

The Department of Informatics

Action Plan 2019–2021

The Foundation for this Plan

This action plan reflects the Department of Informatics' (Ifi) professional and strategic assessments, clarifies which goals the department has, and indicates in which direction the department wishes to develop. The plan also follows up key points in the strategic plans of the Faculty of Mathematics and Natural Sciences (MN) and the University of Oslo. As a university department, Ifi has a particular responsibility for the development and dissemination of generic knowledge, but the department wants this to be combined with active contributions to the solution of important societal challenges of both a national and international nature. Central values are to

- seek quality in all activities;
- have a clear responsibility for meeting societal challenges;
- seek a balance between investing in selected cutting-edge research environments, ensuring development and renewal in all research environments and flexibility in relation to new initiatives;
- provide broad and effective dissemination of knowledge to society, primarily achieved through the department's candidates;
- have an active policy for equality and a recruitment policy that provides diversity;
- contribute to sustainability, ethical reflection and academic formation;
- be an open and inclusive department for all employees and students regardless of gender, ethnicity, religion, sexual orientation, functional ability or age.

In order to make the action plan concrete, a number of transversal groups of employees have been used to prepare drafts of the individual sections. This form of work has been chosen so that those who get the main work with the practical follow-up of the action points have also had a significant influence on the content, even if this form of work results in some loss of consistency in the level of detail and form.

Overall Financial Resource Management

At the start of the planning period, Ifi is in a favorable resource situation. However, the resources also come with major obligations, and the challenge is to utilise the resources for a step-by-step and strategically appropriate build-up of the professional and technical-administrative staff. At the same time, the department must retain a financial buffer that will limit the adverse effects of an economically weaker period.

The goal of the financial resource management is to

- maintain a small positive balance in order to be able to meet unexpected investment needs and as an initial buffer in the event of a possible deterioration in financial conditions;
- have a “4-year buffer” in the form of recruitment positions and bridge-financed positions that can be phased out within a few years, and which means that the department will withstand a longer-term deterioration in financial conditions;
- utilise other resources for the development of the staff and an operating/investment budget that ensures up-to-date infrastructure.

The department aims for buffer components to be equivalent to approximately 10% of the department’s annual turnover, with most of it tied up in recruitment positions or bridging funding.

Priority Subject Areas

Below some areas are highlighted which, based on strategic assessments, should be strengthened, and where the department aims to place some of the first advertised new positions. However, given the department’s strong finances, other areas can also be considered for new positions, either for reasons of education or to develop strong subject groups/leading research environments.

Digitalisation

Digitalisation places Ifi’s knowledge at the center of profound organisational and societal changes, but also challenges the department’s traditional ways of working through, among other things, increased demands for multidisciplinary. Our in-depth expertise in digitalisation should be on system aspects as well as user participation, knowledge-intensive work processes, and on ethics and societal aspects in digitalisation processes. Here the system aspects will require integration of knowledge from many of Ifi’s research areas, including programming, machine learning and intelligent systems, electronics systems, security, entrepreneurship, and platform ecosystems. We should work interdisciplinary with other environments to develop industry and application knowledge, both within academia and with working life, and Ifi must become more ambitious and more visible in digitalisation. The department will therefore

- establish a project that develops new knowledge in digitalisation and contributes to positioning Ifi nationally. The project is administratively linked to the Digitalisation section, but will interconnect internal research groups and build bridges to external parties from research and working life;
- strengthen the digitalisation area in terms of resources, including in the early phase with a position that can be linked to the project indicated above;
- utilise the large societal interest in the field to strengthen external funding, including achieving an SFI in digitalisation;
- establish bachelor’s and master’s courses that provide increased opportunities for internships and tasks with external technology use;
- strengthen the profile of the department within the area, including establishing Digitalisation Day as a permanent conference.

Machine Learning and Artificial Intelligence

Machine learning (ML) and artificial intelligence (AI) have developed rapidly in recent years, and deep learning and neural methods in particular have led to major breakthroughs. This has led to a major need for the development of competence environments and for the education of candidates with competence and experience in ML/AI both in business and at research institutions.

Machine learning forms the main methodological basis for several of Ifi's research groups, and aspects of the field are becoming central to other parts of the department. At the same time that Ifi's investment in ML/AI must build on the areas where Ifi is already strong, such as image analysis, language technology, robotics and bioinformatics, competence must also be built up to cover other areas of application. The activity must also be coordinated with activities within the related area of Data Science, which is a core competency for the SIRIUS/ASR research group. In order for Ifi to be able to take a leading role within ML/AI nationally and internationally, Ifi must further strengthen research within theoretical aspects of the subject, and also ensure that ethical aspects related to the area are covered. The department will therefore

- expand the scientific staff within ML/AI in order to
 - increase the capacity to teach and supervise at bachelor's, master's and PhD level,
 - strengthen research activity within applications, models, algorithms and theory;
- prepare a good and coordinated study offer at bachelor's and master's level that covers machine learning both for those who will carry out method development and research within machine learning methods, and those who will apply machine learning;
- coordinate the department's activity in machine learning with the MN faculty's initiatives in 'Data Science and Computing'.

Information Security

Strengthening the competence environments within information security is an articulated national priority and a prerequisite for sustainable digitalisation. A great many students want to specialise in information security, which places a large strain on teaching and guidance. A strengthening of resources is also highly desirable in view of the new master's programme in information security that Ifi has together with the Department of Technology Systems. Ifi will therefore

- strengthen the security area in terms of resources;
- take the initiative to establish a cluster for cooperation within information security with partners from the academic, private and government sectors;
- investigate how information security can be better integrated into all of Ifi's bachelor's and master's programmes, and how we can integrate privacy aspects into this;
- investigate the opportunities that SecurityLab provides in an educational context;
- increase the visibility of Ifi's activities in this area, including through the improvement of Ifi's websites.

IT in School/Didactics

Informatics didactics is in general not developed as a subject in Norway. This is unfortunate both with regard to the development of the department's own educational agenda, and not least with a view to contributing to the favorable development of IT as a school subject. Ifi will therefore

- advertise a permanent position in the area;
- create a separate research group for "Computing Education" with participation from existing employees and new hires;
- create a professional network of teachers who teach IT in school, as a basis for research and exchange of knowledge about subject content and pedagogical methods with associated seminars and conferences;
- participate actively in the public debate about IT in school and in the design of curricula and teaching material.

Societal Challenges - Health and Energy

The MN faculty's strategy emphasises efforts aimed at societal challenges and the UN sustainability goals, and here the department can make important contributions in the fields of health and energy. Method development and applications in medicine and health are central to the majority of the department's research groups, with activity both towards analysis and modeling of biomedical systems, development of diagnostic methods and precision medicine, introduction of welfare technology and development, and studies of national and international health information systems.

Health will therefore constitute a central contribution from Ifi to the follow-up of the UN sustainability goals, especially through the activity in the HISP project. SIRIUS is our faculty's only SFI, and the centre's primary field of work has been knowledge modelling/data science with application in energy, especially oil and gas. However, the centre also has a clear strategy for building up under the UN sustainability goals, both in energy and health. The department has also built up significant activity within energy informatics, with particular emphasis on technology that supports Smart Grids. The department wants long-term safeguarding of the activity, and will therefore enter into agreements for positions in areas with initial bridging funding. The department will therefore

- advertise positions based on bridging funding in health (from Helse SØ) and Data Science/energy (SIRIUS);
- take a leading role in the MN faculty's collaboration with Helse SØ, and contribute actively to UiO:Life Sciences and UiO:Energy;
- coordinate educational activities and investigate the introduction of courses at bachelor's level;
- increase the visibility of Ifi's activities in health and energy through its own portals.

Research

Ifi wants an academic balance where the department both develops theory and methods in informatics and carries out research inspired by and aimed at society's challenges. In order to reach and maintain a high international level, the exchange with international environments must be strengthened, and the research

group structure must be dynamic and aimed at providing focused research within the groups and extensive collaboration between groups on larger, long-term projects. To support this, the department will

- preferably position new positions so that they acquire competence that is useful for the further development of core activities in the research groups, or so that the position holder can contribute to building an effective professional bridge between research environments;
- work for more international mobility and contact, with family-friendly organisation.

Over time the department has had significant external funding, but the approval rate for applications is nevertheless lower than desirable, and the long-term nature of the research is harmed by project periods that are too short. The department will therefore

- work for growth in external funding, but this should primarily take place through larger, long-term projects or centres which, in line with the university's ambitions, contribute to the development of cutting-edge environments;
- offer a process for the development/review of applications ahead of important application deadlines. Special efforts must be made before announcing of centres or other long-term ventures.

The completion rate for PhD students is too low and lower than for other MN departments. This is serious for those concerned, and reveals that there are weaknesses in our offer that need to be addressed. The department must therefore

- investigate the reasons for the low degree of completion of the PhD study, including both reasons for early termination and reasons for nearly finished candidates not succeeding in completing;
- offer completion grants to fellows, provided that the supervisor and fellow submit a plan that shows how a short-term extension will lead to the completion of the degree. The scholarship can be awarded as a shorter full-time scholarship (max. 3 months) or as a part-time scholarship, provided that the main employer guarantees a corresponding reduction in tasks;
- assess whether arrangements similar to research schools should be introduced at the department;
- further develop the supervisor school, both with the aim of supporting new supervisors and providing an open arena for discussion around research training;
- create a structured programme for industrial PhDs in IT and Management/Architecture/Digitalisation.

Education

On the education side, it is also noticeable that the department has grown and continues to grow, both in terms of the number of students and the number of employees. However, some of the current rules, routines and practices relating to teaching and guidance are not adapted to this growth. In 2019 Ifi is responsible for five bachelor's programmes, five master's programmes, an experience-based master's, one year unit and four half-year units. In addition, the department is involved in two bachelor's and three master's programmes administered by the Department of Physics and Mathematics. From 2020 the department will have two new master's programmes, in information security and digital economy and management. An important task will be the evaluation and follow-up of all the programmes. In addition, there will be increased focus from the MN faculty on dropouts and throughput. The department will therefore

- review relevant routines, regulations and practical conditions relating to teaching/guidance at Ifi and prepare good websites for information to students and staff about this;
- set up one or more working groups with the theme of organisation of education and teaching, including
 - appropriate distribution of work between section leaders, the teaching committee, programme councils, etc.,
 - good use of teaching resources, including strategic use of 4 years for scholarship holders,
 - good use of the students' time (including scope of compulsory activities and forms of learning that facilitate more interaction with and between students);
- increase the number of academic-social initiatives under the auspices of the department/programme councils, so that all students on the bachelor's and master's programmes are invited to at least one relevant event per semester.

From September 2019 there will be new regulations on employment and promotion in teaching and research positions, with new requirements regarding educational competence. The department will therefore

- assess how the change in regulations can be used to increase the focus on quality development of education and teaching at the department;
- arrange for employees in temporary and permanent scientific positions to be given the opportunity to qualify for employment and promotion according to the new requirements.

Lifelong Learning

The rapidly increasing use of IT has created a situation where managers with weak or no IT competence make decisions regarding the implementation of IT solutions, while at the same time employees with IT competence lack basic knowledge of management and project management. The department's established EVU (lifelong learning activities) offer in IT and management helps to remedy the need through a master's programme with 6 compulsory and 7 elective courses, as well as a course package developed in collaboration with DNB. The extent of the skills shortage in society calls for increased efforts both in the further development of the programme itself and in the profiling of the programme towards decision-makers in business and administration. The department will therefore

- improve the use of digital channels in marketing to reach a larger audience while improving accuracy;
- expand the model used in the DNB collaboration with plans for 2-3 new players within the IT industry, the energy sector and the public sector, with the intention of ensuring a predictable influx of students, a relevant course offer and good research arenas;
- work for increased capacity and an expansion of the course offering, including an expanded range of courses within the focus area of digitalisation, and including courses in "Digital innovation with AI/Machine learning" and "Digital management".

With an increased focus on programming and digital competence in school, there is a large need to give teachers this competence. Ifi participates in the MN faculty's EVU offer ProFag (programming tailored to

disciplines), aimed at science teachers in secondary and upper secondary schools. This work is important both in relation to the recruitment of students and as part of our social responsibility. The department will therefore

- further develop ProFag in collaboration with the MN faculty, with a focus on computer science;
- consider the establishment of other informatics-oriented EVU offers for teachers.

Also in other areas the department is experiencing increased demand for EVU, including in information security. The total need and demand from business and others is higher than what the department has the capacity to carry out. The department will therefore

- assess to what extent and possibly how the department's EVU offer should be expanded.

Dissemination

The department's research and expertise are not sufficiently visible to its own students and in the public sphere. The department visibility is also too low in the public debate around IT. The dissemination activity must therefore be strengthened and targeted. It will therefore be a goal that all groups of employees contribute long-term to reputation building and to making visible why and how Ifi is relevant to students, employers and society in general. The department will therefore

- allocate increased resources to dissemination activities;
- specify that communication is important and must be clearly meritorious in assessments;
- encourage employees to participate in communication courses, both at UiO and externally, in order to raise the level of competence in communication. Provide apt information about the course offer;
- improve internal communication; assess the use of different information channels;
- create a dissemination group;
- establish regular employee meetings, both for increased well-being and improved internal information flow.

Applications for the studies have shown good growth over recent years, but increased competition requires efforts to maintain at least the current level of applications. Furthermore, there are still few who take a full five-year informatics degree at UiO, and it is therefore a clear need for improved information activities towards our own students. The department will therefore

- supplement central campaigns at UiO with targeted use of information channels that are sought out by students with an interest in IT and increase visibility in social media;
- increase focus on recruitment to higher education, emphasizing extended career opportunities.

Recruitment to Scientific Positions

The department is facing a significant expansion of the staff, and good recruitment processes are therefore central. However, the department also faces dilemmas in its appointment policy for permanent scientific

positions. The need for training/guidance requires a rapid build-up of the staff, while the recruitment basis is limited in important specialist areas. In order to ensure the recruitment of highly-competent staff, the department must therefore have a broad and active recruitment process also prior to announcements, with the aim of identifying suitable advertisement areas and attracting interesting applicants both nationally and internationally. The recruitment processes also play an important role in achieving gender balance at the department. The department will therefore

- not advertise positions without an advance survey of the applicant base;
- set up search committees that will carry out active recruitment both before and after the announcement;
- facilitate that new employees can quickly acquire the skills they need to be able to participate in all relevant aspects of the department's activities, including proficiency in the Norwegian language;
- actively exploit the opportunities for adjunct positions, with particular emphasis on areas where access to qualified applicants is limited and where education/guidance require strengthening.

For recruitment positions, the supply of well-qualified applicants has been weak in several areas. Better processes for identifying good applicants are therefore necessary, this particularly applies to efforts towards our own students. The individual researcher and research group must work actively and systematically to identify and follow up research talents at bachelor's and master's level. Furthermore, Forskerlinja (a research programme for bachelor/master students) represents an opportunity to identify students with an interest in research at an early stage. The department will therefore

- carry out active recruitment work among own students, including "inspirational lectures" on research both at bachelor's level and during the master's week;
- use waiting grants to retain talent until PhD positions are advertised;
- investigate further development of the Forskerlinje as soon as there is a sufficient experience basis;
- involve our own research talents in research activities and teaching.

Innovation and Cooperation with Business and Administration

There is a growing expectation for UiO to contribute to long-term knowledge-based business development in Norway. New technology challenges existing businesses and creates a growing need for a more active dialogue with the knowledge communities. Ifi possesses a great deal of expertise that is very relevant in this context. At the same time, we must acknowledge that Ifi's activities and expertise are not well known, neither within UiO nor externally. Ifi will therefore

- further develop and formalise existing and new long-term research collaborations with the IT industry and a number of selected sectors such as health, energy and finance;
- exploit Ifi's advantage as an educator of in-demand workforce by establishing long-term collaborative relationships with business and administration on master's and Ph.D. level where students get the opportunity to work on tasks with the partners.

The above may require organisational adaptations, and the department will therefore investigate alternative solutions, including the organisational and resource requirements for creating

- a business unit at Ifi which must
 - be an accessible, competent and outreach point of contact for business and management in dialogue with relevant professional environments at Ifi,
 - improve business knowledge of and interest in the department's activities in education and research, and be an active meeting place between academia and business/administration,
 - assist in the work with applications that require partners from business/administration
 - contribute to the adaptation of the standard contracts that regulate the intellectual property rights between collaboration partners and master students or employees at Ifi, including fellows;
- an advisory board with representatives from business and administration.

Psychosocial Environment

Unfortunately, both surveys at the MN faculty and direct messages to the department's management show that harassment, including sexual harassment, is a pronounced problem in our environment as well, and mostly for girls. The messages are clearest at student level, but also apply to staff. Although the misdeeders must be assumed to be few, many are affected by the harassment and by acquiescence. This reveals a clear weakness in our working environment, and the department will therefore

- have a focus on the psychosocial working environment throughout Ifi, addressing all forms of harassment, including sexual harassment. Through open meetings and discussions clarify the ethical guidelines that we must have in our workplace where freedom is extensive and much of the responsibility lies with the individual;
- in collaboration with the student organisations, prevent harassment in the student environment and facilitate a student life characterised by equality and diversity;
- make all employees and students aware of how they can use the hotline/student representative and various notification systems;
- expand the teaching of ethics, including in the Start of Studies and in the Master's weeks.

Equality and Balance

Ifi still has major challenges regarding gender balance and equality. The department will therefore aim for at least 40% of both sexes among the students, and at least 30% on each study programme. There are also challenges at staff level with few female professors. Ifi will therefore

- further develop initiatives such as IT camps for girls and Girls' Days at bachelor's and master's level;
- formalise the purpose and target group for the girls' room, and prevent negative reactions in the room by ensuring that other needs, such as programme rooms for all bachelor's programmes, get a satisfactory solution;
- when using adjunct positions, special consideration must be given to the goal of gender balance;
- use moderate gender quotas in employment processes;
- actively support the MN faculty's initiatives under the FRONT2 project.

Cooperation with Student Associations and Bodies

The Student council at Ifi (FUI) is the formal body that look after the students' interests and promotes the students' views towards the department, and also organises important tasks such as pre-courses and evaluations of the course teaching. The department benefits from a rich diversity of student associations which are central to maintaining and further developing the good student culture in Ole-Johan Dahl's house. The board of student mentors at Ifi and the business contact upheld by the student associations Navet and dagen@ifi provide good support for the department's own activities. The department holds regular contact meetings with FUI and the associations to facilitate activities, but nevertheless there have been challenges with follow-up of certain desired measures. The department will therefore

- hear FUI in all matters concerning the students, and facilitate such that FUI can conduct their work in a satisfactory manner;
- improve contact between the student associations and Ifi through measures in agreement with the associations;
- contribute to simplifying the work with registration and formal administration of the student associations;
- continue with part-time student association contact persons, and allocate another part-time position for following-up of agreed measures;
- in the reception of new students at both bachelor's and master's level encourage students to participate in the student associations' activities, emphasising that the student association activities are made visible and that the new students meet representatives of the associations.

Organisation and Personnel Management

The department has adopted a change of internal organisation whereby fewer, but larger, sections are established. However, there remains a process of detailing the tasks of the sections and their leaders, as well as specifying the division of labor between sections and research groups. A parallel and partially overlapping task is to improve personnel management; much of today's administration works satisfactorily, but there is too little systematicity and too little professionalisation of the work. The employment of an HR employee and the establishment of the new sections provide the opportunity for the desired strengthening. The department will therefore

- during the autumn of 2019 clarify the distribution of work tasks between the section leaders and the research group leaders, emphasising that the managers must be professionally active and that the tasks must be adapted to this;
- establish a well-functioning personnel management system with a clear division of tasks;
- investigate incentive schemes that motivate initiatives in areas that provide limited academic merit.

Administration

The last few years have been a continuous hectic period for the administration, with many new hires, more students, new study programmes, digitalisation of study administrative systems (including Inspira) and

increased tasks within research administration. Many new employees entail a restructuring of work tasks, as well as a significant need for training. The administration will therefore have the following focus areas going forward:

- competence mapping and development;
- development of good work routines and satisfactory 'back-up' functions;
- strengthening the first-line service at the department;
- development of good routines for receiving new employees;
- review the routines for research administration and specify the division of tasks between administrative advisors, financial administration and Head of research.

IT Services and Laboratories

The department's increasing activity is also manifested through increased IT needs. Maintaining and meeting new needs with the same or better quality than today requires investments both in basic IT infrastructure and the more special and specialist IT needs. A strong increase in the department's laboratory activities with an increasing number of laboratories without earmarked assistance from engineers also highlights a need for the establishment of an overall coordination and responsibility for all laboratory activities at the department. Ifi will therefore work to

- continue a robust basic IT infrastructure through upgrading and investing in a larger number of central network components. Infrastructure in labs and teaching rooms must also keep pace with both increasing and changing needs, and requires a consistent investment in adapted AV equipment and necessary scientific equipment/instruments;
- maintain quality, HSE and information security in all laboratory activities that take place at the department through a comprehensive operation. Earmarking of job resources for this overall area of responsibility must be considered;
- invest further in resources for computing, storage and testing needs, including good GPU capacity. A balance must be sought so that local resources provide solid support for interactive development work, while an effective plan for the use of external resources, both national and international, supports particularly resource-intensive tasks;
- facilitate easy and efficient access to non-standard IT resources through the provision of remote access from standard work surfaces.

Areal Resources

From the moving into Ole-Johan Dahls's house (OJD) in 2011 to the present, the department has had a growth in employees from almost 220 full-time equivalents to well over 280 full-time equivalents; at the same time there has been a strong growth in the number of students at both bachelor's and master's level. Both societal demands and the department's favorable financial situation indicate continued growth at at least the same rate. The department will therefore

- carry out an externally supported review of the premises in OJD's building with a view to making area use more efficient;

- investigate the possibility of suitable premises outside OJD's building;
- carry out the planned redevelopment of the areas around the library, and refurbish the areas on the 2nd and 3rd floors to provide a larger number of suitable workplaces for students.

Follow-up of the Plan

The department management must specify who is responsible for following up the various parts of the plan. In the follow-up, one should use the good experience gained with the use of transversal groups of employees in the preparation of this plan.

A report on the status of follow-up of the action plan must be given annually to the board.