



Abel Visiting Scholarship Program

IMU-CDC Individual Research Travel Support Program
Activity Reporting Form

To be submitted four (4) week after the end of the research visit

Name of Grantee: Nguyen Thac Dung
Home Institution and Country of Grantee: Vietnam National University-University of Science, Hanoi, Vietnam
Name of the Host: Prof. Guofang Wei
Name of the Host Institution and Country: University of California, Santa Barbara, USA
Topic of the Research Activity: Analysis of harmonic forms and geometry of submanifolds.
Dates spent Center/Host Institution: July 15th – August 14th.

The progress report should be a brief (one page) activity report consisting of:

During my visit at UCSB, I discussed with Dr. Gunhee Cho, a postdoctoral fellowship hosted by Prof. Wei some problems on harmonic forms on complete manifolds, geometry of CR-manifolds, analysis of p-harmonic maps, and geometry of constant mean curvature submanifolds immersed in spaces forms. The major outcome during my visit is a published paper in JMAA. This is a joint work with Dr. Cho. The details of my main activities are given as follows.

Since my visiting program was started in 2019, I always kept contact with the host. Based on her connection, I discussed with Dr. Cho on analysis of harmonic forms during the COVID postpone time. Our joint works were initiated since 2020. We usually discussed online together. Before my visit, I gave a talk at the UCSB Differential Geometry seminar in February, 2022. During my stay, I discussed with Prof. Wei the problems which was rising from my online talk. Moreover, together with Dr. Cho, we completed the final version of the paper published in JMAA. I discussed with him some problems on analysis of p-harmonic maps, in particular, some works on the Liouville properties of harmonic and p-harmonic maps.

For the future, I and Dr. Cho plan to investigate p-harmonic maps on gradient Ricci solitons and rigidity of CR-manifolds. I also plan to work with my host on the rigidity of constant mean curvature submanifolds immersed in the space forms. This can be considered as an extension and continuation of the talk I presented in last February.

Moreover, I discussed with Prof. Wei about the ability to give a lecture on a two weeks long Differential Geometry School in Vietnam in 2023. I and my colleagues plan to invite her and other mathematicians giving invited lectures in this school. I believe that this will be a very interesting activity in Summer 2023, in Vietnam.

In summary, the main achievements of my visit are, in fact products of a long team cooperation and discussion. At this moment, we have two join papers listed as bellows.

From
Commission for Developing Countries
Grant Selection Committee



INTERNATIONAL MATHEMATICAL UNION
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[Niels Henrik Abel Board](#)

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1. G.H. Cho and N. T. Dung, [Vanishing results from Lichnerowicz Laplacian on complete Kahler manifolds and applications](#), Jour. Math. Anal. Appl., 517 (2023) Issue 1, 126602
2. **Gunhee Cho, N. T. Dung, and T. Q. Huy**, [Rigidity results with curvature conditions from Lichnerowicz Laplacian and applications](#), Submitted.

We also hope that we have more joint work in the near future.

Additionally, the following must be submitted:

- At least four (4) photographs of the supported activity

Please note that the submitted activity report and images will be made publicly available on the CDC website. With my signature I agree that my Activity Report and pictures can be published on the CDC website.

Date: September 9th, 2022

Signature: Nguyen Thac Dung