David E. Cunningham, B.Eng., Ph.D.

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PROFESSIONAL STATEMENT

Mechanical Engineering Ph.D. offering proven skills in project management and laboratory team leadership. Specialized in developing and optimizing orthopaedic implantable prostheses with a strong focus on research, testing, and quality. Excellent physician collaboration skills with absolute dedication to code compliance, design credibility, safety, and continuous improvement.

Skills

- Research and Development
- Finite Element Analysis
- Python, C++, MATLAB
- Cost/Benefit Analysis
- Root Cause Analysis

- Data-Driven Design/CI
- Gantt, CPM, QFD, DFM
- Statistical Modelling, SPSS, ML
- Lean Six Sigma Green Belt
- Teamwork and Communication

- CAD Modelling and Simulation
- ISO 14971, DFMEA, ASTM
- Design History/Document Control
- Project Management and Budgeting
- Published Technical Documentation

Experience

Research and Development Engineer EIT

Roth McFarlane Hand and Upper Limb Clinic, 2021 – Current

- Developed high-fidelity finite element models for evaluating novel shoulder implant performance under physiological loading, ensuring robust clinically relevant simulation environments.
- Created Python programs for automated stemless TSA design generation and FE joint model setup, including bone geometry creation, implant positioning, partitioning, meshing, and analysis.
- Supervised and coordinated orthopedic prosthetic research teams, leveraging both machine learning algorithms and conventional statistical approaches.
- Developed and invented the novel CERBERUS physiological loading device and executed cadaveric testing protocols for the evaluation of prosthetic designs.
- Performed statistical analysis and authored technical/research reports for journals and conferences.
- Led the implementation of Design Failure Mode and Effects Analysis (DFMEA) to systematically identify potential failure modes in the design phase.
- Ensured compliance with ISO 14971 standards for risk management of medical devices, systematically identifying, evaluating, and mitigating risks.
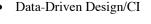
Mechanical Reliability Engineer EIT
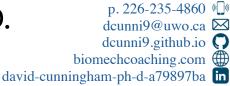
NOVA Chemicals, 2019 – 2019

- Implemented and designed condition monitoring plans for NOVA manufacturing east facilities.
- Conducted vibration analysis and developed preventative maintenance plans using AMS-MH
- Researched, planned, and integrated Emerson Triaxial Accelerometer technology into NOVA's condition monitoring program.
- Performed auditing, safety design, and modifications of existing high-pressure equipment in compliance with OSHA, API, and NOVA standards.

Polyethylene Engineering and Capital Engineer EIT
NOVA Chemicals, 2018 – 2018

- Engineered and created detailed documentation for pressure vessels, high-pressure piping, and
- associated components per ASME B31.3 and ASME Sec VIII Div 1 standards.
- Conducted pressure vessel and piping stress analysis using CAEPIPE, CAESAR I, and PVElite.
- Researched, budgeted, and implemented designs for high-pressure devices, including heat exchangers, tubesheet filters, pulsation dampeners, and other safety-critical equipment.
- Performed low-temperature embrittlement assessments and issued construction work packages for capital and major maintenance projects.

Manufacturing Engineering Systems Designer & Line/Inventory Specialist
Schneider Electric, 2016-2017

- Worked closely with department leadership to identify barriers in the pilot meter program
- Leveraged Lean Six-Sigma principals in a pilot unit scheduling project for the continuous improvement of the pilot meter program.
- Reviewed operating procedures throughout the 6-Sigma plant, presenting potential improvements to engineering groups.
- Operated high-potential (3300V+) testing machinery (LabView) and conformal coating equipment for quality control and data analysis.
- Adhered to 5S, KanBan, One Piece Flow, Poka-yoke and Jidoka best practices during assembly and testing of high-accuracy electrical monitoring equipment

Publications

1. An Analysis of Primary Stability of Stemless Humeral Implants in Shoulder Arthroplasty, Electronic Thesis and Dissertation Repository, https://ir.lib.uwo.ca/etd/10095
2. Stemless Reverse Shoulder Arthroplasty Neck-Shaft Angle Influences Humeral Component Time-Zero Fixation and Survivorship: A Cadaveric Biomechanical Assessment, Journal of Shoulder and Elbow Surgery, https://doi.org/10.1016/j.jseint.2024.04.001
3. Stemless Reverse Humeral Component Neck Shaft Angle has an Influence on Fixation, Journal of Shoulder and Elbow Surgery, https://doi.org/10.1016/j.jse.2023.06.035
4. Leveraging Kindness in Canadian Post-Secondary Education: A Conceptual Paper, College Teaching, https://doi.org/10.1080/87567555.2023.2181307
5. py_BMD_abaqus: BMD property application, GitHub/PyPi, https://pypi.org/project/py-bmd-abaqus/

Professional Certifications

- SOLIDWORKS CAD Design Associate (CSWA), CN: C-H82BNLSZ9P, 2023
- SOLIDWORKS Simulation Associate (CSWA-S), CN: C-WA9536FXUG, 2020
- Lean Six Sigma Green Belt, CN: 40806, 2024
- Lean Six Sigma Yellow Belt, CN: 40432, 2024

Website, Portfolio and Profiles

- LinkedIn: https://www.linkedin.com/in/david-cunningham-a79897ba/
- GitHub: https://dcunni9.github.io/
- EngineeringSimplicity: Orthopaedic Research Tools, Youtube, https://www.youtube.com/@engineeringsimplicity

Other Interests

CPA Bodybuilding Canadian Physique Alliance Bodybuilding

- CPA President's Cup Naturals Men's Classic Silver Medal '23
- Stephanie Worsford Naturals Men's Classic Silver Medal '22

Classical Violin & French Horn - Royal Conservatory of Music

- Grade 10 practical Royal Conservatory of Music violinist, orchestral and solo.
- First Violin - London Promenade Orchestra
- First Violin - FSA Strings Orchestra
- Concert Master - SMUS Orchestra '15
- Soloist/First Violin - Cowichan Consort Orchestra '14-15
- French Horn - SMUS Orchestra '11-15

References Available Upon Request.