様式 Form 7
（外国人招へい研究者）

Fellowship ID：BR230403

2023 年　09 月　15 日
YYYY/MM/DD

独立行政法人日本学術振興会理事長　殿
To: President, Japan Society for the Promotion of Science

研究活動報告書
Research Report

１．受入研究者/ Host researcher

受入研究機関・部局・職 Name of Host Institution, Department and Title	神戸大学・先端膜工学研究センター・センター長・教授
受入研究者氏名 Host Researcher's Name	松山　秀人

２．外国人招へい研究者/ Fellow

所属研究機関・部局・職 Name of Institution, Department and Title	University of Arkansas, Department of Chemical Engineering, Professor
外国人招へい研究者氏名 Fellow's Name	Ranil Wickramasinghe

３．採用期間/ Fellowship Period

2023 年　7 月　23 日　～　2023 年　8 月　20 日

４．研究課題/ Research Theme

廃液処理の為の膜蒸留法の開発

５．研究活動報告/ Research Report

（1）研究活動の概要・成果/ Summary of Research Results

Prof Wickramasinghe's 29 day Bridge Fellowship consisted of two main objectives during his stay at Kobe University: Development of joint research at Kobe University through our existing MOU which would lead to peer reviewed publications; visiting a number of Japanese Universities in order to network with Japanese professors who have similar research interests. The results are summarized in terms of these two objectives.

Development of Research Collaborations

Three research areas for future collaborations with Kobe University were identified.

1. Catalytic membranes for biomass hydrolysis and dehydration
   Prof Wickramasinghe has developed a catalytic membrane for production of sugars and chemical intermediates from lignocellulosic biomass. Prof Ogino at Kobe University has developed fermentation technology at Kobe University for conversion of sugars to biofuels and chemicals. The possibility for future collaboration exists by combining Prof Wickramasinghe's pretreatment process with this fermentation technology.
2. Membranes for bioseparations
   Prof Wickramasinghe met Prof Yamamoto at Yamaguchi University. Prof Yamamoto is an expert on chromatographic

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processes for bioseparations while Prof Wickramasinghe focuses on membrane based bioseparations. The potential for developing joint research focused on chromatographic and membrane processes for continuous bioprocessing was discussed. There is significant industrial interest in developing continuous biomanufacturing operations. The possibility for a new collaboration was discussed.

3. Membranes for water treatment
   Prof Matsuyama at Kobe University has a significant research thrust in this area. One of Prof Wickramasinghe's PhD students just completed postdoctoral research at Kobe University. His work focused on membranes for water treatment applications. There are several possibilities for future joint research.

Interaction with Japanese Research groups

The table below summarizes the research groups Prof Wickramasinghe visited. The first column from the left gives the date of the visit. The second column gives the name of the university visited. The third column gives the name of he professor visited while the last column gives the title of Prof Wickramasinghe's lecture. Including Kobe University Prof Wickramasinghe visited 7 universities and gave talks at 6 of these universities. The only university where Prof Wickramasinghe did not give a talk was Yamaguchi University as few students were present due to Obon.

Date (August)	Institution	Host	Lecture Title
1	Kogakuin University	Prof Kazuki Akamatsu, Department of Environmental Chemistry and Chemical Engineering, School of Advanced Engineering	Promoting a circular economy through sustainable wastewater and agricultural residue management
2	Hiroshima University	Prof Toshinori Tsuru, Chemical Engineering Program, Graduate School of Advanced Science and Engineering	Conversion of waste biomass to platform chemicals and fuels using a catalytic membrane reactor
3	Kansai University	Prof Takashi Miyata, Department of Chemistry and Materials Engineering, Faculty of Chemistry, Materials and Bioengineering	Development of Membrane Based Bioseparations for Emerging Purification Challenges
4	Kyushu University	Prof Masahiro Goto, Department of Applied Chemistry, Director of Transdermal Drug Delivery Center	Development of Membrane Based Bioseparations for Emerging Purification Challenges
7	Tokyo Institute of Technology	Prof Takeo Yamaguchi, Laboratory for Chemistry and Life Science, Institute of Innovative Research	Promoting a circular economy through sustainable wastewater and agricultural residue management
8	Yamaguchi University	Prof Shuichi Yamamoto, Director, Biomedical Engineering Center	
10	Kobe University	Prof Hideto Matsuyama, Research Center for Membrane and Film Technology	Development of Membrane Based Operations for Emerging Separations Challenges

（2）主な研究発表（雑誌論文、学会、集会、知的財産権等）/ Main Research Publications

Jebur, M.; Chiao, Y.-H.; Matsuyama, H., Wickramasinghe, S. R. (2023), 'Electrocoagulation as a Pretreatment for Reverse Osmosis for Potable Water from Brackish Groundwater', Water Resources and Industry (submitted)

Hao, X., Chen, S.-T, Chiao, Y.-H., Matsuyama, H., Qian, X., Ranil Wickramasinghe, S. R. (2023), Aggregate Removal by Responsive Electrospun Membrane based Hydrophobic Interaction Chromatography, Chemie Ingenieur Technik (submitted).

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（３）その他/ Remarks

Overall Prof Wickramasinghe's Bridge Fellowship was very successful. He visited a number of highly ranked universities in Japan. These interactions could lead to new research projects. In addition, two joint papers with Prof Matsuyama at Kobe University were submitted for publication.

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