Application for Linné grant

Linné FLOW Centre

Applicants







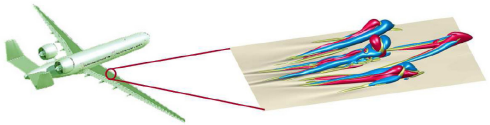
KTH VETENSKAP OCH KONST

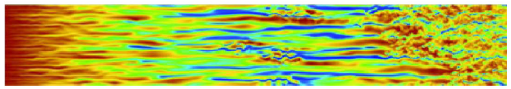
Linné FLOW Centre

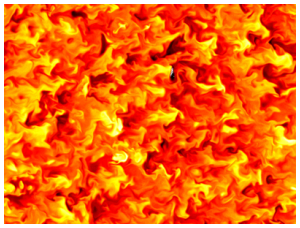
- Dan Henningson, Coordinator, Mechanics
- Henrik Alfredsson, Mechanics
- Gustav Amberg, Mechanics
- Arne Johansson, Mechanics
- Erik Lindborg, Mechanics
- Gunilla Kreiss/Anna-Karin Tornberg, Numerical Analysis
- Mats Åbom, MWL

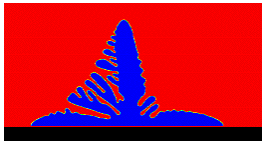
Showcases

- *From* optimization and control theory *to* laminar flow control on Airbus wings
- *From* transient growth theory *to* understanding and modeling of laminar-turbulent transition in turbo-machinery flows
- *From* modern turbulence simulations and experiments *to* accurate and efficient models of turbulent flow
- *From* Kolmogorov theories *to* fluid mechanics of climate change
- Sound scattering in ducts with applications to low Mach number flows
- Fluid motion in free boundary problems involving phase change, surface tension effects and thermo-capillary flows
- Development of accurate and innovative numerical methods









KTH VETENSKAP OCH KONST

Linné FLOW Centre

Vision

We have a vision of the Linné FLOW Centre as an outstanding environment for fundamental research in fluid mechanics, where innovative research is born and future research leaders are fostered.

This is realized by

- collaborative research projects integrating experiments, computations and theory
- combining expertise in stability and transition, flow control, turbulence and geophysical flows, micro-fluid flows, aero-acoustics and numerical analysis
- outreach and network activities such as seminars, workshops, summer-schools and guest researcher programs
- actively incorporating junior faculty members in positions of responsibility and leadership

Linné FLOW Centre

Priority research areas

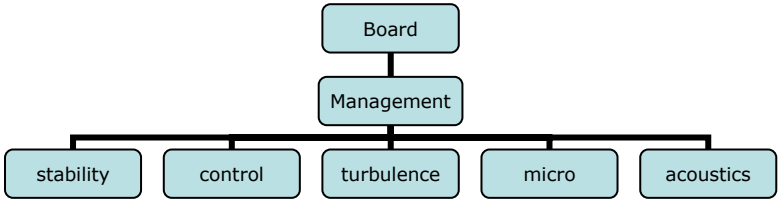
Linné FLOW Centre

- Stability and transition
- Flow control and optimization
- High Re-number turbulence, incl geophysical flows
- Micro- and complex fluids
- Low Ma-number aeroacoustics

Strategy developed for each research area

Organization

- Board members
  - Gunnar Landgren, Vicerector, Chairman
  - Henrik Alfredsson, Mechanics
  - Gustav Amberg, Mechanics
  - Erik Lindborg, Mechanics
  - Anna-Karin Tornberg, Numerical Analysis
  - Mats Åbom, MWL
  - Birgitta Palmberger, STEM
  - Gunnar Svedberg, STFI
  - Erland Källén, MISU



- Management group
  - Dan Henningson, Mechanics, Director
  - Jens Fransson, Mechanics, *stability and transition*
  - Luca Brandt, Mechanics, *flow control and optimization*
  - Erik Lindborg, Mechanics, *high-Re turbulens incl geophysical flow*
  - Anna-Karin Tornberg, Numerical Analysis, *micro and complex fluids*
  - Gunilla Efraimsson, MWL, *low Ma-number aeroacoustics*

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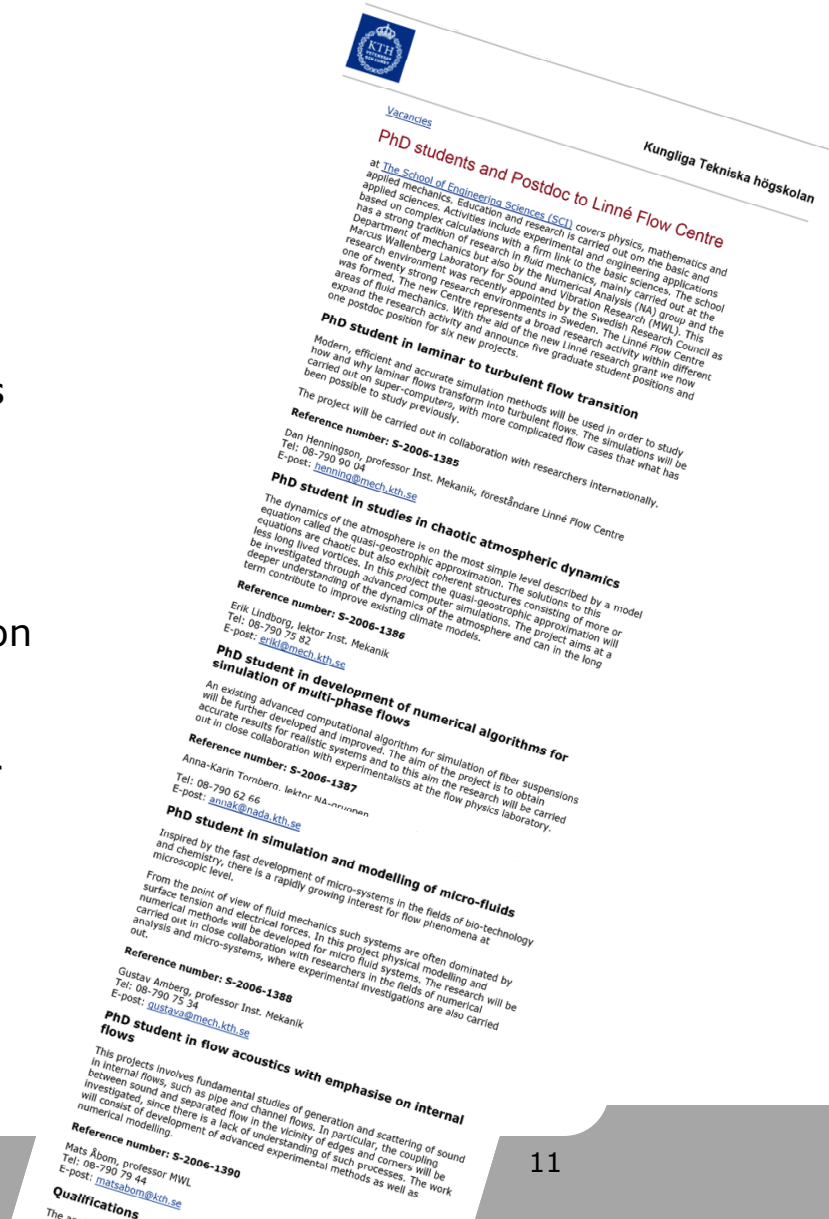
Linné FLOW Centre

PhD students and Postdoc to Linné Flow Centre

Linné FLOW Centre

- PhD student in Laminar-Turbulent transition
- PhD student in studies in chaotic atmospheric dynamics
- PhD student in development of numerical algorithms for simulation of multi-phase flows
- PhD student in simulation and modeling of micro-fluids
- PhD student in flow acoustics with emphasis on internal flows
- Postdoc in modern measurement methods for turbulent flows

Application deadline Jan 15, 2007



Vacancies

Kungliga Tekniska högskolan

PhD students and Postdoc to Linné Flow Centre

at The School of Engineering Sciences (SCI) covers physics, mathematics and applied mechanics. Education and research is carried out om the basic and applied sciences. Activities include experimental and engineering applications based un complex calculations with a firm link to the basic sciences. The school has a strong tradition of research in fluid mechanics, mainly carried out at the Department of mechanics but also by the Numerical Analysis (NA) group and the Marcus Wallenberg Laboratory for Sound and Vibration Research (MWL). This research environment was recently appointed by the Swedish Research Council as one of twenty strong research environments in Sweden. The Linné Flow Centre was formed. The new Centre represents a broad research activity within different areas of fluid mechanics. With the aid of the new Linné research grant we now expand the research activity and announce five graduate student positions and one postdoc position for six new projects.

PhD student in laminar to turbulent flow transition

Modern, efficient and accurate simulation methods will be used in order to study how and why laminar flows transform into turbulent flows. The simulations will be carried out on super-computers, with more complicated flow cases that what has been possible to study previously.

The project will be carried out in collaboration with researchers internationally.

Reference number: S-2006-1385

Dan Henningson, professor Inst. Mekanik, föreståndare Linné Flow Centre
Tel: 08-790 90 04
E-post: henning@mech.kth.se

PhD student in studies in chaotic atmospheric dynamics

The dynamics of the atmosphere is on the most simple level described by a model equation called the quasi-geostrophic approximation. The solutions to this equations are chaotic but exhibit coherent structures consisting of more or less long lived vortices. In this project the quasi-geostrophic approximation will be investigated through advanced computer simulations. The project aims at a deeper understanding of the dynamics of the atmosphere and can in the long term contribute to improve existing climate models.

Reference number: S-2006-1386

Erik Lindborg, lektor Inst. Mekanik
Tel: 08-790 75 82
E-post: erikl@mech.kth.se

PhD student in development of numerical algorithms for simulation of multi-phase flows

An existing advanced computational algorithm for simulation of fiber suspensions will be further developed and improved. The aim of the project is to obtain accurate results for realistic systems and to this aim the research will be carried out in close collaboration with experimentalists at the flow physics laboratory.

Reference number: S-2006-1387

Anna-Karin Tornberg, lektor NA-gruppen
Tel: 08-790 62 66
E-post: annat@nada.kth.se

PhD student in simulation and modelling of micro-fluids

Inspired by the fast development of micro-systems in the fields of bio-technology and chemistry, there is a rapidly growing interest for flow phenomena at microscopic level.

From the point of view of fluid mechanics such systems are often dominated by surface tension and electrical forces. In this project physical modelling and numerical methods will be developed for micro fluid systems. The research will be carried out in close collaboration with researchers in the fields of numerical analysis and micro-systems, where experimental investigations are also carried out.

Reference number: S-2006-1388

Gustav Amberg, professor Inst. Mekanik
Tel: 08-790 75 34
E-post: gustava@mech.kth.se

PhD student in flow acoustics with emphasise on internal flows

This projects involves fundamental sturies of generation and scattering of sound in internal flows, such as pipe and channel flows. In particular, the coupling between sound and separated flow in the vicinity of edges and corners will be investigated, since there is a lack of understanding of such prucesses. The work will consist of development of advanced experimental methods as well as numerical modelling.

Reference number: S-2006-1390

Mats Åbom, professor MWL
Tel: 08-790 79 44
E-post: matsabom@kth.se

Qualifications

Future activities

- Seminar series and Linné visitors program
- Workshops and summer schools
- Project evaluation and follow-up
- Leadership and career planning activities
- Annual meeting
- Research group meetings

Linné FLOW Centre

Linné FLOW Centre LOGO and Webpages

http://www.flow.kth.se