**Nathaniel H. Hunt, PhD**
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NSF CiBER IGERT Fellow

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## Research Interests

Biomechanics, Movement variability, Nonlinear Dynamical Systems, Motor Control and Learning

## Professional Preparation

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|---|---|---|
| 2012.7-<br>2017. 5 | University of California, Berkeley<br><br>Poly-PEDAL Lab<br><br>Center for Interdisciplinary Bio-Inspiration in Education and Research<br><br>Dissertation: *Unsteady Maneuvers in Arboreal Locomotion* | PhD<br>Integrative Biology<br><br>NSF CiBER-IGERT Fellow<br><br>UC Berkeley Chancellor's Fellow<br><br>Advisor: Robert J. Full |
| 2010.5-<br>2012.5 | University of Nebraska, Omaha<br><br>Nebraska Biomechanics Core Facility<br><br>Thesis: *Manipulating Gait Variability with Fur Elise: Chaotic and Fractal Variations* | MS Exercise Science<br><br>Advisor: Nicholas Stergiou |
| 2002.5-<br>2010.5 | University of Nebraska, Lincoln<br><br>High Energy Particle Physics Research Group | B.S. Physics<br><br>Track: Computational Methods<br><br>Minor Mathematics |
| 2006.8 | Henry H Lind Non-Commissioned Officer Academy | Rank: Sergeant<br><br>Honor Graduate |
| 2004.5-<br>2005.8 | Deployed in Operation Iraqi Freedom | Iraq Campaign Medal<br>Global War on Terrorism Service Medal |

## Awards

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| 2012-2017 | Chancellor's Fellowship, University of California, Berkeley |
| 2012-2015 | Center for Interdisciplinary Bio-Inspiration in Research and Education Fellowship, National Science Foundation |
| 2015 | Fellowship of Graduate Student Travel, Society for Integrative and Comparative Biology |
| 2014 | Mentoring Summer Undergraduate Research Fellowship |
| 2012 | NASA Nebraska Travel Grant |
| 2011-2012 | NASA Nebraska Fellowship |
| 2011 | NASA Nebraska Travel Grant |
| 2010-2011 | NASA Nebraska Fellowship |

# Publications

### Book Chapters

Published

1. Autocorrelation, Mutual Information, and Correlation Dimension; Nonlinear Analysis for Human Movement Variability

### Journal Publications

Published in Peer-Reviewed Scientific Journals

1. Yentes J, Hunt N, Schmidt K, Kaipust J, McGrath D, Stergiou N, The appropriate use of approximate entropy and sample entropy with short data sets, Annals of Biomedical Engineering

2. Hunt N, McGrath D, Stergiou N, The influence of auditory motor coupling on fractal dynamics in human gait, Scientific Reports

3. Decker LM, Cignetti F, Hunt N, Potter JF, Studenski SA, Effects of aging on the relationship between cognitive demand and step variability during dual-task walking, Age

4. Full RJ, Jayaram K, Li C, Naik, S Hunt N, Lee C, Bio-Inspired Principles of Extended Terrain Mobility, Micro Autonomous Systems and Technology

In Preparation

1. Hunt, N., Full, RJ Rolling Maneuver and Inverted Running Capability Increase Rod Running Robustness, Journal of Experimental Biology

2. Hunt, N., Jinn, J., Jacobs, L. Full RJ. Error based motor learning enables free ranging Fox Squirrels to recalibrate a highly developed motor skill in the face of a dynamic perturbation.

3. Hunt, N., Jinn, J., Jacobs, L. Full RJ. Parkour-like wall jump maneuver adds intermediate control phase to targeted leaping.

**Published Conference Abstracts**

1. Hunt, N., Hammond, A., Burnett, N.P., Pritchard-Berman, M., Full, R.J., Stability of Cockroaches Running Rapidly on Rigid Rods. Society of Integrative and Comparative Biology 2013. Austin, Texas

2. Hunt, N.; Jinn, J; Libby, T; Jacobs, LF; Full, RJ, Learning to launch: targeted leaping from a dynamic obstacle in squirrels, Society of Integrative and Comparative Biology 2014. West Palm Beach, FL

**Conference Presentations**

3. Hunt, N., Stergiou, N., Effects of Chaotic Music on Movement Patterns. Proceedings of the 121st Nebraska Academy of Sciences Annual Meeting. Lincoln, Nebraska. 2011.

4. Hunt, N., Investigating the Effects of Various Kinds of Chaotic Auditory Stimulus on the Walking Patterns of Both Human Subjects and a Computer Model. Proceedings of the 121st Nebraska Academy of Sciences Annual Meeting. Lincoln, Nebraska. 2012.

5. Hunt, N., Haworth, J., McGrath, D., Myers, S., Stergiou, N., Manipulation of the Structure of Gait Variability with Rhythmic Auditory Stimulus. Proceedings of the American Society of Biomechanics 2012 Meeting. Gainesville, Florida, August 2012

6. Schieber, M, Decker, L, Hunt, N, Myers, SA, Aging Impacts Structure of Gait Variability While Dual-Tasking, The Gerontological Society of America

7. Liu, X, Decker, L, Hunt, N, Myers, SA, The variability of minimum toe clearance decreases in both healthy young and healthy older adults during dual-task treadmill walking, The Gerontological Society of America

**Conference Posters**

1. Hunt, N., Decker, L., Stergiou, N. Phonological dual-task interference affects walking regularity. University of Nebraska Centennial Celebration of Student Research and Creative Activity. Omaha, Nebraska, April 2011.

2. McGrath, D., Wurdeman, S., Yentes, J., Hunt, N., Myers, S., Stergiou, N. Metabolic Cost of Postural Control During a Perturbed Gait Task is Related to Gait Variability. Proceedings of the American Society of Biomechanics 2012 Meeting. Gainesville, Florida, August 2012

3. Renz, J., Vallabhajosula, S., Hunt, N., Chien, J., Stergiou, N. Differences in Stride Interval Variability During Stair-Climbing and Treadmill Walking. Proceedings of the American Society of Biomechanics 2012 Meeting. Gainesville, Florida, August 2012

4. Vallabhajosula, S., Renz, J., Chien, J., Hunt, N., Stergiou, N., Influence of Stepping Rate on Stride Interval Variability of Stair Climbing. Proceedings of the American Society of Biomechanics 2012 Meeting. Gainesville, Florida, August 2012

5. Hunt, N., Stergiou, N., Manipulation of the Structure of Gait Variability with Rhythmic Auditory Stimulus. Society for Integrative and Comparative Biology 2013. San Francisco, CA

6. Hunt, N.; Jinn, J; Libby, T; Jacobs, LF; Full, RJ, Learning to launch: error-based learning drives changes in performance variables, Society for Integrative and Comparative Biology 2016. Portland, OR

## Teaching Experience

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|---|---|
| 2012 | Nonlinear Analysis Workshop |
| 2012 | Guest Speaker, Biomechanics Seminar (IB 232), Integrative Biology, University of California, Berkeley |
| 2012 | Guest Speaker, Biomechanics Seminar (IB 232), Integrative Biology, University of California, Berkeley |
| 2013 | Guest Speaker, Biomechanics Seminar (IB 232), Integrative Biology, University of California, Berkeley |

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| 2014 | Guest Speaker, Biomechanics Seminar (IB 232), Integrative Biology, University of California, Berkeley |
| 2015 | Guest Speaker, Biomechanics Seminar (IB 232), Integrative Biology, University of California, Berkeley |
| 2016 | Teaching Assistant, Bio-Inspired Design (IB 32), Integrative Biology, University of California, Berkeley |
| 2017 | Teaching Assistant, Bio-Inspired Design (IB 32), Integrative Biology, University of California, Berkeley |

## Reviewer Responsibilities

### Journal Article Reviews

Chaos

Motor Control

## Mentoring

### Graduate Students

| | |
|---|---|
| 2014 | Tony Worhl, Sports Science, FSU Jena |
| 2015 | Ben McInroe, Biophysics, UC Berkeley |
| 2015 | Shilpa Naik, Integrative Biology, UC Berkeley |

### Undergraduate Students

| | |
|---|---|
| 2010 | Brian Arnold, University of Nebraska, Omaha |
| 2011 | Jessica Renz, University of Nebraska, Omaha |
| 2012 | Leo Moon, University of California, Berkeley |
| 2013-2016 | Crystal Lee, University of California Berkeley (awarded summer research fellowship) |
| 2013 | Han K. Lam, University of California, Berkeley, (finalist for summer research fellowship) |
| 2014-2015 | Ivonne Fajardo, University of California, Santa Cruz |
| 2015 | Dhvani Patel, University of California, Berkeley |
| 2015 | Jaron Armiger, University of California, Berkeley |
| 2015 | Prithvi Akella, University of California, Berkeley |

## Professional Affiliations

Society for Neuroscience

American Society of Biomechanics

Society of Integrative and Comparative Biology

## Consulting

Sigma Sports – Wearable devices for team sports

Contributions

Sensor Fusion

State Estimation

Energetics Modeling

Behavior Classification with Machine Learning

Data Visualization

Data Interpretation

## Graduate Level Courses

**Computer Science**

Artificial Intelligence

Machine Learning (audited)

Deep Reinforcement Learning (audited)

**Mathematics**

Dynamical Systems and Chaos

Modeling Networks

**Biomechanics**

Advanced Statistics

Motor Control

Doctoral Seminar

Advanced Biomechanics

**Biology**

Mechanics of Organisms

Evolution

Teaching Colloquium

Research & Outreach

Seminar in Biomechanics

Seminar in Locomotion and Energetics

**Engineering**

Control Theory (audited)

Nonlinear Systems, Identification and Control (audited)

**Programming Languages Experience**

MATLAB, C, C++, openGL, Python, JAVA, HTML, MySQL, Prolog

**GRE Scores**

Verbal: 610

Math: 800

Writing: 4.0

## References

**Robert J. Full**
Doctoral Advisor
Chancellor's Professor
Department of Integrative Biology
Department of Electrical Engineering and Computer Science
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