Dr Valentina Noacco

Contact Information

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Key Capabilities

- Experienced researcher specialized in transferring research to industry, in the specific statistical methods to quantify model uncertainty to the re-insurance sector
- PhD in water quality modelling
- Excellent communication and programming skills, collaborative attitude

Work Experience

Senior Research Associate in Uncertainty Analysis, University of Bristol (Sep 2021–)

- I am developing an open-source modelling platform for the transparent quantification of uncertainty in the hazard components of catastrophe models used in the re-insurance sector.
- In collaboration with industrial partner (www.maximuminformation.com) I combine existing open-source Tropical Cyclone Hazard Generator and Global Sensitivity Analysis (GSA) tools to quantify climate and weather peril uncertainty openly in the present so to enable extrapolation and communication of expected changes in these perils due to climate change.

Knowledge Exchange Fellow, University of Bristol (Nov 2017–Aug 2021)

- My work focused on transferring research to robustly quantify and prioritize uncertainties in mathematical models to the re-insurance sector.
- I have developed several case studies with re-insurance companies and model vendors (AXA XL, OASIS LMF, JBA Risk Management), which demonstrate the benefit of using GSA to help build and validate catastrophe models. I have also developed tailored training material to guide the user through the steps needed to apply GSA and to interpret the results.
- I developed strong programming skills in Python and further my R programming skills, I have become proficient at using Jupyter Notebook and Rmarkdown to write reports in an engaging way and to visualise, also interactively, and interpret complex data.
- I have gained extensive experience at working collaboratively with industrial partners, gauging their needs and transferring research in an accessible way, and by writing joint research bids.
- I also demonstrated considerable organisational skills by coordinating multiple projects and organising and delivering several workshops for practitioners and academics, both independently and in collaboration with industrial partners. These presentations and workshops also proved my excellent communication skills for a wide range of audiences.

Maternity Leave (Oct 2020–Jun 2021)

Research Associate, University of Bristol (Apr 2017–Oct 2017)

- My work focused on transferring research to validate actuarial pricing models more efficiently.
- I collaborated with the re-insurance company XL Catlin on an actuarial case study and developed tailored workflows in RMarkdown to apply GSA to their pricing models. I have later presented the results at a seminar at the Bristol Actuarial Society.
- I developed strong programming skills in R and explored VBA in Excel.

Education

Ph.D., Civil Engineering, University of Bristol (2017)

- Thesis title: Investigating long-term drivers and controls on fluvial dissolved organic carbon and nitrate in the UK.
- I developed and applied water quality models and statistical methods to study long-term patterns and drivers of water quality. I gained strong skills in statistical methods (e.g. sensitivity analysis, generalised additive models and singular spectrum analysis), water quality modelling, model programming in Matlab and R, and optimisation techniques (e.g. simulated annealing).

M.Sc., Water and Environmental Management (Distinction), University of Bristol (2012)

- Thesis title: Understanding the spatial heterogeneity of soil carbon on the North Wyke Farm Platform at Rothamsted Research.

B.Sc., Environmental and Resources Engineering (100/110), University of Udine (2011)
- Thesis title: Sewage treatment, focusing on sewage sludge and its utilization in agriculture.

Workshops and tutorials

I have delivered a large number of tutorials and workshops during my fellowship, which include:
- **tutorials** on the use of Global Sensitivity Analysis (GSA) and the SAFE (Sensitivity Analysis For Everybody) toolbox at the **re-insurance companies** AXA XL, Willis Re, AON, AXA and Munich Re (∼56 participants, 2018- 2020),
- two **workshops** at the **OASIS Conference 2019** on GSA and the SAFE toolbox applied to a flood model (with JBA Risk Management and OASIS LMF) (∼80 participants),
- a **workshop** between insurance sector - University of Bristol on strengthening resilience in the developing world (22 participants, 2019),
- two **tutorials** on the use of GSA and the SAFE toolbox applied to a rainfall-runoff model at the University of Bristol and at the University of Southampton (∼25 participants, 2018-2019.)

PRESENTATIONS

I have presented my work extensively at scientific and industry conferences and events, namely the European Geosciences Union General Assembly (2020, 2019, 2018, 2017, 2016, 2014), American Geophysical Union Fall Meeting (2017, 2015, 2014, 2013), the OASIS LMF Conference (2019), Models To Decisions Conference (2018), UK Alliance for Disaster Research Conference (2018), British Hydrological Society Peter Wolf Symposium (2013, 2014, 2015).

SELECTED PUBLICATIONS

Noacco V, Sarrazin F, Pianosi F, Wagener T. 2021. "Matlab/R workflows to assess critical choices in Global Sensitivity Analysis using the SAFE toolbox.". *MethodsX*, 6: 2258-2280 DOI: 10.1016/j.mex.2019.09.033.

Noacco V, Duffy CJ, Wagener T, Worrall F, Fasiolo M, Howden NJK. 2018. "Drivers of interannual and intra-annual variability of dissolved organic carbon concentration in the River Thames between 1884 and 2013." *Hydrological Processes*, 33 (6): 994-1012 DOI: 10.1002/hyp.13379.

Noacco V, Wagener T, Worrall F, Burt TP, Howden NJK. 2017. "Human impact on long-term organic carbon export to rivers." *Journal of Geophysical Research: Biogeosciences*, 122 (4): 947-965 DOI: 10.1002/2016JG003614.

GRANTS AND AWARDS

Post-doctoral fellowship: Natural Environment Research Council (NERC) Knowledge Exchange Fellowship (2017-2021)

Doctoral scholarship: NERC and University of Bristol (2012-2017)

Travel Grants: Bristol University Alumni (2016), British Hydrological Society (2015, 2014)

Awards: Green Capital Change Maker Award (2017, Gold 2015), best poster prize for second year-PhD student at Natural Systems and Processes Poster Session, University of Bristol (2014), British Hydrological Society second prize for best poster at Peter Wolf Early Career Hydrologists' Event, Imperial College, London (2013), best overall MSc student in the Department of Civil Engineering, University of Bristol (2012)

SOFTWARE SKILLS

Expert user of: R and MATLAB programming languages, R Markdown for reports and websites creation, MS Office Suite
Proficient user of Python programming language and Jupyter Notebook

VOLUNTEERING ACTIVITIES

Gender Equality Conference Organiser, University of Bristol (2019): responsible for co-organising the national workshop "Quality through equality - tackling gender issues in hydrology". Duties included: designing the workshop programme, organising activities, inviting external speakers, delivering introductory presentation and chairing sessions.
Forest School Volunteer, Bannerman Road Community Academy (2016-2017): volunteered looking after and ran water-related sustainability projects for students years 3-6.