

CURRICULUM VITAE - John Fleng Steffensen.

Birthday and citizenship: February 28.th 1955 in Horsens, Denmark. Danish citizen (CPR: 280255-1315).

Position: Professor mso in marine biology/fish physiology at the Marine Biological Laboratory, Univ. of Copenhagen, Denmark. Section head from January 1.st 2011.

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Private Address: Tibberupgårdsvej 9, 3060 Espergærde, Denmark: +45 49 17 04 90; +45 60 77 04 90.

Education: Mathematical-physics line College 1974; cand. scient (M.Sc.) in biology/physiology from Århus Univ. 1980; lic. scient. (PhD) in biology/physiology from Århus Univ., Denmark 1984.

Previous experience/jobs:

1980 - 81: Visiting Scientist at Rosenstiel School of Marine and Atmosph. Science, U of Miami, USA.

1982 – 84: PhD.-student at Dept. of Zoophysiology, Århus Univ.,

1985 NATO postdoctoral fellow at Dept. of Zoology, Univ of British Columbia, Vancouver, Canada.

1986 -88: senior researcher at Dept. of Zoophysiology, Århus Univ.

1988 – 89: senior researcher at the National Environmental Research Institute, Denmark.

1989 – 93: assistant professor at the Marine Biological Laboratory, Univ of Copenhagen.

1994 - 2009 associate professor at the Marine Biological Laboratory, U of Copenhagen.

2009 -> Professor mso at the Marine Biological Section, U of Copenhagen.

2012 -> Section Head at the Marine Biological Section.

Research interests and experience: Functional biology and comparative physiology. Respiration and circulation fish physiology with main focus on acclimation to temperature, environmental hypoxia and hypercapnia. Anatomy and function of the secondary circulatory system. Exercise physiology. Metabolic cold adaptation. Temperature preference. Physiology and behaviour of schooling fish. Aquaculture.

Extended periods abroad (>1 mdr): 1988 visiting scientist UNESP, Brazil, 3 months; 1994 visiting scientist at McMurdo Station, Antarctica; 1995 visiting professor at Scripps Inst. of Oceanography, 3 months. 1996 & 1997 2 months as visiting professor at Sesoko Tropical Biosphere Station, Okinawa, Japan. 2002, 2005, 2007 and 2009 - visiting professor at U. of Washington Friday Harbor Laboratories – 5 weeks every time; Sabbatical 3 months at Scripps Inst. Of Oceanography, USA in 2004 and 3 months at Dept of Anatomy, The Medical School, Univ. of Queensland, Australia 2005.

International relations: I have an extended international network and many collaborators – have collaborated experimentally with scientists from Norway, Sweden, Finland, Germany, Holland, France, Portugal, England, Scotland, Italy, Israel, USA, Canada, Brazil, Australia, New Zealand, Singapore and Japan. I have actively participated in more than 30 international congresses, and have been author or co-author of more than 60 oral presentations or posters. I have participated in 15+ research cruises ranging from the Arctic to Antarctica. Principal investigator on several projects – i.e. NATO Grant for International Collaboration 1988, EU-AIR-project 1993-1995, EU-FAIR 1977-2000, NATO CCMS Project 2000-2003, EU-FAIR project 2002-2005 & a Nordic Arctic Research Project. Currently I am involved in 3 Nordic Networks: 1) **MADFISH** (Molecular ADaptation of FISH - <http://madfish.lif.hi.is/home>), 2) NordForsk **Fisknät** – a student exchange programme between 4 universities <http://www.jyu.fi/science/laitokset/bioenv/osastot/wet/opiskelu/fisknat/>, and 3) an International Polar Year project - **TUNU-MAFIG 2002 – 2012** (Marine Fishes of North East Greenland – diversity and adaptation). The project continues for another 5 years – I am part of the

organizing committee. Also member of the Managing committee if an EU Cost Action – Conservation Physiology of Marine Fishes – 2011 – 2014.

Publications: I have 90+ peer reviewed publications in international journals, several book chapters, 5 popular science articles in Danish, and was in focus in a popular science TV program concerning Atlantic cod (DR-Viden Om). Co-author of volume of the Academic Press Series Fish Physiology concerning Physiology of Polar Fish. Of the 80+ publications 30+ appear in 5 of the 100 most influential journals of the last 100 years in Biology and Medicine according to SLA.

Other Qualifications: I am external examiner at Århus, Odense and Roskilde Universities. I have been on the Marine Biological Laboratory Board for +12 years. I have been member of a PhD-committee at Univ. of Queensland, and Univ. Montpellier, France and chairman of a PhD-committee at the Danish Fisheries Institute. In 2006 I was elected to be expert member of the Swedish Research Council FORMAS (Animal- and Veterinary Medicine) for 5 years, and am now expert member of the Sustainable Use of Natural Resources section.

Teaching: Aside from traditional teaching, I have planned and organized several PhD-courses – in 1994 a course concerning how animals move, in 1997 a course concerning Arctic Fish Physiology at the Arctic Station in Greenland, and in 2003 a course on fish swimming at MBL. In addition I have taught PhD-courses four times at Univ. of Washington Friday Harbour Lab. In 2010 arranged a fish physiology PhD-course in Helsingør for MADFISH-students (MADFISH = Molecular Adaptations of Fish). Currently I have 2 KU PhD-students, 3 MSc-student, and 1 PhD-student in collaboration with DTU-Aqua Hirtshals.

Referee: I have been referee for > 25 international journals, as well as the National Science Foundation (USA), National Science Research Council (Canada) and the Norwegian, Swedish Finish and German Research Councils.

Member of societies etc:

Society for Experimental Biology

American Fisheries Society

Fisheries Society of the British Isles

Member of ICES/GLOBEC workgroup on cod and climate change.

(February 2012)

PUBLICATIONS (Most can be downloaded from <http://mbl.ku.dk/JFSteffensen/publications>)

McKenzie, D. J., Steffensen, J. F., Taylor, E. W. and Abe, A. S. (In Press). The contribution of air-breathing to aerobic scope and exercise performance in the banded knifefish *Gymnotus carapo* L. **J. Exp. Biol.**

Frisk, M., Skov, P. V. and Steffensen, J. F. (In Press). Thermal optimum for pikeperch (*Sander lucioperca*) and the use of ventilation frequency as a predictor of metabolic rate. **Aquaculture.**

Svendsen, J. C., Steffensen, J. F., Aarestrup, K., Frisk, M., Etzerodt, A. and Jyde, M. (2012). Excess post hypoxic oxygen consumption in rainbow trout *Oncorhynchus mykiss*: recovery in normoxia and hypoxia. **Canadian Zoology.** (doi: full/10.1139/z11-095).

Åberg Andersson, M, Silva PIM, Steffensen, J, F, and Höglund, E. (2011). Effects of maternal stress coping style on offspring characteristics in rainbow trout (*Oncorhynchus mykiss*). **Hormon and behavior.** **60; 699-705.**

Deurs, M. v., Hartvig, M. and Steffensen, J. F. (2011). Critical threshold size for overwintering sandeels (*Ammodytes marinus*). **Mar. Biol.** DOI 10.1007/s00227-011-1774-8.

Methling, C., Tudorache, C., Skov, P. V. and Steffensen, J. F. (2011). Pop Up Satellite Tags Impair Swimming

Performance and Energetics of the European Eel (*Anguilla anguilla*). **PLoS One**, 6(6): e20797. doi:10.1371/journal.pone.0020797, Published online June 9.th 2011

Killen, S., Marras, S., McKenzie, D. J. and Steffensen, J. F. (2011). Aerobic capacity influences the spatial position of individuals within fish schools. **Proc. Royal Soc. B**. doi:10.1098/rspb.2011.1006, Published online June 8.th 2011.

Deurs, M. v., Behrens, J. W., Warnar, T. and Steffensen, J. F. (2011). Primary versus secondary drivers of foraging activity in sandeel schools (*Ammodytes tobianus*). (2011). **Mar. Biol.** DOI 10.1007/s00227-011-1691-x.

Herbert, N., Skjæraasen, J. E., Nielsen, T., Salvanes, A. G. V., and Steffensen, J. F. (2011). The hypoxia avoidance behavior of juvenile Atlantic cod (*Gadus morhua* L.) depends on the provision and pressure level of an O₂ refuge. **Marine Biology**, 158:737–746. DOI 10.1007/s00227-010-1601-7.

Johansen, J. L., Vaknin, R, Steffensen, J. F., Domenici, P. (2010). Kinematics and energetic benefits of schooling in the Labriform fish, Striped surfperch (*Embiotoca lateralis*). **Mar. Ecol. Prog. Ser.** 420; 221-229.

Cao, Z., Jensen, L. D., Rouhila, P., Hosaka, K., Länne, T. Steffensen, J. F., Wahlberg, E. and Cao, Y. (2010). Hypoxia-induced retinopathy model in adult zebrafish. **Nature Protocols**. 5 (12); 1903-1910.

Rouhila, P., Jensen, L. D., Cao, Z., Länne, T., Wahlberg, E., Steffensen, J. F. and Cao, Y. (2010). Hypoxia-induced metastasis model in embryonic zebrafish. **Nature Protocols**. 5 (12); 1911 - 1918.

Skov, P. V., Steffensen, J. F., Sørensen, T. F. and Qvortrup, K. (2010). Embryonic suckling and maternal specializations in the live-bearing teleost *Zoarces viviparus*. **J. Exp. Mar. Biol. Ecol.** 395; 120-127.

Steinhausen, M. F., Steffensen, J. F. and Andersen, N. G. (2010). The effects of swimming pattern on the metabolic rate of gilthead seabream (*Sparus auratus*): how to estimate spontaneous activity costs? **Mar. Fresh. Beh. Physiol.** 43; 227-241.

Moran, D., Tirsgaard, B. and Steffensen, J. F. (2010). The accuracy and limitations of a new meter used to measure aqueous carbon dioxide. **Aquacultural Engineering**. 40; 101-107.

Methling, C., Aluru, N., Vijayan, M.M. and Steffensen, J.F. (2010). Effect of moderate hypoxia at three acclimation temperatures on stress responses in Atlantic cod with different haemoglobin types. **Comp. Biochem. Physiol. A. Molecular & Integrative Physiology**. 156: 485-490.

Behrens, J. W., Petersen, J. K., Ærtebjerg, G. & Steffensen, J. F. (2010). Influence of moderate and severe hypoxia on the diurnal activity pattern of lesser sandeel *Ammodytes tobianus* (Linnaeus, 1785). **J. Fish Biol.** 77; 538 - 551.

Svendsen J. C., Tudorache C., Jordan A. D., Steffensen, J. F., Aarestrup K. and Domenici, P. (2010). Partition of aerobic and anaerobic swimming costs related to gait transitions in a labriform swimmer. **J. Exp. Biol.** 213: 2177-2183.

Jensen, L. E. D. , Cao, R. Hedlund, E., Söll, I., Lundberg, J., Hauptmann, G., Steffensen, J.F. and Cao, Y. (2009). Nitric oxide switch on hypoxia-induced lymphatic perfusion by controlling the arterial-lymphatic conduits in zebrafish and kryptopterus bicirrhis. **Proc. Nat. Acad. Sciences**. 106; 43; 18408-18413.

McKenzie, D. J., Skov, P. V., Taylor, E. W., Wang, T. and Steffensen, J. F. (2009). Abolition of hypoxic bradycardia by cardiac vagotomy has no effect on regulation of oxygen uptake in Atlantic cod *Gadus morhu*. **Comp. Biochem. Physiol. A** 153; 332-338.

Skov, P. V., Bushnell, P. G., Tirsgaard, B. and Steffensen, J. F. (2009). The role of adrenaline as a modulator of cardiac performance in two Antarctic fishes. **Polar Biology**. 32; 215-223.

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- Køie, M., Steffensen, J. F., Møller, P. D. R. & Christiansen, J. S. (2008). The parasite fauna of *Arctogadus glacialis* (Peters) (Gadidae) from western and eastern Greenland. **Polar Biology**, 31; 1017-1021.
- Fischer, C. & Steffensen, J. F. (2008). Plasma FITC-dextran exchange between the primary and secondary circulatory system in the Atlantic cod, *Gadus morhua*. **Fish Physiol Biochem.** 34; 245-249.
- Steinhausen, M. F., Steffensen, J. F. & Andersen, N. G. (2007). The relationship between caudal differential pressure and activity of Atlantic cod: a potential method to predict oxygen consumption of free-swimming fish. **J. Fish Biol.** 71; 957-969.
- Skov, P.V., Sørensen, T.F., Ramløv, H. and Steffensen, J.F. (2007). Vascular arrangement and ultrastructure of the European eelpout *Zoarces viviparus* ovary: implications for maternal-embryonic exchange. **The Anatomical Record – Advances in Integrative Anatomy and Evolutionary Biology.** 290; 1500-1507.
- Behrens, J. W., Stahl, H. J., Steffensen, J. F. & Glud, R. N. (2007). Oxygen dynamics around buried lesser sandeels *Ammodytes tobianus*: mode of ventilation and oxygen requirements. **J. exp. Biol.** 210; 1006 - 1014.
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- Behrens, J. W. and Steffensen, J. F. (2007). The effect of hypoxia on behavioral and physiological aspects of lesser sandell, *Ammodytes tobianus*. **Mar. Biol.** 150; 1365-1377.
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