**RIMS Camp-Style Seminar: Dynamics of wall-bounded shear flows**

**August 31 (Wednesday)**

13:20-13:30 Opening remarks

13:30-15:00 Chair: Susumu Goto

13:30-14:30 “Edge states in boundary layer flows and relevance to bypass transition”

Yohann Duguet (LIMSI-CNRS)

14:30-15:00 “Unstable periodic orbits in LES plane Couette flow”

Eiichi Sasaki, Genta Kawahara (Osaka Univ.)

and Javier Jimenez (Universidad Politecnica de Madrid)

15:00-15:30 Break

15:30-17:00 Chair: Lennaert van Veen

15:30-16:00 “Shape Optimization of Flow Fields improving Hydrodynamics　Stability”

Takashi Nakazawa (Tohoku Univ.)

16:00-17:00 “Self-sustaining process and periodic orbits in a statistically-stationary homogeneous shear turbulence”

Atsushi Sekimoto (Monash Univ.)

18:00- Diner

**September 1 (Thursday)**

**09:30-11:30 Chair: Genta Kawahara**

09:30-10:30 “Coherent structures at large Reynolds numbers”

Kengo Deguchi (Monash Univ.)

10:30-11:00 “Spectra of turbulent energy transport and pressure-strain in a channel flow”

Yoshinori Mizuno (Doshisha Univ.)

11:00-11:30 “Direct numerical simulation of stratified turbulence containing a high Prandtl number scalar”

Shinya Okino and Hideshi Hanazaki (Kyoto Univ.)

12:00-14:00 Lunch

14:00-15:30 Chair: Yohann Duguet

14:00-15:00 "Some recent results on the transition to box turbulence"

　　　　　　Lennaert van Veen (UOIT), Susumu Goto (Osaka Univ.),

Jean-Philippe Lessard, Jan-Bouwe van den Berg and Maxime Breden

15:00-15:30 “Development of perturbations having different vortex structures toward a turbulent puff in a pipe”

　　　　　　Yuji Tasaka, Kotaro Nakamura, Shun Ishizaka, Jumpei Ohkubo,

Yuichi Murai (Hokkaido Univ.) and Tom Mullin (Univ. of Manchester)

15:30-16:00 Break

16:00-17:30 Chair: Michio Yamada

16:00-16:30 “Bifurcation to a transient turbulent puff in pipe flow”

Masaki Shimizu, Genta Kawahara and Naoto Onishi (Osaka Univ.)

16:30-17:00 “Domain size dependence of the lifetime and the transition in plane channel flow”

Takahiro Kanazawa, Masaki Shimizu and Genta Kawahara (Osaka Univ.)

17:00-17:30 “Transition to turbulence in shear flow as non-equilibrium phase transition”

Keiichi Tamai and Masaki Sano (Univ. of Tokyo)

18:30- Diner

**September 2 (Friday)**

**09:30-11:30 Chair: Atsushi Sekimoto**

09:30-10:30 “The control of near wall turbulence through surface texturing”

Ricardo Garcia Mayoral (Univ. of Cambridge)

10:30-11:00 “Experimental study on the energy cascade in turbulence in a precessing sphere”

Yasufumi Horimoto and Susumu Goto (Osaka Univ.)

11:00-11:30 “Optimization of heat transfer enhancement in wall-bounded shear flow”

Shingo Motoki, Genta Kawahara and Masaki Shimizu (Osaka Univ.)

**Abstract**

**Yohann Duguet (LIMSI-CNRS)**

When a boundary layer starts to develop spatially over a flat plate, only disturbances of sufficiently large amplitude survive and trigger turbulence subcritically. After discussing the associated phenomenology, I will show unstable coherent structures (edge states) found numerically, along with the mechanisms responsible for their self-sustenance and their localisation properties. Two examples of boundary layer flows will be treated: the Blasius boundary layer and the asymptotic boundary layer flow. Finally I will show how to incorporate learnings from these unstable solutions in order to build a reduced-order model for the full transition mechanism using a probabilistic cellular automaton.

**Kengo Deguchi (Monash Univ.)**

When a fluid flows at high speed it becomes turbulence to produce a myriad of vortices. The dependence of such vortices on Reynolds number is of great concern. However, although the equations governing fluid flows are well established as being Navier-Stokes equations, the nonlinear and chaotic nature of turbulence present fundamental difficulties in theoretical and numerical investigations. In recent years there has been much interest in the equilibrium solutions of Navier-Stokes equations and their large Reynolds number asymptotic limit to approach that problem. In this talk I will first provide a brief introduction of large Reynolds number asymptotic theories developed over the years, and then give an overview of some recent progresses in this direction of research.