

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

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## 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.

## Research

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- 07.2018-present Rubenstein School of Environment and Natural Resources (University of Vermont), Burlington, VT, U.S.A.**  
Postdoctoral associate. Advisors: E. Marsden, J. Stockwell.  
Lake Champlain food-web modelling.
- 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 reconstruct the long-term (80 to 1500 years) succession of zooplankton communities in heavily anthropised peri-alpine lakes. My objective is to distangle the impacts of climate change and local human forcings, testing 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 on 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.

## Teaching

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**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

## 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" (\$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

## 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 into Sciences.
- 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.

## 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:** R, Python (Graphics), QGIS2, QGIS3, L<sup>A</sup>T<sub>E</sub>X, Microsoft Office Suite, Zotero

## Courses

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- 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".

## 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

## 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.**      **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
- 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.

## 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)

## 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)

## Communications

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### Seminar, Conference, Workshop

- 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 (**Presentation**)
- 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 (**Presentation**)
- 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 (**Presentation**)
- 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 (**Presentation**)
- 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 (**Presentation**)

- 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 (**Presentation**)
- 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 (**Presentation 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 (**Presentation**)
- 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 (**Presentation**)
- 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 (**Presentation**)
- 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**)

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## References

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