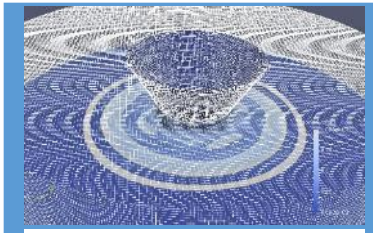
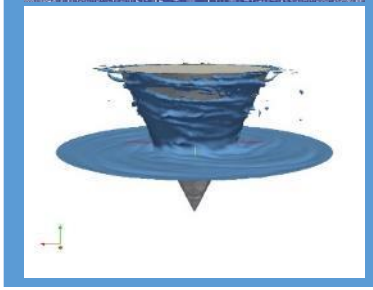
Introduction of Adachi lab. (Fluid Flow and Heat Transfer)

Fluid flow of water and air, and transport of heat and energy are investigated from visualizations to numerical calculations using a super computer in our laboratory.





Applications

Atomization of liquid

Study for making an efficient device to generate small water droplets and its applications

Environment

Robot which can move on water surface in zig-zags. How on a space??

Renewable energy

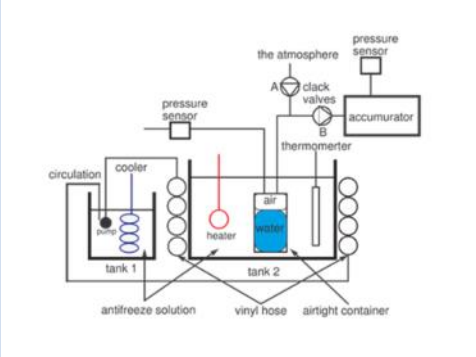
Plate-type heat exchanger

Heat transfer is enhanced by setting a disturbance promoters on plate surface. Ocean Thermal Energy Conversion system adopts the plate-type heat exchanger!

Local energy of nature

Development of cold energy

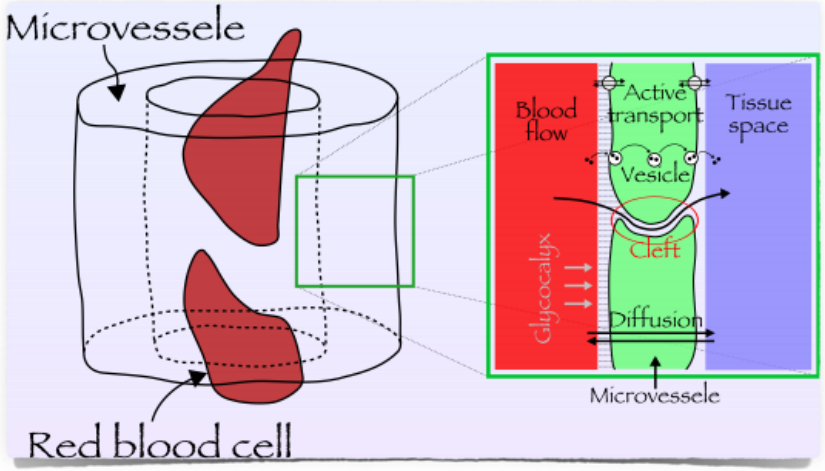
We develop a new method how to use cold energy such as snow, ice, cold outside air



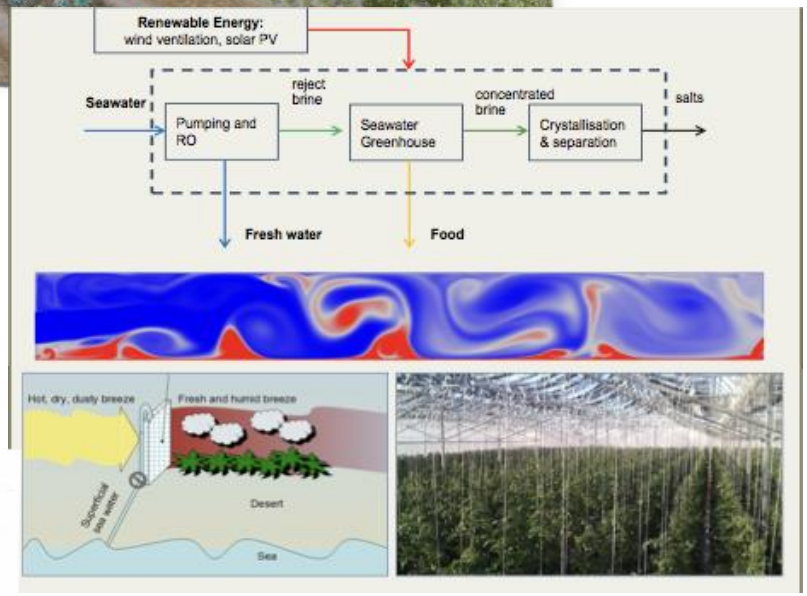
Facebook is available (many interesting movies) **https://www.facebook.com/Adachi.lab**

Introduction of Bio Fluid Eng lab. (Akinaga)

Bio-Fluid: microcirculation

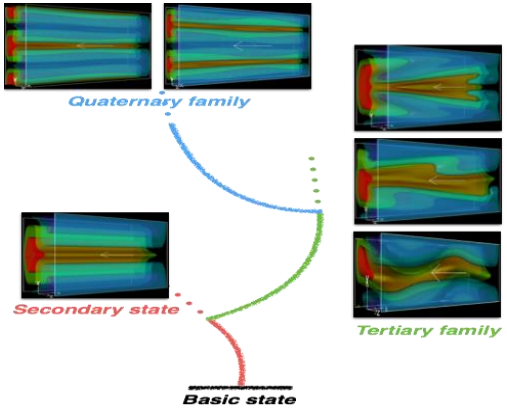


Heat & Mass transfer: Sustainable agriculture in horn of Africa



Validation of turbulence obtained by experiments: Sequential bifurcation approach

Bifurcation tree



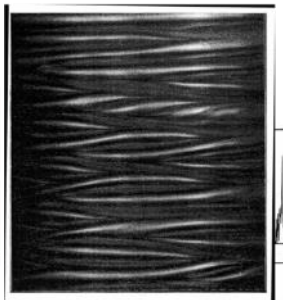


FIG. 12. Close-up of braided vortices for the conditions of Fig. 3.

Andereck et.al: Taylor-Couette flow (Phys. Fluids 1983)

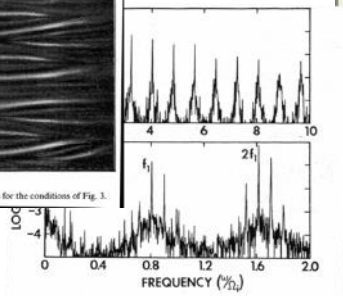
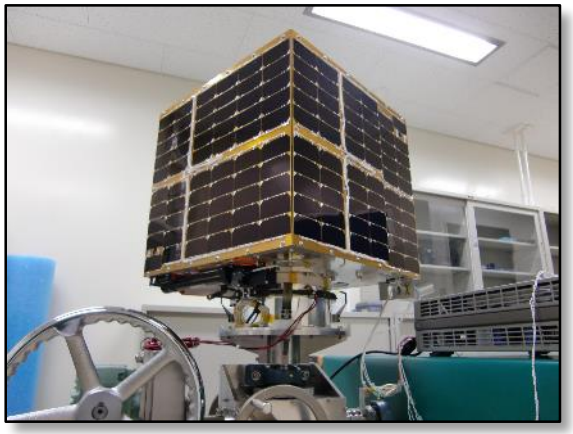


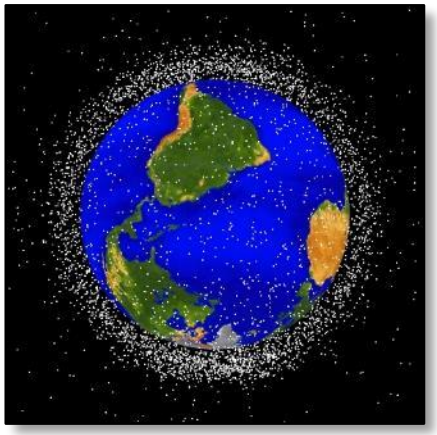
FIG. 13. Scattering intensity power spectra of a braided-vor
($R_o = 890$, $R_i = 1200$, $\Gamma = 30$) showing: (a) the harmonic structu
high frequencies, and (b) the sharp component at the pattern rotati
f_1, its linear combinations with other components, and weak broa
nents.

Introduction of Hirayama lab.

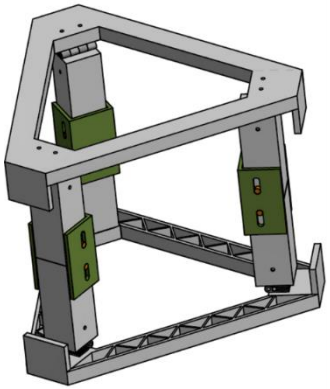
Astrodynamics, Spacecraft System Design,
Space Robotics and Planetary Exploration.



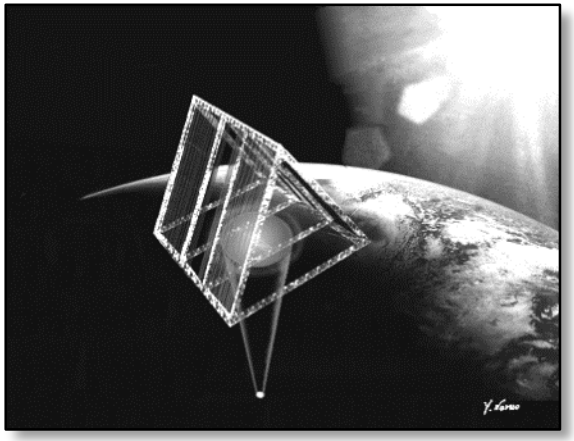
Micro Satellite



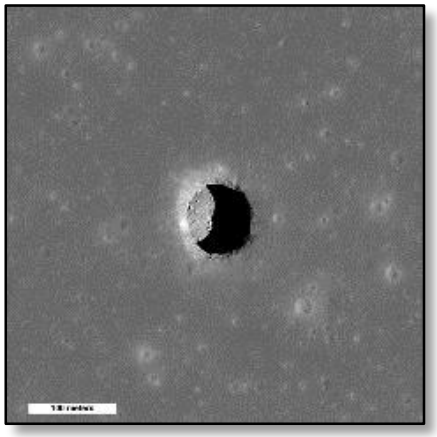
Space Debris



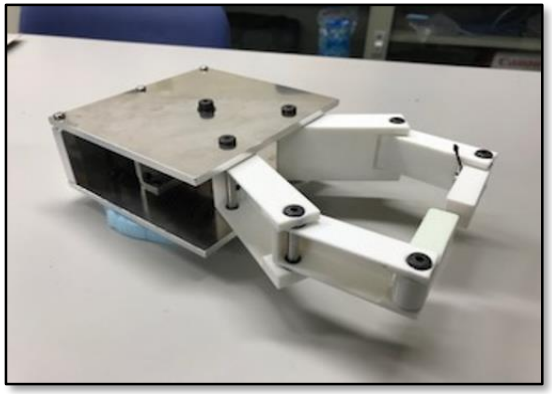
Space Structures



Solar Power Satellite



Moon and Planetary Exploration



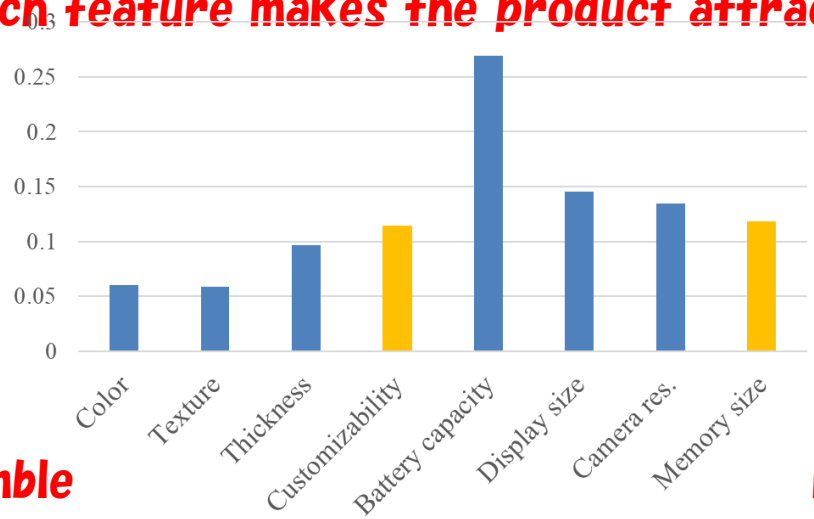
Space Robotics

Introduction of Mishima lab.

Research topics are “eco-efficient design focusing on both visual design and functions,” “easy-to-disassemble design,” “proposal of remote recycling,” etc.

Which feature makes the product attractive?

Battery life?



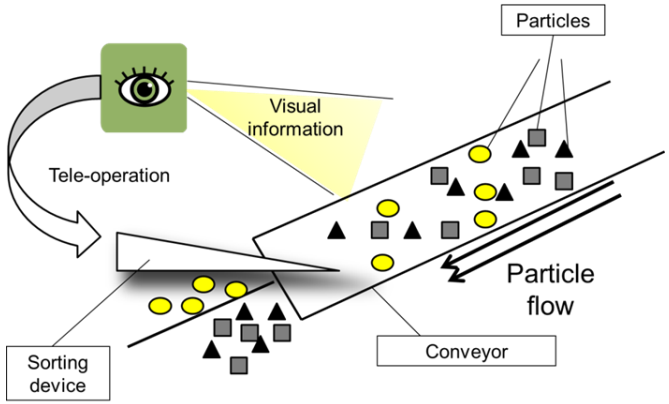
Texture?

Easy-to-disassemble design

Proposal of a resource-efficiency index

$$\text{resource efficiency} = \frac{\left(\sum_{i=1}^{n} \frac{\text{specific value of function } i}{\text{reference value function } i}\right) \times \sum_{j=1}^{m} C_j \frac{V_j}{V_1} L_j + \sum_{k=1}^{l} CC_k \cdot \frac{VC_k}{V_1} \cdot LC_k}{(1-R_u)\sum_{u=1}^{nr} TMR_u - R_r \sum_{r=1}^{nr} TMR_r}$$

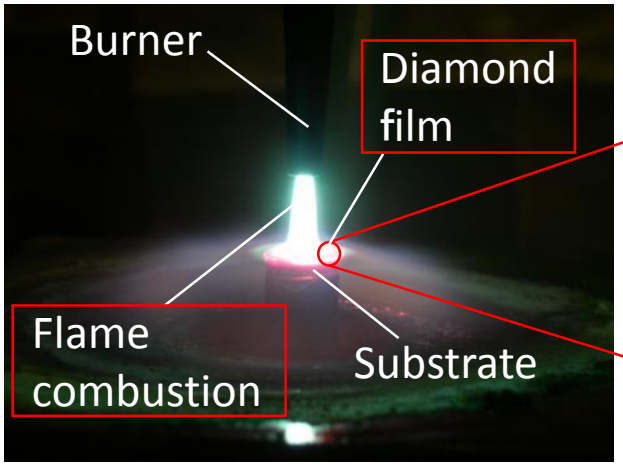
New recycling process

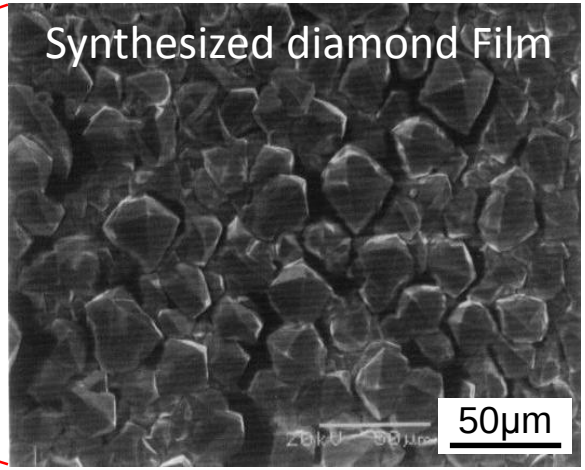


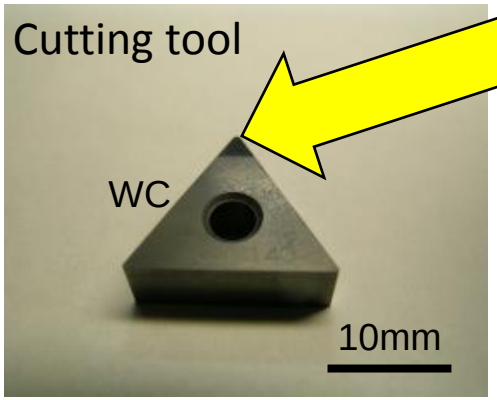
Proposal of remote recycling

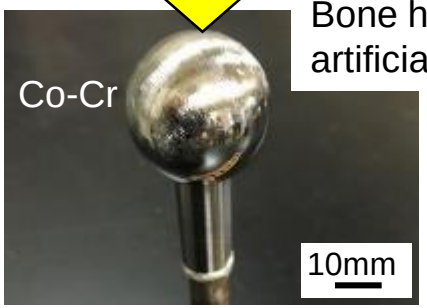
Introduction of Takahashi lab.

Diamond has excellent properties, namely, high hardness and high wear resistance. The flame combustion method enables the synthesis of diamond in ambient air. If diamond films can be directly synthesized on the material surface and good adhesion can be achieved, surface improvement in terms of the high hardness and ultimately in terms of wear resistance can be realized. We have synthesized diamond films on materials surface of cutting tool, artificial hip joint and dental implant by the flame combustion method.







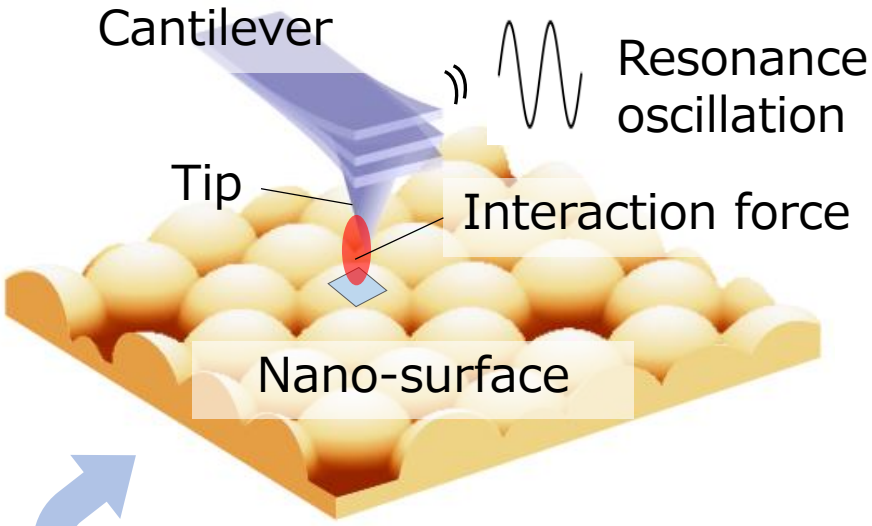


Bone head for artificial hip joint

Introduction of (Kinoshita, Nano-surface science)

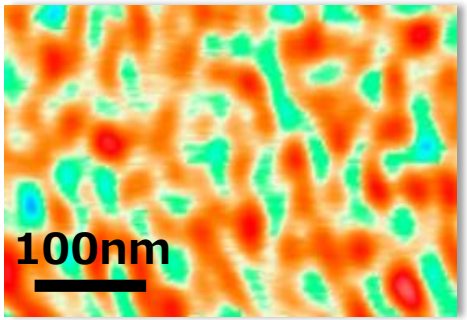
Development of novel quantitative method to measure the surface electric/magnetic quantity on nano-scale surfaces using atomic force microscopy(AFM).

Atomic force microscopy

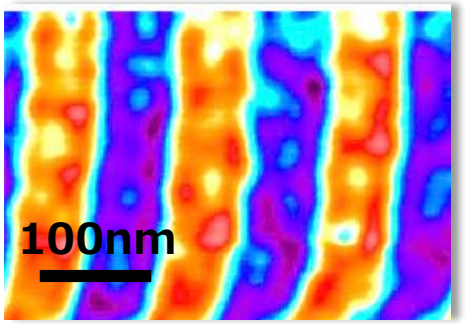


Surface Imaging

Nano-structure



Physical prosperities



Electronic/magnetic devices, nano materials