JERICO

Application for Transnational Access

to Coastal Observatories

National Research Council of Italy

OGS

cnrs

IBW PAN

hcmr

NIVA

Norwegian Institute for Water Research

Ifremer

Helmholtz-Zentrum Geesthacht

Zentrum für Material- und Küstenforschung

CSIC

National Oceanography Centre

Description of the project (to be provided in pdf format)
Please contact the manager of the infrastructure/installation you wish to use before writing the proposal

PART 1: User group details

Indicate if the proposal is submitted by

O an individual
× a user group

Information about the applicants (PI and project partners)

Principal Investigator (user group leader)

Title Prof Name and Surname Kevin C Jones

Gender × Male O Female

Institution Lancaster University, UK

Department / Research Group Chemicals Management

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Lancaster University LA1 4YQ

Country UK

email k.c.jones@lancaster.ac.uk

Telephone +44 1524 510230

Fax +44 1524 593300

Project partners
(repeat for each partner of the group)

Partner # 1

Title Dr Name and Surname Luca Nizzetto

Gender × Male O Female

Institution Norwegian Institute for Water Research

Department / Research Group

Address Gaustadalléen, 21

National Research Council of Italy OGS cnrs IBW PAN hcmr NIVA Norwegian Institute for Water Research

Ifremer Helmholtz-Zentrum Geesthacht Zentrum für Material- und Küstenforschung CSIC National Oceanography Centre

NO-0349 Oslo

Country Norway

email luca.nizzetto@niva.no

PART 2: Additional information about the applicant(s) expertise

Expertise of the group in the domain of the application

Environmental chemistry

Design, testing and applications of novel passive sampling tools

Short CV of the PI

Lancaster team is Jones (PI), Dr Hao Zhang (inventor of DGT for inorganic applications, Reader in Environmental chemistry – Lancaster) and Chang'er Chen – jointly supervised PhD student – who we envisage as conducting the trials.

Jones short CV

Director and Distinguished Professor, Lancaster Environment Centre

One of the world's most cited researchers in Environment/Ecology

Senior Visiting Scientist Professor, Chinese Academy of Sciences, 2010 - .

Elected member of the Norwegian Academy of Science and Letters, 2007 - .

Nominated for the BBVA Foundation Frontiers of Knowledge Award 2010, 2011.

Associate Editor for *Environmental Pollution*; Editorial Boards of *Journal of Environmental Monitoring* and *Environmental Development*; Previously Editorial Advisory Board of *Environmental Science and Technology*. Advisor to: United Nations Environment Programme; the European Union; the Department of Environment, Food and Rural Affairs; the Royal Commission on Environmental Pollution; Chinese Academy of Sciences. Co-founder - the REACH Centre Ltd.

RESEARCH INTERESTS

Environmental behaviour and effects of organic contaminants, particularly:

- Inter-media transfers and global cycling of persistent organic pollutants (POPs);
- Fate and behaviour of organics, in the atmosphere, terrestrial and marine environments;
- Trends in environmental POPs contamination and the implications for sources;
- Food chain transfers of and human exposure to organic chemicals;
- Development of novel sampling and analytical techniques, chemical fate modelling tools

Improved chemicals management

A list of 5 recent, relevant publications of the participant(s) in the field of the project

1. Nizzetto, L., Lohmann, R., Gioia, R., Dachs, J. and Jones, K. C. (2010). Atlantic Ocean surface waters buffer declining atmospheric concentrations of persistent organic pollutants. Environ. Sci. Technol. 44, 6978-6984.
2. Gioia, R., Dachs, J., Nizzetto, L., Berrojalbiz, N., Galban, C., Del Vento, S., Mejanelle, L. and Jones, K. C. (2011). Sources, Transport and Fate of Organic Pollutants in the Oceanic Environment. Chapter 8 in "Persistent Pollution-Past, Present and Future". School of Environmental Research - Organized by Helmholtz-Zentrum Geesthacht Quante, Markus; Ebinghaus, Ralf; Flöser, Götz (Eds.) 1st Edition, 2011. Springer.
3. Breivik, K., Gioia, R, Chakraborty, P., Zhang, G. and Jones, K. C. (2011). Are reductions in industrial organic contaminants emissions in rich countries achieved partly by export of toxic wastes? Environ. Sci. Technol. 45, 9154-9160.
4. Li, J., Li, Q., Gioia, R., Zhang, Y., Zhang, G., Li, X., Spiro, B., Bhatia, R. S. and Jones, K. C. (2011). PBDEs in the atmosphere over the Asian marginal seas, and the Indian and Atlantic oceans. Atmos. Environ. 45, 6622-6628.
5. Paul, A. G., Scheringer, M., Hungerbuhler, K., Jones, K. C. and Sweetman, A. J. (2012). Estimating the aquatic emissions and fate of PFOS into the River Rhine. J. Environ. Mon. 14: 524-530.

PART 3: Detailed scientific description of the project

List the main objectives of the proposed research (one page maximum)

The main objective of this project is to test and deploy a novel passive water sampler, in conjunction with a novel design of sampler unit to be deployed aboard ferries. NIVA colleague Dr Luca Nizzetto has invented the novel "Chem-Mariner" automatic sampler unit for passive sampling of marine water from ferries. The Chem-mariner unit represents a new prototype component which is under test on one of the ferry already equipped with the NIVA ferry box platform. In particular, information and forecasting system of Chem-mariner is fully integrated with the existing ferry-box unit. The Chem Mariner allows deployment of passive samplers in "flow-through" chambers, in which a controlled flow of seawater is maintained during the sampler exposure. In addition the Chem-mariner allows unassisted activation-suspension of sampling and preservation of the samples.. We have invented a variant of the Diffusive Gel Thin Film (DGT) sampler, for organic contaminants. We have 2 manuscripts – one on lab trials for application to antibiotics, the other on a field deployment when used statically at a waste water treatment plant an in river surface waters. The novel modified DGT sampler, is a novel tool able to solve the problem of passive time integrative sampling for polar organic contaminants. Testing it for new type of application is therefore very timely. In particular this device deployed on coastal monitoring platforms (such as those included in the Jerico project), can represent an ideal tools to fulfil the requirement of the EU marine framework strategy, which basically extend the Environmental Quality Standards specified by the Water framework Strategy

There are exciting applications of the sampler in the new flow-through water sampler. We therefore want to:

1. Validate the sampler for applications in seawater;

2. Test the configuration of the sampler in the flow through sampler;
3. Deploy it in a pilot study aboard NIVA "Color fantasy" ferry.;
4. Evaluate the results and – if appropriate – prepare joint publication;
5. Consider joint bid for further funding and wider applications.

Chen, C., Zhang, H. and Jones, K. C. A novel passive water sampler for *in situ* sampling of antibiotics. J. Environ. Monitoring. In revision.
Chang-Er Chen, Lijun Zhou, You-Sheng Liu, Hao Zhang, Guang-Guo Ying, Kevin C. Jones
Field Testing of a Novel Passive Water Sampler: Application to Antibiotics in a Waste Water Treatment Plant and Surface Waters. (In preparation for submission to Environ. Sci. Technol.)

Give a brief description of the scientific background and rationale of your project

(one page maximum)

The European Union has recently launched the Marine Strategy Framework Directive (MSFD, 2008/56/EC).The directive foresees Environmental Quality Standards (EQS) for a range of chemicals, with particular focus on organic contaminants. Signatory countries are thus required by law, to gain adequate infrastructures and tools to perform monitoring to demonstrate fulfilment of the standards, within the next five years. Measurements of organic micropollutants in marine surface waters are challenging and expensive. They require collection and treatment of large volumes of water under "clean" conditions, by qualified personnel, utilising a dedicated sampling campaign and a considerable amount of ship time. Contaminant concentrations fluctuate and are close to or below limits of detection of current techniques. Passive sampling has received much attention in recent years as a technique that may help meet such challenges.

Passive water sampling has several advantages over active methods; it provides time-integrated data, can save on time and cost compared to active methods, and yield high spatial resolution data through co-deployment of simple, cheap units. However, one problem with many sampler designs in current use is that their uptake rates for trace substances of interest are flow-rate dependent, thereby requiring calibration data and other information to enable water concentrations to be derived from the mass per sampler. However, the 'family' of samplers employing the principle of diffusive gradients in thin films (DGT) provides an *in situ* means of quantitatively measuring labile species in aquatic systems without field calibration. So far, this technique has only been tested and applied in inorganic substances – metals, radionuclides, nutrients etc. Design and applications of DGT to trace organic contaminants ('oDGT') would be of widespread interest.

Present the proposed experimental method and working plan

(one page maximum)

1. Conduct o-DGT tests in seawater for a range of antibiotics using one fixed coastal platform;
2. Conduct pre-trials on sampler configurations and deployment requirements
3. Select appropriate sampler use conditions and ferry deployments
4. Deploy o-DGT in the ferry box for different time intervals, to perform uptake trials, alongside conventional sampling approaches.
5. Obtain antibiotic data (and other analytes agreed in conjunction with NIVA colleagues)

Indicate the type of access applied for

O remote	*(the measuring system is implemented by the operator of the installation and the presence of the user group is not required)*
× partially remote	*(the presence of the user group is required at some stage e.g. installing and un-installing)*
O in person/hands on	*(the presence of the user group is required/recommended during the whole access period)*

Indicate the proposed time schedule including expected duration of access time

(half a page maximum)

1. Arrive to the field to check and prepare material/equipments needed (2-3 days).
2. Install a set of the oDGT, after 7 days, 10 days, 15 days and 20 days (20 days)
3. Retrieve a set of the oDGTs on the 7th, 10th, 15th and 20th days, respectively.
4. extract in the lab (2-3 days)

Host infrastructure

Indicate the type(s) of JERICO host facility(s) you are interested in
(Tick more than one if it is useful for your project)

× ferrybox x fixed platform

Indicate the specific JERICO host facility(ies) you wish to choose

Ferrybox – Color line ferry (Oslo-Kiel)
Fixed platform - COSYNA pile 2

Explain briefly why you think your project will be best carried out at the specified host facility(ies)

Currently the Chem mariner unit integrating the Ferry Box system on board the Colour Fantasy is the only existing system which allows unassisted deployment, sampling and storage of passive samplers in mobile platforms.
Access to the fixed platform COSYNA pile 2 will allow assessing the new DGT sampler for marine waters in stationary conditions

If possible, list other JERICO facility(ies) where you think your experiment could alternatively be carried out

Additional information

Is there a facility similar to the one you wish to utilize in your country?

O Yes × No

If yes, please indicate your reasons for requesting access to the JERICO facility you have chosen

Have you already submitted an Access Proposal to any of the participating facilities under this or previous EU Programs?

O Yes × No

If yes, please indicate the name of the institution, submission date and reference number for each such proposal

Is this a resubmission of a previously rejected proposal? *(Select "yes" if this application is a revised version of a proposal submitted to JERICO before that was rejected by the Selection Panel)*

O Yes × No

If yes, please give the exact reference number and submission date. Kindly describe briefly the changes made in comparison to the rejected version.

Is this a continuation of an earlier project funded under a previous call for Transnational Access in JERICO at the same facility?

O Yes × No

If yes, please give the exact reference number and submission date. Kindly indicate also what has been achieved in the previous experiment and the reasons why the objectives have not been fully met.

PART 4: Technical information

Wherever possible, please specify your requests regarding the use of your chosen facility's equipment/instruments/sensors, including any additional services, data or other requirements.

Data: water temperature, pH, Ionic strength, etc., parameters already monitored by the existing ferry box units and fixed platforms.

List all material/equipment you plan to bring to the JERICO facility (if any):

oDGT devices, tweezers, .

Please provide a detailed and realistic budget for the expenses you expect to incur for travel/boarding and the shipment of equipment, if applicable in your case *(note that a maximum of two travel grants will be assigned to each user group, depending on the length of the requested period of stay).*

Travelling (flight, train/taxi): 800Euros
Boarding and subsistence during the access period: 2500Euros/30 days

Please tick the appropriate boxes and give detailed information for the kind of risks associated with your proposed activity

☐ Chemical :
☐ Biological :
☐ Radiological :
☐ Other :

Date of compilation 14 MARCH 2012

Signature of the PI K C Jones.

Signature of an appropriate authorised person
(e.g. Head of Department, Research Office) Joel Pearl

This section reserved to the JERICO TNA Office

Date of proposal receipt by email _____

Assigned reference number _____

Signature of receiving officer _____

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