JAKE LEYHR - CV

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Current Position

Duke University **04/2024**
Postdoctoral Associate **- Present**
Laboratory of Professor David Sherwood
Department of Biology

Education

Uppsala University **2023**
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

Uppsala University **2018**
MSc, Biology (Evolutionary Biology)
Thesis: *"Characterization of Transcription Factor Regulation During the Development of Zebrafish Craniofacial Structures"*
Advisor: Dr. Tatjana Haitina

University of Exeter **2016**
BSc (Hons), 2:1, Biological Sciences
Thesis: *"Development of a Cell-Free Alkane Biosensor"*
Advisor: Professor John Love

Publications

1. Harry, CJ., Hibshman, JD., Damatac, A., Davidson, PL., Estermann, MA., Flores-Flores, M., Holmes, CM., Lázaro, J., Legere, EA., **Leyhr, J.**, Thendral, SB., Vincent, BA., Goldstein, B. (**2024**) Protocol for fluorescent live-cell staining of tardigrades. *STAR Protocols*, 5:103232. doi: 10.1016/j.xpro.2024.103232
2. Mayeur, H., **Leyhr, J.**, Mulley, J., Leurs, N., Michel, L., Sharma, K., Lagadec, R., Aury, JM., 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, AD., 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, SI., Mazan, S., Debiais-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. *bioRxiv*, doi: 10.1101/2024.05.23.595469.
3. **Leyhr, J.**, Haitina, T., Bird, NC. (**2023**) Hidden in plain sight: does the first intercostal ligament help to stabilize the Weberian apparatus? *bioRxiv*, doi: 10.1101/2023.11.20.567829 *In Revision at the Journal of Anatomy*
4. **Leyhr, J.**, Sanchez, S., Dollman, KN., 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
5. **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*, doi: 10.7554/eLife.75749

6. 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 (**Cover feature**)
7. 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
8. 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

* Equal contribution.

Conference Presentations

- Grohganz, 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., Debiais-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., Debiais-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., Debiais-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* (Quijing, 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**

1st 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 82nd 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 Debiais-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

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 2022**

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

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) **2020 - 2021**

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

Teacher, *Toxicology* (1BG209) **2019**

- *Instructed laboratory classes in basic toxicological techniques.*

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, RMarkdown, Python)
- Figure making (Adobe Illustrator)
- Document formatting (LaTeX)
- Version control (GitHub)
- CAD and 3D printing

Referees

Dr. Tatjana Haitina
Associate Professor
Department of Organismal Biology
Uppsala University
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Dr. Sophie Sanchez
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Dr. Melanie Debiais-Thibaud
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