

# Stochastic modelling of anything!

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**When:** April 16, 2018, 16.00 – 20.00

**Where:** Czech University of Life Science Prague, Faculty of Environmental Sciences  
Kamýcká 129, Praha 6 - Suchdol, MCEV I Room Z225

**Enrollment:** Please email [markonis@fzp.czu.cz](mailto:markonis@fzp.czu.cz)

Attendees of this four-hour workshop will be introduced to a unified method of stochastic modelling that makes feasible the generation of time series that preserve any desired marginal distribution and autocorrelation structure including also features like intermittency. The workshop includes a rapid introduction in hydroclimatic processes like precipitation, flooding, wind, temperature, etc., from the viewpoint of stochastics, highlighting features like stationarity, cyclostationarity, marginal distributions, autocorrelations structures and intermittency. We will develop on-the-spot using Microsoft Excel: (a) the iconic AR(1) model, (b) higher order AR models as a method to approach arbitrary autocorrelations structures; (c) the parent-Gaussian framework to simulate time series with any marginal and autocorrelation structure; and (d) intermittent time series modelling.

**Additional info:** The material covered in this workshop is described in detail in (Papalexiou, 2018) and thus all attendees should have a digital (or printed) copy of the paper prior to the workshop. Coded and ready to use MS Excel files with advanced methods will be provided. The general concept of the workshop is to create a “playground” where attendees will develop and apply (or modify and explore given excel programs) by themselves most of the introduced material.

## References

Papalexiou, S. M. (2018). Unified theory for stochastic modelling of hydroclimatic processes: Preserving marginal distributions, correlation structures, and intermittency. *Advances in Water Resources*. <https://doi.org/10.1016/j.advwatres.2018.02.013>

*Simon Michael Papalexiou* is currently a researcher at the University of California Irvine, USA, and an elected Assistant Professor of Statistical Hydrology and Stochastic Processes at the University of Saskatchewan, Canada (starting June 1, 2018) affiliated also to the Global Institute of Water Security, Canada. Simon strives to understand the probabilistic nature of hydroclimatic processes. His past and present research evolves around the quest for a unified and precise theory for stochastic modeling, accurate diagnostics of climatic change, and uncertainty quantification in hydroclimatic processes with emphasis on extreme events. Most of his studies are performed at the global scale or over large areas using tenths of thousands of stations. He aims to assess changes under global warming and develop robust statistical and stochastic modelling tools to improve predictions and quantify the related uncertainty. He believes research is a joy and loves to teach having always in mind that there aren't “bad” students but only “bad” teachers.