

# Curriculum Vitae

## Stephen Sau-Shing Cheung, Ph.D.

Citizenship: Canadian

### Work

### Home

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## 1. Areas of Expertise

Environmental physiology, human temperature regulation, heat and cold physiology, body fluid balance, liquid conditioning garments, protective clothing, breath-holding, cardiovascular physiology, exercise.

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## 2. Education

<b>Degree</b>	<b>Date</b>	<b>University</b>
Post-doctoral Fellowship	1998	University of Aberdeen: Department of Biomedical Sciences
Ph.D.	1994-1998	University of Toronto: Department of Exercise Science, School of Community Health
Diploma (Honours)	1994	International Space University: Department of Space Life Sciences
M.Sc.	1991-1994	Simon Fraser University: School of Kinesiology
B.Sc. (Combined Honours)	1986-1990	University of British Columbia: Department of Oceanography/Zoology (1 <sup>st</sup> Class Standing)

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## 3. Publications

Books (co-authored)	1
Peer-reviewed journal articles	27
Articles in progress	3 submitted 2 invited reviews in preparation
Peer-reviewed conference proceedings	44
Reports	2

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## 4. Books

1. Co-author, Solar System Exploration Design Project. International Space University Press, Strasbourg, 1994.

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## 5. Articles published

\* Graduate student authors

† Undergraduate student authors

1. **Cheung, S.S.** Neuropsychological determinants of exercise tolerance in the heat. *Prog. Brain Res.* (In Press).
2. Flouris, A.D.\* and **S.S. Cheung.** Design and control optimization of microclimate cooling systems underneath protective clothing. *Ann. Biomed. Eng.* (Published on-line February 7, 2006).
3. Geurts, C.L.M.\*, G.G. Sleivert, and **S.S. Cheung.** The effect of repeated cold water immersion on neuromuscular function and thermoregulation of the hand through central and peripheral mechanisms. *Appl. Physiol. Nutr. Metab.* 31:110-117, 2006.
4. Thomas, M.M.\*, **S.S. Cheung,** G.C. Elder, and G.G. Sleivert. Voluntary muscle activation is impaired by central hyperthermia independent of local muscle temperature. *J. Appl. Physiol.* 100:1361-1369, 2006.
5. Wright, H.E.\* and **S.S. Cheung.** Cranial-Neck and Inhalation Rewarming Failed to Improve Recovery from Mild Hypothermia. *Aviat. Space Environ. Med.* 77:398-403, 2006.
6. Geurts, C.L.M.\*, G.G. Sleivert, and **S.S. Cheung.** Effect of cold-induced vasodilatation in the index finger on temperature and contractile characteristics of the first dorsal interosseus muscle during cold-water immersion. *Eur. J. Appl. Physiol.* 93:524-529, 2005.
7. Geurts, C.L.M.\*, G.G. Sleivert, and **S.S. Cheung.** Effect of repeated cold-water immersion on cold-induced vasodilatation and neuromuscular function of the first dorsal interosseus muscle. *Acta Physiol. Scand.* 183:117-124, 2005.
8. **Cheung, S.S.** and G.G. Sleivert. Multiple triggers of hyperthermic fatigue. *Exerc. Sport Sci. Rev.* 32:100-106, 2004.
9. **Cheung, S.S.** and A.M. Robinson†. Wingate sprinting performance in temperate environments after upper body pre-cooling. *J. Sport Sci.* 22:605-612, 2004.
10. Morrison, S.A.\*, G.G. Sleivert, and **S.S. Cheung.** Passive hyperthermia reduces voluntary activation and isometric force production. *Eur. J. Appl. Physiol.* 91:729-736, 2004.
11. **Cheung, S.S.** and G.G. Sleivert. Skin temperature decreases isokinetic maximal force production independent of core temperature. *Eur. J. Appl. Physiol.* 91:723-728, 2004.

12. Geurts, C.\*, G.G. Sleivert, **S.S. Cheung**. Temperature effects on the contractile characteristics and voluntary force control of the first dorsal interosseus muscle. *Eur. J. Appl. Physiol.* 91:41-45, 2004.
13. Thornley, L.J.\*, **S.S. Cheung**, and G.G. Sleivert. Responsiveness of thermal sensors to non-uniform thermal environments and exercise. *Aviat. Space Environ. Med.* 74:1135-1141, 2003.
14. Thornley, L.J.\*, N.S. Maxwell, and **S.S. Cheung**. Local tissue temperature effects on peak torque and muscular endurance during isometric knee extension. *Eur. J. Appl. Physiol.* 90:588-594, 2003.
15. **Cheung, S.S.**, D.L. Montie†, M.D. White, and D. Behm. Changes in manual dexterity following short-term hand and forearm immersion in 10°C water. *Aviat. Space. Environ. Med.* 74:990-993, 2003.
16. **Cheung, S.S.**, N.J. d'Eon†, and C.J. Brooks. Breath-holding capacity of offshore workers inadequate to ensure escape from ditched helicopters. *Aviat. Space Environ. Med.* 72:912-918, 2001.
17. McLellan, T.M. and **S.S. Cheung**. Impact of fluid replacement on heat storage while wearing protective clothing. *Ergonomics.* 43: 2020-2030, 2000.
18. **Cheung, S.S.**, T.M. McLellan, and S. Tenaglia. The thermophysiology of uncompensable heat stress: physiological manipulations and individual characteristics. *Sports Med.* 29: 329-359, 2000.
19. McLellan, T.M., **S.S. Cheung**, W.A. Latzka, M.N. Sawka, K.B. Pandolf, C.E. Millard, and W.R. Withey. Effects of dehydration, hypohydration and hyperhydration on tolerance during uncompensable heat stress. *Can. J. Appl. Physiol.* 24: 349-361, 1999.
20. **Cheung, S.S.** and T.M. McLellan. Comparison of short-term aerobic training and high maximal aerobic power on tolerance to uncompensable heat stress. *Aviat. Space Environ. Med.* 70: 637-643, 1999.
21. **Cheung, S.S.** and T.M. McLellan. Influence of heat acclimation, aerobic fitness, and hydration status on tolerance during uncompensable heat stress. *J. Appl. Physiol.* 84: 1731-1739, 1998.
22. **Cheung, S.S.** and T.M. McLellan. Influence of hydration status and short-term aerobic training on tolerance during uncompensable heat stress. *Eur. J. Appl. Physiol.* 78: 50-58, 1998.

23. **Cheung, S.S.** and T.M. McLellan. Influence of hydration status and fluid replacement on heat tolerance while wearing NBC protective clothing. *Eur. J. Appl. Physiol.* 77: 139-148, 1998.
24. McLellan, T.M., J.I. Pope, J.B. Cain, and **S.S. Cheung**. Effects of metabolic rate and ambient vapour pressure on heat strain in protective clothing. *Eur. J. Appl. Physiol.* 74: 518-527, 1996.
25. **Cheung, S.S.** and I.B. Mekjavic. Human temperature regulation during subanesthetic levels of nitrous oxide-induced narcosis. *J. Appl. Physiol.* 78: 2301-2308, 1995.
26. McLellan, T.M., **S.S. Cheung**, and I. Jacobs. Variability of time to exhaustion during submaximal exercise. *Can. J. Appl. Physiol.* 20: 39-52, 1995.
27. McLellan, T.M., **S.S. Cheung**, and M.R. Meunier. The effect of normocapnic hypoxia and the duration of exposure to hypoxia on supramaximal exercise performance. *Eur. J. Appl. Physiol.* 66: 409-414, 1993.

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## 6. Manuscripts in progress

28. **Cheung, S.S.**, D.A. Westwood, and M.K. Knox†. Cold strain impairs attention via distraction from skin cooling. *Ergonomics*. (Submitted).
29. Geurts, C.L.M., **S.S. Cheung**, and G.G. Sleivert. Local cold acclimation during exercise and its effect on neuromuscular function of the hand. *Eur. J. Appl. Physiol.* (Submitted)
30. Morrison, S.A., G.G. Sleivert, and **S.S. Cheung**. Aerobic influence on neuromuscular function and tolerance during passive hyperthermia. *Med. Sci. Sports Exerc.* (Submitted).
31. Geurts, C.L.M. and **S.S. Cheung**. Functional adaptation of the hand to repeated cold exposure. *Appl. Ergo.* (Invited Review in Preparation).
32. **Cheung, S.S.** Voluntary fatigue during hyperthermia – mechanisms and insights. *Appl. Physiol. Nutr. Metab.* (Invited Review in Preparation).

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## 7. Conference Proceedings (peer-reviewed)

1. **Cheung, S.S.** and A.D. Flouris\*. Behavioral thermoregulation in cold environments is adjusted to changes in body heat content. Second International Meeting on the Physiology and Pharmacology of Temperature Regulation. Phoenix, USA, 2006.

2. Flouris, A.D.\*, **S.S. Cheung**, and I.B. Mekjavic. Cold-induced vasodilatation may regulate body heat content rather than protect extremity integrity. Second International Meeting on the Physiology and Pharmacology of Temperature Regulation. Phoenix, USA, 2006.
3. Carrillo, A.E.\*, A.D. Flouris\*, **S.S. Cheung**, J.R. Fowles, D.A. Westwood, L.D. Kruisselbrink, R.J.L. Murphy. Influence of added body heat before or during cold exposure on finger temperature and manual function. Second International Meeting on the Physiology and Pharmacology of Temperature Regulation. Phoenix, USA, 2006.
4. Reynolds, L.F.\*, **S.S. Cheung**, A.E. Carrillo\*, and I.B. Mekjavic. No trainability or spatial homogeneity of the cold-induced vasodilatation response in the foot. Second International Meeting on the Physiology and Pharmacology of Temperature Regulation. Phoenix, USA, 2006.
5. **Cheung, S.S.**, I.B. Mekjavic. Cold-induced vasodilatation is due to a local mechanism and is not a generalized response across digits or limbs. Canadian Society for Exercise Physiology conference, Gatineau, Canada, 2005.
6. Thomas, M.M.\*, **S.S. Cheung**, G.E. Elder, G.G. Sleivert. Voluntary muscle activation is impaired by central hyperthermia independent of local muscle temperature. Canadian Society for Exercise Physiology conference, Gatineau, Canada, 2005.
7. Flouris, A.D.\*, **S.S. Cheung**, D.A. Westwood, R. Murphy, J. Fowles, D. Kruisselbrink. Effects of pre-heating on manual dexterity and neuromuscular function of the hands during cold exposure. Canadian Society for Exercise Physiology conference, Gatineau, Canada, 2005.
8. Payne, J.M., **S.S. Cheung**, D.A. Westwood, J.D. McInnes, M.D. White. No influence of low core body temperature and superficial cooling on maze acquisition in healthy adult males. Canadian Society for Exercise Physiology conference, Gatineau, Canada, 2005.
9. Mekjavic, I.B., **S.S. Cheung**. Role of manikins in the development of textiles, clothing and protective equipment. Fifth World Textile Conference AUTEX 2005, Potoroz, Slovenia, 2005.
10. White, M.D., J.J. Jennings, **S.S. Cheung**. Recognition memory plus cognitive and psychomotor performance across gender while breathing 30% normoxic nitrous oxide. Undersea Hyperbaric Medicine Society, Las Vegas, USA, 2005.

11. Johnson, E.A.\*, G.G. Sleivert, **S.S. Cheung**, and H. Wenger. Pre-cooling decreases physiological strain during steady-state rowing and enhances self-paced performance in elite rowers. American College of Sports Medicine, Nashville, USA, 2005.
12. Morrison, S.A.\*, G.G. Sleivert, L.Johnson\*, T. Bernhardt, **S.S. Cheung**, and J.P. Neary. Cerebral oxygenation, central drive and force output changes during passive heating and cooling. American College of Sports Medicine, Nashville, USA, 2005.
13. Wright, H.E.\* and **S.S. Cheung**. Comparison of cranial/neck and inhalation rewarming from mild hypothermia. Canadian Society for Exercise Physiology Conference, Saskatoon, Canada, 2004.
14. Geurts, C.L.M.\*, **S.S. Cheung**, and G.G. Sleivert. Effect of core temperature during cold water immersion on neuromuscular function of the hand. Canadian Society for Exercise Physiology Conference, Saskatoon, Canada, 2004.
15. Geurts, C.L.M.\*, G.G. Sleivert, and **S.S. Cheung**. Cardiovascular and temperature responses during manual work in cold weather. Canadian Society for Exercise Physiology Conference, Saskatoon, Canada, 2004.
16. **Cheung, S.S.**, D.A. Westwood, and M.K. Knox†. Mild body cooling does not impair specific aspects of spatial attention. Aerospace Medical Association Annual Meeting, Anchorage, USA, 2004.
17. Geurts-Cole, C.L.M.\*, G.G. Sleivert, and **S.S. Cheung**. Effect of repeated cold water immersion of the hand on temperature response and neuromuscular function of the hand Aerospace Medical Association Annual Meeting, Anchorage, USA, 2004.
18. Morrison, S.A.\*, G.G. Sleivert, and **S.S. Cheung**. The Influence of Aerobic Fitness on Motor Unit Activation (MUA) and Isometric Maximum Voluntary Contraction (MVC) during Hyperthermia. Canadian Society for Exercise Physiology Conference, St. Catharines, Canada, 2003.
19. Wright, H.E.\* and **S.S. Cheung**. Equalizing heat input in two regions with liquid conditioning garments. Canadian Society for Exercise Physiology Conference, St. Catharines, Canada, 2003.
20. **Cheung, S.S.** and G.G. Sleivert. Passive Hyperthermia Effects on Isokinetic Maximal Force Production. Canadian Society for Exercise Physiology Conference, St. Catharines, Canada, 2003.
21. **Cheung, S.S.** Wingate sprinting performance in temperate environments following upper-body pre-cooling. American College of Sports Medicine, San Francisco, USA, 2003.

22. Morrison, S.A.\*, **S.S. Cheung**, G.G. Sleivert. The effects of passive hyperthermia on motor unit activation in men. American College of Sports Medicine, San Francisco, USA, 2003.
23. Morrison, S.A.\*, **S.S. Cheung**, G.G. Sleivert. The influence of core and skin temperature on motor unit activation in men. The 14th IAA (International Aeronautics Association), Banff, Canada, 2003.
24. White, M.D., M.E.S. Powell, J.T. Power, **S.S. Cheung**, and J.D. Pope. Limited acclimation of the upper human limb to repeated cold water immersion. Canadian Physiological Society Winter Meeting, Quebec City, Canada, 2003.
25. **Cheung, S.S.** Critical internal temperature hypothesis: history and implications. Canadian Society for Exercise Physiology Conference, St. John's, Canada, 2002.
26. **Cheung, S.S.**, M.L. Smith†, M.D. White, and D. Behm. Effects of apneic facial immersion training on short-term cold-water immersion. Canadian Society for Exercise Physiology Conference, St. John's, Canada, 2002.
27. M.X. Richardson\*, **Cheung, S.S.**, and M.D. White. Event related potential analysis of a continuous performance task during whole body cooling. Canadian Society for Exercise Physiology Conference, St. John's, Canada, October 2002.
28. D.L. Montie†, **Cheung, S.S.**, M.D. White, and D. Behm. Time course of manual impairment during cold-water immersion. Canadian Society for Exercise Physiology Conference, St. John's, Canada, 2002.
29. Bradbury, E.E., M.D. White, J.T. Power, J.D. Pope, L. Petrie, and **S.S. Cheung**. Dive responses in unacclimated women with warm water face immersion. Canadian Society for Exercise Physiology Conference, St. John's, Canada, October 2002.
30. Hall, A.M., M.D. White, J. Jennings, D. Martin, **S.S. Cheung**, and D. Behm. Core temperature thresholds for ventilation during exercise with 30% nitrous oxide inhalation. Canadian Society for Exercise Physiology Conference, St. John's, Canada, October 2002.
31. Powell, M., M.D. White, J.T. Power, J.D. Pope, **S.S. Cheung**, and D. Behm. Gender comparison of manual dexterity during upper limb cooling. Canadian Society for Exercise Physiology Conference, St. John's, Canada, October 2002.
32. White, M.D., J.T. Power, E.E. Bradbury, J.D. Pope, and **S.S. Cheung**. Maximum breath hold time during face immersion across

- gender and water temperatures from 0 to 20°C. European Undersea and Baromedical Society Conference, Brugge, Belgium, 2002.
33. White, M.D., J.D. Pope, J.T. Power, E.E. Bradbury, and **S.S. Cheung**. Heart rate responses during face immersion across gender and water temperatures from 5 to 20°C. European Undersea and Baromedical Society Conference, Brugge, Belgium, 2002.
  34. **Cheung, S.S.**, C. Brideau†, M.X. Richardson\*, and L.J. Thornley\*. Development of a novel thermal control suit for human thermoregulation and environmental ergonomic studies. International Thermal Physiology Symposium, Wollongong, Australia, 2001.
  35. **Cheung, S.S.** and D.H. Sweeney†. The influence of attachment method and clothing on skin temperature sensor accuracy. American College of Sports Medicine Meeting, Baltimore, U.S.A., 2001.
  36. **Cheung, S.S.**, N.J. d'Eon†, and C.J. Brooks. Inadequate breath-hold capacity in marine helicopter passengers. Canadian Society of Exercise Physiology Meeting, Canmore, Canada, 2000.
  37. **Cheung, S.S.**, J. Kozey, and J. McCabe. The development of a multi-zone water-perfused suit for use in thermophysiology studies. Canadian Society of Exercise Physiology Meeting, Toronto, Canada, 1999.
  38. **Cheung, S.S.** and T.M. McLellan. Influence of aerobic fitness and physical characteristics on response to uncompensable heat stress. American College of Sports Medicine Meeting, Seattle, U.S.A., 1999.
  39. McLellan, T.M. and **S.S. Cheung**. Comparison of short-term aerobic training and high maximal aerobic power on tolerance to uncompensable heat stress. In: *International Conference for Environmental Ergonomics Proceedings*, San Diego, U.S.A., October 1998.
  40. **Cheung, S.S.** and T.M. McLellan. Influence of aerobic fitness, short-term heat acclimation, and hydration status on tolerance during uncompensable heat stress. Canadian Society of Exercise Physiology Meeting, Toronto, Canada, 1997.
  41. **Cheung, S.S.** and T.M. McLellan. Influence of hydration status on tolerance during uncompensable heat stress. American College of Sports Medicine Meeting, Denver, U.S.A., 1997.
  42. **Cheung, S.S.** and T.M. McLellan. Influence of hydration status and fluid replacement on cardiovascular responses while wearing

- NBC protective clothing. In: *International Conference for Environmental Ergonomics Proceedings*, Jerusalem, Israel, 1996.
43. McLellan, T.M., J.I. Pope, J.B. Cain, and **S.S. Cheung**. Effects of metabolic rate and ambient vapour pressure on heat strain in protective clothing. American College of Sports Medicine Meeting, Cincinnati, U.S.A., 1996.
  44. **Cheung, S.S.** and I.B. Mekjavic. Human temperature regulation at subanesthetic levels of nitrous oxide-induced narcosis. In: *International Conference for Environmental Ergonomics Proceedings*, Montebello, Canada, 1994.
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## 8. Reports

1. Brooks, C.J. and **S.S. Cheung**. Breath-holding ability of students attending the basic helicopter survival training course. Natural Resources Canada research and development report 0200, March 2000.
  2. McLellan, T.M., **S.S. Cheung**, C.E. Millard, W.R. Withey, K.B. Pandolf, W.A. Latzka, and M.N. Sawka. Influence of hydration status on tolerance during compensable and uncompensable heat stress. The Technical Cooperation Program (TTCP) Technical Panel 6, KCA-5 Report TTCP/HUM/97/001, 1997.
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## 9. Professional Memberships

Aerospace Medical Association (2002 – present)

American College of Sports Medicine (1997 - present).

Canadian Society of Exercise Physiology (1996 - present).

Canadian Alumni of the International Space University (1994 - present).

Canadian Foundation for the International Space University (1996 - 1997).

The Planetary Society (1994 - 1995).