

Dottorato in Automatica, Robotica, Bioingegneria

Corso breve (16 hrs.) su:

Underwater robotic systems

Prof. John R. Potter,
National University of Singapore

Le lezioni si terranno nell'aula didattica del Dipartimento di Sistemi Elettrici e Automazione, Facoltà di Ingegneria, via Diotisalvi 2, Pisa, con il seguente orario:

Giovedì 2 ottobre: 11.00 – 13.00; 14.00 – 16.00

Venerdì 3 ottobre: 11.00 – 13.00; 14.00 – 16.00

Giovedì 9 ottobre: 11.00 – 13.00; 14.00 – 16.00

Venerdì 10 ottobre: 11.00 – 13.00; 14.00 – 16.00

E' previsto, in maniera facoltativa, un esame finale

Il corso sarà tenuto in lingua inglese.

Programma del corso:

Some examples of commercial autonomous vehicle systems (~2 hrs):

Large, long-range, deep-water: Theseus, Hugin

Small, short-mission, shallow-water: Remus, Gavia (under ice)

Some examples of different kinds of autonomous systems (~2 hrs):

Gliders - Webb, Bluefin

Glider hybrid - Folaga

Static co-operative systems - Panda

Networks: SeaWeb, PlusNet

Emerging Autonomous Concepts (5-6 hrs):

Big versus Small (Few versus Many)

Co-operation

Autonomy at local scale

Graceful degradation

Emergent behaviour (sum is more than the sum of the parts)

Example - Serafina in Australia
Ad-Hoc networking
MAC protocols for Ad-Hoc Nets
JANUS
Possible alternate uses of JANUS

Emerging Autonomous Technologies (5-6 hrs):

Autonomous Surface Vessels
Autonomous LARS - combining USV and AUV - autonomous capture hoop
Thinarray for AUV acoustic sensing
Co-operative adaptive behaviour for target prosecution
Multi-static autonomous acoustic processing
Coherent Ambient Noise Imaging
Bio-inspired propulsion and form:
Closed-loop propeller
Fish fin structures
Fluidic drives
Manta Ray flying
Lightweight fliers
Underwater EM communications

Conclusions and Discussion (1hr)

Prof. J.R. Potter – short bio

Prof. Potter is Associate Professor at the National University of Singapore (NUS). At NUS he is also head of the Acoustic Research Laboratories and Associate Director of the Tropical Marine Science Lab. Prof. Potter is at NUS since 1996. Previously, he has held scientist positions at the Scripps Oceanographic Research Institute, San Diego, CA (1992-96) and at the SACLANT Undersea Research Centre, La Spezia, Italy (1986-92). His main research interests include underwater acoustic and acoustical oceanography, acoustic communications, underwater vehicles and autonomous systems for ocean exploration. He is author of numerous scientific papers and he has been recipient of several national and international awards for the excellence of his scientific work. Prof. Potter is currently on sabbatical at the Dept. Electrical System and Automation (DSEA) of the University of Pisa

In his own words:

Starting with a joint honours Mathematics and Physics Degree from Bristol, UK, John went on to obtain a PhD in Glaciology and Oceanography (with the Department of Applied Mathematics and Theoretical Physics, Univ. Cambridge, UK) on research in the Antarctic, where he spent four consecutive summers. In stunning testimony to the inscrutable methods of the British Empire he was graciously awarded the Polar Medal for this work by Queen Elizabeth II in 1988.

John migrated into Underwater Acoustics in 1986, moving to Italy to work for NATO on high-frequency propagation until 1992. John met his beautiful and amazing partner, Caroline in 1986 and they married in Italy in 1988.

After a 7-month sail across the Atlantic the Italian caffeine rush subsided to find John and Caroline washing up in late 1992 at Scripps Institution of Oceanography (SIO) in California where he worked with Prof Mike Buckingham on Acoustic Daylight, leading the team that built ADONIS, the first camera to produce real-time moving images using only ambient noise and which led to an ASA award for best scientific paper, published in Scientific American.

In 1995 his family (now expanded to include two sons and two cats) sailed across the Pacific to Singapore, where he founded the ARL in 1996 and contributed to creating the Tropical Marine Science Institute, of which he is now an Associate Director.

In August 2004 Prof Potter embarked on a 14-month sabbatical with his family, sailing round the Indian Ocean on an expedition of marine research, education and environmental awareness. On his return in 2005 John resumed work at the ARL and TMSI, with a new focus and appreciation of the increasing degradation of the marine environment and mankind's failed stewardship of this unique and beautiful blue planet.

Prof Potter is currently on sabbatical at the University of Pisa, Italy where he is working on Joint Projects between NUS and Italy on autonomous intelligent sensing, underwater communications networking and co-operative behaviour.

Prof Potter is a Senior Member of the IEEE, an Associate Editor for the IEEE Journal of Oceanic Engineering, PADI Master Scuba Diver Trainer and an International Fellow of the Explorer's Club, among other things. In his spare time he enjoys sailing (both coastal and blue-water ocean) racing motorcycles, visiting whales, skiing, diving, hiking, karate, great food & wine, travel and reading. It is no longer true that he does not own a television.

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