DESIGN RESEARCH ENGINEERING
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Jose D. Mesa, Ph.D.

Professional Specialization

Dr. Mesa is a versatile expert in naval and marine engineering, civil engineering, land surveying, aerospace, and data science/software development. His specialization lies in intricate fluid-structure interaction, adeptly merging finite-element (FEM) and computational fluid dynamics (CFD) techniques. Dr. Mesa's expertise covers comprehensive aircraft fatigue testing and extends to key roles in offshore projects in the Gulf of Mexico. He addresses challenges such as vibrations, fatigue, mooring failures, and asset integrity using advanced numerical tools. Beyond technical excellence, Dr. Mesa excels in design automation, harnessing dashboarding, big data, and machine learning for asset optimization. His commitment to digital engineering and computer vision drives insightful evaluation of cutting-edge designs and technologies.

Specialization Overview:

Digital Engineering for Innovative Solutions

- Embracing the digital transformation in engineering through digital twin concepts and virtual prototyping.
- Integrating simulations, data analytics, and modeling for enhanced product development and optimization.
- Developing machine learning models for predictive maintenance, optimization, and life extension.
- Translating complex engineering data into informative visual dashboards for stakeholder decision-making.
- Proficiency in developing tailored software for process automation and specific customer requirements.
- Enhancing cost and time savings through digital engineering.

Embedded Sensor Monitoring for Performance Enhancement

- Harnessing the power of embedded sensors for real-time monitoring and data-driven decision-making.
- Implementing sensor networks to enhance operational efficiency and mitigate risks.
- Integrating sensor data to estimate post-event asset integrity state and life extension.

Field Inspection and Measurements

- Expertise in selecting appropriate techniques and technologies for precise field inspection and measurements.
- Implementing best practices for collecting and analyzing data from real-world environments.
- Demonstrating the impact of precise field measurements on engineering projects through real-life examples.

Fluid-Structure Interaction (FSI) Analysis

- Modeling of FSI and its significance in various engineering applications, such as high-speed vessels.
- Implementing advanced computational methods coupling FEM and CFD for accurate analysis and prediction.

Maritime Engineering

- Unveiling the principles of vessel stability and hydrodynamics for safe and efficient maritime operations.
- Incorporating design considerations to ensure optimal performance and safety across varying sea conditions.

Offshore Engineering

- Designing and analyzing offshore riser and pipeline systems based on extensive experience.
- Structural integrity assessments for offshore hulls, considering environmental and operational factors.

Aerospace Engineering

- Demonstrated proficiency in full-scale aircraft fatigue and component testing techniques and methodologies.
- Practical insights into designing and operating reliable testing campaigns.

Education

University of Puerto Rico, Mayaguez

B.S., Civil Engineering Magna Cum Laude, 2013

B.S., Surveying Magna Cum Laude, 2015

University of Michigan, Ann Arbor

M.S.E. Naval Architecture and Marine Engineering, 2015
M.S.E. Aerospace Engineering, 2016
Naval Architecture and Marine Engineering, 2018
Ph.D. Dissertation Title: "Hydroelastic Analysis of Aluminum and Composite High-Speed Planing Craft Structures During Slamming"

Certifications

Coursera

Database Design and Basic SQL in PostgreSQL (University of Michigan), 2023

Cornell University *(eCornell), Ithaca, NY*

Data Science with SQL and Tableau, 2022
Python for Data Science, 2022
Machine Learning, 2020
Software Development in Python, 2020

Chevron Corporation*, Houston, TX*

Chevron Data Science Development Program (DSDP), 2020

University of Michigan*, Ann Arbor, MI*

Graduate Teacher Certificate Program, 2018
Rackham Diversity, Equity and Inclusion (DEI) Professional Development Certificate, 2018

University of Puerto Rico*, Mayaguez, PR*

Certificate Environmental Engineering & Water Resources, 2013

APPOINTMENTS

Anaconda Inc., Houston, TX USA
Senior Software Engineer January 2023 - Present
Advance Software Engineer March. 2022 - January 2023

Chevron Corporation, Houston, TX USA
Facilities Engineer, Chevron Technology Center Oct. 2018 - March 2022

University of Michigan, Ann Arbor, MI USA
Graduate Student Researcher, Dept. of Naval Architecture & Marine Engineering Sep. 2013 - 2018

Boeing Company, Everett/Renton, WA USA
777-X Airframe Fatigue Test Engineer, Boeing Test & Evaluation (BT&E) Aug. - Nov. 2016
P8-A Airframe Fatigue Test Engineer, Boeing Test & Evaluation (BT&E) May 2013 - Aug. 2016

Naval Research Enterprise Internship Program, West Bethesda, MD USA
Research Assistant, Computational Hydromechanics Team (Carderock) May - July 2015

Caribbean Coastal Ocean Observation System (CariCoos), Mayaguez, PR
Research Assistant, Field and Numerical Coastal Hazards Division Aug. 2011 - Aug. 2013

University of Michigan SROP, Ann Arbor, MI USA
Intern, Dept. of Naval Architecture & Marine Engineering June - Aug. 2012

University of Puerto Rico, Mayaguez, PR
Department of Energy -Scholarship Fellow, Dept. of Civil Engineering and Surveying Jan. - July 2012
Research Focus: Earthquake Engineering

U.S. Army Corps of Engineers-ERDC-CHL, Vicksburg, MS USA
Intern, Coastal and Hydraulics Laboratory (CHL) June - Aug. 2011

University of Puerto Rico, Mayaguez, PR
PR-LASMP Scholarship Fellow, Dept. of Engineering Science and Materials Aug. 2010 - May 2011
Research Focus: Coastal Hydrodynamics

Stevens Institute of Technology, Hoboken, NJ USA
Intern, Center for Secure and Resilient Maritime Commerce June - Aug. 2010

University of Puerto Rico, Mayaguez, PR
DoE-Scholarship Fellow, Dept. of Engineering Science and Materials Jan. - Dec. 2010
Research Focus: Transportation Optimization

University of Puerto Rico, Mayaguez, PR
Research Assistant, Dept. of Engineering Science and Materials Aug. 2009 - May 2010
Research Focus: Material Science

Honors & Awards

Everyday Excellence - Chevron Company Awards & Recognition by Peer Nomination
- 9 Recognition's 2021
- 8 Recognition's 2020
- 2 Recognition's 2019

Measure Value - Human Energy - Chevron Company Awards & Recognition by Management Nomination
- 2 Growing Capabilities Recognition 2021
- 1 Building Relationships Recognition 2020
- 1 Delivering Results - Innovation Recognition 2020
- 2 University Recruiting Special Recognition Recognition's 2021

Richard F. and Eleanor A. Towner Prize for Distinguished Academic Achievement 2018
College of Engineering, University of Michigan

Distinguished Leadership Award 2018
College of Engineering, University of Michigan

Nominee for the Richard and Eleanor Towner Prize for Outstanding Ph.D. Research 2017
College of Engineering, University of Michigan

Ph.D. Student Achievement Award 2017
*University of Mich*igan Center For Engineering Diversity & Outreach

Rackham Development Leaders Program (RDLP) 2017 – 2018
University of Michigan

Civil Engineering & Surveying Departmental Best Student Award 2015
Civil Engineering & Surveying Department, University of Puerto Rico

University of Michigan, Rackham Merit Fellowship 2013
University of Michigan

Exemplary Summer Research Citation University of Michigan 2012
University of Michigan

Undergraduate Best Student Paper Competition 2012
Earthquake Engineering Research Institute (EERI)

First Place Overall American Society of Civil Engineering (ASCE) 2012
Southeast Student Conference Competition

ExxonMobil LOFT Fellowship Program 2012
ExxonMobil Company

Department of Energy Research Scholarship 2011, 2012
University of Puerto Rico

Boeing Company Scholarship 2011
University of Puerto Rico

NSF-Louis Stokes Alliances for Minority Participation (PR-LSAMP) 2011
Mentored Undergraduate Research Experience Program

Scholarship for Outstanding Academic Record 2008-2013
University of Puerto Rico

RESEARCH & TECHNOLOGY DEVELOPMENT FUNDING

1. Smart Risers and Pipeline Systems, PI-Mesa, Chevron Research and Technology Development (R&TD), 06/2021-12/2023. $600,000

2. DigiPipeline (Subsea Pipeline Automation Design Platform), Co-PM-Mesa, Chevron (R&TD) and Surface Digital Platform, 11/2020-12/22. $1,200,000

TEACHING

1. *Anaconda Learning* - Data Science Portfolio Workshop: This live online course is designed to prepare data scientists to stand out when applying for their first data science role. We will cover portfolio development best practices to demonstrate you have the right skills and experience and explain how to present yourself and your achievements (LinkedIn, certifications, personal site) so that hiring managers and recruiters will notice you. We will also explore how to use the Anaconda notebooks and data catalog to quick-start your data science project and find useful data sets.

Instructed Courses at the University of Michigan

Course #	*Course Title*	*Teaching Role*	*Term*	*Enrollment/ Response*	*Q1*	*Q2*	*Q4*
NA 270	*Marine Design*	*Instructor*	*Winter 2018*	*10/11*	*3.90*	*4.10*	*3.90*
NA 270	*Marine Design*	*Co-Instructor*	*Fall 2017*	*33/39*	*3.62*	*4.03*	*4.87*
NA 423	*Intro to Num Hydro*	*Guest Lecture*	*Winter 2017*	-	-	-	-
NA 423	*Intro to Num Hydro Lab*	*Lab GSI*	*Winter 2017*	-	-	-	-

Q1: Overall, this was an excellent course; Q2: Overall, the instructor was an excellent teacher; Q4: I had a strong desire to take this course. Evaluations are on a 5-point scale where 5 is Strongly Agree , and 1 is Strongly Disagree.

GRADUATE COMMITTEE ACTIVITY

Master's Thesis

1. Kyle Porter, April 2023, “Investigation Of Two-Phase Flow-Induced Vibrations In Horizontal Gas-Liquid Flow", Committee Member (Current position: Occidental Petroleum Company)

PUBLICATIONS AND TECHNICAL REPORTS

Journal Articles

1. Kyle Porter, Eduardo Pereyra, Jose Mesa, Cem Sarica (2023) “Fluid-Structure Theoretical Model for Slug Flow Fatigue Response" Journal of Fluid and Structures (In-Review).

2. Kyle Porter, Eduardo Pereyra, Jose Mesa, Cem Sarica (2023) “Experimental Investigation of Induced Vibrations in Horizontal Gas-Liquid Flow". Journal of Experimental Thermal and Fluid Science.

3. Jose D. Mesa, Kevin J. Maki, Matthew T. Graham (2022) “Numerical Analysis of the Impact of an Inclined Plate with Water at High Horizontal Velocity". Journal of Fluid and Structures.

4. Jose D. Mesa, Kevin J. Maki (2018) “Hydroelastic Assessment of Different High-Speed-Vessel Stiffened Panel Designs". Naval Engineers Journal, September 2018, No 130-3, pp 33-42
Nominated as one of the top papers from ASNE's TSS 2018 conference.

Conference or Symposium Proceedings Papers

1. Jose D. Mesa, Kyle Porter and Eduardo Pereyra (2023) “Computer Vision Approach for Pipeline Slug Flow Analysis" 10th International Conference on Computational Methods in Marine Engineering MARINE 2023, Madrid, Spain

2. Kyle Porter, Jose D. Mesa and Eduardo Pereyra (2022) “Fluid-Pipe Interaction in Horizontal Gas-Liquid Flow" Society of Petroleum Engineers Annual Technical Conference and Exhibition (SPE-ATCE 2022), Houston, USA

3. Jose D. Mesa, Haijing Gao and Yiannis Constantinides (2022) “Prediction and Benchmark of a Nearly Horizontal Flowline Slug Flow" ASME 41st International Conference on Ocean, O shore and Arctic Engineering (OMAE 2022), Hamburg, Germany.

4. Jose D. Mesa and Markku Santala (2020) “Gulf of Mexico Hurricane Single Event Fatigue Method for Riser Analysis" ASME 39th International Conference on Ocean, Offshore and Arctic Engineering (OMAE 2020), Fort Lauderdale, FL.

5. Jose D. Mesa, Kevin J. Maki (2019) “Fluid-structure interaction analysis of high-speed water entry of curved bodies". Technology, Systems & Ships Conference 2019, Arlington, VA.
Nominated as one of the top papers from ASNE's TSS 2019 conference

6. Jose D. Mesa and Kevin J. Maki (2019) “Numerical Hydrodynamic Study on the Effects of Body Curvature During Ditching" VIII International Conference on Computational Methods in Marine Engineering MARINE 2019, Gothenburg, Sweden

7. Jose D. Mesa, Kevin J. Maki. “Numerical Investigation of Rectangular Flat Plate Slamming". 6th European Conference on Computational Mechanics (ECCM 6) 7th European Conference on Computational Fluid Dynamics (ECFD 7), Glasgow, UK, June 11th-15th 2018

8. Jose D. Mesa, Kevin J. Maki. “Numerical hydroelastic analysis of slamming for high-speed vessels”. In Proceedings of the 14th International Conference on Fast Sea Transportation, Nantes, France, September 27th-29th 2017

9. Kevin J. Maki, Matthew Graham, Jose Mesa. A FLUID-STRUCTURE INTERACTION ALGORITHM FOR SHIP HYDROELASTICITY. In Proceedings of the 11th OpenFOAM Workshop 2016 Conference. Paper #130, Guimaraes, Portugal, June 26th-30th, 2016

10. Margaret Craig, Dominic Piro, Lauren Schambach, Jose Mesa, Dave Kring, Kevin Maki. "A Comparison of Fully-Coupled Hydroelastic Simulation Methods to Predict Slam-Induced Whipping". In the Proceedings of the 7th International Conference on Hydroelasticity in Marine Technology Split, Croatia, September 16th-19th 2015

11. Jose Mesa. "Seismic Sloshing Response of Above Ground Oil Storage Tanks". In the Proceedings of the 65th Earthquake Engineering Research Institute Conference. 2012 Undergraduate Student Paper Award, Washington, USA, February 12th-15th 2013

INVITED PRESENTATIONS INTEREST
(Invited keynote presentations at conferences or symposia or seminar series at peer institutions)

"Fluid-Structure Interaction of Thin Wall Tanks Under Seismic Loading", University of Puerto Rico at Mayaguez: Earthquake Engineering Research Institute, Civil Engineering Department September 29, 2016

"Computational Fluid Dynamics for Wave-Interaction and Seakeeping Modeling", University of Puerto Rico at Mayaguez: Coastal & Marine Engineering Technology Seminar Class September 28, 2015

PROFESSIONAL SERVICE
Member of the Tulsa University Fluid Flow Project (TUFFP) Winter 2021-Present
Industry-University Research Consortium

University of Puerto Rico Mechanical Engineering Department Fall 2021- 2022
Advisory Board Member (Chevron)

ASNE's TSS 2019 Technical Session Moderator: USCG Structures June 2019

ASNE's Technology Systems and Ships Symposium technical abstract reviewer Winter 2019

Ocean, Offshore & Arctic Engineering (OMAE) technical paper reviewer Winter 2019

ASNE's TSS 2018 Technical Track 4 Session Moderator June 2018

Engineering Graduate Symposium Co-Chair Summer-Fall 2017

Graduate Rackham International (GRIN) Summer Mentorship Program Summer 2017

UM recruiting home program (at UPRM) Fall 2016
- Present as a guest speaker in the Earthquake Engineering Research Institute
- Organized logistics and activities for recruitment at UPRM
- Initiated faculty lunch and relations between UM and UPRM for future recruitment

2016 Summer Research Opportunity Program (SROP) selection committee Winter 2016

Voluntary teacher at "Nuestra Lengua" teaching program, Ann Arbor MI Fall 2015

UM recruiting home program (at UPRM) Fall 2015
- Present in the Coastal & Marine Engineering Technology Seminar Class (Invited speaker)
- Organize meetings between faculty and UM recruiters

UM Engineering Graduate Symposium (EGS) session chair (volunteer) Fall 2015

UM College of Engineering Laboratory mentoring program Winter 2015

UM Engineering Graduate Symposium (EGS) NAME host volunteer Fall 2015

UM departmental visit committee
(Naval Architecture & Marine Engineering representative) Winter 2014

UM graduate school mentoring lunch program (volunteer mentor) Fall 2014

UM recruiting home program (at UPRM) Fall 2014

- Develop presentation for Informational section
- Organized Info section and contacted student societies for collaboration with UM
- Lead initiative of participated at Civil Engineering companies night
- Led initiative of recap of recruitment trip for following years

SHEP 2014 volunteer student panel University of Michigan: Summer Research

Opportunity Program: Pipeline to Graduate School Fall 2014