

## [Dr. Anne C. Elster](#) – Advising

I work very closely with my graduate students and have so far supervised over 40 masters theses, many of which I help build published papers on, and several which have received prizes. I also supervise/co-supervise several PhD students. Together we have built up my HPC-Lab, a well-respected research lab in heterogeneous and GPU computing which regularly receives international visitors. We recently got several equipment grants, including a NOK 1 million grant from our Dean's office

See <http://research.idi.ntnu.no/hpc-lab> for more details.

### **POST DOCS SUPERVISED BY DR. ELSTER**

1. Ian Karlin (PhD U of Colorado, Boulder 2011) (May 2010-May 2012)
2. Jan Perhac (April 2010-April 2011) (ERCIM)
3. John Ryan (2010) – worked on heterogeneous cluster issues.
4. [Dr. Henrik R. Nagel](#) (2005-2007) – Currently at NTNU HPC Group at ITEA (Computing Center) His research focus is on using grid technology to integrate visualization and computations. Dr. Nagel also helped out with the organization of the SIMS 2005 conference that was held at NTNU in October 2005 and is the co-editor of its proceedings.

### **PHDS SUPERVISED OR EVALUATED OFFICIALLY BY DR. ELSTER**

(The students' work is done at Dept. of Computer & Info Science at NTNU unless otherwise specified.)

#### **2011/2012 PhD-level supervisions:**

1. **Jan Christian Meyer** (PhD thesis submitted for review Sep. 2011), Anne C. Elster (main advisor): "Performance Modeling og Heterogeneous Systems".
2. **Lane Holloway** (Univ. of Texas Austin, PhD proposal to be submitted Oct. 2011), Anne C. Elster (co-advisor/committee member), Prof. Don Fussel (main advisor), Topic: Dynamic Games (games whose story-line change depending on execution. Lane was a student in my Algorithms & Datastructures class back in 2000. He started a PhD with a UT prof. some years late, then went to industry, and is now self-duning himself to "work on what interests me. He was one of my top students in the class. I wrote a recommendation for his partner in the class' projects for Stanford. She has now finished her PhD there and is teaching at a College in California.
3. **Rune Erlend Jensen** (PhD student – estimated finished in 2013), **Anne C. Elster (main advisor)**, Topic: Compiler-optimized BLAS kernals
4. **Erik Smistad** (PhD student), Dr. Frank Lindseth (main advisor), **Anne C. Elster (co-advisor)**: Topic: Medical Imaging on GPUs.

**As of Sept 2011: Elster has one unfilled PhD position and has recruited at least 2 Norwegian students that are eager to start their PhD in her research group**

## 2011 – External PhD evaluations:

5. **Michele Martone** (PhD Università degli Studi di Roma “Tor Vergata”, Facoltà di Ingegneria, [defense May 31, 2011](#)), Anne C. Elster (external EU evaluator), Profs. Salvatore Tucci and Salvatore Filippone (main advisors): [“A Quad-Tree Based Sparse BLAS Implementation for Shared Memory Parallel Computers”](#).
6. **Yong Liu** ([PhD Dept. of Informatics, Univ. of Tromsø, defended Feb 24, 2011](#)), Prof. Otto Anshus (main advisor), Prof. Brian Vinter (Copenhagen Univ., 1<sup>st</sup> Opponent), Anne C. Elster (2nd Opponent): [“Principle and Practice of Distributing Low and High Resolution Display Content from One Computer to Many Computers in Stand-alone or Display Wall Configurations”](#)

## 2010 and earlier

7. **Thorvald Natvig** (PhD thesis submitted for review June 2010, defended Dec. 2010) [Automatic Run-Time Communication and I/O Optimizations](#), **Anne C. Elster (main advisor)**. Job after PhD: Medalia, Palo Alto, CA, USA.
8. **Jo Skjermo** (PhD 2009), Main advisor: Prof. Keith Downing, **Anne C. Elster (3<sup>rd</sup> opponent)**. Title: *“Generation, Rendering and Animation of Polygon Tree Models”*
9. [Cyril Banino-Rokones](#) -- supervised by Elster 2003-2006, PhD 2007 w. Dr. Lasse Natvig as main advisor. Title: [Algorithmic and Scheduling Techniques for Heterogeneous and Distributed Computing \(pdf\)](#) - Now atYahoo!
10. **Nicolae-Zoran Constantinescu-Fülöps** ( PhD 2008) Professor [Richard Blake](#) (main advisor), **Anne C. Elster (3<sup>rd</sup> opponent)** [A Desktop Grid Computing Approach for Scientific Computing and Visualization \(pdf\)](#),
11. **Roxana Diaconescu** (PhD 2002), Prof. Reidar Conradi (main advisor), Prof. Monica Lam (Stanford, 1<sup>st</sup> opponet), **Anne C. Elster (3<sup>rd</sup> opponet)** (The third opponet act as the administrator for the defense) Thesis title: *“Object-Based Concurrency for Data Parallel Applications: Programmability and Effectiveness”*.
12. [Penti Huttunen, First Opponent](#), PhD committee at Lappeenranta University of Technology, Finland, Dec. 2002 for Thesis Title: *Data-parallel computation in parallel and distributed environments* . Advisor: Dr. Jari Porras, Second Opponent: Dr. Kimmo Koski, Nokia (now CSC Director)

## **MASTERS THESES + SELECTED MASTER REPORTS SUPERVISED**

(The students' work is done at Dept. of Computer & Info Science at NTNU with Anne C. Elster a main advisor unless otherwise specified.)

### **2011/2012 On-going Master-level supervisions:**

1. **Kjetil Babington** (Masters project, Fall 2011), Anne C. Elster (main advisor). Topic: Ray tracing and Snow Simulation on GPU
2. **Thomas Falch** (Masters project, Fall 2011), Anne C. Elster (main advisor), Dag Breiby (NTNU Physics Dept, co-advisor) Topic: Physics simulations on GPU
3. **Geir Josten Lien** (Master of Science thesis, to finish summer 2012), Anne C. Elster (main advisor), Topic: GPU BLAS
4. **Hallgeir Lien** (Masters project, Fall 2011), Anne C. Elster (main advisor), Dr. Jo Skjermo (Vegdirektoratet, co-advisor). Topic: Snow simulations and roads on GPU.
5. **Jan Rovde** (Masters project, Fall 2011), Anne C. Elster (main advisor). Topic: SPH and snow simulation on GPU
6. **Kristoffer Stensen** (Masters project, Fall 2011), Anne C. Elster (main advisor). TBD

### **2011 MS theses completed as of Sept 2011**

7. **Yngve Sneen Lindal** (Master og Technology, thesis, June 2011), Anne C. Elster (main advisor), Sverre Jarp (CTO, CERN, co-advisor): "[Optimizing a High-Energy Physics \(HEP\) Toolkit on Heterogeneous Architectures](#)".
8. **Fredrik Fossum** (Master og Technology, thesis, June 2011), Anne C. Elster (main advisor): "[Real-Time Rigid Body Interactions](#)" (on GPU)
9. **Jarle Erdal Steinsland** (Master og Technology, thesis, June 2011), Anne C. Elster (main advisor). "[Auto-tunable GPU BLAS](#)"
10. **Bent Ove Stinessen** (Master og Technology, thesis, June 2011), Anne C. Elster (main advisor), Dr. Alf Birger Rustad (Statoil Research, co-advisor): "Profiling, Optimization and Parallelization of Seismic Inversion Code".
11. **Thor Kristian Valderhaug** (Master og Technology, thesis, June 2011), Anne C. Elster (main advisor), Dr. Frank Lindseth (SINTEF Med Tech/NTNU co-advisor): "[The Lattice Boltzmann Simulation on Multi-GPU Systems](#)".

### **2010**

12. **Ahmed A. Aqrabi** (Masters thesis, June 2010, Anne C. Elster (main advisor): "[Effects of Compression on Data Intensive Algorithms](#)", led to PARA 2010 presentation and IPDPS 2011 workshop paper (MTAAP)
13. **Aleksander Gjermundsen** (Masters thesis, June 2010, Anne C. Elster (main advisor): "CPU and GPU Co-Processing for Sound". Led to paper presented at PARA 2010.
14. **Andreas Hysing** (Masters thesis, July 2010, Anne C. Elster (main advisor), Dr. Alf Birger Rustad (Statoil Research, co-advisor): "Parallel Seismic Inversion for Shared Memory Systems".
15. **Øystein Krog** (Masters thesis, June 2010, Anne C. Elster (main advisor): "[GPU-based Real-Time Snow Avalanche Simulations](#)". Led to paper presented at PARA 2010.
16. **Holger Ludvigsen** (Masters thesis, June 2010, Anne C. Elster (main advisor), Frank Lindseth (co-advisor): "Real-Time GPU-Based 3D Ultrasound Reconstruction and Visualization".

## 2009

17. **Eirik Ola Aksnes** (Master of Technology thesis, July 2009), Anne C. Elster (main advisor), Ståle Fjeldstand and Atle Rudshaug, Numerical Rocks (co-advisors) ["Simulation of Fluid Flow Through Porous Rocks on Modern GPUs"](#) Received National IBM prize, 2009 (shared with Erik Ola Aksnes and one Petroleum student)
18. **Daniel Haugen** (Master of Technology thesis, July 2009), Anne C. Elster (main advisor), Tore Fevang, Schlumberger (co-advisor): ["Seismic Data Compression and GPU Memory Latency"](#)
19. **Åsmund Herikstad** (Master of Technology thesis, July 2009), Anne C. Elster (main advisor), Svein-Erik Måsøy, MedTek, NTNU (co-advisor) "Parallel Techniques for Estimation and Correction of Aberration in Medical Ultrasound Imaging"
20. **Owe Johansen** (Masters thesis, July 2009), Anne C. Elster (main advisor), John Hybertsen and Jon André Haugen, Statoil (co-advisors): ["Seismic Shot Processing on GPU"](#)
21. **Daniele Giuseppe Spampinato** (Master of Technology thesis, July 2009), Anne C. Elster (main advisor): ["Modeling Communication on Multi-GPU Systems"](#) Received National IBM prize, 2009 (shared with Erik Ola Aksnes and one Petroleum student)
22. **Rune Johan Hovland** (Master of Technology thesis, June 2009), Anne C. Elster (main advisor), Magnus Lie Hetland (co-advisor): ["Throughput Computing on Future GPUs"](#)
23. **Henrik Hesland** (Master of Technology thesis, June 2009), Anne C. Elster (main advisor), Thorvald Natvig (co-advisor): ["GPU-Enabled Interactive Pore Detection for 3D Rock Visualization "](#)
24. **Rune Erlend Jensen** (Master of Science thesis, May 2009), Anne C. Elster (main advisor): ["Techniques and Tools for Optimizing Codes on Modern Architectures: A Low-Level Approach"](#)
25. **Robin Eidissen** (Masters thesis, January 2009), Anne C. Elster (main advisor): ["Utilizing GPUs for Real-Time Visualization of Snow"](#)

## 2008

26. **Atle Rudshaug** (Masters thesis, June 2008), Anne C. Elster (main advisor), Optimizing & Parallelizing a Large Commercial Code for Modeling Oil-well Networks – joint work with Yggdrasil, Norwegian Oils service company.
27. **Andreas Bach** (Masters thesis, September 2008), Anne C. Elster (main advisor) **Profiling and Optimizing a Seismic Application on Modern Architectures" --** joint project with Statoil

## 2007

28. **Erik Axel Nielsen** (Masters thesis, June 2007), Anne C. Elster (main advisor) [Real-time Wavelet Filtering on the GPU](#)  
-- joint project with GE Healthcare. *40 times GPU speedup of algorithm led to our implementation being adopted the same fall in their high-end cardiovascular ultrasound scanner.*
29. **Idar Borlaug** (Masters thesis, June 2007), Anne C. Elster (main advisor) [Seismic Processing Using Parallel 3D FMM](#)
30. **Knut Imar Hagen** (Masters thesis, June 2007), Anne C. Elster (main advisor) [Fault-tolerance for MPI Codes on Computation Clusters](#) joint project with Statoil Research.

31. **Christian Larsen** (Masters thesis, June 2007), Anne C. Elster (main advisor), Tore Fevang, Schlumberger (co-advisor): ["Framework for Polygonal Structures Computations on Clusters"](#)
32. **Nils Magnus Larsgård** (Masters thesis, June 2007), Anne C. Elster (main advisor): [Framework for Converting MPI Codes to Hybrid OpenMP/MPI Codes](#)
33. **Thibault Collet** (Masters thesis, July 2007), Anne C. Elster (advisor): [Massively Online Games with Food Chains](#)

## 2006

34. **Thorvald Natvig** (Masters thesis, January 2006), Anne C. Elster (main advisor): **Automatic Optimization of MPI Applications**
35. **Øystein Borg** (Masters thesis, June 2006), Anne C. Elster (main advisor) Håkon Bugge, SCALI (co-supervisor): [Dynamic Selection of MPI Intra-copy Routines Based on Program Characteristics](#)
36. **Ingar Saltvik** (Masters thesis, June 2006), Anne C. Elster (main advisor) **Parallel Methods for Real-Time Visualization of Snow**

## 2005

37. **Håvard Bjerke** (Masters thesis, July 2005), Anne C. Elster (main advisor), Sverre Jarp, CERN and Dan Magenheimer, HP Labs, Fort Collins, CO, USA (Co-supervisor): [a href="http://openlab-mu-internal.web.cern.ch/openlab-mu-internal/Documents/2\\_Technical\\_Documents/Master\\_thesis/Thesis\\_HavardBjerke.pdf"](http://openlab-mu-internal.web.cern.ch/openlab-mu-internal/Documents/2_Technical_Documents/Master_thesis/Thesis_HavardBjerke.pdf) **HPC Virtualization with Xen on Itanium**
38. **Rune Johan Andresen** (Masters thesis, July 2005), Anne C. Elster (main advisor), Rainer Toebecke and Bernard Antoine, CERN (Co-supervisors): **HPC File Server Monitoring and Tuning**
39. **Andreas Braathen** (Masters thesis, August 2005), Anne C. Elster (main advisor), Jørn A. Amundsen (NTNU) and Alastair Bland, CERN (Co-advisors): **Hardware and Software Surveillance**

## 2004

40. **Glen Hisdal** (Masters thesis, June 2004), Anne C. Elster (main advisor), Sverre Jarp, CERN (Co-supervisor): **Service Discovery Techniques for Distributed Systems using SmartFrog**. *Results presented as part of [PARA 2006 talk by Elster et al.](#)*
41. **Tor Arvid Lund** (Masters thesis, June 2004), Anne C. Elster (main advisor), Jørn A. Amundsen (co-advisor) "Porting a Monte Carlo Code from Shared Memory to Computational Clusters" joint project with Jo Smiseth and Eivind Smørgrav, NTNU Dept. of Physics.
42. **Jan Christian Meyer** (Masters thesis, June 2004), Anne C. Elster (main advisor), **Load Balancing Visualisation Servers** in collaborations with Schlumberger Voxel Vision, Trondheim, Norway.
43. **Frode Nilsen** (Masters thesis, June 2004), Anne C. Elster (main advisor), **Portal Development for Grid Technologies** joint project w/ NOTUR, The Norwegian National High-Performance Computing Program.
44. **Morten Rodal** (Masters thesis, June 2004), Anne C. Elster (main advisor), Kjetil Hokstad, Statoil (co-advisor) **Scalability of Seismic Codes on Computational Clusters** joint project w/ Statoil Research

45. Einar Råberg Rosenvinge (Masters thesis, June 2004), Anne C. Elster (main advisor), Cyril Banino (co-supervisor) [On-line Task Scheduling on Heterogeneous Clusters: An Experimental Study](#) (led to paper presented at PARA'04)

## 2003

46. **Robin Holtet** (Masters thesis, June 2003), Anne C. Elster (main advisor): ["Communications-reducing Stencil-based Algorithms and Methods"](#) Supervisor: Dr. Anne C. Elster
47. **Torbjørn Vik** (Masters thesis, June 2003), Anne C. Elster (main advisor): **Real-Time Visual Simulation of Smoke**
48. **Åsmund Østvold** (Masters thesis, June 2003), Anne C. Elster (main advisor), Håkon Bugge, Scali AS (so-supervisor): Tidsmåleteknikker for MPI kollektive kommunikasjons operasjoner

## 2002 and earlier

1. **Charles de Vane** (Master's thesis, Computer Science, Cornell University – Anne C. Elster (co-advisor), Main advisor: Prof. Keshav Pingali: Topic: "Parallel Choleski Factorization on the BBN System".

## SELECTED MASTER REPORTS & BACHELOR'S HONORS THESES SUPERVISED BY DR. ELSTER (The students' work is done at Dept. of Computer & Info Science at NTNU unless otherwise specified.)

## 2010

1. Fredrik Fossum (Masters project, Dec 21, 2011), Anne C. Elster (main advisor) ["Surface Tension in Smoothed Particle Hydrodynamics on the GPU"](#).

## 2009

2. **Ahmed A. Aqrabi** (Masters project, Dec 2009), Anne C. Elster (main advisor), Victor Aarre, Schlumberger Stavanger (co-advisor): ["3D Convolution of Large Datasets on Modern GPUs"](#).
3. **Eirik Ola Aksnes and Henrik Hesland** (Masters Project, Jan 2009), Anne C. Elster (main advisor): ["GPU Techniques for Porous Rock Visualization"](#)

## 2008

4. **Rune Hovland** (Masters project, Dec 2008), Anne C. Elster (main advisor): ["Latency and Bandwidth Impact on GPU Systems"](#) (led to ParCo 2009 paper)
5. **Daniele Giuseppe Spampinato** (Masters Project, December 2008), Anne C. Elster (main supervisor): ["Linear Optimizations with CUDA"](#) (led to IPDPS 2009 paper)

## 2006

6. **Idar Borlaug and Knut Imar Hagen** (MS Project), Anne C. Elster (main advisor): ["Parallelization of an Open Source Game"](#)

7. **Christian Larsen** (MS Project, December 2006), Anne C. Elster (main advisor):  
[Utilizing GPUs on Cluster Computers](#) -- joint project with Schumberger. Presented at Stanford 50 and UT Austin ECE seminar 2006/2007.

### **2003**

8. **Glenn Hisdal** (Master Project, Dec. 2003), Anne C. Elster (main advisor):  
“SmartFrog and SLP: An Introduction to SmartFrog and the Service Location Protocol  
“ in collaborations with CERN.

### **2002 and earlier**

9. **Jostein Tveit** (Masters project, Dec 2002), Anne C. Elster (main advisor): “Secure MPI”. He later took a wrote a masters with Q2S at NTNU and now works for BBS.
10. **Paul Sack** (Honors Bachelor thesis, ECE, UT Austin, 2001) – Anne C. Elster (advisor), his honors thesis + subsequent summer job at NTNU , led to our PARA 2002 paper.

**NOTE: Elster joined NTNU in 2001**

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*This document was last updated Sept 15, 2011.*