

Quarterly Progress reports of 'Higher education and Research collaboration on Nanomaterials for Clean Energy Technologies' (HRNCET) project

Preamble:

In December 2016, a joint project application with Western Norway University of Applied Sciences (HVL) was selected for Norwegian Partnership Programme for Global Academic Cooperation (NORPART) Grant of **NOK 4.7 million (~LKR85 million) over a period of five years (2017 - 2021)** under the theme of '**Higher education and Research collaboration on Nanomaterials for Clean Energy Technologies (HRNCET)**'. Only 21 out of 114 eligible project applications were selected for funding by the Programme Board of NORPART.

This joint proposal was developed after mutual visits of Professors V.Dhayalan and P. Ravirajan in June and August 2016 to the University of Jaffna and Western Norway University of Applied Sciences, respectively under project development funding from the Norwegian Centre for International Cooperation in Education (SIU).

The main objective of the project is to strengthen collaboration between the partner institutions [HVL, Universities of Adger and Bergen (HiB), Norway; Coimbatore Institute of Technology (CIT), India and Universities of Peradeniya and Jaffna, Sri Lanka] in educational and research activities, and implement student and staff mobility in the field of clean energy technologies.

Goal 1: Institutionalization of **student and staff exchange** by creating mobility windows

Goal 2: Increasing the quality of higher education and research through mobility programs, **joint supervision and guest lecturing** (at the Faculties of Science, Engineering and Technology) in the field of Nanomaterials for Clean Energy Technologies.

Goal 3: Development of a **joint course on Nanomaterials for clean energy applications** as part of the existing Master degree programme at HVL/ UiB and part of a new Master degree programme in Clean Energy Technologies at UoJ.

Goal 4: Exchange of knowledge in Nanomaterials for Clean Energy Applications through **joint research, supervision and dissemination activities**.

In February 2017, the Council appointed following board members. (http://project.jfn.ac.lk/hrncet/?page_id=27)

Advisory Board

From UoJ

Vice Chancellor
Dean / Science
Dean / Technology
Dean / Engineering

From HVL

Rector / Pro-Rector
Dean / Engineering
Head / Computer Science, Maths and Physics
Head / International office

Project Management Board

From UOJ

Vice Chancellor
Registrar / Deputy Registrar
Bursar / Senior Assistant Bursar
Prof. Ms. Vasanthy Arasaratnam
Prof. Ms. Meena Senthilnathanan
Prof. Punniamoorthy Ravirajan
Coordinator / HRNCET- UoJ

From HVL

Prof. Øyvind Frette
Prof. Ms. Kristin Fanebust Hetland
Ms. Maren Stallemo, Advisor, International office
Ms. Anna Zheleznaya, Financial advisor, Office for External Funding
Prof. Dhayalan Velauthapillai, Coordinator / HRNCET-HVL

Progress report of HRNCET project - 1st Quarter (March - June, 2017)

On 14th of March 2017, the University of Jaffna and the Western Norway University of Applied Sciences signed a **Memorandum of Understanding (MoU) on educational and research cooperation at Masters and PhD levels**. A high level delegation from the Western Norway University of Applied Sciences, consisting of Vice-Rector, Dr. Bjoerg Kristin Selvik, Dean of the Faculty of Engineering, Prof. Geir Anton Johansen, Special adviser at the international office, Mrs. Maren Stallemo and the NORPART project coordinator Professor Dhayalan Velauthapillai attended the inauguration ceremony of the project in Jaffna. On behalf of the University of Jaffna, Professor Vasanthi Arasaratnam, Vice Chancellor, Deans of the faculties at University of Jaffna and Professor P. Ravirajan, project coordinator at UoJ participated. Emeritus Professor R. Kumaravadivel represented the University Grants Commission and the Deputy Ambassador Knut Nyflot represented the Royal Norwegian Embassy at the inaugural function along with academics, students and well-wishers.

On 19th of March 2017, Coordinators from three partnering institutions (HVL, UoJ and Coimbatore Institute of Technology, India) met in **Coimbatore, India** and had a fruitful **discussion on future collaborative works**. (<http://cit-hib-incp2014.com/index.html>)

In April 2017, Dr (Ms) S. Rasalingam visited CIT, on invitation, to execute the experimental work under HRNCET-NORPART project for a week at the Indo-Norwegian laboratory at CIT. She **initiated the experimental work on synthesizing organic-inorganic perovskite materials** for solar cell applications.

In May 2017, project website - <http://project.jfn.ac.lk/hrncet/> - was **launched to disseminate** the progress of the project. Activities have been continuously reported via http://project.jfn.ac.lk/hrncet/?page_id=29.

On 27th of May 2017, a seminar titled 'Higher Education and Research collaboration on Nanomaterials for Clean Energy Technologies (HRNCET)' (<http://www.jfn.ac.lk/index.php/seminar-on-clean-energy-technologies/>) was arranged as part of the project. **Four undergraduates pursuing BSc in Electrical Engineering degree at Western Norway University of Applied Sciences** and undergraduates pursuing BSc in Physics special degree at University of Jaffna **exchanged scientific knowledge** generated through their final year undergraduate research projects in the field of clean energy during the seminar at the University of Jaffna. The Norwegian students also visited the Nanoscience Research Laboratory of the Department of Physics, University of Jaffna.

On 29th of June 2017, Prof.V.Dhayalan, Coordinator/HRNCET-HVL and Prof.P.Ravirajan, Coordinator/HRNCET-UoJ had discussions with the **Executive Committee of Jaffna Science Association** (<http://www.thejsa.org/>) on possible collaboration **for conducting outreach activities on Clean Energy Technologies in the Northern Province of Sri Lanka**. A proposal was developed by the JSA subcommittee on project planning and implementation in consultation with the HRNCET project coordinators and Department of Education, Northern Province with the **primary objective of educating more than 3000 GCE (A/L) students in Science and Technology streams from 55 schools in the Jaffna district** on the significance of clean energy technologies through interactive discussions and hands on experiments. Further, students will be encouraged to participate in long term activities such as poster preparation, documentary film making and invention of appropriate and innovative formulations on the theme.

In June 2017, applications were invited (<http://www.jfn.ac.lk/index.php/postgraduate-research-studentships/>) from suitably qualified candidates for **Postgraduate Research Studentships to work at the University of Jaffna and the Western Norway University of Applied Sciences** under general theme of Nanomaterials for Clean Energy Technologies. On 3rd of July 2017, five applicants out of seven applied appeared before the interview panel consisted of Prof. V. Dhayalan, Prof. Kandasamy, Prof. Meena Senthilnathanan, Prof. Aputharajah and Prof. Ravirajan, nominated by the Vice-Chancellor and the Chairman/Project Management Board of the project. **Two applicants were selected** to receive studentship of Rs. 50,000/- (fixed) per month for 18 months to carryout research at the University of Jaffna and maintenance grant for 06 months to do research at the Western Norway University of Applied Sciences. Registration fee for the MPhil degree and return airfare to Norway will be covered by the project.



Professor Punniamoorthy Ravirajan
Coordinator / HRNCET Project
University of Jaffna

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Professor Dhayalan Velauthapillai
Coordinator / HRNCET Project
Western Norway University of Applied Sciences

Progress report of HRNCET project – 2nd Quarter (July - September, 2017)

On 03rd July 2017, a workshop on ‘Developing a Master Degree Curriculum on Clean Energy Technologies’ was held at the University of Jaffna. More than twenty academics from the Faculties of Science, Engineering and Technology actively participated in this important academic exercise. The initial draft of syllabi for more than ten course units of the proposed master degree programme were presented by the potential resource persons. Prof. V.Dhayalan and Emeritus Professor Prof. K.Kandasamy served as facilitators. The draft was further refined through constructive discussions. Prof.Lakshman Dissanayake (Physics), Prof.Gamini Rajapakshe (Chemistry) and Prof.Janaka Bandara Ekanayake (Engineering) were identified as potential reviewers of the proposed curriculum.

On 06th July 2017, Professors Dhayalan and Ravirajan visited the research laboratories at the University of Peradeniya and National Institute of Fundamental Studies, Kandy and discussed about the possibilities of collaborative research with Professors Gamini Rajapakshe and Kumara at the respective institutions. Prof. Dhayalan invited both professors to the forthcoming Indo-Norwegian workshop to be held in Coimbatore Institute of Technology, India in December 2017. Also, the research work to be carried out at HVL, Norway under the supervision of Prof. Dhayalan for six months from September 2017 by the PhD student of Prof. Gamini Rajapaksa was discussed with the respective student and Prof. Gamini Rajapaksa.


Further to the MoU signed between the vice chancellors of the University of Jaffna and Western Norway University of Applied Sciences in March 2017 (<http://www.ifn.ac.lk/index.php/mou-norpart/>), an Institutional Technical Assistance Contract on **Capacity Building and Establishment of a Research Consortium in Nanomaterials for Clean Energy Technologies** was signed by the project coordinators Prof.P.Ravirajan, and Prof.V.Dhayalan, at the Royal Norwegian Embassy in Colombo in the presence of the Norwegian Ambassador, His Excellency Thorbjørn Gaustadsæther on 07th of July 2017 . This collaborative initiative will be funded by the Royal Norwegian Embassy, Ministry of Foreign Affairs, Norway as part of its development cooperation programme and the total grant of NOK 6.2 million (LKR 112 million) will be disbursed over a period of three years (2017-2019).

Second and Third workshop on ‘Developing a Master Degree Curriculum on Clean Energy Technologies’ were conducted on 03.08.2016 and 31.08.2017, respectively. Content of the curriculum was refined through constructive discussions. Further, minimum selection criteria for admitting students, postgraduate profile and an exit point at the first year of two year master degree programme in line with SLQF were also discussed.

On invitation from Professor Ravirajan, Murugesan Rasukkannu, a PhD student of Professor Dhayalan from Western Norway University of Applied Sciences is visited the department of physics University of Jaffna for sharing his expertise knowledge on computer modelling of Nanomaterials. He delivered a talk on ‘Computation modelling of Nanomaterials for the Solar cell applications’ on 15.09.2017.

On invitation from Professor Dhayalan, Dr (Miss) S. Rasalingam, Senior Lecturer in Chemistry has been pursuing a collaborative research work with PhD students from Sri Lanka and India at the Western Norway University of Applied Sciences for about three weeks since 18.09.2017.

In collaboration with Western Norway University of Applied Sciences, The Jaffna Science Association and Provincial Department of Education, Northern Province, applications have been invited from **eligible school teachers, who teach Engineering Technology/Physics/Chemistry at 1AB schools in the Jaffna District**, to serve as resource persons for providing educational training on Clean Energy Technologies to the GCE (A/L) students in Science and Technology streams in the Jaffna District.


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