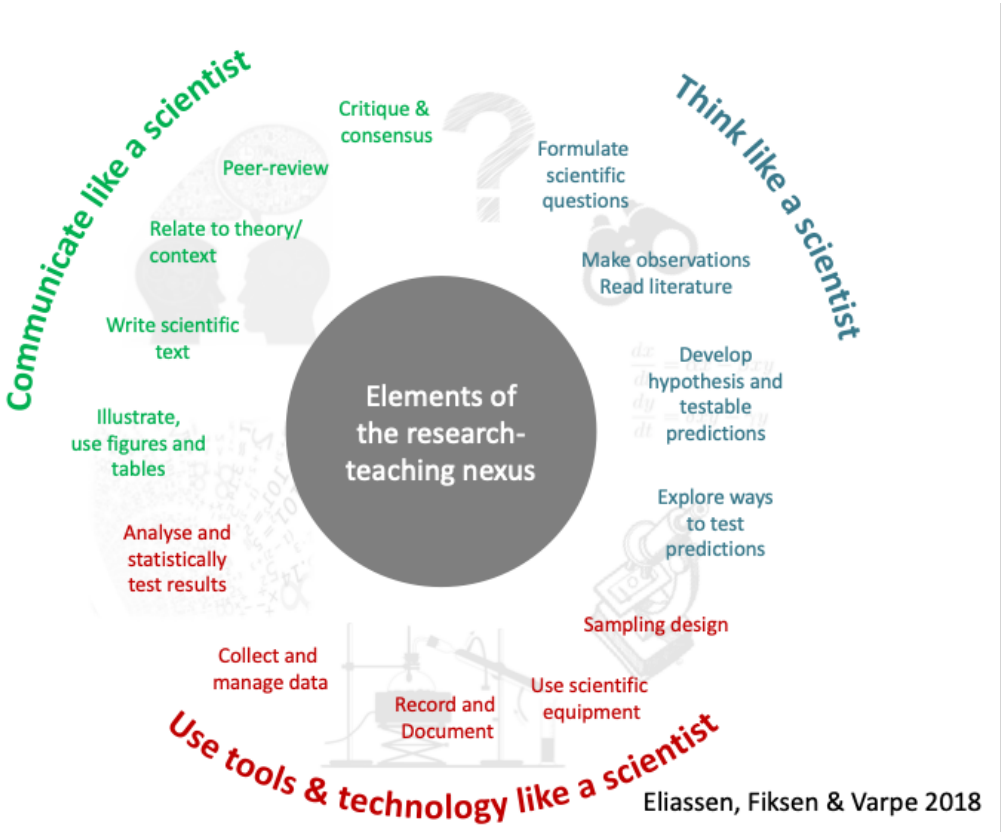

Figure 12. The elements of the research-teaching nexus. bioCEED use this model in constructing aligned learning experiences for students in research. (Eliassen, Fiksen & Varpe 2018)

Focus area 3: Practical training

At the core of the bioCEED vision is that our students should be exposed to a wide range of authentic learning experiences. Such experiences can occur when students engage with 'real' biology in the field or lab, when they train in performing and applying biological skills and competences in relevant contexts, or when they participate alongside 'real' biologists working in research or in the workplace.

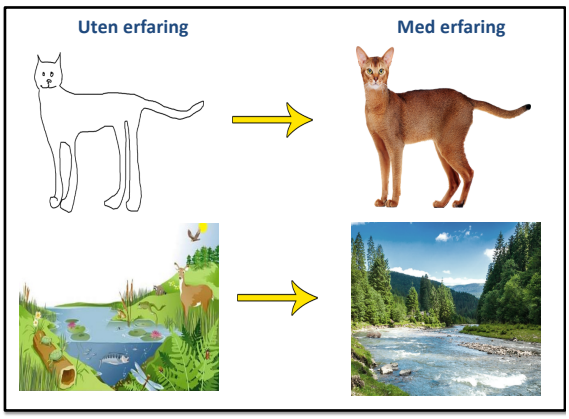

Figure 13. Christian Lucien`s presentation summing up his work practice experience.

Developing, implementing and researching such practical training components, both through full-on work placement courses with external partners and through in-house courses (see also Focus area 2), is an ongoing bioCEED priority. Among the highlights of 2019 is the first round of work placement course at UNIS that is now up and running. Students taking the AB208 Internship course at UNIS blog about practical experience as a biologist in the Artic. Another highlight of 2019 was Torstein Nielsen Hole completing his PhD degree with the dissertation «Learning through practice in biology education»[25].

The BIO-UIB work practice course BIO298 is now integrated in the course portfolio at the department and continue to recruit students from the biology programs. The bioPRACTICE blog has expanded to include BIO299 Research practice blogs , as well as international research practice (e.g. TraitTrain in Peru).

Specific actions relating to practice in biology are described and monitored through our Phase 2 Action plan, and an overview over activities and outputs can be found in the project and dissemination lists in the Appendix.

HIGHLIGHTS FROM ACTIVITIES AND RESULTS IN FOCUS AREA PRACTICAL TRAINING 2019:

Work placement at UNIS

The 15 ECTS bachelor course AB-208 "Internship in Arctic Biology" at UNIS was successfully run for the first-time during spring 2019. Five students were enrolled in the course doing internship at five different workplaces at Longyearbyen (UNIS Arctic Biology tech, SIOS, Arctic Permaculture, bioCEED and Longyearbyen school). While the student's main task was to work for and with local's employers the course also involved participation to seminars and reflection and documentation of their internship experience. All students shared their experience from the internships as blogposts online. The course will run again spring 2020 now also involving Longyearbyen Lokalstyre as a work placement. Read more about the arctic biology internships in bioCEEENews[26].

[25] https://bioceed.w.uib.no/phd-defense-torstein-n-hole-learning-through-practice-in-biology-education/

[26] https://bioceednews.w.uib.no/2019/01/31/unis-launches-its-first-internship-course-for-arctic-biology-students/, https://bioceednews.w.uib.no/2019/05/29/first-arctic-biology-internship-students-at-unis-have-reached-the-end-of-their-period/

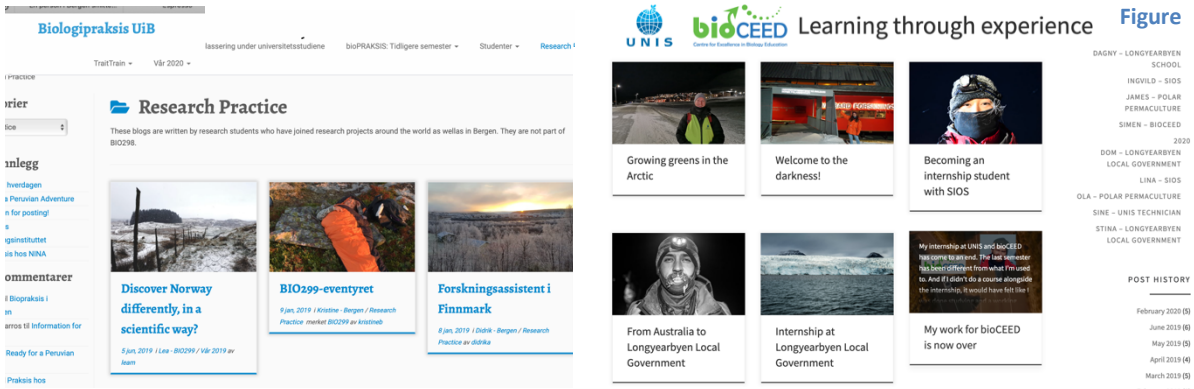

Figure 14. Blogs from research and work practice: https://biopraksis.w.uib.no/category/research-practice/ and https://www.learningarcticbiology.info

BIO299 Research project in biology

The course BIO299 has been furthered developed through formulating new learning outcomes and designing learning activities to support them. The main learning outcome of BIO299 is twofold; (I) for advanced BCs students to get real-life experience with conducting research, working on individual projects in collaboration with a supervisor, and (ii) to build and strengthen biological and transferrable skills and competences using research as a learning arena. The course now has a firmer syllabus that includes seminars on relevant aspects related to research practice, ethics, and presentations; while at the same time retaining the flexibility needed to such a practical course in research. The students present their work as a report, and a poster. They attend a poster workshop, learning how to present their present work as a poster. The poster presentation at the end of the course is held in collaboration with other courses (in 2019 with BIO250), which was a great success, both for the students learning outcome, and as it gave a more 'real' experience of presenting their results beyond a course setting. The format of the poster sessions will be further developed the coming semesters, and in collaboration with several additional courses trying out different formats of posters as assessment.

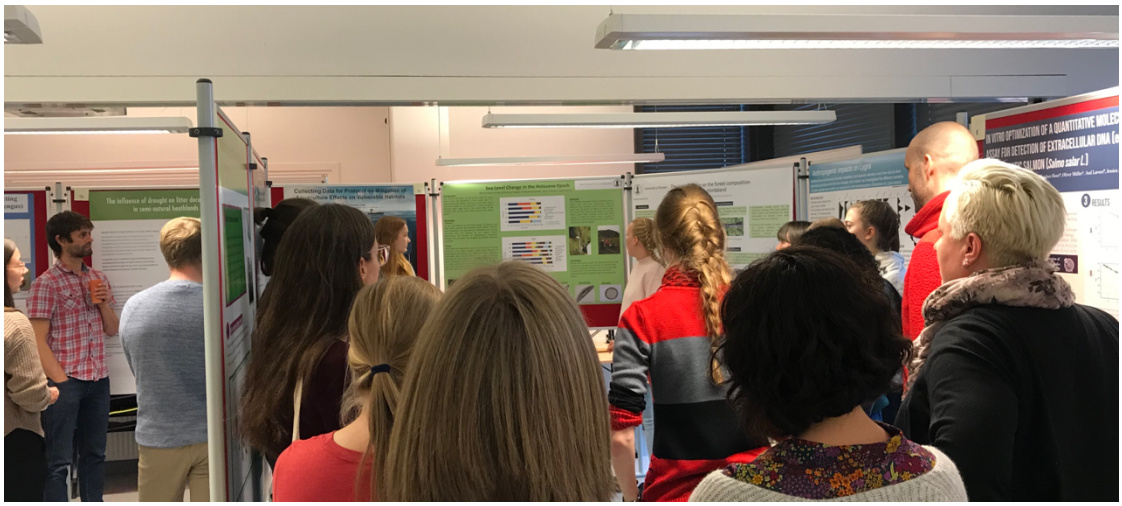

Figure 15. Student poster session

Researching impact of practical experience in research and work practice

The students' experiences and learning outcomes in the course are being surveyed for a follow up study comparing research practice (BIO299), work placements (BIO298), international field courses (RECITE project PFTC courses), as part of the RECITE and EXperTS projects.

Dialogue meeting with work practice students and hosts

The annual dialogue meeting with work practice hosts was held at IMR (Institute of Marine Research) in April. The aim of the meeting is a continued dialogue and development of the work practice course BIO298. At the meeting work practice students, hosts, course organizers and bioCEED/BIO/PRIME meet to exchange experience and provide feedback to improve and develop the work practice course and experience. This annual meeting place is a source of information and conversations that are crucial to maintain a high quality and good relations between all involved partied in the work practice course.

NOKUT – Operasjon praksis (operation practice)

NOKUTs project on practical training (work practice) in higher education aims to gather, systematize, and share knowledge about work practice. bioCEEDs work on practical training and work practice is included in one of the project reports Praksis i fremragende miljøer.

Project leader of PRIME is a member of NOKUTs expert group on work practice and will continue contribute to the project in 2020 on behalf of bioCEED and PRIME.

Practical training and internships at Institute of Marine Research (IMR)

IMR has through the involvment in bioCEED had an increasing interest from staff to host students in practical training. Over the last few years, IMR has work on establishing a routine for hosting students, in terms of administrative and practical rules at the institute, but also securing safety and proper training for a safe and productive training period. These routines have also benefited other groups, like schools and other universities. IMR are happy to say that students that have had practical training with them, sometimes come back as summer assistants and PhD/MSc students.

Figure 16. AB201 UNIS. Students teaching students. Photo: Tina Dahl/UNIS

Focus area 4: Outreach

Sharing, communicating, and interacting with different audiences over scientific developments, results, and their societal implications are integral parts of the research culture. Transferring these aspects into the educational culture is an important aspect of the 'cultural shift' within education. Dissemination and outreach are thus important not only to promote bioCEED outputs, but also as a key part of the idea behind bioCEED.

Our communication and dissemination strategy is broad, both thematically (see Focus areas 1-3 in this report and in the Action Plan) and regarding its aims. We support outreach activities that are variously aiming to raise **awareness**, to improve **understanding**, and/or to foster **action** regarding our focus areas and specific action. These activities have different audiences and scopes, ranging from local communication with our staff and students regarding practical pedagogical issues, to national and international communication aiming more to affect educational policy and society more broadly.

A broad range of outreach activities have been carried out in 2019, at all these levels (Table 1 and Appendices). Specific communication actions are described in the Action plan and an overview over activities and outputs can be found in the project and dissemination lists in the Appendices.

According to our communication strategy, we are now targeting communication more towards the ***outcomes*** of our focus areas and actions, than towards communicating our existence, strategy and status. However, we do also get invitations to present the SFU scheme, our process towards and SFU, and our general strategy and development. We now try to deflect those towards newer SFUs and DIKU to the greatest extent possible. Communication happens through meetings and presentations, scientific literature, opinions, policy impact, and popular science.

Outreach summary			
Format	**Previous**	**2019 ***	**Reference**
Scientific publications	14	5	Cristin.no, bioCEED.no
Conference presentations/papers	50	11	Cristin.no
Other presentations	48	33 (6:2020)	Cristin.no
Seminars, workshops, courses	>38**	19	Appendix, bioCEED.no
Media (op-eds, interviews, magazine articles, podcasts etc.)	20	6	Cristin.no, bioCEED.no, nokut.no
	18		SFU Magazine
Platforms	4	2	bioCEED.no
Student meetings/seminars biORAKEL, bioBREAKFAST	>41* >75	13 ~22	bioCEED.no Mitt.uib.no, bioCEED.no

Tab 1. Summary of dissemination output. *as reported in CRISTIN **see annual reports 2014-2018.

APPENDiCES

Many of these activities are further described in our Newsletter.

1. The bioCEED community and beyond – seminars, workshops, courses

bioCEED seminar series 2019		
Topic	**Speaker(s)**	**When and where**
SCISNAC – skriveprosjekt for stipendiater, og hvordan samle relevant undervisningsmateriale fra nettressurser (undervisningomarktis.w.uib.no)	Anne-Katrine Faber, UiB	30. Jan., 2019, BIO and streamed at UNIS
Nokut conference	Paul Ashwin, Lancaster University	31. Jan., 2019, streamed at UNIS
Seminar: Calculating student workload	Tina Dahl, UNIS	15. Mar., 2019, UNIS
Team-basert læring (TBL)	Sigrunn Eliassen, UiB	20. Mar., 2019, BIO
Workshop: Digital tools	Maria Jensen, UNIS	25. Mar., 2019, UNIS
Work placement host and student dialogue meeting	Work placement students, Gro van der Meeren, IMR, and Gaute Velle, UiB	10. April, 2019, IMR
Seminar: Flipped classroom	Pernille Bronken Eidesen, UNIS	23. April, 2019, UNIS
Bruker vi studentevalueringer på feil måte?	Torgny Roxå, LTH	24. April, 2019, BIO
Simulations and professional learning: Virtual experiences and access to expertise	Roger Säljö, University of Gothenburg	26. April, 2019, PED
Seminar: Inquiry-based teaching	Bård Knutsen, NTNU	08. Aug., 2019, UNIS
Workshop: How to produce videos workshop	Alex Strømme, NTNU	09. Aug., 2019, UNIS
Seminar: How do field instructors assess that learning goals have been achieved?	Jørgen Hauvaldstad, UiB	13. Sept., 2019, UNIS
Seminar: How to create better scientific posters and how to evaluate them	Tom Langbehn, BIO	26. Nov., 2019, UNIS
Helping students grow as disciplinary writers	Lene Nordrum, Lund University	29. Jan., 2020, BIO

bioCEED Teacher/staff development BIO/UNIS activities 2019		
Topic	**Speaker(s)/Facilitator(s)**	**When and where**
Course: Collegial Teaching and Learning – in Biology (5 ECTS)	Roy Andersson, LTH	2019/20,MN UiB
Dialogue meeting - Work placement hosts, students and the BIO-department o	Gro van der Meeren, IMR, Gaute Velle, BIO, work practice students	10 April, 2020, IMR
Learning Forum	K. Edström, Uni of Uppsala, O. Samdal, UiB & internal speakers	22.-24. Oct., 2019, UNIS
Teachers retreat	Linda Herfinndal Lien, BIO Students, BIO teachers	02.-03. Dec., 2019. Voss, BIO
Workshop for BIO teachers (100 club, redesign and bioWRITE): helping students grow as disciplinary writers	Lene Nordrum, Lund University	28. Jan., 2020, BIO

bioCEED Student meetings & seminars 2019		
Topic	**Who**	**When and where**
biORAKEL	The Oracles	Weekly, 2019, BIO
bioBREAKFAST	Stud representatives, PhD student Magdalena Wutkowska & PhD student Kjersti Kalhagen	27. Feb., 2019, UNIS
bioBREAKFAST	Stud representatives, former PhD student Eike Stübner & PhD student Malte Jochmann	22. March, 2019, UNIS
bioCEED seminar: Future job perspective	Stud representatives, Sysselmannen, NP and study adm UNIS	27. March, 2019, UNIS
bioCEED seminar: Writing seminar	Janet Holmen	05. April, 2019, UNIS
bioBREAKFAST	Stud representatives, PhD student Maja Hatlebakk & PhD student Erkka Heino	01. Oct., 2019, UNIS
Workshop Learning Forum: Group collaboration for students	Ivar Nordmo, UiB	22. Oct., 2019, UNIS
bioCEED seminar: Writing seminar	Stud representatives & Janet Holmen	24. Oct., 2019, UNIS
Student workshop: how do we create the best biology education for the future	Students at BIO, invited by bioCEED, BIO and the redesign-project	29.-30. Oct., 2019, BIO
bioCEED seminar: Writing seminar	Stud representatives & Janet Holmen	11. Nov., 2019, UNIS
bioCEED seminar: Success in Graduate School	Stud representatives. Lena Håkansson, UNIS & Anders Ahlberg, LTH	18. Nov., 2019, UNIS
bioBREAKFAST	Stud representatives, Master student Erlend Kalleid & PhD student Snorre Flo	25. Nov., 2019, UNIS
Student participants from the workshop presenting the results for the Teachers retreat	Student participants from workshop	02.-03. Dec., 2019, Teachers' retreat, Voss
Info-meeting for biOracles?? Pedagogy and bioWRITE for biOracles	Lucas Jeno og Dagmar Engelkraut	Jan 2019, BIO

2. Dissemination and outreach – bioCEED online and in the media

- **Monthly bioCEED Newsletter:** http://bioceednews.w.uib.no/
- **bioCEED Web pages:** http://bioceed.w.uib.no/
- **Twitter:** @sfubioceed @VVandvik @OysteinVarpe @lucas_jeno @Frueidesen @bioCEED_JS @oddfridforland
- **Facebook:** https://www.facebook.com/bioceed/
- **Instagram:** sfubioceed
- "A tribute to the Scholarship of Teaching and Learning", Øyvind Fiksen
- **NOKUT-podden** (https://www.nokut.no/om-nokut/nokut-podden/):
    - #1 Den vanskelige samtalen. Intervju med Vigdis Vandvik
    - #8 Den om studenter som underviser. Intervju med Sehoya Cotner
    - #10 LIVE –pod. Gjest: Oddfrid Førland
    - #19 Den om merittering av undervisere. Intervju med Øyvind Fiksen
    - #20 Den om å velge god vurderingsform del 1. Med Arild Raaheim

- **Op -eds**
    - "*Vi vil ha full revolusjon: Studiebarometeret 2.0!*" (Vandvik, Jeno, Raaheim, Hole, Velle) Krohno.no 8.feb 2020: https://khrono.no/vi-vil-ha-full-revolusjon-studiebarometeret-20/458917
    - "*Ny vår for undervisning*" Forskerforum 6.feb 2020 (interview with Pernille Bronken Eidesen and Øyvind Fiksen, among others): https://www.forskerforum.no/gjer-karriere-med-*undervisning/*
    - *Hvis klimakonkurransen skal fungere, er det noen ting man bør tenke på*. Khrono 6 des, Vigdis Vandvik, Lucas Jeno, Joachim Töpper https://khrono.no/hvis-klimakonkurransen-skal-fungere-er-det-noen-ting-man-bor-tenke-pa/424985

See also our web archive for press: http://bioceed.w.uib.no/category/outreach/all-media-articles/

3. Dissemination and outreach – bioCEED platforms

- **bioST@TS : https://biostats.w.uib.no/**
- **bioPRACTICE student blogs: https://biopraksis.w.uib.no**
- **Teach2Learn: https://teach2learn.w.uib.no/**
- **ArtsAPP: https://artsapp.uib.no/**
- **BioWRITE: https://biowrite.w.uib.no/**
- **Larvae Knowledge Incubator**: https://lki.w.uib.no/ , project leader Ivar Rønnestad.

4. Dissemination and outreach – bioCEED publications and presentations

Conference presentations, Op-Eds and articles in the media: cristin.no (project 468879)

Scientific publications 2019:

Cissy J Ballen, Stepfanie M Aguillon, Azza Awwad, **Anne E Bjune**, Daniel Challou, Abby Grace Drake, Michelle Driessen, Aziza Ellozy, Vivian E Ferry, Emma E Goldberg, William Harcombe, Steve Jensen, **Christian Jørgensen**, Zoe Koth, Suzanne McGaugh, Caroline Mitry, Bryan Mosher, Hoda Mostafa, Renee H Petipas, Paula A G Soneral, Shana Watters, Deena Wassenberg, Stacey L Weiss, Azariah Yonas, Kelly R Zamudio, Sehoya Cotner, Smaller Classes Promote Equitable Student Participation in STEM, *BioScience*, Volume 69, Issue 8, August 2019, Pages 669–680, https://doi.org/10.1093/biosci/biz069

Yasué, M., **Jeno, L. M.,** & Langdon, J. (2019). Are autonomously motivated university instructors more autonomy-supportive teachers? *International Journal for the Scholarship of Teaching and Learning.*

Jeno, Lucas Matias; Adachi, Paul J. **C.; Grytnes, John-Arvid; Vandvik, Vigdis;** Deci, Edward L. **(2019)** The effects of m-learning on motivation, achievement and well-being: A Self-Determination Theory approach. *British Journal of Educational Technology 2019* 50: 669–683. *doi:10.1111/bjet.12657*

Jeno, Lucas Matias; Vandvik, Vigdis; Eliassen, Sigrunn; Grytnes, John-Arvid (2019) Testing the novelty effect of an m-learning tool on internalization and achievement: A Self-Determination Theory approach. *Computers & Education 2019* 128: 398-413. *doi: 10.1016/j.compedu.2018.10.008*

Esterhazy, R. and **Fiksen, Ø.** (2019). Evolution of a portfolio-based design in ecology: a three-year design cycle. Uniped, 01/2019 (volum 42) https://doi.org/10.18261/issn.1893-8981-2019-01-05

Dissertations:

Hole, T. H. (2019). Learning through practice in biology education. PhD thesis: University of Bergen, Norway Retrieved from BORA – Bergen Open Research Archive: http://bora.uib.no/handle/1956/20404

Master thesis:

Norderval, Vilde Sandvoll (2019), Læring hos biologistudenter: En kvantitativ pilotstudie av læringsmønstre blant førsteårsstudenter i biologi

Nepdal, Maja (2019), Personlighet og læring blant biologistudenter: En kvantitativ pilotstudie av dyp prosessering og åpenhet for erfaring blant førsteårsstudenter i biologi

Erdal, Kristoffer (2019), Tenkemåte hos biologistudenter: En kvalitativ studie av hvordan biologistudenters tenkemåte er preget av å være vekstbasert eller fastlåst

5. Dissemination and outreach – events, meetings and seminars

Presentations at scientific conference (peer reviewed)				
Title	**Occasion**	**Contribution**	**Speaker**	**When and where**
Biologididaktikk på blogg!	Lektor-utd.-konferansen UiB 2019	Presentation	J. Nylehn	21.-22. Feb., 2019, UiB
Learning by Doing and Reflection: the Redesign of an Alpine Ecology Field Course	MNT-konferansen 2019	Presentation & paper	R. Gya; S.V. Haugum; F. Jaroszynska; J. Nylehn,	28.-29. Mar., 2019, Tromsø
Learning outcomes at master level in biology. Current expectations and guidelines for the future	MNT-konferansen 2019	Presentation & paper	S .Våge; M. Eilertsen; A.C. Øvergård;F. Berg; J.Nylehn	28.-29. Mar., 2019, Tromsø
Use of Active Learning Methods and Technologies – Obstacles, Incentives, and Bottlenecks	MNT-konferansen 2019	Presentation & paper	K. Enberg; S. Ellingsen; I.H. Steen	28.-29. Mar., 2019, Tromsø
Can 'passed with distinction' as a new grading scale in Norway speed up the transition towards active learning and formative assessment?	MNT-konferansen 2019	Keynote	C. Jørgensen; H. Bråten	28.-29. Mar., 2019, Tromsø
Formative assessment – can grading help us get there	Læringsfestivalen 2019	Keynote	C. Jørgensen; H. Bråten	6.-7.May, 2019, Trondheim
Learning strategies, personality and mindset among first-year biology students	EuroSoTL2019 Conference	Presentation & paper	J. Nyléhn; V.S. Nordeval; K. Erdal; M. Nepstad	13.-14. Jun., 2019, Bilbao, Portugal
Germinating popcorn and making spores dance – how to make undergraduates' first meeting with plants a success	EuroSoTL2019 Conference	Poster presentation	A.E. Bjune; R. Gya; S.V. Haugum	13.-14. Jun., 2019, Bilbao, Portugal
Thrown in at the Deep End - Using SoTL Conferences to Train Teachers in SoTL	ISSOTL19 Conference	Paper presentation	R. Andersson; O. Førland	09.-12. Oct., 2019, Atlanta, Georgia
Rewarding Teaching Excellence - Is There a Border Between Individual and Institutional Development?	ISSOTL19 Conference	Paper presentation	T. Olsson; T. Roxå; O. Forland	9.-12. Oct., 2019, Atlanta, Georgia
Integrert og eksemplarisk - en suksesshistorie om samarbeid	Nasjonal lektorutdanning-konferanse	Presentation	K. Lea; J. Nylehn	7.-8. Nov., 2019, Tromsø

Presentations at seminars, workshops, conferences, etc 2019				
Title	**Occasion**	**Contribution**	**Speaker**	**When and where**
The well-structured teaching portfolio	MatNat UiO	Workshop	R. Andersson; O. Førland	24. Jan., 2019, Oslo
Aktiv undervisning	Faglig-pedagogisk dag, UiB	Workshop	K. Lea; J. Nylehn	01. Feb., 2019, Oslo
Formidling i praksis	SFU Nettverkssamlin	Talk	V. Vandvik; O. Førland	05. Feb., 2019, Bergen
Team-basert læring.	Institutt for filosofi og 1.sem. studier, UiB	Presentation	S. Eliassen	06. Feb., 2019, UiB
Active learning and active students – when, how and why?	Trial lecture	Trial lecture	T.N.Hole	8 Mar, 2019, UiB
Framtidens feltbiologi – hvordan vil teknologi påvirke feltbiologien	Sabima seminar	Talk	V. Vandvik	30.-31. Mar, 2019, Gardermoen
Team-basert læring.	Fakultetsledels ved HF fakultetet	Presentation	S. Eliassen	13. May, 2019, UiB
Korleis utviklar vi Kultur for kvalitet?	Visit to UiB from the Ministry of Education (KD)	Talk	V. Vandvik; O. Førland; S. Spjeld	14. May, 2019, Bergen
Hva rører seg på Undervisningsfronten ...og hvilken betydning har det for admin?	Seminar for MatNat administrasjon	Talk	S. Eliassen	14. May, 2019, UiB
Our life as technicians in teaching activities	Læringsdag for teknisk ansatte	Presentasjon	J. Soulé	23. May, 2019, UiB
Education and training resources for fair data management and scientific reuse of data	Living Norway seminar	Talk	V. Vandvik	11.-12. June, 2019, Trondheim
Studentaktiv forskning og overførbare ferdigheter i redesign av biologiutdanningen	Utdannings-utvalget på UiB	Presentation	S. Eliassen	13. June, 2019, UiB
bioCEED – what difference does it make?	Seminar for UIA	Presentation	P.B. Eidesen	17. June, 2019, UNIS
OsloMet@bioCEED	Site visit @bioCEED from OsloMET	Presentation Discussion	Vandvik; Førland; Andersson; Soule; Eliassen; Spjeld	18. June, 2019, Bergen
A collegial Teaching and Learning culture	Department of Chemistry – education day	Presentation	O. Førland; R. Andersson	19. June, 2019, Bergen
bioCEED – excellent education	UiA site Visit MN Faculty UiB	Talk	O. Førland	27. Aug., 2019, Bergen
Studentaktiv forskning og overførbare ferdigheter	UIB leadership	Presentation	S. Eliassen	28. Aug., 2019, UiB
bioCEED – excellent research based education	Rector visit DTU	Talk	O. Førland	06. Sept., 2019, Bergen

Opplæringstilbud for undervisere. Hva kan vi allerede tilby, og hvilke behov har vi i tillegg?	Fakultetsseminar - generiske ferdigheter	Presentation	R. Andersson; H. Walderhaug	09. Sept., 2019, Solstrand
Programdesign med fokus på generelle ferdigheter og kompetanser	Fakultetsseminar	Presentation	S. Eliassen	09. Sept., 2019, Solstrand
"Vi må snakke saman" - utvikling av en kollegial undervisingskultur	Fagsamling, Sosialt arbeid, HVL	Workshop	O. Forland	02. Oct., 2019, HVL, Bergen
bioCEED: Teacher culture – learning culture	Biofagrådet, meeting	Talk	V. Vandvik	02. Oct., 2019, Gardermoen
bioCEED@DIKU - quality culture	DIKU	Talk	V. Vandvik	03. Oct., 2019, Bergen
Evidencing cultural change	SFU Nettverkssamling	Presentation	T. Roxå; O. Førland	22. Oct., 2019, Trondheim
Course alignment and field teaching	Learning Forum	Workshop	P. B. Eidesen; T. Dahl; N. Partamies; J. Haugvaldstad	23. Oct., 2019, UNIS
Assess the unasseable? FieldPass: Promote course alignment in field teaching	Learning Forum	Presentation	P.B. Eidesen	22. Oct., 2019, UNIS
News from bioCEED	Learning Forum	Presentation	P.B. Eidesen	22. Oct., 2019, UNIS
Studentmedvirkning.	DIKU Studentaktiv læring Seminar	Presentation	S. Eliassen	31. Oct., 2019, Oslo
How can a field laboratory for research and teaching contribute fo long-time monitoring	Svalbard Science Conference, Oslo	Poster	P.B. Eidesen	05. Nov., 2019, Oslo
De rare dingsene i Bjørndalen - å forstå naturen frå plankton til reinsyr.	Popular science lecture	Presentation	P.B .Eidesen	10. Nov., 2019, Svalbard Museum
Using Team-Based Learning to increase student engagement and improve learning outcomes	Teled Monthly research series	Presentation	S. Eliassen; Ø. Fiksen	29. Nov., 2019, Teled, UiB
Studentmedvirkning - Studentaktiv forskning og overførbare ferdigheter i redesign av biologiutdanningen	Diku seminar for Program for studentaktiv læring	Presentation	S. Eliassen	31. Nov., 2019 Oslo
Studentaktive prosjekter og arbeidsformer, bioCEED	Utdannings-seminar ved Det tek-nat fakultet, UiS	Presentation	Ø.S. Vabø; J. Nylehn	Jan., 2020, UIS
Tankar om kvalitetsutvikling fra ein SFU	NOKUT strategy seminar	Presentation and panel discussion	O. Førland	Jan., 2020, Oslo
The why's of active learning	Vintermøte/ kontaktmøte Norsk Biokjemisk Selskap	Presentation	J. Nylehn	24. Jan., 2020, Voss

Strategies for developing a teaching and learning culture at the institutional, Faculty and departmental levels	Teled Monthly research series	Presentation	R. Andersson	28. Jan, 2020,. UiB
Panelsamtale: Hva skal vi med karakterer? Tid for revurdering	Nokut konferansen 2020	Panel Discussion	C. Jørgensen	30. Jan., 2020, Oslo
Variert undervisning for alle	Faglig-pedagogisk dag, UiB	Workshop	J. Nylehn; K Lea	31. Jan., 2020, UiB
Søknadsseminar for Program for studentaktiv læring, DIKU	Læringslabben, UIB	Presentation	S. Eliassen	19. Feb., 2020, UiB

6. Awards

Awards and ETP 2019		
Who	**Title**	**From**
Pernille Bronken Eidesen	Excellent Teaching Practitioner	UiB
Christian Jørgensen	Excellent Teaching Practitioner	UiB
Between The Fjords	"Work. Experience. Discover." Prize for long-standing support by providing traineeships	IAESTE
Ivar Rønnestad	Prize for Excellent Teaching 2019	Olav Thon Foundation

7. bioCEED Personnel 2019

Name	Function in bioCEED	Position	Unit
Vigdis Vandvik	Centre leader	Professor	BIO, UiB
Pernille Bronken Eidesen	Deputy Centre leader	Ass. professor	AB, UNIS
Oddfrid Førland	Coordinator, PhD student	Adviser	BIO, UiB
Jonathan Soulé	Technical support	Senior engineer	BIO, UiB
Tina Dahl	Adm. and tech support	Adviser	AB, UNIS
Eike Stübner	Staff member	Higher Executive Officer	AB, UNIS
Birthe Gjerdevik	Admin/project support	Adviser	MN,UiB
Marius Ole Johansen	PhD candidate		bioCEED
Torstein Nielsen Hole	PhD candidate		BioCEED/PRIME
Anja Møgelvang Jacobsen	PhD candidate		bioCEED
Lucas Jeno	Researcher, Associate Professor		PED,UiB
Anne Laure Simonelli	Post doc		bioCEED/PRIME
Roy Andersson	Ass. Professor II	Academic developer	bioCEED
Sehoya Cotner	Ass. Professor II	Academic developer	bioCEED
Sigrunn Eliassen	Core team member	Ass. professor	BIO, UiB
Janne Søreide	Core team member	Ass. professor	AB, UNIS
Arild Raaheim	Core team member	Professor	PED, UiB
Øystein Varpe	Core team member	Professor	AB, UNIS
Gro van der Meeren	Core team member	Senior scientist	IMR
Gaute Velle	PRIME project leader	Researcher, Prof II	Uni /BIO, UiB
Jorun Nyléhn	Core team member	Associate professor	BIO, UiB
Adèle Ménnerat	PRIME researcher	Researcher	BIO, UiB
Kristin Holtermann	Administration, project coordination	Senior Executive Officer	BIO,UiB
Student representatives			
Ragnhild Gya	student representative	PhD student	BIO, UiB
Ingvild Lande Sørensen	student representative	Student	AB, UNIS
Ørjan Vabø	student representative	Student	AB, UNIS
Annie Colgan	student representative	Student	AB, UNIS
Julia Troxell	student representative	Student	AB, UNIS
Endre Lygre	Student representative	Student	BIO, UiB
Sondre Olai Spjeld	Student representative	Student	BIO. UiB
Pernille Eyde Nerlie	Student representative	student	BIO,UiB
Ørjan Vabø	Student representative	student	BIO, UiB
Ingvild Straumøy	Student representative	student	BIO, UiB

8. Externally funded projects

Granted by	Project title	Project period	Funding	PI/Main partner
DIKU Dig	***MOVUL – Mobilbasert vurdering som læring***	**2020-2021**	**550 KNOK**	**L.M. Jeno**
DIKU Aktiv læring	***Utvikling ,testing og evaluering av verktøy og vurderingsformer som fremmer meningsskapende samsvar i feltundervisning***	**2019-2022**	**4800 KNOK**	**P.B. Eidesen (UNIS+BIO)**
DIKU Aktiv læring	***Studentaktiv forskning og overførbare ferdigheter i redesign av biologiutdanningen***	**2019-2022**	**4500 KNOK**	**S. Eliassen**
Thon Stiftelsen	***Utvikling av et høy-arktisk, tverrfaglig feltlaboratorium for forskning og undervisning***	**2019-2021**	**1350 KNOK**	**P.B. Eidesen (UNIS)**
Thon Stiftelsen	***STUDENTAKTIV FORSKNING – FRA VUGGE TIL GRAD***	**2019-2021**	**1500 KNOK**	**V.Vandvik, O.Førland, R.Gya, E. Lygre (BIO)**
Thon Stiftelsen	*Pris for fremragende undervisning*	2019	500 KNOK	I.Rønnestad (BIO)
Olaf Grolle Legat	*Biology students´ knowledge in species identificati on*	2018	10 KNOK	L.M. Jeno
UiB	*Learning Environment Prize to biORAKEL*	2018	50 KNOK	Core team of students(BIO)
NFR, Finnut	***ArtsApp: How technology impacts motivation and interest for learning species***	**2018-2021**	**5900 KNOK**	**J.A. Grytnes (BIO)**
NRF/DIKU Intpart	***RECITE- Research and Education Partnership in Climate Change Impacts on Terrestrial Ecosystems***	**2018-2020**	**4500 KNOK**	**V. Vandvik (BIO)**
NRF/DIKU Intpart	***ExperTS - Experiments, Traits, Synthesis: Using knowledge from global ecological experiments to validate, assess, and improve trait-based theory***	**2019-2021**	**4500 KNOK**	**V. Vandvik (BIO)**
NRF/DIKU Intpart	***PRIMA LEARNING - Connecting hands-on-PRactice and Innovative MArine ecological sampling methods and analysis tools for enhancing student LEARNING"***	**2018-2020**	**4500 KNOK**	**A.G.Salvanes (BIO)**
NRF/DIKU Intpart	*Excel AQUA - Norway-Japan Partnership for Excellent Education and Research in Aquaculture*	2017-2019	4500 KNOK	Rønnestad (BIO)
NRF/DIKU Intpart	*FILAMO - Connecting FIeld work and LAboratory experiments to numerical MOdeling in a changing marine environment*	2017-2019	3960 KNOK	Ø.Fiksen (BIO)

Thon Stiftelsen	*Numerical Competence and Student-Active Research*	2017-2019	1400 KNOK	Eliassen, Varpe, Soulé
SiU, IntPART	*IScope (integrating Science of Oceans, Physics and Education)* Project number 249718	2016-2018	4345 KNOK	K.Pittman, (BIO)
Thon Stiftelsen	Research project student-active research: *Økosystem, klima og variasjon i eit «mini-havøkosystem»: ein vestnorsk fjord*	2016-2018	1137 KNOK	AG. Salvanes, (BIO)
SiU - High North Programme	*TraitTrain. Comparing climate change impacts on High North vs. Alpine ecosystems through researchand training in trait-based approaches* HNP-2015/10037	2016-2018	1500 KNOK	V. Vandvik. (BIO/UNIS)
Norgesuniversitetet	Artsapp: En applikasjon for enklere artsidentifikasjon	01.01.2015-30.12.2017	550 KNOK	JA. Grytnes (bioCEED)
Olsens Legat	*Effekten av ArtsAPP på studenters læring og motivasjon*	2015-2016	47 KNOK	L. Jeno (bioCEED)
Thon Stiftelsen	Excellent Teaching Award	2015	500 KNOK	C.Jørgensen (BIO)
Thon Stiftelsen	Excellent Teaching Award	2015	500 KNOK	K.Pittman (BIO)
UiB	Learning environment Award	2015	50 KNOK	C. Jørgensen (BIO)
WUN Research Mobility	Research stay at University of Rochester, USA,	Sept-Oct 2015	36 KNOK	Lucas Jeno (bioCEED)
UHR	Contribution to for talk at MNT-conference 2015	18-19.03.2015	75 KNOK	Ø.Fiksen, JA Grytnes (bioCEED)
NFR- FINNUT programme	PRIME - *How Implementation of PRactice can IMprove relevance and quality in discipline and professional Educations (knowledge building project).* NFR Project number: 238043	01.08.2014-01.08.2018 (extended 2020)	7000 KNOK	G. Velle (bioCEED/Uni)
SiU- UTFORSK	TRANSPLANT.Student research experience linked to an international research project.	2014-2016	1109 KNOK	V.Vandvik. (BIO)
Research Council of Norway-FINNUT programme	ArtsApp: En applikasjon for enklere artsidentifikasjon (pre-project). NFR Project number: 237821	01.05.2014-30.04.2015	287 KNOK	JA Grytnes. (bioCEED)
UiB, PEK-programme	*Sammen for bedre læring*	03.04.14-03.04.15	280 KNOK	A. Raaheim (UiB)
Research Council of Norway-FINNUT programme	Travel scholarship for developing projects – University of Otago	autumn 2014	160 KNOK	PB Eidesen (AB)

9. Accounting

See attached report.

Rapportert regnskap 2019

bioCEED finansieres gjennom årlig tildeling fra DIKU. Årlig tildeling er på 4 MNOK, i tillegg til et akkumulert overskudd fra 2014-19 på 1 852 000 som er fordelt på å gjenværende senterperiode. Tildelingen har i hovedsak vært brukt på personell (senterleder 40%, nestleder 20%, teknisk og på administrativ støtte i Bergen og Svalbard. I tillegg har det vært timelønnet prosjektstøtte til flere utviklingsprosjekter, innkjøp av digitale verktøy og utstyr, samt reiser, møter, konferanser, og lærerkurs. bioCEEDs partnere bidrar i tillegg med en betydelig egenandel i form av stillingsressurser (administrativ støtte 50%, utviklingstid vitenskapelig stab), to stipendiatstillinger (UiB og MatNat UiB) og kontantoverføringer (årlig toppfinansiering fra UiB som i 2019 utgjorde 573 KNOK). Toppfinansieringsmidler fra UiB blir primært brukt til driftsmidler til 3 PhDer, samt personell (50% undervisningstekniker til BIO, samt i 2019 20% administrativ prosjektstøtte).

bioCEED-partnerne innhenter i tillegg betydeligé midler gjennom ekstern prosjektfinansiering. Mange av disse prosjektene støtter direkte opp under bioCEEDs prosjekter og mål, andre er tilstøtende aktiviteter.

Budsjett og regnskap 2019

SUMMARY DIKU FUNDING								
	Budsjett	Forbruk	Differanse	Budsjett				
	2 019	2 019	2 019	2 020	2 021	2 022	2 023	Totalt
Personnel	2 700 098	2 349 598	350 500	2 825 338	2 914 764	2 990 824	3 008 938	14 089 462
Partnermidler UNIS	1 291 000	1 291 000	0	760 000	760 000	760 000	760 000	4 331 000
Drift	200 902	98 191	102 711	118 666	130 120	135 280	150 707	632 964
Utvikling	420 000	513 927	-93 927	450 000	453 000	455 000	458 351	2 330 278
Outreach	60 000	139 723	-79 723	80 000	80 000	80 000	90 000	469 723

ACTIVITY BUDGET DIKU FUNDING								
				Budsjett				
	Budsjett 2019	forbruk 2019	Differanse	2020	2021	2022	2023	Totalt
Senterdrift	200 902	98 191	102 711	118 666	130 120	135 280	150 707	632 964
Lærarkultur	150 000	413 461	-263 461	180 000	183 000	185 000	188 351	1 149 812
Utv.prosjekter - inn. teaching	250 000	100 466	149 534	250 000	250 000	250 000	250 000	1 100 466
Practical training	20 000	0	20 000	20 000	20 000	20 000	20 000	80 000
Outreach	60 000	139 723	-79 723	80 000	80 000	80 000	90 000	469 723
UNIS -partnermidler	1 291 000	1 291 000	0	760 000	760 000	760 000	760 000	4 331 000
Senterleder - frikjøp	746 692	656 896	89 796	791 540	814 613	838 378	838 381	3 939 809
Senteradmin	549 106	541 776	7 330	567 411	584 379	601 856	601 856	2 897 278
Prof. II Andersson	246 567	154 120	92 447	260 000	285 000	295 000	306 853	1 300 973
Prof. II Cotner	123 283	74 230	49 053	130 000	140 000	150 000	156 256	650 486
Tekniker - frikjøp	518 879	512 416	6 463	520 494	520 494	520 494	520 497	2 594 396
Dlv.lønn	465 572	377 053	88 519	501 669	516 055	530 873	530 871	2 456 520
Timelønn	50 000	33 107	16 893	54 223	54 223	54 223	54 224	250 000
Totalt budsjett	**4 672 000**	**4 392 440**	279 560	**4 234 004**	**4 337 884**	**4 421 104**	**4 467 996**	**21 853 428**

Budsjett 2020-2023 er noe justert i forhold til opprinnelig langtidsbudsjett for andre senterperiode, primært for å tilpasse budsjettet til planlagt aktivitet og forbruk i 2019.

Why 42[27]? Because[28] it is fascinating, extraordinary and, when you think hard about it, completely obvious[29].

[27] The meaning of life, the universe and everything
[28] According to S.Fry quoting D. Adams
[29] Much like evidence based teaching and learning, actually.