

JAKE LEYHR - CV

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Current Position

Duke University

Postdoctoral Associate

Laboratory of Professor David Sherwood

Department of Biology

04/2024

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Present

Education

Uppsala University

PhD, Evolutionary Developmental Biology

Thesis: "Musculoskeletal Development in Jawed Vertebrates: Gene Function, Cis-Regulation, and 3D Phenotypes in Zebrafish"

Advisor: Dr. Tatjana Haitina, Co-advisors: Dr. Sophie Sanchez; Professor Per Ahlberg

2023

Uppsala University

MSc, Biology (Evolutionary Biology)

Thesis: "Characterization of Transcription Factor Regulation During the Development of Zebrafish Craniofacial Structures"

Advisor: Dr. Tatjana Haitina

2018

University of Exeter

BSc (Hons), 2:1, Biological Sciences

Thesis: "Development of a Cell-Free Alkane Biosensor"

Advisor: Professor John Love

2016

Publications

1. Grohgan, M., **Leyhr, J.**, Johanson, Z., Haitina, T., Sanchez, S., Dollman, K., Stundl, J., Bronner, M.E., Fraser, G.J., Donoghue, P.C.J. (2025) Investigating the Morphogenesis and Replacement of Lamprey Toothlets Using Synchrotron Imaging. *Journal of Morphology*, 286(10), e70094. doi: [10.1002/jmor.70094](https://doi.org/10.1002/jmor.70094)
2. Stundl, J., Rajan, A.R.D., Urrutia, H.A., **Leyhr, J.**, Stundlova, J., Solovieva, T., Haitina, T., Sanchez, S., Musilova, Z., Martik, M.L., Bronner, M.E. (2025). Acquisition of neural crest promoted thyroid evolution from chordate endostyle. *Science Advances*, 11(32), eadv2657. doi: [10.1126/sciadv.adv2657](https://doi.org/10.1126/sciadv.adv2657)
3. Ford, C., De Sena-Tomás, C., Wun, T.T.R., Aleman, A.G., Rangaswamy, U., **Leyhr, J.**, Nuñez, M.I., Gao, C.Z., Nim, H.T., See, M., Coppola, U., Waxman, J.S., Ramialison, M., Haitina, T., Smeeton, J., Sanges, R., Targoff, K.L. (2025). Nkx2.7 is a conserved regulator of craniofacial development. *Nature Communications*, 16, 3802. doi: [10.1038/s41467-025-58821-3](https://doi.org/10.1038/s41467-025-58821-3)
4. Mayeur, H., **Leyhr, J.**, Mulley, J., Leurs, N., Michel, L., Sharma, K., Lagadec, R., Aury, J.M., Osborne, O.G., Mulhair, P., Poulain, J., Mangenot, S., Mead, D., Smith, M., Corton, C., Oliver, K., Skelton, J., Betteridge, E., Dolucan, J., Dudchenko, O., Omer, A.D., Weisz, D., Lieberman-Aiden, E., McCarthy, S., Sims, Y., Torrance, J., Tracey, A., Howe, K., Baril, T., Hayward, A., Martinand-Mari, C., Sanchez, S., Haitina, T., Martin, K., Korsching, S.I., Mazan, S., Debais-Thibaud, M. (2024) The sensory shark: high-quality morphological, genomic and transcriptomic data for the small-spotted catshark *Scyliorhinus canicula* reveal the molecular bases of sensory organ evolution in jawed vertebrates. *Molecular Biology and Evolution*, 41(12), msae246, doi: [10.1101/2024.05.23.595469](https://doi.org/10.1101/2024.05.23.595469)
5. **Leyhr, J.**, Haitina, T., Bird, N.C. (2024) Hidden in plain sight: does the first intercostal ligament help to stabilize the Weberian apparatus? *Journal of Anatomy*, 246(2), p288-298. doi: [10.1093/molbev/msae246](https://doi.org/10.1093/molbev/msae246)
6. Harry, C.J., Hibshman, J.D., Damatac, A., Davidson, P.L., Estermann, M.A., Flores-Flores, M., Holmes, C.M., Lázaro, J., Legere, E.A., **Leyhr, J.**, Thendral, S.B., Vincent, B.A., Goldstein, B. (2024) Protocol for fluorescent live-cell staining of tardigrades. *STAR Protocols*, 5:103232. doi: [10.1016/j.xpro.2024.103232](https://doi.org/10.1016/j.xpro.2024.103232)
7. **Leyhr, J.**, Sanchez, S., Dollman, K.N., Tafforeau, P., Haitina, T. (2023). Enhanced contrast synchrotron X-ray microtomography for describing skeleton-associated soft tissue defects in zebrafish mutants. *Frontiers in Endocrinology*, 14:1108916, doi: [10.3389/fendo.2023.1108916](https://doi.org/10.3389/fendo.2023.1108916)

8. **Leyhr, J.***, Waldmann, L.*, Filipek-Górniok, B., Zhang, H., Allalou, A., Haitina, T. (2022). A novel cis-regulatory element drives early expression of Nkx3.2 in the gnathostome primary jaw joint. *eLife* 11:e75749, doi: [10.7554/eLife.75749](https://doi.org/10.7554/eLife.75749)
9. Waldmann, L.*, **Leyhr, J.***, Zhang, H., Allalou, A., Öhman-Mägi, C., Haitina, T. (2022). The Role of Gdf5 in the Development of the Zebrafish Fin Endoskeleton. *Developmental Dynamics*, 251(9), p1535-1549, doi: [10.1002/dvdy.399](https://doi.org/10.1002/dvdy.399) (Cover feature)
10. Waldmann, L.*, **Leyhr, J.***, Zhang, H., Öhman-Mägi, C., Allalou, A., Haitina, T. (2021). The Broad Role of Nkx3.2 in the Development of the Zebrafish Axial Skeleton. *PLoS ONE*, 16(8), e0255953, doi: [10.1371/journal.pone.0255953](https://doi.org/10.1371/journal.pone.0255953)
11. Janssen, R., Andersson, E., Betnér, E., Bijl, S., Fowler, W., Höök, L., **Leyhr, J.**, Landström, E., Mannelqvist, A., Panara, V., Smith, K., Tiemann, S. (2018). Embryonic expression patterns and phylogenetic analysis of panarthropod sox genes: Insight into nervous system development, segmentation and gonadogenesis. *BMC Evolutionary Biology*, 18(88), doi: [10.1186/s12862-018-1196-z](https://doi.org/10.1186/s12862-018-1196-z)

* Equal contribution.

Conference Presentations

- **Leyhr, J.** High-resolution tomography for comparative and developmental anatomy. Oral presentation delivered at Uppsala University Tomo Day (Uppsala, Sweden – May 2025).
- Grohgan, M., **Leyhr, J.**, Johanson, Z., Haitina, T., Sanchez, S., Dollman, K., Stundl, J., Bronner, M., Fraser, G., Donoghue, P. Investigating the morphogenesis and replacement of lamprey toothlets using synchrotron imaging. Poster presentation delivered at the 17th International Symposium on Early and Lower Vertebrates (Rimouski, Canada - June 2024).
- **Leyhr, J.**, Leflaëc, E., Debais-Thibaud, M., Bird, NC., Dollman, K., Tafforeau, P., Sanchez, S., Haitina, T. DICE-PPC-SRμCT for describing anatomy, mutant phenotypes, and tissue organisation in three dimensions at near-histological resolution. Poster presentation delivered at the 82nd Annual Meeting of the Society for Developmental Biology (Chicago, USA – July 2023).
- **Leyhr, J.**, Haitina, T., Dearden, R., Johanson, Z., Debais-Thibaud, M., Tafforeau, P., Dollman, K., Marcellini, S., Boisvert, C., Clarac, F., Qu, Q., Bijl, S., Stundl, J., Soukup, V., Robertson, B., Grillner, S., Wallén-Mackenzie, Å., Smith, MM., Brazeau, M., Sanchez, S. A 3D Histological Survey of Vertebrate Jaw Cartilage with Implications for Chondrichthyan Skeletal Evolution. Oral presentation delivered at the 16th International Symposium on Early and Lower Vertebrates (Valencia, Spain - June 2022), and the 6th International Symposium on Palaeohistology (Online – March 2022).
- **Leyhr, J.**, Leurs, N., Debais-Thibaud, M., Haitina, T. Functional divergence of a novel conserved cis-regulatory element of Mohawk homeobox transcription factor during evolution of vertebrates. Poster presentation delivered at the 8th Meeting of the European Society for Evolutionary Developmental Biology (Naples, Italy – June 2022).
- **Leyhr, J.**, Haitina, T. Evolutionary conservation of cis-regulatory elements of craniofacial tendons and ligaments in Gnathostomes. Oral presentation delivered at the 15th International Symposium on Early and Lower Vertebrates (Qijiang, China - August 2019).
- Haitina, T., Waldmann, L., **Leyhr, J.** Identification of the evolutionary conserved regulatory element controlling the primary jaw joint formation in zebrafish. Poster presentation delivered at the 2nd Joint Congress on Evolutionary Biology (Montpellier, France - August 2018)
- **Leyhr, J.**, Waldmann, L., Haitina, T. Using tissue-specific cell ablation to study the regeneration of the zebrafish jaw joint. Poster presentation delivered at the 7th Meeting of the European Society for Evolutionary Development Biology (Galway, Ireland - June 2018)

Grants and Awards

Yokogawa Spinning Disk Imaging Contest	2023
1 st place award in the microscopy image competition run by the Yokogawa Corporation of America at the MBL Embryology Course – 100 USD	
Society for Developmental Biology Trainee Travel Assistance Grant	2023
Awarded for travel to attend the 82 nd Annual Meeting of the Society for Developmental Biology (Chicago, USA) – 500 USD	
Swedish Developmental Biology Organisation Travel Grant	2023

Awarded for travel to attend the “Embryology: Concepts and Techniques in Modern Developmental Biology” advanced research training course at the Marine Biological Laboratory (Woods Hole, USA) – 5,000 SEK

European Synchrotron Radiation Facility Beamtime

2021

Award LS-3021 (highlighted proposal) – “*Evolution of the shark skeleton*”. Co-proposed with Dr. Sophie Sanchez, Dr. Tatjana Haitina, Dr. Zerina Johanson, Dr. Moya Meredith-Smith, Dr. Richard Dearden, Dr. Melanie Debais-Thibaud, Dr. Sylvain Marcellini, and Dr. Qingming Qu – 33,000 USD (equivalent)

Helge Ax:son Johnsons Foundation Grant

2021

“RNA sequencing analysis of the developing zebrafish pectoral fin” – 40,000 SEK

Anna Maria Lundin Foundation Travel Grant

2020

Awarded for travel and accommodation to present at the 8th European Society for Evolutionary Developmental Biology conference (Naples, Italy) – 12,232 SEK

Supervision

Graduate rotation students – Joshua Kwan and Haleigh Wooters. Supervised their rotations in the Sherwood Lab, basic nematode techniques and projects. 2024/5

Master’s student – Elsa Leflaëc – *Diversity of the cartilage of vertebrates. A study of the Meckel’s cartilage in chondrichthyans and osteichthyans, Master’s Thesis Project* 2023

Master’s students - Paul Ideaser and Antoine Corne - *The evolution of jaw cartilage in gnathostomes, Origin and Evolution of Vertebrates, Master’s Research Project* 2022

Bachelor’s student - Branco Vanhaverbeke - *A potential nkx3.2 enhancer in zebrafish: deletion characterization and motif expression analysis, Bachelor’s Research Project* 2020

Teaching

Uppsala University (Master’s level courses)

Teacher, *Evolution and Development* (1BG397)

2017 - 2023

- Lectured on zebrafish as a model organism and skeletal development, instructed laboratory classes on transgenic animals, CRISPR functional assays, and skeletal staining, led journal clubs and discussion seminars, prepared and graded exams.

Teacher, *Developmental Biology including the Development of the Nervous System* (1BG510)

2017 – 2023

- Lectured on zebrafish as a model organism and early embryonic development, instructed laboratory classes on transgenic animals, morpholino and CRISPR functional assays, prepared and graded exams.

Teacher, *Functional Genomics* (1BG322)

- Instructed laboratory classes in microbial metabarcoding projects, from sediment sample collection through, library preparation, sequencing, and bioinformatic abundance analysis. 2020 - 2021

Teacher, *Toxicology* (1BG209)

- Instructed laboratory classes in basic toxicological techniques.

2019

Select Courses

MBL Embryology: Concepts and Techniques in Modern Developmental Biology

2023

EMBO Practical Course 3D Developmental Imaging

2022

Digital Image Analysis for Scientific Applications – focus MAX IV

2022

Academic Teacher Training Course

2022

Laboratory Animal Science for Researchers - Zebrafish

2020

Technical Skills

- Synteny and genomic conservation analysis
- CRISPR/Cas9 genome editing
- Molecular cloning and transgenesis
- Confocal microscopy
- Synchrotron X-ray scanning
- 3D segmentation (VGStudio MAX)
- Image analysis in (ImageJ, Python)
- Data analysis (R: Shiny, Markdown; Python)
- Figure making (Adobe Illustrator)
- Document formatting (LaTeX)
- Version control (GitHub)
- CAD and 3D printing

Outreach

Coding with Ozobots at the Durham County Library -
Judge for the North Carolina State Science Fair finals -
Darwin Day – Swedish Museum of Natural History -

2025

2025

2020

Referees

Dr. Tatjana Haitina

Associate Professor
Department of Organismal Biology
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Dr. Sophie Sanchez

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Department of Organismal Biology
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Dr. Melanie Debais-Thibaud

Professor
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ISEM
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Dr. David Sherwood

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