

# Annual Report 2016



## **OUR VISION**

### NTNU – Knowledge for a better world

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FORSIDE: A pot from the Roman Iron Age (200-400 AD) found in a pit at a Roman Iron Age farm

It was most probably used for fine dining.

at Vik, Ørland during excavations made prior to expansion of the nearby military base.



## One NTNU – One Museum

On 1 January 2016, the University Colleges in Ålesund, Gjøvik and Sør-Trøndelag merged with NTNU, the Norwegian University of Science and Technology. This necessitated reorganisation of faculties and institutes. For the University Museum this has meant minor changes, and the museum's role will be more clearly defined after growth of the University's academic breadth and expansion of its geographic area:

"As part of its social outreach, NTNU is responsible for the development, operation and maintenance of the University Museum with its scientific collections and public exhibitions. The University Museum also has extensive administrative responsibilities pursuant to the Cultural Heritage Act. Through the Museum's research activities, NTNU shall ensure systematic development of its scientific collections and make them accessible for national and international research communities. The collections represent the oldest changes in natural and cultural history. They not only provide important knowledge for nature and cultural heritage management but also form the basis for research, education and public outreach activities. As a multi-disciplinary, multi-campus university, NTNU will develop the University Museum's role as an important knowledge disseminator."

(The NTNU Merger Platform 19.08.2015.)

#### **OUR ROLE IN SOCIETY**

The NTNU University Museum gathers and shares knowledge about culture and the natural environment, as well as safeguarding and preserving vital scientific collections and making them available for research, curation and outreach activities.

#### An arena for the whole of NTNU

University museums have a special outreach responsibility, and we want the University Museum to be an arena for the whole of NTNU. This means that in addition to producing and developing our own core exhibitions, we will create opportunities to disseminate science from NTNU's faculties. We will use innovative methods to achieve this, while still ensuring that we deliver quality at the same high level as that of other University Museums, both national and international. The public deserves this.

"The only stable element in today's situation is change," stated NRK's (Norwegian Public Broadcasting Corporation) Director General at the Trøndelag meeting, and continued: "Several of our activities in the NRK today have to be done outside the NRK, but are financed by the NRK and form part of the services offered to the public."

I believe that the University Museum and NTNU to a greater extent must follow the same strategy. The Museum alone does not have the capacity or professional competence to produce public-engaging exhibitions and events which lie outside our basic operations.

What we can offer is our professional exhibition expertise, and a well-known and advantageously positioned outreach arena in the centre of Trondheim. We must therefore become better at realising our goals through collaboration, not only with other NTNU departments but also with external players.

#### The surrounding buzz

In 2016 we increased our regional presence. A large van "disguised" as a bumble bee caused quite a stir in Oslo, Gjøvik, Ålesund and round and about in Trøndelag.

More than 2,500 children visited Humlebuzz. They experienced bees close up and learned a great deal about pollination; one of nature's most important eco-system services. Our goal is to increase our regional presence in the coming years.

#### Vulnerable management

In connection with the merger, it was decided that NTNU would review its administrative organisation, focussing in particular on four requirements for the administrative



services: efficiency, quality, professional proximity and modernisation. Substantial work was invested in mapping the respective requirement's goals and in the subsequent development of staffing plans to meet these goals. This work has generated an excellent overview of the NTNU University Museum's services and resource goals, which will be very useful in future personnel planning.

The University Museum has a small and consequently vulnerable administrative staff. It is therefore critical that the actions implemented generate more efficiency so that we can continue the administrative support necessary for our specialised departments.

#### Excellent developments in research

In 2016, the University Museum evaluated and revised Strategy Plan 2011-2016. We have thoroughly reviewed the Plan, including goal achievement with an emphasis on engagement. The new Strategy Plan for 2017-2021 has been given the title "Science in the Centre".

Our unique advantages: scientific collections and crossdisciplinary competence generate results. Significant advances in various types of analytical methods have brought our collections into the spotlight. These unique advantages pique the interest of collaboration partners for top international academic environments. More than half of our scientific activities have international partners, we attract excellent candidates to recruitment positions, and we participate in the most prestigious programmes run by the Research Council of Norway.

It is therefore vital to safeguard our collections in the best possible way. We eagerly anticipate the realisation of our development plans in the Kalvskinnet Knowledge Centre. Therefore, in 2016, the upgrade of several of our collections facilities constituted a major part of our activities. This type of work must continue to be given the highest priority in the coming years.

Museum Director Reidar Andersen

## MUSEUM BOARD 2016

Chairman Peter Johan Schei (External Representative) Siri Hunnes Blakstad (External Representative) Harald Jacobsen (External Representative) Berit Rian (External Representative) Torbjørn Ekrem (Scientific Staff Representative) Per Gustav Thingstad (Scientific Staff Representative) Vibekke Vange (Scientific Staff Representative) Ingrid Ystgaard (Temporary Scientific Staff Representative) Eva Lindgaard (Technical and Administrative Staff Representative) Carl Fredrik Vemmestad (Student Representative)

## MANAGEMENT TEAM

Reidar Andersen, Museum Director Solveig Bakken, Research and Collections Manager Ivar Margido Jensås, Head of Administration Bernt Rundberget, Head of Department, Department of Archaeology and Cultural History Torkild Bakken, Head of Department, Department of Natural History Tove Eivindsen, Head of Communication Randi Wenche Haugen, Head of Section, Section of Public Outreach and Exhibitions Christen Torvik, Human Resources Manager

#### **ORGANIZATION CHART**



as of 31.12.2016

The NTNU University Museum is one of six University Museums in Norway, and as a unit is at the same organizational level as the faculties of NTNU. NTNU reports to the Ministry of Education and Research.

The Museum's exhibitions, collections, museum administration and three of its Departments are located at Kalvskinnet near Trondheim city centre, while the National Laboratories of Age Determination is located at Gløshaugen. The Ringve Botanical Garden is located in Lade in Trondheim. The Kongsvoll Alpine Garden is located in Dovre.

#### THE UNIVERSITY MUSEUM KEY FIGURES

For 2016, the income of NOK 142.9 mill is derived from two main sources:



### Salaries and internal rent constitute 75% of the total costs of NOK 146.4 million

The University Museum's income statement for 2016 shows a loss of NOK 3.5 million.





Over the last 10 years, the composition of income sources for NTNU University Museum has changed greatly. In 2007, income from externally-funded activities comprised some 74% of the appropriated income from NTNU, whereas in 2016 it comprised only 58%.



#### Distribution of positions in percentages

The figures exclude hourly-paid field positions and assistant positions. Apprentices are included among technical positions.

Change in income composition from 2007 to 2016:

### II. INTRODUCTION TO OPERATIONS AND MAIN FIGURES



In 2016, NTNU University Museum had 114.0 working years distributed between 123 positions. Women comprised 44.1% of employees in 2016.

The total number of working years has been stable in the period from 2012 to 2016. The number of teaching and research working years has increased, as has the number of technical working years.

The number of administrative working years has been reduced during this five-year period.

### The Museum buildings comprise 16,798 m<sup>2</sup> distributed geographically in Trondheim.



The premises at Kalvskinnet are in need of further development.

It is important that storage magazines and exhibition premises become a defined and integrated part of further development work at the NTNU Campus in Trondheim.

Taxidermist Per Gätzschmann restoring a wrinkled hornbill from around 1920, which formed part of the exhibition «Deadly Trade – how illegal trade can threaten the existence of species". Restoration of old specimens has been a priority in recent years.



### 2016 HIGHLIGHTS

- The University Museum strengthened its emphasis on research quality and internationalisation in 2016 through:
  - the appointment of an Associate Professor as a tenure track position (Onsager Fellowship) and a Professor II at International Chair level
  - funding from the Research Council of Norway's foundation research programme in FRIMEDBIO Young Research Talents and FRIHUMSAM Researcher Project
  - participation in an ERA-Net Project
  - leadership of/participation in four EU applications, including an ERC starting grant.
- The storage facilities for the cultural historical collections has been substantially improved through re-allocation of space from the church exhibition to magazine and magazine exhibition.
- Extensive refurbishment of the magazine for the botanical collections has been started with the goal of increasing capacity and improving storage conditions in the existing magazine.
- <sup>14</sup>C laboratory has acquired new equipment which will increase capacity to 2,000 samples annually.
- The NTNU Communication Division and the University Museum have initiated "NTNU Kveld", a series of popular science lectures.
- The NTNU Room, a dedicated exhibition area for NTNU's strategic research areas (SRA) was opened with the exhibition "Polar Night" in the Oceans research area.



Grethe Sundet Haugen and Marit Klemetsen Arneberg packing up the herbarium materials for removal to external storage while awaiting the new magazine interior.



In 2016, 26 metres of topographic archive were transferred to Dora from Gunnerushuset. Here we see Frank Asprem and Knut Sande hard at work during the move.



The public being given torches before entering the darkened "Polar night" exhibition.

## LOCAL PRIORITIES IN 2016

Strategic research areas: Linked to SRA Sustainability; the University Museum will strengthen research into biodiversity and ecosystem services through "Experts in Teamwork" villages and the CeBES consortium through four pilot projects. Linked to SRA Oceans, the University Museum will set up the exhibition "Polar Night" in collaboration with the NT Faculty and AMOS.

**Result:** The Museum heads the research area "Biodiversity and Ecosystem Services" in SRA Sustainability and has two recruitment positions linked to the activity. In 2016, the Museum had responsibility for a village in "Experts in teamwork" focussing on ecosystem services. In collaboration with the Centre for Biodiversity and Ecosystem Services (CeBES), an application was prepared and submitted for a national infrastructure for sharing "Lifewatch Norway" data. The internal pilot projects have been initiated. The exhibition "Polar Night" opened on 22 September.

**Living campus;** The University Museum will further develop "NTNU Kveld" at Dokkhuset in collaboration with the NTNU Communication Division. The University Museum will ensure that NTNU has access to international, themed touring exhibitions in collaboration with involved faculties.

**Result:** NTNU Kveld was organised eight times in 2016. A contract was signed to display the touring exhibition BODY WORLDS Vital from June to October 2017.

#### Activating the scientific collections:

The University Museum will kick off the cross-disciplinary research project "Trondheim through 1,000 years" which includes collection of material from today's Trondheim residents, genomic and proteomic analyses of archaeological material and involvement of the newly-appointed Onsager Fellow. The University Museum is to launch the first version of "Collections Online" for the cultural historical and archaeological collections as part of fulfilling "Tingenes tale" [The Language of Things] and the digital content strategy. The goal is higher visibility and revenues, increased international research collaborations and a strengthened position as a national leader within digital accessibility.

**Result:** Two applications were submitted to the Research Council of Norway for funding for the cross-disciplinary projects on the topic "Trondheim through 1,000 years". Both received very good evaluations and one project was granted funding. A contract has been signed with the Centre for Geogenetics at the University of Copenhagen on a collaboration on archaeological genome research. The project "Collections Online" was implemented using internal and external expertise. The development work was completed at the end of December 2016, and the web portal was launched early in 2017. **Long term exhibition plan;** The University Museum will draw up a long-term master plan for exhibition activities with a clear public orientation, and to describe the funding options for implementation.

**Result:** The Long-Term Strategic Exhibition Plan 2017-2022 was finalised in 2016. This contains ten action areas with defined activities that are to be implemented before the end of 2019 or 2022.

**Storage situation and collections;** The University Museum is to improve the storage situation in its buildings; implement activities to upgrade temporary storage; ensure return of the Schreiner collections; transfer the finished digitalised sections of the Topography archive and catalogue cards for town excavations from the Museum to Dora; install compact shelving in the Herbarium; and move the Geology Collection to external storage.

**Result:** In 2016, the following activities were prioritised and allocated resources: Return of the Schreiner collections; transfer of the finished digitalised sections of the Topography archive and catalogue cards for town excavations from the Museum to Dora; installation of compact shelving in the Herbarium. In addition, one activity from 2015 was transferred for completion in 2016: "New organisation of exhibition and storage for church art", increasing its relevance and efficiency as a storage. Moving the Geology collection to an external storage was not prioritised through own funding.



Professor Thomas Tybell at the NTNU Institute for Electronics and Telecommunication held the very first "NTNU Kveld" lecture on nanotechnology.

### **II. INTRODUCTION TO OPERATIONS AND MAIN FIGURES**

### DEPARTMENTS



Department Engineer Sølvi Stene. The quality of the preparation lines was enhanced in 2016.

## THE NATIONAL LABORATORY FOR AGE DETERMINATION

The National Laboratories of Age Determination (ND) date archaeological, geological and organic material using radiocarbon dating (<sup>14</sup>C) and dendrochronology dating (tree-ring analysis). Research is conducted on dating methodology and methods application.

**In 2016:** The National Laboratory of Carbon Dating had good access to test materials, and 668 unknown samples of various types of materials such as carbon, peat, wood, shell, bone and stone have been prepared and dated. The largest batch of samples came from the excavation project associated with the development of a new fighter plane base at Ørland. The Dendrochronology Laboratory has performed 330 datings on samples from 12 counties. Staff have been highly active with participation at international conferences, media contributions and scientific publications. The number of records in CRISTin in 2016 was double the average of the last five years.

	2012	2013	2014	2015	2016
Carbon dating	1 357	0	0	364	668
Dendochronological dating	627	307	153	302	330

The number of reported carbon datings has almost doubled after the laboratory's re-opening in 2015 and during 2016, while dendrochronological datings are at about the same level as in 2015.



#### SECTION FOR EXHIBITIONS AND EVENTS

The Section for Exhibitions and Events (SF) is responsible for producing and maintaining the Museum's exhibitions, coordinating public events and school programmes and other educational activities. The section also manages the Museum Shop.

In 2016: The section has laid down substantial efforts with a new long-term exhibition plan. Substantial efforts have also been invested in the exhibitions "Deadly Trade" in collaboration with the Norwegian Environment Agency, "Polar Night" in collaboration with the Polar Museum in Tromsø and NTNU's Faculty of Natural Sciences, Humlebuzz in collaboration with NTNU's resource centre for STEM-education and the Centre for Ecological and Evolutionary Synthesis at the University of Oslo, and NTNU Kveld in collaboration with NTNU's Communication Division.

#### THE DEPARTMENT OF ARCHAEOLOGY AND CULTURAL HISTORY

The Department of Archaeology and Cultural History (SAK) studies prehistoric, historic, and maritime archaeology. The department conducts archaeological excavations pursuant to Norway's Cultural Heritage Act, hosts the Museum's conservation laboratory, and is responsible for the cultural history collections and teaching in archaeology.

**In 2016:** The number of scientific publications has increased, and new research groups and one research network have been established. Heritage management activities have been extensive and a specialised heritage management programme is under development. The interest in searching with metal detectors has resulted in considerable media activity. Increased staff numbers have made the Department more robust, and process development and rationalisation have been emphasised. The new studies programme continued its implementation in archaeological studies.



2016 was a year with high activity in heritage management archaeological investigations. The archaeological projects have varied in size and duration, but all have contributed new and important knowledge on the pre-history of our region. The last field season for the major "Ørland Project" was completed in 2016, and post-field work and publication of the results are now underway. Several smaller investigations have been undertaken on rock art as well as a number of maintenance activities.

#### DEPARTMENT OF NATURAL HISTORY

The Department of Natural History (SN) manages the Museum's Natural History collection. The Department conducts research in biogeography, biosystematics and ecology, with an emphasis on conservation biology. The two botanical gardens are part of the Department.

**In 2016:** The Department continued a high level of research activity, generating extensive scientific publications and international collaborations. As much as 65% of the scientific publications in 2016 was the result of collaborations with international research communities. There has been particular attention to top-level research, which is also a priority area for NTNU. The scientific collections are a central element of research activity, and several PhD candidates are employed in projects that utilise the scientific collections. Refurbishment of the herbarium has started – an activity with significant benefits for the department.



Archaeological field courses are conducted each year at Hitra for Bachelor and Master degree students.

Ingegjerd Hellevig with a sea trout that is to be marked for her Master's thesis, in Botnvassdraget in Nordland. Ashley Gilbreath on the right.



Heritage management investigations

#### **RESEARCH THAT STANDS OUT FROM THE COMPETITION**

The scientific collections, long time series and the material from excavations represent an extremely valuable research infrastructure, and have received increasing attention internally and externally in recent years. Activation of this research infrastructure has been an important objective for the University Museum during the strategy period 2011-2016.

The infrastructure is up-to-date and is being increasingly utilised in externally-funded projects with applied and basic research topics, and in internal degree projects. Digital and open access to data facilitates its use, a factor that makes the museum an attractive collaboration partner. In 2016, 56% of the Museum's scientific publications were based on collections or long time series, a figure that exceeds our goal of 50%. The material can be of more recent date, as seen in the publication of the anthology "Marine Ventures – Archaeological perspectives on Human-Sea relations" by Equinox Publishing, or such as our oldest material from the time of the Museum's establishment in 1760, with the publication of "Flora Norvegica by J.E. Gunnerus. In Norwegian and with comments" in Gunneria, the Museum's own publication series.

The NTNU University Museum adhered to an Action Plan for 2013-2016 targeting increased quality in research. The positive developments during this period include increased research quality and quantity and continued in 2016. The total number of scientific publications, numbers of publications at the highest quality level, and collaborations with international partners are all increasing. Two projects were awarded funding from the Research Council of Norway's basic research programme in FRIMEDBIO Young Research Talents and FRIHUMSAM Researcher Project. The Museum was highly active in submitting applications for EU funds in 2016, including leading or participating in three large Marie Curie network applications and an application for an ERC starting grant. Although we have received some excellent evaluations in the last years, we have unfortunately not received any funding thus far.

#### **RESEARCH TOPIC: BIOSYSTEMATICS AND EVOLUTION**

Biosystematics is the study of variance, through the description of biological diversity and the understanding of the processes that lead to evolutionary change. This includes naming species, deducing the relationship between different organisms, gaining an understanding of how species formation occurs, and analysing the history of all living creatures on Earth.

**In 2016:** Activities were started that focussed on top-level research with a basis in genetic studies of biological diversity. Priority has been given to development of a clean laboratory and infrastructure for next generation sequencing. The scientific collections are a core element of these research projects. Several large projects are now underway and new degree candidates have been employed. The work with DNA barcoding through the national infrastructure NorBOL has the same high priority as previously, and the development of a tool for environmental barcoding has been started.

Manoa xianjuensis. PhD student Xiaolong Lin was involved in describing a new non-biting midge for science in 2016. It was named after the place where it was found, the Xianju National Park in China.

## RESEARCH TOPIC: HUMANS, NATURE AND LANDSCAPE INTERACTIONS

Research on the interaction between humans and their natural environment is key to understanding how people have influenced the natural environment for thousands of years, and how changes in nature have shaped culture. Conservation biology research attempts to understand the factors that determine species distribution in time and space, how environmental variations influence the structure and dynamics of various populations, communities and habitats, as well as how to preserve biodiversity and ecosystem services at all levels.

**In 2016:** The Museum's researchers have been involved in work under the supervision of the Nature Panel (IPBES) and NTNU's Strategic Research Area Sustainability. The crossdisciplinary project Snow Patch Archaeological Research Cooperation (SPARC) is in its concluding phase. The project has focussed on the effects of climate change through the study of archaeological, biological and geological relics in snowdrifts in the mountains. The specialist activity on bogs and wetlands has increased nationally and internationally.



A bone from the hind leg of a reindeer; one of several finds that emerged when the snow melted from Kringsollfonna in Oppdal in 2016.

#### RESEARCH AREA: PRESERVATION IDEOLOGY AND MUSEOLOGY

Preservation ideology provides the theoretical principles upon which legal and applied environmental protection is built. Museology involves the processes that contribute to the establishment, maintenance, and changes in museums, historically and today.

In 2016: There was little activity in this research area in 2016.

## RESEARCH AREA: MATERIAL CULTURE AND OTHER FORMS OF CULTURE

This research area addresses artefacts and other forms of culture expressed through archaeological material and places them in the context of their landscape origins, continuity, change and variation in a Norwegian, European, and global context, along with theories that have been formulated in this field

**In 2016:** This was the last excavation season for the Ørland project. The result is increased knowledge on settlements and work throughout the Iron Age. A concentration on natural science analyses has contributed to the understanding of the use and exploitation of the west coast landscape. Investigations of Stone Age settlements on Korsmyra in Fræna municipality have generated increased expertise on settlements, technology and work. Several of the research projects utilise natural science analyses such as DNA, isotopes and trace elements on archaeological material to gain a better understanding of people and society in prehistoric and historic times.

#### **RESEARCH AREA: TECHNOLOGY-BASED METHODS**

Conservation technology entails the conservation and safeguarding of movable and immovable cultural heritage artefacts for future generations. It is founded on the study of scientific and technological subjects to increase our understanding of the materials of

cultural artefacts, their construction and deterioration, and the development of technology-based methods of conservation and strategies for safeguarding them. Archaeological fieldwork methodology consists of the methods and strategies for documenting and collecting archaeological data. This includes excavation techniques, the use of geographic information systems to measure structures and finds, geophysical information systems and other methods of distance measurement, and photographic and field conservation techniques.

In 2016: A PhD project on the use and development of geophysical methods was completed in the autumn. The objective of the application of this technology was to increase the use of non-destructive methods for knowledge development in archaeological

research and conservation. Another ongoing PhD project is linked to the NTNU Centre for Autonomous Marine Operations and Systems (AMOS), and relates to use of self-governing technologies (robotics) to detect and diagnose archaeological relics on the sea floor.

#### **RESEARCH AREA: AGE DATING METHODOLOGY**

Radiocarbon (<sup>14</sup>C) and dendrochronology research contributes to enhancing the precision of dating methods and supports its expansion into other application areas. The methods are employed in a series of research projects and generate new knowledge in a range of fields such as natural science and cultural anthropological studies of climate and environmental development, building history, and changes in landscapes, cultures, and settlements.

**In 2016:** Through contributions to two scientific anthologies published in 2016, the results of 30 years' research has now been collated with existing knowledge of dendrochronological dating of stave churches in Norway and Værnes church. The first datings using cosmogenic isotopes were performed in the laboratory in 2016 as measurements on <sup>10</sup>Be in standards prepared in Bergen, Seville and Bern, and in unknown samples from Finnmark.



Conservator Ellen G. Randers with finds from the Ørlandet military base. In the background, Project Field Leader, Ulf Fransson.



Senior Engineer Einar Værnes placing samples for dating in the accelerator-based mass spectrometer.

## PARTICIPATION IN PROJECTS PARTIALLY FUNDED BY THE RESEARCH COUNCIL OF NORWAY OR THE EEA

Overall programme in parentheses

NTNU UNIVERSITY MUS	SEUM AS PROJECT MANAGER OR COORDINATOR:
NorBOL	NorBOL, Norwegian Barcode of Life (FORINFRA). Museum contact person: Torbjørn Ekrem
SPARC	Snow Patch Archaeology Research Cooperation – The effects of climate change on vulnerable high mountain heritage environments (Miljø2015). Museum contact person: Birgitte Skar
INVAFISH	Invasive freshwater fishes, dispersal vectors, impacts and management (Miljø2015). Museum contact person: Anders G. Finstad
EBAI	Environmental Barcoding of Aquatic Invertebrates (Miljø2015). Museum contact person: Torbjørn Ekrem
Chocolate's sweet little	<b>secret</b> (PROFORSK). Museum contact person: Reidar Andersen
CHASES	Consequences of land use change and human activity (MILJØFORSK). Museum contact person: Jan Grimsrud Davidsen
Sphagnum	Speciation genomics of peat mosses ( <i>Sphagnum</i> ) – testing speciation with gene flow hypotheses in a highly diverse genus (FRIMEDBIO). Museum contact person: Kristian Hassel
Your body in movement	(PROFORSK). Museum contact person: Morten Sylvester
PARTICIPANT:	
ForBio	The Research School in Biosystematics – towards permanent existence (UNIMUSEER). Museum contact person: Hans K. Stenøien
ClimJaM	Climate and glacier variations since the Last Glacier Maximum in Jan Mayen (KLIMAFORSK). Museum contact person: Eiliv Larsen
MIRACLE	Mires and climate: towards enhancing functional resilience of fen peatlands (EEA). Museum contact person: Kristian Hassel
DNA barcoding of crypto	<b>ogams, including biosystematics studies of selected groups</b> (EEA). Museum contact person: Mika Bendiksby
SFF AMOS	Centre for Autonomous Marine Operations and Systems (SFF). Museum contact person: Øyvind Ødegård
SFF CBD	Centre for Biodiversity Dynamics (SFF). Museum contacts: Hans K. Stenøien and Anders G. Finstad

Parts of the excavation field at Ørland fighter plane base

#### SCIENTIFIC PUBLICATIONS AND INTERNATIONALISATION

The Museum's scientific publications continue to show a positive trend for both scope and quality. Compared with 2015 and the average for the five-year period, there has been an increase in both the number of publications and the percentage of publications at level 2. We achieved our long-term goal by a good margin, with at least 50% of all scientific publications in 2016 based on collections and long time series.

Our researchers have extensive international collaborations; 57% of the scientific articles are published in collaboration with international colleagues. The long-term goal for 2016 that at least 20% of the museums events would have international participants was realised.

At the start of the strategy period, the Museum had high ambitions for cross-disciplinary dissemination activities. At least 50% of exhibitions and events were to have a crossdisciplinary topic by the end of 2016. Over the last few years this has been around 40-45%, revealing that we are close to realising our goal. The ambition level was set while the Museum participated in the project "Kunnskapsbyen" in which many events had a cross-disciplinary topic. Our participation in the project lasted until the end of 2014. From the end of 2016, three-quarters of the digitalised collections are now accessible on the internet. In regard to cultural history, we are some way off the actual goal of 90% for 2016. This is primarily due to the quality of the data for the planned published dataset, which was substantially poorer than anticipated and meant that extensive re-working was necessary.



	Results 2016	Goal 2016	Ambition 2016
Scientific publications based on collections and long time series	56%	50%	50%
Events with international participation	32%	23%	20%
Percentage of exhibitions and events with an interdisciplinary theme	40%	42%	50%
Percentage of digitalised cultural heritage collections made available on the web	76.1%	90%	90%
Percentage of digitalised natural history collections made available on the web	73.3%	60.7%	90%

Ambition 2016 for these indicators was approved by the Management Team at the Museum in November 2011. "Adjusted goals" for 2016 were set at the start of the year.

#### DISSEMINATION

In 2016 the Museum focussed on a new and larger audience by creating new events with live dissemination of knowledge. Two new public outreach arenas were established: NTNU Kveld and Humlebuzz. In addition, the Museum dedicated a separate exhibition room to communicate NTNU's Strategic Research Areas.

#### EXHIBITIONS AND EVENTS

NTNU Kveld organised 8 evenings with 17 lecturers and 1,765 visitors. NTNU Kveld is a collaboration between the Museum and the NTNU Communication Division.

Humlebuzz visited 12 schools and 36 classes in years 4-7 in Oslo, Gjøvik, Ålesund and Trondheim. In 2016 a total of 2,606 children and adults visited Humlebuzz. Humlebuzz is a collaboration between NTNU's resource centre for STEM-education and the Centre for Ecological Synthesis at the University of Oslo.

The NTNU Room has been established to enable display of exhibitions communicating NTNU research, including the four Strategic Research Areas. The exhibition "Polar Night", which was developed by the Polar Museum in Tromsø, was adapted to include presentations of NTNU's contribution to the research on, and discovery of, new species under the ice on Svalbard. This exhibition is a collaboration with the NTNU Faculty for the Natural Sciences and Technology and NTNU AMOS (Autonomous Marine Operations and Systems). The exhibition "Deadly Trade" is a collaboration with the Norwegian Environment Agency, detailing how illegal trade can threaten the existence of species.

#### VISITORS

One goal is to increase the numbers of visitors to the Museum. Experience shows that events and activities in which children and adults meet researchers are popular. The number of events in the Museum with a pedagogic theme and lecture increased from 19 in 2015 to 37 in 2016.

The number of education activities for school children increased from 478 in 2015 to 609 in 2016, with 10,433 pupils taking part in the Museum's pedagogic activities. The number of guided tours also increased from 518 in 2015 to 573 in 2016. Popular activities such as the summer school programme during the summer holidays and "Welcomed by the Sea" have been continued. The Middle

Ages exhibition has been upgraded with a new sound system and lighting, and permanent guided tours have been introduced.

#### Visits to the exhibitions at Kalvskinnet



2010: Jubilee Exhibition Kunnsapslarm [Knowledge Alert] 2012: Afghanistan – the hidden history

The Museum's two botanical gardens at Ringve and Kongsvoll have been very popular, with an estimated 80,000 and 10,000 visitors in 2016 respectively.

## TOTAL PUBLIC OUTREACH AND RESEARCHER COMMUNICATION



Public outreach and research dissemination in 2016 was at the same high level as 2015. Activity in public outreach is stable, while in recent years there has been a significant increase in researcher communication and, particularly, in lectures. The trend in communication activities has changed over the last few years, with an increase in blog posts and web publications. In 2016, 10 people were responsible for 53% of the registered public outreach activities.

#### CONTRIBUTION TO THE STORE NORSKE LEKSIKON (GREAT NORWEGIAN ENCYCLOPEDIA)

In 2016, NTNU ran extensive communication work through the Store Norske Leksikon, and several of the people responsible for academic content are from the NTNU University Museum. The Museum had four active academic staff in 2016 who together produced 203 articles which were read 106,928 times.

Steering parameters common to all museums	Results 2016	Goal 2016
Number of visitors	129,854	125,750
Number of educational programmes for school children	609	515
Number of guided tours in total	573	605
Number of exhibitions (permanent/temporary)	3/9	4/9

#### COMMUNICATION

The University Museum has a consistently high media presence, with an average of two media reports per day. The number has been relatively stable in recent years. 2012 was a year of exceptional media reporting, primarily due to the media interest around the exhibition "Afghanistan – the hidden history". The Museum also contributes regularly to articles on the popularised research websites Forskning.no and Gemini.no.

#### MEDIA COVERAGE

	2012	2013	2014	2015	2016
Media coverage in Norway	1,064	723	824	690	768

#### Forskning.no and Gemini.no



This figure only includes Gemini articles in Norwegian, not those in English. The Museum had 13 articles in the English "Gemini research news" in 2016. Numbers for Forskning.no include blog posts from the Ørland project, a collaboration based on Norark.no.

#### DIGITAL AND SOCIAL MEDIA

#### Visits to web pages in 2016



Annual visits to the Museum's web pages including blogs and Norark, have been relatively stable at between 140,000 and 150,000 over the last three years. The numbers for the 2015 high season visits to Norark.no are missing, so the drop in that year most probably does not reflect the true numbers.



The Norwegian Facebook page is the largest, and is increasing the most. The Ringve Botanical Garden and Norark pages have each increased with around 500 followers. These increases have occurred without any special activities to recruit more followers in 2016.

- 63% of those who like the Vitenskapsmuseet-page on Facebook are women.
- 92% of the followers are in Norway, and 47% of these are in Trondheim.
- 72% of those who like the English Facebook page are in the United States.
- 80% of those who like Ringve Botanical Garden on Facebook are women, and 94% of the followers are in Norway.

#### Facebook engagement

There is large variation in the extent to which those who like the pages respond to the content that is published. The English language page mainly contain links to foreign media coverage and blogs in English. Here, the number of times a follower engages (shares, likes, comments) is generally low – on average 1.2 times per person in 2016.

On the Norwegian pages the content varies more with links to media coverage in Norwegian, sharing of images from activities, events posting, and sharing of links to new publications. Here, the number of engagements per follower increased from 4.6 in the previous year to 6.7.

One reason for this increase can be the large response to the video posts on the upcoming touring exhibition BODY WORLDS Vital towards the end of the year. This video has received many comments and shares. The page had a total of 111,000 or so video plays in 2016.

Ringve Botanical Garden had the best and continuously high number of engagements per post with 7 per follower in 2016. In particular, pictures from the garden stimulate Facebook engagement.

### PUBLIC OUTREACH AND RESEARCH COMMUNICATION

#### **Publications**

NTNU University Museum	Archaeological
Natural History reports	excavation reports
posted in 2016:	posted in 2016:
15	12
Number of downloads:	Number of downloads:
<b>5,380</b>	1,301

Many reports were posted towards the end of the year, resulting in fewer downloads. Much of the traffic comes later:

**Natural history reports** posted in 2015 were downloaded 2,077 times when the last annual report was compiled; now, the number is 7,082.

**Archaeological excavation reports** from 2015 have now been downloaded 8,000 times.

8,000

+5,000



The popular science magazines "Bli med ut!" and "SPOR – News from the past" are downloaded almost twice as often as reports and notes.

The Natural History reports have been posted on the web pages a few years longer than the archaeology reports, which may explain the difference in the download average.



The Project Manager for the Ørland Project, Ingrid Ystgaard, being interviewed by NRK in connection with the foyer exhibition in which the Museum displayed some of the many finds from the project.

#### Total and average downloads of publications

## Implementation of the new studies programme for archaeology studies at NTNU is still ongoing, and we cannot yet see the full effect of these major academic changes. Implementation will be completed in 2017.

One main element of the study programme is to enhance the awareness of career opportunities arising from a Bachelor's degree in archaeology. The number of applicants to the Master's degree programme fell in the autumn of 2016, a situation that was also seen with archaeology studies at the country's other universities. It is most probably related to business cycles, increased unemployment and the spotlight on defined job markets.

This indicates that the new studies programme in archaeology comes at the right time with its emphasis on how archaeology can be applied in business and professional life. The Department of Natural History takes an active part in the studies, offering foundation courses in biology with an emphasis on field activity. The Museum is increasingly active at Bachelor and Master degree level.

#### EDUCATIONAL ACTIVITIES

	2012	2013	2014	2015	2016
Archaeology: Number of field course days	1,716	1,300	1,135	1,064	1,061
Biology: Number of field course days	1,207	1,072	1,015	1,061	1,202



Professor Hein Bjerck teaching Bachelor degree students in archaeology.



Students on a field course in biology examining life in the shoreline.

### SCIENTIFIC COLLECTIONS

Managing extensive growth of collections in addition to the safeguarding and conservation work has necessitated high activity levels. Staff at the University Museum have contributed considerable expertise and resources to the work on common national IT solutions for the University Museums (MUSIT). Insect data has migrated to a new application and the Museum now has responsibility for adapting the application to marine organisms.

#### ANNUAL GROWTH (number of items/objects)

Over the last five years, growth of the collections has varied greatly on an annual basis. For cultural history, the most important factor in this variation is the size of the excavation fields, with Stone Age sites providing the most material. For natural history, the growth varies with the type of research and mapping projects as well as the capacity to register and organise the material in the collections.



NTNU University Museum has many large vegetation datasets. The data has been collected over a long period, from about 1970 until now. Funding from the Global Biodiversity Information Facility, GBIF Norway, has enabled completion of a pilot project to systematise, secure and facilitate older datasets from forests for publication. Data has been transferred from older and outdated systems and formats to standard international data formats that can be published through GBIF. Metadata was written for the datasets based on literature published from the projects.



#### NUMBER OF DETECTOR FINDS

In 2016 a total of **206** metal detector finds were handed into the University Museum.

Of these, **171** finds were handed in by the general public.

**35** finds came in as a result of social searches under the supervision of the county council.

Metal detector finds enrich the collections and constitute important scientific source material. This growth contributes knowledge on new, previously unknown artefact types and variants. Examining how these have spread provides new insights into distribution areas and economic history. Metal detecting by the public has resulted in the discovery of several previously unknown, automatically conserved, cultural heritage sites on agricultural land, trade/market places and ploughed burial sites, and can potentially provide new understanding of the cultural landscape.

#### SAFEGUARDING AND CONSERVATION

From 2006 to 2015, the Museum's work with safeguarding and conserving the collections was organised through the Revita project. From 2016, this ongoing work will be undertaken by the departments while larger projects will be prioritised in the Museum's common annual plans and budget. In 2016, activities that improve safeguarding and conservation conditions in the existing storage magazines will be prioritised. An exhibition room with climate regulation (414m<sup>2</sup>) has been re-allocated to a cultural history magazine with a magazine exhibition; this will increase capacity and improve the storage conditions.

An extensive project has been started to refurbish the botanical magazine (335 m<sup>2</sup>) with compact storage shelving. This measure will increase the storage capacity for botanical material by at least 50%, as well as improving the climate conditions. The material was packed in 6,600 boxes and distributed between 101 Europallets in three trailers. At the same time, all tracheophyta (vascular plants) material was sent to the Netherlands for scanning so that it also will be digitally available with an image. Those parts of the cultural history archives that have completed digitalisation were moved in 2016 to improved storage facilities in external magazines. Evacuation plans for the collections were finalised and emergency storage facilities have been established. At Ringve Botanical Garden, a start was made on converting the classification system to ensure that the planting represents up-to-date knowledge on plant classification. "The Plant System" is the garden's most diverse planting with more than 1,000 species. The project is planned to take three years (image on the left).

#### 30.7 of the NTNU University Museum's 114 working years are registered as temporary employment. Compared with NTNU as a whole, the number of temporary employees is high.

This is primarily due to the areas of responsibility assumed by the NTNU University Museum. However, 2016 was a year with an above-average level of activities in seasonal field work and this is reflected in the high numbers of temporary staff.

In parallel with the work related to the merger and staffing plans, NTNU has also moved some administrative services from faculty level to central level in order to provide a more efficient and homogeneous service. Together with internal changes at the Museum, this has resulted in changed work tasks for some employees.

From 2015 to 2016, the number of work years in administrative positions fell by 3.2. The two most important factors contributing to this reduction were the conclusion of the Revita project, and the changes implemented in the staffing plans. The increase of three working years in scientific positions is the result of two new positions and one appointment to a vacant position.

#### Employees by age and gender



#### Scientific positions - gender distribution



Percentage of women in scientific work years in 2016 is 31.3%. For comparison, the same figure for NTNU is 40.1%.

#### NTNU University Museum has 16,798 m<sup>2</sup> buildings at its disposal, of which 93.7% is owned by NTNU and 6.3% is leased.

As much as 7,225 m<sup>2</sup>, or 43%, of the area at the Museum's disposal is used for museum-related tasks such as exhibitions, greenhouses and magazines for scientific material.

#### The area of 16,798 m<sup>2</sup> is used as follows:



At Kalvskinnet, the area at the museum's disposal constitutes primarily older buildings some of which are completely or partially listed. The Museum's academic activities and administration are located in several buildings at Kalvskinnet, Ringve and Gløshaugen, a factor that generates high running costs. The building mass does not afford efficient utilisation of the space. This becomes obvious when looking at the area used for offices (about 22.3 m<sup>2</sup> per work year), office support (10.8 m<sup>2</sup> per work year) and traffic (16.2 m<sup>2</sup> per work year).

Refurbishment work has been started in Gunnerushuset which will mean that some employees and functions in the Department of Archaeology and Cultural History can be moved from leased areas to owned areas at Kalvskinnet.

# NTNU has initiated work on a control system for information security as well as a comprehensive internal control system. The work was still in progress at the end of 2016. NTNU has decided to establish an internal audit system which will facilitate procurement of services through a common arrangement for state operations.

The NTNU University Museum currently has several internal control and risk management systems, but these differ between functional areas. Risk assessments and control measures reveal that assessments, control procedures, and follow-up actions are still occasionally insufficiently documented.

The NTNU University Museum wants to work more comprehensively and systematically with internal controls and risk management both in-house and in close collaboration with the rest of NTNU. Controls that prevent and enable detection of issues will require less resources in the long term than "putting out fires" and troubleshooting after the event. It is also important to reconcile resource use with the expected impact of inspection measures.

#### Research including BOA and financial steering

Established practices and procedures have been followed for the most part, and role descriptions, procedures, and process descriptions are available for most areas. Accounting and hours monitoring is conducted regularly for collaboration or commission funded (BOA) projects. Checklists and contract templates have been drawn up and adhered to. Monthly follow-up of accounts and budget for the departments and central NTNU is monitored. A separate accounting and budget template for public heritage management projects deviates from the Total Cost Model (TDI) which is otherwise used in all externally funded activities. This poses challenges for both monitoring and comprehension. In spite of increased expertise and an improved project management and reporting system, there continues to be challenges accurately estimating budgets and prognoses for the interaction between externally funded activities and appropriation accounts. Registration and control in the research information system CRISTin is well-monitored.

#### HSE

The NTNU University Museum has consistently good HSE practices. There is still room for improvement in documentation and non-conformance reporting, and risk assessments could also be improved further for activities such as field work and exhibition productions.

#### IT

The NTNU University Museum has good management and control practices in IT. Client operations for PCs for administrative employees was transferred to central IT in 2016, while academic IT continues to be supported locally. There is centralised management and update of IT security and computers. 2016 saw the introduction of new systems for development, documentation and management of IT activities.

#### ΗR

Internal controls are to a great extent integrated in the work processes. There is potential to use the control options more systematically. Controls are conducted as needed, and more frequently than scheduled. Not everything is documented. Work is ongoing to speed up employment procedures and to reduce any risks. Work plans have been introduced for all employees; follow-ups could be improved.

#### Emergency preparedness and scientific collections

An RVA analysis from 2014 has been followed up in 2016 with measures to mitigate identified risks. Some risks cannot be addressed until the Museum acquires new storage magazines. A new RVA analysis will be performed in 2017. The greatest challenges facing safeguarding and conservation work with the scientific collections, from both a short- and long-term perspective, are the lack of satisfactory storage for parts of collections, and sufficient storage capacity. A security plan was completed in 2015, and an evacuation plan was drawn up in 2016. Formalized procedures for lending and borrowing artefacts are in place, but there is a lack of comprehensive systematic internal control. An emergency preparedness exercise was conducted in 2016, and a room has been allocated for "emergency equipment" for use in the event of undesired incidents in the scientific collections and exhibitions.

#### Public exhibitions

Risk assessments should be conducted to a greater extent prior to exhibition production. A new long-term strategy exhibition plan highlights several procedural improvements for the decision documentation for exhibitions. The situation is therefore expected to improve. Evaluations are conducted but could be positively developed to include learning elements to a greater extent. Routine descriptions (standard storyboard) should be prepared for exhibition projects.



#### AT EYE LEVEL WITH SOCIETY

Dissemination is one of NTNU's four core areas together with research, education and innovation. With a clearly expressed dissemination responsibility, the University Museum must be a visible player if it is to achieve the goals of good, relevant, and society-engaging dissemination activities with the public. NTNU must be at "eye level with the public" as expressed by one of the NTNU Board representatives. Unfortunately, while it is widely accepted that incentive schemes are necessary for the other three core areas, this acceptance continues to be lacking for public outreach.

Few dissemination activities are more effective than academics describing their own research. This type of dissemination will be given a higher priority in the future. Not only will we fill the museum with interesting events at which the public can meet the academics, we will also go out into the regions more frequently and meet the public on their home ground.

The prospects for renewing the Museum's own basic exhibitions are not exactly bright. In-house production of touring exhibitions, based on NTNU research activities, for a demanding national and international public does not appear to be a realistic goal, unfortunately.

#### PRIORITISED RESEARCH AREAS

Projects or activities that are not fully-funded through NTNU basic appropriations are defined as either collaboration- or commission-funded activities (BOA). BOA operations constitute a significant part of the Museum's total activity.

To ensure a sustainable economy, we will strive to achieve a composition with a higher percentage of commission-funded projects. The University Museum will more actively use its laboratories and scientific equipment in commission-funded operations. Capacity at the National Laboratories of Age Determination is now good, and commission-funded activities here will contribute greatly to an improved economy for the Museum as a whole.

We believe that in the future we will be able to increase our research activities in a few prioritised research areas. A sound economy will enable us to recruit top academics, generating a strong, internationally-oriented academic environment at the Museum.

#### DIGITAL PRESENCE

In recent years, the University Museum has taken a proactive position to sharing data, including photographic images. We wish to be an active and visible contributor to the digital knowledge pool, and with the large volumes of data in our possession, we have opportunity to be an important player.

We have demonstrated that we are capable of managing projects on behalf of others. One example is Norark.no,

where the five University Museums undertaking archaeological research have signed an operations agreement in 2016 covering the next four years. This is a web portal for archaeological investigations and research which started as a Research Council of Norway-funded project with a work package led by the University Museum. We have also contributed to "Species on the web", coordinated by The Norwegian Biodiversity Information Centre, the most recent being Sphagnum.

In 2016, major efforts were put into facilitating new accessibility to our online archaeological and cultural history objects database. When launched early in 2017, the initial phase will contain about 250,000 objects from central Norway which will be available to international researchers in English.

We are continuing this work, and are now establishing a specialist committee for digital sharing. This will help the University Museum to achieve its ambitions of innovation and excellence in digital sharing of knowledge, and to be at the forefront of open publication. We believe that this will generate even more interest in the Museum's collections, and in its researchers, for international research collaborations.



Vibekke Vange, General Manager at Ringve Botanical Garden talking about dispersal of seed at the Museum in October.

#### DIRECTOR'S COMMENTS

The annual income statement has been prepared in accordance with government accounting standards. In the opinion of the Museum Director, the loss in the annual statement of NOK 3.5 million provides a correct picture of the 2016 results and the financial situation as of 31.12.2016.

Revenues in 2016 were around NOK 142.9 million, an increase of NOK 7.3 million or just over 4.5% on the previous year. This increase is primarily due to revenues from externallyfunded operations. Externally-funded revenues increased by just over 18.7% compared to the previous year. This is due to high activity with public heritage management activities (mandatory archaeological excavations) in 2016.

Expenses in 2016 constituted NOK 146.4 million, an increase of NOK 7.7 million or 5.6% on the previous year. This was first and foremost due to an increase in operating expenses in 2016 (32.5%). More goods and services were purchased both in the appropriation accounts and in the externally-funded accounts in 2016.

The income statement for 2016 shows a total loss of NOK 3.5 million. The loss is distributed as NOK 4.6 million from the Museum's ordinary operating appropriations, also called Framework Operations (RD), a profit of NOK 2.0 million from appropriations for Strategy and Restructuring funds (RSO), and a negative development of operating capital of NOK 0.9 million.

The deficit in the operating appropriations in 2016 is mainly due to higher academic activity than indicated by the appropriations from NTNU and contributions from externally funded activities. In 2016, the Museum Director implemented extraordinary measures to increase the academic activity and to help reduce the transfers in the accounts. At year-end, allocations to the operating account for NTNU University Museum were 6.3%. At the beginning of the year, they were closer to 15%.

The net contribution per kroner turnover from externally funded operations to the appropriation finances has been reduced in 2016. A net refund of NOK 23.8 million was budgeted from the externally funded operations to the appropriation accounts, whereas the result in 2016 was about NOK 21 million. This was in spite of the external revenues being about NOK 4-5 million higher than budgeted.

The reduction in net contribution per kroner turnover appears to be due to:

- Lower sales of services, from the National Laboratories of Aging Determination and also from the other laboratories/ infrastructure at the Museum.
- 2) Higher equity funding in contribution projects than budgeted in the appropriation accounts.
- Fewer collaboration-funded hours were "sold/refunded" for the Museum's externally funded projects than budgeted.

The accounts for the NTNU University Museum consist only of an income statement. Each year, a complete collective financial statement is prepared for NTNU, including an income statement, balance sheet, notes and cash flow statement. Separate balance sheets are not prepared at the unit level at NTNU. This means that there is no separate balance sheet for the NTNU University Museum.

Further information on NTNU's income statement and balance sheet can be found at:

http://bit.ly/ntnu2016



4) Change in the composition of the project portfolio from one with projects with high hourly rates to collaboration projects with lower hourly rates.

One challenge for the Museum is the fact that externally funded revenues vary greatly from year to year. This applies not least to the revenues from public heritage management which constitute a substantial volume of the Museum's externally funded operations. Public heritage management is determined by business cycles, and the NTNU University Museum has little opportunity to influence the scope of this.

### The Figure presents the total external revenues and the contribution by public heritage management (figures in 1,000)



Targeted efforts to generate positive attention in international research forums, and higher public attractiveness, will further strengthen the Museum's strategic and economic ability to manoeuvre. In the coming years, the primary financial challenge for NTNU University Museum will be to realise predictable and stable growth of incomes from the externally funded operations without a further drop in the contribution margin for each "sold krone".

Museum Director Reidar Andersen

#### **INCOME STATEMENT**

Results, figures in NOK 1,000	2012	2013	2014	2015	2016
Income distribution					
NTNU appropriation (note 1)	80,225	87,399	88,523	91,899	92,178
External funding* (note 2)	41,052	30,677	39,129	40,362	47,921
Other income (note 3)	7,082	4,668	3,540	3,339	2,850
Total income	128,359	122,744	131,192	135,600	142,949
Cost allocations:					
Investments (note 4)	2,557	3,093	1,503	5,143	2,676
Payroll and social security costs (note 5)	77,389	80,522	81,434	89,038	90,153
Other operating expenses (note 6)	32,742	28,200	25,089	24,081	31,897
Changes in business capital (note 7)	-556	-1,608	99	35	910
Internal rental expenses (note 8)	16,385	19,478	19,482	20,133	20,640
Internal items (note 9)	1,204	178	937	268	171
Total expenditures	129,721	129,863	128,544	138,698	146,447
The year's result	-1,362	-7,119	2,648	-3,098	-3,498
Transfers (note 10)				9,079	6,490

\* exclusive of pass-through funds



When Stephen Barstow held the tour "Around the garden in 80 edible plants" in Ringve Botanical Garden on 1 June, some 400 people attended.

#### NTNU APPROPRIATION (NOTE 1)

The NTNU University Museum receives appropriations from NTNU to three budget frameworks. Framework Operation (RD), also called operating accounts, Framework Strategy and Restructuring Funds (RSO) and Framework Common Funds (RF). In addition, NTNU University Museum has its own revenues in the appropriation accounts such as ticket revenues, museum shop sales, etc. cf. Note 3.

Strategy and Restructuring Funds (RSO) cover allocations for recruitment positions and (partial) financing of major pieces of equipment. Common Funds (RF) pay for NTNU's own share and part of the Museum's costs for the University Museums' common IT organization (MUSIT).

The Museum's appropriation incomes are relatively stable from year to year, and are adjusted mainly to reflect salary and cost of living increases. Individual allocations for scientific equipment, recruitment positions or security measures can vary from year to year.

#### **EXTERNAL FUNDING (NOTE 2)**

The income statement for NTNU University Museum consists of appropriation funded operations (BFV), collaboration or commission funded activity (BOA or only externally funded operations) and change in the Museum's operating capital. Income from externally funded projects are taken to income as the activity is completed (costs). The accounting result for externally funded projects will always be reported in the accounts as zero. The externally funded projects give an accounting result (profit or loss) only when they are finalised.

Revenues from external funding include sales of services or activities that are not (fully) financed by NTNU's primary appropriations from the Ministry of Education and Research. Externally funded activities are defined as activities funded through commissions or collaborations (BOA). Collaboration projects are defined as projects in which NTNU University Museum receives funding from national and international sources without a requirement for delivery. Commission projects are defined as projects in which NTNU performs services for payment from external commissioners that have a requirement for delivery when the contract is signed.

Total accounting of all externally funded activities (collaborative and commissioned activities) is used at NTNU. This means that for NTNU University Museum collaborative projects, all direct and indirect costs, including NTNU University Museum own shares, are accounted for.

Archaeological investigations conducted under the Cultural Heritage Act (public heritage management) are financed by the developer or the Directorate for Cultural Heritage in accordance with dedicated guidelines, and are classified as collaboration projects. In 2015, public heritage management was reclassified from commission projects to collaborative projects. Some projects lasting several years were reclassified in the accounts in 2016, and this has resulted in an "accounting" negative balance of NOK 1.8 million for commission projects in 2016.

#### Change in turnover externally-funded operations 2015-2016



Collaborative projects are reported excluding pass-through funds, funds that NTNU University Museum receives from contributor(s) to cover the collaboration partners' share of the project. In 2016, pass-through funds amounted to NOK 7.4 million.

Collaboration projects funded by the Research Council of Norway show an increase from NOK 6.0 million in 2015 to NOK 7.6 million in 2016. NTNU University Museum has increased application activities to the Research Council of Norway and the EU.

#### OTHER EXTERNAL AND INTERNAL REVENUES (NOTE 3)

Ticket revenues from public exhibitions and sales from the Museum Shop and individual reimbursements are recorded under Other Income.

The reduction in other income in recent years is due in large part to the fact that grants from the Directorate for Cultural Heritage for some services that are carried out as public heritage management have been reclassified as externally funded activities.

#### **INVESTMENTS** (NOTE 4)

Investments are reported as costs in the income statement for each year. There is a central fixed assets register of all investments at NTNU. Capitalized assets and depreciations are only recorded in NTNU's consolidated financial statements.

Investments and depreciations are included in the calculations when setting rental prices for use of the nine defined Museum premises.

#### PAYROLL AND SOCIAL SECURITY COSTS (NOTE 5)

The largest cost in the accounts is payroll and social security costs at NOK 90.2 million. These constitute about 64% of the total costs.

(figures in thousand kroner)	2014	2015	2016
Salaries	58,776	62,521	64,289
Holiday pay	7,288	7,785	7,896
Employer's tax	10,121	11,040	11,128
Pension contributions	8,183	8,410	8,314
Sick leave and other reimbursements	-3,347	-1,578	-2,426
Honoraria for contractors and for the board and committees	134	324	589
Other benefits	279	537	363
Total payroll costs	81,433	89,038	90,153
Number of working years	111.0	111.0	114.2

The NTNU University Museum had 114.0 working years in 2016 compared to 114.2 working years in 2015, as reported to the Database of Higher Education (DBH).

Of the Museum's 114 working years in 2016, 82.6 working years were financed by appropriations from NTNU, five working years by the Research Council of Norway, and 26 working years were financed by income from other external projects.

Only those employees receiving a monthly salary at the time of the reporting date for DBH are recorded as working years. The NTNU University Museum has a large field season during the summer with many temporary field staff. These staff are, in general, not included in the reporting to DBH. This is also the case for extra help hired for the summer for the Ringve Botanical Garden or for the scientific collections, for example.

In 2016, the gross payroll costs for the Museum Director and honoraria for the Museum Board including social security costs were NOK 1.4 million and NOK 0.039 million, respectively.

#### **OTHER OPERATING EXPENSES** [NOTE 6]

Other operating costs of NOK 1.9 million related to operational and travel costs financed over the operating budget or external projects. This constitutes some 22% of the Museum's total costs against 17% in 2015.

(figures in thousand kroner)	2014	2015	2016
Lease of machinery, fittings, equipment and similar	2,074	2,151	2,355
Purchase of small equipment etc.	4,997	4,979	7,899
Purchase of services outside NTNU	10,622	8,884	9,752
Travel and subsistence, etc.	4,955	4,333	6,546
Other operating costs	2,441	3,734	5,345
Total Other operating costs	25,089	25,089	24,081

There have been only small changes in payroll costs from 2015 to 2016. Increased activity in the appropriations accounts and externally-funded operations has occurred for the most part due to increased purchase of goods and services.

#### CHANGE IN BUSINESS CAPITAL (NOTE 7)

The change in business capital consists primarily of the net results from projects that were completed in 2016. Business capital decreased by NOK 0.9 million in 2016 and, as of 31 December 2016, was NOK 1.5 million. The net result from concluded collaboration projects is part of the operating accounts (appropriation accounts).

#### INTERNAL RENTAL EXPENSES (NOTE 8)

The charged internal rents in the income statement for 2016 amounted to NOK 20.6 million. The rent appropriation, which is part of the total appropriation from NTNU, is NOK 19.1 million. The difference of NOK 1.5 million must be financed by the Museum's operating appropriations and revenue from externally funded activities. The share that the NTNU University Museum must cover from own appropriations or external funding is increasing.

#### INTERNAL ITEMS (NOTE 9)

Internal items consist mainly of:

- A) The sales of services and reimbursements between the operating accounts and externally funded operations, own share and self-financing of collaborative projects and the completion of collaborative projects. These expenditures are eliminated in the total accounts.
- B) Sales of goods and services internally and to other units at NTNU.

#### TRANSFERS (NOTE 10)

Transfers in the appropriation accounts are accumulated as accounting profits. The remittances have an important function in ensuring stability in years with low externally funded turnover, as reserve capital in case of problems with critical infrastructure, and to cover possible future accounting deficits. The need for reserves and security must be seen against the need to activate these transfers to increase the Museum's strategic ability to manoeuvre, enhance the Museum's primary responsibilities and enhance its competitiveness in order to generate even higher levels of externally funded activities (BOA).

Transfers in the appropriation accounts at the end of 2016 constituted about NOK 6.5 million and were distributed as NOK 2.7 million to Framework Strategy and Restructuring Funds (RSO) and NOK 3.8 million to Framework Operation (RD).

The Museum Board has decided that the Museum's transfers to Framework Operations (RD) should be in the range of 8 to 12% of ordinary operating appropriations excluding internal rental. Transfer to Framework Operations (RD) has been reduced further in 2016 from 15% to about 6.3%.

Svanemerket trykksak fra Skipnes Kommunikasjon 🍿 Lisensnr. 241 731

Project Manager: Tove Eivindsen. Photo: Âge Hojem, Trond Sverre Kristiansen Skevik, Sindre Håvarstein Eldøy, Tove Eivindsen, Elin Sandbakk, Torkild Bakken, Stefan Patrick Nilsen, Per Gätzschmann, Chun-Tang Chen, NTNU Science Museum, Crestock. Sources: Bevisst, CRIStin database, DBH, Google Analytics, Lydia, Maconomy, Retriever.



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