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（学校用）

様式 A-1
(FY2025)

2025 年　7 月　10日

サイエンス・ダイアログ　実施報告書

1. 学校名：北海道北見北斗高等学校

2. 講師氏名：Dr. Daniel R. NEWMAN（Mr.）

3. 講義補助者氏名：Mr. Azim Zulhilmi、Yufu Li

4. 実施日時：　2025 年　7 月　1 日（火）　14：15　～ 16：05

5. 参加生徒：　3 年生 36 人、　2 年生　0 人、　1 年生　0 人（合計 36 人）
   備考：理数科の生徒（全て）

6. 講義題目：Geomorphometry: Measuring the Earth’s surface

7. 講義概要：Landslides（地滑り）の理解にあたり、Geomorphometry が情報工学や地形学などの知識を基礎とすることを学ぶ。具体的には、調査のためにドローンや衛星などから放たれる数十億回ものレーザー放射を通じて2D、3D 的に地形をモデル化し、起伏などから山や谷の位置を把握しながら水系網の図を構築することとなる。また、最終的には物理式を使い、地形を正確に再現し、それらを元に実地調査を行い、枯木のずれなどから地滑りの痕跡を追い、その原因等を明らかにしていることなどを学習する。
   更に、上記の内容を関連機器を通じて、VR 体験をする。

8. 講義形式：
   ☑対面 ・ □オンライン （どちらか選択ください。）
   1) 講義時間　100 分　質疑応答時間　10 分

   2) 講義方法（例：プロジェクター使用による講義、実験・実習の有無など）
   プロジェクター使用による講義、VR 機器使用による体験学習

   3) 事前学習
   □有 ・☑ 無 （どちらか選択ください。）
   使用教材：

9. その他特筆すべき事項：

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Form B-2
(FY2025)
Must be typed

Date（日付）
（Date/Month/Year：1 日/ 7 月/ 2025 年）

Activity Report -Science Dialogue Program-
（サイエンス・ダイアログ 実施報告書）

- Fellow's name（講師氏名）: Daniel R. Newman （ID No. P23741）

- Name and title of the lecture assistant（講義補助者の職・氏名）
Azim Zulhilmi, PhD Student and Yufu Li, MSc student

- Participating school（学校名）: Hokkaido Kitamihokuto High School

- Date （実施日時）: （Date/Month/Year: 1 日/ 7 月/ 2025 年）

- Lecture title（講義題目）:
Geomorphometry: Measuring the Earth's surface

- Lecture format（講義形式）:
◆☒Onsite ・ ☐Online (Please choose one.)（対面 ・ オンライン）（（どちらか選択ください。））
◆Lecture time（講義時間） ~120 min（分）, Q&A time（質疑応答時間） ~30 min（分）
◆Lecture style（ex.: used projector, conducted experiments）
（講義方法（例：プロジェクター使用による講義、実験・実習の有無など））
Lecture using a projector with a slide show, and a companion virtual reality activity

- Lecture summary（講義概要）: Please summarize your lecture within 200-500 words.

The lecture was the primary education tool that introduced students to the discipline of Geomorphometry, which is a combination of geomorphology, computer science, applied mathematics, and remote sensing, concerned with the analysis of topogrpahic information. The lecture was intended to introduce them to these fields, and how they are related by geomorphometry. This information was used to educate students about Earth observation sciences, with a particular focus on Light Detection and Ranging (LiDAR) data collection and analysis for the study of landslides. Students learned how 2-d array data structures and point clouds can be used to model the Earth's surface, how LiDAR (and other remote sensing platforms) collect data, and how these data can be analyzed to learn about various environmental processes that interact with the Earth's surface. Finally, students were shown how these ideas were used in my personal research to study landslide motion fields, and how this data can be used to explore other environmental phenomena (e.g., vegetation responses to disturbance).

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The total science dialouge time was divided evenly into two sessions, featuring the lecture and a virtual reality (VR) activity designed to reinforce the lecture material. The VR activity was intended to improve student's intuition and understanding of the lecture content since geoscientific can be challenging to understand without previous exposure through lecture or field trips.The VR activirty divided students into pairs to make the most effective use of the 10 head mounted displays that were available. A virtual reality lecture and museum were created and populated with the verbal lecture content to facilitate student interaction and engagement.

◆Other noteworthy information（その他特筆すべき事項）:

- Impressions and comments from the lecture assistant（講義補助者の方から、本プログラムに対する意見・感想等がありましたら、お願いいたします。）:

Many students rarely have the opportunity to visit actual geological sites that they learn about in the classroom, especially those involving geohazards like landslides, because of the inherent danger and inaccessibility of such locations. As a result, such geoscience concepts are often taught primarily through textbooks or 2D media, which fail to capture the essential three-dimensional nature of geological features. This lack of spatial context can hinder students' ability to fully grasp the scale, orientation, and complexity of these environments (the elements that are crucial for understanding the true reality of geohazards)

I assisted Dr. Newman in designing and implementing a immersive virtual reality (VR) activity to complement his lecture on geomorphometry & geohazards. The immersive VR experience allowed students to experience a VR lecture & museum catered for the lecture topic and to allow them to explore realistic 3D landslide sites in a safe and engaging way, enhancing dimensional learning, conceptual understanding, and spatial awareness. For many participants, it may have been their first encounter with VR technology. Therefore, such a session offered not only insights into the 3D aspects of geoscience but also hands-on experience with learning advanced emerging immersive technology. This exposure could be valuable for their future academic or professional endeavors, especially as immersive tools become more integrated into scientific research and education.


12:45
What do I study?