

# Philippe Massicotte

philippe.massicotte@takuvik.ulaval.ca

801 Cardinal-Rouveau app.3  
Québec (Québec) G1S3K6  
☎ 418-654-8128  
Canada

## Education

|           |   |
|-----------|---|
| 2007–2012 | <b>Ph.D. in environmental science (with mention), UQTR/UQAM</b><br><i>Modélisation et simulation de la dynamique de la matière organique dissoute en milieu fluvial</i> |
| 2007      | Certificate in environmental science, UQTR  |
| 2005–2007 | Master in mathematics and computer science (with mention), UQTR   |

## Scientific interests (no specific order)

Numerical analyses, multivariate analyses, spatial analyses, system dynamic, limnology, optic (fluorescence and absorbance), geomatic, mathematics, modeling, scientific programming, complex system, aquatic ecology, large rivers, carbon dynamic, community structure, remote sensing, image analysis (satellite and photographic).

## Competence

|                    |  |                  |   |
|--------------------|--|------------------|---|
| <b>Programming</b> | R<br>Matlab<br>C/C++<br>Java<br>Mathematica<br>Maple         | <b>Systeme</b>   | Linux<br>Windows  |
| <b>SIG</b>         | ArcGIS<br>Geomatica<br>GDAL Librairies<br>Quantum GIS (QGIS) | <b>Others</b>    | ΛT <sub>E</sub> X<br>Products MS Office (Word, Excel, Access)<br>Products Adobe (Photoshop et Illustrator)<br>Products Libre Office |
|                    |  | <b>Languages</b> | French (primary language)<br>English (spoken and written)<br>Danish (beginning)   |

## Professional experiences

|           |   |
|-----------|---|
| 2016–     | <b>Research assistant (Université Laval, Québec, Canada)</b><br>Takuvik Joint International Laboratory (UMI 3376) Université Laval (Canada) & Centre National de la Recherche Scientifique (France)   |
| 2014–2016 | <b>Post-doctoral fellowship (Aarhus University, Denmark)</b><br>Department of Bioscience - Marine Diversity and Experimental Ecology  |
| 2012–2014 | <b>Post-doctoral fellowship (UQTR, Québec, Canada)</b><br>Centre de Recherche sur les Interactions Bassins Versants - Écosystèmes Aquatiques (RIVE)   |
| 2008–2016 | <b>Reviewer in various scientific journals</b><br>Marine Chemistry; International journal of remote sensing; Aquatic Geochemistry; Aquatic Sciences; Environmental Science and Technology; Limnology & Oceanography; Photochemical and Photobiological Sciences; Estuarine, Coastal and Shelf; Environmental Science and Pollution Research |
| 2011      | <b>Invited researcher international scholarship (University of Liège, Belgium)</b>  |

- Characterizing dissolved organic matter in the Congo river  
Université de Liège - Département d'astrophysique, géophysique et océanographie
- 2009 **Project with a professor (UQTR, Québec, Canada)** *Prof. Denis Gratton*  
A tool to remove atmospheric bias introduced in spectral images (Landsat 4/5 and 7)
- 2007 **Student auxiliary (UQTR, Québec, Canada)** *Prof. Jean-Jacques Frenette*  
Create a database for the *Lampsilis* research vessel

## Academic awards and honors

Recipient of 17 research grants for ~ 310 000\$ CDN.

- 2016 **Nomination to Aarhus ST Education Award 2016**  
Quality of the teaching for the class *Analyzing large data sets in R - designed for biologists*
- 2014 **Postdoctoral fellowships program (NSERC)**  
Natural Sciences and Engineering Research Council of Canada (2 years, 90 000\$)
- 2014 **Postdoctoral fellowships program (FRQNT)**  
Fonds de recherche du Québec - Nature et technologies (2 years, 60 000\$)  
*I had to refuse this grant because can not be coupled with NSERC*
- 2012 **Postdoctoral scholarship (UQTR)**  
University of Québec at Trois-Rivières - RIVE (2 years, 80 000\$)
- 2012 **Scholarship diffusion aid (UQTR)**  
Conference - ASLO 2012 Aquatic sciences meeting (1 500\$)
- 2012 **International scholarship (Japan)**  
Student Travel Awards - ASLO 2012 Aquatic sciences meeting (USD 500\$)
- 2011 **Scholarship diffusion aid (UQTR)**  
Conference - 18<sup>th</sup> Annual International Symposium on the St. Lawrence / Great Lakes ecosystems (UQTR, 1 500\$)
- 2011 **Scholarship diffusion aid (UQTR)**  
Publication - Dean of graduate studies and research UQTR (750\$)
- 2011 **Scholarship diffusion aid (UQTR)**  
Conference - 94<sup>th</sup> Canadian Chemistry Conference and Exhibition 2011 (UQTR, 1 000\$)
- 2011 **International scholarship (FRQNT)** Invited researcher for 3 months in University of Liège, Belgium (5 000\$)
- 2010 **Excellence grant 3<sup>rd</sup> cycle (FEDNAV)**  
Foundation of the University of Québec at Trois-Rivières (2 500\$)
- 2010 **Excellence grant 3<sup>rd</sup> cycle - environmental sciences (UQTR)**  
Foundation of the University of Québec at Trois-Rivières (4 000\$)
- 2009 **Scholarship diffusion aid (UQTR)**  
Publication - Dean of graduate studies and research UQTR (750\$)
- 2009 **Scholarship diffusion aid (ISE-UQAM)**  
Publication - Institut of environmental sciences (1 000\$)
- 2009 **Scholarship diffusion aid (ISE-UQAM)**  
Conference - 77<sup>e</sup> Congrès de l'ACFAS - Institut of environmental sciences (1 000\$)
- 2007 **Doctoral Fellowships Program (NSERC)**  
Natural Sciences and Engineering Research Council of Canada (3 years, 60 000\$)

## Teaching, Workshops and other activities

In the last few years, I gave various modelling workshops to graduate students (master and PhD) and also researchers.

- 2016 | **Teaching** *Analyzing large data sets in R - designed for biologists*

- 45 hours teaching (regular class) at Aarhus University
- 2015 **Workshop** *An introduction to R programming language*  
12 weeks workshop at Aarhus University
- 2014 **Interview Radio-Canada**  
La couleur de l'eau selon Philippe Massicotte (program : Les Années Lumières - Doc/postdoc)
- 2014 **Interview newspaper Entête (UQTR)**  
Des chiffres pour l'avancement des connaissances sur le fleuve Saint-Laurent
- 2014 **Evaluation of a master thesis**  
Student : Samuel Bourque, Supervisors : Andrea Bertolo and Paul del Giorgio
- 2012 **Judge in a scientific poster competition**  
Natural Sciences and Engineering - Graduate Studies (UQTR)
- 2012 **Interview newspaper Le Nouvelliste**  
Les couleurs expliquent l'état du fleuve
- 2012 **Interview newspaper Le Nouvelliste**  
Les tributaires ont une influence prépondérante
- 2012 **Oral presentation**  
Marine and freshwater biology [BMR-1001] (UQTR)
- 2012 **Teaching assistant**  
Interpretation of ecological data (statistics) [ECL-1012] (UQTR)
- 2011 **Judge in a scientific poster competition**  
Natural Sciences and Engineering - Graduate Studies (UQTR)
- 2011 **Interview Radio-Canada**  
Le Saint-Laurent scruté à la loupe (program : Le Téléjournal Mauricie)
- 2010 **Workshop** *Statistical Analysis with R*  
Departmental presentation on R as a statistical tool (UQAR)
- 2010 **Teaching assistant (autumn)**  
Interdisciplinary Seminar in Environmental Science I and II (UQAM)
- 2010 **Teaching assistant (winter)**  
Interdisciplinary Seminar in Environmental Science I and II (UQAM)
- 2009 **Volunteer**  
34<sup>th</sup> annual symposium Quebecoise Society for the Biological Study of Behavior (SQEBC)
- 2009 **Workshop** *Workshop on parallel factor analysis (PARAFAC)*  
Institut des sciences de la mer de Rimouski (ISMER) – Québec Océan
- 2006 **Teaching assistant**  
Numerical analysis and scientific programming (UQTR)
- 2005 **Teaching assistant**  
Analysis and processing of digital images (UQTR)

## Conferences and posters

Since my master degree, I gave **more than 20 conferences** of which many were international and three where I was an invited speaker. I also participated in different scientific poster contests.

- 2015 **Invited speaker** *Using a Gaussian decomposition approach to model absorption spectra of chromophoric dissolved organic matter*  
International Workshop on Organic Matter Spectroscopy 2015 (Sopot, Poland)
- 2015 **Conference** *A new method to model absorption spectra of chromophoric organic matter in natural ecosystems*  
18<sup>th</sup> Danske Havforskermede (Copenhagen, Denmark)
- 2014 **Scientific poster** *Influence of the submerged aquatic vegetation landscape on fish larva abundance*  
Shallow Lakes 2014 (Antalya, Turkey)
- 2014 **Conference** *Influence of the submerged aquatic vegetation landscape on fish larva abundance*  
144<sup>th</sup> Annual meeting American Fisheries Society 2014 (Québec, Canada)
- 2014 **Conference** *Googling trends in conservation biology*  
US-IALE 2014 Annual Symposium (Anchorage, Alaska)
- 2014 **Conference** *Influence of the submerged aquatic vegetation landscape on fish larva abundance*  
24<sup>e</sup> symposium annuel du GRIL (auberge du lac Morency, Québec)
- 2013 **Conference** *Google at the service of conservation biology*  
2<sup>e</sup> colloque du RIVE (Trois-Rivières, Canada)
- 2013 **Conference** *Influence of habitat structure on the diversity of aquatic organisms*  
Conference at UQTR (Trois-Rivières, Canada)
- 2012 **Conference** *Mechanistic modeling of doc dynamic: understanding interactions between kinetic processes and mass transport in a large fluvial lake*  
ASLO 2012 Aquatic Sciences Meeting (Lake Biwa, Japan)
- 2012 **Conference** *Spatial and temporal evolution of the St. Lawrence River spectral profile: A 25-year case study using Landsat 5 and 7 imagery*  
1<sup>er</sup> colloque du RIVE (Trois-Rivières, Canada)
- 2012 **Conference** *Mechanistic modeling of doc dynamic: understanding interactions between kinetic processes and mass transport in a large fluvial lake*  
22<sup>e</sup> symposium annuel du GRIL (manoir du lac William, Québec)
- 2012 **Scientific poster** *Colourful niches of phototrophic microorganisms shaped by the spatial connectivity in a large river ecosystem: a riverscape approach*  
22<sup>e</sup> symposium annuel du GRIL (manoir du lac William, Québec)
- 2011 **Conference** *Spatial connectivity in a large river system: resolving the sources and fate of dissolved organic matter*  
18<sup>th</sup> Annual International Conference on the St. Lawrence River/Great Lakes Ecosystem: Scoping the Future (Cornwall, Canada)
- 2011 **Invited speaker** *Spatial connectivity in a large river system: resolving the sources and fate of dissolved organic matter*  
94<sup>th</sup> Canadian Chemistry Conference and Exhibition (Montréal, Canada)
- 2010 **Conference** *La gouvernance à l'épreuve des enjeux environnementaux et des exigences démocratiques*  
78<sup>e</sup> congrès de l'ACFAS (Ottawa, Canada)
- 2009 **Invited speaker** *Modeling and simulation of the dynamics of dissolved organic matter in river environments*  
Institut des sciences de la mer de Rimouski (Rimouski, Canada)
- 2009 **Conference** *Modeling and simulating the dynamic of dissolved organic matter in the St. Lawrence river*  
19<sup>e</sup> symposium annuel du GRIL (manoir du lac William, Québec)
- 2009 **Conference** *Presentation of the thesis project*  
Conference at UQTR (Trois-Rivières, Canada)
- 2005 **Conference** *Aspects-Classes Integration Testing Strategy: An Incremental Approach*

- 2005 | Rapid Integration of Software Engineering Techniques: Second International Workshop, RISE 2005 (Heraklion, Greece)
- 2005 | **Conference** *Generating aspects-classes integration testing sequences a collaboration diagram based strategy*  
3<sup>rd</sup> ACIS International Conference on Software Engineering Research, Management and Applications (SERA 2005). (Michigan, USA)

## Open source development

Author of three R libraries available on CRAN.

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|----------|---|
| eemR     | Analyzing tools for fluorescence matrix<br><a href="https://cran.r-project.org/web/packages/eemR/index.html">https://cran.r-project.org/web/packages/eemR/index.html</a>                    |
| cdom     | Analyzing tools for absorbance spectra of CDOM<br><a href="https://cran.r-project.org/web/packages/cdom/index.html">https://cran.r-project.org/web/packages/cdom/index.html</a>             |
| gtrendsR | R interface with Google Trends for citizen science<br><a href="https://cran.r-project.org/web/packages/gtrendsR/index.html">https://cran.r-project.org/web/packages/gtrendsR/index.html</a> |

## Publications

- 2017 | Massicotte, P., Asmala, E., Stedmon, C., and Markager, S. (2017a). Global distribution of dissolved organic matter along the aquatic continuum: Across rivers, lakes and oceans. *Science of The Total Environment*, 609(C):180–191
- 2017 | Massicotte, P., Stedmon, C., and Markager, S. (2017b). Spectral signature of suspended fine particulate material on light absorption properties of CDOM. *Marine Chemistry*
- 2017 | Massicotte, P. (2017). Excitation-emission fluorescence matrix manipulation made easy: An introduction to eemR. *Journal of Statistical Software (en révision)*
- 2017 | Pena Mello Brandão, L., Brighenti, L., Staehr, P. A., Asmala, E., Massicotte, P., Tonetta, D., Barbosa, F., and Fernandes Bezerra-Neto, J. (2016). Distinctive effects of allochthonous and autochthonous inputs of organic matter on colored dissolved organic matter spectra. *Aquatic Sciences (en révision)*
- 2017 | Nielsen, S. L., Massicotte, P., and Markager, S. (2017). Carbon inputs and dynamics in the eutrophic estuary Roskilde Fjord. *Estuarine Coastal and Shelf Science (en révision)*
- 2017 | Asmala, E., Haraguchi, L., Jakobsen, H. H., Massicotte, P., and Carstensen, J. (2017). Progressive transformation of phytoplankton derived DOM by coastal planktonic community. *Geophysical Research Letters (en révision)*
- 2016 | Massicotte, P. and Markager, S. (2016). Using a Gaussian decomposition approach to model absorption spectra of chromophoric dissolved organic matter. *Marine Chemistry*, 180:24–32
- 2016 | Lambert, T., Bouillon, S., Darchambeau, F., Massicotte, P., and Borges, A. V. (2016a). Environmental drivers on dissolved organic matter degradation in the Congo River Basin across a gradient of streams and rivers. *Biogeosciences*
- 2016 | Lambert, T., Bouillon, S., Darchambeau, F., Massicotte, P., and Borges, A. V. (2016b). Shift in the chemical composition of dissolved organic matter in the Congo River network. *Biogeosciences Discussions*, (July):1–49
- 2016 | Lambert, T., Teodoru, C. R., Nyoni, F. C., Bouillon, S., Darchambeau, F., Massicotte, P., and Borges, A. V. (2016c). Along-stream transport and transformation of dissolved organic matter in a large tropical river. *Biogeosciences*, 13(9):2727–2741
- 2016 | Assani, A. A., Landry, R., Azouaoui, O., Massicotte, P., and Gratton, D. (2016). Comparison of the Characteristics (Frequency and Timing) of Drought and Wetness Indices of Annual Mean Water Levels in the Five North American Great Lakes. *Water Resources Management*, 30(1):359–373

- 2015 Bombenger, P.-H. and Massicotte, P. (2015). Mathématiques & Géographie – Déchiffrer ou des chiffres et la Terre : Apports des concepts mathématiques à la géographie. In Guillaume Tomasini, editor, *Pourquoi les mathématiques?*, page 288. Ellipses markeing
- 2015 Beauchamp, M., Assani, A. A., Landry, R., and Massicotte, P. (2015). Temporal variability of the magnitude and timing of winter maximum daily flows in southern Quebec (Canada). *Journal of Hydrology*, 529:410–417
- 2015 Lambert, T., Teodoru, C. R., Nyoni, F. C., Bouillon, S., Darchambeau, F., Massicotte, P., and Borges, A. V. (2015b). Degradation of dissolved organic matter in a large tropical river. *Scientific Reports*
- 2015 Massicotte, P., Proulx, R., Cabana, G., and Rodríguez, M. A. (2015b). Testing the influence of environmental heterogeneity on fish species richness in two biogeographic provinces. *PeerJ*, 3:e760
- 2015 Massicotte, P., Bertolo, A., Brodeur, P., Hudon, C., Mingelbier, M., and Magnan, P. (2015a). Influence of the aquatic vegetation landscape on larval fish abundance. *Journal of Great Lakes Research*, 41(3):873–880
- 2015 Lambert, T., Darchambeau, F., Bouillon, S., Alhou, B., Mbega, J.-D., Teodoru, C. R., Nyoni, F. C., Massicotte, P., and Borges, A. V. (2015a). Landscape Control on the Spatial and Temporal Variability of Chromophoric Dissolved Organic Matter and Dissolved Organic Carbon in Large African Rivers. *Ecosystems*, 18(7):1224–1239
- 2014 Massicotte, P., Frenette, J.-J., Proulx, R., Pinel-Alloul, B., and Bertolo, A. (2014). Riverscape heterogeneity explains spatial variation in zooplankton functional evenness and biomass in a large river ecosystem. *Landscape Ecology*, 29(1):67–79
- 2014 Proulx, R., Massicotte, P., and Pépino, M. (2014). Googling Trends in Conservation Biology. *Conservation Biology*, 28(1):44–51
- 2014 Biron, S., Assani, A. A., Frenette, J.-J., and Massicotte, P. (2014). Comparison of Lake Ontario and St. Lawrence River hydrologic droughts and their relationship to climate indices. *Water Resources Research*, 50(2):1396–1409
- 2013 Massicotte, P. and Frenette, J.-J. (2013). A mechanistic-based framework to understand how dissolved organic carbon is processed in a large fluvial lake. *Limnology & Oceanography: Fluids & Environments*, 3(3):139–155
- 2013 Massicotte, P., Gratton, D., Frenette, J.-J., and Assani, A. A. (2013b). Spatial and temporal evolution of the St. Lawrence River spectral profile: A 25-year case study using Landsat 5 and 7 imagery. *Remote Sensing of Environment*, 136:433–441
- 2013 Massicotte, P., Assani, A. A., Gratton, D., and Frenette, J. J. (2013a). Relationship between water color, water levels, and climate indices in large rivers: Case of the St. Lawrence River (Canada). *Water Resources Research*, 49(4):2303–2307
- 2012 Frenette, J.-J., Massicotte, P., and Lapierre, J.-F. (2012). Colorful Niches of Phytoplankton Shaped by the Spatial Connectivity in a Large River Ecosystem: A Riverscape Perspective. *PLoS ONE*, 7(4):e35891
- 2012 Pommier, J., Frenette, J.-J., Massicotte, P., Lapierre, J.-F., and Glémet, H. (2012). Seston fatty acid composition and copepod RNA:DNA ratio with respect to the underwater light climate in fluvial Lac Saint-Pierre. *Aquatic Sciences*, 74(3):539–553
- 2011 Massicotte, P. and Frenette, J.-J. (2011). Spatial connectivity in a large river system: resolving the sources and fate of dissolved organic matter. *Ecological Applications*, 21(7):2600–2617
- 2007 Massicotte, P., Badri, L., and Badri, M. (2007). Towards a tool supporting integration testing of aspect-oriented programs. *Journal of Object Technology*, 6(1):67–89
- 2006 Massicotte, P., Badri, L., and Badri, M. (2006). *Rapid Integration of Software Engineering Techniques*, volume 3943 of *Lecture Notes in Computer Science*. Springer Berlin Heidelberg, Berlin, Heidelberg

- 2005 | Massicotte, P., Badri, M., and Badri, L. (2005). Generating aspects-classes integration testing sequences a collaboration diagram based strategy. In *Third ACIS Int'l Conference on Software Engineering Research, Management and Applications (SERA'05)*, pages 30–37. IEEE