

# Debora Yumi de Oliveira

PhD candidate  
Department of Civil and Environmental Engineering  
University of California, Irvine

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## EDUCATION

- 2019-present    **PhD in Civil and Environmental Engineering**, University of California, Irvine (UCI), United States  
Focus area: Hydrology and Water Resources  
Advisor: Dr. Jasper Alexander Vrugt  
January 2019 – June 2022 (expected)  
GPA: 4.0/4.0
- 2016-2018    **Master in Environmental Engineering**, Federal University of Santa Catarina (UFSC), Brazil  
Specialization: Hydrology and Applied Hydraulics  
Thesis title: *Bayesian inference applied to interception and rainfall-runoff modeling*  
Advisor: Dr. Pedro Luiz Borges Chaffe  
March 2016 – March 2018  
GPA: 10/10
- 2010-2015    **Environmental and Sanitary Engineering**, Federal University of Santa Catarina (UFSC), Brazil  
Thesis title: *Identification of interception model parameters using an automatic calibration algorithm*  
Advisor: Dr. Pedro Luiz Borges Chaffe  
March 2010 – September 2015  
GPA: 9.03/10
- 2012-2013    **BRAFITEC Exchange Program**, École Nationale Supérieure de Géologie (ENSG), France  
Specialization: Resources, land use and water management  
January 2012 – February 2013  
GPA: 15.35/20

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## AWARDS

- 2022    Miguel Velez Scholarship, University of California, Irvine
- 2017    Young Researcher Award (awarded every two years), Brazilian Water Resources Association
- 2015    Medal of honor for academic achievement (top graduating student in Environmental and Sanitary Engineering), Federal University of Santa Catarina

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## PEER-REVIEWED PUBLICATIONS

*In progress*

**Oliveira, D.Y.**; Vrugt, J.A. Diagnostic Bayes: Merging the strengths of Bayesian inference and diagnostic model evaluation. *In preparation.*

Vrugt, J.A.; **Oliveira, D.Y.** The Universal Likelihood Function. *In preparation.*

Anzolin, G.; Chaffe, P.L.B.; **Oliveira, D.Y.**; Vrugt, J.A.; Rodrigues, R.R.; AghaKouchak, A. Considering uncertainty and nonstationarity in extreme rainfall frequency analysis. *In preparation.*

**Oliveira, D.Y.**; Vrugt, J.A. The Treatment of Uncertainty in Diagnostic Model Evaluation: 1. A Probabilistic Description of Measured Streamflow Records. *Submitted* (under review).

**Oliveira, D.Y.**; Vrugt, J.A. The Treatment of Uncertainty in Diagnostic Model Evaluation: 2. A Probabilistic Description of Hydrologic Signatures. *Submitted* (in revision).

Vrugt, J.A.; **Oliveira, D.Y.** Probabilistic interpretation of the Kling-Gupta Efficiency. *Submitted* (in revision).

#### *Published*

7. David, P.C.; Chaffe, P.L.B.; Chagas, V.B.P.; Dal Molin, M.; **Oliveira, D.Y.**; Klein, A.H.F.; Fenicia, F. (2022). Correspondence between model structures and hydrological signatures: a large-sample case study using 508 Brazilian catchments. *Water Resources Research*. <https://doi.org/10.1029/2021WR030619>
6. Paiva, R.C.; et al. including **Oliveira, D.Y.** (2020). Advances and challenges in the water sciences in Brazil: a community synthesis of the XXIII Brazilian Water Resources Symposium. *Brazilian Journal of Water Resources*, 25, e50. <https://doi.org/10.1590/2318-0331.252020200136>
5. Franco, A.C.L.; **Oliveira, D.Y.**; Bonumá, N.B. (2020). Comparison of single-site, multi-site and multi-variable SWAT calibration strategies. *Hydrological Sciences Journal*, 65(14), 2376-2389. <https://doi.org/10.1080/02626667.2020.1810252>
4. Bartiko, D.; **Oliveira, D.Y.**; Bonumá, N.B.; Chaffe, P.L.B. (2019). Spatial and seasonal patterns of flood change across Brazil. *Hydrological Sciences Journal*, 64(9), 1071-1079. <https://doi.org/10.1080/02626667.2019.1619081>
3. David, P.C.; **Oliveira, D.Y.**; Grison, F.; Kobiyama, M.; Chaffe, P.L.B. (2019). Systematic increase in model complexity helps to identify dominant streamflow mechanisms in two small forested basins. *Hydrological Sciences Journal*, 64(4), 455-472. <https://doi.org/10.1080/02626667.2019.1585858>
2. **Oliveira, D.Y.**; Chaffe, P.L.B.; Sá, J.H.M. (2018). Extending the applicability of the Generalized Likelihood function for zero-inflated data series. *Water Resources Research*, 54, 2494-2506. <https://doi.org/10.1002/2017WR021560>
1. Sá, J.H.M.; Chaffe, P.L.B.; **Oliveira, D.Y.** (2015). A comparative analysis of the Gash and the Rutter models for the estimation of rainfall interception by Mixed Ombrophilous Forest. *Brazilian Journal of Water Resources*, 20, 1008-1018. <https://doi.org/10.21168/rbrh.v20n4.p1008-1018> (in Portuguese)

#### TEACHING EXPERIENCE

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| 2020 | <b>Teaching Assistant</b> , CEE20 <i>Introduction to Computational Engineering Problem Solving</i> , Fall 2020, University of California Irvine, United States.                         |
| 2019 | <b>Lecturer</b> , Short course on <i>Fundamentals of Hydrological Modeling</i> (12 hours), Federal University of Paraná (UFPR), Brazil. Participants: 20. November 19-20, 2019.         |
| 2019 | <b>Lecturer</b> , Short course on <i>Fundamentals of Hydrological Modeling</i> (8 hours), XXIII Brazilian Symposium on Water Resources, Brazil. Participants: 30. November 24, 2019.    |
| 2017 | <b>Lecturer</b> , Short course on <i>Bayesian Analysis applied to Hydrology</i> (6 hours), XXII Brazilian Symposium on Water Resources, Brazil. Participants: 15. November 28-30, 2017. |

- 2016-2017      **Teaching Assistant**, Federal University of Santa Catarina (UFSC), Brazil. One to three lectures per semester on Hydrology and Climatology (interception, runoff generation mechanisms, introduction to hydrological modeling) and one lecture per semester on Water Resources Planning (reservoir management lab session) for undergraduates in Environmental and Sanitary Engineering.
- 2016            **Lecturer**, Short course on *Introduction to MATLAB* (8 hours) for undergraduates in Environmental and Sanitary Engineering, Federal University of Santa Catarina (UFSC), Brazil. Participants: 15. March 29-April 01, 2016.

## MENTORSHIP EXPERIENCE

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- 2019            **Co-advisor**, Gabriel Anzolin, *Estimation of rainfall intensity-duration-frequency curves in Southern Brazil using stationary and nonstationary models*, Bachelor thesis, Federal University of Santa Catarina, Brazil.
- 2017            **Co-advisor**, Paula Cunha David, *Influence of conceptual model structure on the rainfall-runoff simulation in two forested catchments*, Bachelor thesis, Federal University of Santa Catarina, Brazil.

## PROFESSIONAL SERVICE

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- 2021            **Selection committee**, Young Researcher Award, XXIV Brazilian Symposium on Water Resources, Brazil.
- 2019            **Co-convener**, Special session on *Hydrological models as hypothesis of catchment functioning*, XXIII Brazilian Symposium on Water Resources, Brazil.
- Journal reviewer**: Water Resources Research, Brazilian Journal of Water Resources, Revista de Gestão de Água da América Latina (in Portuguese)

## SKILLS

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Software: ArcGIS, MATLAB, familiar with R  
 Language: Portuguese (native), English, French

## PRESENTATIONS

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### *Oral presentations*

**Oliveira, D.Y.**; Vrugt, J.A. (2021). Estimating the Uncertainty of Hydrologic Signatures through Model-free Discharge Resampling and its use for Model Diagnostics. *AGU Fall Meeting*, New Orleans & virtual.

**Oliveira, D.Y.**; Vrugt, J.A. (2019). Uncertainty in hydrological signatures. *XXIII Brazilian Symposium on Water Resources*, Florianópolis, Brazil. (in Portuguese)

**Oliveira, D.Y.**; Vrugt, J.A. (2019). The use of hydrological signatures for model calibration. *27th IUGG General Assembly*, Montréal, Canada.

**Oliveira, D.Y.**; Bartiko, D.; Chaffe, P.L.B. (2018). Uncertainty in flood frequency analysis using stationary and nonstationary models in Southern Brazil. *I Brazilian Symposium on Natural Disasters*, Porto Alegre, Brazil. (in Portuguese)

**Oliveira, D.Y.**; Chaffe, P.L.B.; Sá, J.H.M. (2017). Impact of the likelihood function on the predictive uncertainty and parameter inference of a rainfall interception model. *XXII Brazilian Symposium on Water Resources*, Florianópolis, Brazil. (in Portuguese)

**Oliveira, D.Y.**; Chaffe, P.L.B.; Sá, J.H.M. (2016). Why size doesn't matter: The importance of stemflow measurements in the evaluation of interception models. *AGU Fall Meeting*, San Francisco.

#### *Poster presentation*

**Oliveira, D.Y.**; Chaffe, P.L.B. (2019). Embracing parameter correlation in hydrological models: explicitly accounting for it improves identifiability. *EGU General Assembly*, Vienna, Austria.

**Oliveira, D.Y.**; Chaffe, P.L.B.; Sá, J.H.M. (2015). Identification of rainfall interception model parameters using an automatic calibration algorithm. *XXI Brazilian Symposium on Water Resources*, Brasília, Brazil. (in Portuguese)

#### CONFERENCE PUBLICATIONS

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##### *Conference papers*

**Oliveira, D.Y.**; Vrugt, J.A. (2019). Uncertainty in hydrological signatures. In: *XXIII Brazilian Symposium on Water Resources*, Foz do Iguaçu, Brazil. (in Portuguese)

Anzolin, G.; **Oliveira, D.Y.**; Chaffe, P.L.B. (2019). Uncertainty in rainfall intensity-duration-frequency curves in the Itajai River basin. In: *XXIII Brazilian Symposium on Water Resources*, Foz do Iguaçu, Brazil. (in Portuguese)

Arienti, P.F.; Sa, J.H.M.; **Oliveira, D.Y.**; Chaffe, P.L.B. (2019). Uncertainty analysis of two rainfall interception models applied to a Dense Ombrophilous Forest. In: *XXIII Brazilian Symposium on Water Resources*, Foz do Iguaçu, Brazil. (in Portuguese)

Bartiko, D.; **Oliveira, D.Y.**; Bonumá, N.B.; Chaffe, P.L.B. (2019). Uncertainty and nonstationarity in flood frequency analysis in Brazil. In: *XXIII Brazilian Symposium on Water Resources*, Foz do Iguaçu, Brazil. (in Portuguese)

David, P.C.; **Oliveira, D.Y.**; Chagas, V.B.P.; Chaffe, P.L.B. (2019). Investigation of the relationship between hydrological model structures and catchment characteristics. In: *XXIII Simpósio Brasileiro de Recursos Hídricos*, 2019, Foz do Iguaçu, Brazil. (in Portuguese)

Sá, J.H.M.; **Oliveira, D.Y.**; Arienti, P.F.; Perez, A.B.A.; Innocente, C.; Chaffe, P.L.B. (2019). Intra-event variability of the interception process in a Dense Ombrophilous Forest. In: *XXIII Brazilian Symposium on Water Resources*, Foz do Iguaçu, Brazil. (in Portuguese)

**Oliveira, D.Y.**; Bartiko, D.; Chaffe, P.L.B. (2018). Uncertainty in flood frequency analysis using stationary and nonstationary models in Southern Brazil. In: *I Brazilian Symposium on Natural Disasters*, 2018, Porto Alegre, Brazil. (in Portuguese)

**Oliveira, D.Y.**; Chaffe, P.L.B.; Sá, J.H.M. (2017). Impact of the likelihood function on the predictive uncertainty and parameter inference of a rainfall interception model. *XXII Brazilian Symposium on Water Resources*, Florianópolis, Brazil. (in Portuguese)

Bartiko, D.; **Oliveira, D.Y.**; Speckhann, G.A.; Chagas, V.B.P.; Bonumá, N.B.; Chaffe, P.L.B. (2017). Seasonality of maximum discharges in Southern Brazil. *XXII Brazilian Symposium on Water Resources*, Florianópolis, Brazil. (in Portuguese)

David, P.C.; **Oliveira, D.Y.**; Chaffe, P.L.B. (2017). The influence of temporal data resolution on a conceptual hydrological model. *XXII Brazilian Symposium on Water Resources*, Florianópolis, Brazil. (in Portuguese)

Innocente, C.; **Oliveira, D.Y.**; David, P.C.; Perez, A.B.A.; Chagas, V.B.P.; Chaffe, P.L.B. (2017). Investigating the representative elementary area concept in small coastal watersheds. *XXII Brazilian Symposium on Water Resources*, Florianópolis, Brazil. (in Portuguese)

Sá, J.H.M.; Chaffe, P.L.B.; **Oliveira, D.Y.**; Lisboa, H.M. (2017). Spatial and temporal patterns of throughfall in a coastal Atlantic Forest plot in Southern Brazil. *XXII Brazilian Symposium on Water Resources*, Florianópolis, Brazil. (in Portuguese)

**Oliveira, D.Y.**; Chaffe, P.L.B.; Sá, J.H.M. (2015). Identification of rainfall interception model parameters using an automatic calibration algorithm. *XXI Brazilian Symposium on Water Resources*, Brasília, Brazil. (in Portuguese)

Sá, J.H.M.; Chaffe, P.L.B.; **Oliveira, D.Y.**; Giglio, J. N.; Kobiyama, M.; Lisboa, H.M. (2015). Identification and characterization of rainfall interception events on a catchment covered by Mixed Ombrophilous Forest. *XXI Brazilian Symposium on Water Resources*, Brasília, Brazil. (in Portuguese)

### Conference abstracts

**Oliveira, D.Y.**; Vrugt, J.A. (2021). Estimating the Uncertainty of Hydrologic Signatures through Model-free Discharge Resampling and its use for Model Diagnostics. In: *AGU Fall Meeting*, 2021, New Orleans & virtual. AGU Abstract Browser, Abstract H52C-04.

Anzolin, G.; **Oliveira, D.Y.**; Chaffe, P.L.B. (2020). Uncertainty and nonstationarity in precipitation frequency analysis in Southern Brazil. In: *II Encontro Nacional de Desastres*, 2020, virtual. (in Portuguese)

**Oliveira, D.Y.**; Vrugt, J.A. (2019). The use of hydrological signatures for model calibration. In: *27th IUGG General Assembly*, 2019, Montréal, Canada. IUGG 2019 Abstracts Book.

Chaffe, P.L.B.; **Oliveira, D.Y.**; Bartiko, D.; Chagas, V.B.P. (2019). Prediction of extreme flood events in Brazil: accounting for uncertainty and (non)stationarity. In: *27th IUGG General Assembly*, 2019, Montréal, Canada. IUGG 2019 Abstracts Book.

**Oliveira, D.Y.**; Chaffe, P.L.B. (2019). Embracing parameter correlation in hydrological models: explicitly accounting for it improves identifiability. In: *EGU General Assembly*, 2019, Vienna, Austria. Geophysical Research Abstracts, EGU2019-1456.

Sá, J.H.M.; **Oliveira, D.Y.**; Perez, A.B.A.; Innocente, C.; David, P.C.; Brighenti, T.M.; Chaffe, P.L.B. (2018). Rainfall interception by Dense Ombrophilous Forest - A study in Subtropical Brazil. In: *EGU General Assembly*, 2018, Vienna, Austria. Geophysical Research Abstracts, EGU2018-11244.

Innocente, C.; Sá, J.H.M.; Perez, A.B.A.; Arienti, P.F.; **Oliveira, D.Y.**; David, P.C.; Chaffe, P.L.B. (2018). Preliminary investigation of topography and baseflow chemical characteristics in subtropical watersheds. In: *EGU General Assembly*, 2018, Vienna, Austria. Geophysical Research Abstracts, EGU2018-5601.

David, P.C.; **Oliveira, D.Y.**; Chaffe, P.L.B. (2018). Increasing complexity in model structure and likelihood function helps to identify dominant streamflow mechanisms: A case study of two small forest basins in Brazil. In: *EGU General Assembly*, 2018, Vienna, Austria. Geophysical Research Abstracts, EGU2018-3520.

Sá, J.H.M.; Chaffe, P.L.B.; **Oliveira, D.Y.**; Giglio, J. N.; Kobiyama, M. (2017). Throughfall patterns of a Subtropical Atlantic Forest in Brazil. In: *EGU General Assembly*, 2017, Vienna, Austria. Geophysical Research Abstracts, EGU2017-2343.

**Oliveira, D.Y.**; Chaffe, P.L.B.; Sá, J.H.M. (2016). Why size doesn't matter: The importance of stemflow measurements in the evaluation of interception models. In: *AGU Fall Meeting*, 2016, San Francisco. AGU Abstract Browser, Abstract H52A-08.

## SHORT COURSES

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| 2022 | <b>Machine Learning in Python for Environmental Science Problems</b> (15 hours)<br>American Meteorological Society (AMS), United States   |
| 2021 | <b>Introduction to the WRF-Hydro Modeling System</b> (8 hours)<br>American Meteorological Society (AMS), United States  |
| 2016 | <b>Model building, inference and hypothesis testing in hydrology</b> (36 hours)<br>Luxembourg Institute of Science and Technology (LIST), Luxembourg  |
| 2015 | <b>Basic SWAT course</b> (36 hours)<br>Federal University of Santa Catarina (UFSC), Brazil  |
| 2015 | <b>TerraMA<sup>2</sup>: Computational platform for developing systems for monitoring, analysis and alert of environmental data</b> (32 hours)<br>Brazilian Institute of Space Research (INPE), Brazil |