Department of Computer Science

Aarhus University

Denmark

Strategy towards 2030

Visualization of IT-City Katrinebjerg Campus in 2030 made by AART Architects

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Our Mission

To conduct computer science research of the highest international standard with societal and industrial impact, and to educate outstanding graduates who will become the innovators and leaders of their generation.

Our Vision

The Department of Computer Science is recognized as one of Europe's leading departments in computer science. We will continually strive to grow, consolidate and strengthen our international position as one of the leading and most innovative computer science departments.

1. Introduction

Here we set the scene for the strategic goals and actions to be taken towards 2030.

The societal and international context

The increasing digitization of societal and industrial services is evident and, in the years ahead, strong research and education in computer science is necessary to provide society with proper and sufficient qualifications for the continued digital transformation.

In Denmark it is predicted that we will have a shortage of up to 20.000 IT specialists by 2030, if radical Investments in IT-education and research are not made. To put this number in perspective, Denmark has to date educated less than 7500 computer science graduates (of which Aarhus University has produced ~2500) since the 1970s.

The US, China and India are growing their focus on computer science at all levels, and the EU including Denmark is lacking behind on capacity to meet the challenges. Thus, EU is asking its member states to double the growth of IT-graduates to meet the target of being 20 M IT-specialists in EU in 2030, thus a radical increase in the number of IT-graduates is necessary in the entire EU.

Department of Computer Science at Aarhus University is devoted to increase the number of IT-graduates based on both Danish and International students, but it is of course important to ensure it is based on our renowned high international standards of excellent research, consequently it also requires growth in number of senior faculty members.

This document describes the strategy of the Department of Computer Science at Aarhus University to deliver on the societal demands towards 2030. The Department is part of the Faculty of Natural Sciences and accordingly, the strategy is in alignment with, and contributes towards, the goals of both the Faculty and the University as a whole.

As a public institution, our endeavors are subject to governmental regulations and political changes. In the final section, we will touch upon how such regulations may create both opportunities and threats to the department's performance.

Concrete vision towards 2030

The 2030 vision of Computer Science at Aarhus University is to grow both in number of students and in number of faculty. We will continue our pursuit of research excellence in CS' core research areas and expand into more computer science research areas to develop an even stronger and more comprehensive CS department. By expanding the number of senior faculty members, we wish to consolidate existing research groups and to cover gaps core Computer Science research areas. The expansion of faculty will be balanced with an increase in the volume of students, albeit with the aim of reducing the student/teacher ratio to a fair level compared to the average at the Faculty of Natural Sciences.

We maintain the quality of our graduates, improve our research impact, and societal impact by targeting highly important challenges, also by engaging in interdisciplinary collaborations. We will provide support for industry collaboration and innovators/entrepreneurs amongst students as well as faculty.

We will continue to develop and maintain an attractive and vibrant work and study environment, through culture defining work and continued development of our physical infrastructure.

We will increase awareness of the department both nationally and internationally, and strive to make policy makers, potential students, and staff aware that CS at AU is a highly recognized department internationally.

To realize this vision, the department of computer science will pursue the following overall strategic goals.

1. Strengthen excellence of research through continued recruitment of talented researchers to build a more comprehensive research environment in terms of new topic areas and more diversity.
2. Increase our contribution to society's need for computer science knowledge through an increase in graduate output, and by extending the provision of IT skills to high schools, elementary schools as well as other university programmes.
3. Increase visibility of CS research and innovation, through more national outreach to industry, the public sector and the general public, as well as international outreach.
4. Develop the department's facilities in IT-City Katrinebjerg into a still more modern and vibrant physical environment for research, education and entrepreneurship supported by strong, local administrative and technical staff.

In the following, the strategy for the realization of these goals will be elaborated. Section 2, 3 and 4 treat the three classical core tasks of a university department at Aarhus University, research, education, and societal collaboration, whereas section 5, 6 and 7 describe three particular focus areas considered fundamental for the ambitions of the department of computer science at Aarhus University, recruitment, work environment and visibility. In section 8, we will touch upon the most prominent barriers and uncertainties for the realization of our vision.

2. Research

Department of Computer Science is a department with an excellent level of scientific output and impact compared to similar departments, both nationally and internationally.

The department has a high level of external funding for basic research, with a large number of career grants such as ERC and Sapere Aude elite funding as well as funding for a few large center activities. The department has a rich tradition of being involved in strategic research with industrial and public sector institutions.

The department provides mentoring for all researchers who plan to apply for funding, and we utilize experienced past and present Danish Research Council members and experienced colleagues for mentoring and supervising new applicants. We emphasize that successes and failures are a collective responsibility.

Strategic goals towards 2030
• To conduct both basic and strategic research for society and industry at the highest international level • To continually strive for research excellence and international leadership in core CS disciplines • To become a more comprehensive CS department by expanding into new CS research areas • To increase our involvement in larger research collaborations nationally and internationally, these may be basic research grants as well as strategic grants

To achieve our goals, we will focus on the following areas:

Consolidate and expand research areas

We will follow a quality-first strategy when growing the department to ideally 70 senior faculty members by 2030. The planned expansion should allow us both to consolidate existing groups and to cover a few gaps in our core research areas, when compared to world-leading universities, focusing on e.g. Machine Learning, AI, Systems and Networking, Computer Graphics, Quantum Computing, and Software Engineering. In figure 1 below, we depict our envisioned coverage of CS research disciplines by 2030. Existing and consolidated groups are shown with a blue outline, whereas new research groups emerging as related to existing groups are shown with an orange outline.

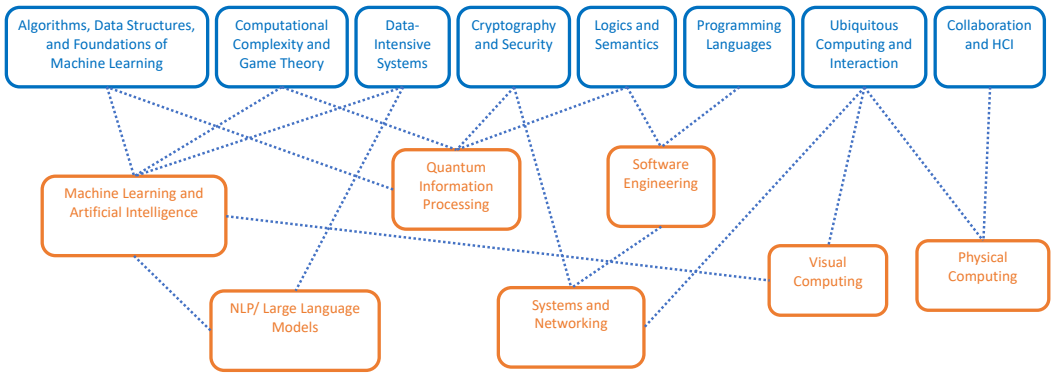

Figure 1: Envisioned Computer Science research areas covered by 2030. (Blue groups are existing and orange groups are emerging.)

We expect to allocate around half of the new senior faculty recruited from now and until 2030 on consolidating existing groups, and the other half on growing the new research groups. People in existing groups may potentially transition and help create the new groups or even take the lead in establishing them.

Dynamic research environment

We will gradually develop the research environment to foster new and perhaps smaller research groups supporting emerging areas of computer science with young talents utilizing the external funding opportunities to grow their own groups.

All academic staff should be encouraged to engage in collaborations, peer discussions and to provide feedback to colleagues. And to increase the number of guest researchers, visiting the department for both short- and longer-term stays. We will provide attractive conditions for both faculty and guests to engage in this.

The planned growth of the department will challenge the attention span of the Head of Department with respect to personnel management in the current flat organization structure. Thus the department needs to consider a new governance structure where personnel management may be delegated to a small number of Heads of Sections heads. This will move daily management closer to the everyday life in the groups and contribute to further coherence in closely related research activities. The overall strategic management will still be the scope of the department management and the Research Committee.

Retention of permanent academic staff

Our retention efforts begin already with the onboarding of new faculty members. A professional onboarding set-up, that is responsive and has as its goal to welcome, integrate and retain new staff has been designed. We will implement and continue to improve the set-up, particularly during the first part of the strategy period. A particular focus area will be to ensure externally funded starting grants e.g. from NOVO, Villum and AUFF up front as part of the onboarding process.

A special effort will be made to render career paths for particularly young researchers, women and internationally recruited staff more visible. Attractive career development schemes and local anchoring are key for retaining talented staff. The department will also continue its efforts to develop an inclusive workplace where all staff and students experience a strong "sense of belonging" and influence on strategy as well as daily life.

We also wish to increase focus on helping support the new faculty member's partner in their job search and in participating in social life at the department with their partner.

Attracting external funding

With an increasing number of faculty members, we will focus on measures to improve our success rates for grant applications.

We will strengthen local supervision and mentoring of newly recruited staff in applying for funding in the Danish and the EU funding landscape, including attracting funding from private foundations. The shift towards more private foundation grants will be reflected in the department's revised fundraising strategy. As will the increased focus on the coverage of indirect costs. We will increase and improve the administrative support of these fundraising efforts.

Proposed activities
• To focus on increasing the number of high-impact, peer-reviewed publications • To continue attracting prestigious individual career grants (such as Sapere Aude, ERC, Villum Investigators, DG Centre of excellence, Eliteforsk etc.) • Create attractive career paths and conditions for young faculty members • Active support for new faculty members in their fund-raising efforts e.g. via more local administrative support • Stimulate larger bottom-up driven research efforts fostering cross group collaboration at the department, areas like cybersecurity and artificial intelligence may have potentials • To engage in interdisciplinary projects and centers where there is a need for CS research beyond application of known methods to new domains • Maintain and expand attractive research infrastructure, e.g. clusters for AI, AR/VR equipment, and digital "maker" labs

3. Education

In order to increase our contributions towards the societal need for deep theoretical and technical competences in digital technologies, it is essential for the department to increase the output of

graduates while maintaining the highest quality. This again implies that we have an obligation to increase the enrollment considerably and improve retention and graduation rates of our students. We will have to work creatively to achieve the needed growth within the complex landscape of reforms issued by the government.

Strategic goals towards 2030
• To maintain and expand research-based education at the highest international standards • Substantially increase enrollment aiming for a student population of 1200 students by 2030, using the English language versions of our BSc programmes • Ensuring that students have the qualifications and motivation to complete a BSc education in a timely manner • Contribute to lifting the computing competences of all graduates from Aarhus University • Continually ensure that our teaching methods keep up to date with societal needs, the enrolled students' backgrounds, and utilization of relevant new tools

To achieve our goals, we will focus on the following areas:

Recruiting more talented students for the department educational programs

By continuously focusing on our visibility, an excellent study environment and showcasing our positive impact on society we hope to convince more Danish high school students to choose an education at our department.

Together with AU's international office, we will expand our international recruitment based on our attractive programs, including a growing set of Master's specializations. An important aspect of international recruitment is to retain our high subject rankings on the mainstream ranking lists.

We will continue to develop our recruitment campaigns, making sure the students make a well-informed choice and have their expectations aligned with the reality of being a student at the department, ie. the content of our programmes, the workload etc.

To expand the talent pool, we will continue and expand targeted campaigns for female students, including events like IT Camp for Girls.

We will expand collaboration with high schools, including research staff giving talks. And continue to develop our "visit service" where high school classes can visit the department and get an introduction to the content of our programs and the life as a student in our department.

We will also continue to develop more public talks that can be given as part of the OFN programme at Aarhus University, at the Open University, high schools etc.

Retention of students

One important measure of securing retention is to attract students with higher GPAs from high schools. This requires that our programs become still more visible as attractive educations that open doors to having a strong impact on society including green transition, better health care, better education, more ethical development of technology etc.

The department recognizes a challenge regarding student culture and the students' sense of belonging to the department. Traditionally, many CS students have part-time jobs where they spend many hours per week which means they are only on campus when they have classes. In addition, we also suspect that the Covid pandemic has had a lasting impact. Hence, it is important to continue our efforts to maintain and improve our study environment, and it is equally important to continually involve student organizations and representatives in the work.

The department will continue to ensure that all classes for CS students take place in the department facilities and give high priority to continuous development of the surrounding student facilities, including the student labs, to make it attractive for the students to become a daily part of the department culture. In particular, we will increase the engagement of our many teaching assistants to help foster a culture with more presence at the university to develop fruitful learning and academic discourse.

We also wish to increase the direct interaction of students with researchers, which means that more faculty resources must be allocated to courses, teaching and supervision activities, perhaps at the cost of less traditional lecturing.

International students

A key dimension of increasing enrollment numbers will be to increase the intake of students with an international background.

We already have a scheme in place for recruiting and enrolling highly qualified international students to our master's programmes and will continue our efforts to improve the "success rate" by targeted communication, recruitment campaigns etc.

Starting in 2025, we will open for enrollment to English language versions of our two bachelor's programmes in Computer Science and IT Product Development, respectively. We hope to gradually increase the intake of international students at the bachelor's level to a total of 250 by 2030, if government allows us to grow the number to that level.

In addition, we will introduce industry part-time versions of our master's programs. This will offer a more flexible student life which we hope to be attractive for international students as it will allow students to work more hours alongside their studies. The programs will, of course, also be available for Danish students.

Extend the provision of IT knowledge to other programs

We wish to provide more targeted or tailored courses in computer science to the rest of the university, such as minors to the rest of NAT, or one of the new 75 ECTS Master's programme for non-IT bachelors from the entire university, this could be based on a course structure like the Harvard CS50[i] designed and offered to the entire university.

We will also develop and run a campaign to encourage more students in other programs at Aarhus University and other Danish universities, to take their minor in computer science.

We also have a vision to develop computer science for all (CS4ALL) modules that introduce computer science into other fields, for example physics, biology, social science, economics. These modules should be tailored to the specific field and hence needs to be developed in collaboration with researchers/teachers from the relevant educational fields.

Encourage the interest in computer science in high school and elementary school

Contribute to the continuing education of teachers. We offer the Master's in Informatics Teaching (MIU) to high school teachers, and we will continue promoting and developing it. But we will also utilize the network of high school teachers growing from MIU to develop a closer and more research related collaboration with the high schools to constantly improve our supply chain of students.

We will radically expand the activities of Centre for Computational Thinking and Design (CCTD) to the new topic of Digital Technology Comprehension in public schools. This will take place through the knowledge center for Digital Tech Comprehension[ii], where research and collaborative activities are concentrated around the elementary school level.

Proposed activities
• Successfully initiate English language version of our bachelor's programmes • Develop and promote internationally attractive Master's specializations • Continue our efforts to attract highly qualified Danish and international students • Focus on improving our study environment, in particular when we have our new facilities • Expansion of activities on technology comprehension and Informatics to Public Schools and High Schools • Design targeted CS for all (CS4ALL) courses/programs in collaboration with faculty from other research areas within and outside NAT

4. SOCIETAL COLLABORATION

Department of Computer Science has a long tradition for close collaboration with industry. Through numerous successful projects, our research has found its way into practice and contributes to Danish society and international welfare, presenting a source of growth and the creation of new markets, products and services.

The department has initiated and actively maintains activities with local companies to facilitate contacts between students, researchers and industry. In particular, we have an extensive collaboration with our RTO[iii] spin-out the Alexandra Institute[iv] on strategic research and innovation.

Further, the department has been the source of several spin-out companies, and our HatchIT Lab[v] continually hosts a number of promising and innovative student start-up companies, along with a few faculty start-ups.

Strategic goals towards 2030
• To increase the span of societal collaboration • To increase the volume and quality of research projects in collaboration with companies and public authorities • To increase the number of industry funded research projects • To increase the volume and quality of student projects with companies • Strengthen connections with and support from local businesses, public institutions and politicians • Involve a larger number of senior faculty members in societal collaboration activities

To achieve our goals, we will focus on the following areas:

Outreach

The department will continue and expand its activities with local companies to facilitate contacts between students, researchers, and industry. And we will engage in more local research focused events with industry and business participation, such as our successful Aarhus University Digital Innovation Festival and the 2024 MatchPoints conference on Cyber Security.

Industry collaboration

We will strengthen our engagement in national and international networks and activities aimed at knowledge transfer to industry, such as EDIH, Digital Lead, DIREC etc.

The CS Business Club serves as an entry point for companies to scientific staff and students at the department, facilitating the creation of new industry research projects, student recruitment, and establishment of strategic partnerships.

During the strategy period, we will expand the portfolio of companies that CS collaborates with, using the strong connections with the local businesses (including members of CS business club) as a platform for establishing collaborative research projects. Specifically, we are planning to work on a possibility to provide industry collaboration mentorships for relevant junior VIP. And, to develop a scheme to facilitate student projects in collaboration with companies as part of their studies, including a platform for matching students and companies.

Engage in local and national Digital Technology activities and networks

The department will participate actively in societal initiatives that need our competences and can increase our relevance for the Danish Society. Currently we are involved in a number of such initiatives:

- Pioneer Centre for Artificial Intelligence[vi]
- Digital Research Centre Denmark (DIREC)[vii]
- Danish Data Science Academy (DDSA)[viii]
- Manufacturing Academy of Denmark (MADE)[ix]
- National Defence Technology Centre (NFC)[x]
- Security Tech Space[xi] and the Cyber Campus Denmark[xii] proposal
- DigitalLead cluster[xiii]
- Copenhagen Fintech cluster[xiv]

The list is not comprehensive. The initiatives are many and new initiatives are continually formed and so, we may have to prioritize our involvement given the number of senior faculty members.

Initiate and sustain more start-ups

We have a well-established environment for creating a student entrepreneurial culture at the department, providing a physical space and light weight mentoring program for students and newly graduates that wish to establish a start-up company. This local environment is supported by a close collaboration with the AU innovation support function, providing consulting as well as physical facilities in The Kitchen. We wish to strengthen this collaboration as well as the collaboration with the local Aarhus accelerator environments, such as INCUBA, Stibo Accelerator etc.

We will also give priority to promote a start-up mindset among the students as well as faculty and provide courses on entrepreneurship for master's and PhD students.

Upskilling more faculty members in societal collaboration

To achieve more societal collaboration, it is important that more faculty members develop an interest in business networks and become confident in dealing with the challenges of e.g. establishing strategic and industrial project collaborations or industry targeted courses and master class activities. In particular, younger faculty members and international faculty members may need more supervision on such activities. Finally, we note that working with international companies and organizations, e.g. in EU projects is also considered valuable societal collaboration, i.e. we think society at large.

Proposed activities
• Maintain close collaboration with Aarhus Municipality, Central Region of Denmark, Destination Aarhus, our local Alexandra Institute (RTO), organizations like DI, ITB, etc. • Support and participate in important national and local research, innovation and business activities like the D3A conference[xv] and the Digital Tech Summit[xvi] • Establish more research collaboration with local businesses e.g. through Innovation Fund Denmark and EU Pillar II and III funding • Expand the memberships base and the activities in CS business club • Reestablish and run annual Entrepreneurship courses

- Stimulate student and faculty start-ups in HatchIT Lab[xvii], The Kitchen[xviii], and INCUBA Next[xix]
- Run workshop series to upskill interested faculty members in societal collaboration

5. RECRUITMENT, ONBOARDING, AND RETENTION

To realize the 2030 vision for department of computer science, including meeting the societal needs for computer scientists both for industry, the public sector, as well as for research, it is pivotal to recruit more highly qualified senior faculty.

CS will also in the future strive to recruit excellent computer scientists who publish in top tier venues within their fields. While we face a radical expansion, we have no intention of lowering the bar for hirings, thus we issue broad calls and choose only the highly qualified applicants, without tipping the internal balance between research groups too much.

Most of the recruitment potential is international, which means we are operating in a different and more competitive market.

To benefit from an increased diversity, we strive to attract more female faculty members which in the long run requires enrolment of more female students and PhD students.

Strategic goals towards 2030
• Economically sustainable growth of senior faculty to 70 by 2030 • To increase diversity by recruiting more female permanent academic staff, and more Danish junior academic staff • Getting extensive external funding for starter packages including application for career grants during recruitment and onboarding • Focus on retention through attractive career plans • Focus on smooth generation shifts when senior faculty approach retirement

To achieve our goals, we will focus on the following areas:

Recruitment process

CS will continue to formulate open calls to screen the market in all areas of computer science and we fully support and adhere to AU's 7 recruiting norms. An effort to identify more specific and relevant channels to post calls will be initiated. The department strives to align our calls posting cycle in the best possible way with the North American Academic hiring cycle.

The use of search committees and personal networks to attract the best candidates will be encouraged and increased significantly.

Our recruitment process needs to be fast and transparent. We run a process that allows for this while at the same time securing a thorough evaluation and consideration, to make sure that we recruit the best qualified candidates that will also fit well into the department.

Another focal point for the department is to recruit more women, this pertains to both the student and the faculty level. We will investigate the obstacles and address the ones that we can affect, such as needs for cultural shifts, how to make diversity intentions clearer in job calls and the hiring process.

Competitive salaries and starting grants

Being a public university, salary levels are not internationally competitive, in particular not at the senior level. And at the junior level, employment opportunities in the industry are attractive alternatives. Hence, we must compete on other dimensions, such as attractive funding, in particular starting grants.

When recruiting scientific staff at the senior level, it is of critical importance to be able to offer starting grants in terms of a number of PhD- and postdoc-positions, depending on the type of position. This is a major challenge. Recruiting at the junior level, i.e. to tenure-track positions, we face a similar challenge although at a smaller scale. We will provide adequate support for candidates to apply for the available funding from external sources.

Utilize the Tenure Track systems for retentions

We will continue to recruit young talents to tenure-track positions and make sure to support the development of their talents.

Strengthening the PhD programme in computer science by offering more PhD courses. These should also be open to international PhD students.

Secure more external funding for PhD students via research grants and promote the use of industrial PhD schemes while at the same time working on establishing attractive contracts with local businesses. This could keep some of the talented students open to a career in academia.

Continue our focus on recruitment of highly talented students to PhD positions through our talent track programme. The aim of the programme is to ensure high retention among the talented students by exposing them to the research groups early, but it also constitutes an important source of talents for recruitment to PhD positions.

Proposed activities
• Continue our use of annual broad calls • Secure the funding of starting grants from external sources and the new NAT budget model • Investigate the obstacles for attracting more female applicants • Engage in more personal headhunting to encourage relevant applicants • Supplement broad calls with targeted calls when opportunities rise • Recruit more students, in particular Danish students, to the PhD programs • Focus on balancing the senior faculty group with Danish members • Enroll more faculty members in the full professor promotion program • Explore the possibilities to find financial support for sabbaticals to do exchange with other universities or industry

6. Organization and Work Environment

An attractive work environment is mandatory to recruitment and retention of students, faculty members and technical/administrative staff. We need to constantly pay attention to the work environment, department organization and governance model, to keep up with the growth in employees and activities.

The Department of Computer Science has a highly motivated and hard-working faculty and staff. We are proud of the results and contributions made by our department, and all faculty and staff are contributing to move the department forward on both the national and international scene.

To provide high-quality service to students and faculty members and to drive the department development forward, CS will maintain a team of highly qualified administrative staff who undertake the departmental tasks in areas like communications, outreach, international student recruitment, research support, onboarding, fundraising etc.

Moving forward, the department will benefit from a more diverse group of employees coming with different backgrounds from all over the world. It is our expectation that the entire staff will contribute equally to shaping the department and making it their own.

Strategic goals towards 2030
• Make sure that department organization and governance is continually updated to keep up with growth • To maintain a strong department culture fostering engagement, employee involvement, job satisfaction, work-life-balance, and shared responsibility • Create a strong sense-of-belonging for all employees • Encourage a more inclusive and diverse employee profile

To achieve our goals, we will focus on the following areas:

Department governance

With a growing group of senior faculty members, we will also see a growth in PhDs and Post Docs, and in turn this requires a larger support group of technical and administrative staff (TAP).

Such a growth in number of employees require us to rethink the organization and distribute and delegate more management tasks to a small group of managers to support the scaling of the organization. Thus, we will likely have to introduce the notion of Sections and Heads of Section, being responsible for employee related tasks, while the Department Research Committee will continue to centrally run recruitment of faculty members.

We also need to appoint a Deputy Head of Department for Education to devote more management focus to our expanding Danish and International educations. The Deputy Head of Department for Education and the possible Heads of Sections will become part of the department management team.

Psychological work environment

The department will continue to work systematically on maintaining a high-quality work environment based on the mandatory regular physical and psychological workplace evaluations as well as through culture development. We strive to take work-life-balance, job satisfaction, and general wellbeing into account when developing the department.

The current size of the department enables us to ensure and develop the sense of belonging to one department with mutual interests and a joint sense of direction among the employees. It is important to scale this sense of engagement and belonging with the growth in size. The establishment of a CS Staff Club, which organizes social activities, has proved a success and will be continuously developed.

We will continue to embrace the cultural diversity of the department and use it as a means to create a strong sense-of-belonging at the department for all department employees and students.

Code of Conduct

The department committee for diversity has developed a code of conduct, stating the official policy on social as well as scientific issues related to diversity and inclusion. The CoC promotes respect for all groups (female networks, talent tracks, study programs etc.) and all individual choices, it condemns all discrimination and demands a respectful and professional approach to communication.

We will continue to actively make the Code of Conduct support our work with maintaining an including and contemporary workplace. The Code of Conduct also applies for all students who are introduced to it as part of the introduction when first arriving to the department.

Physical environment

Located in the IT-City Katrinebjerg, the majority of the buildings are relatively new and of high quality. The entire staff is located in the same building complex with short distances between offices. Master's thesis students are located together with their research groups while other students are located in nearby buildings.

Within the next few years, we will be expanding our facilities with a completely new building. This will allow us to establish a more coherent environment for staff as well as students, by locating lab facilities, student areas, and staff offices closer together. We expect this to encourage even more social interaction, also between research groups.

Proposed activities
• Recruit a Deputy Head of Education and organize a scalable educational management • Initiate a process for adjusting organization and governance, e.g. establish a few sections as governance umbrellas for smaller research groups with sufficient coherence to constitute a unit • Increase our focus on creating a strong sense-of-belonging to the work environment • Establish a more coherent physical work environment for staff as well as students • Continue to develop an inclusive work environment

7. VISIBILITY NATIONALLY AND INTERNATIONALLY

In recent years, competition at the national level in Denmark has become fiercer. In a competitive market, visibility and differentiation is a prerequisite for attracting the attention of policy makers, potential students and staff, and major foundations. Thus, there is a strategic need to make CS and Aarhus University strong and visible to create more awareness of the computer science capabilities in the Aarhus Region as well as at the national scene. CS already hosts many activities that in and by themselves justifiably attract attention, but we wish to develop more streamlined narratives to increase visibility.

Digital technologies are high on the political agendas both in Denmark, EU and the rest of the world. Our profession becomes the epicenter for many political, economic, ethical and sustainability dilemmas and debates - often heated and polarized. This makes it important for the department to prepare faculty members to be able to participate in public communication and debates. We should contribute with factual public lectures debunking myths with deep insight, but we should also be able to participate in balanced debates bringing the needed nuances into the debates.

Strategic goals towards 2030
• To position ourselves in the Danish CS research landscape and spark awareness about our societal contributions • To make the department's excellence more visible at relevant international fora • To increase societal visibility through public talks, panels and media • Long-term improvement of the general role model image of computer scientist

To achieve our goals, we will focus on the following areas:

Broaden exposure through on-campus activities

The location of our department, the city of Aarhus, is not widely known and not easy to reach from abroad. Nevertheless, it is an attractive place to work and live and we wish to expose our department and the city even more to potential faculty and collaborators.

We will do so by attracting more premier international research conferences, workshops, PhD courses, and summer schools to the department in Aarhus. And by offering attractive conditions, in terms of support and facilities, to visiting scholars we wish to increase the number of international visitors who could be potential faculty members.

Engagement in representation of interests

We could increase the number of faculty who engage in the national political dialogue on relevant subjects, for instance under the auspice of ATV and other boards. This would contribute not only to better informed decisions but also to a broader political knowledge of computer science in general, and of our department more specifically.

Another focus area will be to improve our efforts on putting forward eligible CS candidates for positions of trusts and on boards of relevant foundations.

We may consider participation in national initiatives to attend activities at the Ministry's Innovation Centers around the world, e.g. in Boston, Silicon Valley, Shanghai, to create more awareness.

General public outreach

In order to create awareness and broaden the knowledge of computer science amongst the general public, we should increase our participation in events and debates targeted to the general public, like Open University (Folkeuniversitetet) and Public Lectures in Natural Sciences (OFN), the latter reaching an audience of more than 25000, all over Denmark.

We already have some good experience with this however, to cover more topics – and events – we would need more faculty members to engage in these tasks.

Proposed activities
• Continue to grow a portfolio of talks for the general public and decision makers • Develop incentives for faculty members to do more outreach and participation in debates • Prepare faculty members who show an interest to participate in public debates on hot topics like AI, Cyber Security, Quantum Computing etc. • Invite more decision makers to our department for gaining insight into computer science

8. Barriers and uncertainties

Political conditions

In recent years, the Danish government has introduced several reforms that reduce the number of seats in several of the university degree programmes, among others the natural sciences. Although the programmes in computer science have not yet been affected much directly, the reforms introduce an uncertainty.

The recent Master's reform includes a cap on bachelor enrolment which may affect the department growth. On the positive side, the government recently approved international versions of the Department's two bachelor's programs allowing enrolment of a limited number of EU students and an unlimited number of self-paying non-EU students. Given the high number of applicants we receive for the international Master's programs we expect a growth in Bachelor's enrolment despite the general introduction of caps on bachelor enrolment.

Moreover, we have to change our Master's programs such that only 70% get a 2-year Master's degree and up to 30% get either a new 1,25 year Master's degree or a four year Business Master's program. The department proposes that we do not change any of our 2-year Master's but reduce it to only cover 70% of our Master's, and instead we offer new 1,25 year Master's to non-IT-bachelors outside our department.

Another reform that threatens the visions of this strategy is the government act of limiting the amount of SU. In effect, this introduces an upper limit to the number of international EU students that can be enrolled in our programmes, but the non-EU enrolment is in principle unlimited.

Sustainable growth

The projected growth in numbers of computer science students demands a similar growth in the number of senior faculty at the department locally as well as nationally. This growth in senior computer science faculty in Denmark in turn puts a pressure on the external funding sources unless these sources are expanded proportionately.

Metrics of CS research output

The traditional natural science measure of research output (e.g. WoS and SCOPUS) does not align well with the publication tradition of computer science, traditional methods only cover between 20% and 45% of Computer Science citations compared to Google Scholar. This influences the way computer science is benchmarked against other natural science disciplines and since we are competing for the same funds, this is potentially a threat to the financial foundation of the disciple of computer science in general and the department in specific. Ultimately, we need to develop our own metrics based on CSRankings, DBLP and Google Scholar.

Competitive situation

Our graduates have a de facto unemployment rate of zero. There is a huge lack of IT-specialists in the market thus we can anticipate a huge demand for our graduates towards and beyond 2030.

We will be in fierce competition with industry on attracting PhD students and Post Docs to grow the senior faculty of our department.

Endnotes

[i]. https://pll.harvard.edu/course/cs50-introduction-computer-science
[ii] https://tekforstaa.dk
[iii] Research and Technology Organization – Danish GTS – Government approved technical service organization.
[iv] www.alexandra.dk
[v] http://projects.au.dk/hatchitlab/
[vi] https://www.aicentre.dk
[vii] https://direc.dk
[viii] https://ddsa.dk
[ix] https://www.made.dk
[x] https://www.en.nfc.aau.dk
[xi] https://securitytechspace.dk
[xii] https://securitytechspace.dk/aarhus-vil-styrke-danmarks-cyberforsvar-med-nationalt-cyber-campus/
[xiii] https://digitallead-dk.translate.goog/?_x_tr_sl=da&_x_tr_tl=en&_x_tr_hl=en&_x_tr_pto=wapp
[xiv] https://www.copenhagenfintech.dk
[xv] https://d3aconference.dk
[xvi] https://event.ing.dk/dts2024
[xvii] https://projects.au.dk/hatchitlab
[xviii] https://thekitchen.io
[xix] https://incuba.dk/en/hubs/it-tech-incuba-katrinebjerg/incuba-next/