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LOUIS A. DIBERARDINO, III

EDUCATION

University of Illinois at Urbana-Champaign, USA

Doctor of Philosophy in Mechanical Engineering · Expected May 2013

Advisors: Harry Dankowicz · Elizabeth T. Hsiao-Wecksler

Master of Science in Mechanical Engineering · Dec. 2008 · GPA 4.0/4.0

Advisor: Elizabeth T. Hsiao-Wecksler

Thesis: *Assessing Gait Differences Through the Complexity and Variability of Motion Shapes*

Bachelor of Science in Mechanical Engineering · Dec. 2008 · GPA 3.61/4.0

GRADUATE RESEARCH

Applied Dynamics Laboratory (HD) · Mechanical Science & Engineering Dept. (MechSE) · UIUC

Human Dynamics & Controls Laboratory (ETHW) · MechSE · UIUC

PhD · Dynamical systems modeling of neuromuscular control adaptation in gait · Dec. 2008 - present

- Short-term adaptations in gait control, focusing on discontinuities caused by injury and recovery
- Long-term (evolutionary) adaptations in gait control, exploring possible similarities between climbing and bipedal gait control strategies
- Development of ‘toy’ dynamical systems with similar characteristics to gait (*i.e.*, multiple coupled degrees of freedom, impact events) to better understand how system changes affect output

MS · Clinical testing and analysis of human gait (HDCL only) · April 2006 - Dec. 2008

- Development of mathematical/statistical tools to better detect and diagnose gait asymmetries
- Participated in a design team to develop fluid-powered ankle-foot orthoses

TEACHING / MENTORING

Instructor · MechSE · UIUC · 2011 (2 semesters)

Mechanical Design II (ME 371)

- **Fall 2011: MechSE Teaching Fellow** · Sole instructor for one lecture/discussion section (22 students)
- **Spring 2011: Instructing TA** · Sole instructor for one lecture /discussion section (35 students)
- Topics taught: Stress/strain · failure modes · fracture · impact · fatigue · crack growth · surface wear component design (screws · springs · lubrication/bearings · gears · clutches/brakes · shafts/misc. components)
- Heavy focus on team work and group design projects (on paper and built)
- Managed computer laboratory TA and homework/quiz grader

Teaching Assistant · MechSE · UIUC · (3 semesters)

Whole-body Musculoskeletal Biomechanics (ME 481) · Fall 2010

- Assisted instructor (ETHW) with homework, quiz, project, and exam preparation
- Graded all homework; assisted in project grading
- Performed several lectures; assisted students with homework and projects

Mechanical Design II (ME 371) · Fall 2006 - Spring 2007

- Led ANSYS computer laboratory exercises for 2 semesters
- Created exercises/instructions and final exam question
- Advised and evaluated exercises and design projects; graded exams

Mentoring

- Assisted undergraduate researchers in completion of various Human Dynamics & Controls Lab projects
- Mentored/managed two undergraduate summer research interns (2009)

PROFESSIONAL / WORK EXPERIENCE

Johnson Diversey · May 2004 - Aug. 2006

Dispensing Technologies Intern · Summers 2005 - 2006

- Assisted in the development and launch of a revolutionary end-user chemical dispensing device for cleaning solutions
- Conducted research on various new dispensing products
- Aided dispensing team on daily dispensing tests, field tests, computer file management, and lab organization

Information Technology Intern · Summer /Winter 2004

- Lead electronic data collection project for a lawsuit, managing four contractors
- Provided electronic/computer support to all employees

University of Illinois Library · April 2004 - May 2006

Undergraduate Assistant (while obtaining BS degree)

- Managed circulation desk and periodicals
- Performed collection maintenance

MEMBERSHIPS / ACTIVITIES

American Society of Mechanical Engineers · American Society of Biomechanics · Society of Engineering Science · Pi Tau Sigma ME Honor Society · Evangelism Committee (present) & Youth Committee (2010) - Good Shepherd Lutheran Church, Champaign IL

AWARDS

MechSE Dept. Teaching Fellowship (Fall 2011) · Eugene and Lina Abraham Endowed PhD Fellowship (2009) · First place: 2009 ASME Summer Bioengineering Conference MS Poster Competition · 2003-2006 National Deans List · 2003-2005 SC Johnson Fund Sons and Daughters Scholarship

COMPUTER ABILITIES

MATLAB · Mathematica · Mambo (rigid body modeling) · Vicon Workstation (motion capture) · LaTeX · SPSS · SAS · R · EndNote · ANSYS · Pro/Engineer · Working Model · EES · Adobe Acrobat/Illustrator/InDesign · HTML/CSS · MS Windows/Office · Lotus Notes · Macintosh OSX · Unix · Linux

PUBLICATIONS

Published or In-press

1. DiBerardino III, L.A., Ragetly, C.A., Griffon, D.J., Hong, S. & Hsiao-Wecksler, E.T., 2011 "Improving 'regions of deviation' gait symmetry analysis with point-wise t-tests." *Journal of Applied Biomechanics*, in press.
2. DiBerardino III, L.A., Polk, J.D., Rosengren, K.S., Spencer-Smith, J.B. & Hsiao-Wecksler, E.T., 2010. "Quantifying complexity and variability in phase portraits of gait." *Clinical Biomechanics*, **25** (6), 552-6.
3. Rosengren, K.S., Deconinck, F.J.A., DiBerardino III, L.A., Polk, J.D., Spencer-Smith, J., Lenoir, M. & De Clercq, D., 2009. "Differences in gait complexity and variability between children with and without developmental coordination disorder." *Gait & Posture*, **29** (2), 225-9.
4. Polk, J.D., Spencer-Smith, J., DiBerardino, L., Ellis, D., Downen, M. & Rosengren, K.S., 2008. "Quantifying variability in phase portraits: Application to gait ontogeny." *Infant Behavior and Development*, **31**, 302-6.

In preparation

1. DiBerardino III, L.A., Dankowicz, H. & Hsiao-Wecksler, E.T. "Neuromuscular control adaptations in gait due to injury: A motivating study using a simplified dynamic model," in preparation.
2. DiBerardino III, L.A., Dankowicz, H., Polk, J.D. & Hsiao-Wecksler, E.T. "Predicting the origin of bipedalism from a simple climbing model," in preparation.

CONFERENCES

Presenting Author

1. DiBerardino III, L.A., Ragetly, C.A., Hong, S., Griffon, D.J. & Hsiao-Wecksler, E.T. "Improving Regions of Deviation Gait Symmetry Analysis with Pointwise T-Tests" (podium). 34th Annual Meeting of the American Society of Biomechanics, Providence, RI, August 18-21, 2010.
2. DiBerardino III, L.A., Dankowicz, H. & Hsiao-Wecksler, E.T. "Neuromuscular Control Adaptation in Gait due to Injury: A Motivating Study Using a Simplified Dynamic Model" (poster). 34th Annual Meeting of the American Society of Biomechanics, Providence, RI, August 18-21, 2010.
3. DiBerardino III, L.A., Dankowicz, H. & Hsiao-Wecksler, E.T. "Neuromuscular control adaptations in gait due to injury: A motivating study using a simplified dynamic model" (poster). Symposium on Control and Modeling of Biomedical Systems, Urbana, IL, April 22-23, 2010.
4. DiBerardino III, L.A., Polk, J.D., Rosengren, K.S. & Hsiao-Wecksler, E.T. "Quantifying complexity and variability of gait phase portraits" (poster). Proceedings of the ASME Summer Bioengineering Conference 2009, SBC2009 (Part B), p. 863-4. Lake Tahoe, CA, June 17-20, 2009. **First place:** MS level poster competition.
5. DiBerardino III, L.A., Hong, S., Ragetly, C.A., Thomas, E.J. & Hsiao-Wecksler, E.T. "Analysis and classification methods for healthy and cruciate-deficient dogs" (podium). 45th Annual Society of Engineering Science Conference, Urbana, IL, Oct. 12-15, 2008.
6. DiBerardino III, L.A., Spencer-Smith, J.B., Polk, J.D., Rosengren, K.S. & Hsiao-Wecksler, E.T. "Elliptical Fourier analysis of joint angle phase portraits: application to simulated injury" (podium). 45th Annual Society of Engineering Science Conference, Urbana, IL, Oct. 12-15, 2008.

Contributing Author

1. Hsiao-Wecksler, E.T., Dankowicz, H., Hong, S., Lague, M.R., Polk, J.D., Rosengren, K.S., Bokhari, E., DiBerardino III, L.A., Helwig, N.E. & Park, K. "Quantitative characterization of complex motion patterns using shape-based and multivariate techniques" (poster). NSF CMMI Research and Innovation Conference, Atlanta, GA, January 4-7, 2011.
2. Hsiao-Wecksler, E.T., Dankowicz, H., Hong, S., Lague, M.R., Polk, J.D., Rosengren, K.S., DiBerardino III, L.A., Helwig, N.E. & Park, K. "Quantitative characterization of complex motion patterns using shape-based and multivariate techniques" (poster). NSF CMMI Research and Innovation Conference, Honolulu, HI, June 22-25, 2009.
3. Hsiao-Wecksler, E.T., Shorter, K.A. & DiBerardino III, L.A. "New methods for quantifying asymmetric gait" (podium). 45th Annual Society of Engineering Science Conference, Urbana, IL, Oct. 12-15, 2008.
4. Niu, P., Chapman, P., DiBerardino III, L.A. & Hsiao-Wecksler, E., 2008. "Design and optimization of a biomechanical energy harvesting device." *PESC Record - IEEE Annual Power Electronics Specialists Conference*, art. no. 4592589, 4062-9.