

Brett S. Kirby, PhD

Office Address

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<u>Degree</u>	<u>Major Area of Study</u>	<u>Institution</u>	<u>Date</u>
Postdoc	Hematology/Transfusion Medicine	Duke University Medical Center	2014
PhD	Human Bioenergetics	Colorado State University	2010
MS	Cardiovascular Physiology	Colorado State University	2007
BS	Health and Exercise Science	Colorado State University	2004
	Nutrition Science	Northern Arizona University	2000

Professional Experience

- 2/2018 – Present; Principal Scientist – Human Performance, Nike Explore Team – Sport Research Lab.
- 9/2017 – Present; Adjunct Faculty, Sports Product Management and Sports Product Design Graduate Programs, University of Oregon.
- 7/2016 – 1/2017; Lead Physiologist, Next Generation Research, Nike Explore Team – Sport Research Lab.
- 1/2016 – 2019; Senior Visiting Fellow, University of Exeter – Sport and Health Sciences, United Kingdom.
- 2/2014 – 6/2016; Lead Scientist, Nike Sport Performance Lab, Nike+ Smart Sensing, Nike, Beaverton, OR.
- 2013 – 2014; Club Sports Physiologist/Cycling Team Director, Duke University Athletics, Durham, NC.
- 2012 – 2014; Senior Postdoc Fellow, Hematology Division, Duke University Medical Center, Durham, NC.
- 2011 – 2012; Sport Performance Analyst and Consultant, Team Garmin Pro Cycling – Slipstream Sports.
- 2011 – 2012; Human Performance and Sport Physiology Consultant, Reebok.
- 2010 – 2012; Junior Postdoctoral Research Fellow, Vascular Physiology Research Group – Department of Biomedical Sciences, Colorado State University, Fort Collins, CO.
- 2011; Co-Instructor, Cardiovascular/Mammalian Physiology, Colorado State University, Fort Collins, CO.
- 2010; Visiting Research Fellow, Cardiology/Transfusion Center, Emory University, Atlanta, GA.
- 2004 – 2010; Graduate Instructor Research Assistant, Human Cardiovascular Physiology Laboratory, Health & Exercise Science, Colorado State University, Fort Collins, CO.
- 1999 – 2000; Nutrition Science Undergraduate Assistant, Northern Arizona University, Flagstaff, AZ.

Additional Education/Certificates

2019, Certificate in Disruptive Strategy with Clayton Christensen, Harvard Business School Online
2022, Certificate in Network Dynamics of Social Behavior with Damon Centola, Coursera - UPenn

Advisory Boards, Honors and Awards

2019 – 2021, Scientific Advisory Board Member, AMP Human/Momentous
2018 – 2021, Judge, Sports Technology Awards, Most Innovative Technology and Equipment
2014, Clinical Science Young Investigator Award, Cardiovascular, American Physiological Society
2013, Gabor Kaley Postdoctoral Professional Award, American Physiological Society

2012, Early Career Award, Neural Control and Autonomic Regulation, American Physiological Society
2010, Caroline tum Suden Professional Opportunity Award, American Physiological Society
2009, Successful Aging Research Colloquium Award, Colorado State University
2008, Predoctoral Award, Environmental and Exercise Physiology, American Physiological Society

Professional Memberships and Societies

2007 – present, American Physiological Society
2014 – present, American College of Sports Medicine
2011 – 2014, American Heart Association
2007 – present, The Physiological Society
2016 – present, European Journal of Sport Science
2012 – 2014, American Society of Hematology

Scientific Journal Reviewer

The Journal of Physiology
Journal of Applied Physiology
European Journal of Sport Science
American Journal of Physiology
European Journal of Applied Physiology
Medicine & Science in Sports & Exercise

Invited Research Seminars

“The Balance of Muscle Oxygen Supply and Demand Reveals Critical Metabolic Rate and Predicts Time to Exhaustion”, Annual MOxy Summit, *Keynote Lecture*, 2021.

“Influence of Performance Running Footwear on Muscle Soreness and Damage”, Footwear Biomechanics Symposium, 2019, Kananaskis, Canada.

“Defining the Limits of Human Performance: Evidence from the First 2 Hour Marathon Attempt”, Sports Performance Data and Fan Engagement, *Keynote Lecture*, 2018, San Francisco, CA.

“A Deeper Understanding of Athletes and Sport through Critical Intensity Concepts” Critical Power Symposium, *Keynote Lecture*, 2018, Provo, UT.

“Daring to Break the 2 Hour Marathon: Discovery of Human Potential through Science and Innovation”, 30th Annual Doris Drees Lecture, University of Dayton, 2017, Dayton, OH.

“Human Performance with Muscle Oxygenation”, Annual MOxy Summit, 2017, Seattle, WA.

“The Extra Mile: Nike and Breaking2”, MiND Talks, MiND Magazine, 2017, Seattle, WA.

“Models to Predict Endurance Performance”, ACSM, 2017, Denver, CO.

“Tackling Human Performance Discovery Through Science and Innovation”, Sports Analytics Innovation Summit, 2015, San Francisco, CA.

“Intravascular ATP as a Modulator of Vascular Tone During Exercise in Humans”, American College of Sports Medicine Annual Meeting, 2014, Orlando, FL.

“Impaired Blood Flow Control with Advancing Age: erythrocyte dysfunction as root cause?”, Center for Study of Aging, Duke University Medical Center/VA Medical Center, 2013, Durham, NC.

“Impact of Augmenting Intracellular ATP on the Inducible Release of ATP from Banked Erythrocytes”, Duke University - Hematology, Medical Oncology, and Cellular Therapy, 2013, Durham, NC.

“The Age-Old Tale of Skeletal Muscle Vasodilation: New Ideas Regarding Erythrocyte Dysfunction and Intravascular ATP in Human Physiology”, University of Zurich, 2012, Zurich, Switzerland.

“Control of Vascular Tone by Extraluminal Nucleotides” – Session Chair, APS – Experimental Biology Conference, 2012, San Diego, CA.

“Myoendothelial Contacts Within the Skeletal Muscle Arterial Network: A Potential Mediator for Divergent Control of Vascular Tone”, APS – Experimental Biology Conference, 2012, San Diego, CA.

“Age-related Changes in the Role of Sympathetic and Endothelial Regulation”, APS – Experimental Biology Conference, 2011, Washington DC.

“Modulation of Postjunctional α -adrenergic Vasoconstriction during Exercise and Exogenous ATP Infusions in Aging Humans”, APS – Experimental Biology Conference, 2010, Anaheim, CA.

“Potential Mechanisms for Impaired Skeletal Muscle Blood Flow with Advancing Age: The role of circulating ATP in humans”, Emory University School of Medicine, 2010, Atlanta, GA.

“Ascorbic Acid Increases Muscle Blood Flow during Dynamic Exercise in Older Healthy Humans”, APS – Experimental Biology Conference, 2008, San Diego, CA.

Peer-Reviewed Publications

1. Broxterman RM, Craig JC, and **Kirby BS**. Critical Power: Over 95 years of evidence and evolution. *Scand J Med Sci Sports*. May;32(5):933-934, 2022.
2. Black MI, Kranen SH, Kadach S, Vanhatalo A, Winn BJ, Farina EM, **Kirby BS**, and Jones AM. Highly Cushioned Shoes Improve Running Performance in Both the Absence and Presence of Muscle Damage. *Med Sci Sports Exerc*. Apr 1;54(4):633-645, 2022.
3. **Kirby BS**, Winn BJ, Wilkins BW, and Jones AM. Interaction of exercise bioenergetics with pacing behavior predicts track distance running performance. *J Appl Physiol*. Nov 1;131(5):1532-1542, 2021.
4. **Kirby BS**, Clark DA, Bradley EM, and Wilkins BW. The Balance of Muscle Oxygen Supply and Demand Reveals Critical Metabolic Rate and Predicts Time to Exhaustion. *J Appl Physiol*. Jun 1;130(6):1915-1927, 2021.
5. **Kirby BS**, Sparks MA, Lazarowski ER, Lopez Domowicz DA, Zhu H, and McMahon TJ. Pannexin 1 channels control the hemodynamic response to hypoxia by regulating O₂-sensitive extracellular ATP in blood. *Am J Physiol Heart Circ Physiol*. Mar 1;320(3):H1055-H1065, 2021.
6. Jones AM, **Kirby BS**, Clark IE, Rice HM, Fulkerson E, Wylie LJ, Wilkerson DP, Vanhatalo A, and Wilkins BW. Physiological demands of running at 2-hour marathon race pace. *J Appl Physiol* Feb 1;130(2):369-379, 2021.
7. Clark IE, Vanhatalo A, Thompson C, Joseph C, Black MI, Blackwell JR, Wylie LJ, Tan R, Bailey SJ, Wilkins BW, **Kirby BS**, and Jones AM. Dynamics of the power-duration relationship during prolonged endurance exercise and influence of carbohydrate ingestion. *J Appl Physiol*. 1;127(3):726-736, 2019.
8. Clark IE, Vanhatalo A, Thompson C, Wylie LJ, Bailey SJ, **Kirby BS**, Wilkins BW, and Jones AM. Changes in the power-duration relationship following prolonged exercise: estimation using conventional and all-out protocols and relationship with muscle glycogen. *Am J Physiol Regul Integr Comp Physiol*. 1;317(1):R59-R67, 2019.
9. **Kirby BS**, Bradley EM, and Wilkins BW. Critical Velocity during Intermittent Running with Changes of Direction. *Med Sci Sports Exerc*. 51(2):308-314, 2019.
10. Clarke IE, Vanhatalo A, Bailey SJ, Wylie LJ, **Kirby BS**, Wilkins BW, and Jones AM. Effects of Two Hours of Heavy-Intensity Exercise on the Power-Duration Relationship. *Med Sci Sports Exerc*. 50(8):1658-1668, 2018.
11. Hearon CM, **Kirby BS**, Luckasen CJ, Larson DG, and Dinunno FA. Endothelium-dependent vasodilatory signaling modulates α 1-adrenergic vasoconstriction in contracting skeletal muscle of humans. *J Physiol*. 594(24):7435-53, 2016.
12. Crecelius AR, **Kirby BS**, Hearon CM Jr, Luckasen GJ, Larson DG, Dinunno FA. Contracting human skeletal muscle maintains the ability to blunt α 1-adrenergic vasoconstriction during KIR channel and Na(+)/K(+)-ATPase inhibition. *J Physiol*. 593(12):2735-51, 2015.
13. **Kirby BS**, Schwarzbaum PJ, Lazarowski ER, Dinunno FA, McMahon TJ. Liberation of ATP secondary to hemolysis is not mutually exclusive of regulated export. *Blood*. 125(11):1844-5, 2015.

14. Crecelius AR, **Kirby BS**, and FA Dinunno. Intravascular ATP and the regulation of blood flow and oxygen delivery in humans. *Exerc Sport Sci Rev.* 43(1):5-13), 2015.
15. **Kirby BS**, Hanna G, Hendargo H, and TJ McMahon. Restoration of intracellular ATP production in banked red blood cells improves inducible ATP export and suppresses RBC-endothelial adhesion. *Am. J. Physiol. Heart Circ. Physiol.* 307(12):H1737-44, 2014.
16. Bennett-Guerrero E*, **Kirby BS***, Zhu H, Herman AE, Bandarenko N, and TJ McMahon. Randomized Study of Washing 40-42 Day Stored Red Blood Cells. *Transfusion.* 54(10):2544-52, 2014. * Co-1st authors
17. Crecelius AR, **Kirby BS**, Luckasen GJ, Larson DG, and FA Dinunno. Mechanisms of rapid vasodilation following a brief contraction in human skeletal muscle. *Am. J. Physiol. Heart Circ. Physiol.* 305: H29-40, 2013.
18. Crecelius AR, **Kirby BS**, Richards JC, and FA Dinunno. Mechanical effects of muscle contraction increase intravascular ATP draining quiescent and active skeletal muscle in humans. *J Appl Physiol.* 114(8):1085-93, 2013.
19. **Kirby BS**, Bruhl A, Sullivan MN, Francis M, Dinunno FA, and S Earley. Robust internal elastic lamina fenestration in skeletal muscle arteries. *PLoS One.* 8(1):e54849, 2013.
20. **Kirby BS**, Crecelius AR, Richards JC, and FA Dinunno. Sources of intravascular ATP during exercise in humans: critical role for skeletal muscle perfusion. *Exp Physiol.* 98(5):988-98, 2013.
21. Dinunno FA and **BS Kirby**. The age-old tale of skeletal muscle vasodilation: new ideas regarding erythrocyte dysfunction and intravascular ATP in human physiology. *Circ Res.* 111(7): 203-4, 2012.
22. Crecelius AR, **Kirby BS**, Richards JC, Luckasen GJ, Larson DG, and FA Dinunno. ATP-mediated vasodilatation occurs via activation of inwardly rectifying potassium channels in humans. *J Physiol.* 590.21: 5349-5359, 2012.
23. **Kirby BS**, Crecelius AR, Richards JC, and FA Dinunno. Impaired skeletal muscle blood flow control with advancing age in humans: attenuated ATP release and local vasodilation during erythrocyte deoxygenation. *Circ Res.* 111(2):220-30, 2012.
24. Richards JC, Crecelius AR, **Kirby BS**, Larson DG, and FA Dinunno. Muscle contraction duration and fibre recruitment influence blood flow and VO₂ independent of contractile work during steady-state exercise in humans. *Exp Physiol.* 97(6):750-61, 2012.
25. **Kirby BS**. Reactive oxygen species enter the tug-of-war between metabolic vasodilatation and sympathetic vasoconstriction. *J Physiol.* 590.3: 417-8, 2012.
26. Richards JC, Crecelius AR, and **BS Kirby**. Muscle afferent feedback during exercise: Putting the pressure on flow. *J Physiol.* 589.24: 5293-4, 2011.
27. Crecelius AR, **Kirby BS**, Richards JC, Garcia LJ, Voyles WF, Larson DG, and FA Dinunno. Mechanisms of ATP-mediated vasodilation in humans: modest role for nitric oxide and vasodilating prostaglandins. *Am. J. Physiol. Heart Circ. Physiol.* 301(4): H1302-10, 2011.
28. Crecelius AR, **Kirby BS**, Voyles WF, and FA Dinunno. Augmented skeletal muscle hyperaemia during hypoxic exercise in humans is blunted by combined inhibition of nitric oxide and vasodilating prostaglandins. *J Physiol.* 589.14: 3671-83, 2011.
29. **Kirby BS**, Crecelius AR, Voyles WF, and FA Dinunno. Modulation of postjunctional α -adrenergic vasoconstriction during exercise and exogenous ATP infusions in ageing humans. *J Physiol.* 589.10: 2641-53, 2011.
30. Markwald RR, **Kirby BS**, Crecelius AR, Carlson RE, Voyles WF, and FA Dinunno. Combined inhibition of nitric oxide and vasodilating prostaglandins abolishes forearm vasodilatation to systemic hypoxia in healthy humans. *J Physiol.* 589 (Pt 8): 1979-90, 2011.

Role: PI

- F32 HL 114263-01A1 Kirby (PI) (9th Percentile – Declined; relocation to Duke University)
NIH/NHLBI

Role of TRPC3 in Endothelial Cell Signaling by ATP on Skeletal Muscle Vascular Tone

The goal of this proposal was to examine the contribution of endothelial cell TRPC3 ion channels to vasodilation following purinergic receptor stimulation

Role: PI/Trainee

- EPD12054 Kirby (PI) (Awarded – Declined; relocation to Duke University)
Ellison Medical Foundation/American Federation for Aging Research

Endothelial Cell Transient Receptor Potential Channels and Age-Associated Endothelial Dysfunction

The goal of this proposal was to determine the impact of aging on endothelial cell transient receptor potential channel-mediated vasodilation

Role: PI/Trainee

Patent Publications

Processing And Analyzing Ultrasound Shear Wave Elastography Images - 20220192637

Adaptive Athletic Activity Prescription Systems - 11,177,038

Calculating Energy Expenditure from Athletic Movement Attributes - 20160346614

Activity Monitoring Device with Assessment of Exercise Intensity - 11,134,890

Energy Expenditure Calculation Using Data from Multiple Devices - 10,803,090

Near-Infrared Spectroscopy for Sensing Glycogen in Muscle Tissue - 11,147,481

Special Projects/Product Development/Other

Nike+ Fuelband 2.0; Lead Scientist and Algorithm Conception/Development

Nike+ Nike Training Club Software Application; Performance Model Creation

Nike+ Nike Running Club Software Application; Performance Model Creation

Nike Breaking2 Marathon; Lead Scientist and Project Architect

Nike Breaking2 National Geographic Documentary; Cast Member

Ineos 1:59 Challenge – Athlete Performance Scientist

Nike Trained Podcast – Breaking Barriers in Human Performance

20 Minutes Fitness Episode #230 Podcast - How To Optimize Human Performance