

# Rosalie Bruel (Ph.D., ORCID: 0000-0001-8351-7539)

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## 1 Education

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**2014-2018 University Savoie-Mont Blanc, Chambéry, France**

Ph.D., Freshwater Ecology.

**2012-2014 University of Pau et Pays de l'Adour, Anglet, France**

M.A., Aquatic Ecology and Hydrobiology.

**2011-2012 Napier University, Edinburgh, Scotland (UK)**

B.A. of Science with Distinction, Environmental Biology.

**2009-2011 University Aix-Marseille, Digne-les-bains, France**

BTEC Higher National Diploma, Environmental Biology.

## 2 Research

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**07.2018-12.2020 Rubenstein School of Environment and Natural Resources (University of Vermont), Burlington, VT, U.S.A.**

Postdoctoral associate. Advisors: J. E. Marsden, J. Stockwell.

Project: Lake Champlain food-web modelling.

I am working on compiling 10+ long-term databases of Lake Champlain species and groups, with the objective to build a food-web model with Ecopath with Ecosim, to test management scenarios that would impact the fisheries.

**04.2018 CARTEL (University Savoie Mont-Blanc), Thonon-les-bains, France**

Study collaborator. Advisor: V. Frossard.

Project: SIGNALE.

I sub-sampled a 70 cm core from Lake Tignes (FR) for ancient DNA and biological remains.

I analysed the samples for Cladocera sub-fossils.

**10.2014-09.2017 CARTEL (INRA/University Savoie Mont-Blanc), Thonon-les-bains, France  
+ CNR-ISE, Verbania-Pallanza, Italy (7 months international stay)**

Ph.D. student. Supervisor: M.-E. Perga.

Project: “Eutrophication legacy on peri-alpine lakes ecological vulnerability to climate change”.

I reconstructed the long-term (80 to 1500 years) succession of zooplankton communities in heavily anthropised peri-alpine lakes. My objective was to distangle the impacts of climate change and local human forcings, test for theoretical non-linear properties of systems, and loss of resilience.

Collaboration with researchers from various backgrounds (Ecology, Paleolimnology, Sedimentology): EDYTEM, ISTERre (FR), University of Geneva, University of Lausanne, EAWAG, ETH Zurich (CH), CNR-ISE (IT)

**2014**      **Edytem & Asters, Le Bourget-du-lac, France**

Master thesis. Supervisors: F. Arnaud, E. Malet (Edytem), C. Birck (Asters).

Project: “Constraints and contributions of high-frequency sensors in the monitoring of ecosystems: the example of Lake Anterne watershed”

During the first part of the project, I cleaned (QA/QC) and compiled the data from Lake Anterne monitoring program (weather, in-lake sensors, river station, soil sensors). Then, I used the data to give the first picture on the seasonal dynamics of this high-altitude lake (e.g. mixing periods). Finally, I coded in R a routine to detect summer extreme events (extreme wind, rain, or combination of both) from high-frequency data, and investigated the impact on the physico-chemistry of the lake.

**2013**      **Halieutic Ressources Laboratory, Ifremer, Anglet, France**

Master thesis. Supervisor: N. Caill-Milly.

Project: “Impact of environmental factors on manila clam (*Venerupis philippinarum*) morphology in Arcachon Bay (France)”

I looked at the relationships between manila clam morphology and environmental conditions (extracted from MARS-3D model) to find the potential best protected area in Arcachon Bay.

### 3 Publications

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Publications in peer reviewed international scientific journals

- 2018**      **Bruel, R.**, Marchetto, A., Bernard, A., Lami, A., Frossard, V., Sabatier, P., Perga, M.-E. (Freshwater Biology) Seeking alternative stable states in a deep lake. DOI: 10.1111/fwb.13093
- Perga, M.-E., **Bruel, R.**, Rodriguez, L., Guénand, Y., Bouffard, D. (Global Change Biology) Storm impacts on alpine lakes: antecedent weather conditions matter more than the event intensity. DOI: 10.1111/gcb.14384
- Subm. (preprint available)**      **Bruel, R.**, Sabatier, P. (Submitted to Journal of Environmental Radioactivity) *serac*: a R package for Short-livEd RAdionuclides Chronology of recent sediment cores. DOI preprint EarthArXiv: 10.31223/osf.io/f4yma
- Bruel, R.**, Girardclos, S., Marchetto, A., Kremer, K., Lami, A., Crouzet, C., Reyss, J.-L., Sabatier, P., Perga, M.-E. (Submitted to Journal of Paleolimnology) Reframing Lake Geneva ecological trajectory in a context of multiple but asynchronous drivers. DOI preprint EarthArXiv: 10.31223/osf.io/j8up3
- Bruel, R.\***, White, E. R.\* (Submitted) Sampling requirements and approaches to detect ecosystem shifts. DOI preprint bioRxiv: 10.1101/2020.04.07.030643. \*Authors contributed equally.
- Subm.**      Rantala, M. V., **Bruel, R.**, Marchetto, A., Lami, A., Spangenberg, J., Perga, M.-E. (Submitted) Nutrients and warming shape carbon cycling in large clear perialpine lakes.

- In prep.** **Bruel, R.**, Marchetto, A., Milan, M., Tolotti, M., Lami, A., Nevalainen, L., Manca, M., Dubois, N., Sabatier, P., Perga, M.-E. (In prep.) Quantitative approach to lakes ecological vulnerability to climate change.
- Monchamp, M.E., **Bruel, R.**, Frossard, V., McGowan, S., Lavrieux, M., Muschick, M., Perga, M.-E., Dubois, N. (In prep.) Human impact on planktonic and benthic communities at multiple trophic levels: The sedimentary record of Lake Joux, Switzerland.
- Goulon, C., Lasne, E., Anneville, O., **Bruel, R.**, Domaizon, I., Cachera S., Champigneulle A., Guillard, J. (In prep.) Restoration of whitefish population in Lake Bourget: an historical analysis.

## Reports

- 2014** **Bruel, R.**, Malet E. Lake Anterne’s monitoring (north-eastern French Alps). Documentation about the data and metadata. Edytem. 22p. (English version available upon request)
- Bruel, R.** Tinytag Explorer – Dispositifs de mesures Tinytag installés dans le cadre du suivi des lacs dans les Alpes françaises. Guide de l’utilisateur. 16p. (French version available upon request)
- Bruel, R.** Data Standardizer – Standardisation des données capteur. Guide de l’utilisateur. 11p. (French version available upon request)
- Bruel, R.** B3 – Compilation de données haute-fréquence et outil de contrôle des données. Guide de l’utilisateur. 24p. (French version available upon request)

## Theses

- 2018** **Bruel, R.** Eutrophication legacy on peri-alpine lakes ecological vulnerability to climate change. CAR-RTTEL, INRA/University Savoie-Mont Blanc. PhD program, University Grenoble Alpes.
- 2014** **Bruel, R.** Constraints and contributions of high-frequency sensors in the monitoring of ecosystems: the example of Lake Anterne watershed. Asters/Edytem. Master DynEA, UPPA. 25p + Supplementary Materials.(French version available upon request)
- 2013** **Bruel, R.** Impact of environmental factors on manila clam (*Venerupis philippinarum*) morphology in Arcachon Bay (France). Ifemer. Master DynEA, UPPA. 50p + Supplementary Materials (French version available upon request)

## 4 Communications

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### Seminar, Conference, Workshop

- 2020** **Bruel, R.**, Stockwell, J. D., Marsden, J. E. Informing lake trout population management in Lake Champlain with an ecosystem-based approach. *NYAFS*. Lake Placid, NY (US), 5-7 February 2019 (**Oral**)
- 2019** **Bruel, R.**, Stockwell, J. D., Marsden, J. E. Trophic-dynamic viewpoint on Lake Champlain fish populations evolution under environmental changes. *Ecopath 35*. St Petersburg, FL (US), 4-11 December 2019 (**Oral**)
- Bruel, R.**, Stockwell, J. D., Marsden, J. E. Trophic-dynamic viewpoint on Lake Champlain fish populations evolution under environmental changes. *Department Seminar*. Burlington, VT (US), 20 November 2019 (**Seminar**)
- Sabatier, P., **Bruel, R.**.. *serac*: a R package for ShortlivEd RAdionuclide Chronology of recent sediment cores. *17<sup>e</sup> Congrès Français de Sédimentologie*. Beauvais (FR), 21-25 October 2019 (**Oral**)
- 2018** Kremer, K., **Bruel, R.**, Zenhäusern, G., Girardclos, S. Turbidites as proxy for past events (Lake Geneva, France/Switzerland). *ISC 2018*. Québec, QC (CA), 13-17 August 2018 (**Poster**)

- @**RosalieBruel**, @SGirardclos, @MEPerga. Eutrophication legacy on Lake Geneva vulnerability to climate change. #QUAPAL18. Twitter, 13 June 2018 (**Twitter conference**)
- Bruel, R.**, Alric, A., Marchetto, A., Girardclos, S., Marchetto, A., Kremer, K., Frossard, V., Perga, M.-E. Size structure of zooplankton grazer community to infer lake ecological resistance towards climate variability. *EcoRe3 2nd Workshop*. Salt Lake City, UT (US), 8-10 May 2018 (**Oral**)
- 2017 **Bruel, R.**, Marchetto, A., Bernard, A., Lami, A., Frossard, V., Sabatier, P., Perga, M.-E. Littoral habitats display evidence for alternative stable states even in a deep lake. *SEFS 10*. Olomouc (CZ), 2-7 July 2017 (**Oral**)
- Bruel, R.**, Marchetto, A., Bernard, A., Lami, A., Frossard, V., Sabatier, P., Perga, M.-E. Operational assessment of regime shifts: application to the long-term ecological trajectory of a hollow lake under multiple forcings. *OSM Pages 2017*. Zaragoza (ES), 9-13 May 2017 (**Oral**)
- Bruel, R.**, Girardclos, S., Marchetto, A., Kremer, K., Crouzet, C., Reyss, J.L., Sabatier, P., Perga, M.E. Another Side of the Anthropocene: humans increased ecosystem vulnerability to climate variability. *OSM Pages 2017*. Zaragoza (ES), 9-13 May 2017 (**Poster**)
- 2016 **Bruel, R.** Lakes vulnerability to climate change modulated by human local forcings: ongoing studies and future collaboration with ISE. Seminari Limnologici del Istituto per lo Studio del Ecosystem (CNR), Verbania Pallanza (IT), 13 May 2016 (**Seminar**)
- Bruel, R.**, Bernard, A., Marchetto, A., Lami, A., Frossard, V., Sabatier, P., Perga, M.-E. Nutrient, not climate change, drives a new equilibrium in the cladoceran assemblage of a deeper lake (Italy). *XIV Subfossil Cladocera Workshop*. Levico Terme (IT), 5-8 April 2016 (**Oral**)
- 2015 Bouffard, D., **Bruel, R.**, et al. Modelling as a tool to understand high-altitude lakes: Lake Anterne case study. Bourg d'Oisans, 9-10 November 2015 (**Oral by DB**)
- Bruel, R.**, Kremer, K., Girardclos, S., Perga, M.-E.. Comparison of Lake Geneva zooplankton responses to current and medieval atmospheric warming. *15<sup>e</sup> Congrès Français de Sédimentologie*. Chambéry, 13-15 October 2015 (**Oral**)
- Bruel, R.**, Birck, C., Sentinel lakes: a network for the study and management of mountain lakes in the French Alps. *SEFS 9*. Geneva (CH), 5-10 July 2015 (**Oral**)
- Bruel, R.**, Girardclos, S., Kremer, K., Perga, M.E. Comparison of current and medieval planktonic responses to atmospheric warming in Lake Geneva. *SEFS 9*. Genève (CH), 5-10 July 2015 (**Poster**)
- 2014 **Bruel, R.**, Arnaud, F., Malet, E., Birck, C. Treatment of high-frequency monitoring data: contributions on understanding lakes dynamics – The example of Lake Anterne. *5<sup>e</sup> rencontres scientifiques et techniques, Réseau Lacs Sentinelles*. Aix-en-Provence, 27-28 November 2014 (**Oral**)
- Bruel, R.**, Arnaud, F., Malet, E., Birck, C., Perga, M.E. NETworking Lake observatories in Europe. Lake Anterne, Netlake site in France. *Netlake workshop*. Erken (SE), June 2014 (**Poster**)

## 5 Teaching

### Fisheries Biology & Techniques

WFB 161 - University of Vermont, VT (US) - Fall 2018 - SO/JR/SR students

WFB 161 - University of Vermont, VT (US) - Guest lecture on 'Fish growth and equations', Sept. 2019 - SO/JR/SR students

### GLEON Graduate Students Association workshop

Intro to GitHub - GLEON 20 All hand's meeting - Rottneest Island, WA (AU) - 02/12/18 - Graduate students

## 6 Awards and Fellowships

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### Sea Grant

Stockwell, Marsden, and Bruel "Food web models to evaluate impacts of environmental change and management actions on Lake Champlain fish populations" (2019-2020) (\$150,000)

### GLEON

Grant to attend 20<sup>th</sup> GLEON All Hands' meeting, Rottneest Island, AU (2018) (\$3000)

### PAGES

Grant to attend 2<sup>nd</sup> EcoRe3 workshop in Salt Lake City, US (2018) (\$850)

Grant to attend 5<sup>th</sup> PAGES Open Science Meeting in Zaragoza, Spain (2017) (200€)

### Explo'RA Doc, Grant awarded by Region Auvergne Rhone-Alpes

Funding for international stay at the Institute for Ecosystem Studies (CNR-ISE, Verbania-Pallanza, IT), 2016 (6 months) (4260€)

### Doctoral School SISEO

Funding to support the participation to an International Summer School (in Russia), 2015 (800€)

### Ph.D. Grant awarded by the University Savoie Mont-Blanc

Awarded for 3 years (2014-2017) (60500 €)

### NETLAKE

Grant to attend 1<sup>st</sup> NETLAKE workshop on Automated Buoys Deployment, Erken, SE (2014) (300€)

### International student grant awarded by the Student Award Agency for Scotland

Grant awarded to cover Napier University tuitions fees (2011-2012) (£1820)

### Student Awards

- Best Poster, Ph.D. students Day, Doctoral School SISEO, 13 November 2015
- Best Presentation, International Summer School in Limnology, August 2014

## 7 Skills

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**Languages:** English (advanced), French (native)

**Main interest / theoretic knowledge:** limnology, freshwater ecology, transitions in ecosystems (drivers, dynamics, linearity vs. non-linearity), climate change, multi-lake analysis

**Paleolimnology:** core sampling and sub-sampling (regular+DNA protocol), sediment dating (radioelements, paleomagnetism), age-depth models (clam, serac (author of the R package)), XRF analysis

**Food-web modelling:** Ecopath with Ecosim (use of Rpath version)

**High-frequency:** QA/QC (GLEON programs: Data Standardizer, B3, rB3), buoy deployment

**Evaluation of community diversity:** sampling strategy, taxonomy (cladoceran sub-fossils, river macro-invertebrates), pigments analysis (HPLC)

**Statistics:** R, uni- and multivariate analysis of ecological data, linear and non-linear models, temporal series

**Scientific communication and collaborative tools:** R, Python (Graphics), QGIS2, QGIS3, L<sup>A</sup>T<sub>E</sub>X, Microsoft Office Suite, Zotero, Github

## 8 Courses

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**Professional workshops:** "Using blackboard" (Teaching Learning center, 2018), "Outcomes-based course design" (Teaching Learning center, 2018), "What Does Working on Diversity, Equity Inclusion at UVM Look Like" (Staff Council UVM, 2019), "Communicating Science" (Alan Alda Communicating Science Workshop, 2020), "Inclusify your syllabus" (UVM, 2020), "Designing a course from the ground up" (Prof. Linden Higgins, UVM, 2020), "Thriving in Change" (Dr. Phelan Fretz, UVM EDU, 2020), "Pedagogy of Hope in the Time of Covid-19 (Prof. Kevin Gannon, UVM Pivotal Pedagogy)

**2015 International Summer School in limnology, Bolshie Koty (RU)**

"Lake Ecosystems under Pressure, Processes and Impacts".

**2014 International Summer School in limnology, Evian-les-Bains (FR)**

"Lake Ecology and Temporal Dynamics".

**2014 NETLAKE Workshop, Action COST ES1201, Uppsala (SE)**

"Automated Monitoring and High-Frequency Data Analysis".

## 9 Outreach

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- 2019-2020 Letters to a pre-scientist** - penpal to a 8th grade student from Santa Maria, CA (US). The purpose of the no-opt-out program is to contribute to breaking down the barriers to higher education, by sharing with students from underrepresented communities our experience, and get them interested in Science.
- 2019-11-11 Rubenstein Lab Open-house (per request of the North American Lakes Management Society 2019 conference held in Burlington, VT, USA)**
- 2019-10-05 Rubenstein Lab Open-house (UVM parent's weekend)** - food web of Lake Champlain
- 2018-10-06 Rubenstein Lab Open-house (UVM parent's weekend)** - fish dissection
- 2018-04-02 Host for 'La Bio au labo' (Science popularization)** - Daily communication on Twitter & Facebook during a week.
- 2017-05-22 March for Sciences, Thonon-les-bains (FR)** - Organisation team co-leader of Thonon-les-bains Satellite March. Contact with authorities for autorisation request. Public relation via local newspapers, Twitter, Facebook. Organisation and animation of meetings.
- 2016-09-30 European Researchers Night, Verbania-Pallanza (IT)** - Introduction to paleolimnology with the paleo-team of the CNR-ISE.
- 2015-10-11 "Fête de la science", Thonon-les-bains (FR)** - Member of the organization committee. Creation of a children play-book.
- 2015-07 9<sup>th</sup> Symposium for European Freshwater Sciences, Geneva (CH)** - Student volunteer.
- 2015-06 NETLAKE Workshop, Evian-les-bains (FR)** - Support in the organization.

## 10 Synergistic activities

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Reviewer for journals including: Journal of Paleolimnology, Global Change Biology, Journal of Great Lakes Research, Journal of Plankton Research

## 11 Contacts of references

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### References

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