

# DTU Compute

September 2023

## Data and digital technology as enablers for environmentally sustainable societies

Tailored Course under the DFC Scholarship Program 2023



Danida Fellowship Centre  
- sustaining development through research and learning

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## Leveraging Data and Digital Technology



Danida Fellowship Centre (DFC) is delighted to announce a new course on “Data and Digital Technology as Enablers for Environmentally Sustainable Societies”! In today’s world, where environmental sustainability has become a critical global concern, harnessing the power of data and digital technology can play a key role in addressing pressing environmental challenges.

Data and technology play a crucial role in all sectors, including water, energy and environment and are of increasing significant importance to the challenges addressed under the Danish Sector Cooperation.

Knowledge in action is at the core of DFCs learning programs and strategy. The knowledge in action approach is to encourage individuals to apply what they have learned, and to enable them to make a tangible and meaningful impact in their organizations and toward the addressed challenges in the sector cooperation projects with Denmark. It is critical to bridge the gap between theory and practice, ensuring that knowledge is not limited to academic or theoretical realms but is translated into real-world solutions, innovations, and improvements.

We are excited to embark on this collaboration with DTU Compute and to provide the opportunity to explore how data and digital technology can be used as enablers to create more sustainable societies and foster positive environmental impacts.

A handwritten signature in blue ink, appearing to read 'Ulla Næsby'.

**Ulla Næsby**  
Tawiah, Director,  
Danida Fellowship Centre



**Danida Fellowship Centre**  
- sustaining development through research and learning

# A warm welcome

Dear Participant,

We would like to extend a very warm welcome on this exciting journey you are about to take on!

At DTU Compute we are honored to further the technological and sustainable understanding and interdisciplinary collaboration between sectors enabling a strong digital and sustainable development in Brazil, Ghana, Kenya and South Africa.

Together with our esteemed partners we have developed a course in which you will be meeting international leading researchers within digital transformation, technologies, sustainability and leadership, go on site visits and getting presentations by experts and top leaders within some of the most digitalized ministries and private organizations as well as meet our international collaboration partners within the GovTech area. As part of the course you will be invited to work on a case from your own organization enabling you to bring your gained knowledge into practice during the course. Further you will be invited to work on developing your own personal, organisational development strategy strengthening your resilience as change agents. Finally we are totally excited to co-create a Tech4Civ country specific board game with you, which will support further upskilling and knowledge transferability in your organization and your home country.

It is our hope that the course will prove to be fruitful as well as challenging enabling your personal growth as well as the continuous digital transformation and sustainable development in Brazil, Ghana, Kenya and South Africa to the benefit of the citizens.

Our team is committed to do the utmost for making it an exciting and amazing journey into the digital and sustainable landscape.

**Anja Mie Weile**  
Head of the Tech4Civ Section and PhD Student  
DTU Compute

**Jan Madsen**  
Professor, PhD, Head of Department  
DTU Compute



Anja Mie Weile and Jan Madsen,  
founders of the Tech4Civ Anti-helix

*The competence development program is created on basis of the Tech4Civ Anti-helix model founded by PhD Student Anja Mie Weile and Professor Jan Madsen.*

# Mindset: Digitalization and sustainability



The program is designed to build a digital sustainability mindset as well as give the participants an introduction to the Danish context taking the point of departure in the Danish digitalization and sustainability experiences. Furthermore, the program is designed on the belief that transition towards a sustainable future is not a single-standing effort by any one public agency but a strategic objective that must be cross-cutting and undertaken at all levels of government and society. The program aims to enable application of digital technologies to promote environmental sustainability in the local contexts and institutions the participants are working in.

The program participants come from 4 different countries; Brazil, Ghana, Kenya and South Africa. The countries are involved in different sector programs within digitalization and sustainability.

To support the outcome (see figure) of the course the program will be built on a “blended learning” approach, using a wide variety of learning forms to guarantee an optimal outcome for each participant.

This will include:

- Classic lectures combined with cases, videos and assignments to reflect upon.
- Team based learning as well as individual based learning
- Experimental based learning that will be achieved through working with a hands-on project and co-creation of the Tech4Civ board game.
- Peer-based learning with focus on a structured learning process between the participants, eg. working on project in own organisations
- Individual reflections on building resilience through working with the personal, organisational development strategy

# Country descriptions



## Brazil - Digitalization Cooperation

Brazil has made significant progress in digital government since the launch of its visionary strategic plan in 2019. The main citizen platform, gov.br, now boasts over 140 million unique users, representing over 80 percent of the adult population, and offers more than 4,000 online services. Recognized by the World Bank as the second most mature country in terms of digital government in 2022, Brazil has saved nearly a billion dollars in efficiency gains. The robust digital infrastructure has also played a crucial role during the COVID-19 pandemic, facilitating social payments to those in need. Denmark has been a supportive partner in Brazil's digital government ambitions since 2015, with continued collaboration focusing on improving digital public services, administrative efficiency, and reducing costs until 2026. The next phase of the partnership will prioritize technologies and data for environmental sustainability and protection.



## Kenya - Circular Economy Cooperation

The Danish Sector Cooperation on Environment is actively assisting Kenya in achieving its ambitious sustainability targets through initiatives such as the Kenya Sustainable Waste Management Act and an Extended Producer Responsibility scheme, with digitalization playing a crucial role in their implementation. Key partners in these efforts are the Ministry of Environment, Climate Change and Forestry and the National Environment Management Authority, but the involvement of the private sector and civil society is also considered essential for fostering a more circular economy in Kenya. The program's main focus is on supporting the implementation of the Kenya Sustainable Waste Management Act and Extended Producer Responsibility regulation. Enforcing compliance within Kenyan authorities is also prioritized, with digitalization being utilized to improve enforcement efforts and ensure effective implementation of these sustainability measures.



## Ghana - Cooperation on statistics

Ghana has made significant progress in digitizing its public sector, implementing projects such as the National biometric ID system, property addressing system, and mobile money interoperability system, resulting in improved public service delivery, reduced corruption, and increased availability of public data. However, challenges in data governance and technical issues have hindered the full realization of the benefits of these efforts. Denmark, a global leader in public sector digitization, has been supporting Ghana's statistical service through the Strategic Sector Cooperation between the two countries since 2019. The cooperation aims to strengthen Ghana's official statistics, promote sustainable growth and development, and bring Danish technical expertise to address development challenges in Ghana.



## South Africa - Water/Energy Cooperation

South Africa is undergoing a process of digitalizing crucial aspects of the public sector to enhance service delivery. However, due to the lack of a designated institution to oversee this process, digitalization efforts are fragmented and spread across multiple government departments and institutions without proper coordination. Denmark and South Africa collaborate in the fields of Energy, Water, and Urban Solutions, where digitalization could greatly improve efficiency and service delivery. In the energy sector, digital solutions could streamline public tenders for integrating renewable energy sources into the electricity grid. Danish water utilities already use digital solutions for customer communications, revenue collection, and automating plant processes. However, South African municipalities face financial challenges in upgrading their IT systems and infrastructure, slowing down the adoption of digitalization in the water sector. Integrated training solutions are crucial for successful implementation of digital solutions across departments and municipalities.

# Point of departure: Digital Transformation

## Complexity and uncertainty

The digital technology development not only enables the development of new services and products for the citizens, however also enhances the complexity and uncertainty in which organizations and people work and live. To enable the full potential of digital technologies there is a need for all professions to be actively involved in the digital transformation bringing their specific knowledge and expertise to the center of technology development ensuring that the right solutions and contemporary laws will be developed building inclusive, open and democratic organizations and societies of the future.

Building bridges and creating a shared language is fundamental in the digital transformation bringing all into the discussion on how we are shaping our future lives through digital technologies.

## Technology

To fully utilize the potential that the digital technological development enables, the development of new technologies must incorporate not only the end-user perspective but has to include the organization (people) in which the technology is to be used.

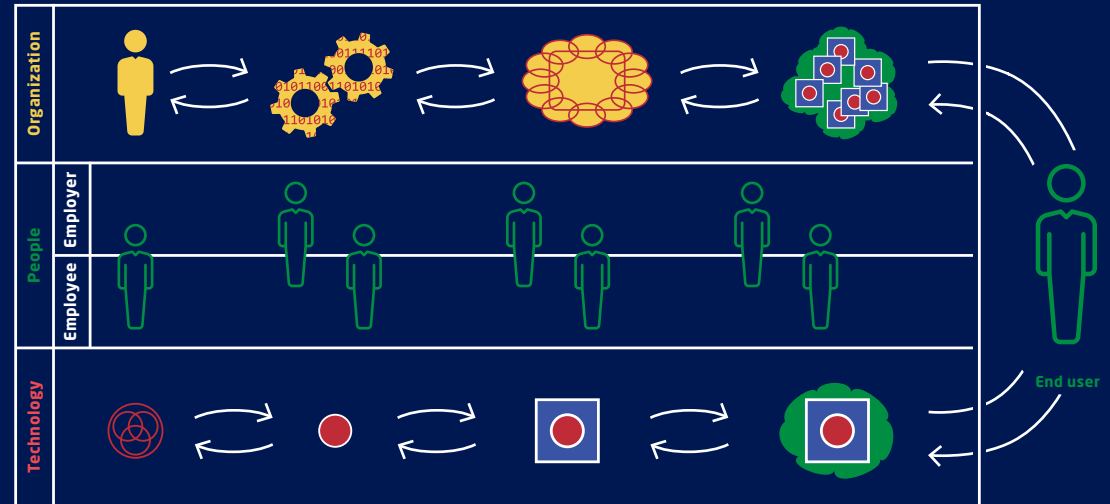


Figure by PhD student Anja Mie Weile and Professor Jan Madsen

## Organization

Only by understanding the potentials of digital technologies will organizations (people) be able to create new services and products of the future and not be limited to going from analog to digital missing out on the true potential of digital technologies.

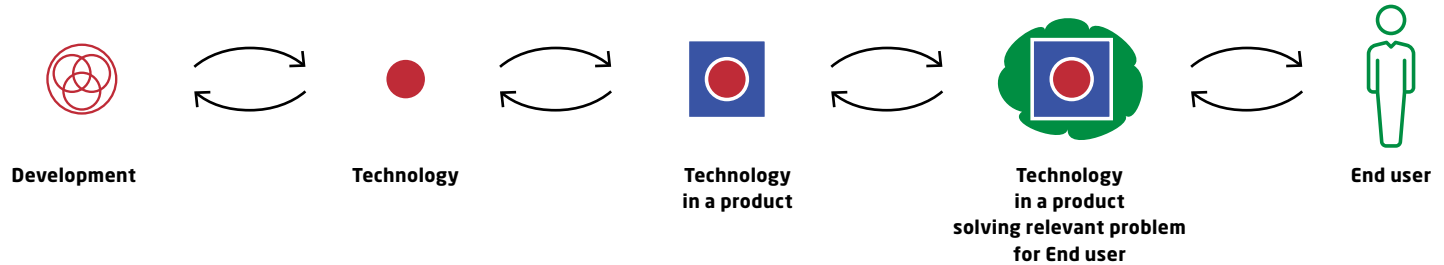
## People

The potential of the digital technology development calls for the creation of a shared language amongst all employees and leaders in organizations. Seeing the other side and being open to bringing in perspectives from other professions is critical in the development of new services and products.

# Digital Transformation

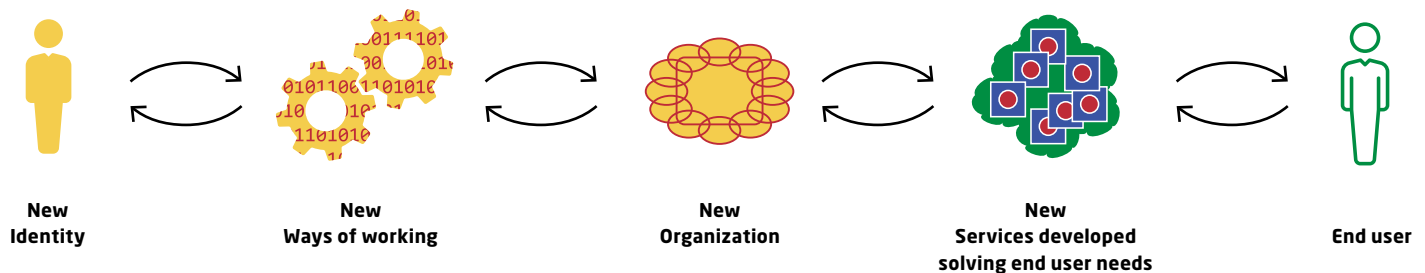


## Digital ...



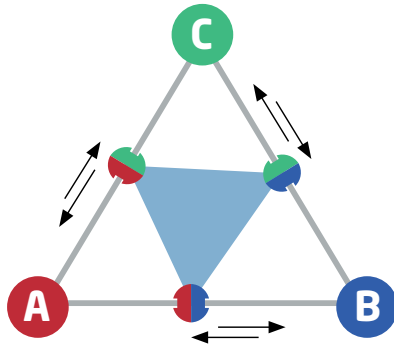
Looking at the digital transformation from just a technical side there is a risk of only seeing how science leads to the creation of new products solving relevant problems for end-users. Missing out the critical understanding of bringing in the organization in which the digital technology is to be used.

## ... Transformation



Looking at the digital transformation from just an organizational side there is a risk of only seeing how new services are developed solving end-users' needs changing the organization in which the technology is embedded creating new ways of working and in the end changing the identity of the employees and leaders. Missing out the critical understanding of bringing in the digital technology development ensuring utilization of the full potential of technology and enabling people to take active part of creating the future of organizations and societies in which they live.

# Course outline: Methodology - Tech4Civ Anti-helix - Mode 1 (sector level)



The Tech4Civ Anti-helix Mode 1 is created by PhD student Anja Mie Weile and Professor Jan Madsen.

The Tech4Civ Anti-helix Mode 1 is an emerging hybrid in the triple helix. The triple helix represents the dynamics between the sectors

A: Academia  
B: Business  
C: Government institutions

## From industrial to a digital sustainable society

The competence development course aims to help increase awareness of the new digital technologies as well as the transformation taking place. The ambition of the course is to ensure that the digital transformation in South Africa, Ghana, Kenya and Brazil, supports a sustainable future.

With the development of new digital technologies, breakthroughs are happening more frequently in the intersection of disciplines and professions. Simultaneously the digital technology development accelerates the speed in which these breakthroughs happen. Digitalization hereby demands a paradigm shift in how we as humans interact and calls for new competencies as well as new ways of working. To take advantage of the opportunities enabled by the digital technologies there is therefore a much greater need for collaboration between the different sectors and to use the broader eco-system.<sup>[1]</sup>

## Fostering a shared language

Bringing the Anti-helix Mode 1 into play the competence development course seeks to bring light to the deep conversations of what society we would like to

create for the future putting the civil servants in the front seat of creating and facilitating the important inter-disciplinary discussions utilizing the different sectors specialized knowledge in the process of creating environmental, social, and economic sustainable regulations and solutions. The interplay of the different sectors will not only foster a shared language but bring the Anti-helix Mode 1 (see figure next page) into play enabling the development of new services utilizing the exponential development of digital technologies.<sup>[2]</sup>

## Collaboration, Trust and Dialogue

With the demand for co-creating new services and products there is a need to go from 'working with others' to 'working together' (Anti-helix blue triangle). The ability to be open and to include the unique contribution each profession and sector has become central in the creation of relevant digital and sustainable services and products. This not only demands communication and collaboration skills, but having the courage and the will to go into an unknown arena together becomes a key competence in the digital society.<sup>[3]</sup>

[1] Mariana Mazzucato, 2018 & Etzkowitz and Leydesdorff, 1995

[2] Kane et al, 2019 & Yeung and Ulrich, 2019

[3] Brené Brown, 2012, 2017





# Course outline: Methodology - Tech4Civ

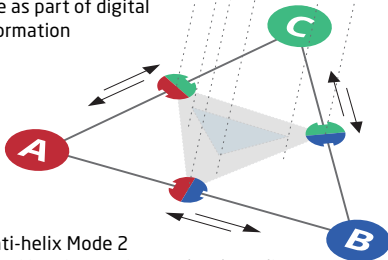
## Anti-helix - Mode 2 (organizational and personal level)

The blue triangle illustrates the opportunity field in which new ideas and co-creation is possible

The grey area illustrates the parameters that can give the resistance:

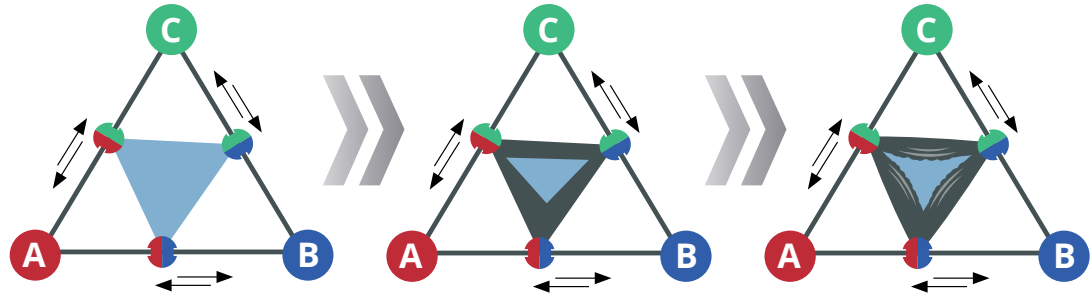
- Leadership
- Organizational structure and culture
- Peoples personal resistance to change

The Anti-helix shows the dynamics of having to co-create new services and the resistance that will emerge as part of digital transformation



The Anti-helix Mode 2 is created by PhD Student Anja Mie Weile.

It shows the dynamics of power and how building resilience is important when working with digital transformation.



### Mode 1

The Tech4Civ Anti-helix Mode 1 is an emerging hybrid in the triple helix. The triple helix represents the dynamics between different parties .

### Mode 2

The Tech4Civ Anti-helix Mode 2 shows the resistance when driving digital sustainability transformation in organizations (grey area) and the opportunity field in which co-creation is possible.

### Mode 2 under stress

The Tech4Civ Anti-helix Mode 2 illustrates the dynamics of resistance and voltage field. Knowing that the resistance will change during the process is important in building resilience.

### Building resilience

Encountering resistance will be part of the transformation proces. Building the capacity to withstand or to recover quickly from difficulties is essential when driving the digital and sustainability agenda. Grounded on the Anti-helix Mode 2 the course sets out via the personal, organizational development strategy to build the resilience of the participants.

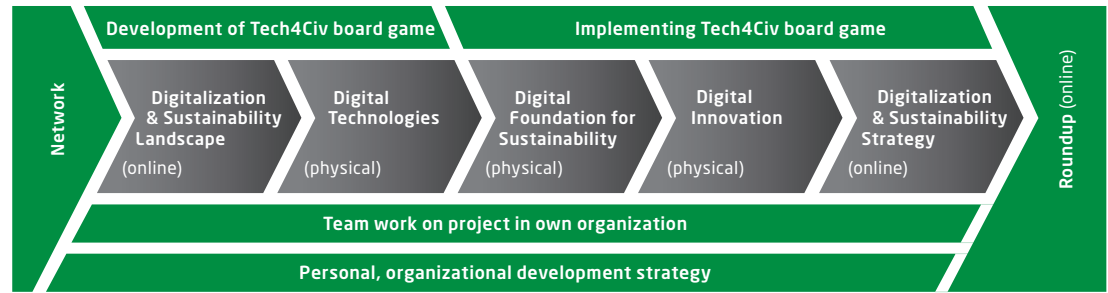
# Course outline: Methodology - Tech4Civ Anti-helix

## The Course outline

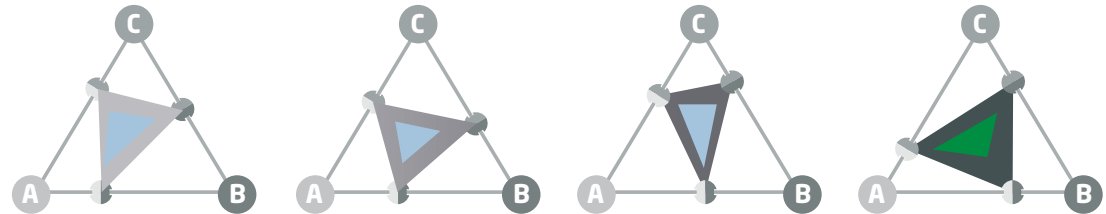
The competence development course aims to increase the participants' competencies in relation to:

- Creation of a common language in relation to the digital transformation and environmental, social and economic sustainable understandings.
- Building a digital sustainability mindset.
- Gaining knowledge of selected digital technologies, including understanding and being able to navigate the new digital technologies.
- Understanding and working with the UN sustainability goals as well as be able to navigate between them in relation to the Triple bottom line.
- Spotting potentials in relation to developing new business models and services on the basis of data and digital technologies as enablers for sustainable societies.
- Gaining knowledge of the broader eco-system and the elasticity and dynamics of the sectors in the Tech4Civ Anti-helix methodology.
- Building personal resilience to be able to handle the resistance to change in own organisation

Through the course the participants will explore the digital opportunities and solutions, be introduced to the broader eco-system as well as work with projects in own organization. Simultaneously the Tech4Civ technology and sustainability board game will be developed enabling the participants to bring back the learnings into own organization.



The Course "Data and digital technology as enablers for environmentally sustainable societies" will be a three-week training course in Denmark, requiring full-time attendance, with 3-4 preparatory online sessions. Follow up session after three months and six months. The course is the foundation for possible further specific supplement courses.



## Dynamic Anti-helix Toblerone

The "Toblerone" showcases the elasticity and flexibility of the different program weeks of the course. The design of each week has been and is grounded of a needs analysis by a strong collaboration with the Embassies of the four countries, the Danish Fellowship Center and the participants enabling a program to be developed giving a holistic introduction to the broader ecosystem and the context in which the learnings are to be implemented. Based on the Anti-helix Toblerone the course aims to provide a holistic approach working with data and digital technology as enablers for environmentally sustainable societies.

# Online digital program: Digitalization and Sustainability Landscape

Tuesday 20/06	Tuesday 11/07	Monday 17/07	Tuesday 18/07
<b>Welcome</b>	<b>Presentation of own organization and group formation</b>	<b>Tech4Civ board game</b>	<b>Tech4Civ board game</b>
<p><b>Welcome</b></p> <p>Capacity Development Advisor Simon Skårhøj, DFC PhD student &amp; Head of the Tech4Civ Section Anja Mie Weile, DTU Compute</p>	<p><b>Canvas presentation</b></p> <p>PhD Student Anja Mie Weile, DTU Compute &amp; Program Partner Josefine Steinfurth, DTU Compute</p>	<p><b>Group 3</b></p> <p><b>Feedback</b></p> <p>Group interviews to enable development of country specific Tech4Civ board game</p>	<p><b>Group 4</b></p> <p><b>Feedback</b></p> <p>Group interviews to enable development of country specific Tech4Civ board game</p>
<p><b>Methodology and course set-up</b></p> <p>PhD Student Anja Mie Weile, DTU Compute &amp; Professor Jan Madsen, DTU Compute</p>	<p><b>Project presentations from former participants</b></p> <p>Associate Professor José Antonio Fernández de Macado, Federal University of Cear &amp; Raquel Santos Moura Oliveira Department of Digital Public Services</p>	<p><b>Group 5</b></p> <p><b>Feedback</b></p> <p>Group interviews to enable development of country specific Tech4Civ board game</p>	<p><b>Group 6</b></p> <p><b>Feedback</b></p> <p>Group interviews to enable development of country specific Tech4Civ board game</p>
<p><b>Expectation talk and presentation of participants and their organization</b></p> <p>Head of the Tech4Civ Section and PhD Student Anja Mie Weile, DTU Compute &amp; Program Partner Josefine Steinfurth, DTU Compute &amp; Program Partner Cecilie Carstens, DTU Compute</p>	<p><b>Workshop: Working on own project</b></p> <p>Head of the Tech4Civ Section and PhD Student Anja Mie Weile, DTU Compute &amp; Program Partner Josefine Steinfurth, DTU Compute &amp; Program Partner Cecilie Carstens, DTU Compute</p>	<p><b>Group 7</b></p> <p><b>Feedback</b></p> <p>Group interviews to enable development of country specific Tech4Civ board game</p>	<p><b>Group 8</b></p> <p><b>Feedback</b></p> <p>Group interviews to enable development of country specific Tech4Civ board game</p>
		<p><b>Group 1</b></p> <p><b>Feedback</b></p> <p>Group interviews to enable development of country specific Tech4Civ board game</p>	<p><b>Group 2</b></p> <p><b>Feedback</b></p> <p>Group interviews to enable development of country specific Tech4Civ board game</p>



- Main theme for the day
- Plenum lecture and exercises
- Homework + groupwork

Applied Team Project: How can you support the innovation in own organization?

# Online digital program: Digitalization and Sustainability Landscape

Monday 14/08	Tuesday 15/08	Monday 24/08	Tuesday 29/08
<p><b>Data, Digital Technologies and Digitalization of public services in Denmark</b></p> <p>Digital technologies and sustainability in the Danish context Associate Professor Kristoffer Albris, Copenhagen University</p> <p><b>Local Government Denmark: Technology radar</b> Professor and Head of Department Jan Madsen, DTU Compute</p> <p><b>Workshop: Working on own project</b> PhD Student Anja Mie Weile, DTU Compute &amp; Program Partner Josefine Steinfurth, DTU Compute &amp; Program Partner Cecilie Carstens, DTU Compute</p>	<p><b>GovTech: utilizing eco-systems to drive a digital and sustainable future</b></p> <p>The future of GovTech Senior Vice President Carsten Orth, DTU</p> <p><b>GovTech in the Danish context</b> Senior Advisor Søren Nørgaard Madsen, Local Government Denmark KL</p> <p><b>Panel Talk: CivTech in the Scottish context</b> Civitech program &amp; CivTech Alliance Alexander Holt, Scottish Government &amp; PhD Student Anja Mie Weile, DTU Compute</p>	<p><b>The sustainability agenda - historically and currently in DK</b></p> <p>Data and data collaboration in the green transition in Denmark Chief Advisor Peter Knudsen, Agency for Data Supply and Infrastructure &amp; Advisor Caroline Wagner-Eckert, Agency for Data Supply and Infrastructure</p> <p><b>Personal, organizational development strategy</b> PhD Student Anja Mie Weile, DTU Compute &amp; Program Partner, Cecilie Carstens, DTU Compute</p>	<p><b>How to support the sustainability agenda</b></p> <p>Grasping the sustainability agenda through digital technologies Professor Michael Zwicky Hauschild, DTU Sustain &amp; Professor and Head of Department Jan Madsen, DTU Compute</p> <p><b>Building software for a more sustainable world</b> Head of climate and sustainability Morten Østergaard, cBrain</p> <p><b>Dark side of sustainability</b> Post doc Daniel Guzzo, DTU Construct</p>



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Applied Team Project: How can you support the innovation in own organization?

# In Denmark program: Digital Technologies



Monday 11/9	Tuesday 12/9	Wednesday 13/9	Thursday 14/9	Friday 15/9
<p><b>Setting the future - digital megatrends</b></p> <p>Welcome to DTU</p> <p><b>Digital thinking and digital megatrends</b> Professor and Head of Department Jan Madsen, DTU Compute</p> <p><b>New Business Models</b> Professor Jan Damsgaard, Copenhagen Business School</p> <p><b>Workshop: Working on own project</b></p> <p><b>Denmark and Digitalization Strategy</b> Chief Consultant Yih-Jeau Wang, Ministry of Digital Government and Gender Equality</p> <p><b>Tech4Civ board-game: Workshop</b> Head of the Tech4Civ Section and PhD Student Anja Mie Weile, DTU Compute &amp; Program Partner Josefine Steinfurth, DTU Compute</p>	<p><b>Data as grounds for decision making</b> (visit Statistics Denmark)</p> <p><b>Introduction to Statistics Denmark</b> Chief Advisor Jesper Ellemose Jensen, Statistics Denmark (DST)</p> <p><b>ICT Statistics</b> Chief Advisor Agnes Tassy, DST</p> <p><b>Administrative Data</b> Chief Advisor Jens Bjerre, DST</p> <p><b>Big Data</b> Chief Advisor Peter Ottosen, DST</p> <p><b>From weather merchant to data pusher</b> Head of Department Morten Thearup, Danish Meteorological Institute</p> <p><b>Wrap Up</b> Chief Advisor Jesper Ellemose Jensen, DST &amp; PhD Student Anja Mie Weile, DTU Compute</p>	<p><b>Working with data</b></p> <p><b>Deep tech dive: Machine Learning and big data</b> Professor Morten Mørup, DTU Compute</p> <p><b>Ensuring uniform grounds for data collection</b> Chief Architect and PhD Marius Hartmann, Danish agency for Digital Government</p> <p><b>What can 'you' do with data?</b> Professor Sune Lehmann, DTU Compute</p> <p><b>Workshop: Working on own project</b> PhD Student Emil Njor, DTU Compute &amp; PhD Student Mathias Gammelmark, DTU Compute &amp; PhD Student Kasper Skov Johansen, DTU Compute &amp; Post Doc Daniel Guzzo, DTU Construct</p>	<p><b>Interaction and Dynamics of Technologies</b> (visit Confederation of Danish Industry)</p> <p><b>Deep tech dive: Internet of Things (IoT)</b> Professor Paul Pop, DTU Compute</p> <p><b>Agricultural use of drones</b> Founder Per Valentin Lund, Scout Robotics</p> <p><b>Smart Cities</b> Senior Researcher Martin Brynskov, DTU Compute &amp; Chief Consultant Rasmus Sune Reeh, DTU Compute &amp; Senior Academic Officer Elisabeth Beck Knudsen, DTU Compute</p> <p><b>Workshop: Working on own project</b></p> <p><b>Pushing the digital and sustainability agenda</b> Chief Consultant Kirstine Finneman Arendal, Confederation of Danish Industry &amp; Political Chief Consultant Jacob Høffer Larsen, Confederation of Danish Industry</p>	<p><b>Ensuring transparency and working agile</b></p> <p><b>Deep Tech Dive: Blockchain</b> Professor Nicola Dragoni, DTU Compute</p> <p><b>Converging big data and securitization</b> CEO Darren Wolfberg, Blockchain Triangle</p> <p><b>Agile Working</b> Head of Service Design Lars Elmgreen, Copenhagen Municipality</p> <p><b>Workshop: the methodology of agile working in own context</b> Head of Service Design Lars Elmgreen, Copenhagen Municipality</p>



- Main theme for the day
- Plenum lecture and exercises
- Homework + groupwork

Applied Team Project: How can you support the innovation in own organization?

# In Denmark program: Digital foundation for sustainability

Monday 18/9	Tuesday 19/9	Wednesday 20/9	Thursday 21/9	Friday 22/9
<b>Digital processes and infrastructure</b>	<b>New Public Business Models</b>	<b>New sustainable business models</b> (visit DTU Skylab)	<b>Digital transformation for a sustainable and ethical future</b>	<b>Leading the digital sustainable future</b>
<b>Optimizing digital processes</b> Associate Partner Lise Frandsen, Devoteam & Senior consultant Kristoffer Byskov, Devoteam	<b>The Danish Tax Agency's Business Aim</b> Chief Consultant Frederik Magnus Dahl Petersen, The Danish Tax Agency	<b>Competencies of the future – Anti-helix Mode 1</b> PhD Anja Mie Weile, DTU Compute & Professor Jan Madsen, DTU Compute	<b>Digital Transformation and the future</b> Associate Professor Melissa Goodsite Beach, SDU & Professor Patricia Wolf, Department for Business and Management, SDU	<b>Transformation Through Responsive Conversation</b> Associate professor and PhD John McClellan, Aalborg University
<b>Reflection session</b> PhD Student Anja Mie Weile, DTU Compute	<b>Developing and Simplifying Digital Solutions</b> Product Owner Markus Mohr, The IT and De- velopment Agency & Senior Data Scientist and Tech Lead Violaine Michel Lange, The IT and Development Agency	<b>Putting the eco-system into play</b> CEO and co-found, Christina Hebert, Blue Lobster & CEO Rasmus Elsborg, Re-Flow	<b>Workshop: Digital Transformation and the future</b> Associate Professor Melissa Goodsite Beach, SDU & Professor Patricia Wolf, Department for Business and Management, SDU	<b>Data ethics</b> Assistant Professor Kristoffer Albris, University of Copenhagen
<b>Driving Data-Driven Business Development in the Green Transition of our Energy System</b> Business Developer, Christian Adelhardt, DataHub, Energinet	<b>Cross-Collaboration between Organizations</b> Agile Coach, PhD Ann Fugl-Meyer, The Capital Region of Denmark	<b>Co-creating green solutions and the role of blended financing</b> Professor Jacob Torfing, RUC	<b>Securing investment for driving green digital business</b> CEO and Operating Partner Nima Sophia Tisdall, Nordic Makers	<b>What does the technology development demand of leadership</b> PhD Student Anja Mie Weile, DTU Compute & Professor Jan Madsen, DTU Compute
<b>Readiness and infrastructure</b> CEO Kristian Vengsgaard, KOMBIT	<b>Workshop: Driving Digital Transformation in Cross-Collaboration</b> Agile Coach, PhD Ann Fugl-Meyer, The Capital Region of Denmark	<b>Workshop: Working on own project</b>	<b>Digital Ethics Compass</b> CEO and PhD Christian Bason, Danish Design Center	<b>How to deal with complexity in leadership and to exhibit responsible leadership</b> Director Vilhelm Stefan Holsting, Royal Danish Defense College
		<b>Exploring the entrepreneurial space</b> Innovation Manager Camilla Nørgaard, DTU Skylab & Innovation Manager Christian Dalsgaard Nielsen, DTU Skylab	<b>Deep Tech Dive: AI</b> Associate Professor Nina Gierasimczuk, DTU Compute	<b>Leading with data</b> Data & Analytics Manager Mie Madvig Svane, Lantmännen Unibake



- Main theme for the day
- Plenum lecture and exercises
- Homework + groupwork

Applied Team Project: How can you support the innovation in own organization?

# In Denmark program: Digital Innovation



Monday 25/9	Tuesday 26/9	Wednesday 27/9	Thursday 28/9	Friday 29/9
<p><b>Digital sustainable mindset</b></p> <p><b>Panel talk: Ensuring sustainability through innovation, entre- and intrapreneurship</b> Professor and Head of Department Jan Madsen, DTU Compute &amp; CEO, Look Up Venture &amp; Adjunct Professor, DTU Tommy Ahlers</p> <p><b>Personal, organizational development strategy</b> PhD Student Anja Mie Weile, DTU Compute &amp; Program Partner Cecilie Carstens, DTU Compute</p> <p><b>How people are the key to digital transformation</b> Professor Gerald C. Kane, University of Georgia</p>	<p><b>Green Transition</b> (visit Niras)</p> <p><b>Deep tech dive: Green Transition</b> Professor Henrik Madsen, DTU Compute</p> <p><b>Greenition - a strategic NIRAS investment and application focus</b> Power Engineer Mads Theill Jørgensen, NIRAS</p> <p><b>How to embrace data science and digitalization in sustainable growth of society</b> Head of Department Torben Kirk Wolf, NIRAS</p> <p><b>How can satellite data improve our sustainability efforts</b> Geospatial Consultant Ana Fernandez, NIRAS</p> <p><b>A holistic approach to land management and energy landscapes</b> Advisor Johannes Malte Schwaab, NIRAS &amp; Senior Geospatial Consultant Søren Zebitz, NIRAS</p> <p><b>Absolute sustainability: When is it good enough?</b> Industrial engineer Mia Heide, NIRAS &amp; DTU</p>	<p><b>Digital dilemmas and digital transformation</b></p> <p><b>Dark side of digitalization</b> Professor Nicola Dragoni, DTU Compute</p> <p><b>Fairness in AI</b> Professor Aasa Feragen, DTU Compute</p> <p><b>Digital Strategy and Digital Transformation including workshop</b> Professor Jan Pries Heje Roskilde University</p>	<p><b>Continuous innovation with Digitalization</b> (visit DOLL)</p> <p><b>Furthering the environmental agenda with digitalization including workshop</b> Associate Professor and PhD James Maguire, IT university of Copenhagen</p> <p><b>Creating New Businesses</b> Associate Professor, RUC and Co-founder, GoMore, Søren Riis</p> <p><b>Intro to DOLL</b> Innovation Manager, Ben Cahill, DOLL Living Lab Partner Presentations: Intelligent Traffic Control, IoT and Environmental Sensing Large-Scale Digital Twinning, European standards in Smart City Technology Outdoor trip</p>	<p><b>Digital and sustainability everywhere</b> (Comwell Holte)</p> <p><b>Presentation of the Tech4Civ board game</b> Head of the Tech4Civ Section and PhD Student Anja Mie Weile &amp; Head of Department Jan Madsen, DTU Compute &amp; Program Partner Josefine Steinfurth</p> <p><b>Project Grand Prix</b> Group pitches of project in own organization</p> <p><b>Reception :)</b></p>



- Main theme for the day
- Plenum lecture and exercises
- Homework + groupwork

Applied Team Project: How can you support the innovation in own organization?

# Online digital program: Roundup

January 2024

Online  
follow up 1

**Driving the digital agenda from inside out - Antihelix Mode 2**

PhD Anja Mie Weile, DTU Compute & Professor Jan Madsen, DTU Compute

**Personal, organizational development strategy**

Head of the Tech4Civ Section & PhD Student Anja Mie Weile, DTU Compute & Program Partner Cecilie Carstens, DTU Compute

**Tech4Civ board game**

PhD student Anja Mie Weile, DTU Compute & Program Partner Josefine Steinfurth, DTU Compute

March 2024

Online  
follow up 2

**Digital Transformation and the future - follow up**

Associate Professor Melissa Goodsite Beach, SDU & Professor Patricia Wolf, Department for Business and Management, SDU

**Projects in own organization**

Head of the Tech4Civ Section & PhD Student Anja Mie Weile, DTU Compute

**Environmental and social sustainability challenges (TBD)**

April 2024

Online  
follow up 3

**Personal, organizational development strategy**

Head of the Tech4Civ Section & PhD Student Anja Mie Weile, DTU Compute & Program Partner Cecilie Carstens, DTU Compute

**Quantum Technology (TBD)**

**Round up**

Head of the Tech4Civ Section & PhD Student Anja Mie Weile, DTU Compute & Head of Department and Professor Jan Madsen, DTU Compute







## Primary learning elements – online course sessions

### Learning by seeing

(Exposure visits)

- During the online course there will be presentations held by governmental institutions working with digital technologies as well as sustainable solutions sharing best practices and lessons learned.
- Further leading international researchers and specialists within the area of digital transformation and sustainability will share the newest research in the area as well as casestudies.

### Learning by doing/applying

(Project work)

- During the online course, the participants will be introduced to hands-on experience with the technology where applicable, (eg. ML: "A Neural Network Playground").
- Between the online sessions the participants will in teams work on a project in own organization.

### Learning by example (Peer learning)

- Peer learning via project work sharing challenges and possibilities in own organization.

- Learning from Danish authorities – cases to be shared

### Translating learning into action (Action Plan)

- Development of Tech4Civ board game to be used in own organization – transferring learnings from the course into own organizations
- Project work in own organization – Learning to spot potentials as well as explain benefits clearly.
- Developing a personal and organizational strategy - building resilience

### Passing on learning

- Playing the Tech4Civ board game transferring learning from the course into own organisation building a shared language within digital technologies, sustainability and transformation applying organisational learning principles.
- Project work enabling incorporating learning into own organization – institutionalizing new working practices.



## Primary learning elements – course sessions in Denmark

### Learning by seeing (Exposure visits)

- During the onsite course, there will be presentations of cases from relevant governmental institutions as well as start-up companies from all over the world working with digital transformation and sustainable innovation.
- Customized site visits to relevant institutions, innovation labs and companies
- Additionally, practitioners are invited to present cases and solutions

### Learning by doing/applying

(Project work)

- Action learning approach. All groups work with own projects of high relevance during the course period, and learning cases will relate to projects and practices.
- Focus on applied technology as grounds for sustainability solutions
- Lectures will to a large extent include exercises, models and tools.

### Learning by example (Peer learning)

- Peer learning facilitated via team work, break-out sessions, plenary discussions and presentations

- Invitation to case and practice comparison during course period and presentations.

### Translating learning into action (Action Plan)

- All learning is designed to be reflectively related to own projects, contexts and sustainable challenges.
- Personal, organizational development strategy will be developed ensuring a focus on applied learning and execution capacity going forward. There will be a follow up on the plan in an online session after 6 months
- With the Tech4Civ board game there is a strict focus on bringing learnings into real action.

### Passing on learning

- All learning material will be shared with the participants to ensure a personal knowledge library enabling knowledge transfer
- Tech4Civ boardgame to be used in own organization as a continuous socially shareable learning tool

# Country-specific Tech4Civ Technology and Sustainable board game

The Tech4Civ technology and sustainable board game is co-developed with the participants to create innovation and organizational learning in the participants' own organizations, hereunder to identify projects in own organization.

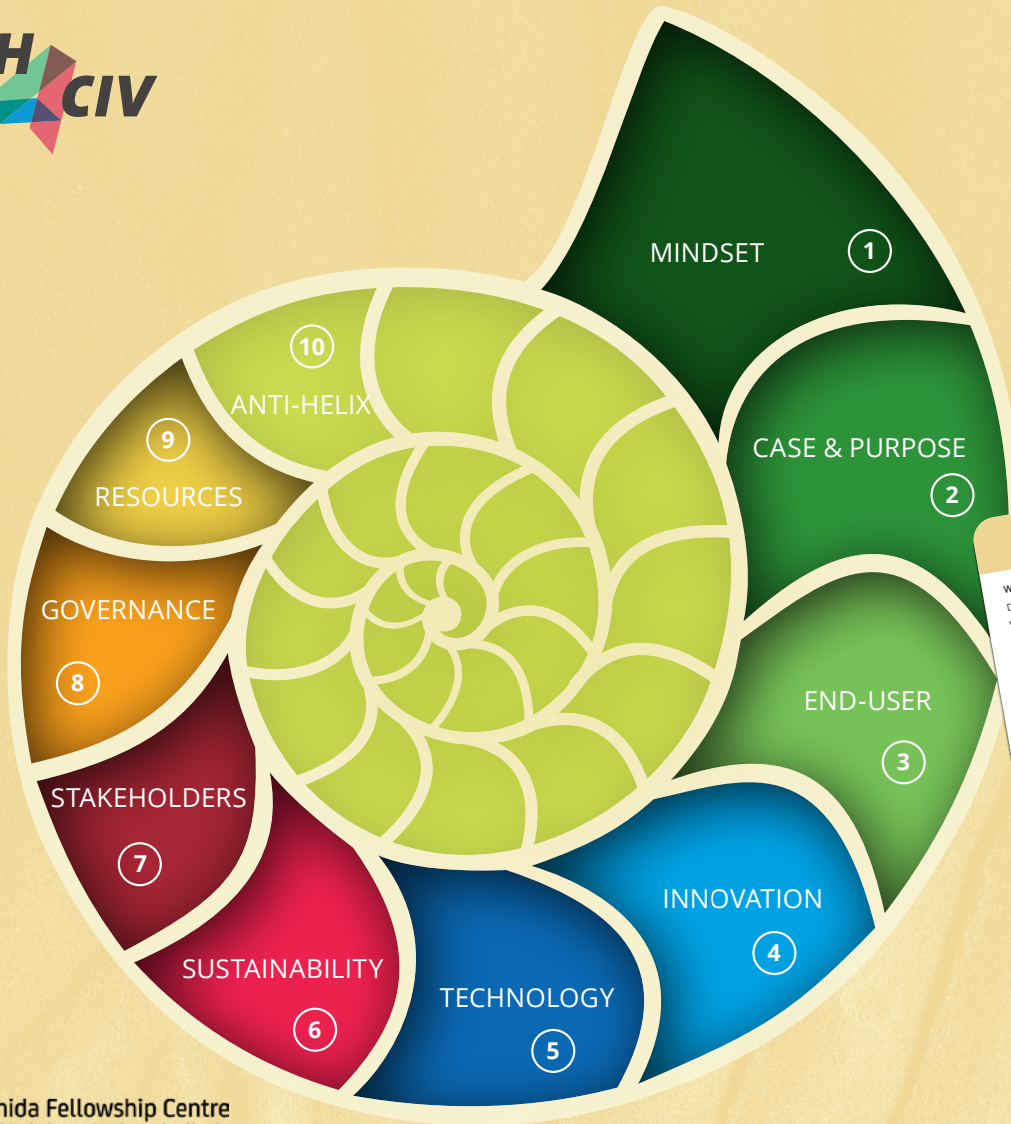
PROCESS:	Development of Tech4Civ board game				Implementation of Tech4Civ board game		
SESSION:	Knowledge and development with participants	Tech4Civ develops the game further	Country wise feedback	Tech4Civ develops the game further	Presentation of prototype	Testing in own organization	Workshop and physical game in DK
TIME & DATE:	17th and 18th July 1 hour session pr. group		27th and 28th July 45 min. session with representatives from each country	10th - 16th August Individual feedback on the cards	21th & 22 th August 45 min. country wise sessions (all participants present)	28th August - 8th of September	11th - 30th September

## The Tech4Civ board game is a learning tool enabling:

- Knowledge transferability: Possibility for bringing learning back into own organization in own country
- A neutral ground for digital and sustainability discussions in a fun and open space enabling the needed and sometimes difficult discussions that follow in driving transformation in organizations

## Tech4Civ board game will:

- Create a digital sustainability mindset by understanding and identifying relevant digital technologies, sustainable understanding, stakeholders and resources for developing digital & sustainable solutions and new services
- Enable structured discussions on relevance of technologies as the mean to promote environmental sustainability in the local contexts and institutions the participants work in
- Build a shared language for working with digital & sustainable transformation and innovation in own organization



# Group project in own organization – Project Grand Prix

Early in the program groups will be formed and the participants will be invited to work in groups with a chosen project from one of their own organizations on how to support innovation, digital transformation and sustainability utilizing the methodology and learnings from the course.

## Working with the project

While working with the projects the participants will put the knowledge and learnings from the course into play enabling new services and products to be developed. Through the course there will be project workshops, where the participants will

have time to work on their projects as well as get sparring and support from facilitators and researchers ensuring a holistic approach including both the digital technologies, sustainability, organizational perspectives as well as policy and governance perspectives in the projects. While working with the project the participants will use a supportive project-canvas, that will ensure a structured learning and development process around the projects.

## Project grand prix

On the final day of the physical competence development course the participants will in groups present a short video/talk on their projects as part of a project grand prix. Guests from home organizations as well as relevant stakeholders will be invited to watch the presentations.

The groups will receive feedback from a panel of experts. Further the participants will select the winners within the following areas:

- Most innovative project
- Most progressed project
- Most impactful project
- Most inclusive project

The project grand prix will be followed by an open reception celebrating the great ideas and projects created through the course as well as enable further discussions on how to develop new services and products to the benefit of the people of Brazil, Ghana, Kenya and South Africa.

## The process of working with projects in own organization

With the projects in own organization the aim of the process is to create concrete cases that the participants can bring back into their own organizations as well as sharing best practices and methodologies that can be implemented in own organizations creating not only a momentum but also a structural change, that will support further innovation in Brazil, Ghana, Kenya and South Africa using data and digital technology as enablers for environmentally sustainable societies.

## Logistical note

The course "Data and digital technology as enablers for environmentally sustainable societies" is scheduled to take place both online and in-person in Denmark.

The first seven sessions, planned on 20th June, 11th of July, 17th of July, 18th of July, 14th of August, 15th of August, 24th of August and 29th of August. will be held online via Zoom in the time interval 14:00-17:00 Copenhagen time.

Development of the Tech4Civ board game is taking place in the period 17th of July to 22nd of August. Testing in own organization will take place from the 28th of August to 8th of September. Final development of the Tech4Civ board game takes place from the 11th to 30th of September. The final board game is presented at the farewell reception.

From 11 September to 29 September, the course will take place physically in Denmark.

The Danish Fellowship Center will cover the full tuition fee, daily allowances, accommodation, international travel and insurance. All administrative aspects will be handled by the Danish Fellowship Center. Before start of the physical course in Denmark, administrative personnel will contact each selected candidate individually to facilitate travel arrangements and be ready to answer any logistical or administrative questions.

3 online follow up sessions will be held in spring 2024.

## Overview of key speakers on the course



**Anja Mie Weile**, Co-Founder of Tech4Civ, Head of Tech4Civ Section and PhD-student, DTU Compute. Mie has extensive experience working in the field of HR. Furthermore, Mie has strong knowledge and experience developing digital competency courses on executive, leader and employee level in both ministries and private companies. Mies's research is within the area of how competence development can ensure democratization of technologies and drive innovation. Mie is co-founder of the Anti-helix methodology. Mie is a well sought speaker within GovTech, competencies for the future and the role of academia in the digital transformation.



**Jan Madsen**, Co-Founder of Tech4Civ, Professor, Head of Department at DTU Compute. Jan is one of the most sought after speakers in Denmark regarding digitalization. Jan is co-founder of the Anti-helix methodology. Jan is an international leading researcher in embedded computer systems (including IoT), and has in the latter years been interested in the intersection between biology and computer science. He has great insight into digital trends, is a national expert in ICT, member of ATV and has e.g. helped shape the EU's ECSEL program.



**Nicola Dragoni**, Professor in Secure Pervasive Computing at DTU Compute, where he also serves as Deputy Director and Head of Section (Cybersecurity Engineering). His main research interests centre around pervasive computing and cybersecurity, with latest focus on Internet-of-Things and Fog/Edge computing. He has co-authored around 150 peer-reviewed scientific papers in international journals and conference proceedings. He has edited 3 journal special issues and 1 book. He has been active in several national and international projects. He is a well-recognized speaker, with several invited speeches at international conferences and business events.



**Henrik Madsen** is a Professor in Mathematical Statistics at DTU Compute. Furthermore, he is Professor II at NTNU in Trondheim. He has published more than 500 papers and 12 books. He has got several awards. Lately, in June 2016, he was appointed Knight of the Order of Dannebrog by Her Majesty the Queen of Denmark, and he was appointed Doctor HC at Lund University in June 2017. He is heading a National Strategic Research Centre entitled: Centre for IT-Intelligent Energy Systems (CITIES). This centre aims at being a leading research centre related to Smart Cities and data-driven methods for the green transition.

## Overview of key speakers on the course



**Paul Pop**, Professor, DTU Compute. Paul's research is focused on developing methods and tools for the analysis and optimization of networked dependable cyber-physical IoT systems. In this area, he has published over 150 peer-reviewed papers and three books. His work has received six "best paper awards". He is the coordinator of the Nordic University Hub on Industrial IoT, has coordinated the European Training Network on Fog Computing for Robotics and Industrial Automation. He is teaching IoT related courses at DTU and giving tutorials at conferences.



**Nina Gierasimczuk**, Associate Professor in Logic at the Department of Applied Mathematics and Computer Science, Technical University of Denmark. Her main research interests lie in symbolic Artificial Intelligence: the logical aspects of learning in both single- and multi-agent context, and involve computational learning theory, modal logic, and computability theory. Her current projects focus on learning action models, dynamic knowledge representation, and multi-agent systems. She is also interested in the coordination mechanisms involved in natural language evolution, and in the role of logic in cognitive science and visual arts.



**Vilhelm Stefan Holsting**, Commander Senior Grade (Navy), Director Institute of Leadership and Organization at the Royal Danish Defense College. PhD from Copenhagen Business School and MA of Adult Education, Aarhus University. Vilhelm is an experienced executive coach, author and facilitator of CEO development programs with 33 years of professional experience combined with comprehensive knowledge of Senior Officership, Management Development, Organizational Learning, Public Management and Professional Development. Vilhelm will lecture about leadership as a cultural enabler of technological development.



**Jan Damsgaard**, Professor, Department of Digitalization, Copenhagen Business School. The Danish Academy of Technical Sciences has appointed Jan to designated national Digital Advisor. Jan holds a Ph.D. in Information Systems and a Master's degree in Computer Science and Psychology. His research focuses on the digital transformation of businesses and the society and associated technologies such as IoT, blockchain and AI. Jan has worked and done research at several institutions in the USA, China, Finland and Australia. Jan also consults on digital innovation and business transformation.



**Ann Fugl-Meyer**, PhD and Agile Coach. Ann is an interdisciplinary practitioner and a researcher. She is a professional with a multi-faceted background, holding a PhD from Copenhagen Business School, an MSc in Civil Engineering from DTU, and an MSc in Management from the University of Aberdeen. Her career spans long-term international experiences in Denmark, Qatar and Scotland, fostering a deep understanding of interdisciplinary collaboration and cross-cultural dynamics. Ann's research centres on the organisational dynamics of digital transformations, focusing on organizational change. She is passionate about understanding how new technologies and digital work practices fundamentally transform organisations and their collaborative networks.

# The Technical University of Denmark (DTU)



Founded in 1829 by Hans Christian Ørsted, DTU is an international elite technical university whose social value creation and activities in **education**, **scientific advice**, and **innovation** rest on a solid foundation of world-class research.

**DTU's mission** is to develop and create value through the technical and natural sciences for the benefit of society.

DTU has been ranked second in the new World University Research Rankings 2020 after the American top university Massachusetts Institute of Technology (MIT) and number one in Europe in research being applied for the benefit of society. DTU scores particularly high in the categories multidisciplinary and collaborativeness.

DTU develops technology for people. With our international elite research and study programs, we are helping to create a better world and to solve the global challenges formulated in the UN's 17 Sustainable Development Goals.

## DTU Compute

Department of Applied Mathematics and Computer Science (DTU Compute) is an internationally unique academic environment spanning the scientific disciplines of mathematics, data science, and computer science and engineering. At the same time, DTU Compute is an engineering department with a strong focus of applying our research results and insights, to advance relevant industries and to create a better society. DTU Compute has a long-established tradition of advancing our disciplines together by exploring their synergies as well as their fundamental role in all engineering disciplines, and is hence, uniquely positioned to take leadership in the digital transformation of our society. DTU Compute strive to drive democratization of technologies and empower people to take active part in how our society should be transformed.



# Contact and Course program leader

## Program leader, Tech4Civ

Head of the Tech4Civ Section and PhD Student Anja Mie Weile, DTU Compute  
Mobile: +45 22859496, miewe@dtu.dk

## Program partners, Tech4Civ

Josefine Steinfurth, Tech4Civ, DTU Compute      Cecilie Carstens, Tech4Civ, DTU Compute  
+45 61396264, josst@dtu.dk                              Mobile: +45 93518897, celca@dtu.dk

## Course responsible

Capacity Development Advisor Simon Skårhøj, Danida Fellowship Centre

## Support team

Economy and contracts:

Teamleader Economy Kristina Holdgaard-Sørensen

Head of Administration Susanne Plougheld Rasmussen

## Course design

Head of the Tech4Civ Section and PhD Student Anja Mie Weile, DTU Compute

Professor and Head of Department Jan Madsen, DTU Compute

Program Partner Josefine Steinfurth, Tech4Civ, DTU Compute

Program Partner Cecilie Carstens, Tech4Civ, DTU Compute

Capacity Development Advisor Simon Skårhøj, Danida Fellowship Centre

Sector Counsellor Terkel Hallberg Borg, Embassy of Denmark in Brazil

Senior Project Coordinator Harrison Ofori, Embassy of Denmark in Ghana

Sector Advisor Kim Sarup, Embassey of Denmark Ghana

Sector Advisor Kristoffer Rønde Møller, Embassy of Denmark in South Africa

Sector Advisor Morten Holm van Donk, Embassy of Denmark in South Africa

Sector Advisor Thomas Emil Jensen, Embassy of Denmark in Kenya

## Tech4Civ Board game

Head of the Tech4Civ Section and PhD Student Anja Mie Weile, DTU Compute

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## Personal, organizational development strategy

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