CV Date	31/01/2024

Part A. PERSONAL INFORMATION

First Name	Pranav		
Family Name	Sudersan		
Sex	Male	Date of Birth	08/12/1992
ID number Social Security, Passport	Z1445834J		
URL Web			
Email Address	pranavsudersan@gmail.com		
Open Researcher and Contributor ID (ORCID)	0000-0003-2629-6535		

A.1. Current position

Job Title	Postdoc		
Starting date	2024		
Institution	Universidad de Murcia		
Department / Centre	Centro de Investigación en Óptica y Nanofísica / Facultad Química		
Country	Spain	Phone Number	(34) 868 88 30 00
Keywords	Nanostructures; Surfaces and interphases; Nanomaterials; Interfaces		

A.2. Previous positions (Research Career breaks included)

Period	Job Title / Name of Employer / Country
2019 - 2023	Doctoral researcher / Max Planck Institute for Polymer Research, Germany
2016 - 2018	Research Assistant / Indian Institute of Technology Bombay, India

A.3. Education

Degree/Master/PhD	University / Country	Year
Doctor of Natural Sciences	Johannes Gutenberg University Mainz, Germany	2023
Bachelor of Technology in Chemical Engineering	Indian Institute of Technology Bombay, India	2015
Master of Technology in Chemical Engineering	Indian Institute of Technology Bombay, India	2015

Part B. CV SUMMARY

My scientific research career since my Master's thesis on "glassy microemulsions" to my PhD thesis on "insect adhesion" has been quite special due to its interdisciplinary nature: a mixture of interfacial phenomena, biology, nanotechnology, and engineering. During the last four years of my PhD in Germany, I have specifically focused on the incredible field of bio-inspiration, that is, learning how nature solves some specific problems so as to help provide novel solutions to human challenges. Here, I studied the specific case of the remarkable ability of ladybug beetles to effortlessly adhere and walk on underwater surfaces. Understanding this phenomena can help provide novel technological solutions where artificial adhesives can work very well even under wet conditions, with potential applications in robotics, marine navigation and rain resistant technologies. Working on this project put me in a unique position to not only work with biological specimen, but also design electronic instrumentation to measure adhesive forces exerted by a tiny insect with good precision. I learned how to model the system using computer simulations, which would later support my experimental measurements on the insect quite well, as published in my 2021 article. Thus, the project gave me an in-depth hands-on experience in both experimental techniques and theoretical simulations, both

together are the fundamental pillars of modern scientific research. Working with tiny insect specimens also pushed my research to a new direction, where I identified a gap in a state-of-the-art experimental characterization technique. Specifically, it was not well studied how to measure the surface tension of the "glue" secreted by the insect's leg, since the "glue" amount is too small for conventional techniques to work. This motivated me to develop a new method using Atomic Force Microscopy (AFM), where a combination of experiment and simulation would allow one to interpret AFM force measurements on microscopic drops in order to obtain its surface tension value (published in Langmuir, 2024). Such a method could be a boon to other research fields, for example climate science, where the impact of atmospheric aerosols on cloud formation is a recent topic of interest. Here, my proposed technique could be potentially helpful in characterizing the microscopic aerosol drops. Presently I'm working as a postdoc in Murcia, Spain, where I'll be using certain "advanced modes" of the AFM to better understand other biological samples such as leaves. AFM is a powerful tool to help understand micro and nanoscale phenomena and can be especially useful to study leaves where the nanoscopic structure and chemistry are expected to have a big influence on the leaf functions, such as stomata opening/closing. Understanding these details can help one design better agricultural products such as foliar fertilizers or pesticides, which would work efficiently on a leaf with minimal environmental contamination.

Part C. RELEVANT ACCOMPLISHMENTS

C.1. Most important publications in national or international peer-reviewed journals, books and conferences

AC: corresponding author. (nº x / nº y): position / total authors. If applicable, indicate the number of citations

1 **Scientific paper**. Zhou, X.; Sudersan, P.; Diaz, D.; et al; Butt, H.J.2024. Chemically robust superhydrophobic surfaces with a self-replenishing nanoscale liquid coating. Droplet. Wiley. 3, pp.e103.
2 **Scientific paper**. Sudersan, P.; Müller, M.; Hormozi, M.; Li, S.; Butt, H.J.; Kappl, M.2023. Method to Measure Surface Tension of Microdroplets Using Standard AFM Cantilever Tips. Langmuir. American Chemical Society. 39-30, pp.10367-10374.
3 **Scientific paper**. Song, J.; Hou, Y.; Sudersan, P.; Lam, C.W.E.; Poulikakos, D.; Butt, H.J.; Yeung, K.L.2023. Inhibition of condensation-induced droplet wetting by nano-hierarchical surfaces. Chemical Engineering Journal. Elsevier. 460, pp.141761.
4 **Scientific paper**. Sudersan, P.; Kappl, M.2023. Mechanisms of detachment in fibrillar adhesive systems. Journal of Theoretical Biology. Academic Press. 557, pp.111315.
5 **Scientific paper**. Sudersan, P.; Kappl, M.; Pinchasik, B.E.; Butt, H.J.; Endlein, T.2021. Wetting of the tarsal adhesive fluid determines underwater adhesion in ladybird beetles. Journal of Experimental Biology. The Company of Biologists Ltd. 224-20, pp.jeb242852.

C.2. Conferences and meetings

1 Sudersan, P.; Kappl, M.; Pinchasik, B.E.; Butt, H.J; Endlein, T.. How some insects adhere to underwater surfaces. XXVIII Congress of the International Society of Biomechanics. International Society of Biomechanics. 2021. Participatory - oral communication. Conference.
2 Sudersan, P.; Kappl, M.; Pinchasik, B.E.; Butt, H.J.; Endlein, T.. How some insects adhere to underwater surfaces. Society of Experimental Biology Annual Conference. The Society for Experimental Biology. 2021. Participatory - oral communication. Conference.

C.3. Research projects and contracts

1 **Project**. Air Mediated Reversible Underwater Adhesion: from Beetles to Bioinspired Materials. German Research Foundation. Thomas. (Max Planck Institute for Polymer Research Germany). 2017-2022. Team member. Performed all experiments, modelling and wrote three publications (first author) with the help of this project funding.

2 **Project**. Self-assembly of polyelectrolytes. Jyoti Seth. (Indian Institute of Technology Bombay). 2016-2018. Team member. Performed theoretical simulations

3 **Project**. Preparation and characterization of sugar-oil complex glass. Master thesis. (Indian Institute of Technology Bombay). 2014-2015. Team member. Performed experiments and wrote patent based on this work filed in India

C.4. Activities of technology / knowledge transfer and results exploitation

Pranav Sudersan; Jyoti Seth. 390921. Method for preparing bi-continuous inter- penetrating polymer network India. 01/03/2022. Indian Institute of Technology Bombay.