CHRISTOPHER J. FOLEY

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Highlights: 3X Working Aerospace Hardware on Mars • Intraocular Lens Inspection System now in use by major IOL manufacturers • Runway Hardness Tester used in an active war zone by USAF Special Ops • Working Animatronic Hardware at Walt Disney World • U.S. Patent 6,474,711

- Aerospace Mechanism Design
- Optomechanical Design
- Robotics / Animatronics Design
- Military Hardware Design
- Purpose Built Excel Sheets
- Manufacturing Engineering
- Vendor Management
- Documentation and Procedures
- Geometric Tolerancing
- Visual Communication
- Advanced Solidworks
- FEA, CFD and PDM
- Machine Shop
- Fabrication
- Injection Molding

Lead Mechanical Project Engineer 5/23→Present
Motiv Spacesystems | Pasadena, CA
• Lead Mechanical Engineer on early prototype version of Robotic Gantry for JPL/Goddard Mars sample return (CCRS).

Senior Mechanical Design Engineer 9/01→11/02 5/07→9/08 2/10→5/11 10/16→4/23
Maxar Space Solutions Robotics | Pasadena, CA
• Project Engineer on runway hardness tester program for U.S.A.F. Special Operations Command, Hurlburt Field. Designed the machine to meet MIL-810 specifications and several Combat Controllers' requirements and performed systems-level energy analysis.
• Successful Launch Locks on the internal sample handling SHA robot arm for JPL's Mars 2020 rover (Perseverance) which will collect samples for later retrieval. Created new concepts rapidly in response to changing loads and requirements. Met JPL's margins on loads, performance and stress for mission critical mechanisms.
• Detailed design of launch restraint for robotic arm turret on JPL's 2012 Mars Science Lab (Curiosity) and 2020 rover (Perseverance). Conceptualized and analyzed (FEA and traditional) a cable cutting and routing scheme that released MDA's arm from the MSL rover in Mars' Gale Crater in August 2012 after the rough trip and landing.
• Full design and development of ground support hardware for the IDD (Instrument Deployment Device) used successfully on the 2004 Mars MER missions.
• Authored procedures, proposals, test plans and associated documentation.

Senior Mechanical Engineer 5/12→10/16
Disney Imagineering R&D | Glendale, CA
• Designed components for the animatronic figure on the Na'vi River Ride at Disney's Avatar Land in Animal Kingdom in Orlando. CAD modelled complex organic surfaces into 3D printed tooling and creature prototypes.
• Found root causes and solutions for commutation drift, encoder skipping and load cell problems on custom actuator for a mobile robotics research platform. Created R.O.S. kinematic models of robots with software and hand conversions.
• Designed rugged fall and crash protection for the same platform, preventing Li-Po battery fires.
• Built a custom actuator around a commercial gearset and hobby motor for large gains in performance vs. mass and envelope.

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Project Engineer 4/04→3/07 10/08→7/09 5/11→10/11
The Pilot Group | Monrovia, CA
• Mechanically designed, built, and tested a projector zoom lens with 3 moving groups and 19 elements. Mounting and motion precision was in the 10 to 60 micron range and group motion was via stepper motors, allowing for temperature compensation and other effects. On-board electronics provided a web interface for lens control.
• Designed, built, tested, and installed an intra-ocular lens inspection facility. Generated full documentation including procedures, drawings, and electrical schematics. The unit was used to make MTF measurements on all lenses manufactured. The Pilot Group has re-purposed the original design for more recent customers.
• Designed, built, tested, and installed full-sky telescope enclosures used to house RAPTOR robotic telescopes used for observation of transient phenomena from Fenton Hill, Los Alamos National Labs. Analyzed roof motor torque near a singularity with wind CFD, managed fabrication and lead on-site assembly.
•Responsible for assembly and documentation of two super-plastic titanium argon gas forming systems used for manufacturing aircraft parts.

Product Development Engineer 8/03→2/04
W.E.T. Design | Universal City, CA
• Designed underwater electromechanical hardware for a water feature installation in Hakata, Japan.
• Improved design of high maintenance servo output link for easier installation by underwater technicians.

Project Engineer (Contract) 3/03→8/03
Rain Bird | Azusa, CA
• Optimized performance and reliability for a high volume production release of an agricultural sprinkler using several injection molded plastic parts including FEA analysis of a strength / failure issue.
• Handled user interface concerns with several prototypes and developed new test methods to quantify market requirements for performance.

EDUCATION

The University of California at Berkeley
• M.S., Mechanical Engineering.
• U.S. Patent 6,474,711, “Mechanical Grapple for Manipulating Objects”.
• Management of Technology Certificate, Haas School of Business.

Massachusetts Institute of Technology
• B.S., Mechanical Engineering.
• Designed and built a simple, functional, self-contained 8 pound autonomous wall climbing robot at the MIT A.I. Lab Mobile Robotics Group featured in Smithsonian magazine.
• Designed and interfaced analog sensors. Designed hardware for many other robotics projects.
• Developed small piezoelectric actuators for insight on a microscopic ultrasonic motor project.
• Maintained a machine shop and taught shop use and safety classes.