Marco de Angelis

Publications: complete list

Updated November 2026

Journal articles (24)

J24 Keith, S., Tubaldi, E., **de Angelis, M.**, Stripajova, S., & Douglas, J. (2026). Assessing the Value of Information in pricing insurance against multiple hazards: the case of earthquake and liquefaction. *International Journal of Disaster Risk Reduction*, 135, art. 106052. doi:10.1016/j.ijdrr.2026.106052

J23 Sunny, J., **de Angelis, M.**, & Edwards, B. (2024). Regionally adjusted stochastic earthquake ground motion models, associated variabilities and epistemic uncertainties. *Journal of Seismology*, 28(2), pp. 303–320. doi:10.1007/s10950-024-10195-7

J22 Gray, N., **de Angelis, M.**, & Ferson, S. (2023). Towards an automatic uncertainty compiler. *International Journal of Approximate Reasoning*, 160, art. 108951. doi:10.1016/j.ijar.2023.108951

J21 Behrendt, M., **de Angelis, M.**, & Beer, M. (2023). Uncertainty propagation of missing data signals with the interval discrete Fourier transform. *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering*, 9(3), art. 04023022. doi:10.1061/AJRUA6.RUENG-1048

J20 Gray, A., **de Angelis, M.**, Patelli, E., & Ferson, S. (2023). Bivariate dependency tracking in interval arithmetic. *Mechanical Systems and Signal Processing*, 186, art. 109771. doi:10.1016/j.ymssp.2022.109771

J19 **de Angelis, M.**, Gray, A., Ferson, S., & Patelli, E. (2023). Robust online updating of a digital twin with imprecise probability. *Mechanical Systems and Signal Processing*, 186, art. 109877. doi:10.1016/j.ymssp.2022.109877

J18 Bonney, M. S., **de Angelis, M.**, Dal Borgo, M., & Wagg, D. J. (2023). Contextualisation of information in digital twin processes. *Mechanical Systems and Signal Processing*, 184, art. 109657. doi:10.1016/j.ymssp.2022.109657

J17 Behrendt, M., **de Angelis, M.**, Comerford, L., Zhang, Y., & Beer, M. (2022). Projecting interval uncertainty through the discrete Fourier transform: an application to time signals with poor precision. *Mechanical Systems and Signal Processing*, 172, art. 108920. doi:10.1016/j.ymssp.2022.108920

J16 Gray, N., Ferson, S., **de Angelis, M.**, Gray, A., & de Oliveira, F. B. (2022). Probability bounds analysis for Python. *Software Impacts*, 12, art. 100246. doi:10.1016/j.simpa.2022.100246

J15 Gray, A., Wimbush, A., **de Angelis, M.**, Hristov, P. O., Calleja, D., Miralles-Dolz, E., & Rocchetta, R. (2022). From inference to design: a comprehensive framework for uncertainty quantification in engineering with limited information. *Mechanical Systems and Signal Processing*, 165, art. 108210. doi:10.1016/j.ymssp.2021.108210

J14 Bonney, M. S., **de Angelis, M.**, Dal Borgo, M., Andrade, L., Beregi, S., Jamia, N., & Wagg, D. J. (2022). Development of a digital twin operational platform using Python Flask. *Data-Centric Engineering*, 3(1), art. e1. doi:10.1017/dce.2022.1

J13 Sunny, J., **de Angelis, M.**, & Edwards, B. (2022). Ranking and selection of earthquake ground-motion models using the stochastic area metric. *Seismological Research Letters*, 93(2A), pp. 787–797. doi:10.1785/0220210216

J12 Gray, N., Calleja, D., Wimbush, A., Miralles-Dolz, E., Gray, A., **de Angelis, M.**, Derrer-Merk, E., Oparaji, B. U., Stepanov, V., Clearkin, L., & Ferson, S. (2021). Is "no test is better than a bad test"? Impact of diagnostic uncertainty in mass testing on the spread of COVID-19. *PLoS ONE*, 16(2), art. e0247129. doi:10.1371/journal.pone.0247129

J11 Sadeghi, J., **de Angelis, M.**, & Patelli, E. (2020). Analytic probabilistic safety analysis under severe uncertainty. *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering*, 6(1), art. 04019019. doi:10.1061/AJRUA6.0001028

J10 Sadeghi, J., **de Angelis, M.**, & Patelli, E. (2020). Robust propagation of probability boxes by interval predictor models. *Structural Safety*, 82, art. 101889. doi:10.1016/j.strusafe.2019.101889

J9 Faes, M., Sadeghi, J., Broggi, M., **de Angelis, M.**, Patelli, E., Beer, M., & Moens, D. (2019). On the robust estimation of small failure probabilities for strong non-linear models. *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part B: Mechanical Engineering*, 5(4), art. 041007. doi:10.1115/1.4044044

J8 Estrada-Lugo, H. D., Tolo, S., **de Angelis, M.**, & Patelli, E. (2019). Pseudo credal networks for inference with probability intervals. *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part B: Mechanical Engineering*, 5(4), art. 041010. doi:10.1115/1.4044239

J7 Sadeghi, J., **de Angelis, M.**, & Patelli, E. (2019). Efficient training of interval neural networks for imprecise training data. *Neural Networks*, 118, pp. 338–351. doi:10.1016/j.neunet.2019.07.005

J6 Sadeghi, J., **de Angelis, M.**, & Patelli, E. (2018). Frequentist history matching with interval predictor models. *Applied Mathematical Modelling*, 61, pp. 29–48. doi:10.1016/j.apm.2018.04.003

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J4 Altieri, D., Tubaldi, E., **de Angelis, M.**, Patelli, E., & Dall'Asta, A. (2018). Reliability-based optimal design of nonlinear viscous dampers for the seismic protection of structural systems. *Bulletin of Earthquake Engineering*, 16(2), pp. 963–982. doi:10.1007/s10518-017-0233-4

J3 **de Angelis, M.**, Patelli, E., & Beer, M. (2017). Forced Monte Carlo simulation strategy for the design of maintenance plans with multiple inspections. *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering*, 3(2), art. D4016001. doi:10.1061/ajrua6.0000868

J2 Patelli, E., Alvarez, D. A., Broggi, M., & **de Angelis, M.** (2015). Uncertainty management in multidisciplinary design of critical safety systems. *Journal of Aerospace Information Systems*, 12(1), pp. 140–169. doi:10.2514/1.I010273

J1 **de Angelis, M.**, Patelli, E., & Beer, M. (2015). Advanced line sampling for efficient robust reliability analysis. *Structural Safety*, 52(Part B), pp. 170–182. doi:10.1016/j.strusafe.2014.10.002

Book chapters (1)

B1 Valdebenito, M. A., **de Angelis, M.**, & Patelli, E. (2021). Line sampling simulation: recent advancements and applications. In Noroozinejad Farsangi, E., Noori, M., Gardoni, P., Takewaki, I., Varum, H., & Bogdanovic, A. (Eds.), *Reliability-Based Analysis and Design of Structures and Infrastructure*, ch. 15, pp. 215–226. CRC Press. doi:10.1201/9781003194613-15

Conference papers (published proceedings) (46)

C46 Chen, Y., Rocchetta, R., Nespoli, L., Medici, V., **de Angelis, M.**, Ochnio, D., & Patelli, E. (2026). A Python library for stochastic model updating with black-box models using PyUncertainNumber: a case study with the NASA UQ challenge. In *Proceedings of the 36th European Safety and Reliability Conference (ESREL 2026)*, pp. 2949–2956. Research Publishing Services. doi:10.3850/ESREL2026061419_esrel26-p26140-cd

C45 McIntosh, A., Loayza Romero, E., & **de Angelis, M.** (2026). Interval uncertainty propagation on CO_2 emission calculations in road haulage. In *Proceedings of the 36th European Safety and Reliability Conference (ESREL 2026)*, pp. 2426–2433. Research Publishing Services. doi:10.3850/ESREL2026061419_esrel26-p27770-cd

C44 Paez Jimenez, M. G., McIntosh, A., & **de Angelis, M.** (2026). A systematic evaluation of uncertainty quantification in transport carbon accounting standards. In *Proceedings of the 36th European Safety and Reliability Conference (ESREL 2026)*, paper P29001. Research Publishing Services. doi:10.3850/ESREL2026061419_esrel26-p29001-cd

C43 Ochnio, D., & **de Angelis, M.** (2026). Interaction effects in subinterval Sensitivity Analysis. In *Proceedings of the 36th European Safety and Reliability Conference (ESREL 2026)*, pp. 899–906. Research Publishing Services. doi:10.3850/ESREL2026061419_esrel26-p26224-cd

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C41 **de Angelis, M.**, Estrada-Lugo, H. D., Ferson, S., & Patelli, E. (2025). On the computational complexity of the interval dependence problem in credal networks. In *Digitalisation and Digital Transformation: First Research Twinning Conference, RTC-Digital 2023*, Communications in Computer and Information Science 2647, pp. 113–118. Springer. doi:10.1007/978-3-032-04731-1_15

C40 Rocchetta, R., Nespoli, L., Medici, V., Chen, Y., **de Angelis, M.**, Ochnio, D., Patelli, E., & Smith, E. (2025). An integrated uncertainty quantification and optimization for solving the 2025 NASA-DNV challenge. In *Proceedings of the 35th European Safety and Reliability & 33rd Society for Risk Analysis Europe Conference (ESREL SRA-E 2025)*, paper P3804. Research Publishing Services. doi:10.3850/978-981-94-3281-3_ESREL-SRA-E2025-P3804-cd

C39 Ochnio, D., & **de Angelis, M.** (2025). Subinterval sensitivity for high dimensional models. In *Proceedings of the 35th European Safety and Reliability & 33rd Society for Risk Analysis Europe Conference (ESREL SRA-E 2025)*, paper P3432. Research Publishing Services. doi:10.3850/978-981-94-3281-3_ESREL-SRA-E2025-P3432-cd

C38 **de Angelis, M.** (2024). Sharp polynomial upper bound on the variance. In *Combining, Modelling and Analyzing Imprecision, Randomness and Dependence (SMPS 2024)*, Advances in Intelligent Systems and Computing 1458, pp. 76–84. Springer. doi:10.1007/978-3-031-65993-5_9

C37 Lye, A., Gray, A., **de Angelis, M.**, & Ferson, S. (2023). Robust probability bounds analysis for failure analysis under lack of data and model uncertainty. In *Proceedings of the 5th International Conference on Uncertainty Quantification in Computational Sciences and Engineering (UNCECOMP 2023)*. doi:10.7712/120223.10345.19797

C36 Miralles-Dolz, E., Gray, A., **de Angelis, M.**, & Patelli, E. (2022). Interval-based global sensitivity analysis for epistemic uncertainty. In *Proceedings of the 32nd European Safety and Reliability Conference (ESREL 2022)*, pp. 2545–2552. Research Publishing Services. doi:10.3850/978-981-18-5183-4_S14-04-180-cd

C35 **de Angelis, M.**, & Gray, A. (2022). Bounding failure probability with the SIVIA algorithm. In *Proceedings of the 32nd European Safety and Reliability Conference (ESREL 2022)*, pp. 2570–2577. Research Publishing Services. doi:10.3850/978-981-18-5183-4_S14-07-334-cd

C34 Brown, C., Ferson, S., & **de Angelis, M.** (2022). Analysis of inspection records to evaluate the prevalence of ageing in the UK's industrial asset base. In *Proceedings of the 8th International Symposium on Reliability Engineering and Risk Management (ISRERM 2022)*, pp. 231–237. Research Publishing Services. doi:10.3850/978-981-18-5184-1_MS-08-073-cd

C33 Behrendt, M., **de Angelis, M.**, Comerford, L., & Beer, M. (2022). Assessing the severity of missing data problems with the interval discrete Fourier transform algorithm. In *Proceedings of the 32nd European Safety and Reliability Conference (ESREL 2022)*, pp. 2553–2560. Research Publishing Services. doi:10.3850/978-981-18-5183-4_S14-05-243-cd

C32 Bonney, M. S., **de Angelis, M.**, Wagg, D., & Dal Borgo, M. (2021). Digital twin operational platform for connectivity and accessibility using flask python. In *2021 ACM/IEEE International Conference on Model Driven Engineering Languages and Systems Companion (MODELS-C)*, pp. 239–243. IEEE. doi:10.1109/MODELS-C53483.2021.00042

C31 Gray, A., Hose, D., **de Angelis, M.**, Hanss, M., & Ferson, S. (2021). Dependent possibilistic arithmetic using copulas. In *Proceedings of the Twelfth International Symposium on Imprecise Probability: Theories and Applications (ISIPTA 2021)*, Proceedings of Machine Learning Research 147, pp. 169–179. PMLR. https://proceedings.mlr.press/v147/gray21a.html

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C28 **de Angelis, M.**, Behrendt, M., Comerford, L., Zhang, Y., & Beer, M. (2021). Forward interval propagation through the discrete Fourier transform. In *REC 2021: Proceedings of the 9th International Workshop on Reliable Engineering Computing*, pp. 39–52. Risk and Uncertainty in Engineering Computations (REC). http://ww2new.unime.it/REC2021/proceedings/REC2021_Proceedings.pdf

C27 Gray, A., Wimbush, A., **de Angelis, M.**, Hristov, P. O., Miralles-Dolz, E., Calleja, D., & Rocchetta, R. (2020). Bayesian calibration and probability bounds analysis solution to the NASA 2020 UQ challenge on optimization under uncertainty. In *Proceedings of the 30th European Safety and Reliability Conference and 15th Probabilistic Safety Assessment and Management Conference (ESREL 2020 PSAM 15)*. Research Publishing Services. doi:10.3850/978-981-14-8593-0_5520-cd

C26 Estrada-Lugo, H. D., Santhosh, T. V., **de Angelis, M.**, & Patelli, E. (2020). Resilience assessment of safety-critical systems with credal networks. In *Proceedings of the 30th European Safety and Reliability Conference and 15th Probabilistic Safety Assessment and Management Conference (ESREL 2020 PSAM 15)*. Research Publishing Services. doi:10.3850/978-981-14-8593-0_4192-cd

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C22 Estrada-Lugo, H. D., **de Angelis, M.**, & Patelli, E. (2019). Probabilistic risk assessment of fire occurrence in residential buildings: application to the Grenfell tower. In *Proceedings of the 13th International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP13), Seoul, South Korea*. doi:10.22725/ICASP13.364

C21 **de Angelis, M.**, Ricciardi, V., & Dalmau, E. (2018). Uncertainty estimation of road-dust emissions via interval statistics. *Journal of Physics: Conference Series*, 1065(21), art. 212023. XXII IMEKO World Congress 2018. doi:10.1088/1742-6596/1065/21/212023

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C13 Hernandez, J. E., Kacprzyk, J., Panetto, H., Fernandez, A., Liu, S., Ortiz, A., & **de Angelis, M.** (2017). Challenges and solutions for enhancing agriculture value chain decision-making. A short review. In *Collaboration in a Data-Rich World: PRO-VE 2017*, IFIP Advances in Information and Communication Technology 506, pp. 761–774. Springer. doi:10.1007/978-3-319-65151-4_68

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C10 **de Angelis, M.**, Patelli, E., & Beer, M. (2015). Uncertainty management of safety-critical systems: a solution to the back-propagation problem. In *Proceedings of the 12th International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP12), Vancouver, Canada*. University of British Columbia. doi:10.14288/1.0076201

C9 Comerford, L., **de Angelis, M.**, Mannis, A., Beer, M., & Kougioumtzoglou, I. (2014). An open approach to educational resource development, with a specific example from structural engineering. In *Proceedings of the 42nd SEFI Annual Conference*. SEFI. https://sefi.be/?p=2921

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C5 Patelli, E., Broggi, M., **de Angelis, M.**, & Alvarez, D. A. (2014). An integrated and efficient numerical framework for uncertainty quantification: application to the NASA Langley multidisciplinary uncertainty quantification challenge. In *16th AIAA Non-Deterministic Approaches Conference, AIAA SciTech 2014*. AIAA. doi:10.2514/6.2014-1501

C4 **de Angelis, M.**, Patelli, E., & Beer, M. (2013). An efficient strategy for computing interval expectations of risk. In *Safety, Reliability, Risk and Life-Cycle Performance of Structures and Infrastructures: Proceedings of ICOSSAR 2013*, pp. 2225–2232. CRC Press.

C3 Gabriele, S., Valente, C., & **de Angelis, M.** (2013). Interval solution and robust validation of uncertain elastic beams. In *Safety, Reliability, Risk and Life-Cycle Performance of Structures and Infrastructures: Proceedings of ICOSSAR 2013*, pp. 445–452. CRC Press.

C2 Patelli, E., Valdebenito, M. A., & **de Angelis, M.** (2013). On robust maintenance scheduling of fatigue-prone structural systems considering imprecise probability. *Chemical Engineering Transactions*, 33, pp. 1081–1086. doi:10.3303/CET1333181

C1 Patelli, E., & **de Angelis, M.** (2012). An open computational framework for reliability based optimization. In *Proceedings of the 11th International Conference on Computational Structures Technology, CST 2012*, Civil-Comp Proceedings 99, paper 203. Civil-Comp Press. doi:10.4203/ccp.99.203

Conference presentations and posters (no full paper) (4)

P4 **de Angelis, M.**, & Gray, A. (2023). Verified bounds on the imprecise failure probability with the SIVIA algorithm. Poster, 13th International Symposium on Imprecise Probabilities: Theories and Applications (ISIPTA 2023), Oviedo, Spain.

P3 Lye, A., **de Angelis, M.**, & Patelli, E. (2020). Bayesian regression over sparse fatigue crack growth data for nuclear piping. Poster, Modelling in Nuclear Science and Engineering Seminar 2020, Bangor, UK.

P2 **de Angelis, M.**, Estrada-Lugo, H. D., Patelli, E., & Ferson, S. (2019). On the dimensionality of inference in credal nets with interval probabilities. Poster, 11th International Symposium on Imprecise Probabilities: Theories and Applications (ISIPTA 2019), Ghent, Belgium.

P1 **de Angelis, M.**, Patelli, E., & Beer, M. (2012). Dealing with scarce information on engineering systems. Presentation, 6th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS 2012), Vienna, Austria.

Preprints (2)

R2 **de Angelis, M.** (2022). Exact bounds on the amplitude and phase of the interval discrete Fourier transform in polynomial time. arXiv preprint. doi:10.48550/arXiv.2205.13978

R1 **de Angelis, M.**, & Gray, A. (2021). Why the 1-Wasserstein distance is the area between the two marginal CDFs. arXiv preprint. doi:10.48550/arXiv.2111.03570

Software (3)

S3 McCann, M., & **de Angelis, M.** (2026). Zonolayer [software]. Python package, Zenodo. doi:10.5281/zenodo.23916120

S2 **de Angelis, M.**, & Sunny, J. (2022). Stochastic area metric: binary search for speed [software]. Python/MATLAB code, Zenodo. doi:10.5281/ZENODO.6366288

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Editorials, letters and other (2)

O2 Ferson, S., & **de Angelis, M.** (2021). Computing with confidence. *International Journal of Approximate Reasoning*, 137, pp. 67–68. Editorial, special issue *Computing with Confidence*. doi:10.1016/j.ijar.2021.07.001

O1 Oparaji, B. U., Clearkin, L., Ferson, S., **de Angelis, M.**, Ferrer-Fernandez, M., Calleja, D., Gray, N., & Derrer-Merk, E. (2020). Comment on: British Society for Rheumatology guideline on diagnosis and treatment of giant cell arteritis. *Rheumatology*, 59(12), p. e159. Letter. doi:10.1093/rheumatology/keaa265

Doctoral thesis (1)

T1 **de Angelis, M.** (2015). Efficient random set uncertainty quantification by means of advanced sampling techniques. PhD thesis, University of Liverpool. doi:10.17638/02038039