

Personal Information

Full name: Paul Vincent Debes
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Education & Degrees Awarded

2008–2014 **PhD in Biology**; Department of Biology, Dalhousie University, Halifax, Canada (awarded May 13, 2014); Supervision: Prof. Jeffrey A. Hutchings; confirmable via biology@dal.ca.
2003–2007 **Studies in fishery biology, zoology, and ocean chemistry**; Division of Marine Ecology, GEOMAR - Helmholtz Centre for Ocean Research Kiel, Kiel, Germany (Diplom [comparable: MSc] awarded June 11, 2007); Supervision: Prof. Reinhold Hanel.
2001–2003 **Studies in biology, physics, and chemistry**; Department of Biology, Johann Wolfgang Goethe-University, Frankfurt am Main, Germany (Vordiplom [comparable: BSc] awarded June 22, 2003).

Research Experience (post PhD)

07/2022–present **Associate professor (docent)**, Department of Aquaculture and Fish Biology, Hólar University College, Sauðárkrókur, Iceland.
05/2020–06/2022 **Assistant professor (lecturer)**, Department of Aquaculture and Fish Biology, Hólar University College, Sauðárkrókur, Iceland.
03/2017–03/2020 **Post-doctoral researcher**, Faculty of Biological & Environmental Sciences, Organismal & Evolutionary Biology, University of Helsinki, Helsinki, Finland. Supervision: Prof. Craig Primmer.
01/2017–02/2017 **Post-doctoral researcher**, Division of Genetics & Physiology, Department of Biology, University of Turku, Turku, Finland [continues in Helsinki]. Supervision: Prof. Craig Primmer.
12/2014–11/2016 **DFG research fellow**, Division of Genetics & Physiology, Department of Biology, University of Turku, Turku, Finland. Supervision: Prof. Anti Vasemägi
06/2014–11/2014 **Postdoctoral fellow**, Department of Biology, Concordia University, Montreal, Canada. Supervision: Prof. Dylan Fraser.
01/2014–03/2014 **Scientist**, Thünen-Institute of Fishery Ecology, Hamburg, Germany (temporarily replacing a maternal-leave position)

Linguistic Skills

German Proficient user (mother tongue)
English Proficient user

Grants

2021–2022 Icelandic Food Fund (Matvælasjóðs), main applicant and responsible person („Bætt heilbrigði í bleikjueldi“ – „Improved health in charr farming“; project manager: Theódór Kristjánsson)

2014-2016 Two-year German Research Foundation (DFG) research fellowship (DE 2405/1-1: "Genetically based variation of proliferative kidney disease pathology traits")

Supervision & Examinations

2021 External PhD thesis examiner, Shahinan Islam, PhD student, Memorial University of Newfoundland, Canada

2021-present Project supervision, Ibukunoluwa Abiola Akintayo, UNESCO GRÓ-FTP programme fellow, Hólar University, Iceland

2018-present Co-supervision, Andrew House, PhD student, University of Helsinki, Helsinki, Finland

2015-present Co-supervision, Freed Ahmat, PhD student, University of Turku, Turku, Finland

2016-2017 Co-supervision, Ilkka Nousiainen, MSc student, University of Turku, Turku, Finland; graduated.

Teaching

Classes at Hólar University College, Iceland:

- *Introduction to aquaculture* (INF1006180, 6 ECTS), Autumn 2022, 2021.
- *Fundamentals for studying aquaculture organisms* (URL1108200, 8 ECTS), Autumn 2022, 2021, 2020.
- *Health and hygiene* (SOH1604200/SOH5604200, 4 ECTS), Spring 2022.
- *Statistics with R* (STA1306180), guest lecture: *Multivariate mixed models – (co)variance beyond simple regression and correlation models*, Autumn 2021, 2020.
- Selective breeding and genetic manipulations in aquaculture (UNESCO GRÓ-FTP, 2 days), Autumn 2021.
- Experimental design (UNESCO GRÓ-FTP, 2 days), Autumn 2021.

Past teaching assistant at Dalhousie University, Halifax, Canada:

- *Ecology & Evolution of Fishes* (BIOL/MARI 3067), Winter 2011, 2009
 - *Introductory Biology I: Cells, Genetics and Evolution* (BIOL 1020), Winter 2010
 - *Principles of Biology Part II* (BIOL 1011), Winter 2010
 - *Principles of Biology Part I* (BIOL 1010), Autumn 2010
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Other Academic Experiences & Merits

Referee: 24 journals

2021-present Member of the Animal Care Committee at HU, Hólar University College, Iceland

2021-2022 Member of the Working Group on Support for International Staff at HU, Hólar University College, Iceland

2021- 2022 Member of the Committee for Research and Innovation at HU, Hólar University College, Iceland

2020-present Member of the Icelandic Arctic Charr Breeding Programme Board

2020-present Quantitative geneticist for the Icelandic Arctic Charr Breeding Programme, Hólar, Iceland

2019-2020	Member of the European Society for Evolutionary Biology
2010-2013	Member of the Canadian Society for Ecology and Evolution
2008-2010	Graduate student representative on the University Committee on Laboratory Animals, Dalhousie University, Halifax, Canada

Selected Contributions to Conferences and Meetings

2019	Talk: Congress of the European Society for Evolutionary Biology; August 19-24; Turku, Finland.
2016	Poster: Workshop on marine evolution under climate change; 20-25 November; Kristineberg, Sweden
2012	Talk: First Joint Congress on Evolutionary Biology; July 6-10; Ottawa, Canada.
2010	Talk: Canadian Society for Ecology and Evolution Meeting; 9-12 May; Québec, Canada.
2009	Poster; ICES Annual Science Conference; 21-25 September; Berlin, Germany

Publication List

Peer-reviewed journal articles: 35 (13 first- or first-co-authored); h-index: 17;
 Google scholar: <https://scholar.google.com/citations?user=xNFLcOMAAAAJ>

*shared first author

Peer-reviewed Journal Articles

- 1 Niemelä PT, Klemme I, Karvonen A, Hyvärinen P, **Debes PV**, Erkinaro J, Sinclair-Waters M, Pritchard VL, Härkönen LS, Primmer CR (2022) Life-history genotype explains variation in migration activity in Atlantic salmon (*Salmo salar*). *Proceedings of the Royal Society B: Biological Sciences* **289**, 20220851. <https://doi.org/10.1098/rspb.2022.0851>
- 2 Klemme I, **Debes PV***, Primmer CR, Härkönen LS, Erkinaro J, Hyvärinen P, Karvonen A (2022) Host developmental stage effects on parasite resistance and tolerance. *The American Naturalist* **200**, 646-661. <https://doi.org/10.1086/721159>
- 3 Wysujack K, Marohn L, Lindemann C, Illing B, Freese M, Pohlmann JD, Reiser S, **Debes PV**, Meskendahl L, Pelster B, Hanel R (2022) A novel hyperbaric swimming respirometer allows the simulation of varying swimming depths in fish respirometry studies. *Comparative Biochemistry and Physiology Part A: Molecular & Integrative Physiology* **264**, 111117. <https://doi.org/10.1016/j.cbpa.2021.111117>
- 4 **Debes PV**, Solberg MF, Matre IH, Dyrhovden L, Glover KA (2021) Genetic variation for upper thermal tolerance diminishes within and between populations with increasing acclimation temperature in Atlantic salmon. *Heredity* **127**, 455-466. <https://doi.org/10.1038/s41437-021-00469-y>
- 5 Andrew SC, Primmer CR, **Debes PV**, Erkinaro J, Verta JP (2021) The Atlantic salmon whole blood transcriptome and how it relates to major locus maturation genotypes and other tissues. *Marine Genomics* **56**, 100809. <https://doi.org/10.1016/j.margen.2020.100809>
- 6 Bremer K, Yasuo H, **Debes PV**, Jacobs HT (2021) The alternative oxidase (AOX) increases sulphide tolerance in the highly invasive marine invertebrate *Ciona*

- intestinalis*. *Journal of Experimental Biology* **224**.
<https://doi.org/10.1242/jeb.242985>
- 7 **Debes PV**, Piavchenko N, Ruokolainen A, Ovaskainen O, Moustakas-Verho JE, Parre N, Aykanat T, Erkinaro J, Primmer CR (2021) Polygenic and major-locus contributions to sexual maturation timing in Atlantic salmon. *Molecular Ecology* **30**, 4505-4519. <https://doi.org/10.1111/mec.16062>
- 8 Sävilammi T, Papakostas S, Leder EH, Vøllestad LA, **Debes PV**, Primmer CR (2021) Cytosine methylation patterns suggest a role of methylation in plastic and adaptive responses to temperature in European grayling (*Thymallus thymallus*) populations. *Epigenetics* **16**, 271-288. <https://doi.org/10.1080/15592294.2020.1795597>
- 9 Ahmad F, **Debes PV**, Nousiainen I, Kahar S, Pukk L, Gross R, Ozerov M, Vasemägi A (2021) The strength and form of natural selection on transcript abundance in the wild. *Molecular Ecology* **30**, 2724-2737. <https://doi.org/10.1111/mec.15743>
- 10 House AH, **Debes PV**, Kurko J, Erkinaro J, Käkelä R, Primmer CR (2021) Sex-specific lipid profiles in the muscle of Atlantic salmon juveniles. *Comparative Biochemistry and Physiology Part D: Genomics and Proteomics* **38**, 100810. <https://doi.org/10.1016/j.cbd.2021.100810>
- 11 Ahmad F, **Debes PV**, Pukk L, Kahar S, Hartikainen H, Gross R, Vasemägi A (2021) Know your enemy - transcriptome of myxozoan *Tetracapsuloides bryosalmonae* reveals potential drug targets against proliferative kidney disease in salmonids. *Parasitology* **148**, 726-736. <https://doi.org/10.1017/S003118202100010X>
- 12 Moustakas-Verho JE, Kurko J, House AH, Erkinaro J, Debes P, Primmer CR (2020) Developmental expression patterns of six6: A gene linked with spawning ecotypes in Atlantic salmon. *Gene Expression Patterns* **38**, 119149. <https://doi.org/10.1016/j.gep.2020.119149>
- 13 Kurko J, **Debes PV**, House AH, Aykanat T, Erkinaro J, Primmer CR (2020) Transcription profiles of age-at-maturity-associated genes suggest cell fate commitment regulation as a key factor in the Atlantic salmon maturation process. *G3: Genes, Genomes, Genetics* **10**, 235-246. <https://doi.org/10.1534/g3.119.400882>
- 14 **Debes PV**, Piavchenko N, Erkinaro J, Primmer CR (2020) Genetic growth potential, rather than phenotypic size, predicts migration phenotype in Atlantic salmon. *Proceedings of the Royal Society B: Biological Sciences* **287**, 20200867. <https://doi.org/10.1098/rspb.2020.0867>
- 15 Verta JP, **Debes PV**, Piavchenko N, Ruokolainen A, Ovaskainen O, Moustakas-Verho JE, Tillanen S, Parre N, Aykanat T, Erkinaro J, Primmer CR (2020) Cis-regulatory differences in isoform expression associate with life history strategy variation in Atlantic salmon. *PLoS Genetics* **16**, e1009055. <https://doi.org/10.1371/journal.pgen.1009055>
- 16 Saari S, Garcia GS, Bremer K, Chioda MM, Andjelkovic A, **Debes PV**, Nikinmaa M, Szibor M, Dufour E, Rustin P, Oliveira MT, Jacobs HT (2019) Alternative respiratory chain enzymes: Therapeutic potential and possible pitfalls. *Biochimica et Biophysica Acta - Molecular Basis of Disease* **1865**, 854-866. <https://doi.org/10.1016/j.bbadis.2018.10.012>
- 17 Ahmad F, **Debes PV**, Palomar G, Vasemägi A (2018) Association mapping reveals candidate loci for resistance and anaemic response to an emerging temperature-

- driven parasitic disease in a wild salmonid fish. *Molecular Ecology* **27**, 1385-1401. <https://doi.org/10.1111/mec.14509>
- 18 **Debes PV**, Gross R, Vasemägi A (2017) Quantitative genetic variation in, and environmental effects on, pathogen resistance and temperature-dependent disease severity in a wild trout. *American Naturalist* **190**, 244-265. <https://doi.org/10.1086/692536>
- 19 Kahar S, **Debes PV***, Vuori KAM, Vähä J-P, Vasemägi A (2016) Heritability, environmental effects, and genetic and phenotypic correlations of oxidative stress resistance-related enzyme activities during early life stages in Atlantic salmon. *Evolutionary Biology* **43**, 215-226. <https://doi.org/10.1007/s11692-016-9368-5>
- 20 Marin K, Coon A, Carson R, Debes PV, Fraser DJ (2016) Striking phenotypic variation yet low genetic differentiation in sympatric lake trout (*Salvelinus namaycush*) *PLoS One* **11**, e0162325. <https://doi.org/10.1371/journal.pone.0162325>
- 21 Sereda SVe, **Debes PV**, Wilke T, Schultheiß R (2016) Divergent mating system adaptations in microallopatric populations of *Acanthodiptomus denticornis* (Copepoda, Calanoida). *Journal of Plankton Research* **38**, 1255-1268. <https://doi.org/10.1093/plankt/fbw060>
- 22 Ozerov MY, Himberg M, **Debes PV**, Hägerstrand H, Vasemägi A (2016) Combining genetic markers with an adaptive meristic trait improves performance of mixed-stock analysis in Baltic whitefish. *ICES Journal of Marine Science: Journal du Conseil* **73**, 2529-2538. <https://doi.org/10.1093/icesjms/fsw122>
- 23 **Debes PV**, Visse M, Panda B, Ilmonen P, Vasemägi A (2016) Is telomere length a molecular marker of past thermal stress in wild fish? *Molecular Ecology* **25**, 5412-5424. <https://doi.org/10.1111/mec.13856>
- 24 Yates MC, **Debes PV**, Fraser DJ, Hutchings JA (2015) The influence of hybridization with domesticated conspecifics on alternative reproductive phenotypes in male Atlantic salmon in multiple temperature regimes. *Canadian Journal of Fisheries and Aquatic Sciences* **72**, 1138-1145. <https://doi.org/10.1139/cjfas-2014-0527>
- 25 **Debes PV**, Hutchings JA (2014) Effects of domestication on parr maturity, growth, and vulnerability to predation in Atlantic salmon. *Canadian Journal of Fisheries and Aquatic Sciences* **71**, 1371-1384. <https://doi.org/10.1139/cjfas-2013-0618>
- 26 **Debes PV**, Fraser DJ, Yates M, Hutchings JA (2014) The between-population genetic architecture of growth, maturation, and plasticity in Atlantic salmon. *Genetics* **196**, 1277-1291. <https://doi.org/10.1534/genetics.114.161729>
- 27 Rollinson N, Keith DM, Houde AL, **Debes PV**, McBride MC, Hutchings JA (2014) Risk assessment of inbreeding and outbreeding depression in a captive-breeding program. *Conservation Biology* **28**, 529-540. <https://doi.org/10.1111/cobi.12188>
- 28 Fraser DJ, **Debes PV***, Bernatchez L, Hutchings JA (2014) Population size, habitat fragmentation, and the nature of adaptive variation in a stream fish. *Proceedings of the Royal Society B: Biological Sciences* **281**, 1471-2954. <https://doi.org/10.1098/rspb.2014.0370>
- 29 **Debes PV**, Fraser DJ, McBride MC, Hutchings JA (2013) Multigenerational hybridisation and its consequences for maternal effects in Atlantic salmon. *Heredity (Edinb)* **111**, 238-247. <https://doi.org/10.1038/hdy.2013.43>

- 30 Schwab P, **Debes PV**, Witt T, Hartl GB, Hmwe SS, Zachos FE, Grobler JP (2012) Genetic structure of the common impala (*Aepyceros melampus melampus*) in South Africa: phylogeography and implications for conservation. *Journal of Zoological Systematics and Evolutionary Research* **50**, 76-84. <https://doi.org/10.1111/j.1439-0469.2011.00638.x>
- 31 Limborg MT, Hanel R, **Debes PV**, Ring AK, Andre C, Tsigenopoulos CS, Bekkevold D (2012) Imprints from genetic drift and mutation imply relative divergence times across marine transition zones in a pan-European small pelagic fish (*Sprattus sprattus*). *Heredity (Edinb)* **109**, 96-107. <https://doi.org/10.1038/hdy.2012.18>
- 32 **Debes PV**, Normandeau E, Fraser DJ, Bernatchez L, Hutchings JA (2012) Differences in transcription levels among wild, domesticated, and hybrid Atlantic salmon (*Salmo salar*) from two environments. *Molecular Ecology* **21**, 2574-2587. <https://doi.org/10.1111/j.1365-294X.2012.05567.x>
- 33 Fruciano C, Hanel R, Debes PV, Tigano C, Ferrito V (2011) Atlantic-Mediterranean and within-Mediterranean molecular variation in *Coris julis* (L. 1758) (Teleostei, Labridae). *Marine Biology* **158**, 1271-1286. <https://doi.org/10.1007/s00227-011-1647-1>
- 34 Fraser DJ, Houde AL, **Debes PV**, O'Reilly P, Eddington JD, Hutchings JA (2010) Consequences of farmed-wild hybridization across divergent wild populations and multiple traits in salmon. *Ecological Applications* **20**, 935-953. <https://doi.org/10.1890/09-0694.1>
- 35 **Debes PV**, Zachos FE, Hanel R (2008) Mitochondrial phylogeography of the European sprat (*Sprattus sprattus* L., Clupeidae) reveals isolated climatically vulnerable populations in the Mediterranean Sea and range expansion in the northeast Atlantic. *Molecular Ecology* **17**, 3873-3888. <https://doi.org/10.1111/j.1365-294X.2008.03872.x>