

# Curriculum Vitae

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## Dr Arne Jacobs

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### RESEARCH POSITIONS AND EDUCATION

- 2018- Postdoctoral Research Associate, Cornell University, Therkildsen Lab
- 2018-2018 Postdoctoral Research Assistant, University of Glasgow, Elmer Lab
- 2014-2018 PhD student, Evolutionary Biology, University of Glasgow  
*Thesis: "The population genomic origins of ecological specialisation in salmonid fishes"*  
*Supervisors: Dr Kathryn R. Elmer and Prof Colin E. Adams*
- 2014 Technical assistant, Glasgow Polyomics Centre, University of Glasgow (*Conducted next generation sequencing runs on ion Proton and illumina NextSeq500*)
- 2013-2014 Erasmus Exchange student from University of Konstanz Germany to the University of Glasgow
- 2011-2012 Research assistant with Dr Helen Gunter, University of Konstanz
- 2010-2013 BSc in Biological Sciences, University of Konstanz, Germany  
*Thesis: "Comparative molecular investigation of heterochrony during jaw development in Beloniform fishes" (Thesis mark: 1.0; Overall: 1.7).*  
*Supervisors: Dr Helen Gunter and Prof Axel Meyer*

### AWARDS

- 2018 Nominated for John C. Marsden Medal of the Linnean Society (nominated by KR Elmer and Prof. D Haydon; awaiting decision)
- 2018 Nominated for the Joseph Black Prize (for top 5% of examined thesis at the University of Glasgow in 2018)
- 2017 Finalist for the Hamilton Award from the Society for the Study of Evolution
- 2017 David Searle Prize for best IBAHCM student report

### SCHOLARSHIPS/GRANTS

- 2017 FSBI Travel Grant (£900 – to attend the Evolution Conference 2017)
- 2017 SSE Travel Grant (\$500 – to attend the Evolution Conference 2017)
- 2015 FSBI small research grant with Kathryn Elmer (£4500)
- 2013 ERASMUS Exchange scholarship (€2000)

## TEACHING EXPERIENCE

- 2014-2018 Co-supervision of three summer intern projects, two undergraduate honours projects and two Master student projects.
- 2016-2017 Demonstrator - Evolutionary Biology 2 (2B) BIOL2009, University of Glasgow

## ACADEMIC SERVICE

- 2016-2018 PGR representative in the IBAHCM Athena Swan committee for promoting gender equality in research.
- 2015-2016 Organiser of the Graduate Students' Seminar Series, IBAHCM, University of Glasgow
- 2015-2017 Convenor of the Evolutionary Analysis Group, IBAHCM, University of Glasgow

## SKILLS & EXPERIENCE

### Bioinformatics & Statistics

#### Experienced in the following programming languages:

*R, Unix/Bash, Python.*

#### Experienced in a wide range of population genetic, phylogenetic and transcriptomic approaches:

*phylogenetics (e.g. RAxML, Beast, Splitstree), population structure and genetic ancestry reconstruction (e.g. Admixture, Structure, DAPC, PCA, fineRADstructure); introgression analysis (e.g. Treemix, ABBA-BABA), genome-wide association analysis (random forest, linear mixed models, BayPass, LFMM, RDA) or analyses of selection (haplotype-based approaches: rehh, SNP-based approaches: pcadapt, BayPass, BayeScan, RDA, Fst-genome scan approaches), gene expression and splicing analyses (e.g. DEseq2, leafcutter, DEXseq, WGCNA).*

#### Experienced in eco-morphological analyses:

*geometric morphometric analysis (MorphoJ, geomorph); statistical analyses of linear morphological data; stable isotope data; ecological data (e.g. parasite load data) and integrative statistical analysis of ecological and morphological data using custom statistical models in R.*

### Fieldwork and husbandry skills

#### Experienced in fish husbandry and breeding:

- 2011-2013 Husbandry and breeding of medaka (*Oryzias latipes*) and halfbeak (*Dermogenys pusilla*) for evolutionary-developmental studies.
- 2011-2012 Husbandry of African cichlids (mainly *Astatoreochromis alluaudi*) and conducting of feeding (plasticity) experiments.

#### Experienced in sampling of salmonid fishes:

- 2014-2015 Several fieldtrips for sampling of Arctic charr in Scotland (Loch Awe, Loch Tay): collection of ecological and morphological data
- 2014 Sampling of European whitefish in Lake Constance: collection of ecological and morphological data.

## Lab skills

**Experienced in the extraction of DNA and RNA** from a range of tissues, even difficult ones such as bone (cichlid pharyngeal jaws).

**Experienced in candidate gene expression analysis:** qPCR, sanger sequencing, in situ hybridization.

**Experienced in the preparation and optimization of next-generation sequencing library protocols.**

**Experienced in dissections and histology:** dissection of jaws at different developmental stages; histochemical staining of bone and cartilage in fish at different developmental stages.

## PUBLICATIONS

8. Salmón P.\*, **Jacobs A.\***, Lundberg M., Ahrén D., Biard C., Dingemanse N.J., Dominoni D., Helm B., Senar J.C., Sprau P., Visser M. & Isaksson C. ***Repeated genomic signatures of adaptation to urbanization in a songbird across Europe.*** *In review in Science.* (\*shared first authors)
  
7. **Jacobs A.\***, Carruthers M.\*, Eckmann R., Yohannes E., Adams C.E., Behrmann-Godel J. & Elmer K.R. (2019) ***Rapid niche expansion by selection on functional genomic variation after ecosystem recovery.*** *Nature Ecology and Evolution.* (\*shared first authors)
  
6. **Jacobs A.**, Carruthers M., Yurchenko A., Gordeeva N.V., Alekseyev S.S., Hooker O., Leong J.S., Rondeau E.B., Koop B.F., Adams C.E. & Elmer K.R. (2018) ***Convergence in form and function overcomes non-parallel evolutionary histories in Arctic charr.*** *bioRxiv preprint* (<https://doi.org/10.1101/265272>).
  
5. **Jacobs A.**, Hughes M.R., Robinson P.C., Adams C.E. & Elmer K.R. (2018) ***The genetic architecture underlying the evolution of a rare piscivorous life history form in brown trout after secondary contact and strong introgression.*** *Genes* **9**. (Invited contribution to a special issue on the 'Evolutionary Genetics of Reproductive Isolation').
  
4. **Jacobs A.**, Doran C., Murray D., Duffill Telsnig J., Laskowski K.L., Jones N.A.R., Auer S.K. & Praebel K. (2018) ***On the challenges and opportunities facing fish biology: a discussion of five key knowledge gaps.*** *Journal of Fish Biology* **92**, 690–698.
  
3. **Jacobs A.**, De Noia M., Praebel K., Kanstad-Hanssen Ø., Paterno M., Jackson D., McGinnity P., Sturm, A., Elmer K.R. & Llewellyn M.S. (2018). ***Genetic fingerprinting of salmon louse (*Lepeophtheirus salmonis*) populations in the North-East Atlantic using a random forest classification approach.*** *Scientific Reports* **8**, 1203.
  
2. **Jacobs A.**, Womack R., Chen M., Gharbi K. & Elmer K.R. (2017). ***Significant synteny and co-localisation of ecologically relevant quantitative trait loci within and across species of salmonid fishes.*** *Genetics* **207**, 741-754.
  
1. Recknagel H., **Jacobs A.**, Herzyk P. & Elmer K. R. (2015). ***Double-digest RAD sequencing using Ion Proton semiconductor platform (ddRADseq-ion) with nonmodel organisms.*** *Molecular Ecology Resources* **15**, 1316-1329.

Acknowledged contribution for research assistantship (molecular laboratory and fish experiments):  
Gunter H. et al.: ***Revisiting de Beer's textbook example of heterochrony and jaw elongation in fish: calmodulin expression reflects heterochronic growth, and underlies morphological innovation in the jaws of belonoid fishes.*** *EvoDevo* 2014 5:8.

## MANUSCRIPTS IN PREPARATION & ONGOING RESEARCH PROJECTS

Burgon J.D., Vieites D.R., **Jacobs A.**, Gunter H.M., Weidt S.K., Burgess K., Steinfartz S., Vences M., Mable B.K. & Elmer K.R. ***Positive selection in rare fire salamander colour variants reveals important genetic and ecological associations with conspicuous colouration.*** *Manuscript in prep.*

**Jacobs A.** & Elmer K.R. ***Parallel evolution in Arctic charr through complementary effects of regulatory and post-transcriptional processes.*** *Manuscript in prep.*

**Jacobs A.**, Praebel K., *et al.* ***The evolutionary and demographic history of Greenland sharks.*** Ongoing project (completion: autumn 2018).

**Jacobs A.**, Carruthers M., Adams C.E. & Elmer K.R. ***The genetic architecture underlying parallel body shape evolution in Arctic charr.*** Ongoing project (completion: autumn 2018).

## CONFERENCE PRESENTATIONS (\* indicates presenter)

### 2018

Evolution - II Joint Congress on Evolutionary Biology – **Jacobs A.\***, Carruthers M., Eckmann R., Yohannes E., Adams C.E., Behrmann-Godel J. & Elmer K.R. “Rapid niche expansion by selection on functional genomic variation after ecosystem recovery.” (Poster).

### 2017

50th Anniversary Symposium of the Fisheries Society of the British Isles, Exeter (UK) – **Jacobs, A\***, Natalia Gordeeva, Sergey Alekseyev, Colin Adams and Elmer, K.R. “The evolution of parallel Arctic charr ecotypes via non-parallel evolutionary & genomic routes” (Talk).

Evolution conference, Portland (Oregon, USA) – **Jacobs, A\***, Natalia Gordeeva, Sergey Alekseyev, Colin Adams and Elmer, K.R. “The evolution of parallel Arctic charr ecotypes via non-parallel evolutionary & genomic routes” (Talk in the Hamilton Award session).

### 2016

Evolutionary Biology Meeting, Marseille (France) – Recknagel, H., **Jacobs, A.\***, P. Herzyk, and K. R. Elmer, “*Fast and scalable genome-wide SNP genotyping (ddRADseq-ion) on Ion Torrent next-generation sequencing platform*” (Poster)

Evolutionary Biology Meeting, Marseille (France) – **Jacobs, A.\***, Gordeeva, N.V., Alekseyev, S.S., Adams, C.E. and Elmer, K.R. “*Genomics of rapid parallel evolution in Arctic charr (Salvelinus alpinus)*” (Talk)

2015

International Charr Symposium, Tromsø (Norway) – **Jacobs, A.\*** and Elmer, K.R. “*Genomic insights into adaptations, variations, and evolutionary histories in Arctic charr*” (Plenary talk)

International Charr Symposium, Tromsø (Norway) - **Jacobs, A.\***, Adams, C.E., Gharbi, K, Wanzenboeck, J and Elmer, K.R. “*Comparative linkage mapping of Arctic charr for population genomics: Comparing genomic organisation in salmonids*” (Poster)

48<sup>th</sup> Population Genetics Group Meeting (Sheffield) – Recknagel, H., **Jacobs, A.**, Herzyk P., and Elmer, K.R.\*, “*A new method for fast and scalable genome-wide SNP genotyping (ddRADseq-ion) on Ion Torrent next-generation sequencing platform*” (Talk)

Society for Molecular Biology & Evolution conference, Vienna (Austria): Recknagel, H., **Jacobs, A.**, Herzyk P., and Elmer, K.R.\*, “*Fast and scalable genome-wide SNP genotyping (ddRADseq-ion) on Ion Torrent next-generation sequencing platform*” (Poster)