

# Curriculum Vitae

Guillaume Guénard

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**Research scientific in biology, biostatistics, bioinformatics, applied mathematics, spatial analysis, machine learning, and data science**

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## Professional skill highlights

- Analysis of complex, sparse, or large data sets with state of the art and cutting edge methods to extract information useful to science (ecology, eco-toxicology, paleontology) or the industry (pharmaco-ecology, strain screening, feature selection) about physical processes or organisms or any sizes.
- Building predictive and forecasting models using advanced methods and contextual descriptors such as space (spatial modelling), time or parenthood among species (phylogenetic modelling). These models can be targeted at any type of organisms such as animals, plants, fungi, microorganisms, for examples, and in a variety of environmental stages such as rivers, lakes, farm lands, forest lands, sea shores, soil, petri dish, etc.
- Experimental design of studies, planning of field works, execution and supervision of analyses, development of computer tools and automatized reporting for paper or web diffusion. Working together with people from various backgrounds (engineering, finance, law).
- Development and validation of field sampling material and methods. Finding timely, elegant as well as cost-effective solutions to take up practical challenges.
- Outstanding aptitudes for communication and teaching with a strong sense of duty. Conscientious, open to new knowledge and experiences, and mindful of other's needs. Will support colleagues and readily take the lead when called for.

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## Work experience

**Biologist II [2022-09 – *nunc*]** Fisheries and Océans Canada, Institut Maurice-Lamontagne, Mont-Joli QC, Canada – Fish and Fish Habitat Protection, Regulatory review, Regional Ecosystems Management Branch – Mining projects. – Supervisor(s): Simon Trépanier

**Aquatic biologist II [2020-09 – 2021-05]** Fisheries and Océans Canada, Institut Maurice-Lamontagne, Mont-Joli QC, Canada – Project SPERA: valuation of data sets from commercial stock assessment surveys towards ecosystem-based modelling. – Supervisor(s): Cédric Juillet

**Research agent [2017-09 – 12, 2019-07 – 2020-09]** Département de sciences biologiques, Université de Montréal, Montreal QC, Canada – Development in numerical ecology: artificial intelligence and remote sensing to take up the challenges of observational ecology; reticulated trait evolution for species and ecosystem conservation, paleontology, and ecotoxicology. – Supervisor(s): Pierre Legendre

**Project leader in environmental modelling [2016-01 – 2017-09, 2018-01 – 2019-07]** Environment and Climate Change Canada, Canadian Weather Service, Hydrology and Ecohydraulics Section, Quebec City QC, Canada – Development of numerical habitat models to assess the impact of river flow management practices on animal and plant species. – Supervisor(s): Jean Morin

**Research Associate [2015-05 – 2016-01]** Département de sciences biologiques, Université de Montréal, Montreal QC, Canada – Development of multiple species and spatially-explicit fish habitat models to assess the influence of hydro-electric dam operation on freshwater fishes. – Supervisor(s): Daniel Boisclair & Pierre Legendre

**Post-doctoral fellow [2013-03 – 2015-04]** Département de sciences biologiques, Université de Montréal, Montreal QC, Canada – Development and evaluation of analysis methods in phylogenetics modelling and landscape genetics. – Supervisor(s): Daniel Boisclair

**Post-doctoral fellow [2010-05 – 2013-02]** Département de sciences biologiques, Université de Montréal, Montreal QC, Canada – Development and evaluation of analysis methods in phylogenetics modelling and landscape genetics. – Supervisor(s): Pierre Legendre

**Post-doctoral fellow [2008-04 – 2010-03]** Université Paul-Sabatier, Toulouse, France – Development and application of methods to incorporate spatial and phylogenetic processes in assessing the impact of toxic stress on aquatic community structure and biodiversity. Involved in a European research training network (Keybioeffects) whose goal is to study the relationships between key pollutants on the biodiversity of European rivers. – Supervisor(s): Sovanarath Lek

**Field work assistant [1999-05 – 08]** Département de sciences biologiques, Université de Montréal, Montreal QC, Canada – Sampling the distribution of juvenile Atlantic salmon and physical habitat variables in Les Escoumins River (QC, Canada). The purpose of that study was to model the effect of fluctuating water flow on the availability of suitable habitat for juvenile Atlantic salmon. – Supervisor(s): Daniel Boisclair

**Field work assistant [1998-05 – 08]** Département de sciences biologiques, Université de Montréal, Montreal QC, Canada – Sampling the daytime and nighttime distribution of fish communities inhabiting three lakes of the Laurentian region (QC, Canada), and post-processing the data. The purpose of that study was to quantify the influence of the moon phase on the intensity of the daily onshore-offshore fish migrations across different communities. – Supervisor(s): Daniel Boisclair

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## Education

**2008-08 — Doctor of Philosophy (*Ph. D.*) in Biology** Université de Montréal – Thesis: Utilisation de l'énergie chez l'omble chevalier (*Salvelinus alpinus*): importance relative des mécanismes dépendants de la densité, de la diversité intra-spécifique et de la présence de compétiteurs. *English*: Bioenergetics of Arctic charr (*Salvelinus alpinus*): relative importance of density-dependant mechanisms, among-populations diversity, and inter-specific competition (LINK). Director: Daniel Boisclair

**2002-01 — Master of science (*M. Sc.*) in Biology** Université de Montréal – Transferred to a *Ph. D.* program. Director: Daniel Boisclair

**2000-05 — Bachelor of science (*B. Sc.*) in Biology** Université de Montréal

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## Achievements

**Articles** Publication of **20** articles (**14** as a first author) in **15** peer-reviewed scientific journals: Canadian Journal of Fisheries and Aquatic Sciences, Ecography, Ecohydrology, Ecological Applications, Ecology, Ecophere, Ecosphere, Ecotoxicology and Environmental Safety, Estuarine Coastal and Shelf Science, Journal of Fish Biology, Journal of Statistical Software, Limnology and Oceanography: Methods, Methods in Ecology and Evolution, Proceedings of the Royal Society B: Biological Sciences, and Systematic Biology; with contributions from a total of **34** fellow scientists.

**Presentations** **24** authored conference presentations (in English and French; **17** as the speaker) in **13** national and international symposia: American Fisheries Society Annual Meeting, Biophysical Coupling

Workshop of the Great Lakes Fisheries Commission, Canadian Conference for Fisheries Research, Canadian Society for Ecology and Evolution, Ecological Society of America (ESA) Annual Conference, Ecological Society of America / INTECOL joint meeting, Final Modelkey conference, International Rainy-Lake of the Woods Watershed Forum, International Symposium for Toxicity Assessment, ISE Ecohydraulics conference, Keybioeffect workshop, Symposium du Groupe de Recherche Inter-universitaire en Limnologie, and Symposium of the Society for Environmental Toxicology and Chemistry; with contributions from a total of **22** fellow scientists.

**Research report** 5 research reports published by different institutions and outlets (Département de sciences biologiques, Hydrology and Ecohydraulics Section, Environment and Climate Change Canada, NINA Temahefte, Science Advisory Secretariat Research Document, and Water Quality Monitoring and Surveillance Division, Environment and climate changes Canada).

**Software** contribution in **5** R language packages; maintainer for **3** of them (constr.hclust, MPSEM, and codep).

List of achievements

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## Awards

NSERC Postgraduate Scholarship D (2003-05 – 2005-04; 21 000 \$/a)

NSERC Postgraduate Scholarship M (2000-05 – 2002-04; 19 500 \$/a)

NSERC Undergraduate research student award (1999-05 – 08; 5 000 \$)

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## Professional activities, qualifications, and services

- Programming (C/C++, R); development of R package (used for statistical analysis), including computer code (R, C/C++) and documentation; implementation and usage of relational databases using MySQL. I am familiar with POSIX compliant operating systems (e.g. Linux, MacOS X, Unix).
  - Electronics: designing circuits and printed circuit boards (Eagle CAD), programming controller boards (Arduino environment <http://www.arduino.cc/>), self construction of personal computers from separate components, using Computer Assisted Design (CAD) software, 3D printing.
  - Organization comity member for the “15<sup>ième</sup> Symposium du Département de Sciences Biologiques de l’Université de Montréal” (Biology department symposium: 60 oral presentations) 27 Jan. 2005.
  - President of the Association des Étudiants Chercheurs en Biologie de l’Université de Montréal (AECBUM; english: Association of Student Researchers in Biology), Oct. 2002 – Sept. 2003.
  - Scientific adviser and treasurer of the Société des Amis du Biodôme de Montréal (SABM; Biodôme de Montréal is a zoological garden devoted to ecosystems, website, Sept. 2000 – August 2002.
  - Scuba diver certifications (CMAS since 15-05-2000, PADI Lake since 17-03-2000).
  - Class 5 (car) driver license (Québec, since 1993).
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