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DEPARTMENT OF MECHANICAL ENGINEERING

10th April 2021

Letter of Recommendation

It is my pleasure to recommend Mr. Sumanta Laha for the PhD program jointly offered by IIT Kharagpur and the University of Manchester. I was one of the members of the Departmental Academic Committee (DAC) to periodically monitor and evaluate his MS thesis work. I have interacted with Sumanta for more than 2 years and I have to say that he is a quick learner and an independent researcher. He always came up with simple and effective solutions to the given research problems.

Recently he has submitted his masters' thesis titled "Study of Typical Cardiovascular Ailments and Malfunctioning of Artificial Heart Valve through Experimentation and Analysis" in February 2021. In his dissertation, he has worked independently on three related problems. Those are (1) Development of a cardiovascular replicator, an electro-mechanical platform for simulating human heart under healthy conditions as well as under diseased conditions, (2) Developing a basic combined model of human thermoregulation and cardiovascular system to study the effect of ailing heart on the human thermoregulation, and (3) Investigation of the fluid mechanics abnormalities of the defective bi-leaflet mechanical heart valve and its diverse effect on the human body by means of fluid body interaction model. Out of his research, he has already communicated a journal paper in the journal *Artificial Organs*. *He has also presented papers in reputed international conferences like EUMS-2019, ISHMT-2019, INSHLT-2019, FMFP-2018.* He has used SIMULINK and MATLAB for his modeling work in the first two problems and used STAR CCM for the last problem. He has gained very sound knowledge in these software. He was awarded the prestigious SITARE-GYTI national award along with a financial grant from BIRAC (under Dept. of Biotechnology, Govt. of India) for his work titled "An Automated Cardiovascular Replicator for Online Assessment of Cardiac Assist Devices, Prosthetics, and Beyond" and he has also filed a patent on the same.

Sumanta has demonstrated impressive resourcefulness in overcoming the problems faced during his Masters' Research. I was amazed to see that instead of giving up he was always ready to follow up on the suggestions of DAC regarding his work. In this process, he has gained valuable experience and confidence. I have attended his seminars three times and I would have to say that his communication skill to express his research ideas to others is quite commendable. I am sure that he will easily cope with the rigors of the new research problem and will come up with unique solutions in his upcoming PhD work. It is not out-of-place to mention that he will be an asset to any organization that he will be associated with in near future. My assertion is based on his multitasking skill, leadership abilities, and sound fundamental knowledge. His dedication to contemporary research, honesty, self-motivation and drive for perfection will definitely stand in good stead towards achieving greater success.

Dr. Arun K. Samantaray



Professor

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