

Curriculum Vitae

Personal data

Name: Hannah Grace Caldwell
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 Date of birth: 15. June 1995



Recent Scientific Training/Experience

09/23-present **Postdoctoral Researcher Fellow**, CIHR Fellowship Award¹, NEXS, University of Copenhagen²
 04/24-present **Postdoctoral Researcher Fellow**, Mitacs Accelerate³, University of British Columbia and Lululemon Athletica Canada inc.
 03/23-03/24 **Scientific Program Coordinator**, *Project FURTHER*, contractor for Lululemon Athletica Canada inc.
 2019-2023 **PhD candidate**^{4,5}, specialized in integrative human physiology, dual degree between School of Health and Exercise Sciences, University of British Columbia and Department of Nutrition, Exercise and Sports (NEXS), University of Copenhagen.

Scientific publications and selected outreach

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As of 2017, I have published 39 peer-reviewed articles (including first author of an Invited Topical Review in *The Journal of Physiology* and first author of an invited book chapter on 'Cerebral blood flow and metabolism during exercise' by the *American Physiological Society* with Springer Nature); 16 of which are first author, 14 as corresponding.

Proceedings approx. 10, *h*-index 14 (Scopus 11/2024)

I was the Scientific Program Coordinator for *Project FURTHER*, a first-of-its-kind 6-day ultramarathon initiative led by Lululemon Athletica Canada inc. in partnership with the University of British Columbia and the Canadian Sport Institute Pacific involving approximately 12 multi-disciplinary physiology/psychosocial research studies.

Prof. Phil Ainslie and I have been approved to co-author a textbook titled 'Human and Applied Cerebrovascular Physiology' with Human Kinetics publishing (24-month contract).

I have been invited speaker and chair of cardiovascular/exercise physiology PhD courses and symposia at proceedings such as '*Vascular function and angiogenesis in relation to health and physical activity*', '*Exercise training and performance of the top-class athlete*' and *August Krogh Symposium: "Crossroads in Metabolism: Tales from Talents & Trailblazers"* at NEXS, University of Copenhagen.

I was awarded 1st place in the Journal Club Prize 2018 and 1st place in the Early Investigator Prize 2021 by *The Journal of Physiology*.

I participate as peer reviewer for *The Journal of Physiology* (IF: 5.5), *Journal of Applied Physiology* (IF: 3.5), *Experimental Physiology* (IF: 2.9), and *European Journal of Applied Physiology* (IF: 3.0).

During my postgraduate training, I participated as project lead/research assistant on several international field experiments; including, 1. two separate field studies in Cavtat, Croatia; investigating the cardiorespiratory and

¹ \$200,000 for 36-months.

² \$50,000 per year.

³ \$45,000 for 12-months. **Co-applicant**; drafted grant application including 7 trainee internship salaries (\$45,000/year) across 3 universities for a total of \$315,000.

⁴ PhD work at University of British Columbia: 09/19 to 06/21 and 01/23 to 08/23 – NSERC Alexander Graham Bell Canada Graduate Scholarship

⁵ PhD work at University of Copenhagen: 06/21 to 12/22 – UBC Friedman Award for Scholars in Health

pulmonary effects of repetitive deep diving in elite apnea free divers (2018 & 2019⁶); 2. three separate applied sport performance field studies supported by Own the Podium's Innovations 4 Gold in collaboration with Canadian Sport Institute in Switzerland, Québec, and Dubai; developing individualized cooling strategies for Team Canada Para-Athletics (2019; subject reports provided to 16 athletes/coaches); and 3. two separate high-altitude expeditions to the Barcroft Laboratory in California, USA; studying integrative human environmental physiology (2015 & 2022⁷).

Scientific focus

My research expertise is in integrative cardiovascular physiology in the context of environmental and energetic stress such as high-altitude, exercise, and nutritional caloric deficits. Further, I have scientific interest in investigating the physiological limits of human energy expenditure, specifically with respect to female ultra-endurance performance. Presently, I am investigating energy expenditure and mitochondrial respiratory capacity in patients with sepsis during my postdoctoral fellowship training at the University of Copenhagen.

Selected publications

1. **Caldwell, HG.**^{*8}, Jeppesen, JS.^{*}, Lossius, LL., Atti, JP., Durrer, CG., Oxfeldt, M., Melin, AK., Hansen, M., Bangsbo, J., Gliemann, L., Hellsten, Y. The whole-body and skeletal muscle metabolic response to 14-days highly-controlled low energy availability in endurance-trained females. *FASEB J.* **In-Press** (202401780).
2. **Caldwell, HG.**, Hoiland, RL., Bain, AR., Howe, CA., Carr, JMJR., Gibbons, TD., Durrer, C., Tymko, MM., Stacey, BS., Bailey, DM., Sekhon, MS., MacLeod, DB., Ainslie, PN. Evidence for direct CO₂-mediated alterations in cerebral oxidative metabolism in humans. *Acta Physiol.* DOI: 10.1111/apha.14197
3. Jeppesen, JS.^{*}, **Caldwell, HG.**^{*}, Lossius, LL., Melin, AK., Gliemann, L., Bangsbo, J., Hellsten, Y. Low energy availability increases immune cell formation of reactive oxygen species with acute exercise and impairs exercise performance in female endurance athletes. *Redox Biol.* DOI: 10.1016/j.redox.2024.103250
4. Gibbons, TD., **Caldwell, HG.**, Islam, H., Duffy, J., MacLeod, DB., Ainslie, PN. Intense exercise at high altitude causes platelet loss across the brain in humans. *J Physiol.* DOI: 10.1113/JP285603
5. Hoiland, RL., MacLeod, DB., Stacey, BS., **Caldwell, HG.**, Howe, CA., Nowak-Flück, D., Carr, JMJR., Tymko, MM., Coombs, GB., Patrician, A., Tremblay, JC., van Mierlo, M., Gasho, C., Stemberge, M., Sekhon, MS., Bailey, DM., Ainslie, PN. Hemoglobin and cerebral hypoxic vasodilation in humans: nitric oxide-dependent and S-nitrosothiol mediated signal transduction. *J Cereb Blood Flow Metab.* DOI: 10.1177/0271678X231169579
6. **Caldwell, HG.**, Gliemann, L., Ainslie, PN. (2022). Metabolism in the brain during exercise in humans. Book Chapter. *APS. Springer Nature.* ISBN: 978-3-030-94305-9.
7. **Caldwell, HG.**, Hoiland, RL., Smith, KJ., Brassard, P., Bain, AR., Tymko, MM., Howe, CA., Carr, JMJR., Stacey, BS., Bailey, DM., Drapeau, A., Sekhon, MS., MacLeod, DB., Ainslie, PN. (2022). Trans-cerebral HCO₃⁻ and PCO₂ exchange during acute respiratory acidosis and exercise-induced metabolic acidosis in humans. *J Cereb Blood Flow Metab.* DOI: 10.1177/0271678X211065924
8. Hoiland, RL., **Caldwell, HG.**, Carr, JMJR., Howe, CA., Stacey, BS., Dawkins, T., Wakeham, DJ., Tremblay, JC., Tymko, MM., Patrician, A., Smith, KJ., Sekhon, MS., MacLeod, DB., Green, DJ., Bailey, DM., Ainslie, PN. (2022). Nitric oxide contributes to cerebrovascular shear-mediated dilatation but not steady-state cerebrovascular reactivity to carbon dioxide. *J Physiol.* DOI: 10.1113/JP282427
9. **Caldwell, HG.**, Carr, JMJR., Minhas, JS., Swenson, ER., Ainslie, PN. (2021). Acid-base balance and cerebrovascular regulation. *J Physiol.* DOI: 10.1113/JP281517
10. **Caldwell, HG.**, Howe, CA., Chalifoux, CJ., Hoiland, RL., Carr, JMJR., Brown, CV., Patrician, A., Tremblay, JC., Panerai, RB., Robinson, TG., Minhas, JS., Ainslie, PN. (2021). Arterial carbon dioxide and bicarbonate rather than pH regulate cerebral blood flow in the setting of acute experimental metabolic alkalosis. *J Physiol.* DOI: 10.1113/JP280682

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Hannah Caldwell, PhD

⁶ Kelly et al. (2022). *J Sci Med Sport*, Patrician et al. (2021). *J Appl Physiol*, Patrician et al. (2021). *Exp Physiol*

⁷ Gibbons et al. (2024). *J Physiol*

⁸ ^{*}Indicates co-first authorship