



James O'Flanagan

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Summary

Innovative Mechanical Engineer with over 20 years of experience in computational mechanics, robotics, and the integration of AI in engineering solutions. Recognized for pioneering advancements in healthcare technology, sports science, and virtual training methodologies. Holds multiple patents that demonstrate a profound ability to blend mechanical engineering principles with cutting-edge technologies, leading to groundbreaking applications in ocular surgery, biomechanical simulations, and beyond. Adept at leveraging finite element analysis, machine learning, and generative AI to solve complex engineering challenges, enhance diagnostic and treatment solutions, and drive the development of novel mechanical systems. Seeking to apply my expertise and passion for engineering innovation in a dynamic new role.

Professional Engineering Experience

Chief Engineer & Founder, OAPSIE Inc.

Mar 2019 – Present

- Led the development of Pennantview, a computational methodology for baseball biophysical quantities, integrating advanced FEA and CFD techniques.
- Conducted in-depth FEA and CFD studies to support conservation efforts in the Cuyahoga River watershed.
- Developed Edi Oapsie, an engineering project leveraging Generative AI to explore its application in mechanical engineering, showcasing potential in automating design processes with DOE technology.

Principal Engineer, Ophthalmic/Biotech Startup

Jan 2020 – Dec 2022

- Led a worldwide development team in creating software for laser eye surgery, combining structural, fluid simulations, and AI-driven image processing.
- Directed the development of software for eye biomechanics simulations, incorporating AI for predictive analysis.
- Led software and hardware system design, incorporating AI to enhance ophthalmic diagnostic and treatment solutions.

Senior Design Engineer, Johnson Matthey, Ravenna, OH

September 2019 – October 2020

- Applied ASME PVC to various natural gas extraction equipment vessel.
- Conducted full analysis using FEA, CFD, FSI, hand calcs, and Excel simulations.
- Managed design and prototyping for natural gas plant extraction equipment, applying simulation technology for efficiency improvements.

Design Engineer, Senior Engineer, US Naval Reactors Program

Babcock & Wilcox 2012 – 2015, BWX Technologies, Inc. 2015 – 2016

- Led a \$2.6 million shipping rig design project and conducted finite element analysis for ASME and MIL spec pressure vessel designs.

Principal Engineer, Rubber Simulation Projects

Goodyear 2001-2012, Hankook 2016-2019

- Directed release of North America Load Defl. Tool software, enhancing tire design & performance analysis through FEA.
- Conducted Finite Element Analysis (FEA) modeling of rubber tires, including composite physics, engineering mechanics, and visco-elasticity. All are used in human tissue HPC modeling & simulations.

Education

The University of Akron, Akron, OH. 2007 – 2010.

Master of Science in Engineering Management. Specialization: Finite Element Analysis and Computational Mechanics, & International Business. GPA: 3.85

- Thesis: "Outsourcing FEA jobs at Large US Manufacturing Companies: Sound or Unsound?"

Case Western Reserve University, Cleveland, OH. 2000 – 2002.

Bachelor of Science in Computer Engineering. GPA: 2.9

- Classes in: Static/Strength of Materials, Software Engineering, Statistics, Numerical Methods, Economics, Accounting, AI, Thermodynamics, Chemical Engineering, Manufacturing Technology, CAD, Systems Engineering, Linear Algebra

John Carroll University, University Heights, OH. 1998 – 2000.

Major: Applied Physics. GPA: 3.86

- Emphasis on Engineering Physics and Applied Physics, biotechnology and material science.

- Engaged in research projects focused on the application of physical principles to biological systems, laying the groundwork for a career at the intersection of technology and life sciences.

Skills

This skills section is tailored to showcase James O'Flanagan's breadth of expertise in mechanical engineering, emphasizing his innovative contributions, technical proficiencies, and leadership abilities within complex engineering projects.

- **Mechanical Design and Simulation:** Proficient in advanced mechanical design, inclc. the development of complex mechanical systems. Expertise in utilizing CAD tools (SolidWorks, AutoCAD) for design & simulation purposes.
- **Computational Mechanics:** Advanced proficiency in Finite Element Analysis (FEA) and Computational Fluid Dynamics (CFD), with a solid understanding of mechanical and computational engineering principles.
- **Robotics & Automation:** Skilled in the design and implementation of robotic systems, including those used in medical surgery training. Knowledgeable in automation processes, sensor integration, and motion control strategies.
- **Artificial Intelligence and Machine Learning:** Demonstrated ability in leveraging AI and machine learning algorithms to enhance mechanical engineering solutions, predictive maintenance, and optimization problems.
- **Material Science and Engineering:** Deep understanding of material properties and their application in mechanical design, including composites, polymers, and bio-compatible materials for healthcare technologies.
- **Biomechanics and Human Factors Engineering:** Experience in modeling and analyzing human biomechanics, particularly in ocular movements and sports biomechanics, to improve product design and ergonomics.
- **Project Management and Leadership:** Proven track record of leading engineering projects from concept through to completion, managing cross-functional teams, and coordinating with stakeholders to meet project objectives.
- **Patent Development and Innovation:** Rich history of patenting innovative solutions, demonstrating a capacity for creative problem-solving and a deep understanding of intellectual property law as it relates to mechanical engineering.
- **Technical Communication:** Strong ability to communicate complex technical information clearly and effectively to non-technical stakeholders, including writing patent applications, research publications, and project reports.
- **Software Proficiency:** Advanced user of engineering software, including MATLAB, ANSYS, Abaqus, and Python for scripting and automation of engineering analyses.
- **Analytical Skills:** Strong background in physics, providing a deep understanding of the physical principles underlying mechanical engineering challenges.

Professional Memberships, Awards & Honors

- **American Society of Mechanical Engineers (ASME):** Expertise in developing and applying AI algorithms for predictive modeling, data analysis, and automation in biotech applications.
- **Sigma Pi Sigma Physics National Honor Society:** Member since May 1999, recognizing outstanding achievement in physics.
- **The Order of The Engineer:** Inducted in March 2023. Symbolizes the highest standards of engineering ethics & practice.
- **Society for American Baseball Research (SABR):** At intersection of sports science & mechanical engineering.
- **NEO Science Fair Judge:** Judge for the 70th Annual NEO Science and Engineering Fair at Cleveland State in March 2023.
- **Golden Key International Honor Society:** Inducted in November 2008, for academic excellence & leadership potential.
- **Conferences:** SABR 51, ASME IMECE, ASCRS 2021, AAO 2021, ASCRS 2022, AAO 2022, Tire Society 2016, Tire Society 2017

Patents

This section emphasizes the applicant's ability to apply mechanical engineering skills across various fields, including healthcare technology, robotics, virtual reality, and sports science, demonstrating a diverse skill set and innovative approach to problem-solving.

- **VIRTUAL INTEGRATED REMOTE ASSISTANT APPARATUS AND METHODS**
 - *Patent Application #20230067625, Filed August 24, 2022*
 - Innovated a system for enhancing remote surgical procedures through a virtual assistant, integrating eye tracking and laser feedback mechanisms. This work showcases the application of mechanical engineering principles in developing advanced healthcare technologies.
- **SYSTEMS AND METHODS FOR OCULAR FINITE ELEMENT MODELING AND MACHINE LEARNING**
 - *Patent Application #20230351073, Filed November 2, 2023*
 - Co-invented a groundbreaking methodology employing finite element modeling and machine learning to simulate ocular responses, demonstrating a novel intersection of computational mechanics & biotechnological applications.
- **OCULAR SIMULATED CAMERA ASSISTED ROBOT FOR LIVE, VIRTUAL/REMOTE EYE SURGERY TRAINING APPAR. & METHOD**
 - *Patent Application #20230142530, Filed May 11, 2023*
 - Pioneered a robotic system mimicking ocular movements for surgical training, embodying the integration of mechanical engineering, robotics, and virtual reality in medical simulation technologies.
- **COMPUTATIONAL METHODOLOGY FOR DETERMINING BASEBALL BIOPHYSICAL QUANTITIES**
 - *US Patent No. 20230351073, Filed December 22, 2023*
 - Developed a computational framework for analyzing and predicting the biophysical movements in baseball, highlighting the versatility of mechanical engineering expertise in sports science and analytics.