
Bioengineering Scientist with over eight years of medical device research experience seeking to help launch new technological innovations in the medical devices, surgical tools, and prosthetics industry.

- Dedicated to performing economical, relevant research that directly advances company goals and milestones while increasing the technology's stature in the peer reviewed field.
- Leads interdepartmental communication between R&D and the rest of the company so that projects and timelines are integrated for maximum efficiency.
- Continuously striving to learn and experience all aspects of entrepreneur and medical device business.

Technical Skills

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| • Material Testing (MTS) | • SolidWorks | • Anatomical Dissection |
| • Atomic Force Microscopy | • LabVIEW | • SPSS Statistics |
| • Basic German | • MATLAB | • Basic ANSYS |
| • Doppler Ultrasound | • 200 Hrs Machining Experience | • Lean Six Sigma Black Belt |
| • High Speed Video Capture | • Technical Writing | • Instruction / Lecture |

Education

Ph.D., Mechanical Engineering (Biomechanics Focus) | *University of Washington, Seattle* | 3.90 GPA

Dissertation:

The Efficacy of using Vibrometry to Detect Osteointegration of the Agility Total Ankle.

M.S., Mechanical Engineering (Biomechanics Focus) | *University of Washington, Seattle* | 3.92 GPA

Dissertation:

An Alternative to Disc Fusion: The Dynamic Characteristics of the Bryan Cervical Disc System.

- University of Washington College of Engineering Graduate Fellowship

B.S., Biomedical Engineering | *Washington University in St. Louis* | 3.88 GPA

- President of the Biomedical Engineering Society
- Founded Alpha Eta Mu Beta BioEngineering Honor Society
- Tau Beta Pi, Golden Key, and Alpha Eta Mu Beta Honor Societies
- Graduated Magna Cum Laude, Dean's List all semesters

B.A., Physics | *University of Puget Sound, Tacoma* | (Dual Degree Program with Washington University)

- Vice President of Sigma Pi Sigma
 - Philanthropy and Social Chair of Sigma Nu
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Research Experience

Multilevel Biomechanics of a DASCOR Nucleus Replacement / ProDisc-L Hybrid Construct

Developed and executed a study to analyze the biomechanics of a DASCOR nucleus replacement used in conjunction with a ProDisc-L total lumbar intervertebral disc replacement. Investigated kinematics as well as adjacent level intradiscal pressures. Results were used to expand product indications in European markets.

Dahl MC, Tsantrizos A, Lee M, Myint K, Herrington R, Cohen A, Ching RP. *Hybrid, Multilevel Lumbar Spine Arthroplasty Using an In Situ Cured, Polyurethane Nucleus Replacement Device in Conjunction with Total Disc Replacement. Submitted to Spine 2009*

Poster Presentations at:

24th Annual Meeting of the North America Spine Society, November 10th – 14th, 2009, in San Francisco, California.

Contributed to book chapter on *Lumbar Nucleus Replacement* in: **The Spine, 6th edition**. Edited by Drs. Herkowitz, Garfin, Eismont, Bell, and Balderston. Rothman-Simeone.

Clinical and In Vitro DASCOR Research Scientific Exhibit at:

Annual Meeting of the American Association of Orthopaedic Surgeons, February 25th-28th, 2009, in Las Vegas, Nevada.

Multilevel Biomechanics of a DASCOR Nucleus Replacement / Fusion Hybrid Construct

Developed and executed a study to analyze the biomechanics of a DASCOR nucleus replacement used in conjunction with an adjacent lumbar fusion. Investigated kinematics as well as adjacent level intradiscal pressures. Results were used to expand product indications in European markets.

Dahl MC, Ellingson AM, Mehta H, Huelman JH, Nuckley DJ. *Multilevel Hybrid Construct Biomechanics Using Lumbar Nucleus Replacement in Conjunction with Fusion. Submitted to Spine 2009*

Poster Presentations at:

24th Annual Meeting of the North America Spine Society, November 10th – 14th, 2009, in San Francisco, California.

Clinical and In Vitro DASCOR Research Scientific Exhibit at:

Annual Meeting of the American Association of Orthopaedic Surgeons, February 25th-28th, 2009, in Las Vegas, Nevada.

Finite Element Analysis of Three Nucleus Replacement Technologies

Constructed a load transfer and endplate contact pressure analysis of three current nucleus replacement technologies using finite element in conjunction with Exponent Consulting. Results were utilized for marketing literature as well as fundraising presentations and physician training.

Dahl MC, Ahrens M, Sherman J, Martz E. *The Restoration of Lumbar Intervertebral Disc Load Distribution: A Comparison of Three Nucleus Replacement Technologies. Accepted to Spine 2009*

Poster Presentations at:

9th Annual Meeting of the Spine Arthroplasty Society, April 28th - May 1st, 2009, in London, England.

Helmet and Shoulder Pad Removal in Football Players with Unstable Cervical Spine Injuries

Designed and executed an *in-vitro* study examining three prevalent techniques of equipment removal in cervically compromised football players. Supervised a team of neurosurgeons from Harborview Medical Center to compare and contrast the vertebral forces and translations characterized by each technique.

Dahl MC, Ananthakrishnan D, Nicandri G, Chapman JR, Ching RP. *Helmet and shoulder pad removal in football players with unstable cervical spine injuries. Journal Applied Biomechanics. 2009 May;25(2):119-32.*

The Implementation and Osteointegration of the Agility Total Ankle Prosthesis

Developed a novel device to non-invasively assess the amount of osteointegration present in a total ankle prosthesis. Constructed prototype equipment and performed a clinical study to determine efficacy. Measured wear debris of the ankle prosthesis and its contribution to joint inflammation using Atomic Force Microscopy.

Dahl MC, Kramer PA, Reinhall PG, Benirschke SK, Hansen ST jr., Ching RP. The Efficacy of using Vibrometry to Detect Osteointegration of the Agility Total Ankle. *Submitted to: Journal of Biomechanics, 2009*

U.S. Patent Application (No. 12/427,575) entitled: Method and Apparatus for Evaluating Osteointegration of Medical Implants.

Analysis of Backside Polyethylene Wear in the Agility Total Ankle using Atomic Force Microscopy

Developed a novel method to ascertain backside polyethylene wear using Atomic Force Microscopy.

Determining the Dynamic Biomechanical Properties of the Bryan Cervical Disc System

Investigated the *in-vitro* dynamic mechanical properties of the Bryan Cervical Disc System using material testing systems and vibration analysis. Contracted by Medtronic-Sofamor-Danek to compare the dynamic stiffnesses and hysteretic properties of various implant cores to support FDA investigational device testing.

Dahl MC, Rouleau JP, Papadopoulos S, Nuckley DJ, Ching RP. *Dynamic characteristics of the intact, fused, and prosthetic-replaced cervical disk. Journal of Biomechanical Engineering, 2006 Dec; 128(6):809-14.*

Presentations at:

23th Annual Meeting of the North America Spine Society, October 14th – 18th, 2008, in Toronto, Canada.

Dynamic to Quasi-Static Stiffness Comparison of Cervical Spine Level C2-C3

Constructed an *in-vitro* cadaveric study to quantify the logarithmic relationship of the dynamic and quasi-static stiffness of the C2-C3 intervertebral cervical disc.

Poster Presentation at:

50th Annual Meeting of the Orthopaedic Research Society, March 7th-10th, 2004, in San Francisco, California.

Using Atomic Force Microscopy to Scan DNA Microarrays

Examined novel methods to scan DNA Microarrays using Atomic Force Microscopy. Developed a protocol to interpret DNA Microarray density and probe hybridization using gold nanoprobe hybridized DNA.

Ampullary Canals of Lorenzini

Initiated novel research on the sensory canals of bamboo sharks by constructing biofidelic prototypes and integrating technical signal analysis equipment.

Technical Work Experience

Senior Biomechanical Scientist | *Disc Dynamics Inc.* | (2008 - 2010)

Developed, managed, and executed studies (internally and in collaboration) to biomechanically assess devices for a venture capital backed spine implant company.

- Analyzed data and wrote manuscripts for journal publications, textbook chapters, marketing distribution, and European market device indication expansion.
- Oversaw the submission of abstracts for AAOS, SAS, and NASS conferences as well as constructing the corresponding posters, presentations, and scientific marking literature.
- Preliminary work on device optimization and six sigma DOE, including animal model and cadaveric biomechanics testing. Developed custom injection apparatus and software for product development.
- Conducted technical device specification and surgical training for physicians involved in clinical trials.
- Assisted executive management in constructing venture capital fundraising presentations and literature.
- Represented DDI in contributing to ASTM standards development for nucleus replacement testing.
- Collaborated with director of regulatory in writing and submitting indication expansions, annual reports, and other FDA documentation.
- Collaborated with director of clinical in planning and analyzing clinical study protocol, statistical analysis plans, and feasibility study data.

Graduate Researcher and Course Instructor | *Applied Biomechanics Laboratory* | (2002 - 2008)

Prepared and executed contractual research on medical devices for private individuals as well as venture capital backed and publicly traded companies. Presented research results via both podium and poster formats in multiple conferences. Constructed testing fixtures and performed biomechanics grant research. Supervised and lectured for engineering dynamics, mechanics of materials, and orthopaedic biomechanics courses. Prepared, administered, and graded laboratory sections, homework and tests.

Bio-Technician Intern | *Institute of Systems Biology* | (Summer 2000)

Engineered, constructed, and operated sections of an ink jet microarray synthesizer used to construct multi-oligonucleotide arrays onto slides and synthetic membranes. Created the drafting and technical aspects of the apparatus. Initiated preliminary testing of ink-jet protein fractionation for mass spectrometry.

Honors and Achievements

- Herbert B. Jones Northwest Entrepreneur Scholarship
- Collegiate All-American Scholar Award
- Washington University Biomedical Engineering Departmental Award for Senior Academic Excellence
- Eagle Scout
- Lean Six Sigma Black Belt