This is Simula

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More than half of the employees come from countries outside Norway.
Research at Simula

Simula@Fornebu (established 2001):
- Software Engineering
- Scientific Computing
- Advanced Computing and System Performance

Simula@UiB (established 2015):
- Location: Department of Informatics UiB
- Cryptography, computer security and information theory

Simula@OsloMet (established 2018):
- Center for Digital Engineering (SimulaMet)
- A direct response to the national and European need for greater capacity within ICT research and digitisation.
Maximising software quality and reliability by researching software development and improving software testing.
Scientific Computing

Developing tools for high performance computing, and applying novel simulation techniques to complex physical processes affecting human health.
Advanced Computing and System Performance

Takes a system / end-to-end view to address such performance and efficiency challenges at several levels. Research leverages advances in hardware and focuses on the design and analysis of algorithms, computing and communication methods.
Simula School of Research and Innovation (SSRI) organises research education at Simula.

Different levels of education at Simula

<table>
<thead>
<tr>
<th>Levels</th>
<th>Active today</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master students</td>
<td>52</td>
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<tr>
<td>PhD students</td>
<td>35</td>
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<tr>
<td>Postdoctoral fellows</td>
<td>21</td>
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2001 – present*:

119 PhD
391 Master

*August 17th, 2018
What can we offer @Simula?

- Excellent working conditions, international, young and highly motivated environment, own work place, canteen subsidy, reimbursement of public transport expenses

- Assignments connected to the research projects = close contact to active research

- Strong connection to industry and possibility for tech start-up opportunities

- **Master thesis** - different forms of collaboration, connected to a university
- **PhD candidates** - jobs are posted on a continuous basis, different ways in
- **Summer Internships** - application deadline usually in February

For more information, please see: [https://www.simula.no/education/ssri](https://www.simula.no/education/ssri)

Or contact:
Elin Backe Christophersen, Advisor
[elin@simula.no](mailto:elin@simula.no)
Collaborations

University of Oslo
Beihang University
The SUURPh collaboration
Simula-UiO-UCSD Research and PhD training
The Simula Garage/Gründergarasjen

What: free co-working environment up to 12 months, for ambitious tech entrepreneurs

Why: more successful tech startups

Financing: mostly internal funding with support from Oslo + Akershus Fylkeskommune

Purpose:
- Give tech entrepreneurs a place to start
- Provide investment opportunities
- Promote entrepreneurial spirit at Simula

Locations:
- Gründergarasjen@Simula (2013)
- Gründergarasjen@OsloMet (2018, mainly for OsloMet researchers and students)

Number of current garage members: 108 (343 in total since 2013)
Number of current garage projects: 42 (144 in total since 2013)
Percentage of female members: 24% (!)

More info and application: grundergarasjen.no
But, what can you expect if you do your master at Simula?

- Examples from the advanced computing and system performance group -
About our Master Students so far...

- Student in the focus
- Perform research from a system point of view including the whole pipeline
- Work in teams on interesting problems
  - Fully integrated in the research group
- Research how machine learning works on challenging problems from the real world and show the limitations in terms of accuracy but also system performance
- Last semester we had 4 students finishing with A
- Most of them also had one or more scientific article published
- In addition we released open source and open dataset with our students

"It takes two flints to make a fire."
- Louisa May Alcott

“Why are people born? Why do they die? Why do they want to spend so much of the intervening time wearing digital watches?”
- Douglas Adams

“If you only read the books that everyone else is reading, you can only think what everyone else is thinking.”
- Haruki Murakami
Example topics

- Steven Hicks: "Mimir: An Automatic Reporting and Reasoning System for Screening of the Gastrointestinal Tract Using Deep Neural Networks", May 2018

- Rune Johan Borgli: "Hyperparameter optimization using Bayesian optimization on transfer learning for medical image classification", May 2018

- Edvard J. Bakken: "The Empire Strikes Back - Exploring and Comparing Deep Learning for Image Classification with Other Methods", May 2018

- Tor Jan Derek Berstad: "Trade-offs of Adapting Binary Neural Network Ensembles for Multiclass Problems", May 2018
Research output of our students
Understanding of deep learning output
## Angastacia detection

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<th>SPEC</th>
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The table shows the performance metrics for each fold and the overall average (Avg). The metrics include Precision (PREC), Sensitivity (SENS), Specificity (SPEC), Accuracy (ACC), F1 score, and Matthew's Correlation Coefficient (MCC). The average values indicate excellent performance with near-perfect scores across all metrics.
Open datasets

• Kvasir: A **multi-class image-dataset** for computer aided gastrointestinal disease detection
  • 8 different findings (landmarks and diseases)
    • Esophagitis, dyed and lifted polyps, dyed resection margins, cecum pylorus, Z-line, polyps and ulcerative colitis
  • 8,000 images collected at Baerum Hospital

• Nerthus: A **bowel preparation quality** video dataset
  • 4 degrees of cleanliness, based on Boston bowel preparation scale
  • 21 videos collected at Baerum Hospital

• Depression in bipolar patients
  • Activity sensor data
Interested?
Open day at Simula

- Simula invites students to a meet and greet in September
- Bus from IFI
- Inspirational talks
- Food
- Possibility to talk directly with our researchers and what master topics they can offer
More questions?

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