

2025年度 関西学院大学 海外客員教員(招聘C) 成果報告書

書式 2 (適宜行追加可 Additional lines can be added as needed)

受入担当	所属・職	生命環境学部・教授
教員	氏名	橋本 秀樹
海外客員	所属・職	ダッカ大学 物理学教室 教授
教員	氏名	WAHADOSZAMEN, Md
招聘目的	1. 授業担当及び研究 ②. 共同研究 3. 特別枠 (いずれかに○)	
招聘期間	2025年 6月 1日 ~ 2025年 6月 30日	
成果報告 Achievement Report	During this period, I engaged in the collaborative research project titled “Development of Nanostructure-Enhanced Photosynthetic Pigment Complexes for Advanced Biophotonics Applications”, in association with Professor Hideki Hashimoto and his research team at Kwansei Gakuin University. The primary aim of the project was to explore and develop experimental strategies involving Stark effect spectroscopy to investigate photosynthetic pigment complexes decorated with nanostructures. My visit comprised three main phases: Phase I: Scientific Engagement and Knowledge Exchange In the initial phase, I actively participated in scientific discussions with Professor Hideki Hashimoto, junior faculty member Dr. Chiasa Uragami, and the students of the Hashimoto Laboratory. These interactions were conducted both individually and in group settings. I attended two weekly group seminars of the Hashimoto Laboratory, which served as valuable platforms for exchanging scientific insights, discussing project goals, and building a foundation for effective collaboration. Phase II: Teaching and Hands-on Training in Stark Spectroscopy In the second phase, I focused on teaching the theoretical foundation and practical methodology of Stark spectroscopy to a Master’s course student, Mr. Natsuki Sasagawa. - I began with detailed explanations of the theoretical principles behind the Stark effects and their application in molecular spectroscopy, ensuring conceptual clarity. - Following the theoretical instruction, I provided hands-on training in conducting the Stark experiment. - To facilitate this, I developed a comprehensive, step-by-step manual covering sample preparation, system setup, cryogenic cooling, equipment interfacing, and experiment execution. - Mr. Sasagawa was then guided to independently implement the entire protocol, gradually becoming proficient in the technique over two weeks. Phase III: Experimental Implementation and Technical Challenges In the final phase, Mr. Sasagawa and I attempted to perform Stark absorption measurements on a carotenoid sample: - We assembled the Stark cell, prepared the carotenoid solution, pumped the cryostat, and successfully cooled the setup to liquid nitrogen temperatures. - However, during the final experimental run, we encountered a major technical issue: the computer used to interface the electronic components (running Windows XP) failed to power on. - With assistance from Dr. Chiasa Uragami, we diagnosed a failure in the computer's power supply. We attempted to recover the system by transferring the hard disk to other lab computers, but compatibility issues with newer hardware prevented success. - Due to the outdated nature of the hardware, the only feasible solution is to re-implement the experimental software on a new system. Unfortunately, this could not be accomplished within the timeframe of my visit. Conclusion and Future Steps Despite the technical setbacks, the visit significantly contributed to scientific exchange, training, and laying the groundwork for future experimental implementation. The next step will involve recreating the Stark spectroscopy interface on modern computing hardware, which can be continued in collaboration with Professor Hashimoto’s team.	
以下の内容を日本語か英語で記載して下さい。 Please describe the following in Japanese or English.		
1. 授業担当及び研究		
Teaching classes and research		
(1)授業科目名		
Course titles		
(2)授業担当の成果		
The achievement of the		
classes in which you are in		
charge		
(3)研究の内容		
Research Details		
(4)研究の成果		
Research achievement		
2. 共同研究		
Joint research		
(1)共同研究の内容		
Details of joint research		
(2)共同研究の成果		
Joint research achievement		
受入担当教員コメント (日本語で記載)	Wahadoszamen博士は、Stark分光法を用いた光合成色素複合体の研究で共同作業を行った。橋本研の大学院院生である佐々川君への研究指導やマニュアル作成を通して技術移転に貢献した。測定は機器トラブルで完遂できなかったが、問題点の整理と今後の方針が明確になった。今後も共同研究を継続したいと考えている。	

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