

**Jobbnorge ID:** 283185  
**Deadline:** 9/8/2025  
**Website:** <https://www.usn.no/>  
**Scope:** Fulltime  
**Duration:** Temporary

The Faculty of Technology, Natural Sciences and Maritime Sciences have a vacancy for a position as

## **PhD Research Fellow in “Integration of carbon nanotubes (CNTs) in microelectronics”**

### **About the position**

The Faculty of Technology, Natural Sciences and Maritime Sciences has a vacancy for a 100% position as PhD Research Fellow in the Department of Microsystems from 01.12.2025.

The position is located at the Department of Microsystems and reports to the Head of Department. The place of employment is Raveien 215, Borre, Norway at Campus Vestfold.

The employment period will be three years of full time with no teaching obligations, and there is a premise for employment that the PhD Research Fellow is enrolled in USN's PhD-program in within three months of accession in the position.

### **About the PhD-project**

Carbon nanotubes (CNTs) are one of the most interesting nanomaterials due to their remarkable material properties. The direct integration of such nanomaterials in microelectronic chips / CMOS can enable fabrication of compact, wireless, power-efficient, low-cost smart sensors (e.g., gas and pressure). In this integrated system, CNTs serve as the sensing elements, while necessary signal processing can be performed directly on-chip by the CMOS circuitry. The ultra-sensitive CNT-based sensors can be utilized in various applications including monitoring indoor and outdoor air quality for health and environmental concerns, perishable food detection to reduce food waste, breath analysis in medical diagnosis, detecting pesticides and pathogens in agricultural production. In this part of the research, the goal is to optimize local CNT growth conditions at low temperature using different catalyst materials, while ensuring high growth density, optimal CNT length, limited defects, and compatibility with large-scale wafer-level manufacturing.

The project also explores the development of CNT-based field effect transistors (CNTFET) for ternary computing. Semiconducting CNTs are ideal for transistor channels due to their material properties and 1-D structure. With the continuous need of improving transistor performance, CNTFET technology offer a multi-generational leap in performance and power efficiency. They also enable optimization of digital systems through multi-valued logic (MVL) design. With binary transistors nearing scaling limits, higher radix alternatives like ternary offer increased information density. Three-valued signals are gaining traction with recent industry standard adoptions (USB 4.2, I3C and GDDR7). In the CNTFET application, this project aims to realize ternary logic circuits by selectively depositing semiconducting CNTs of different diameters to tune transistor threshold voltages for MVL design. This research holds strong potential for significant scientific contributions and breakthrough advances in IC fabrication and digital system design.

### **Qualifications**

Eligibility Requirements:

- A Master's degree (120 ECTS) or equivalent higher education qualifications in Micro/Nanoelectronics, Electronic/Electrical Engineering, Nanotechnology, Materials Science and Engineering, Microsensors or related fields.
- The applicant must have gained the degree within the start date of the position, so applicants in the last semester of their master's degree are also encouraged to apply.
- Strong background in electronics and / or material science.
- Excellent in written and spoken English, with documented proficiency.

Ideal Candidate:

- Hands-on experience in cleanroom environment for microfabrication or comprehensive knowledge of microfabrication fundamentals.
- Experience with CMOS chip design, or proficiency in relevant EDA tools such as Cadence Virtuoso, Tanner EDA, L-Edit.
- Experience in Multiphysics modelling and simulation with COMSOL or ANSYS.
- Documented software skills in MATLAB and LabVIEW.
- Relevant master's thesis or major projects aligned with the PhD project.

\* The applicant should document which of the qualifications above he/she possesses.

It is a requirement that the successful applicant is granted admission to the university's doctoral programme in technology within three months of accession in the position. For admission to the Programme the weighted average grade is B or higher is usually required.

The candidate must have the ability to work independently and at the same time have the motivation to share knowledge and take part in teamwork. Personal suitability for the post will be emphasised.

Co-operation between staff members is an integrated part of the working atmosphere at the University of South-Eastern Norway. The candidate must be motivated and demonstrate a proven ability to work effectively within a team and in a collegiate manner to formulate and realize common objectives.

Personal characteristics:

- Strongly motivated and ambitious.
- Be structured, targeted and solution oriented.
- The successful candidate should be creative and actively contribute to the team he/she will be part of.
- Have good dissemination skills.
- Personal skills like a positive and friendly attitude and contributing to a sustainable social environment, will also be valued.

### Documentation of skills in English language

Strong communication skills in English language skills are required for participation in the doctoral program. International applicants must document this with a valid certificate from one of the following tests:

- TOEFL - Test of English as a Foreign Language, Internet-Based Test (IBT). Minimum result: 90
- IELTS - International English Language Testing Service. Minimum result: 6.5
- Certificate in Advanced English (CAE) eller Certificate of Proficiency in English (CPE) from Cambridge University
- PTE Academic - Pearson Test of English Academic. Minimum result: 62

The following applicants are exempt from the above requirements:

- applicants with one year of completed university studies in Australia, Canada, Ireland, New Zealand, the United Kingdom, the United States
- applicants with a completed master's degree with English as the language of instruction in an EU/EEA country

### We offer

- A stimulating and growing research environment, with good opportunities to develop your career and your academic skills
- A good social environment
- Attractive welfare benefits in the [State Pension Plan](#)
- Opportunity for physical activities within working hours

### Salary

PhD Research Fellow (code 1017): NOK 550 800 a year. Further promotion will be based on time served in the position. In special cases, employment in code 1378 (NOK 546 569 - 685 728 a year) may be considered

A statutory contribution to the state pension plan will be deducted from the employee's salary.

### Other information

The Academic Appointments Board for PhD Research Fellowships is responsible for the appointment. An expert assessment of applicants will be carried out. The candidates deemed best qualified will be invited to an interview.

The person appointed must comply with the laws, regulations and agreements that apply at any given time to the post. Please note that approved work permit is a prerequisite for the employment.

According to its human resources policy, the University of South-Eastern Norway targets a balanced gender composition and aims to recruit persons with a background as an immigrant.

The Department has few women appointed in scientific positions, and women are therefore particularly encouraged to apply.

The University contributes to the Inkluderingsdugnaden (a voluntary scheme to promote inclusion), and it is our aim that our employees, to the fullest extent possible, shall reflect the diversity of the general population. We therefore encourage qualified applicants with disabilities to apply for the post. The University will facilitate the workplace for employees with disabilities.

Pursuant to section 25, 2nd paragraph of the Freedom of Information Act, information on the applicant may be disclosed even if the applicant has requested not be included on the list of applicants. Applicants will be notified if such requests are not allowed.

### License or security clearance requirements

Employment in this position requires a license under the [Export Control Act and the Export Control Regulations](#). Applicants must therefore state their citizenship and the citizenship of any spouse/partner in the application. Citizenship must also be documented, for example by attaching a copy of their passport.

Applicants who hold citizenship in countries that make it likely that a license will not be granted, may be excluded from the further application process. The same applies to applicants who have a spouse/partner with citizenship in such countries, or where it is likely that a license will not be granted for other reasons.

## Contact information

For more information about the position, please contact:

Associate Professor Avisek Roy, [avisek.roy@usn.no](mailto:avisek.roy@usn.no), phone: 47 31 00 99 44

For questions regarding the recruitment process, please contact:

Adviser Stine Knudseth, [stine.knudseth@usn.no](mailto:stine.knudseth@usn.no)

## How to apply

The University of South-Eastern Norway makes use of online application management. Applicants to the post must register their application and CV with enclosures online via the Jobbnorge recruitment portal by clicking on the link on the right-hand side - "Søk stillingen" (Apply for the post).

The following documents shall be attached to the online application:

- Cover letter outlining the motivation (1-page) and a detailed Curriculum Vitae (CV).
- Transcripts and diplomas of Bachelor's and Master's Degrees (120 ECTS).
- Other relevant certificates.
- Master's thesis.
- Documentation of English proficiency.
- Any scientific publications and a list of these.
- Three references (contact information).

Please note that all documents must be in a Scandinavian language or in English. Any translations must be certified.

If your higher education is from a university outside of Norway, we require it to be recognized by the Norwegian Directorate of Higher Education and Skills. [You must apply for the recognition before the application deadline for this position expires.](#) Add a receipt on your application or recognition when applying. The recognition must be sent to us and is a requirement for being hired.

For relevant applicants who have not completed their master's degree at the time of application but will have completed it by the start date, USN will apply for approval by the Norwegian Directorate of Higher Education and Skills.

**The application will be assessed on the basis of the attached documentation as requested above. Each applicant is responsible for ensuring that the required documentation has been uploaded with the application deadline.**

The University has been awarded a Charter & Code certificate by the European Commission, and is entitled to use the HR Excellence in Research (HRS4R) logo. The University is also a member of the EURAXESS network, which contributes to good working conditions for mobile researchers.

## About us

The University of Southeastern Norway (USN) ranks as the country's fourth largest higher education institution. We are a vibrant community of approximately 18,000 students and 1,900 employees.

Video: <https://vimeo.com/898549899/60305e2540>

## About USN

*At USN you'll contribute to a mission that matters. The University of Southeastern Norway was established in 2018, following the merger of several smaller university colleges, some with historical roots dating back to the 17th and 18th centuries. We are committed to collaborative problem-solving, aiming to provide solutions that benefit our communities - locally as well as globally.*

*Our diverse campuses are located from the beautiful fjords to the snow-covered mountains. USN spans three Norwegian counties, with campuses in Bø, Drammen, Horten, Kongsberg, Notodden, Porsgrunn, Ringerike, and Rauland.*

*Wherever you're located, you will engage in meaningful work amidst a thriving student culture and innovative research environments. Our university offers a wide range of high-quality and internationally recognized academic programs. With a strong emphasis on profession-oriented and socially relevant education, we prepare our students for the workforce and equip them with the necessary skills to make a positive impact on society.*

*At USN, we deeply value and cultivate our relationships with local communities. Our staff and students are actively engaged in a variety of projects that address societal challenges, driving change and innovation. We place a strong emphasis on diversity, inclusion, and equal opportunity, and we strive to shape future leaders, innovators, and change-makers.*

Read more about working for us: (link to) [Work for us - Universitetet i Sørøst-Norge](#)

## Additional information

### Contact person:

Avissek Roy, Associate Professor  
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**Place of service:**

Raveien 215 3184 Borre (Horten Municipality)