Resume'
Farzam Mortazavi, Ph.D.
Mechanical Advisor

Professional Summary:

Farzam is a Mechanical Adviser for the KnightHawk Engineering (KHE). He recently defended his Ph.D. in Mechanical Engineering at Texas A&M University. As the KHE rotating equipment, CFD and research engineer Farzam is responsible for participating in rotating equipment investigations performed by KHE, supporting the work of KHE when CFD expertise is required, and performing research and publication tasks. Farzam's Ph.D. work focused on computational models for prediction of dynamic forces in rotating equipment, especially impellers. This work was combined with coursework and teaching assistant assignments in the field of energy conversion, including significant work in the areas of CFD, turbomachinery rotordynamics, vibrations, heat transfer, and fluid dynamics. Farzam also hold a M.Sc. degree in Mechanical Engineering from University of Tehran where he focused on turbomachinery flow path design and analysis. His undergraduate degree was in Mechanical Engineering. This combination of experience has provided Farzam with a strong, multi-disciplinary background from which he can draw experience from multiple fields in order to solve complex problems.

Employment History:

2018 to Present: KnightHawk Engineering – Mechanical Advisor

As a rotating equipment, CFD and research engineer for KHE, Farzam is chiefly responsible for reviewing and producing technical content in these areas. This includes overseeing mechanical equipment projects, flow simulation projects, turbomachinery design projects, supporting KHE root cause failure analysis projects and fitness for service projects, providing expert opinions on rotating equipment investigations for litigation, and research tasks.

2014-2018: Texas A&M University, Vibration Control & Electromechanical Lab.

During his Ph.D. at Texas A&M University, Farzam developed a dissertation research program to investigate CFD-based impeller and seal rotordynamic forces. To communicate his work, the author prepared annual technical research reports for Turbomachinery Research Consortium under TurboLab (consisting 40 major rotating equipment companies) many of whom had no experience with CFD modeling of rotordynamic forces and Fluid-Structure Interaction (FSI). In return, Farzam received input on the project from industrial mentors interested in industrial application of results. Additionally, the author performed both TA and class work involving turbomachinery vibration and rotordynamics, CFD, advanced heat transfer, and advanced fluid mechanic topics such as turbulence, hydrodynamic instability and lubrication theory. His exposure to the work of turbomachinery research was further broadened by attending annual meetings such as TurboExpo (IGTI) and TurboPump Symposium (TPS) where results from a wide array of modern research techniques were presented. In his research, the author used several novel CFD techniques to analyze the dynamic forces forming on vibrating rotating equipment such as impellers and annular seals. He proposed a phase modulated multi-frequency transient approach to obtain impeller and volute dynamic impedances in a single CFD simulation with speed-up achievements as high as 30 times. Such data are crucial for prediction of turbomachinery vibration and rotordynamic stability. Farzam's research heavily involved inverse design of impellers, complex mesh generation and moving mesh CFD simulations. He also developed a 3D turbulent parallel

CFD code for leakage and power loss prediction in annular seals. The findings of his research have been published in ASME journals.

2015-2016: Texas A&M University, Multi-Phase Flow & Heat Transfer Lab.

During his stay at Multi-Phase Flow and Heat Transfer Lab. Farzam worked as a team on design, analysis and test of a flow loop for enhanced heat transfer of molten salt nano-fluids. The test flow loop operated in ultra-high temperatures with highly corrosive nano-fluids to resemble a solar thermal power plant. He experimented with several nano-fluids to measure corrosivity of molten-salt based thermal fluids in solar thermal power plants to deliver nano-fluid corrosion protocols. He also worked on rheology of nanofluids during this period.

2015-2016: University of Tehran, Hydraulic Machinery Research Institute

Farzam attended the energy conversion M.Sc. program at University of Tehran, with an specialization in hydraulic machinery. His thesis involved investigation of back vanes effects on pump performance and axial thrust. During his Master program he was exposed to extensive training in numerical modeling, CFD, incompressible flow turbomachinery design and analysis, and advanced aerodynamics.

Professional Registration:

Farzam is an ASME member and an academic partner in Hydraulic Institute (HI).

Education: Texas A&M University, College Station, TX; PHDME 2018
University of Tehran, Tehran, Iran, MSME 2014
Semnan University, Semnan, Iran, BSME 2011

Recent Presentations and Publications:

Mortazavi, F., and Palazzolo A. B., 2018, “A Transient Computational Fluid Dynamics, Phase Modulated, Multi-Frequency Approach for Impeller Rotordynamic Forces," Submitted to ASME J. Fluids Eng., Under review.

Mortazavi, F., and Palazzolo A. B., 2018, “Rotordynamic Force Coe_cients of Volutes and Diffusers for Prediction of Turbomachinery Vibration," ASME J. Vib. Acoust., 140(5):051015-051015-12.

Mortazavi, F., and Palazzolo A. B., 2018,”Prediction of Rotordynamic Performance of Smooth Stator-Grooved Rotor Liquid Annular Seals Utilizing Computational Fluid Dynamics" ASME J. Vib. Acoust., 140(3):031002-031002-9.

Mortazavi, F., Riasi, A., and Nourbakhsh A., 2017, “Numerical Investigation of Back Vane Design and Its Impact on Pump Performance." ASME J. Fluids Eng., 139(12): 121104-121104-121109.

Rahbari, I., Mortazavi, F., and Rahimian, M. H., 2014, “High Order Numerical Simulation of Non-Fourier Heat Conduction: An Application of Numerical Laplace Transform Inversion," International Communications in Heat & Mass Transfer, 51, pp. 51-58.

Mortazavi, F., and Palazzolo, A. B., 2017, “CFD-Based Prediction of Rotordynamic Performance of Smooth Stator-Grooved Rotor (SS-GR) Liquid Annular Seals," ASME Proc. Int. Gas Turb. Inst. (IGTI), GT2017-63380, June 2017.

Mortazavi, F., and Banerjee, D., 2016, “Review of Molten Salt Nanouids," ASME Summer Heat Tran. Conf., July 2016, Washington DC, (50329), p. V001T003A011.

Mortazavi, F., Chaparian E., and Najafi A. F., 2014, “An Algorithm for 3D Design of Centrifugal Pumps Impeller: Theoretical Approach," The 5th Conference on Rotating Equipment in Oil and Power Industries, January 2014, Tehran, Iran.