SungWon Kwak

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EDUCATION

Ph.D. in Astronomy at the **University of Rome**, joint by Sapienza and Tor Vergata — 2019 – 2023

Thesis: The Formation and the Chemodynamical Evolution of the Milky Way and its Stellar Halo

Supervisor: Prof.Giuseppe Bono

M.S. in Astronomy at **Seoul National University** — 2009 – 2013

Thesis: Origin of Non-Axisymmetric Features of dE galaxies in the Virgo Cluster

Supervisor: Prof.Woong-Tae Kim

B.S. in Physics & Astronomy at the **University of Washington**, Seattle — 2009 – 2013

The Storm King High School, New York — 2007 – 2009

EMPLOYMENT

Postdoc at the Leibniz Institute for Astrophysics Potsdam (AIP) — 2023.09 – *present*

Postdoc at Seoul National University — Summer 2023

Research Assistant at Seoul National University — Summer 2019

Technical Personnel (military service) at Korea Astronomy and Space Science Institute — 2016 – 2019

Research Assistant at CERN, Switzerland — Winter 2014

RESEARCH INTEREST

Galactic Dynamics, Bar, Spiral, Disk Instabilities
Nuclear Ring, Nuclear Stellar Disk, Nuclear Star Cluster
Structure Formation, Stellar Halo, Dark Matter Halo

REFERENCES

Prof.XXXX — XXX@aip.de
Prof.XXXX — XXX@aip.de
Prof.XXXX — XXX@aip.de
Prof.XXXX — XXX@aip.de
Prof.XXXX — XXX@aip.de

AWARDS/SCHOLARSHIPS

PUBLICATIONS

SKILLS AND INTERESTS

Interests — Product Development, Design, Automobile, CAD/CAE, Finite Element Analysis, Optimization, Fluid Mechanics, Robotics, Modeling and Simulation

Design Software — Basic AUTOCAD, CATIA V5, ANSYS (Static Structural, Transient Structural, Static Thermal, Transient Thermal, Harmonic Response, Model analysis, Acoustic, Fluent), OptimumLap, MATLAB

PROJECTS

Design Optimization of Hydraulic Press Plate using Finite Element Analysis January 2016 - April 2016
Major Project as a part of curriculum

- An Industrial Defined Project in collaboration with Incredible Machines, Rajkot
- Designed and performed an FEA analysis of the plates of Hydraulic machine with the capacity of 250-ton
- Optimization in terms of design and material reduction, leading to cost effectiveness, considering minimum deformation of plates during operation

Mathematical Modeling and Analysis of a Hydro-pneumatic Suspension Column of a Car July 2015 - October 2015
Minor Project as a part of curriculum

- Modeled a 2-DOF system considering sprung and unsprung mass of the vehicle
- Performed sensitivity analysis to minimize the displacement of sprung and unsprung mass caused by vehicle hitting a bump using Transfer Function approach
- The settling time and displacement of the system were decreased using Hydro-pneumatic suspension system

Design and Thermal analysis of Disk Brake Rotor using ANSYS March 2016
GT Motorsports,a Formula Student Team of GTU

- Applied Energy Equation to calculate theoretical data for the input of simulation
- Devised boundary conditions for modeling the system by calculating including Heat power and Heat flux
- A Static thermal analysis in ANSYS Workbench using real time boundary conditions to obtain temperature distribution of Brake Rotor

Design, Development and Analysis of Exhaust System and Muffler assembly Sept 2015 - Jan 2016
GT Motorsports,a Formula Student Team of GTU

- Design and Development of complete muffler assembly for the reduction of noise under 110 dBC as per the rulebook
- Modeling and Acoustics analysis of muffler assembly in ANSYS to determine the Transmission Loss
- A CFD analysis of Exhaust Manifold using ANSYS Fluent to optimize the exhaust gas flow

RESEARCH PUBLICATION

Akshay Vaishnav, Path Lathiya, Mohit Sarvaiya"*Design Optimization of Hydraulic Press Plate using Finite Element Analysis*"Vol. 6 - Issue 5, International Journal of Engineering Research and Applications (IJERA), ISSN: 2248-9622 May 2016

INTERNSHIP/TRAININGS

Automotive Industry Simulation Internship,
Expertshub,Sinhgad Institute of Engineering, Pune June 2015
Machining and Quality Control of Forged Connecting Rods,
Amul Group of Industries, Rajkot February 2015

POSITION OF RESPONSIBILITY

CAE and Powertrain Lead, Formula SAE August 2015 - Present
GT Motorsports,a Formula Student Team of GTU

- Devised the design objectives and validation of designs through simulations and testings
- Concentrated on real time simulation of Exhaust System and the noise reduction of Exhaust system
- Part of core Design group in the team helping with various design decisions
- Performed numerous simulations of various components of the car in the area of FEA and CFD segments with documentations

Head coordinator of Mechanical section at Robotics club July 2015 - May 2016
Sanjaybhai Rajguru College of Engineering

· A college level Robotics club established by students with the aim of learning and professional skill development among students and peers
· Lead in Mechanical work of Robotics club, working mostly with CAD and Hardware systems
· Team leader and active member working to develop various robots of different concepts and configurations

EXTRA-CIRRUCULAR

- STTP on **Life Long Research** under TEQIP-II, SVNIT, Surat February 2016
- Participated in **Formula Student India**, An International FSAE competition, Secured 9th rank overall & 4th in Endurance January 2016
- Seminar on **Introduction to Robotics and Arduino Programming**, SRCOE,Rajkot July 2015
- **Junkyard**, BRIZINGER'15, a National Level Techfest, GEC, Rajkot March-2015
- Seminar on **Rapid Prototyping**, COGNIZANCE 2K14, a National Level Technical Festival, CSPIT, Charotar September-2014
- **Rise of Machine**, PRAKARSH 9.0, a National Level Technical Symposium, SVIT, Vasad March-2014

DECLARATION

I hereby declare that all the details furnished above are true to the best of my knowledge and belief.