

様式 A-1

(FY2025)

年 月 日

## サイエンス・ダイアログ 実施報告書

1. 学校名: 兵庫県立川西緑台高等学校
2. 講師氏名: Dr. Gabriel HADJERCI
3. 講義補助者氏名:
4. 実施日時: 2025 年 7 月 15 日 (水) 11 : 10 ~ 12 : 15
5. 参加生徒: 年生 人、 年生 人、 3 年生 31 人 (合計 31 人)  
備考: (例: 理数科の生徒) 総合理数コースの生徒
6. 講義題目: How to study natural flows on planets and inside stars? Application to climate and astrophysics.
7. 講義概要: I study fluid flows in natural contexts, such as the Earth's atmosphere, the ocean, and the interior of stars. I am interested in the mechanism responsible for the transport of heat in these systems. Heat transport is very important. For example, it sets the climate on Earth. It also determines the heat the Sun will send to the Earth. To study heat transport, I first use theoretical tools. Those tools helps me to obtain theoretical relations that predicts the amount of heat one system will transport between two points. Then, I am performing experiments or numerical simulations to verify if my predictions are correct.
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 40 分 質疑応答時間 20 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)  
プロジェクターと黒板使用による講義
  - 3) 事前学習  
☒有 ・ ☐無 (どちらか選択ください。)  
使用教材: 講師よりいただいた事前学習単語やウェブサイトのリスト, 研究内容の説明文
9. その他特筆すべき事項:

Form B-2  
(FY2025)  
Must be typed

Date (日付)  
16/07/2025 (Date/Month/Year: 日/月/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): Gabriel Hadjerci (ID No. P24706)

- Name and title of the lecture assistant (講義補助者の職・氏名)  
       No lecture assistant

- Participating school (学校名): Hyogo Prefectural Kawanishi Midoridai Senior High School

- Date (実施日時): 15/07/2025 (Date/Month/Year: 日/月/年)

- Lecture title (講義題目):  
       How to study natural flows on planets and inside stars? Application to climate and astrophysics.

- 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) 45 min (分), Q&A time (質疑応答時間) 15 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))

There were slides projected and drawings on a blackboard.

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

Before discussing science, I introduced myself and presented some fun facts about the differences between France and Japan.

The first part of my presentation covered the physical concepts important for understanding my work. I introduced the concepts of energy and energy transfer in physics by using the example of a pendulum losing energy through friction. The important result is that energy characterizes a physical system, and this energy can vary through energy transfer, such as heat transfer. This is what we call energy conservation. I explained to the students how the law of energy conservation applies everywhere, especially in fluid media. I provided examples such as Bernoulli's theorem to demonstrate the Magnus effect: a rotating ball does not travel in a straight line due to pressure differences on its surface. My goal was to show the students why energy and heat transfers are important.

The second part was about my research. Since my focus is on heat transfers, I explained the three modes of heat transfer: conduction, convection, and radiation. I showed the students various examples of heat transfer in astrophysical and geophysical contexts. In particular, I

showed them natural convective phenomena occurring on Earth. I explained that my goal is to determine the heat flux in these convective systems. I showed them pictures of experiments and simulations of these phenomena and explained how we use them to achieve this goal.

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

At first, the projector didn't work, so I started my presentation without showing my slides. That was a bit disconcerting, but the problem was quickly solved, and I was able to continue as planned.

The students seemed to better understand and appreciate the presentation when I used examples from everyday life, such as convection in miso soup.

- 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。):