ALEXANDER VAN NYNATTEN

Department of Biological Sciences
University of Toronto Scarborough
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Education

2019 **Ph.D**. in *Cell and Systems Biology*
University of Toronto, Toronto, ON, Canada
The molecular evolution of rhodopsin in marine-derived and other freshwater fishes
Advisors: Belinda SW Chang, Nathan R Lovejoy

2012 **B.Sc.** (Honours) in *Biochemistry and Cell Biology*
University of Western Ontario, London, ON, Canada
Miniaturization of the CK2 kinase assay using capillary electrophoresis
Advisors: David Litchfield, Ken Yeung

Appointments

2021 – *Present* **Mitacs Postdoctoral Fellow**
University of Toronto Scarborough, Toronto, ON, Canada
Identifying and quantifying entrained larval fishes using eDNA and metabarcoding
Advisor: Nicholas E Mandrak

2019 – 2021 **Postdoctoral Fellow**
University of Toronto Scarborough, Toronto, ON, Canada
Analysis of the molecular adaptation in vision of Nearctic deepwater fish
Advisors: Belinda SW Chang, Nathan R Lovejoy, Nicholas E Mandrak

Peer-reviewed manuscripts

12. **Van Nynatten, A.**, Gallage, K.S., Lujan, N.K., & Mandrak, N.E., Lovejoy, N.R. Ichthyoplankton metabarcoding: an efficient tool for early detection of invasive species establishment. *Accepted. Mol. Ecol. Res. MER-22-0554*

11. Castiglione, G.M., Hauser, F.E., **Van Nynatten, A.,** Chang, B.S.W. (2023). Adaptation of Antarctic Icefish Vision to Extreme Environments. *Mol. Biol. Evol.* 40:msad030

10. **Van Nynatten, A**., Castiglione, G.M., Gutierrez, E.A., Lovejoy, N.R., Chang, B.S.W. (2021). Recreated ancestral opsin associated with marine to freshwater croaker invasion reveals kinetic and spectral adaptation. *Mol. Biol. Evol.* 38(5): 2076-2087

9 Bzonek, P.A., **Van Nynatten, A.,** Mandrak, N.E. (2021). Phylogenetic signal found in a fish-community response to an acoustic deterrent deployed in a wetland. *Freshw Biol*. 66: 1698-1708.

8. Castañeda, R.A., Burliuk C.M.M., Casselman, J.M., Cooke, S.J., Dunmall, K.M., Forbes, L.S., Hasler, C.T., Howland, K.L., Hutchings, J.A., Klein, G.M., Nguyen, V.M., Price, M.H.H., Reid, A.J., Reist, J.D., Reynolds, J.D., **Van Nynatten**, **A**., Mandrak, N.E. (2020). A brief history of fisheries in Canada. *Fisheries*. 45: 303-318.

7. Castañeda, R.A., **Van Nynatten, A.,** Crookes, S., Ellender, B., Heath, D., MacIsaac, H., Mandrak, N.E., Weyl, O.L.F. (2020). Detecting native freshwater fishes using novel non-invasive methods. *Front. Environ. Sci.* 8: 1-16.

6. **Van Nynatten, A**., Janzen, F.H., Brochu, K., Maldonado-Ocampo, J.A., Crampton, W.G.R., Chang, B.S.W., Lovejoy, N.R. (2019). To see or not to see: molecular evolution of the rhodopsin visual pigment in neotropical electric fishes. *Proc. R. Soc. B:* 286: 20191182.

5. Schott, R.K., **Van Nynatten, A.,** Card, D.C., Castoe, T.A., Chang, B.S.W. (2018). Shifts in selective pressures on snake phototransduction genes associated with photoreceptor transmutation and dim-light ancestry. *Mol. Biol. Evol.* 35(6): 1376–1389.

4. Castiglione, G.M., Hauser, F.E., Liao, B.S., Lujan, N.K., **Van Nynatten, A.,** Morrow, J.M., Schott, R.K., Bhattacharyya, N., Dungan, S.Z., Chang, B.S.W. (2017) Evolution of non-spectral rhodopsin function at high altitudes. *Proc. Natl. Acad. Sci.* 114(28): 7385–7390.

3. Elbassiouny, A.A., Schott, R.K., Waddell, J.C., Kolmann, M.A., Lehmberg, E.S., **Van Nynatten, A.**, Crampton, W.G.R., Chang, B.S.W., Lovejoy N.R. (2016). Mitochondrial genomes of the South American electric knifefishes (Order Gymnotiformes). *Mitochondrial DNA B* 1(1): 401-403.

2. Hauser, F., Schott, R.K., Castiglione, G.M., **Van Nynatten, A**., Kosyakov, A., Tang, P., Gow, D., Chang, B.S.W. (2015) Comparative sequence analyses of rhodopsin and RPE65 reveal patterns of selective constraint across hereditary retinal disease mutations. *Visual Neurosci.* 33:e002.

1. **Van Nynatten, A.**, Bloom, D.D., Chang, B.S.W., Lovejoy, N.R. (2015) Out of the blue: adaptive visual pigment evolution accompanies Amazon invasion. *Biol. Lett*. 11: 20150349.

Submitted manuscripts

4. **Van Nynatten, A.**, Duncan, A.T., Lauzon, R., Sheldon, T.A., Chen, S.K., Lovejoy, N.R., Mandrak, N.E., Chang, B.S.W. Adaptive evolution of Nearctic deepwater fish vision: a novel metabarcoding approach to monitor functional variation for conservation. *In review Mol. Ecol. MEC-23-0168*

3. Chau, K.D., Hauser, F.E., **Van Nynatten**, **A**., Daane, J.M., Harris, M.P., Chang, B.S.W., Lovejoy, N.R. Multiple Ecological Axes Drive Cone Opsin Evolution in Beloniformes. *In review Proc. R. Soc. B. RSPB-2023-0100.*

2. Gallage, K.S., **Van Nynatten, A**., Lujan, N.K., Lovejoy, N.R., Mandrak, N.E. Identifying early life stages of Great Lakes fishes using a metabarcoding approach. *In review. Can. J. Fish. Aquat. Sci. cjfas-2023-0061*

1. Elbassiouny, A.A., Waddell, J.C., **Van Nynatten, A**., Schott, R.K., Buck, L.T., Crampton, W.G.R., Chang, B.S.W., Lovejoy, N.R. 'Field transcriptomics' reveals dynamic circadian metabolic reprogramming in electric fishes. *In review J. Exp. Biol*. JEXBIO/2023/245813.

Book and Encyclopedia Chapters

1. Gutierrez, E.A., **Van Nynatten, A.,** Lovejoy, N.R., B.S.W. Chang (2016). Sensory Systems: Molecular Evolution in Vertebrates. In: *The Encyclopedia of Evolutionary Biology*, Kliman, R.M. (ed.), Oxford: Academic Press, vol. 4, pp. 33–40

Grant, Honours, and Awards

2022	GenFish travel grant ($500)
2021	Presentation award - GLAM EvoGen ($50)
2021	MITACS accelerate ($165,000 over 3 years)
2020	Canada 150 Genome Project grant ($2500)
2019	Milestones and Pathways Grant to instruct data visualization workshop ($1300)
2019	Society for Molecular Biology and Evolution Registration Award ($700)
2018	Cell and Systems Biology Travel Grant ($1000)
2017	Vision Science Research Fellowship - University Health Network ($24,000)
2017	Cell and Systems Biology Travel Grant ($1000)
2016	American Society of Ichthyologists and Herpetologists Student Travel Grant ($762)
2016	Cell and Systems Biology Travel Grant ($1000)
2016	Vision Science Research Fellowship - University Health Network ($28,491)
2015	Zoology Sesquicentennial Graduate Award - Cell and Systems Biology, UofT ($600)
2015	Vision Science Research Fellowship - University Health Network ($27,829)
2014	Society of Graduate Studies Travel Grant ($520)
2014	Cell and Systems Biology Travel Grant ($400)
2014	Vision Science Research Fellowship - University Health Network ($29,840)
2013	University of Toronto Fellowship ($8,300)
2013	University of Toronto Fellowship ($8,270)
2012	Dean's Honor list

2011 Dean's Honor list

2008 Western Scholarship of Distinction ($1500)

Invited Presentations

2022 Electric Power Research Institute Great Lakes Interest Group Annual Meeting, online, (oral)

2016 Vision Science Research Day, University Health Network, Toronto ON *(oral)*

Contributed Presentations

2022 Gen-Fish Annual General Meeting, Windsor, ON (oral)

2022 The International Conference on Aquatic Invasive Species, online (oral)

2021 Great Lakes Annual Meeting of Evolutionary Genomics, online (*oral*)

2021 Evolution Meeting, online *(oral)*

2021 Society for Molecular Biology and Evolution Annual Meeting, online *(poster)*

2019 Society for Molecular Biology and Evolution Annual Meeting, Yokohama, JP *(poster)*

2018 Canadian Society for Ecology and Evolution Annual Meeting, Guelph, ON *(oral)*

2018 Interdisciplinary Graduate Research and Discovery Conference, Scarborough, ON *(oral)*

2017 Evolution Meeting, Portland, OR *(poster)*

2017 Vision Science Research Day, University Health Network, Toronto ON *(poster)*

2017 Canadian Society for Ecology and Evolution Annual Meeting, Victoria, BC *(poster)*

2016 Joint Meeting of Ichthyologists and Herpetologists, New Orleans, LA *(oral)*

2016 Great Lakes Bioinformatics Conference, Toronto, ON *(poster)*

2016 Vision Science Research Day, University Health Network, Toronto ON *(poster)*

2015 Vision Science Research Day, University Health Network, Toronto ON *(poster)*

2014 Evolution Meeting, Raleigh, NC *(poster)*

2013 International Biogeographic Society: Special Meeting, Montreal, QC *(poster)*

2013 Society for Molecular Biology and Evolution Annual Meeting, Chicago IL *(poster)*

Teaching

2021	Guest Lecturer – BIOD52: Special Topics in Biodiversity and Conservation
2019	Instructor – Data Visualization Workshop for Grad Students and Postdocs
2019	Teaching Assistant – CSB492: Advanced Topics in Cell and Systems Biology
2018	Teaching Assistant – EEB460: Molecular Evolution and Genomics
2016 – 2018	Teaching Assistant – BIO255: Cell and Molecular Biology Advanced Laboratory
2013 – 2017	Teaching Assistant – BIO130: Molecular and Cellular Biology
2017	Teaching Assistant – BIOC51: Tropical Biodiversity Field Course
2015	Guest Lecturer – BIOB52: Ecology and evolutionary biology lab
2013	Teaching Assistant – BIO230: From Genes to Organisms
2012	Teaching Assistant – BIOC21: Vertebrate Histology – Cells and Tissues

Mentoring

	Adam Poulin (Undergraduate student, University of Toronto Scarborough)
	Elizabeth Patterson (Undergraduate student, University of Toronto Scarborough)
	Benjamin Tudor Price (Undergraduate student, University of Toronto)
2017 – *Present*	Kavishka Gallage M.Sc. (Masters student, University of Toronto Scarborough)
	Fangyu Ren (Undergraduate student, University of Toronto)
	Matthew Woo (Masters student, University of Toronto)
	Iris Chiu, M.Sc. (Masters student, University of Toronto)

Field Experience

2022	Meaford, Ontario (4 months): Deployment of autonomous eDNA sampler in Lake Huron for analysis of deepwater fish community in collaboration with Saugeen Ojibway Nation
2022	Cambridge Bay, Nunavut (2 weeks): Planning and logistics expedition for long-term study of Arctic fish diversity and evolution in collaboration with Polar Knowledge Canada
2021	Hamilton, Ontario (1 week): Collection of eDNA from urban storm water ponds in collaboration with Fisheries and Ocean Canada

2019	Cederberg, South Africa (1 week): Fish and invertebrate survey of the Rondegat river in collaboration with the South African Institute for Aquatic Biodiversity
2016	Iquitos, Peru Field Expedition (3 weeks): Collection of electric organ tissue for transcriptomic analyses in collaboration with University of Central Florida
2015	Santarém, Brazil Field Expedition (3 weeks): Fish survey of the Amazon and Tapajos rivers in collaboration with University of Central Florida
2014	Iquitos, Peru Field Expedition (3 weeks): Collection of electric organ tissue for transcriptomic analyses in

Professional Memberships

Society for Molecular Biology and Evolution
Society for the Study of Evolution