

# Duane Edmonds

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**STATEMENT** Experienced product development professional with more than 21 years of experience (10+ dedicated to medical device design and development) and a passion for building relationships and helping diverse, cross-functional teams deliver innovative solutions to improve patient outcomes. Solid background in business management and coaching, automation and robotics, collaborative robotics, design controls, verification and validation testing, risk management, data analysis and visualization, descriptive and predictive analytics, quality management and global compliance.

**EXPERIENCE** **Johnson & Johnson** Santa Clara, California

9/2020 – present Program Manager, Robotics & Digital Solutions, Advanced Development

- Managing multiple, cross-functional teams in the design and development of the Ottawa surgical robotic system (robot-assisted surgery), supporting system architecture and requirement definition, risk management, data analysis, and procedure workspace development.

3/2015 – 9/2019 **Ekso Bionics** Richmond, California

Director, R&D and Compliance – Director, Medical Products and Systems

- Accountable for medical device product development, product lifecycle processes, design controls, design verification, product and process validation, pre- and post-market risk management, and customer complaint handling activities and processes
- Program Manager for medical device product development
- Responsible for product adherence to and consistency with the Quality Management System (QMS)
- Quality Council – Coordinated cross-company efforts to improve processes (effectiveness and efficiency), product quality and device reliability using data from post-market surveillance activities
- Developed and implemented company-wide risk management processes
- Directed the generation of Clinical Evaluation Reports (CERs) to support products in the European Union and authored a Clinical Evaluation standard operating procedure (SOP)
- Responsible for global adverse event monitoring and reporting
- Implemented a complaint handling system to enable data-driven improvement processes
- Performed customer complaints data analysis and identified performance improvement opportunities
- Managed department budget in a dynamic environment and provided consistent, detailed reporting on projections vs actuals, working closely with accounting and executive teams
- U.S. Patent US10694948B2 – Methods of exoskeleton communication and control (published 2020-06-30)

6/2011 – 3/2015 Director, Software Engineering

- Led a strong team of Software & Controls Engineers and Embedded Systems Engineers responsible for design, development, and testing of software for all medical products
- Responsible for creating, maintaining, and communicating the company's medical device software development processes (e.g., coding standards, code reviews, testing and release processes)
- Developed standard processes for software development, risk management, and human subject testing
- Served on review board for product stage and phase gate reviews, accountable for approval of product safety and effectiveness, development stage progress, design outputs and documentation

7/2009 – 3/2012 Program Manager  
EksoNR (Class II medical robotic exoskeleton)

- Led an exceptional development team in developing a first-of-kind battery-powered, bionic exoskeleton system to enable more efficient neurorehabilitation for people with lower-extremity weakness (e.g., spinal cord injury (SCI), stroke) – over 112 million steps taken globally in more than 30 countries (2019)
- Guided the project through a stage-gated product development process through requirements generation, planning, hazard analysis, risk assessment and mitigation, design, verification and validation through design transfer into full production
- Helped to coordinate the company's efforts to implement a global QMS to support the product release schedule for the launch of the company's first commercial and first medical product; authored and assisted with the development of several core SOPs for product lifecycle management (stage gate reviews, design control, software development, verification and validation, design transfer, risk management, post-market surveillance).

- Obtained device CE certification enabling access to the European Union market 3 months after U.S. release; developed and packaged Technical Documentation and supported review by Notified Body

#### Human Unified Load Carrier (HULC)

- Led successful \$6M R&D project to develop and build rugged, hydraulic load-carriage (up to 200 lbs. at 3 mph) exoskeleton prototypes for field evaluation (e.g., VO<sub>2</sub> max metabolic costs) by military personnel at the Soldier Research, Development and Engineering Center in Natick, Massachusetts
- Coordinated development, procurement, and build efforts between engineering, procurement, and production teams in Orlando, Florida (Lockheed Martin) and Berkeley, California
- Reported detailed, monthly cost and performance progress using Earned Value Management (EVM)

10/2006 – 7/2009 **Agilent Technologies** (Velocity11) Santa Clara, California

#### Research & Development Hardware and Systems Engineer – Agilent Automation Solutions

- Responsible for helping to move a 5-axis direct-drive microplate handling robot (DDR) from early feasibility exploration through to production
- Designed and implemented multi-threaded embedded software for a multi-axis embedded motion controller including motion path generation, custom low-level diagnostic interface, scheduler, system monitor, and exception handling
- Developed a torque-based servo gripping routine for a single-axis embedded controller
- Responsible for servo control performance optimization and throughput
- Designed parameterized path planning and trajectory algorithm to coordinate motion on a 3-axis microplate handling system, including collision avoidance
- Developed custom, lightweight unit testing framework
- Designed rich, diagnostic command line interface that decreased overall system downtime

9/1999 – 10/2006 **Berkeley Process Control** Richmond, California

#### Project Manager and Controls Engineer

- Project Manager for various semiconductor wafer handling and robotics development projects
  - Coordinated engineering, procurement, and production efforts
  - Guided hardware, software, and control system development
  - Tracked development effort and material costs
  - Negotiated equipment acceptance definitions
- Technical Lead for design and development of motion control system software
  - Designed control software for multi-axis coordinated motion, error handling, and user interfaces
  - Developed robust and automatic, machine-to-machine calibration (autocalibration) algorithms
  - Designed a custom and secure communication protocol with integrated data integrity validation
- Developed an algorithm that allows the exact specification and control to a non-radial, linear point-to-point path and motion profile for 200mm and 300mm wafer handling robotic arm
- Designed and developed a control scheme for a "pneumatic servo" system (accurate position control of an instrumented pneumatic cylinder) involving control hardware selection and software design

11/1997 – 8/1998 **Vibration Control and Electromagnetics Laboratory** College Station, Texas

#### Research Assistant – Advisor: Dr. Alan B. Palazzolo

- Fuzzy Logic Expert System Control of Magnetic Bearings on High-Energy Energy Storage Flywheels

**STANDARDS** FDA Title 21 CFR 820 (QSR), Medical Device Directive 93/42/EEC (EU), ISO 13485 (QMS), IEC 62304 (Software Lifecycle), ISO 14971 (Risk Management), IEC 60601-1 (Safety and Essential Performance), MEDDEV 2.7/1 (Clinical Evaluation)

**SKILLS** Objectives and Key Results (OKRs), Product Lifecycles, Medical Design Controls, Agile development, Scrum, Kanban, MS Project, GNU/Linux, Git, embedded development, C/C++, Python, MATLAB, R, machine learning and predictive analytics

**EDUCATION** **University of California**, Berkeley

8/1998 – 9/1999 Advanced Control Systems; Department of Mechanical Engineering  
3.78 G.P.A.; Successfully passed Preliminary Examinations for doctoral degree candidacy

8/1993 – 7/1998 **Texas A&M University**, College Station

#### Bachelor of Science Degree; Department of Mechanical Engineering

#### Dynamics and Control Systems Focus

3.96 G.P.R. (major); 3.93 G.P.R. (overall); graduated *summa cum laude*