

Curriculum Vitae

Guy Schumann, MA Joint Honours, MSc, PhD

Place and date of birth: 15 September 1978
 Nationality: Luxembourg
 E-mail: Guy.J.Schumann@jpl.nasa.gov



CURRENT: Research position at the NASA Jet Propulsion Laboratory (JPL), California Institute of Technology, working on projects for the NASA/CNES SWOT satellite mission

Honorary Research Fellow position at the School of Geographical Sciences, University of Bristol, UK

08/2008 – 03/2012: 08/2011-03/2012: Full-time tenured lecturer/Research Fellow in Hydrology, University of Bristol (UK)

GWR Postdoctoral Researcher (08/2008-07/2011)

10/2010: Academic visit to the School of Earth Sciences at Ohio State University, USA (Doug Alsdorf)

10/2007 – 07/2008: 1-year project at Bristol University funded by the National Research Fund of Luxembourg. Evaluation of a LAM with remotely sensed soil moisture fields

03/2005 – 02/2008: PhD study (PhD in Geography, Dundee University (UK) / CRP-GL (L), Department of Environment and agrobiotechnologies. Part of the research unit GEOSAT for hydrological studies. PhD topic: Water stages from remotely sensed imagery for improved flood inundation modelling. PhD awarded: October 2008

09/2003 – 09/2004: Postgraduate studies at Dundee University. Degree of MSc with Distinction in Remote Sensing: Image Processing and Applications

05/2004 – 09/2004: MSc thesis research placement at the Public Research Centre – Gabriel Lippmann (CRP-GL), Luxembourg

09/1999 – 06/2003: Undergraduate studies at Dundee University. First class degree of MA Joint Honours in Geography/Environmental Science

05/2002 – 09/2002: Undergraduate dissertation research placement at Grande Dixence S.A. (HEP, Sion, Switzerland)

09/1991 – 06/1998: Secondary school education, LGE, Luxembourg

Pending research funding and other:

- Co-I on a NASA THP proposal submitted 2013: A multi-sensor hydrologic modeling framework to understand the coupled human and natural feedbacks in the Zambezi basin \$ 449,160 (01/2014 – 12/2016, proposed)
- SMAP Early Adopter project with the UN World Food Programme (current): Application of a SMAP-based index for flood forecasting in data-poor regions
- Consultancy work for the World Bank (J1 Caltech-approved): Applications of remote sensing techniques to hydrologic and meteorological services in southern Africa

Successful current and past research funding:

- 3-year PhD scholarship from the Luxembourg government (BFR) of € 54,000 (03/2005 – 02/2008)
- Conference funding from the CRP-GL and the Luxembourg National Research Fund in the order of € 1500 (6x)
- 1-year research fellowship from the Luxembourg National Research Fund (MA6) of € 27,592 (10/07-07/08)
- Principal Investigator on ESA CAT-1 projects on flooding and space-borne remote sensing (current)
- Co-PI on a DLR TerraSAR-X project investigating the Tewkesbury 2007 summer flood (current)
- PI on a UK DEFRA ALSF-MEPF grant investigating the feasibility of automated processing of SONAR data for seabed features of high conservation status (£ 163,049) (current) (10/09-11/10)
- PI on a NERC NCEO small grant investigating the use of low resolution remotely sensed flood imagery and height data for the retrieval of water levels on large rivers around the globe and integration with large scale hydraulic models (£ 25,000) (current) (01/10-06/11) (for a brief summary, see: <http://www.bristol.ac.uk/water/news/2010/8.html>)
- CONGO-HYDRO: PI on a Leverhulme (UK research charity organisation) grant proposal to look at the Congo flood processes and contrast modelling with Amazon results (project partners include Doug Alsdorf from OSU and Ed Beighley from San Diego State University) (£315k)

- FLOODMOIST: £25k for international collaborator on £350k project funded by BELSPO (Belgian Science Office) and the Luxembourg National Research Fund (FNR) to look into assimilation of soil moisture and flood parameters from space into coupled hydrologic-hydraulic models
- FLOODTRACKER: £25k for international collaborator on project funded by the Luxembourg National Research Fund (FNR) to look into autonomous tracking of buoys from space for measuring water level and velocities and integration with hydraulic models
- PAPARAZZI: £25k for international collaborator on project funded by the Luxembourg National Research Fund (FNR) to look into global flood mapping from space and integration with hydraulic models

Supervision: A 1-year post-doctoral research assistant looking at sonar image data for seabed feature identification and monitoring under the UK DEFRA-funded project
Two 3-year UK NERC-funded PhD students looking at LiDAR data from the ICESat mission to track water levels and hydrodynamics from space and integration with large scale hydraulic modelling

Teaching: **University of Bristol, School of Geographical Sciences, academic year 2008/09-03/2012**
MSc Environmental Management and Politics unit convener & lecturer / Year 2 BSc Remote Sensing unit convener
Second year BSc lecture courses on remote sensing theoretical principles and application (+ practicals)
First year BSc lecture courses on GIS (+ practicals)
University of Dundee, Department of Geography, January 2009-2011
Regular guest lecturer at the MSc in Remote Sensing/MSc in Sustainable Catchment Management
UNESCO IHE Institute for Water Education, Delft, September 20-24, 2010
Lecturer and co-organiser of a short course on *new data sources to support flood modelling*

Conferences: RSPSoc Annual Student Meeting 2005, Firthcree Point, Scotland, **14-16 March 2005**
RSPSoc Annual Conference, Portsmouth (UK), **6- 9 September 2005**.
Science Day (L), **29 October 2005**
High School workshop (EU project on research science), Luxembourg, **18 November 2005**
High School remote sensing workshop, Luxembourg, **19 December 2005**
Graduate School Seminar Day, Nancy (F), **26 January 2006**
ISPRS, Mid-Term Symposium 2006, Enschede (NL), **8- 11 May 2006**
7th Spatial Accuracy Symposium, Lisbon (P), **5-7 July 2006**
ERB 2006, Luxembourg (L), **19-22 September 2006**
International Graduate School 2006, Trier (G), **1 December 2006**
EGU General Assembly 2007, Vienna (A), **15-20 April 2007**
ESA LAND TRAINING 2007 Workshop, Lisbon (P), **2-7 September 2007**
SHHG/BHS postgraduate evening day, Glasgow (UK), **14 November 2007**
EGU 2008, Vienna (Austria), **13-18 April 2008**
RSPSoc 2008, Falmouth (UK), **15-17 September 2008**
EGU 2009, co-convener of two sessions on floodplain mapping, Vienna (Austria), **19-24 April 2009**
RSPSoc 2009, Leicester (UK), **08-11 September 2009**
ESA/EGU Water Cycle Conference, Frascati (Italy), **18-20 November 2009**
EGU 2010, convener and co-convener of two sessions on remote sensing and flooding/hydrology, Vienna (Austria), **2-7 May 2010**
BHS International Symposium 2010, co-convener of one session, Newcastle (UK), **19-23 July 2010**
IAHS, Remote Sensing and Hydrology 2010, Jacksonhole (Wyoming, USA), **27-30 September 2010**
EGU 2011, convener and co-convener of two sessions on remote sensing and flooding/hydrology, Vienna (Austria), **3-8 April 2011**
AGU 2011, co-convenering session H99: papers on remote sensing and hydrology, San Francisco, CA, **5-9 December 2011**
EGU 2012, co-organising 3 sessions on remote sensing and flood modelling and hydrology, Vienna (Austria), **22-27 April 2012**
CMWR 2012, invited speaker, Champaign, IL, **18-21 June 2012**
AGU 2012, San Francisco, CA, **3-7 December 2012**
3rd Global Flood Workshop 2013, Washington D.C./Greenbelt, MD, **4-6 March 2013**
SWOT Assimilation Workshop. Toulouse, France, **11-13 November 2013**
AGU 2013, San Francisco, CA, **9-13 December 2013**

Qualifications: Computing experience: Microsoft Office: Mac OS X; Linux; LaTeX suite; ARC GIS; Image Processing Software Packages: ENVI; ERDAS; ERMapper; PCI (GUI models); Matlab Image Processing Toolbox; ESA software (POLARSARPRO, BEST, BEAM); Hydrodynamic modelling: HEC-RAS (1D), LISFLOOD-FP (2D); Programming skills: C/C++; Python; VBA; HTML; FORTRAN (all rather basic); MATLAB (advanced); Languages: Luxemburgish (mother tongue), English (fluent), French (fluent), German (fluent), Italian (good)

Prizes and Awards: Caird Social Prize from Dundee University, Geography Department, **June 2003**
Dundee University Class Medal in Environmental Science (4th year), September 2003

BHS Student Award 2003 from the British Hydrological Society and the Institution of Civil Engineers, **January 2004**
Alfred Steers Dissertation Prize from the Royal Geographical Society, **June 2004**
Dundee University Class Medal in Remote Sensing, **September 2004**
RSPSoc Student award for the Best MSc thesis 2005, **September 2005**
Runner-up poster award at the International Graduate School 2006, **December 2006**
FNR (National Research Fund, Luxembourg) award for outstanding scientific publication, **October 2010**

- Memberships:** Remote Sensing and Photogrammetry Society (RSPSoc), British Hydrological Society (Institution of Civil Engineers), American Society for Photogrammetry and Remote Sensing (ASPRS), IEEE, EGU, AGU
- Editorial roles:** Academic Editor of PLoS One (fastest growing award winning open access journal)
 Guest editor of a special issue on *Flood Hydrology and Remote Sensing* (2010/11, Physics and Chemistry of the Earth, Elsevier)
 Guest editor of a special issue on *Flood Risk and Uncertainty* (2011/12, *Hydrological Processes*, Wiley)
- Other:** **Acting as scientific reviewer for:** Nature, IEEE journals, Hydrology and Earth System Sciences, Water Management Journal, Water Resources Research, Journal of Hydrology, Remote Sensing of Environment, Geophysical Research Letters, Hydrological Processes, International Journal of River Basin Management, etc.
- Publications:** **A. Papers in international peer-reviewed journals**
- [1] **Schumann, G.** and Lauener, G. 2005. Application of a degree-day snow depth model to a Swiss glacierized catchment to improve neural network discharge forecasts. *Nordic Hydrology*, 36, 99-111.
 - [2] Matgen, P., **Schumann, G.**, Henry, J.-B., Hoffmann, L. and Pfister, L., 2007. Integration of SAR-derived inundation areas, high precision topographic data and a river flow model toward real-time flood management. *Journal of Applied Earth Observation and Geoinformation*, 9 (3), 247-263.
 - [3] **Schumann, G.**, Matgen, P., Pappenberger, F., Hostache, R., Puech, C., Hoffmann, L. and Pfister, L., 2007. High-resolution 3D flood information from radar for effective flood hazard management. *IEEE Transactions on Geoscience and Remote Sensing*, Disaster Special Issue, 45 (6), 1715-1725.
 - [4] **Schumann, G.**, Matgen, P., Pappenberger, F., Hostache, R. and Pfister, L., 2007. Deriving distributed roughness values from satellite radar data for flood inundation modelling. *Journal of Hydrology*, 344, 96-111.
 - [5] **Schumann, G.**, Matgen, P., Cutler, M., Black, A. and Pfister, L., 2007. Comparison of remotely sensed water stages from LiDAR, topographic contours and SRTM. *ISPRS Journal of Photogrammetry and Remote Sensing*, 63, 283-296.
 - [6] **Schumann, G.**, Matgen, P., Pappenberger, F., Black, A., Cutler, M., Hoffmann, L. and Pfister, L., 2008. Evaluating uncertain flood inundation predictions with uncertain remotely sensed water stages, *International Journal of River Basin Management*, 6 (3), 187-199.
 - [7] **Schumann, G.**, Pappenberger, F. and Matgen, P. 2008. Estimating uncertainty associated with water stages from a single SAR image. *Advances in Water Resources*, 31, 1038-1047.
 - [8] **Schumann, G.**, Matgen, P. and Pappenberger, F. 2008. Conditioning water stages from satellite imagery on uncertain data points. *IEEE Geoscience and Remote Sensing Letters*, 5 (4), 810-813.
 - [9] Di Baldassarre, G., **Schumann, G.** and Bates, P. 2009. Near real time satellite imagery to support and verify timely flood modelling. *Hydrological Processes: Scientific Briefing*, 23 (5), 799-803.
 - [10] Hostache, R., Matgen, P., **Schumann, G.**, Puech, C., Hoffmann, L. and Pfister, L., 2009. Water Level Estimation and Reduction of Hydraulic Model Calibration Uncertainties Using Satellite SAR Images of Floods. *IEEE Transactions on Geoscience and Remote Sensing*, 47 (2), 431-441.
 - [11] Di Baldassarre, G., **G. Schumann** and P. D. Bates, 2009. A technique for the calibration of hydraulic models using uncertain satellite observations of flood extent. *Journal of Hydrology*, 367, 276-282.
 - [12] Montanari, M., R. Hostache, P. Matgen, **G. Schumann**, L. Pfister and L. Hoffmann, 2009. Calibration and sequential updating of a coupled hydrologic-hydraulic model using remote sensing-derived water stages. *Hydrology and Earth System Sciences*, 13, 367-380.
 - [13] **Schumann, G.**, G. Di Baldassarre and P. D. Bates, 2009. The utility of space-borne radar to render flood inundation maps based on multi-algorithm ensembles. *IEEE Transactions on Geoscience and Remote Sensing*, 47, 2801-2806.
 - [14] **Schumann, G.**, D. J. Lunt, P. J. Valdes, R. A. M. de Jeu, K. Scipal and P. D. Bates, 2009. Assessment of soil moisture fields from imperfect climate models with uncertain satellite observations. *Hydrology and Earth System Sciences*, 13, 1545-1553.
 - [15] **Schumann, G.**, P. D. Bates, M. S. Horritt, P. Matgen, and F. Pappenberger, 2009, Progress in integration of remote sensing-derived flood extent and stage data and hydraulic models, *Reviews of Geophysics*, 47, RG4001, doi:10.1029/2008RG000274
 - [16] Neal, J. C., **G. Schumann**, W. Buytaert, P. D. Bates, P. Matgen, F. Pappenberger, 2009. An assimilation approach to discharge estimation from space. *Hydrological Processes*, 23, 3641-3649.
 - [17] **Schumann, G.** and G. Di Baldassarre, 2010. The direct use of radar imagery for event-specific flood risk mapping. *Remote Sensing Letters*, 1, 75-84.
 - [18] Mason, D. C., Speck, R., Devereux, B., **Schumann, G. J.-P.**, Neal, J. C., Bates, P. D., 2010. Flood detection in urban areas using TerraSAR-X. *IEEE Transactions on Geoscience and Remote Sensing*, 48, 882-894.

- [19] Di Baldassarre, G., **G. Schumann**, P. Bates, J. Freer, K. Beven, 2010. Floodplain mapping: a critical discussion of deterministic and probabilistic approaches. *Hydrological Sciences Journal*, 55, 364-376.
- [20] **Schumann, G.**, G. Di Baldassarre, D. Alsdorf and P. D. Bates, 2010. Near real-time flood wave approximation on large rivers from space: application to the River Po, Northern Italy. *Water Resources Research*, 46, doi: 10.1029/2008WR007672.
- [21] P. Prestininzi, G. Di Baldassarre, **G. Schumann** and P. D. Bates, 2011. The use of low-resolution satellite imagery to guide the selection of the appropriate hydraulic model structure. *Advances in Water Resources*, 34, 38-46.
- [22] G. Di Baldassarre, **G. Schumann**, L. Brandimarte and P. D. Bates, 2011. Timely low resolution SAR imagery to support floodplain modelling: a case study review. *Surveys in Geophysics*, 32, 255-269.
- [23] G. Di Baldassarre and **G. J-P. Schumann**, 2011. Recent advances in mapping and modelling flood processes in low-lying and areas. *Physics and Chemistry of the Earth*, 36, 221-222.
- [24] A. C. Hall, **G. J-P. Schumann**, J. L. Bamber and P. D. Bates, 2011. Tracking water level changes of the Amazon Basin with active space-borne remote sensing and integration with large scale hydrodynamic modelling: a review. *Physics and Chemistry of the Earth*, 36, 223-231.
- [25] P. Matgen, R. Hostache, L. Pfister, L. Hoffmann, **G. Schumann**, P. Bally and H.H.G. Savenije, 2011. Towards an automated SAR-based flood monitoring system: lessons learned from two case studies. *Physics and Chemistry of the Earth*, 36, 241-252.
- [26] Neal, J. C., **Schumann, G.**, Fewtrell, T., Budimir, M., Bates, P. D. and Mason, D. C., 2011. Evaluating a new LISFLOOD-FP formulation with data from the summer 2007 floods in Tewkesbury, UK. *Journal of Flood Risk Management*, DOI:10.1111/j.1753-318X.2011.01093.x.
- [27] **G. J-P. Schumann**, J. C. Neal, D. C. Mason and P. D. Bates, 2011. The accuracy of sequential aerial photography and SAR data for observing urban flood dynamics, a case study of the UK summer 2007 floods. *Remote Sensing of Environment*. 115, 10, 2536-2546.
- [28] A. C. Hall, **G. J-P. Schumann**, J. L. Bamber, P. D. Bates and M. A. Trigg, 2012. Geodetic corrections to Amazon River water level gauges using ICESat altimetry. *Water Resources Research*, 48, W06602, doi: 10.1029/2011WR010895.
- [29] D.C. Mason, **G.J.-P. Schumann**, J.C. Neal, J. Garcia-Pintado and P.D. Bates, 2012. Automatic near real-time selection of flood water levels from high resolution Synthetic Aperture Radar images for assimilation into hydraulic models: A case study. *Remote Sensing of the Environment*, 124, 705-716.
- [30] D.C. Mason, I. J. Davenport, J.C. Neal, **G.J.-P. Schumann** and P.D. Bates, 2012. Near real-time flood detection in urban and rural areas using high-resolution synthetic aperture radar images. *IEEE Transactions on Geoscience and Remote Sensing*, 50, 3041-3052.
- [31] **Guy J.-P. Schumann**, Jeffrey C. Neal and Paul D. Bates, 2012. Global scale simulation of flood plain inundation with low resolution space-borne data, in C. M. U. Neale and M. H. Cosh (eds.). *Remote Sensing and Hydrology*, IAHS Publ. 352, pp. 482, 464-467.
- [32] M. A. Trigg, P. D. Bates, M. D. Wilson, **G. Schumann** and C. Baugh, 2012. Floodplain channel morphology and networks of the middle Amazon River. *Water Resources Research*, 48, doi: 10.1029/2012WR011888
- [33] J. Neal, **G. Schumann** and P. Bates, 2012. A sub-grid channel model for simulating river hydraulics and floodplain inundation over large and data sparse areas. *Water Resources Research*, 48, doi: 10.1029/2012WR012514
- [34] M. Lewis, P. Bates, K. Horsburgh, J. Neal and **G. Schumann**, 2013. Storm surge inundation model of the Northern Bay of Bengal using publically available data. *Quarterly Journal of the Royal Meteorological Society*, 139, 671, 358-369.
- [35] L. Giustarini, R. Hostache, P. Matgen, **G. J.-P. Schumann**, P. D. Bates and D. C. Mason, 2013. A change detection approach to flood mapping in urban areas using TerraSAR-X. *IEEE Transactions on Geoscience and Remote Sensing*, 51, 4, 2417-2430.
- [36] M. Lewis, P. D. Bates, K. J. Horsburgh and **G. Schumann**, 2013. Understanding the variability of an extreme storm tide along a coastline. *Estuarine, Coastal and Shelf Science*, 123, 19-25.
- [37] Aronica, G. T., H. Apel, G. Di Baldassarre and **G. Schumann**, 2013. HP - Special Issue on Flood Risk and Uncertainty Preface. *Hydrological Processes*, 27, 9, 1291-1291.
- [38] O'Loughlin, F., M. A. Trigg, **G. J. P.Schumann** and P. D. Bates, 2013. Hydraulic characterization of the middle reach of the Congo River. *Water Resources Research*, 49, 8, 5059-5070.
- [39] Baugh, C. A., P. D. Bates, **G. Schumann** and M. A. Trigg, 2013. SRTM vegetation removal and hydrodynamic modeling accuracy. *Water Resources Research*, 49, 9, 5276-5289.
- [40] K. M. Andreadis, **G. J.-P. Schumann** and T. Pavelsky, 2013. A simple global river bankfull width and depth database. *Water Resources Research*, 49, doi:10.1002/wrcr.20440.
- [41] E. Stephens, **G. Schumann** and P. D. Bates, 2013. Problems with binary pattern measures for flood model evaluation. *Hydrological Processes*, doi: 10.1002/hyp.9979.
- [42] **G. J.-P. Schumann**, H. Vernieuwe, B. De Baets and N. E. C. Verhoest, 2013. ROC-based calibration of flood inundation models. *Hydrological Processes*, doi: 10.1002/hyp.10019.
- [43] **G. J.-P. Schumann**, Jeffrey Neal, Nathalie Voisin, Konstantinos Andreadis, Florian Pappenberger, Nuttavikhom Phanthuwongpakdee, Amanda Hall and Paul D. Bates, 2013. A first large scale flood inundation forecasting model. *Water Resources Research*, 49, doi:10.1002/wrcr.20521.
- [44] **G. J.-P. Schumann**, K. M. Andreadis and P. D. Bates, 2014. Downscaling coarse grid hydrodynamic model simulations over large domains. *Journal of Hydrology*, 508, 289-298.
- [45] P. D. Bates, J. C. Neal, D. Alsdorf and **G. J.-P. Schumann**, 2014. Observing global surface water flood

dynamics. *Surveys in Geophysics*. In press.

[46] J. Kim, **G. Schumann**, J. C Neal and S-Y. Lin, 2014. Planetary water flow analysis based on multi-resolution stereo DTMs and 2D hydrodynamic modeling: Case study on Athabasca Valles, Mars. *Planetary and Space Science*. In review.

... With more in submission already; please contact me by email for an up-to-date list of these.

B. Books and book chapters, professional journals and magazines

[1] **Schumann, G.**, 2009. Spatially distributed water stages from remotely sensed imagery: Prospects for improved flood inundation modelling. VDM Publishing, Germany, p. 116.

[2] **Guy Schumann**, Giuliano Di Baldassarre, and Paul D. Bates, 2010, Fuzzy flood mapping, playing it safe? *Sensed, Remote Sensing and Photogrammetry Society*, UK, 36, April 2010.

[3] Mason, D. C., **G. J-P. Schumann** and P. D. Bates (2011), Data utilization in flood inundation modelling. In: G. Pender and H. Faulkner (2011), *Flood risk science and management*, Wiley-Blackwell, Chichester, UK, pp. 211-233.

[4] **Guy Schumann**, Paul D. Bates, Giuliano Di Baldassarre and David C. Mason (2012), The use of radar imagery in riverine flood inundation studies, pp. 115-140. In: P. E. Carbonneau and H. Piégay (2012), *Fluvial remote sensing for science and management ('Advancing river restoration and management' Series)*, Wiley-Blackwell, Chichester, UK, p. 458.

[5] Freer, J., K. J. Beven, J. Neal, **G. Schumann**, J. Hall and P. D. Bates. 2013. Flood risk and uncertainty. In J. Rougier, S. Sparks and L. J. Hill (eds). *Risk and uncertainty assessment for natural hazards*. CUP, Cambridge, UK. p. 583.

[6] **G. J-P. Schumann**, 2014. Applications of remote sensing techniques to hydrologic and meteorological services in southern Africa. The World Bank. In review.

[7] **G. J-P. Schumann**, P. D. Bates, J. C. Neal and K. M. Andreadis, 2014. Measuring and mapping flood processes. In P. Paron and G. Di Baldassarre (eds). *Hydro-meteorological hazards and disasters*. Elsevier. In submission.