
Curriculum Vitae

Marie Rachelle Kasprzyk

Rotordynamics Engineer
Oak Ridge National Laboratory
One Bethel Valley Road, Oak Ridge, TN 37830

EDUCATION

- Ph.D. Mechanical Engineering**, Texas A&M University, GPA 3.25/4.0, Expected 2024
Thesis: Evaluating the effect of trapped fluid on the creation of asynchronous forces on shaft systems
- M.S. Mechanical Engineering**, University of Central Florida, GPA 3.0/4.0, 2017
Thesis: Continuous Oscillation: Vibrational Effects and Acceptable Frequency Ranges of Small Bore Piping in Field Applications
- B.S. (Honors in Major) Mechanical Engineering**, University of Central Florida, GPA 3.5/4.0, 2013
Thesis: Strategically Minded: Dynamic Analysis of Strategic Flight Bat Maneuvers
- A.A. (Summa Cum Laude)** Indian River State College, GPA 3.9/4.0, 2009

EXPERIENCE

Sept. 2022 – Present **Oak Ridge National Laboratory** Oak Ridge, TN
Rotordynamics Engineer

- ❖ R&D of rotating equipment including rotordynamics, design, balancing, energy dissipation mechanisms, modeling and improvement of rotating machinery systems and components.

Aug. 2017 – Sept. 2022 **Texas A&M University** College Station, TX

Graduate Research Assistant, J. Mike Walker Department of Mechanical Engineering
Advisor: Dr. Adolfo Delgado

Project #4) Sea Floor Pump Rig, December 2019 – May 2020

Testing a prototype subsea pump for an oil & gas exploration company

- ❖ Re-commissioned loop to test a pump supplied by an outside company. The work included, consulting on the design and manufacturing of the pump, designing the thrust bearing and sealing assembly, fabricating the pump supports (MIG/stick welding), rewiring the lab for instrumentation, installing instrumentation, and completing the pump testing matrix. Website about the test rig (pump not shown in pictures): <https://turboreliability.engr.tamu.edu/research/hydraulic-test-rig/>

Project #3) Fluid Subsynchronous Rig, December 2018 – August 2019

Replicating a trapped fluid in a hollow cylinder/shaft causing an instability of the system

- ❖ Within 5 months, designed, built, commissioned, and obtained data from the test rig. The design process included modeling the rotordynamics of the rotor-bearing system using XLTRC2, designing the machine in solidworks, and creating precision drawings for outside machine shops. Logistics

included: a) guiding machining companies on manufacturing each component, b) tracking progress of critical tasks and part ETA, c) writing detailed assembly, commissioning, and operating procedures with pictures, d) presenting progress, results, and collected data in weekly meetings with the company sponsor, and e) prepared a final report and presentation for the company sponsor.

- ❖ The machine was designed and fully assembled within the three month deadline including 1. aligning pedestals, 2. wiring proximitors 3. fabricating machine guard (MIG/stick welding), 4. assembling machine and oil system. Website about the test rig:

<https://turboreliability.engr.tamu.edu/research/subsynchronous-response-due-to-trapped-fluid/>

Project #2) Rod String Stability and Reliability Rig, August 2018 – December 2018

Replicating a long shaft for an ESP and inducing multiple shaft bending modes.

- ❖ Modified rig to determine axial force output for different shaft bending modes.

Project #1) Oil Whip and Whirl Rig, Aug. 2017 – Aug. 2018

Replicating oil whip where the rotor becomes unstable and contacts the journal bearing.

- ❖ Completed the rotordynamics modeling and analysis of the rotor-bearing system using XLTRC. Modeled parts, and created precision drawings using SOLIDWORKS. Worked with machining companies to manufacture each component. Used millwright skills to assemble and commission the test rig. Website about the test rig: <https://turboreliability.engr.tamu.edu/research/whip-and-whirl-test-rig/>

July 2013 – Aug. 2017
Maintenance/Reliability Engineer

The Dow Chemical Company

Plaquemine, LA

- ❖ Provide solutions to maintain and improve the reliability of the mechanical equipment in the Polyolefin Elastomers and Linear Low Density polyethylene production plants. Worked with plant personnel to troubleshoot day to day issues and provided technical expertise to plant support to implement new projects. Implemented global reliability strategies to increase the reliability of the equipment and wrote and modified around 500 maintenance procedures to increase reliability of the equipment.

March 2012 – July 2013
Undergraduate/Graduate Research Assistant, College of Engineering and Computer Science
Advisor: Dr. Suhada Jayasuriya

University of Central Florida

Orlando, FL

- ❖ **Graduate Study:** Study of the simple Jeffcott Rotor. Derivation of the three-dimensional characteristics of a dynamic rigid rotor (thick) supported by two bearings.
- ❖ **Undergraduate Study:** Analyzed the dynamics and pursuit strategies of bats during pursuit till successful capture of prey. Extracted video frames and manually collected digital data which was used to calculate the pursuit strategies and dynamics of bat(s) and prey using MATLAB. Wrote undergraduate thesis based on the research.

May 2011 – Aug. 2011
Quality Engineering Intern

Walt Disney World

Orlando, FL

- ❖ Collaborated with engineers, project managers, and engineering services to successfully complete multiple projects.

PUBLICATIONS:

Journal

1. Kasprzyk, M., Sentmanat, J., and Delgado, A., 2022, "Stability of a Rotor Partially Filled With Fluid: Test Facility and Experimental Results." *ASME. J. Eng. Gas Turbines Power.* **145**(4): 041019. <https://doi.org/10.1115/1.4055946>
2. Patil, A., Kasprzyk, M., Delgado, A., and Morrison, G., 2020, "Effect of Leakage Flow Path Wear on Axial Thrust in Downhole Electrical Submersible Pump Unit," *ASME J. of Fluids Eng.*, **142**(5) : 051202 <https://doi.org/10.1115/1.4045571>

Conferences

1. Kasprzyk, M., Sentmanat, J., and Delgado, A., 2022, "Stability of a Rotor Partially-Filled With Fluid: Test Facility and Experimental Results," Proc. Gas Turbine Tech. Conf. Exp. ASME Turbo Expo, Rotterdam, The Netherlands, June 13-17, 2022, Paper No. GT2022-82200

LEADERSHIP:

MEFECS (Mechanical Engineering Female Graduate Students)

- ❖ **Founder and President**, August 2017 – May 2021
- ❖ The goal is to provide a support system and a friend group for women in the mechanical engineering graduate program.
- ❖ Website: <https://www.mefegstamu.org/>

Texas A&M University Turbomachinery Lab

- ❖ **Supervisor/Mentor**, August 2017 – August 2021
- ❖ Oversaw a total of 6 interns, 3 M.S., and 2 Ph.D. students over the past four years.
- ❖ Interns are undergraduate students in the A&M mechanical and aerospace engineering programs.
- ❖ Assigned projects to assist with designing and building machinery.
- ❖ Taught basic millwright skills such as using hand tools, torque wrench, feeler gauge, induction bearing heater, and how to clean components, install o-rings, and perform coupling alignment.
- ❖ Trained how to write/modify procedures, spec out parts, and calculate torque values.
- ❖ Taught safety protocol such as proper PPE for each task.
- ❖ Taught/assigned the following projects

PROFESSIONAL SERVICE ACTIVITIES:

- ❖ Bearings and Seals Technical Session Chair of IGTI/ASME Turbo Expo Conference 2023 (2 sessions)
- ❖ Active Reviewer (1 ASME Conference paper, 1 ASME Journal article, 1 Diagnostyka Journal article)

TEACHING

Texas A&M

- ❖ MEEN 404 (Engineering Laboratory): Laboratory Instructor – Fall 2021
- ❖ MEEN 210 (Geometric Modeling for Mechanical Design): Teaching Assistant – Fall 2017

University of Central Florida

- ❖ EGN 3321 (Engineering Mechanics Dynamics): Undergrad Teaching Assistant – Spring 2013

Tutored at University of Central Florida

- ❖ EGN 3310 (Statics): Tutor, student academic resource center – Spring 2011
- ❖ EGN 3343 (Thermodynamics): Tutor, student academic resource center – Fall 2011 to Spring 2012

ACADEMIC HONORS AND AWARDS

1. Wilkes Family Turbomachinery Laboratory Fellowship, 2019
2. Kozik-Hervey Fellowship, 2017
3. Ralph E. James Fellowship, 2017
4. Deans List, 2007-2009, 2011 - 2013
5. Central Florida FES Scholarship, 2011
6. National Smart Grant, 2010 - 2011
7. Academic Competitiveness Grant, 2009
8. Florida Medallion Scholarship, 2007 - 2011
9. Adrian M. Sample Scholarship Trust, 2007 - 2013

PROFESSIONAL SOCIETIES AND ACADEMIC ACTIVITIES:

- ❖ Member American Society of Mechanical Engineers (ASME), 2022 - present
- ❖ President MEFEGs (Mechanical Engineering Female Graduate Students), 2017- 2021
- ❖ Member Society of Women Engineers (SWE), 2011 - 2015
- ❖ President Florida Engineering Society (FES), UCF Chapter, 2012 - 2013
- ❖ Vice President Big Screen Engineering (BSE), 2011 - 2013
- ❖ Banquet Chair Society of Women Engineers (SWE), UCF Chapter, 2012 - 2013
- ❖ Member American Society of Mechanical Engineers (ASME), UCF chapter, 2010 - 2013
- ❖ Member Pi Tau Sigma Mechanical Engineering Honor Society, 2012
- ❖ Member Phi Theta Kappa International Honor Society Of Two-Year College, 2009

SKILLS:

- ❖ Programming Languages: Python, Matlab, MathCAD
- ❖ Rotordynamics Programs: XLTRC2, Dyrobes, ANSYS (beam and solid model)
- ❖ Design: Solidworks (modeling and drawings), machining (mill and lathe), welding (mig and stick), GD&T, ANSYS mechanical
- ❖ Data Software: Bentley Nevada ADRE 408, Aspen Tech/SAP