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Education

Human Performance Studies

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### **Human Performance Lab**

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## WSU Human Performance Lab

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At the heart of  
**INNOVATION**  
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Human Performance Laboratory (HPL) is a high-technology research facility, designed with multiple integrated spaces to facilitate interdisciplinary teaching, research, and engagement.

The Human Performance Laboratory (HPL) at Wichita State University is dedicated to providing students majoring in Exercise Science within the Department of Human Performance Studies with the opportunity to utilize the knowledge and skills obtained during the educational process. [Read More...](#)



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# Human Performance Laboratory

The Human Performance Laboratory (HPL) at Wichita State University is dedicated to providing students majoring in Exercise Science within the Department of Human Performance Studies with the opportunity to utilize the knowledge and skills obtained during the educational process. To allow for this hands-on experience, the laboratory provides athletes of all ability levels, the Wichita community, and persons looking to begin a lifetime of exercise the ability to receive up-to-date evaluations. These evaluations consist of examination of cardiovascular risk, fitness and training status, and guidance on how to improve and implement fitness and sport specific training into their lives.

Our recently renovated high-technology research facility is designed with multiple integrated spaces to facilitate interdisciplinary teaching, research, and engagement. The HPL supports research and private industry projects assessing human exercise performance and fundamental human physiology in sport, exercise, and health. Unique to the HPL is the development and design of performance and health technologies. Since 2004, the HPL is credited with assisting in the start-up of 30 local and national companies.

## Research grants submitted as principal investigator to external agencies

1. **Patterson, J.A.** (2014) SWAY Medical Research Award: Measuring balance from above center of gravity. \$7,500: **Funded.**
2. **Patterson, J.A.** (2013) SWAY Medical Research Award: Evaluation of 10 seconds versus 20 seconds balance assessment criteria. \$6,900: **Funded.**
3. Cluff, K., **Patterson, J.A.**, Collins, T., Twumasi-Ankrah, P., Ammar, A. (2013) National Institutes of Health / AREA (R15): Label free raman spectral biomarkers characterize PAD muscle. Co-PI \$458,698: Not Funded.
4. **Patterson, J.A.** (2012) Thorotread Treadmill (Full Vision, Inc.) Research Award. Evaluation of upper body concentric exercise while treadmill walking – influence on HR and metabolic expenditure. \$12,000: **Funded.**
5. Patterson, J.A. (2011) University of Kansas School of Medicine – Wichita: Physiological assessments pre and post chemotherapy in breast cancer survivors. \$11,000: **Funded.**
6. **Patterson, J.A.** (2011) Capacity Sports Research Award: Reproducibility & reliability of Smartphone balance application. \$6,500: **Funded.**

7. **Patterson, J.A.** (2011) Capacity Sports Research Award: Validation of Smartphone balance application. \$7,500: **Funded.**
8. **Patterson, J.A.**, Farhoud, H.H., Mondal, S., Parikh, D.R. (2010) National Institutes of Health / Challenge Grant: Comparison of catheter ablation to antarrhythmic drugs as first-line treatment for atrial fibrillation. \$607,336: Not Funded.
9. **Patterson, J.A.** (2009) National Institutes of Health / AREA Grant: Effects of resistance training and vibration training in individuals with severe mental illness. \$290,570: Not Funded.
10. **Patterson, J.A.** (2009) American Heart Association Mentorship Award: Exercise capacity pre and post radiofrequency ablation treatment for atrial fibrillation. \$110,000: Not Funded.
11. **Patterson, J.A.**, Farhoud, H.H., Mondal, S., Parikh, D.R. (2009) National Institutes of Health/Challenge Grant: Comparison of catheter ablation to conventional therapy as first-line treatment for atrial fibrillation. \$607,336: Not Funded.
12. **Patterson, J.A.** (2005). Kansas Health Foundation / Recognition Grant: Cardiovascular education and training program. \$21,000: Not Funded.

#### **Research Grants submitted as joint effort to external agencies**

13. Young, K.Y., Roberts, M.D., Poole, C., **Patterson, J.A.** (2014) MusclePharm Research Award. The effects of a nutritional supplement on golf performance and biophysical measures during a 36-hole golf tournament in competitive male golfers aged 20-55 years. \$36,915: **Funded.**
14. Collins, T., Twumasi-Ankrah, P., **Patterson, J.A.**, Johnston, J., Baade, L., Slovut, D., Correa, A. National Institutes of Health (R01) resubmission Mar 2014. Targeted analysis of Jackson Heart Study data. Peripheral arterial disease in African Americans: Predictors and Systemic Risk. \$1,235,360: **Pending.**
15. Young, K.Y., Roberts, M.D., Poole, C., **Patterson, J.A.** (2013) MusclePharm Research Award. Effects of the Bizzy Diet and FitMess supplements on body composition changes and blood serum metabolic markers in women. \$50,000: **Funded.**
16. Rogers, M.E., Patterson, J.A. (2013) Hygenic Research Award. Metabolic

expenditure of elastic band resistive exercises. \$5,000: **Funded.**

17. Rogers, M.E., **Patterson, J.A.** (2012) Hygenic Research Award. Effect of whole body vibration exercise on muscle activity when using elastic resistance bands in younger and older adults while standing on foam surfaces. \$5,000: **Funded.**
18. Rogers, M.E., **Patterson, J.A.** (2012) Proformance Health. Postural balance of young and older adults while standing on foam surfaces. \$5,000: **Funded.**
19. Rogers, M.E., **Patterson, J.A.** (2011) Hygenic Research Award. Calculation of caloric expenditure for elastic resistance exercise with upper and lower body exercise. \$5,000: **Funded.**
20. Rogers, M.E., **Patterson, J.A.** (2011) Hygenic Research Award. Postural balance of young and older adults while standing on foam surfaces. \$5,000: **Funded.**
21. Frazier, L.M., **Patterson, J.A.** (2011) United Methodist Health Ministry Fund, Fit for Kansas Kids: Preventing childhood obesity through physical activity and nutrition during pregnancy. \$99,956: **Funded.**
22. **Patterson, J.A.**, B. Andres, J. Johnson. (2011). Robert Wood Johnson Foundation: Health Education and Leadership (HEAL) Project – One-Year Study Extension. \$200,000. **Funded.**
23. Ablah, E., Patterson, J.A. FEMA: Improving cardiorespiratory fitness among aging rural, volunteer firefighters in Kansas and Oklahoma. \$1,000,000: Not Funded.
24. Rogers, M.E., **Patterson, J.A.** (2010) Hygenic Research Award. Effect of Biofreeze gel on power output on blood lactate during anaerobic exercise. \$5,000: **Funded.**
25. **Patterson, J.A.**, Andres, B., Johnson, J., Rogers, M.E., Ballard-Reisch, D. (2010). Department of Education NIDRR: Integrating Mental-Health and Physical Activity Toolkit (IMPACT). \$307,319: Not Funded.
26. Frazier, L.M., **Patterson, J.A.** (2010) Wichita Council for Graduate Medical Education Research: Employment problem-solving and physical activity in women after cancer diagnosis. \$10,000: **Funded.**
27. Frazier, L.M., **Patterson, J.A.** (2009) Wichita Council for Graduate Medical Education Research: Fear and other barriers to physical activity during pregnancy. \$10,000: **Funded.**

28. Toro-Ramos, Z., Jorgensen, M., Radebaugh, T., Rogers, M.E., Patterson, J.A., Self, T., Goldberg, L., Downs, D. (2009) National Science Foundation / MRI-R2: Acquisition of integrated equipment to support research in sensory and motor systems related to balance and gait across the lifespan. \$900,000: Not Funded.
29. Rogers, N.L., Ballard-Reisch, D., Chaparro, B., **Patterson, J.A.** (2009). Robert Wood Johnson Foundation / Health Games Research Program: Physical activity promotion for rural older adults. \$233,106: Not Funded.
30. **Patterson, J.A.**, B. Andres, J. Johnson. (2008). Robert Wood Johnson Foundation: Health Education and Leadership (HEAL) Project. \$396,000 (funding matched by Cargill Cares and Kansas Health Foundation totaling to \$800,000). **Funded.**
31. Rogers, M.E., **Patterson, J.A.** and R. Bohlken. (2008). City of Wichita: Fitness testing for Wichita Fire Department firefighters. \$28,240: Not Funded.

#### **Research Grants submitted to WSU college or university research committees**

32. He, J., Chaparro, A., **Patterson, J.A.**, Becic, E. (2013) Regional Institute on Aging: Improve the safety of older drivers: the influences of fitness and automation. \$10,000: Not Funded, due to lack of funds at RIA.
33. **Patterson, J.A.** (2012). iPad Innovation Grant: Use of iPad tri-axis accelerometer to measure balance. 10 iPads: **Funded.**
34. Rogers, M.E., **Patterson, J.A.** (2012). Hendrick Foundation Award. Bone density and body composition studies using Dual Energy X-Ray Absorptiometer. \$95,000: **Funded.**
35. He, J., **Patterson, J.A.** (2012). Multidisciplinary University Research Project Award: Validation of heart rate assessment by video imaging. \$7,500: **Funded.**
36. **Patterson, J.A.**, Berry, B. (2012). Regional Institute on Aging: Effects of upper body resistance while walking on older adults. \$3,000: **Funded.**
37. **Patterson, J.A.** (2009). Wichita State University LINK Award: Assessment of bone mineral density in individuals with severe mental illness. \$3,000: **Funded.**
38. Ballard-Reisch, D., **Patterson, J.A.** and Parker, K. (2008) Wichita State University LINK Award: MoveIt! Increasing physical activity in fifth graders. \$3,000: Not Funded.



39. **Patterson, J.A.** and Rogers, M.E. (2006). Wichita State University LINK Award: Effects of strength and balance training on bone density in the elderly. \$3,040: Not Funded.
40. **Patterson, J.A.** (2005). WSU University Research/Creative Projects Award (URCA): Assessing electrical activity of the heart during lifting may be a reliable method of identifying improper mechanics. \$4,424: **Funded**.

## **Patents**

1. U.S. Provisional Patent Application; SYSTEM AND METHOD FOR IMPLANTABLE ELECTROACTIVE POLYMER HEART ASSISTIVE MESH; Filed October 5, 2015; Docket No. –PRO.
2. U.S. Provisional Patent Application; ELECTRIC PERMITTIVITY AND MAGNETIC PERMEABILITY BIOSENSING SYSTEM; Serial No. 62/185,198; Filed June 26, 2015; Docket No. 47415-PRO.
3. U.S. Patent; NON-INVASIVE BIOFEEDBACK SYSTEM. Definition: use of camera to measure physiological changes and data is interpreted and used to control exercise equipment. I.e., if it is unbeneficial for an individual to exercise above anaerobic threshold, the software will reduce the workload of the equipment (treadmill) Dkt. No. 45713-PCT. Jan 2014.
4. Electrocardiogram screening patch. Definition: disposable ECG patch developed for student athletes, with green, yellow, & red light to indicate whether an arrhythmia related to sudden cardiac death is present. Provision Patent Jun 2013.
5. Copyrighted; Smartphone Application to Assess Balance, Cognition and Agility in Older Adults. Nov 2011.

## **Reports published by FDA**

1. **Patterson, J.A.** Consistency of measures from the Smartphone SWAY Balance application compared to a validated balance-testing device (study 1,2, & 3 of 6). Accepted as official research report for FDA submission of biomedical device; funded by Capacity Sports, Concussion Manager Smartphone Report Accepted Sept. 2011.
2. **Patterson, J.A.** Postural sway analysis with motion sensors in Smartphone technology: familiarization, reliability, validity and specific protocol analysis

(study 4 of 6). Accepted as official research report for FDA submission of biomedical device; funded by Capacity Sports, Concussion Manager Smartphone Report Accepted Sept. 2011.

3. **Patterson, J.A.** Validation of motion sensors in Smartphone technology to measure postural sway compared to clinically tested force platforms in progressively less stable conditions (study 5 of 6). Accepted as official research report for FDA submission of biomedical device; funded by Capacity Sports, Concussion Manager Smartphone Report Accepted Sept. 2011.