1. Online/physical community applying participatory design. This project aims to use and explore participatory design methods for working with bottom-up communities that are physically situated and supported online by shared tools (databases, google docs, Facebook, etc.). Through the design process, the aim is to explore their needs for further technology and prototype possible solutions. The project is based on exploration of relevant (Communities and Technologies) literature, and the process and prototypes are discussed in relation to this. Through this project the students will show that they master methodologies, theories and concepts in Participatory design and Human Computer Interaction. The students will plan and carry out the project, build digital and/or physical prototypes, and apply the results in the relevant contexts. The students will apply and reflect on the methodologies used to analyse and solve academic questions and issues. In the project the students will relay and communicate academic questions and issues, collaborating constructively on a scientific basis to solve subject related issues. Supervisor: Susanne Bødker

2. Newcomers versus experts in an online community. This project aims to explore how users learn and become members of an online community. The work will be based on Bryant et al.'s work where they study what interface mechanisms in Wikipedia it takes to 'become Wikipedians.' and include empirical interviews with community members and newcomers. The process includes developing design suggestions and prototypes to better support learning in the particular community. One possibility is to redo the Wikipedia study, another is to choose another similar online platform. Through this project the students will show that they master methodologies, theories and concepts in Human Computer Interaction. The students will plan and carry out the project, and apply the results in the relevant contexts. The students will apply and reflect on the methodologies used to analyse and solve academic questions and issues. In the project the students will relay and communicate academic questions and issues, collaborating constructively on a scientific basis to solve subject-related issues. Supervisor: Susanne Bødker

3. Shared traces in collaborative virtually activities. Choosing a specific collaborative activity that happens virtually (either on-line or through a specific shared technology) this project works with traces of activity, analytically and constructively. Based on principles from the CIO project the aim is to identify a collaborative activity and explore the possibilities of augmenting this through traces. The process includes developing design suggestions and prototypes to better support traces, using the CIO principles. Through this project the students will show that they master methodologies, theories and concepts in Human Computer Interaction. The students will plan and carry out the project, and apply the results in the relevant contexts. The students will apply and reflect on the methodologies used to analyse and solve academic questions and issues. In

the project the students will relay and communicate academic questions and issues, collaborating constructively on a scientific basis to solve subject-related issues. Supervisor: Susanne Bødker

4. Walkthrough based interface assessment methods with context in mind. Walkthrough based methods are used in many fields of computing e.g. in code reviews. In human-computer interaction several walkthrough-based methods have been developed often in conjunction with a variation of task analysis, e.g. the cognitive walkthrough. While walkthrough-based methods for interface assessment are cost effective and often easily communicated, they often depend implicitly on extended knowledge about the field of application and future users. In other cases, such methods may suffer from limited because context of use is not properly reflected. Through this project the students will show that they master methodologies, theories and concepts in Human Computer Interaction. The students will plan and carry out the project. The students will apply and reflect on the methodologies used to analyse and solve academic questions and issues. In the project the students will relay and communicate academic questions and issues, collaborating constructively on a scientific basis to solve subject related issues and develop a walkthrough-based method that enables the evaluator to better take context and knowledge about users into account. The method could be based on the cognitive walkthrough or other established walkthrough methods. The suggested method will be evaluated in the context of a development project. Supervisor: Olav Bertelsen

5. Interactive Tools for Open Data Platforms. Public institutions increasingly publish data on open data platforms as an effort to stimulate the digital economy and promote transparency. Denmark is at the forefront with multiple open data platforms and initiatives. These platforms are repositories or databases with a simple API interface and often under-designed user interface. This opens up for multiple opportunities to develop interactive tools exploring and navigating open data platforms using concepts from visual analytics, data visualization, human-computer interaction, social and collaborative computing etc.
- How can we design search interfaces that balance overview and detail?
- How can we design interfaces that allow the user to compare central data properties?
- How would multiple users share and collaborate with/on data from these platforms?
- What techniques can we apply to improve search, comparison, sharing, idealization etc. in the interface design?

In the project, students will be asked to choose a specific platform based on an initial introduction and together with the supervisor, identify relevant approaches and questions, implement interactive tools based on relevant literature and/or on behalf of a particular user group, and evaluate the designs

using methods from within Information Visualization and Human-Computer Interaction. Through this project the students will hence show that they master methodologies, theories and concepts in Information Visualization and Human Computer Interaction. The students will plan and carry out the project, and apply the results in the relevant contexts. The students will apply and reflect on the methodologies used to analyse and solve academic questions and issues. In the project the students will relay and communicate academic questions and issues, collaborating constructively on a scientific basis to solve subject related issues. Supervisor: Henrik Korsgaard

6. Data Journalism – Asking Good Questions to Data? Today, journalism involves a significant amount of data-work – searching, collecting, analyzing, visualizing data as part of the investigative process and as part of the reporting and presentation. The commonality of graphs and projection during COVID19 is just one apparent example. Hence, data journalism is an obvious area of interest for Human-Computer Interaction and related areas.
- How do journalist approach data?
- What are the driving questions?
- How does data `fit' in the journalistic practice?
- What new interactive tools and technologies could we design to support data journalism?

Students can approach this project from two perspectives (depending on COVID19 as well): First, they can examine how data journalists work, the tools they use and how they `use' data in their process and work. Second, students can engage with data journalists/journalism students in various co-design activities with the aim of developing a novel interactive tool for data journalism *together* with the practitioners. Through this project the students will show that they master methodologies, theories and concepts in Human Computer Interaction. The students will plan and carry out the project, and apply the results in the relevant contexts. The students will apply and reflect on the methodologies used to analyse and solve academic questions and issues. In the project the students will relay and communicate academic questions and issues, collaborating constructively on a scientific basis to solve subject related issues. Supervisor: Henrik Korsgaard.

7. I/O Ambient eInk Displays. eInk technology offer multiple advantages over other display technologies – they require minimal power to operate, improved readability and are often less intrusive than more common displays. However, the use-cases for eInk technology and examples seem limited to small tags in supermarkets and eReaders. As part of several projects, we are interested in developing use-cases for and explore eInk displays as ambient displays – at home, at work, outside, in the laboratory etc. Similarly, they seem ideal as situated and ad hoc output displays.

In this project students are invited, literally, to play around with eInk technology and coming up with design exemplars for ambient displays. This could involve exploring a specific design theme, conduct co-design activities within a domain, develop and test a specific application, explore interaction techniques, data visualization etc. Through this project the students will hence show that they master methodologies, theories and concepts Human Computer Interaction. The students will plan and carry out the project, and apply the results in the relevant contexts. The students will apply and reflect on the methodologies used to analyse and solve academic questions and issues. In the project the students will relay and communicate academic questions and issues, collaborating constructively on a scientific basis to solve subject related issues.Supervisor: Henrik Korsgaard or Eve Hoggan.

8. Wearable Physiological Sensors. The aim of this project is to create wearable sensors that measure heart rate and GSR that can be worn for a long period of time. The data will then be analysed to try and determine the user's affective state. Currently, in research, there are very few long-term studies of physiological data. We believe that creating wearables that users actually want to wear, without any stigma, will enable a more in-depth analysis of emotional well-being. Students will have the opportunity to explore different fabrication methods, and different types of sensors (including printing their own sensors). This is a very technical project, so students should be confident in their Physical Computing skills. Through this project the students will show that they master methodologies, theories and concepts. The students will plan and carry out the project. The students will apply and reflect on the methodologies used to analyse and solve academic questions and issues. In the project the students will relay and communicate academic questions and issues, collaborating constructively on a scientific basis to solve subject related issues. Supervisor: Eve Hoggan

9. Multimodal We-Awareness in Remote Communication. In our everyday lives we rely heavily on our awareness of the state of the spaces and objects we share with the people living and working around us. An open door indicates availability; the noise of the coffee machine and a full cup tell you not only that someone's just been here and that they will return, but also give you hints on who it might be. As many of us have experienced when we moved to remote work during the COVID19 lockdown, digital technologies still struggle to mediate the multiple and constant flow of multimodal cues and traces that are so important to our awareness of human activity and collaboration. In this project, students will consider the input and output modalities (e.g., temperature, smell, ambient light, vibrations), whilst also enabling different ways of connecting activities across multiple devices, supporting a high degree of intelligibility and

control. The most basic example of this would be to augment Zoom with haptic feedback to indicate whenever someone has raised their hand, as these small interactions are often missed. Students will need good prototyping skills, as well as the ability to combine hardware with a browser-based or mobile application. Through this project the students will show that they master methodologies, theories and concepts from Human-Computer Interaction. The students will plan and carry out the project. The students will apply and reflect on the methodologies used to analyse and solve academic questions and issues. In the project the students will relay and communicate academic questions and issues, collaborating constructively on a scientific basis to solve subject related issues. Supervisor: Eve Hoggan

10. Magnetic Haptic Feedback. Traditionally, haptic feedback is presented using vibrotactile motors. However, these are noisy and somewhat limited in terms of design parameters. In this project, students will explore the possibilities of creating distinguishable haptic feedback using magnets. Through this project the students will show that they master methodologies, theories and concepts. The students will plan and carry out the project. The students will apply and reflect on the methodologies used to analyse and solve academic questions and issues. In the project the students will relay and communicate academic questions and issues, collaborating constructively on a scientific basis to solve subject related issues.
This project requires extremely good prototyping skills (electronics and 3D printing), and will also involve psychophysical user studies. Supervisor: Eve Hoggan

11. 3D Printed Active Haptic Feedback. Again, traditionally, haptic feedback is presented using vibrotactile motors. However, these are noisy, difficult to use, and prone to breakdowns. In this project, students will explore the possibilities of printing various different interactive components with their own intrinsic haptic feedback. The main approach will be to use the principles of mechanical metamaterials. Students will need good 3D modelling and printing skills. Through this project the students will show that they master methodologies, theories and concepts. The students will plan and carry out the project. The students will apply and reflect on the methodologies used to analyse and solve academic questions and issues. In the project the students will relay and communicate academic questions and issues, collaborating constructively on a scientific basis to solve subject related issues. Supervisor: Eve Hoggan

12. Visualizing Collaboration
Most applications for writing or programming collaboratively create a trace in the form of a revision log. This revision log in itself is not always informative to

writers/programmers or others, but if transformed into a different representation it can provide interesting insights about the collaboration.

- For example, when creating collaboratively, work is divided among people who end up having a stronger attachment and/or expertise in relation to particular parts of a project. Having a sense of attachment and expertise can be helpful during collaboration.
- Studying patterns in revision/activity visualizations can also provide useful empirical insights about how people collaborate, especially in combination with other empirical methods.

An empirically oriented project within this theme would typically begin by identifying a collaborative activity (e.g. writing, programming) and a group of users (e.g. university students, software developers) and then survey the literature on related work. The next step would be to formulate a research question to examine by use of visualizations. Based on this, a visualization tool for examining the research question would be designed and implemented. The visualization tool would then be used on data from actual instances of the chosen activity (e.g. LaTeX documents or code on GitHub), and the visualizations would be analyzed in relation to the research question. The outcome will be a report or thesis describing the type of collaborative activity and users, related work, methodology, key insights, and recommendations within the field of HCI.

A prototype-oriented project within this theme would typically begin by identifying a collaborative activity (e.g. writing, programming) and a group of users (e.g. university students, software developers) and then survey the literature on related work. The next step would be to obtain an understanding of the chosen activity by, e.g., interviewing, surveying, or observing relevant users. Based on this, a visualization tool to support the chosen activity would be designed and developed. Depending on scope, the project could end with a user evaluation of the tool, or several design and development iterations could be undertaken (including involvement of users along the way). The outcome will be a report or thesis outlining the project, methodology, design rationale and implementation, and evaluation, key insights, and recommendations within the field of HCI. Through this project the students will show that they master methodologies, theories and concepts from Human-Computer Interaction. The students will plan and carry out the project. The students will apply and reflect on the methodologies used to analyse and solve academic questions and issues. In the project the students will relay and communicate academic questions and issues, collaborating constructively on a scientific basis to solve subject related issues. Supervisor: Ida Larsen-Ledet or Susanne Bødker

12. Online Activism. Online activism has become more and more common. Many initiatives see the light but fail to sustain themselves (sometimes because they do not gain traction, but sometimes because of difficulties sustaining the

activism). Coordinating and sustaining online activism often relies on multiple platforms and actors that are made the best of and activated at different points of time. The project is about understanding what the artifact ecologies of online activism look like, and what challenges and opportunities activism has online A project within this theme would typically begin by identifying one or more communities doing online activism (e.g. Everyday Sexism Project or For alle os som vil redde Den Gamle By) and then survey the literature on related work. The project will involve qualitative research (e.g. interviews and observations) and analysis thereof, focusing on how artifact ecologies and/or infrastructures play into supporting online activism. The outcome will be a report or thesis outlining the community, methodology, related work, key insights and recommendations within the field of Human-Computer Interaction. Through this project the students will show that they master methodologies, theories and concepts from Human-Computer Interaction. The students will plan and carry out the project. The students will apply and reflect on the methodologies used to analyse and solve academic questions and issues. In the project the students will relay and communicate academic questions and issues, collaborating constructively on a scientific basis to solve subject related issues. Supervisor: Ida Larsen-Ledet or Susanne Bødker