The Department of Information Security and Communications Technology has a vacancy for a

**PhD position in "Cyber-Security for Critical Infrastructures Digital Twins"**

**This is NTNU**
At NTNU, creating knowledge for a better world is the vision that unites our 9 000 employees and 42 000 students.
We are looking for dedicated employees to join us.
You will find more information about working at NTNU and the application process [here](https://www.ntnu.no/en).

Video: [https://www.youtube.com/watch?v=clqKd1SwGLI](https://www.youtube.com/watch?v=clqKd1SwGLI)

**About the position**
At the Department of Information Security and Communications Technology we have a vacancy for a PhD candidate in "Cyber-Security for Critical Infrastructures Digital Twins".

Digital twins have evolved from passive monitoring and state estimation systems to integrated sociotechnical mechanisms that are essential for strategic modeling and planning, as well as operational real-time monitoring and control of cyber-physical systems. In order to support these functionalities, the operation of digital twins relies heavily on maintaining fidelity and synchronization with the production systems to which they are targeted. This is particularly important in safety-critical systems, from power station generators to manufacturing systems or production facilities in the oil and gas industry.

The position's working place is NTNU campus in Gjøvik.
You will report to the Head of the Department.

**Duties of the position**
The PhD candidate will work on challenging research problems related to developing digital twin demonstrators, and mechanisms that allow the monitoring and protection of such digital twin configurations targeted towards safety-critical cyber-physical systems. The primary objective of this work is to develop digital twin demonstrations of sufficient fidelity and ability to support realistic scenarios within selected sectors, such as manufacturing, energy, and smart cities.

Consequently, the candidate will utilise this capability to study data flows, state synchronisation, and broadly binding processes between production systems and the corresponding digital twins. This will allow to assess risks and attack methods towards the selected production systems, the digital twin configurations, and the bindings between the two.

This will form the basis not only for the development of detection and mitigation mechanisms for attacks targeted towards the monitoring and control processes, but also for training of incident handling and analysis.

The position is part of SFI NORCICS, the new 8-year research-based innovation Norwegian Center for Cybersecurity in Critical Sectors. These sectors include electricity production and distribution, oil & gas production and distribution, manufacturing, healthcare, industrial production, financial services, transportation, smart districts. NORCICS follows a holistic, comprehensive and systemic approach addressing people, processes and technology to protect critical sectors throughout the cybersecurity core functions (identify, protect, detect, respond, recover). NORCICS has partners from academia, research, the public sector and the industry.

There are several PhD positions announced within the context of NORCICS. You are encouraged to apply for all positions that fit your background and interests.

We open up for an Integrated PhD-study. Please see link for more information on integrated PhD and the requirements: [Integrated PhD](https://www.ntnu.no/en). Master students must be admitted to a master study at the Faculty of Information Technology and Electrical Engineering.

**Required selection criteria**
The PhD-position's main objective is to qualify for work in research positions. The qualification requirement is that you have completed a master's degree or second degree (equivalent to 120 credits) with a strong academic background in Information Security, electrical engineering, electronic engineering and/or computer science or equivalent education with a grade of B or better in terms of NTNU's grading scale. If you do not have letter grades from previous studies, you must have an equally good academic foundation. If you are unable to meet these criteria you may be considered only if you can document that you are particularly suitable for education leading to a PhD degree.
Preferred selection criteria
- Experience with developing testing and simulation platforms for cyber physical systems.
- Background in information/cyber security.
- Experience with risk and threat modeling.
- Strong motivation for high quality research.
- Programming and modeling skills in relevant tools (e.g. MATLAB, LabView) (As relevant to the position).
- Research background within at least one of the aforementioned fields.
- Excellent communication skills.
- Completeness of application.

Personal characteristics
- Be scientifically curious and open to new research challenges.
- Demonstrate independence and persistence in addressing technical problems.
- Be flexible and reliable, with ability to work effectively independently and as part of a team.

We offer
- exciting and stimulating tasks in a strong international academic environment
- an open and inclusive work environment with dedicated colleagues
- favourable terms in the Norwegian Public Service Pension Fund
- employee benefits

Salary and conditions
PhD candidates are remunerated in code 1017, and are normally remunerated at gross from NOK 507 400 per annum before tax, depending on qualifications and seniority. From the salary, 2% is deducted as a contribution to the Norwegian Public Service Pension Fund.

The period of employment is 3 years.

Appointment to a PhD position requires that you are admitted to the PhD programme in Information Security and Communication Technology within three months of employment, and that you participate in an organized PhD programme during the employment period.

The research within NORCICS is on the cybersecurity of critical sectors, that include critical infrastructures, and is to be performed in close collaboration with industry, including operators of critical infrastructures. As such, it is expected that persons engaged with this kind of research will, directly or indirectly, become involved with knowledge and technology of an inherently sensitive, from a cybersecurity perspective, nature. The engagement is to be made in accordance with the regulations in force concerning State Employees and Civil Servants, and the acts relating to Control of the Export of Strategic Goods, Services and Technology. Candidates who by assessment of the application and attachment are seen to conflict with the criteria in the latter law will be prohibited from recruitment to NTNU.

After the appointment you must assume that there may be changes in the area of work.

The position is subject to external funding.

It is a prerequisite you can be present at and accessible to the institution on a daily basis.

About the application
The application and supporting documentation to be used as the basis for the assessment must be in English.

Publications and other scientific work must follow the application. Please note that applications are only evaluated based on the information available on the application deadline. You should ensure that your application shows clearly how your skills and experience meet the criteria which are set out above.

The application must include:
- A short and directed cover letter (in English or Norwegian) identifying:
  - Your motivation for a PhD study.
  - Your understanding and thoughts of topics of the position.
  - Why you are suited for the position (elaborating on the aforementioned required and preferred criteria).
- CV, certificates and diplomas that verify the aforementioned selection criteria (both required and preferred).
- Academic works - published or unpublished - that you would like to be considered in the assessment (up to 5 works - if available).
- Name and address of three referees.

Joint works will be considered. If it is difficult to identify your contribution to joint works, you must attach a brief description of your participation.

In the evaluation of which candidate is best qualified, emphasis will be placed on education, experience and personal suitability. Academic results, publications, relevant specialisation, work or research experience, personal qualifications and motivation will be considered when evaluating the applicants.

NTNU is committed to following evaluation criteria for research quality according to The San Francisco Declaration on Research Assessment - DORA.
General information

Working at NTNU

A good work environment is characterized by diversity. We encourage qualified candidates to apply, regardless of their gender, functional capacity or cultural background.

The city of Gjøvik has a population of 30 000 and is a town known for its rich music and cultural life. The beautiful nature surrounding the city is ideal for an active outdoor life! The Norwegian welfare state, including healthcare, schools, kindergartens and overall equality, is probably the best of its kind in the world.

As an employee at NTNU, you must at all times adhere to the changes that the development in the subject entails and the organizational changes that are adopted.

In accordance with The Public Information Act (Offentleglova), your name, age, position and municipality may be made public even if you have requested not to have your name entered on the list of applicants.

If you have any questions about the position, please contact Associate Professor Vasileios Gkioulos, telephone (0047)61135162, email vasileios.gkioulos@ntnu.no. If you have any questions about the recruitment process, please contact Stine Terese Ruen Nymoen, e-mail: stine.t.r.nymoen@ntnu.no.

Please submit your application electronically via jobbnorge.no with your CV, diplomas and certificates. Applications submitted elsewhere will not be considered. Diploma Supplement is required to attach for European Master Diplomas outside Norway. Chinese applicants are required to provide confirmation of Master Diploma from China Credentials Verification (CHSI).

If you are invited for interview you must include certified copies of transcripts and reference letters. Please refer to the application number 2020/44823 when applying.

Application deadline: 31.07.2021

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The Norwegian University of Science and Technology (NTNU) creates knowledge for a better world and solutions that can change everyday life.

Department of Information Security and Communication Technology

Research is vital to the security of our society. We teach and conduct research in cyber security, information security, communications networks and networked services. Our areas of expertise include biometrics, cyber defence, cryptography, digital forensics, security in e-health and welfare technology, intelligent transportation systems and malware. The Department of Information Security and Communication Technology is one of seven departments in the Faculty of Information Technology and Electrical Engineering.

Jobbnorge-ID: 207456, Søknadsfrist: Søknadsfristen er gått ut