

AARON D. LIKENS, PH.D.

Center for Research on Human Movement Variability
Department of Biomechanics
University of Nebraska Omaha
6001 Dodge St., Omaha NE 68182-0202
(405) 200-9755 • aaronlikens@gmail.com

EDUCATION

- 2016 Ph.D. Perception, Action, & Cognition, Arizona State University
- 2010 M.A. Experimental Psychology, University of Central Oklahoma
- 2008 B.A. Psychology, University of Central Oklahoma

EMPLOYMENT

Research Positions

- 2020 – **Assistant Professor**
Center for Research on Human Movement Variability
Department of Biomechanics
University of Nebraska at Omaha
- 2018 – 2020 **Research Associate**
Center for Research on Human Movement Variability
Department of Biomechanics
University of Nebraska at Omaha
- 2016 – 2018 **Postdoctoral Scholar**
Science of Learning and Education Technology Lab
Institute of the Science of Teaching and Learning
Arizona State University
- 2010 – 2016 **Graduate Research Associate**
Arizona State University
- 2008 – 2010 **Graduate Research Assistant**
University of Central Oklahoma

GRANTS AND FELLOWSHIPS

Current Funding

- 2020 - 2021 **Principal Investigator**
National Strategic Research Institute
Repeated Bouts of Physical Stress: A Lab Based Simulated Multiday Mission Scenario
Total awarded: \$273,421
- 2020 - 2021 **Principal Investigator**

University of Nebraska Collaborative Initiative
Planning Grant

*Investigation of the Impact of Augmented Reality in Human Gait
Variability and Medical Care*

Total awarded: \$20,000

Previous Funding

- 2018 – 2020 **Principal Investigator**
The National Institutes of Health
Center for Research on Human Movement Variability
Pilot Project Award
Embedded Visuomotor Coordination
Total awarded: \$100,000
- 2011 **Security and Defense Systems Initiative Fellow**
College of Liberal Arts and Sciences
Arizona State University
Total awarded: \$18,000
- 2010 **Doctoral Enrichment Fellow**
Arizona State University
Total awarded: \$41,000
- 2009 **Principal Investigator**
University of Central Oklahoma, Office of Research and Grants
Research, Creative, and Scholarly Activities Student Grant
Hysteresis in Visual Search
Total awarded: \$2,400
- 2009 **Principal Investigator**
University of Central Oklahoma, Office of Research and Grants
Research, Creative, and Scholarly Activities Student Grant
Eye movements reveal the fractal nature of visual search
Total awarded: \$2,400

PUBLISHED MANUSCRIPTS

Refereed Journals (Published and in press)

1. **Likens, A. D.**, Kent, J. K., Sloan, C. I., Wurdeman, S., & Stergiou, N. S. (accepted). Stochastic resonance reduces sway and gait variability in individuals with unilateral transtibial amputation. To be published in *Frontiers in Fractal Physiology*.

2. **Likens, A. D.** & Wiltshire, T. J. (accepted). Windowed multiscale synchrony: Modeling Interpersonal Neurophysiological Coordination Dynamics. To be published in *Social, Cognitive, and Affective Neuroscience*.
3. Gibbons, C. T., Amazeen, P. G., & **Likens, A. D.** (2020). Distinguishing two types of variability in a sit to a stand task. *Motor Control*, *24*, 168-188.
4. Patten, K. J., Greer, K., Likens, A. D., Amazeen, E. L., & Amazeen, P. G. (2020). The trajectory of thought: Long-tailed distributions in memory foraging promote efficiency. *Memory & Cognition*, *48*, 772-787.
5. Allen, L. K., **Likens, A. D.**, & McNamara, D. S. (2019). Writing flexibility in argumentative essays: A multidimensional analysis. *Reading and Writing*, *32*, 1607-1634.
6. **Likens, A. D.**, Amazeen, P. G., West, S. G., Gibbons, C. T. (2019). Statistical properties of multiscale regression analysis. Simulation and application to human postural control. *Physica A: Statistical Mechanics and its Applications*, *532(121580)*, 1-17.
7. Demir, M., **Likens, A. D.**, McNeese, N., Cooke, N. J., & Amazeen, P. G. (2019). Team coordination and effectiveness in human-autonomy teaming. *IEEE Transactions on Human-Machine Systems*, *49(2)*, 150-159.
8. Gibbons, C. T., Amazeen, P. G., & **Likens, A. D.** (2019). Effects of foot placement on postural sway in the AP and ML directions. *Motor Control*, *23(2)*, 149-170.
9. McCarthy, K. M., **Likens, A. D.**, Johnson, A. M., Guerrero, T. A., & McNamara, D. S. (2018). Metacognitive overload!: Positive and negative effects of metacognitive prompts within an intelligent tutoring system. *International Journal of Artificial Intelligence in Education*, *28(3)*, 420-438.
10. Gorman, J. C., Martin, M. L., Dunbar, T. A., Stevens, R. H., Galloway, T. L., Amazeen, P. G., & **Likens, A. D.** (2016). Cross-level effects between neurophysiology and communication during team training. *Human Factors: The Journal of the Human Factors and Ergonomics Society*, *58(1)*, 181-199.
11. Waddell, M. L., Fine, J. M., **Likens, A. D.**, Amazeen, E. L., & Amazeen, P. G. (2016). Perceived Heaviness in the Context of Newton's Second Law: Combined Effects of Muscle Activity and Lifting Kinematics. *Journal of Experimental Psychology: Human Perception and Performance*, *42(3)*, 363-374.
12. Fine, J. M., **Likens, A. D.**, Amazeen, E. L., & Amazeen, P. G. (2015). Emergent complexity matching in interpersonal coordination: Local dynamics and global variability. *Journal of Experimental Psychology: Human Perception & Performance*, *41(3)*, 723-737.
13. **Likens, A. D.**, Fine, J. M., Amazeen, E. L., & Amazeen, P. G. (2015). Experimental control of scaling behavior: What is not fractal? *Experimental Brain Research*, *233(10)*, 2813-2821.
14. Snow, E. L., **Likens, A. D.**, Allen, L. K., & McNamara, D. S. (2015). Taking control: Stealth assessment of deterministic behaviors within a game-based system. *The International Journal of Artificial Intelligence in Education*, *26(4)*, 1011-1032.

15. **Likens, A. D.**, Amazeen, P. G., Stevens, R., Galloway, T., & Gorman, J. C. (2014). Neural signatures of team coordination are revealed by multifractal analysis. *Social Neuroscience*, 9(3), 219-234.
16. Stevens, R., Gorman, J. C., Amazeen, P., **Likens, A. D.**, & Galloway, T. (2013). The organizational neurodynamics of teams. *Nonlinear Dynamics, Psychology, and Life Sciences*, 17(1), 67-86.

Book Chapters

1. **Likens, A. D.**, & Stergiou, N. (2020). A tutorial on fractal analysis of human movements. In N. Stergiou (ed). *Biomechanics and Gait Analysis*. London: Academic Press.
2. **Likens, A. D.**, & Stergiou, N. (2020). Basic biomechanics. In N. Stergiou (ed). *Biomechanics and Gait Analysis*. London: Academic Press.
3. **Likens, A. D.**, & Stergiou, N. (2020). Coordination and Control: A dynamical systems approach to the analysis of human gait. In N. Stergiou (ed). *Biomechanics and Gait Analysis*. London: Academic Press.
4. Rowen, D., **Likens, A. D.**, & Stergiou, N. (2020). Revisiting a classic: Muscles, reflexes, and locomotion by TA McMahon. In N. Stergiou (ed). *Biomechanics and Gait Analysis*. London: Academic Press.
5. Wiltshire, T. J., Steffensen, S. V., & **Likens, A. D.** (2020). Challenges for using coordination-based measures to augment collaborative social interactions. In *Selbstorganisation—ein Paradigma für die Humanwissenschaften* (pp. 215-230). Springer, Wiesbaden.
6. Allen, L. K., **Likens, A. D.**, McNamara, D. S. (2019). Modeling the dissemination of misinformation through discourse dynamics. In Kendeou, Robinson, & McCrudden (eds). *Misinformation and fake news in education*. Charlotte, NC: Information Age Publishing, Inc.

Invited Workshops and Colloquia

1. **Likens, A. D.** (July, 2020). *Recurrence quantification analysis*. Workshop presented at the 30th Annual International Conference of the Society for Chaos Theory in Psychology and Life Sciences, Online Conference.

Refereed Conference Proceedings (Peer Reviewed)

1. McCarthy, K. S., Roscoe, R. D., **Likens, A. D.**, & McNamara, D. S. (2019, June). Checking It Twice: Does Adding Spelling and Grammar Checkers Improve Essay Quality in an Automated Writing Tutor? In International Conference on Artificial Intelligence in Education (pp. 270-282). Springer, Cham.
2. Allen, L. K., **Likens, A. D.**, & McNamara, D. S. (2018). A multi-dimensional analysis of writing flexibility in an automated writing evaluation system. In A. Pardo, K. Bartamote-Aufflick, & G. Lynch (Eds.), Proceedings of the 8th International

- Conference on Learning Analytics & Knowledge (LAK 18) in Sydney, NSW, Australia, (pp. 111-120). New York, NY: ACM.
3. Bracken, B. K., Amazeen, P. G., **Likens, A. D.**, Demir, M., & Gibbons, C. T. (2018). Comparison of a custom functional near-infrared spectroscopy sensor, a peripheral SpO2 sensor, and a standard laboratory sensor (BIOPAC) for RR interval assessment. In H. Gamboa, S. Badia, G. Saggio, A. Fred (Eds.), *BIOSIGNALS 2018 - 11th International Conference on Bio-Inspired Systems and Signal Processing, Proceedings* (pp. 281-285).
 4. **Likens, A. D.**, McCarthy, K. M., Allen, L. K., & McNamara, D. S. (2018). Recurrence Quantification Analysis as a Method for Studying Text Comprehension Dynamics. In A. Pardo, K. Bartamote-Aufflick, & G. Lynch (Eds.), *Proceedings of the 8th International Conference on Learning Analytics & Knowledge (LAK 18) in Sydney, NSW, Australia*, (pp. 111-120). New York, NY: ACM.
 5. Allen, L. K., **Likens, A.**, & McNamara, D. S. (2017). Recurrence Quantification Analysis: A technique for the dynamical analysis of student writing. In Z. Markov & V. Rus (Eds.), *Proceedings of the 30th Annual Florida Artificial Intelligence Research Society International Conference (FLAIRS)*. Marco Island, FL: AAAI Press.
 6. Allen, L. K., Perret, C., **Likens, A. D.**, McNamara, D. S. (2017). What'd you say again? Recurrence quantification analysis as a method for analyzing the dynamics of discourse in a reading strategy tutor. In A. Wise, P. Winne, G. Lynch, X. Ochoa, I. Molenaar, & S. Dawson (Eds.), *Proceedings of the 7th International Conference on Learning Analytics & Knowledge (LAK 17) in Vancouver, BC, Canada*, (pp. 373-382). New York, NY: ACM.
 7. Demir, M., Amazeen, P. G., McNeese, N. J., **Likens, A. D.**, & Cooke, N. J. (2017, September). Team Coordination Dynamics in Human-Autonomy Teaming. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 61, No. 1, pp. 236-236). Sage CA: Los Angeles, CA: SAGE Publications.
 8. **Likens, A. D.**, Allen, L. K., & McNamara, D. S. (2017). Keystroke dynamics predict essay quality. In G. Gunzelmann, A. Howes, T. Tenbrink, & E. Davelaar (Eds.), *Proceedings of the 39th Annual Meeting of the Cognitive Science Society (CogSci 2017)*, London, UK (pp. 2573 - 2578). Austin, TX: Cognitive Science Society.
 9. Gibbons, C. T., **Likens, A. D.**, & Amazeen, P. G. (2015). Multifrequency coordination in dyads. In J. Weast-Knapp, M. Malone & D. Abney (Eds.), *Studies in Perception & Action XVIII*. Minneapolis, MN: Taylor & Francis Group, LLC.
 10. Waddell, M. L., Fine, J. M., **Likens, A. D.**, Amazeen, E. L., & Amazeen, P. G. (2015). Muscle activity and lifting kinematics combine in the perception of weight by dynamic touch. In J. Weast-Knapp, M. Malone & D. Abney (Eds.), *Studies in Perception & Action XVIII*. Minneapolis, MN: Taylor & Francis Group, LLC.
 11. Snow, E. L., McNamara, D. S., Jacovina, M. E., Allen L. K., Johnson, A., Perret C. E., Dai, J., Jackson, G. T., **Likens A. D.**, Russell, D. G., & Weston, J. L. (2015). Promoting metacognitive awareness within a game-based intelligent tutoring system. In *Proceedings of the 17th International Conference on Artificial Intelligence in Education*.

12. Snow, E. L., **Likens, A. D.**, Jackson, G. T., & McNamara, D. S. (2013). Students' walk through tutoring: Using a random walk analysis to profile students. In *Proceedings of the 2013 Educational Data Mining Conference*. Berlin / Heidelberg, Germany: Springer.
13. Cooke, N. J., Amazeen, P. G., Gorman, J. C., Guastello, S. J., **Likens, A. D.**, & Stevens, R. (2012). Modeling the Complex Dynamics of Teamwork from Team Cognition to Neurophysiology. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 56, No. 1, pp. 183-187). SAGE Publications.

Conference Podium Presentations

1. Sloan, C. I., **Likens, A. D.**, Sommerfeld, J., & Stergiou, N. S. (2020, September). Autocorrelation and Probability Distributions In Gait-Metronome Synchronization. Podium presentation at the 5th annual Human Movement Variability Conference, Omaha, NE.
2. Rowen, D. R., Silva, L., **Likens, A. D.**, Vaz, J., & Stergiou, N. S. (2019, July). Do older adults synchronize their strides to different visual stimuli? Poster presented at the 2019 International Society of Biomechanics Conference.
3. **Likens, A. D.**, McCarthy, K. S., Allen, L. K., & McNamara, D. S. (2017, December). Recurrence quantification analysis as method for measuring text comprehension dynamics. *Paper presented at the 8th ASU/U of A Cognitive Science Conclave*, Tucson, AZ.
4. Allen, L. K., **Likens, A. D.**, & McNamara, D. S. (2017, November). An examination of students' adaptive writing behaviors. *Paper presented at the 2017 Annual Meeting of the Society for Computers in Psychology*.
5. **Likens, A. D.**, McCarthy, K. M., Allen, L. K., & McNamara, D. S. (2017, November). Let's walk about that: Random walk analyses contextualize performance in an intelligent tutoring system. *Paper presented at the 2017 Annual Meeting of the Society for Computers in Psychology*.
6. **Likens, A. D.** (2015, December). Fractal steering volatility. *Paper presented at the 6th ASU/U of A Cognitive Science Conclave*, Tucson, AZ.
7. Snow, E. L., Varner, L. K., **Likens, A. D.**, Jackson, G. T., & McNamara, D. S. (2013, November). We're watching you: Using random walks and probability trajectories to profile system users. *Paper presented at the 43rd annual meeting of the Society for Computers in Psychology*, Toronto, Canada.
8. **Likens, A. D.**, & Vanhoy, M. (2011, July). Multifractal scaling in eye movements. *Paper presented at the 21st Annual Conference of the Society for Chaos Theory in Psychology and Life Sciences*, Orange, CA.
9. **Likens, A. D.** (2010, April). Hysteresis in visual search. *Paper presented at the annual meeting of the Oklahoma Psychological Society*, Edmond, OK.
10. Vanhoy, M., & **Likens, A. D.** (2009, July). Eye movements reveal the fractal nature of visual search. *Paper presented at the 19th Annual International Conference of the Society for Chaos Theory in Psychology and Life Sciences*, Milwaukee, WI.

Conference Poster Presentations

1. **Likens, A. D.**, Skiadopoulou, A., & Stergiou, N. (2020, September). A simulation based investigation of unbiased detrended fluctuation analysis. Poster presentation at the 5th annual Human Movement Variability Conference, Omaha, NE.
2. **Likens, A. D.**, Skiadopoulou, A., & Stergiou, N. (2019, November). Unbiased detrended fluctuation analysis for short psychological time series. *To be presented at the 2019 Meeting of the Society for Computers in Psychology.*
3. **Likens, A. D.**, Silva, L., Vaz, J. & Stergiou, N. (2019, August). Multifractal correlation reveals variation in complexity matching across metronome types. *Poster presented at the 2019 International Society of Biomechanics Conference.*
4. Silva, L., **Likens, A. D.**, Rowen, D., Vaz, J., Knarr, B. & Stergiou, N. (2019, August). Multifractal analysis of visually cued stride intervals. *Poster presented at the 2019 International Society of Biomechanics Conference.*
5. Silva, L., **Likens, A. D.**, Rowen, D., Vaz, J., Knarr, B. & Stergiou, N. (2019, August). Synchronization between stride time intervals and external visual cueing. *Poster presented at the 2019 International Society of Biomechanics Conference.*
6. Sloan, C. I., Kent, J. A., **Likens, A. D.**, Takahashi, K. Z. & Stergiou, N. (2019, August). Subthreshold vibration influences the posture and gait of transtibial amputees. *Poster presented at the 2019 International Society of Biomechanics Conference.*
7. Sommerfeld, J. H., Likens, A. D., & Stergiou, N. (2019, August). Isolating aspects of gait through the use of pacing signals. *Poster presented at the 2019 International Society of Biomechanics Conference.*
8. Gibbons, C. T., & **Likens, A. D.**, Amazeen, P. G. (2013, December). Dynamics of motion perception. *Poster presented at the 4th ASU/U of A Cognitive Science Conclave, Tucson, AZ.*
9. Patten, K. J., **Likens, A. D.**, & Puglisi, C. (2012, May). Walk this way: Ecological attenuation of facing bias in point light walkers. *Poster presented at the 24th Annual Association for Psychological Science Conference, Chicago, IL.*
10. Patten, K. J., **Likens, A. D.**, & Puglisi, C. (2011, December). Attenuation of facing bias in point light walkers. *Poster presented at 2nd annual ASU/U of A Cognitive Science Conclave, Tucson, AZ.*
11. **Likens, A. D.** (2012, December). The dynamics of team readiness. *Poster presented at the 3rd Annual ASU/U of A Cognitive Science Conclave, Tempe, AZ.*
12. **Likens, A. D.**, & Vanhoy, M. (2009, May). Hysteresis in eye movement patterns. *Poster presented at the 21st Annual Conference of the Association for Psychological Science, San Francisco, CA.*
13. Preddy, D., Vanhoy, M., **Likens, A. D.**, & DiGiovanni, R. (2009, May). Memory in post-attentive visual search. *Poster presented at the 21st Annual Conference of the Association for Psychological Science, San Francisco, CA.*

MENTORING

Ph.D. Committees

- 2020 – Ryan Meidinger, Biomechanics, University of Nebraska at Omaha
Role: Committee Member
- 2020 – Samantha Birse, Exercise and Sport Science, University of Newcastle
Role: Committee Member

M.S. Thesis Committees

- 2019 – Joel Sommerfeld, Biomechanics.
Role: Co-chair

Graduate Student Mentoring

1. Kolby Brink
2. Anaelle Charles
3. Allison Grunkelmeyer
4. Taylor Kinney
5. Taylor Wilson
6. Colleen Vogel
7. Darko Radakovic
8. Joel Sommerfeld
9. Cecile Perret
10. Morgan Waddell
11. Cameron Gibbons
12. Mustafa Demir

Undergraduate Students

1. Caenis Bryan
2. Ian Sloan

SERVICE

Ad-hoc Reviewing

- *Chaos, Solitons, & Fractals*
- *Gait and Posture*
- *Frontiers in Psychology*
- *Frontiers in Physiology*

- *Human Movement Science*
- *Journal of Applied Biomechanics*
- *Journal of Biomechanics*
- *Journal of Neuroscience*
- *Journal of the Royal Society: Interface*
- *Motor Control*
- *Neuroscience Letters*
- *PLOS ONE*
- *Social Neuroscience*

Society Memberships

- Cognitive Science Society
- International Society of Biomechanics
- International Society for Ecological Psychology
- Psychonomics Society
- Society for Chaos Theory in Psychology and Life Sciences
- Society for Computation in Psychology