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※弊会記入欄
（学校用）

様式 A-1
(FY2025)

2025 年 5 月 14 日

サイエンス・ダイアログ　実施報告書

1. 学校名:お茶の水女子大学附属高等学校

2. 講師氏名: Dr. Elamaran Durgadev

3. 講義補助者氏名:なし

4. 実施日時: 2025 年 5 月 9 日（ 金 ） 15 : 30～ 17: 00

5. 参加生徒: 1 年生 16 人 2年生 11 人、 年生 人（合計 27 人）
備考:（例:理数科の生徒）

6. 講義題目:「ニューロモルフィック・コンピューティング:2 次元材料による脳型デバイス」

7. 講義概要:人間の脳は既存のコンピューターに引けを取らない高い能力を持ち、その脳の仕組みのなかでも特にニューロン同士の結合の仕組みに注目し、その仕組みをコンピューター開発に活かすことに取り組んでいる。

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 70 分 質疑応答時間 15 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

3) 事前学習
☑有 ・□ 無 （どちらか選択ください。）
使用教材: 先生から事前に送付された資料

9. その他特筆すべき事項:
講義の内容は非常に高度で専門的な内容を含むものでしたが、生徒たちは、高い専門性の獲得と英語学習への意欲が喚起されたようでした。

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Form B-2
(FY2025)
Must be typed

Date（日付）
12/05/2025 （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）: Elamaran Durgadevi (ID No. P24056)

- Name and title of the lecture assistant（講義補助者の職・氏名）
Nil

- Participating school（学校名）: Ochanomizu University Senior High School

- Date （実施日時）:09/05/2025 （Date/Month/Year:日/月/年）

- Lecture title（講義題目）:
Neuromorphic computing: A brain inspired revolution with 2D materials

- 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） 80 min（分）, Q&A time（質疑応答時間） 10 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））
Used projector

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

❖ Who Am I?

I began the session by introducing myself: sharing a bit about my background, where I come from, and what inspired my journey. I also spoke about my hobbies and interests outside of research to help the students connect with me on a personal level. To make it more engaging, I introduced them to the famous landmarks, traditional foods, and cultural highlights of my hometown and country, giving them a glimpse into the place I call home.

❖ How I Became a Researcher

Next, I shared the story of how I became a researcher. I talked about my academic and career journey, highlighting the key experiences, challenges, and turning points that guided me toward a life in research. I also spoke about the inspirations and motivations—both people and ideas—that sparked my interest in science and innovation, aiming to encourage students to find and follow their own passions.

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❖ Discussion about neuromorphic

I began the session by introducing the concept of the human brain as a "supercomputer" and posed a thought-provoking question to the audience: *Who is the real supercomputer: humans or machines?* This set the tone for a comparative discussion between biological intelligence and artificial systems. To help the students visualize how the brain works, I played a short video that explained the fundamental mechanism of **synapses**, the connections between neurons that are central to how our brain processes and stores information. This naturally led into an introduction to **brain-inspired computing**, highlighting how researchers are attempting to mimic the efficiency and adaptability of the brain in artificial systems.

Following this, I introduced the field of **2D materials**, explaining what makes them unique and why they are attracting so much attention in the field of neuromorphic electronics. I also discussed the limitations of traditional silicon-based technologies and why 2D materials are seen as promising alternatives, especially in terms of flexibility, scalability, and atomic-level control.

To keep the session interactive, I included a few **basic quiz questions** after the introduction. Although the students were a bit hesitant at first, they gradually opened and participated, offering answers and engaging with the material.

After setting the foundation, I transitioned into the core of the session: **my research**. I described my work on **2D material-based memristors**, with a focus on how we can **tune the contact properties** to optimize their performance for **neuromorphic applications**. I shared experimental data, design strategies, and insights into how contact engineering can influence synaptic-like behavior in these devices.

We concluded with a **brief Q&A session**, where students asked insightful questions, allowing us to reflect on the broader implications of this research and its future potential. Though the session was concise, it successfully sparked curiosity and laid the groundwork for deeper exploration into neuromorphic electronics and 2D materials.

◆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。）: