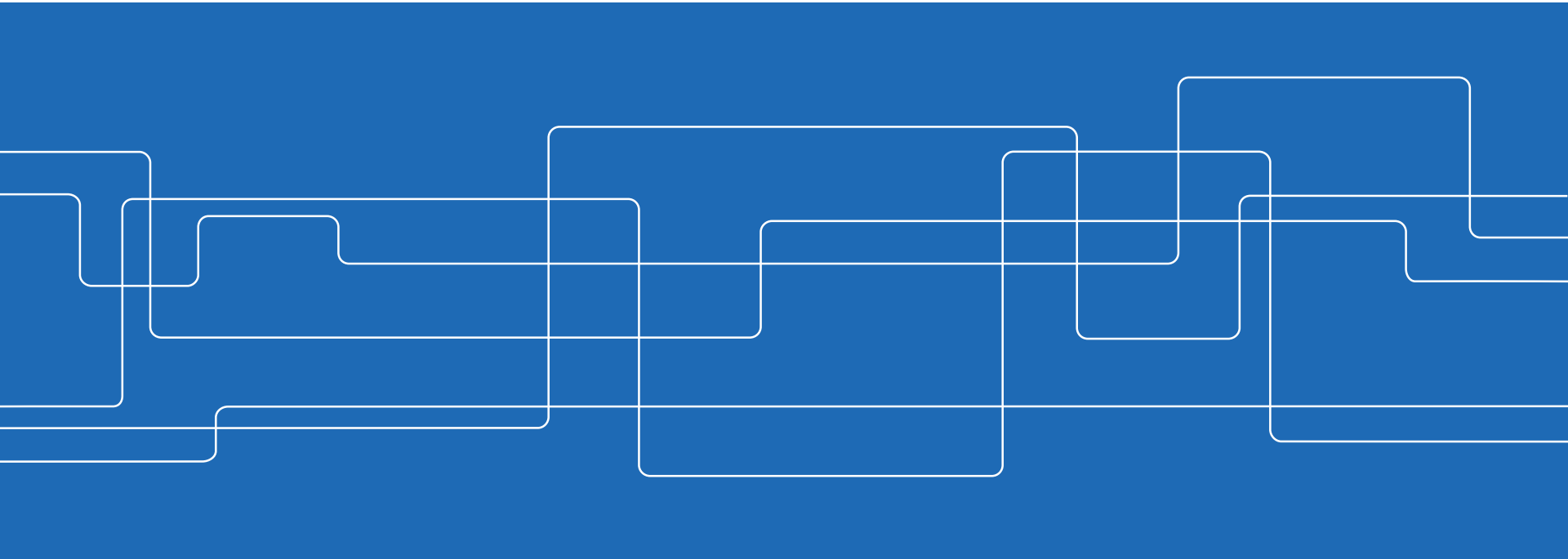




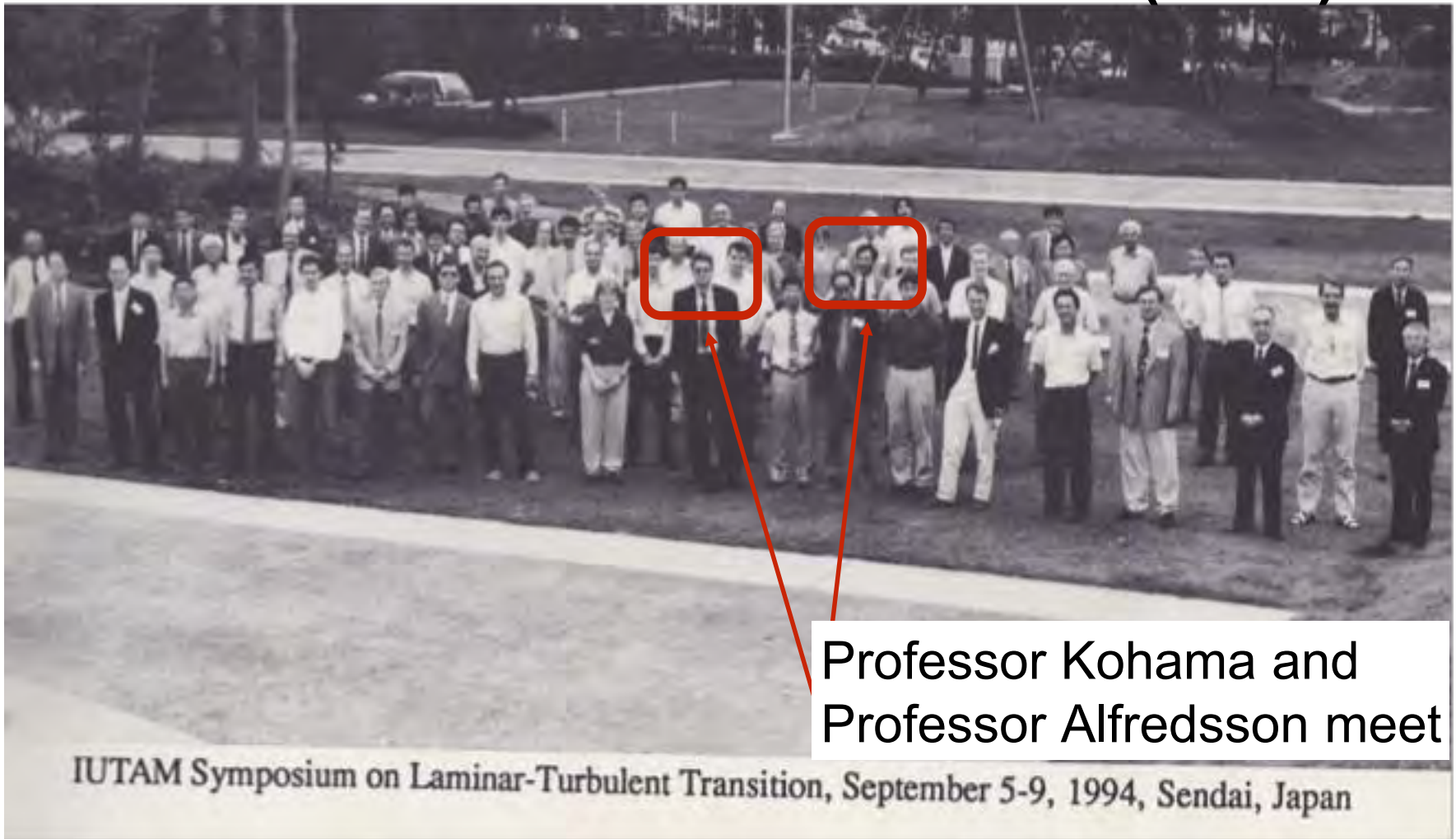
The KTH (Mechanics) and Tohoku University collaboration

Presentation prepared by **Professor Fredrik Lundell**
(with additions by professor emeritus P. Henrik Alfredsson)

KTH Mechanics



IUTAM Symposium on Laminar/Turbulent Transition (1994)



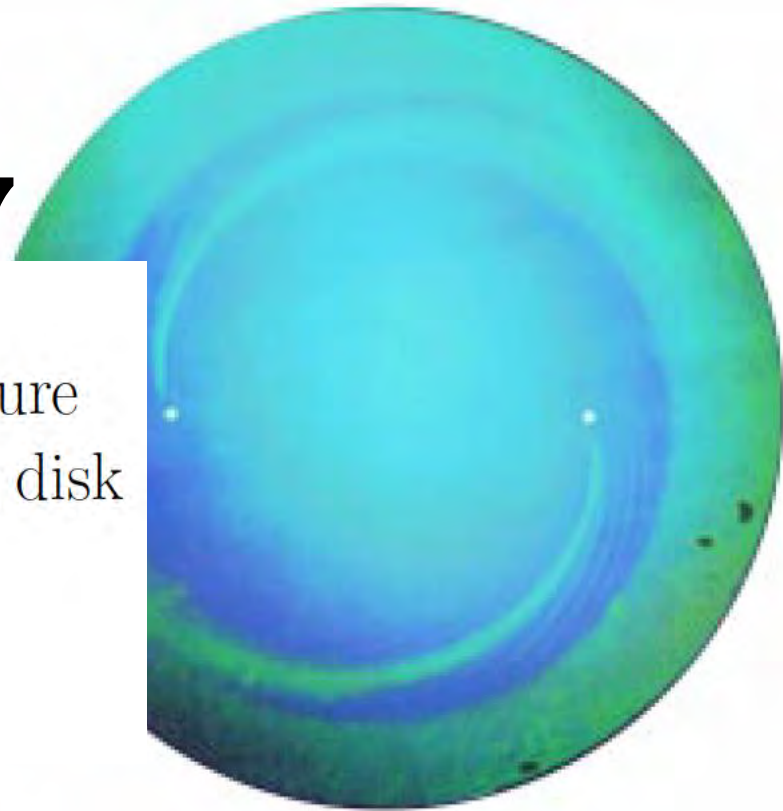


First KTH Mechanics “export” to Tohoku in 1996: Dr M. Matsubara

First student exchange 1997

A study of the velocity and temperature
boundary layers over a heated rotating disk

Alex Cederholm & Fredrik Lundell





Studies in applied fluid dynamics

Tohoku U. Championships 1997

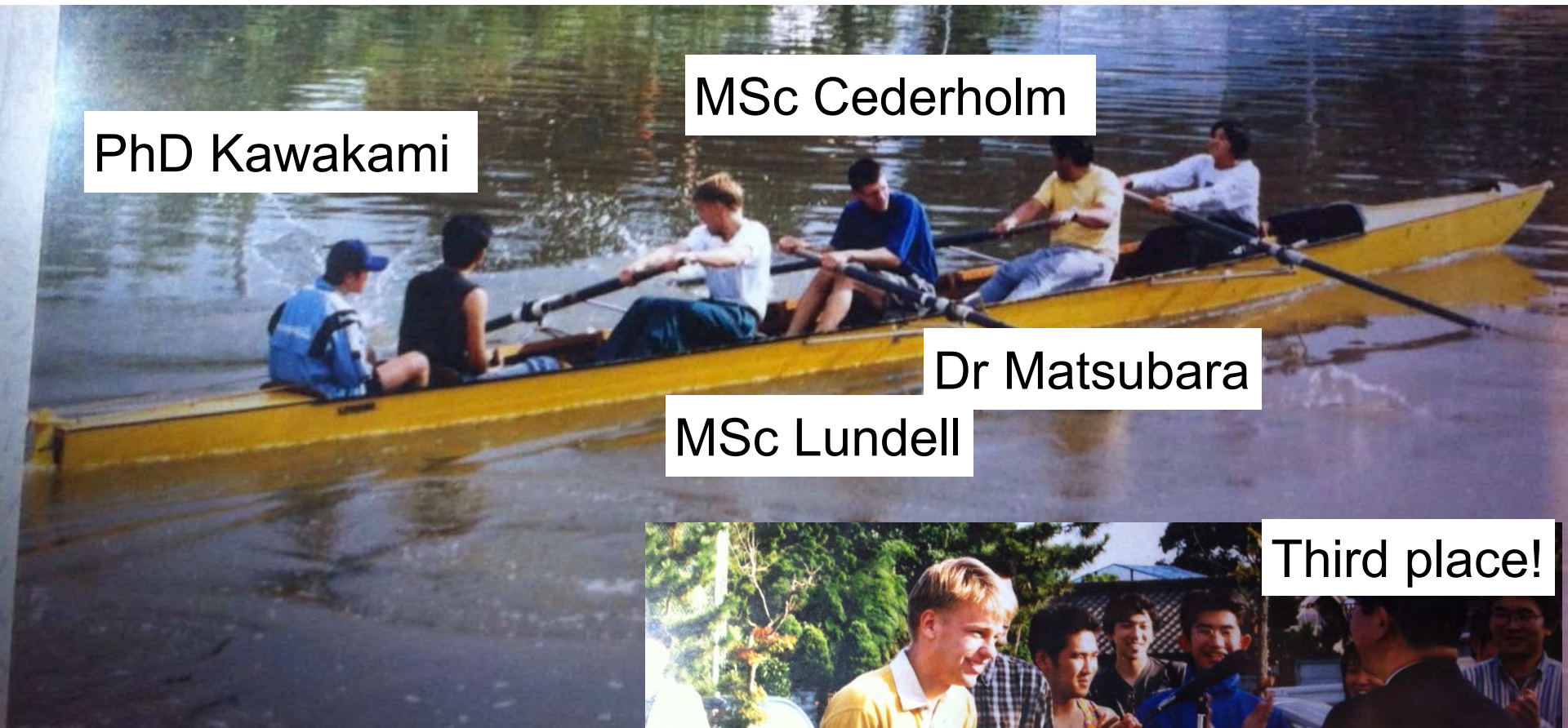
PhD Kawakami

MSc Cederholm

Dr Matsubara

MSc Lundell

Third place!



Early scientific outputs

PhD Kawakami

MSc Cederholm

Springer Link



Experiments in Fluids

February 2003, Volume 34, Issue 2, pp 242–252 | Cite as

Velocity statistics and flow structures observed in bypass transition using stereo PTV

Authors

Authors and affiliations

A. Inasawa, F. Lundell, M. Matsubara, Y. Kohama, P. H. Alfredsson

Article

141

11

Downloads Citations

Experiments on the stability of streamwise streaks in plane Poiseuille flow

Cite as: Physics of Fluids 11, 915 (1999); <https://doi.org/10.1063/1.869962>

Submitted: 29 December 1997 . Accepted: 18 December 1998 . Published Online: 05 March 1999

Per A. Elofsson, Mitsuyoshi Kawakami, and P. Henrik Alfredsson



View Online

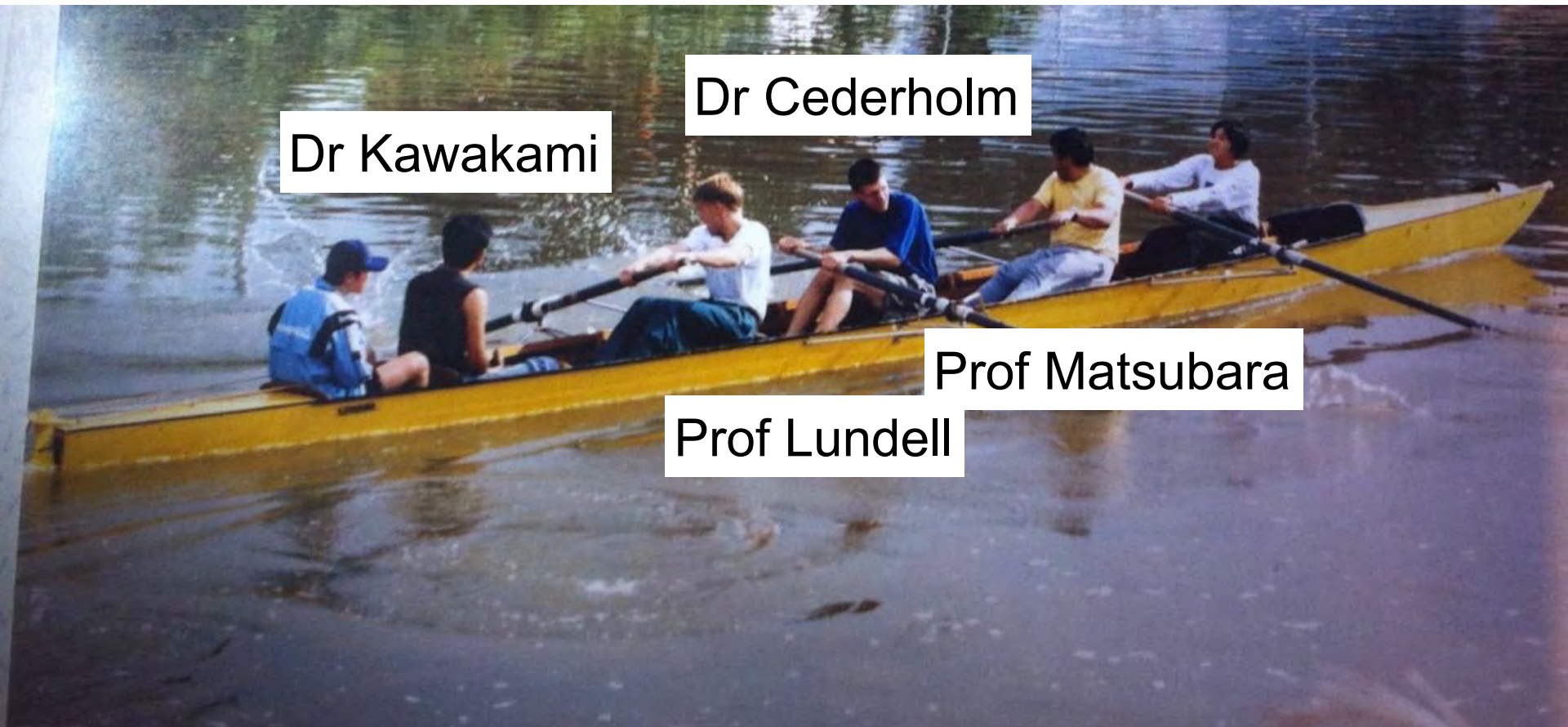


Export Citation

ARTICLES YOU MAY BE INTERESTED IN

Optimal disturbance and bypass transition in boundary layers

Early scientific outputs



Dr Kawakami

Dr Cederholm

Prof Matsubara

Prof Lundell

Collaborative work on estimation

(Lundell, Hayase, Higuchi)



Kentaro Imagawa, Gabriele Bellani, Outi Tammissola, Fredrik Lundell, Hiroshi Higuchi, and Toshiyuki Hayase. "Measurement-Integrated Simulations and Kalman Filter Applied to a Co-Flowing Jet", 5th Flow Control Conference, Fluid Dynamics and Co-located Conferences, 0
<http://dx.doi.org/10.2514/6.2010-4420>

Measurement-Integrated Simulations and Kalman Filter Applied to a Co-Flowing Jet

Kentaro Imagawa, Tohoku University; Gabriele Bellani, Royal Institute of Technology; Fredrik Lundell, Royal Institute of Technology; Hiroshi Higuchi, Syracuse University; Toshiyuki Hayase, Tohoku University
 5th Flow Control Conference
 28 June - 1 July 2010, Chicago, Illinois

Measurement-Integrated Simulations and Kalman Filter Applied to a Co-Flowing Jet

Kentaro Imagawa*
 Graduate School of Engineering, Tohoku University
 Gabriele Bellani†, Outi Tammissola†
 Linné FLOW Centre, KTH Mechanical
 Department of Mechanical and Aerospace Engineering, KTH

AIAA 2010-4420

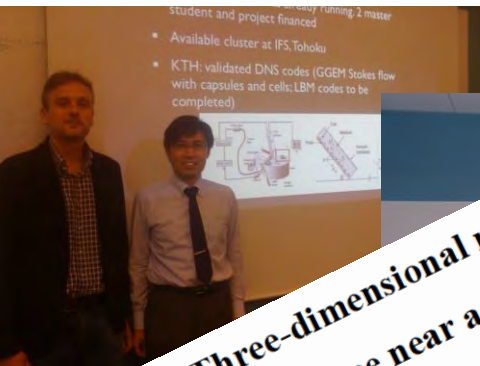


2012: Liaison office established @ KTH Mechanics



2012: Young research

Identified future collaborations



Title: Three-dimensional numerical simulation of the behavior of an erythrocyte subject to an inclined centrifugal force near a plate in a fluid

Defo
Brandt

Author: Suguru MIYAUCHI^{1,*}, Toshiyuki HAYASE¹, Arash Alizad BANAEP², Jean-Christophe LOISEAU² and Luca BRANDT²

Estimatic

Bagheri, Lu

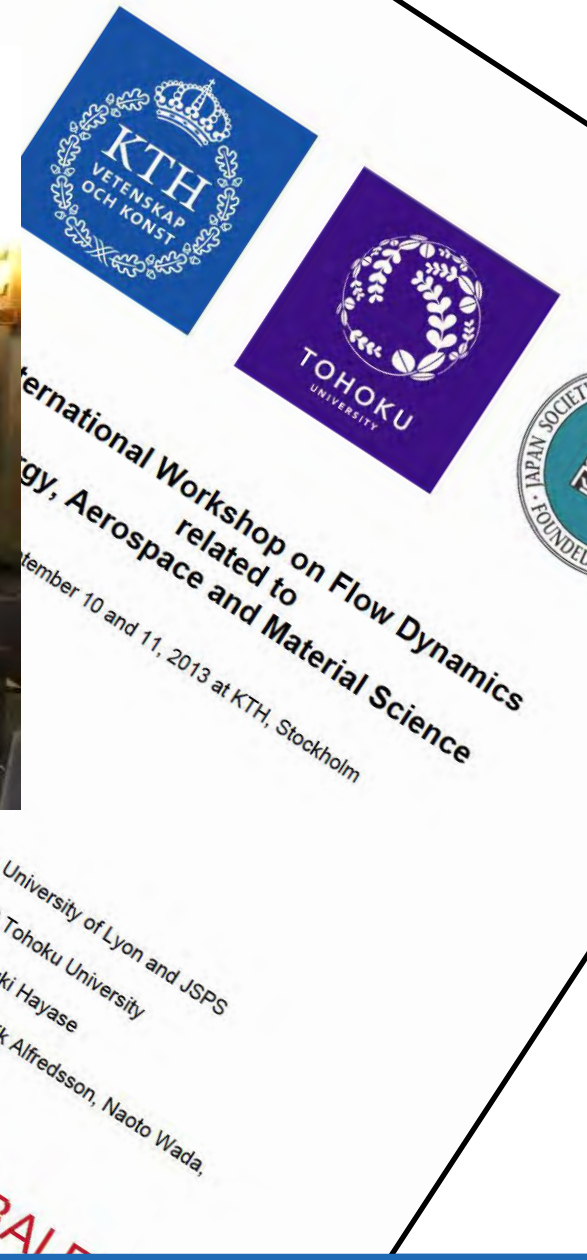
Affiliation:

¹ Institute of Fluid Science, Tohoku University, 2-1-1 Katahira, Aoba-ku, Sendai 980-8577, Japan
² Linne Flow Centre, KTH Mechanics, S-10044 Stockholm, Sweden





2013: Workshop at KTH



Unveiling nameplate at IFS





Continued activities

2014: Workshop in Sendai

2015: Workshop in Stockholm

Double degree student
(Tanabe)

Research visists

(Hirota, Nishio, Appelquist, Takana,
Imoto, Arash, Loiseau, Pastuhoff)



**International Workshop on
Flow Dynamics and Spintronics**

November 12-13, 2015, Royal Institute of Technology, Stockholm, Sweden





Fluid science collaborations 2013-2019

- **Nishio, Fukunishi, Asai, Alfredsson, Kalpakli, Pastuhof:** In-cylinder flow, Rotating disk, PSP
- **Miyauchi, Hayase, Lundell, Bagheri:** Turbulent flow in hybrid wind tunnel
- **Ohta, Lundell et al:** Bone model with cellulose nanofibrils
- **Miyauchi, Hayase, Brandt:** Deformable cells in centrifuge
- **Takana, Lundell:** Cellulose nanofibrils in electric field
- **Kosukegawa, Lundell:** Cellulose filaments in composites



Student exchange B & M (one semester or more)

	14/15	15/16	16/17	17/18	18/19	19/20
Tohoku U students @ KTH	3	2	7	0	6	4
KTH students @ Tohoku U	2	3	9	5	2	4



Some other recent collaborations (PSP, Engine flows, Rotating disk flows)

International Journal of Heat and Fluid Flow 75 (2019) 61–76

Contents lists available at ScienceDirect

International Journal of Heat and Fluid Flow

journal homepage: www.elsevier.com/locate/ijhff

 ELSEVIER

Investigating swirl and tumble using two prototype inlet port designs by
means of multi-planar PIV

A. Kalpakli Vester^{a,1,a}, Y. Nishio^b, P.H. Alfredsson^a

^a KTH Mechanics Osquars Backe 18, Stockholm, SE-100 44, Sweden
^b Graduate School of Engineering, Tohoku University, 6-6-01 Aramaki-Aoba, Aoba-ku, Sendai, 980-8579, Japan

Check for updates

Citations ▾ Metrics ▾

nsitive paint data by singular

HEAT FLUID FLOW



Brief summary

Participation at ICFD (*Alfredsson, Lundell, Eliasson and students*)

Wind tunnel experiments on stability and transition delay at KTH

(*Kawakami 96/97, Kikuchi & Inasawa 2000/01, Yoshioka, 2002/04*)

Short course on Hydrodynamic stability (*Sendai, Alfredsson 2004*)

Collaborative work on *Estimation and Liquid Crystal Measurements*

Research visits by students/faculty (*Imagawa, Sone, Nishio, Medici, Pastuhoff, Appelquist....*)

and more

**..... and hopefully continued fruitful
exchanges and collaborations
between researchers from
KTH (Mechanics) and Tohoku University**

Lundell



Bagheri



Brandt



Prahl Tammisola

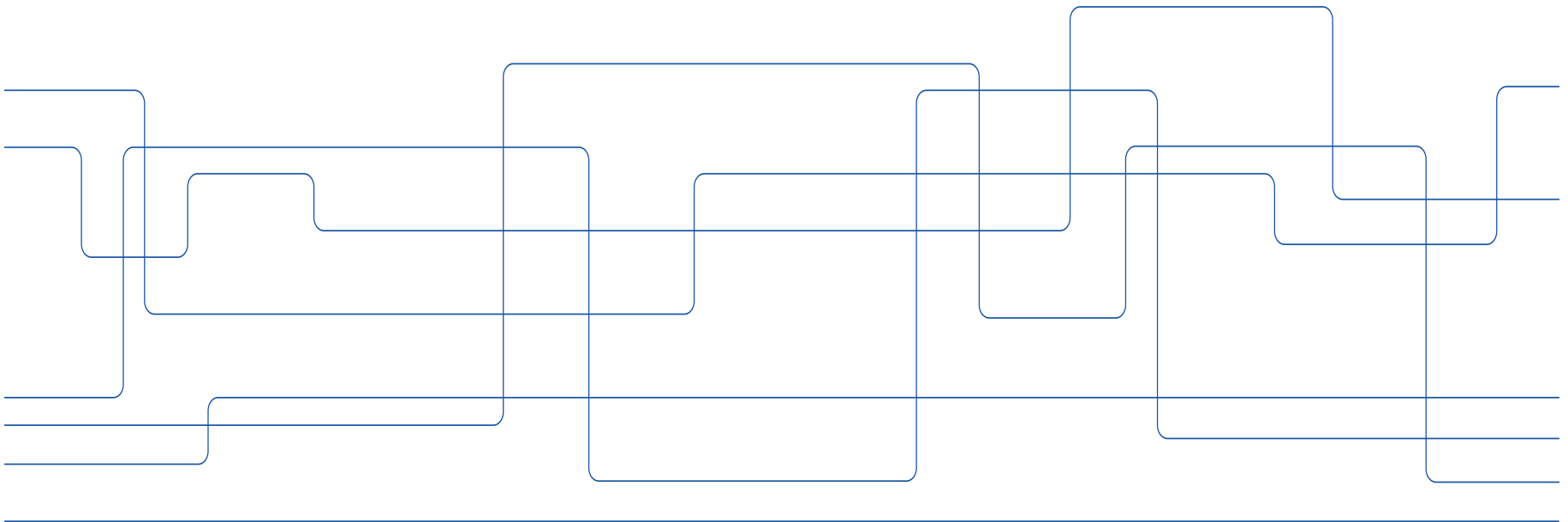


....to be continued !



**KTH ROYAL INSTITUTE
OF TECHNOLOGY**

This is KTH





One of Europe's leading technical universities





Swedens largest technical university

- Close to 14,000 full-time students (one-third women).
- Close to 1,700 research students (one-third women).
- More than 3,600 full-time positions (one-third women).
- Five campuses in the Stockholm region.



World-class ranking

QS World University Ranking

- 98th university in the world
- 19th in Electrical Engineering
- 23rd in Architecture / Built Environment
- 26th in Mechanical Engineering
- 26th in Materials Science
- 39th in Statistics & Operational Research
- 41st in Computer Science & Info Systems
- 43rd in Civil & Structural Engineering
- 44th in Mathematics

Times Higher Education (THE)

- 187th university in the world
- 72nd in Europe
- 7th in the THE Impact Rankings



Research and education for a better future

KTH's core values

KTH's activities are based on the conviction that education and research can and should contribute to better living conditions and to societal development that is ecologically, economically and socially sustainable.

As a technical university, KTH has a special responsibility to develop and communicate the necessary knowledge to promote such sustainable development.

KTH's focus rests on four pillars:

- Sustainability
- Gender equality
- Internationalisation
- Digitalisation



Sigbritt Karlsson, President of KTH



Working for sustainable future

Active participation in the transition towards a sustainable future is part of KTH's responsibility. KTH contributes to sustainable development by educating, researching and collaborating with society at large.

- Sustainability is incorporated into all of KTH's educational activities.
- A systematic approach to sustainable development in research contributes to an increased understanding of and greater interaction between technology and social, ecological and financial systems.
- Collaboration with industry and society enables new knowledge to be applied.
- KTH's activities have environmental certification in accordance with the international environmental management standard ISO14001.



Gender equality, diversity and equal opportunities

Gender equality and the rejection of all forms of discrimination are a self-evident component of KTH's core values.

Diversity among employees and students is an important resource for KTH to provide new perspectives and broader experiences.

- A process has been launched to implement knowledge of gender equality and diversity issues in all educational and research programmes.
- Gender equality modules are being introduced in an increasing number of courses and are driving the organisation towards a more gender-equal environment.
- The KTH Equality Office has been established as a permanent unit whose function is to systematically coordinate and support KTH's overall gender equality work.

An international environment

Internationalisation is an important aspect and a mindset across all of KTH's activities

- An international faculty and student body create an excellent environment.
- Great opportunities for students to study or do their degree projects abroad.
- Mobility programmes for teachers and staff.
- Global collaborations and partnerships.
- Partnerships with prominent international universities.





Digitalisation

Digitalisation is revolutionising education and research, and KTH is making major investments to exploit the opportunities on offer.

Initiatives to drive development are taking place in a number of areas:

- Digital courses, exercises and self-assessment.
- Changes in the planning and implementation of courses.
- Changes in educational methods and the physical design of educational facilities.
- Large-scale research projects together with industry and society.



Education at KTH



Education for the future

Our educational programmes are about building the society of the future, developing good living environments and providing good development conditions for the business community.

- Focus on practical application.
- Collaborations with leading universities around the world.
- Tremendous opportunities for students to study or do their degree projects abroad.





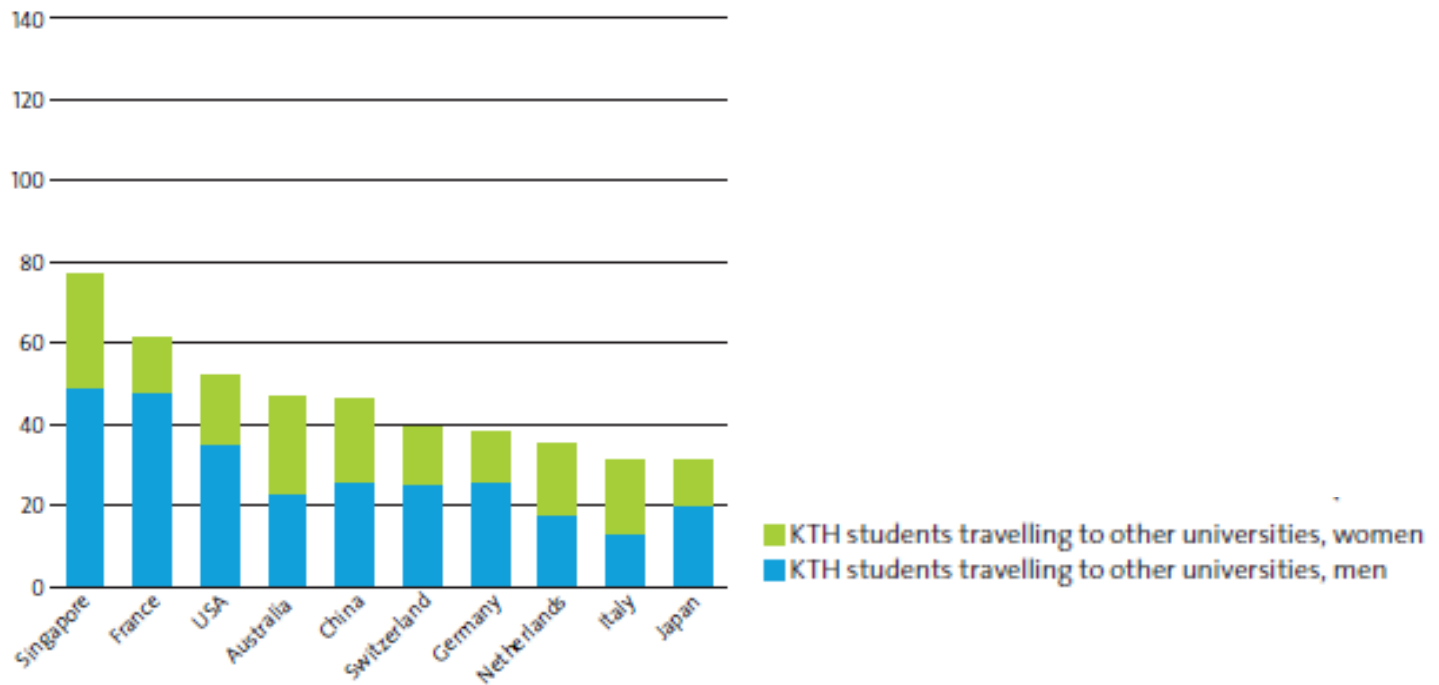
High-quality programmes

The following degrees are awarded at KTH:

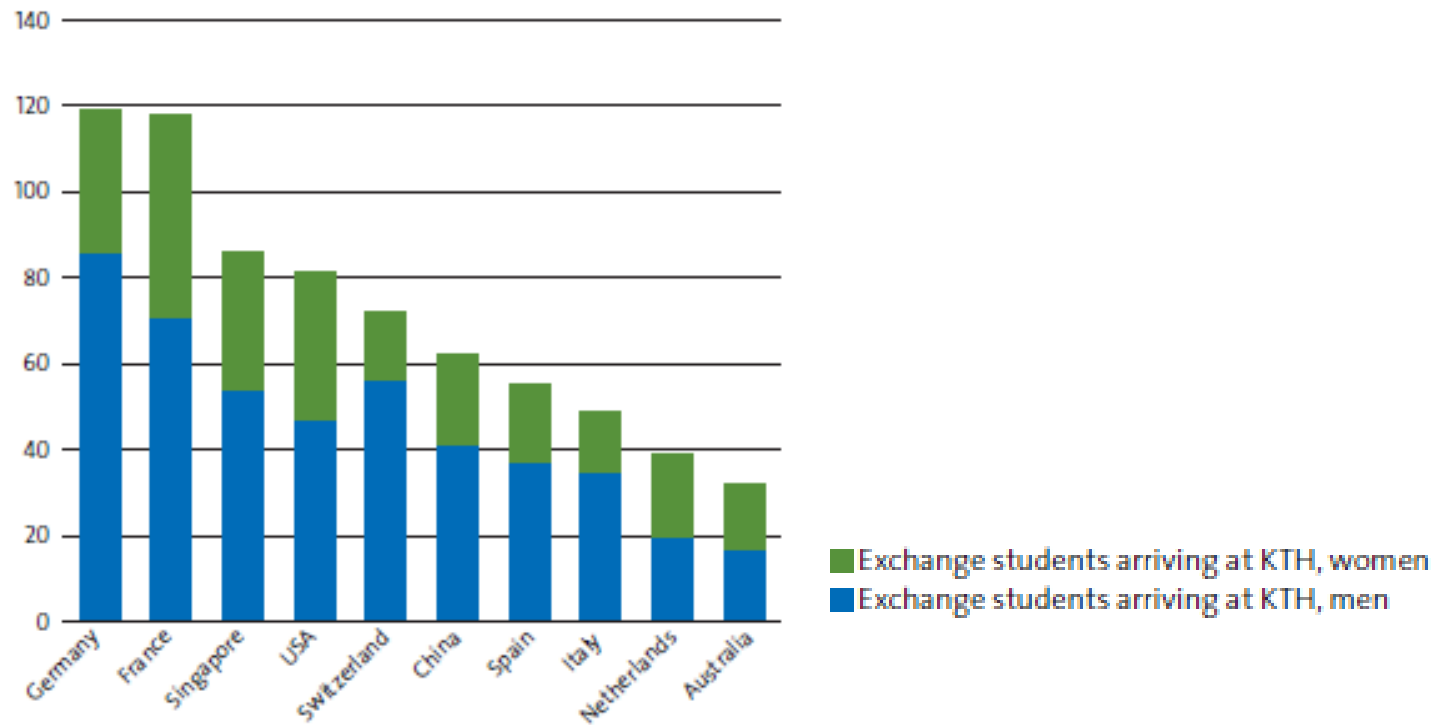
	General qualifications	Professional qualifications
First cycle	Higher Education Diploma Bachelor of Science	Bachelor of Science in Engineering Bachelor of Science in Education
Second cycle	Master of Science 60 credits Master of Science 120 credits	Master of Science in Engineering Master of Architecture Master of Science in Education
Third cycle	Licentiate of Engineering Doctor of Philosophy	

Over 60 Master's programmes in nine fields with strong links to research and industry.

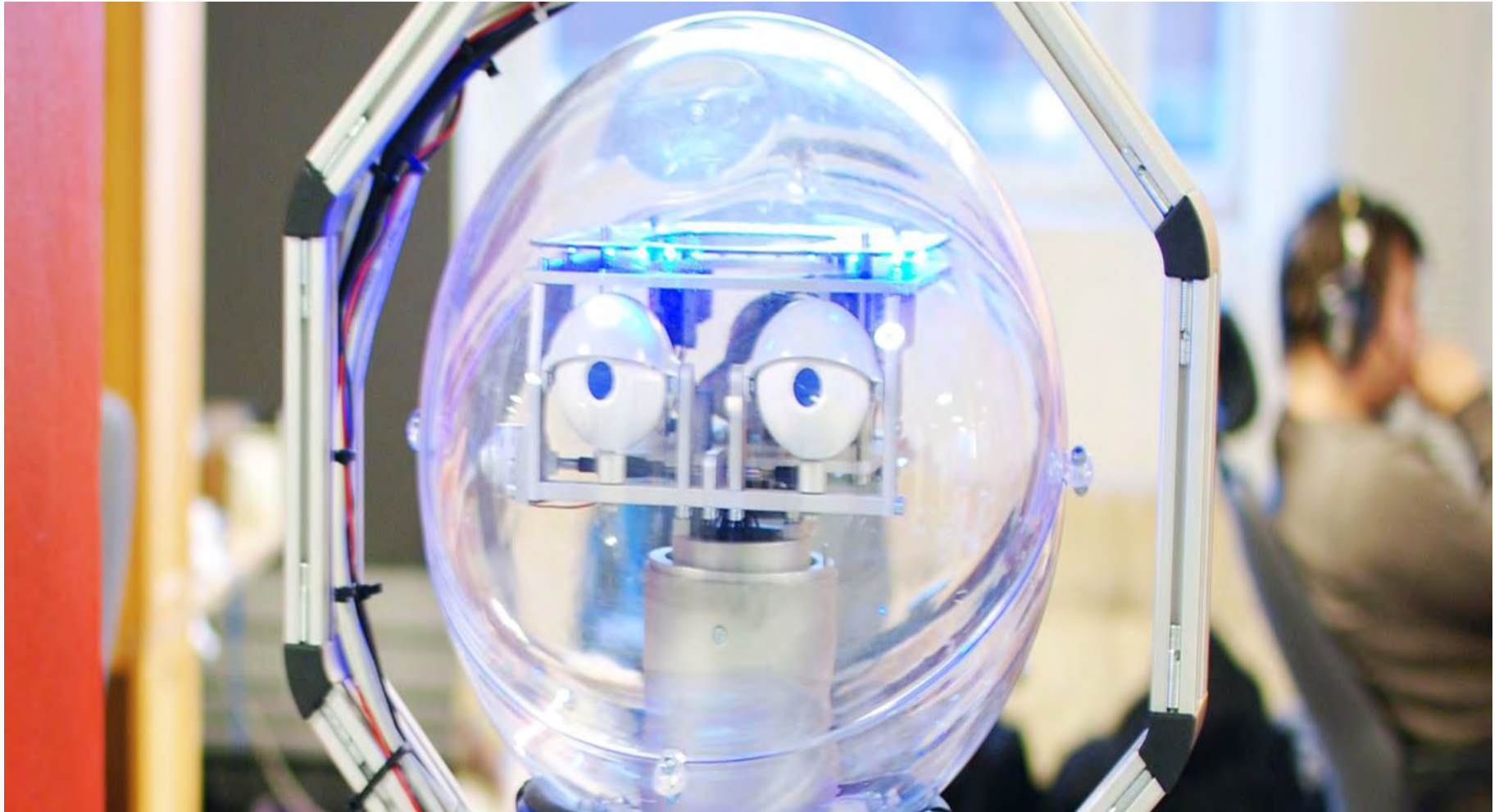
Student exchange - outbound students



Student exchange - inbound students



Research at KTH



Innovative thinking - unlimited possibilities

KTH research and education encompasses a wide range of disciplines; engineering, natural sciences, architecture, industrial management, urban planning, history and philosophy.

Research focus areas; digitalisation, energy, industrial transformation, life science technology, materials, transport.



Collaborative approach to research

Close collaboration with industry and society creates the potential for implementation of research results.

Personnel exchanges offers strategic mobility:

- Adjunct professors
- Doctoral students
- Affiliated faculty



Competence centres enable collaborations

Competence centres dedicated to new subject areas are one way to enable collaborations.

Around fifty competence centres are located at KTH.

They are managed in partnership with leading companies, government institutions and other universities.



From idea to innovation

Each year some 300 ideas, born out of KTH's research and education, start the journey from idea to innovation.

An internationally recognised process that includes coaching, legal and financial advice and turns ideas into businesses.





Collaboration at KTH





Collaborating on a brighter future

- High-quality research benefits society today and in the future.
- A collaborative approach ensures implementation of research.
- Partners gain access to the university's cutting-edge research infrastructure and advanced laboratories, as well as the intellectual resources of students and faculty.
- Interaction with 65,000 alumni network ensures a global collaboration base.



Strategic partnering with companies, institutes and public organisations

- Skanska
- Bombardier
- Vattenfall
- Scania
- Ericsson
- Region Stockholm
- SAAB
- Sandvik
- Stockholms stad
- ABB
- Stora Enso



Strategic partnering with universities

- Hong Kong University of Science and Technology (HKUST)
- Nanyang Technological University
- Shanghai Jiao Tong University (SJTU)
- University of Illinois at Urbana-Champaign
- University of Tokyo

Financial figures



Field of activity 2018 (2017)

Total MSEK 4,786 (4,549)



Field of activity	2018	2017
First and second level studies	31.5	30.5
Purchased courses	0.2	0.3
Commissioned courses	0.3	0.2
Research and doctoral studies	65.4	66.5
Commissioned research	2.6	2.5

Sources of income 2018 (2017)

Total MSEK 4,786 (4,549)



Sources of income	2018	2017
Government grants for education first and second level studies	24.2	23.7
Government grants for research and doctoral studies	25.2	26.0
Research Council	7.3	8.4
Other government agencies	15.6	16.7
Strategic foundations	3.5	2.7
EU	5.9	6.0
Private / Other	18.3	16.5