Narvik University College ”The Technological University College in Northern Norway”

Arne Erik Holdø

September 2011

LOCATION

- Only technological higher education establishment in Northern Norway
- Region of 480 000 inhabitants
- Region of large unexploited minerals, oil and gas reserves
- Present and future large demands for Engineers and Scientists

History

- Established in 1955
- Bachelor in Engineering from 1955
- Prequalification Course from 1976
- Department in Alta from 1986
- Master in Technology from 1990
- PhD Education from 1992, in cooperation with NTNU (among others)
- Bachelor in Nursing from 1994
- Bachelor in Pedagogic from 2000
- Bachelor in Teaching from 2005
- Bachelor in Economy and Admin. from 2005
- Prequalification Course in Bodø from 2007
- Bachelor in Engineering in Bodø from 2008
- Regional net-based BSc 2009
- Be acredited to give PhD-education (2011)
- Specialised University Institution (2012)

Size

- ~ 1500 students
- ~ 200 foreign students from 30 different nations (largest numbers from Russia and China)
- Total staff: ~ 170
- Academics ~ 120
- Academics from 10 foreign countries
- Budget 2011: ~ 168 mill. NOK
- Building area: ~ 26000 m^2

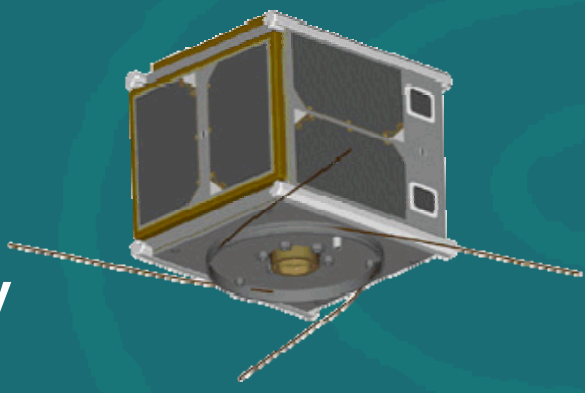
PhD–studies (3 years)

In cooperation with:

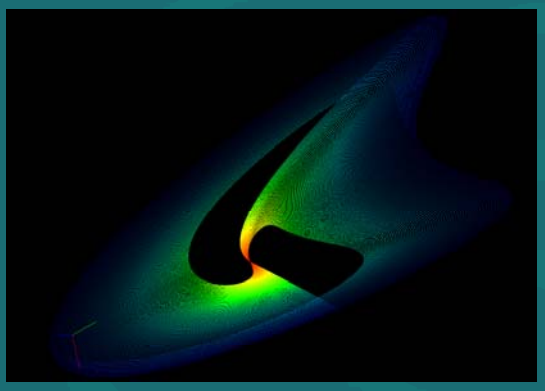
- Norwegian University of Science and Technology
- University of Tromsø
- Luleå Technical University in Sweden
- University of Agder
- University of Oslo

Master Programs (2 years)

- Computer Science
- Industrial Engineering
- Engineering Design
- Electrical Engineering
- Integrated Building Technology
- Space Technology



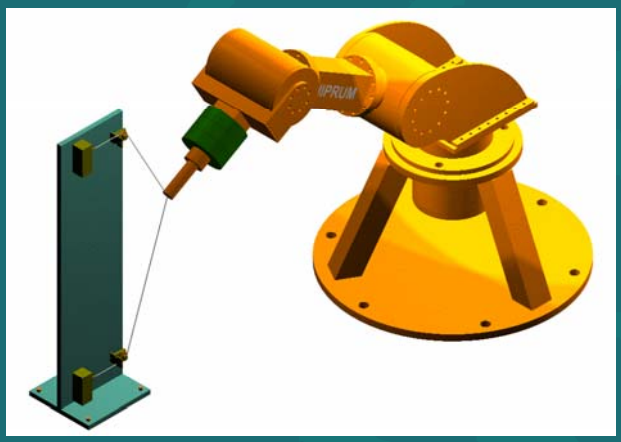
Computer Science
(Game and simulator programming)



- Advanced Object oriented programming
- GPU-programming, Meta-programming
- Geometric Modelling
- Computer Graphics/Virtual Reality/ Animation
- Artificial Intelligence
- Game programming, special effects for movies.
- Scientific Computations and Simulations

Industrial Engineering

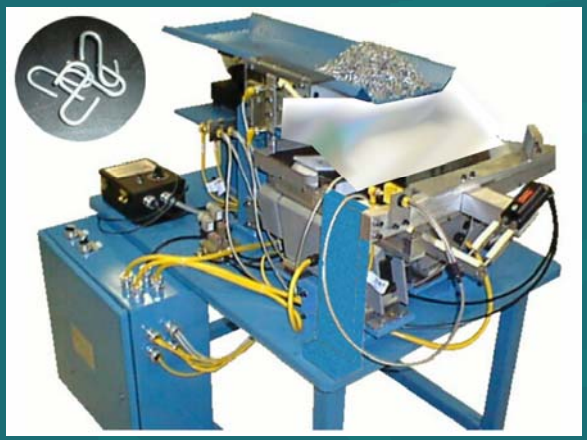
- Computer Integrated Manufacturing
- Virtual Manufacturing
- Industrial robotics
- Supply Chain Management
- Logistics
- System Engineering….



Engineering Design

- Design, geometry and design processes and methods
- Calculation of strength of shapes
- Computer modelling, virtual prototyping and simulations
- Lightweight constructions
- Modern materials and materials selection
- Scientific computing

Electrical Power Engineering



- Power electronics
- Control engineering
- Digital signal processing
- Power sources (water / windmills / solar cells etc)
- Instrumentation and measuring systems
- Electromagnetic field theory

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INTEGRATED BUILDING TECHNOLOGY

- Building technology
- HVAC technology
- Energy technology
- Cold climate technology
- Indoor Environment
- Gives unique knowledge in the interaction between the building and the technical installations in engineering management, construction management and property management

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Space Technology
(Satellite Systems)

- Spacecraft Dynamics and Control
- Satellite Communications
- Remote Sensing
- Environmental Surveillance
- Satellite Design

Bachelor of Engineering (3 years)

- Civil Engineering
- Computer Science
- Industrial Engineering
- Electronics Engineering
- Electrical Power Engineering
- Space Engineering
- Process Engineering

CIVIL ENGINEERING

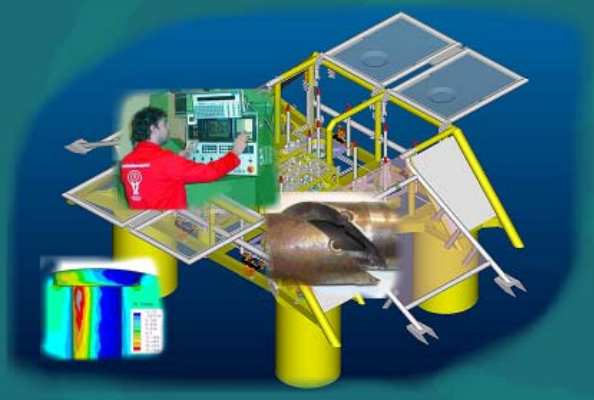
- Building materials
- Building construction
- Construction Management
- Plant engineering
- Water supply and sewage
- Geology
- Road construction

Computer science

- Solid base
  - Programming, algorithms, operating systems, data communication, networking
- In-depht
  - Game programming
    - Games, learning systems, visualization
  - Internet applications
    - Multimedia, web programming, distributed applications

Industrial Engineering

- Bsc degree in general Mechanical engineering
- Combined core curriculum cover
  - Mechanical and Structural Design
  - Manufacturing processes
  - Energy Systems
- Working functions in various industries:
  - Mechanical Design
  - Maintenance
  - Project Management



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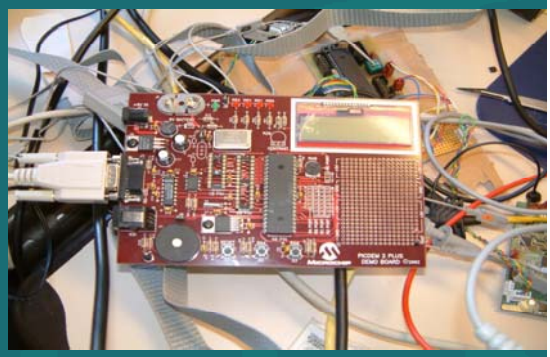
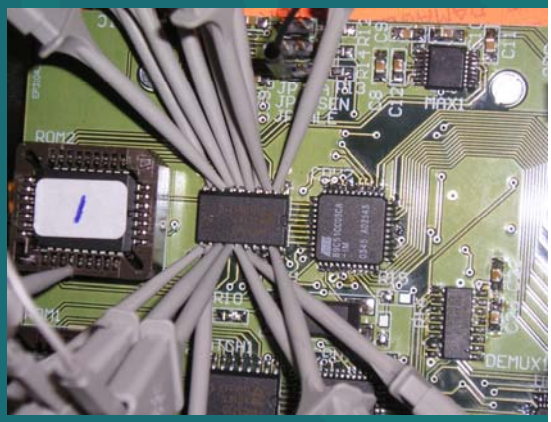
Electronics Engineering

Programming in C++
Microcontrollers
PC-based measurements
Mobile- and digital communication





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Power Engineering

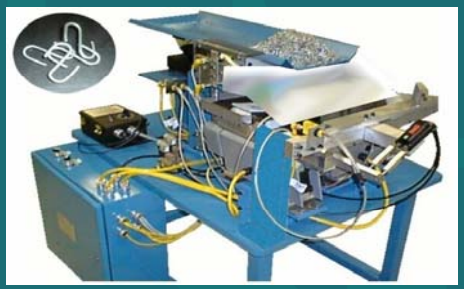
- **Electrical Power Production, Distribution and Consumption**
- **Electrical Machines**
- **Power Electronics**
- **High Voltage Technology**
- **Low Voltage Electrical Installations**
- **Energy, Environment and Alternative Energy Sources**

Space Engineering

- *Basic Space Technology: Rockets and Baloons*
- *Instrumentation and Design for Space Environment*
- *Space Physics*
- *Remote sensing from satellite*
- *Earth observation*

Other Bachelor Programs

- **Nursing**
- **Teacher Training in Science and Technology**
- **Economy and Administration with Specialisation in Logistics or IT**



Qualifications

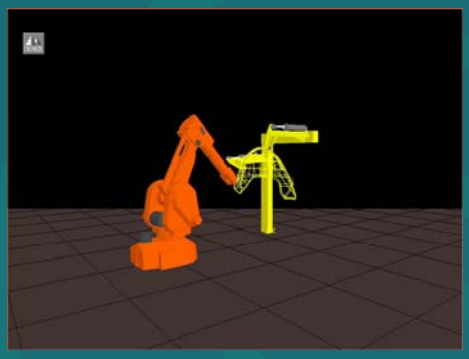
- Pre Qualification for Bachelor in Engineering (1 year)
- Pre Qualification for Foreign Students (1 year)
- Three Terms System

Postgraduate/Part-time Courses

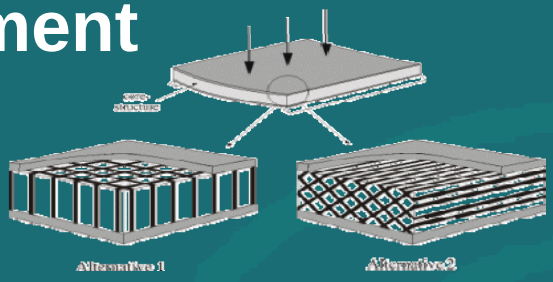
- Studies in Preventive Drug-abuse
- Applied Pedagogical Guidance
- Computer Engineering
- Business Management & Economy
- Mathematics for Teachers in Primary and Secondary School
- Maintenance of Streets and Roads
- Violence and Aggressive Behaviour

Industrial cooperation – some examples

- Statoil - Melkøya
- SHELL - Shakalin
- ABB - Vallhall
- CognIT AS, Norway
- ComputeIT AS, Norway
- LKAB, Narvik and Kiruna
- Heatwork AS, Narvik
- Productive Programming Methods AS, Trondheim
- Scancell AS, Narvik
- Natech, Narvik

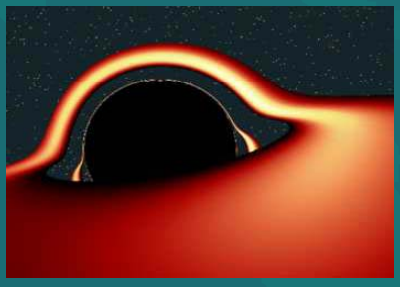


Research & Development



Five R&D-groups:

- Simulations/Cold Climate Technology
- Inhomogeneous Materials/Light Weight Materials
- Industrial Engineering/Waste Logistics
- Electromechanical Systems/Space Technology
- Energy Technology



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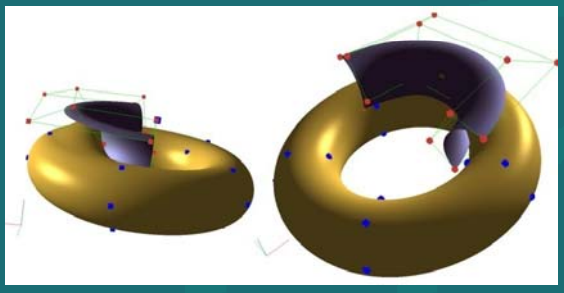
Main R&D Areas at NUC

Simulations / Cold Climate Technology



- **Computational Fluid Dynamics, Cold Climate Phenomena**
- **Computer Aided Geometric Design, Geometric Modelling, B-splines**
- **Game and simulation programming**
- **Multivariate Approximation, Interpolation, Data Fitting, Smoothing, Compression**
- **Wavelet Library and Database**
- **Initial and Boundary Problems, Finite and Boundary Element Methods**
- **Constrained Optimization, Variational Techniques**

Homepage for the R&D group Simulations:

http://www.hin.no/simulations

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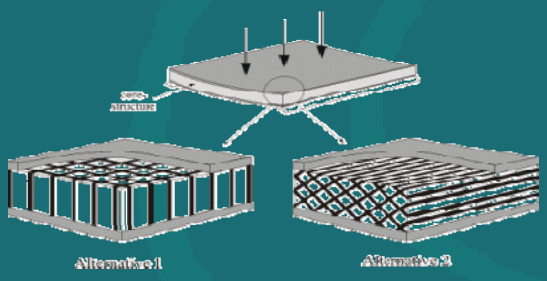
Main R&D Areas at NUC

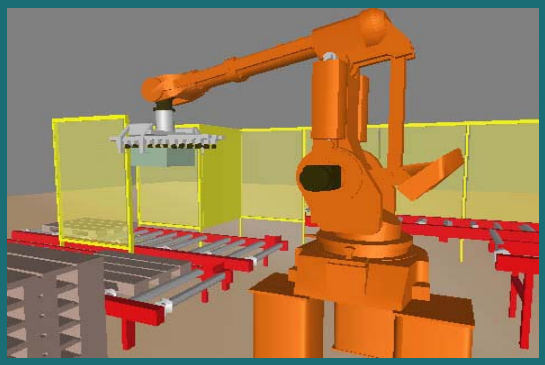
Homogenisation Theory

- **Mathematical Modelling and Mechanics of Composite and Cellular Structures**
- **Optimal Design of different kinds of Honeycomb Structures in Cellular Sheet-, Beam- and Sandwich Structures**
- **Homogenisation of sequences of Non-linear Partial Differential Operators and Integral Functionals**
- **Asymptotic Analysis and Averaging of Partial Differential Equations and Diffusion Processes**
- **Stochastic Partial Differential Equations. Problems in Domains with Microscopic Geometry**
- **Computational Methods for Partial Differential Equations**



Main R&D Areas at NUC

Industrial Engineering



- Virtual manufacturing – modelling, simulation and visualisation
- Harbour logistics
- Green logistics
- Sustainable supply chain management
- Quality management in supply chains
- Computer integrated manufacturing
- Waste management

Main R&D Areas at NUC

Electromechanical Systems

- Robust control and uncertain systems
- Energy conversion and renewable energy
- Modelling and control of industrial processes
- Signal processing, e.g. estimation and control of oscillations in noisy environments
- Distributed electrical power systems and power quality
- Control algorithms for spacecraft, e.g. formation flying of satellites
- Application of control theory to economical systems

Main R&D Areas at NUC

Energy Technology

- **Modelling and simulation of energy systems**
- **Waterborne heat and increased energy flexibility**
- **Energy efficiency**
- **Energy planning**
- **Alternative and renewable energy**
- **Energy supplies for cold climate areas**
- **Bioenergy in the northern regions**

Heating central

Artificial thawing

Energy efficient Norwegian module House in Arkhangelsk

New Degrees

- **BSc International preparedness jointly with Norway's Fireman School and Harstad University College**

Outcome from EU Framework 7 project

PRETEAR

High North Technology Centre

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HIGH NORTH Technology Centre

Narvik University College is the only technological institute in northern Norway.

The mission of the High North Technology Centre is to address and resolve the technical issues **relevant to high north environment** by delivering experimental capabilities and modelling techniques which can reliably represent applied sciences and industrial engineering applications.

High North Technology Centre // Narvik University College
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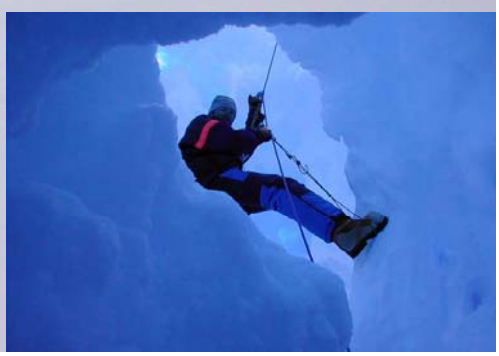
Tel: +47 76 96 60 00 // Fax: +47 76 96 68 10 // E-Mail: postmottak@hin.no

The Norwegian Government's overall objective is to create sustainable growth and development in the area through more extensive international cooperation on the use of natural resources, environmental management and research.

HIGH NORTH Technology Centre

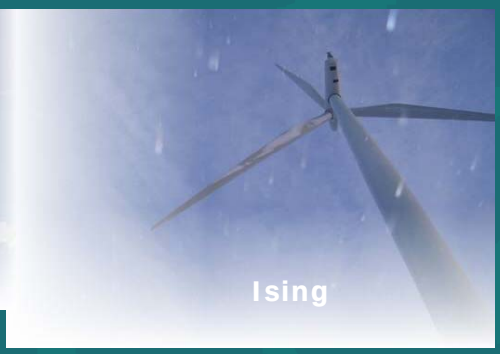
Field research



Bygninger og infrastruktur i kaldt klima

Vind og snødrift rundt bygninger

Konstruksjoner i ekstremklima



Veger i snødrift områder

Selection of Research Projects

- Petromax project (NRC) on shock loading of composite subsea pipelines
- FP7 project on robotics
- FP7 project on optimisation of vehicles
- Coldtech – NRC and industry
- NRC project on Applied Mathematics
- NRC project on satellite technology

Bilateral agreements

- **Beijing Institute of Petrochemical Technology, China**
- **Tianjin University of Technology, China**
- **Jiangsu Teachers University of Technology, Cina**
- **Archangelsk State Technical University, Russia**
- **Murmansk State Technical University, Russia**
- **University of Novi Sad, Serbia**
- **University of Sofia, Bulgaria**
- **University of Oulu, Finland**

Erasmus agreements - 1

• University College Øresund	København	Denmark
• Institut National Polytechnique de Toulouse	Toulouse	France
• Universitet de Metz	Metz	France
• Universidad Politecnica de Valencia	Valencia	Spain
• Universidad Politechnica de Cartagena	Cartagena	Spain
• Universidad Politecnica de Madrid	Madrid	Spain
• Luleå technical University	Luleå	Sweden
• Vilnius Pedagocigal University	Vilnius	Lithuania

Erasmus agreements - 2

• Anadolu University	Eskisehir	Turkey
• Technische Universität	Dresden	Germany
• WestSachsische Hochschule	Zwickau	Germany
• Fachhocshule Lippe und Höxter	Höxter	Germany
• Budapest University of Technology and Economics	Budapest	Hungary
• State Higher Vocational School	Nowy Sacz	Poland
• Sabanci University	Istanbul	Turkey

Future plans

- **Be Accredited to give PhD-education (2011)**
- **Specialised University Institution (specialised in Cold Climate Technology (2012)**
- **BSc/MSc Sustainable Energy**
- **MSc Architecture**
- **More than 20% turnover research based**

The Students Welfare Organisation

- Has 279 bed site rooms and 84 self contained flats
- Internet in all houses
- Kindergarden
- Dining facilities
- Hotel
- Sportscenter

The students Welfare organisation

- Climbing hall
- Paintball hall
- Pub
- Guidance counsellor
- Bookstore

The NUC Student

Student Clubs and Society

- Photo &video
- Computing
- Football
- Jægermeister (outdoor activities)
- NUC – Extreme
- Table tennis
- Kickboxing
- Student radio
- Games
- Student choir
- Newpaper & media
- Theatre
- And more….

Thank You for Your Attention!

Welcome to visit www.hin.no