## **Division of Environmental Studies**

## **Department of Ocean Technology, Policy and Environment**

Laboratory	Faculty	Introduction of research activities and laboratory	Key words	Projects or activities summer program students can participate
Ocean Resource and	Dr. Hideyuki SUZUKI	One of the key challenges of humankind in the 21st century is to	Ocean renewable energy;	We have a variety of research topics related to ocean
Energy Laboratory	Dr. Shinichiro	establish a sustainable society. Developing new types of resources	floating offshore wind	renewable energy and ocean natural resources and the
	<u>HIRABAYASHI</u>	and energies that reduce global warming and negative environmental	turbines; ocean space	applicant can choose what he/she wants to do after
		impact is a key issue. The ocean provides such opportunities.	utilization; floating systems;	acceptance. Some examples we can offer are the
		Development of ocean renewable energy such as offshore wind,	ocean natural resources	design/manufacture of the novel floating wind turbines,
		ocean current, thermal, wave, and solar energies is one of the areas		measurement and analysis of dynamic response of floating
		of our research. In addition, research on development of platform		platform, development of effective wave absorbing system,
		technologies such as riser, floating platform, station keeping and		and measurement of vortex field in the wake of a floating
		materials are investigated. Main areas of laboratory research are (1)		body. Experiments will be done in the wave tank in our
		ocean renewable energy, (2) mineral resources, (3) CO2 ocean		laboratory.
		sequestration, (4) space utilization for transportation, and (5) storage		
		of resources.		
Takagi Laboratory	Dr. Ken TAKAGI	We are developing ocean technologies which can overcome big	Ocean renewable energy;	We are developing a floating type ocean current turbine
		issues such as depletion of natural resources, food crisis and global	Ocean current; Current	system as stated above. The device has two big turbines
		warming, and basing on the experience of development we make	simulation; Environmental	whose diameter is about 40m for the 2MW system. We
		policy recommendations. For this purpose, we are operating several	impacts	have already showed that our proposed system can be
		marine projects and trying to identify key technologies in each project.		stably moored by a single mooring system with
		Now, we focus on the ocean current turbine system, which convert		weathervane functions, and demonstrated by a scale
		ocean current energy to electricity. So far, we formed a consortium		model in offshore model basin. However, we still have
		with several private companies, and we developed a prototype		many concerns. One of measure concerns to
		floating current turbine which will be deployed next year. We are		commercialize the proposed system is whether the system
		expanding the research field to conventional offshore development		is feasible or not in realistic ocean current which has small
		such as a floating logistics terminal, marine drones and riser casings.		fluctuations, because we found the fluctuation strongly
		These technologies are useful for offshore oil & gas development in		affects the fatigue life of the turbine. To give an answer to

developing countries. Our final goal is make a proposal of ocean technology policy in comprehensive and systematic fashion.    Light   Process   Light   Light	Í	İ	1	İ	1
Using these data, we will perform a fatigue assessment in which summer program students taxe horwiseds of fluid dynamics and/or mechanics of materials. However, all student who are strongly wiling to study the marine renewable energies can participate.  Documeroprochy.  Laboratory  The following research activities are on-going: i) next generation wave forecasting under severe condition and ice-covered sea; ii) Hindicasting extreme wave events; iii) optimum routing of sailing cargo ship; iv) development of entry Tsunami Warning system. In the next generation wave forecasting, we will develop a model that combines spectral wave model and phase resolving wave model in a consistent manner. The application will be forecasting wave condition under severe storm and in an los-covered sea. Field experiment will be conducted using stereo photogrammenty to reconstruct 3D surface wave geometry. In the ocean renewable energy project, we have recently completed a 21 year wave hindicast to estimate manner wave energy resources near the coast. We will enhance this wave model to improve the forecast skill of typhon and bomb cyclone conditions. The third topic includes analysis of marine winds based on reanalysis as well as ensemble forecasts. A sailing cargo ship navigation support system is under development and will be utilized to identify optimum route to dramatically reduce the use of fossil fuel energy. The fourth project aims to plan for the real-time monitoring of Mega-Tsunami. Possibility of the use of satellitie and air-borne remote sensing is considered.			developing countries. Our final goal is make a proposal of ocean		this question, we have conducted an ocean current
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					have any experience. The research topics can be

		determined upon discussion with Prof. Waseda prior to the
		visit to Japan via e-mail exchange. We are happy to host
		those who are interested not only in research but also in
		learning about Japanese culture.