

# Guggilla Mukesh



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## EDUCATION

Program	Institution	%/CGPA	Year of Completion
PhD. Ocean Engineering	Indian Institute of Technology Madras, Chennai	9.75/10	Ongoing
<i>B.Tech &amp; M.Tech (Dual Degree):</i> Naval Architecture & Ocean Engineering	Indian Institute of Technology Madras, Chennai	8.24/10	2017
XII Grade	S.R. Junior College, Karimnagar, AP	96.2	2012
X Grade	St. Anthony's High School, Karimnagar, AP	94	2010

## RESEARCH INTERESTS

My research interests are Experimental and Numerical Studies in Maneuverability of Autonomous Underwater Gliders, Hull and Wing Design Optimization and Guidance and Control Systems Analysis

## PUBLISHED WORKS

- "CFD Study of the Hydrodynamic Characteristics of Blended Winged Unmanned Underwater Gliders", International Ocean and Polar Engineering Conference (**ISOPE**), "Mukesh Guggilla and R Vijayakumar", 2019, Vol.1, Pages 1547-1552, ISBN 978-1 880653 85-2; ISSN1098-6189.
- "Study on the Hydrodynamic Performance of Unmanned Underwater Gliders with Varying Wing Sections Using CFD", International Conference on Computational and Experimental Marine Hydrodynamics (**MARHY**), "Mukesh Guggilla and R Vijayakumar", 2018, Pages 264-269, ISBN: 978-93-80689-30-2.
- "Autonomous Underwater Gliders – A Review of Development and Design and a Proposed Model for Virtual Mooring", International Conference on Coastal and Inland Water Systems, **CIS**, 2019, Dec 16-18, Mukesh Guggilla and Vijayakumar R, 2019/28, pp1-8, Bhubaneswar.
- "Numerical Study on the Hydrodynamics associated with Underwater Gliders", International Maritime Research Confluence, **IMRC-IIRE**, 2020, Feb 13-14, Mukesh Guggilla and Vijayakumar R, 2020/6.
- "CFD Investigation on the Hydrodynamic Characteristics of Blended Wing Unmanned Underwater Gliders with Emphasis on the Control Surfaces", **OMAE2020-19280**, Mukesh Guggilla and Vijayakumar R.

## AWARDS & HONORS

- Research Scholarship - Honored with the prestigious Prime Minister's Research Fellowship (**PMRF**), IIT Madras, India, 2018 July to 2021 June.
- Placed in the **top 1%** from over 500,000 Indian students in **IIT JEE** (Joint Entrance Examination) 2012
- Placed in the **top 1%** from over 1.2 million Indian students in All India Engineering Entrance Exam 2012
- Ranked **All India Second** from over 300,000 Indian students in NDA – National Defence Academy Examination 2012

## ACADEMIC PROJECTS

- Wave Attenuation and Siltation in the presence of an Underwater Reef** 2016 - 2017  
*Postgraduate Thesis with Prof. Murali* IIT Madras
- The thesis focuses on the numerical study of **wave attenuation and sediment transport** in the presence of a submerged reef near the coastline
  - Modelled the wave transformation in the shallow water zone using Boussinesq equations in the programming language FORTRAN
  - Performed a computational study of sediment transport using a finite-difference scheme for sea bed evolution from Van Rijn theory
- Fatigue Analysis of Jack-up leg under Environmental Loads** 2015  
*Course Project with Dr Deepak Kumar* IIT Madras
- Modelled and performed **fatigue analysis of the jack-up leg** under the environmental loads based on PM spectrum using CFD
  - Compared the cumulative fatigue damage for different wave periods and current loads to a basic model with minimal structural complexity and verified the load distribution
- Preliminary Ship Design of a 68,000 DWT Bulk Carrier** 2015  
*Course Project with Prof. P. Krishnankutty* IIT Madras
- Modelled the Bulk Carrier from offset data generated using BSRA series on Rhinoceros for a service speed of 16 knots and a 9000 NM range
  - Modelled conventional marine propeller from the basic design principles using  $B_p - \delta$  standard chart
- Quasi-Two-Dimensional Flow through a Diverging Nozzle** 2015  
*Course Project with Prof. Murali K* IIT Madras
- This project presents a finite-difference scheme for computing solution to a quasi-two-dimensional flow through a diverging nozzle using MATLAB
- Analytical Model for an Oscillating Water Column** 2014  
*Course Project with Prof. S.A. Sannasiraj* IIT Madras
- Proposed an Analytical Model for an **Oscillating Water Column** detailing Energy potential
  - Evaluated wave characteristic data along the Indian coastline for installing OWC devices
  - Surveyed six potential sites for three different monsoon seasons by calculating mean wave power
  - Suggested offsetting capital costs, replacement of turbine blades to improve the efficiency of OWC
- Design of an Amphibious Water Scooter** Summer 2013  
*Co-Curricular Project with Centre for Innovation (CFI)* IIT Madras
- Proposed the design for an Amphibious Water Scooter for use in recreational activities near Chennai coast
  - Modelled the design in SolidWorks and made the prototype for testing at the Centre for Innovation club

## PROFESSIONAL EXPERIENCE

- Larsen & Toubro Shipbuilding Limited** Tiruvallur, TN  
*Shipyard Trainee in Construction* Summer 2015
- Worked in the **Dynamic Positioning** system design for a Platform Supply Vessel
  - Involved in the different stages of **Shaft Alignment** of an Anchor Handling Tug Supply Vessel
  - Lead the Construction team for **Waterjet Propulsion** of high-speed Interceptor Boats

- Training aided in understanding Standard industry and safety practices at shipyards
- Procured on-site experience in Ship Design, Building and Repair departments
- Analyzed various procedures involved in shipbuilding from planning to the launching of different vessels
- Gained basic structural knowledge of various ships such as Fast Patrol Vessels and Air Craft Carriers

### PROFESSIONAL SOCIETAL MEMBERSHIPS

- Associate Member, The Royal Institution of Naval Architects (RINA) – since 2013
- Graduate Student Member, IEEE and IEEE Oceanic Engineering Society (OES) – since 2019
- Graduate Student Member, American Society of Mechanical Engineers (ASME) – since 2020

### COURSEWORK

Guidance and Control of Marine Vehicles, Marine Robotics, Computer- Aided Surface Development for Marine Vehicles, Numerical Techniques in Ocean Hydrodynamics, Advanced Marine Vehicles, Ship Hydrodynamics, Ship Resistance and Propulsion, Nonlinear Problems in Ocean Engineering, Vibrations of Marine Structures and Acoustics, Ocean Wave Hydrodynamics, Ocean Energy, Marine Engineering, Applied Mechanics lab, Probability, Statistics and Stochastic Process

### PROGRAMMING SKILLS

**Software Packages:** STARCCM+, NAPA, Paramarine, AutoCAD, Rhinoceros, SolidWorks

**Programming Languages:** MATLAB, FORTRAN, C

### EXTRA-CURRICULAR ACTIVITIES

#### **Positions of Responsibility:**

- Leader of the Event Management team of the annual techno-cultural festival, **Wavez**, (2014-15)  
Department of Ocean Engineering, IIT Madras. Spearheaded the group of 50 students, with 15 events
- Selected as Coordinator for Roboceana (**Floating and Underwater robotics**), Wavez, (2012-13)  
Department of Ocean Engineering
- Volunteered for the event Roboceana (Floating and Underwater robotics) in India's largest (2012-13)  
and ISO certified campus festival, Shaastra 2013, IIT Madras

#### **Social Activities:**

- Initiated and conducted the social event 'Beach Clean-up' as part of the department festival (2014)
- Member of CPC (Campus Palliative Care), a social club where I conducted various programs (2013)  
to aid and create awareness among the cancer patients and their families
- Member of IVil (IIT for Villages), taught in schools of backward areas (2012)

#### **Others:**

- Cleared the 'B1' Certificate examination of the National Cadet Corps, Air Squadron (2013)
- House Captain for six consecutive years at St. Anthony's High School (2005-10)