

# Emanuele Borgonovo

Full Professor



**Knowledge Group:** Economics, Politics and Decision Sciences

**Research Domains:** Decision Analysis

**Teaching Domains:**

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## Articles in Scholarly Journals

### **Global Sensitivity Analysis via Optimal Transport**

BORGONOVO, E., A. FIGALLI, E. PLISCHKE, G. SAVARÉ, "Global Sensitivity Analysis via Optimal Transport", *Management Science*, 2025, vol. 71, no. 5, pp. 3809-3828

### **Direction of impact for explainable risk assessment modeling**

BORGONOVO, E., M. BAUCCELLS, A. DE ROSA, E. PLISCHKE, J. BARR, H. RABITZ, "Direction of impact for explainable risk assessment modeling", *Risk Analysis*, 2025, vol. 45, no. 8, pp. 2157-2182

### **Global sensitivity analysis of integrated assessment models with multivariate outputs**

CHIANI, L., E. BORGONOVO, E. PLISCHKE, M. TAVONI, "Global sensitivity analysis of integrated assessment models with multivariate outputs", *Risk Analysis*, 2025, vol. 45, no. 8, pp. 2132-2156

### **Convexity and measures of statistical association**

BORGONOVO, E., A. FIGALLI, P. GHOSAL, E. PLISCHKE, G. SAVARÉ, "Convexity and measures of statistical association", *Journal of the Royal Statistical Society. Series B - Statistical Methodology*, 2025, vol. 87, no. 4, pp. 1281-1304

### **Fifty years of decision analysis in operational research: A review**

BORGONOVO, E., V. R. R. JOSE, M. KNOWLTON, R. SHACHTER, J. U. SIEBERT, C. ULU, "Fifty years of decision analysis in operational research: A review", *European Journal of Operational Research*, 2025

### **A global sensitivity analysis framework for guiding the design improvement of new concepts of small modular reactors**

MARCHETTI, S., F. DI MAIO, E. ZIO, E. BORGONOVO, E. PLISCHKE, "A global sensitivity analysis framework for guiding the design improvement of new concepts of small modular reactors", *Nuclear Engineering and Design*, 2025, vol. 444, pp. 114398

### **Global sensitivity analyses for test planning with black-box models for Mars Sample Return**

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#### **A framework for global sensitivity analysis in long-term energy systems planning using optimal transport**

NICOLI, M., E. BORGONOVO, V. DI COSMO, D. MOSSO, E. PLISCHKE, L. SAVOLDI, A. R. DE QUEIROZ, "A framework for global sensitivity analysis in long-term energy systems planning using optimal transport", Energy, 2025, vol. 338, pp. 138788

#### **Do automation and AI impact on job reduction? A study on perceived risk of losing job among white-collars in the Italian manufacturing companies**

CHIARINI, A., A. GRANDO, S. VENTURINI, E. BORGONOVO, "Do automation and AI impact on job reduction? A study on perceived risk of losing job among white-collars in the Italian manufacturing companies", Production Planning & Control, 2024, vol. 35, no. 16, pp. 2198-2211

#### **Total effects with constrained features**

BORGONOVO, E., E. PLISCHKE, C. PRIEUR, "Total effects with constrained features", Statistics and Computing, 2024, vol. 34, no. 2, pp. 87

#### **Why insurance regulators need to require sensitivity settings of internal models for their approval**

BORGONOVO, E., G. P. CLEMENTE, G. RABITTI, "Why insurance regulators need to require sensitivity settings of internal models for their approval", Finance Research Letters, 2024, vol. 60, pp. 104859

#### **The many Shapley values for explainable artificial intelligence: A sensitivity analysis perspective**

BORGONOVO, E., E. PLISCHKE, G. RABITTI, "The many Shapley values for explainable artificial intelligence: A sensitivity analysis perspective", European Journal of Operational Research, 2024, vol. 318, no. 3, pp. 911-926

#### **Feature importance measures for flood forecasting system design**

CAPPELLI, F., F. TAURO, C. APOLLONIO, A. PETROSELLI, E. BORGONOVO, E. VOLPI, S. GRIMALDI, "Feature importance measures for flood forecasting system design", Hydrological Sciences Journal, 2024, vol. 69, no. 4, pp. 438-455

#### **A Systematic Approach of Global Sensitivity Analysis and Its Application to a Model for the Quantification of Resilience of Interconnected Critical Infrastructures**

LIU, X., E. ZIO, E. BORGONOVO, E. PLISCHKE, "A Systematic Approach of Global Sensitivity Analysis and Its Application to a Model for the Quantification of Resilience of Interconnected Critical Infrastructures", Energies, 2024, vol. 17, no. 8, pp. 1823

#### **Screening: From tornado diagrams to effective dimensions**

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#### **Global sensitivity analysis in epidemiological modeling**

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### **Explaining classifiers with measures of statistical association**

BORGONOVO, E., V. GHIDINI, R. HAHN, E. PLISCHKE, "Explaining classifiers with measures of statistical association", Computational Statistics & Data Analysis, 2023, vol. 182, pp. 107701

### **Feature importance measures to dissect the role of sub-basins in shaping the catchment hydrological response: a proof of concept**

CAPPELLI, F., F. TAURO, C. APOLLONIO, A. PETROSELLI, E. BORGONOVO, S. GRIMALDI, "Feature importance measures to dissect the role of sub-basins in shaping the catchment hydrological response: a proof of concept", Stochastic Environmental Research and Risk Assessment, 2023, vol. 37, no. 4, pp. 1247-1264

### **Information Density in Decision Analysis**

HAZEN, G., E. BORGONOVO, X. LU, "Information Density in Decision Analysis", Decision Analysis, 2023, vol. 20, no. 2, pp. 89-108

### **Addressing Adverse Selection in Public-Private Partnership (PPP) Procurement: An Agent-Based Approach**

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### **Interactions and computer experiments**

BORGONOVO, E., E. PLISCHKE, G. RABITTI, "Interactions and computer experiments", Scandinavian Journal of Statistics, 2022, vol. 49, no. 3, pp. 1274-1303

### **Sensitivity analysis of agent-based models: a new protocol**

BORGONOVO, E., M. PANGALLO, J. RIVKIN, L. RIZZO, N. SIGGELKOW, "Sensitivity analysis of agent-based models: a new protocol", Computational and Mathematical Organization Theory, 2022, vol. 28, no. 1, pp. 52-94

### **Global Sensitivity Analysis with Mixtures: A Generalized Functional ANOVA Approach**

BORGONOVO, E., G. LI, J. BARR, E. PLISCHKE, H. RABITZ, "Global Sensitivity Analysis with Mixtures: A Generalized Functional ANOVA Approach", Risk Analysis, 2022, vol. 42, no. 2, pp. 304-333

### **Improving the reliability of cohesion policy databases**

LO PIANO, S., E. BORGONOVO, A. PUY, A. SALTELLI, J. WALSH, D. VIDONI, "Improving the reliability of cohesion policy databases", Plos One, 2022, vol. 17, no. 4, pp. e0266823

### **Gli advanced analytics a supporto delle decisioni manageriali**

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### **Money, privacy, anonymity: What do experiments tell us?**

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### **Probabilistic sensitivity measures as information value**

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### **The Future of Sensitivity Analysis: An essential discipline for systems modeling and policy support**

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### **Computing Shapley Effects for Sensitivity Analysis**

PLISCHKE, E., G. RABITTI, E. BORGONOVO, "Computing Shapley Effects for Sensitivity Analysis", SIAM/ASA Journal on Uncertainty Quantification, 2021, vol. 9, no. 4, pp. 1411-1437

### **Remaining-useful-lifetime and system-remaining-profit based importance measures for decisions on preventive maintenance**

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### **Irrigated areas drive irrigation water withdrawals**

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### **Nonparametric estimation of probabilistic sensitivity measures**

BORGONOVO, E., I. ANTONIANO-VILLALOBOS, X. LU, "Nonparametric estimation of probabilistic sensitivity measures", Statistics and Computing, 2020, vol. 30, no. 2, pp. 447-467

### **Faster Kriging: Facing High-Dimensional Simulators**

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### **Fighting the Curse of Sparsity: Probabilistic Sensitivity Measures From Cumulative Distribution Functions**

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### **Is mortality or interest rate the most important risk in annuity models? A comparison of sensitivity analysis methods**

RABITTI, G., E. BORGONOVO, "Is mortality or interest rate the most important risk in annuity models? A comparison of sensitivity analysis methods", Insurance: Mathematics & Economics, 2020, vol. 95, pp. 48-58

#### **A Shapley-Owen Index for Interaction Quantification**

RABITTI, G., E. BORGONOVO, "A Shapley-Owen Index for Interaction Quantification", SIAM/ASA Journal on Uncertainty Quantification, 2019, vol. 7, no. 3, pp. 1060-1075

#### **Copula theory and probabilistic sensitivity analysis: Is there a connection?**

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#### **Risk analysis and decision theory: A bridge**

BORGONOVO, E., V. CAPPELLI, F. A. MACCHERONI, M. MARINACCI, "Risk analysis and decision theory: A bridge", European Journal of Operational Research, 2018, vol. 264, no. 1, pp. 280-293

#### **A global tolerance approach to sensitivity analysis in linear programming**

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#### **Which Parameters Are Important? Differential Importance Under Uncertainty**

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#### **On the Relationship between Safety and Decision Significance**

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#### **Deciding with Thresholds: Importance Measures and Value of Information**

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#### **Forty years of the European Journal of Operational Research: A bibliometric overview**

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#### **Sensitivity of projected long-term CO<sub>2</sub> emissions across the Shared Socioeconomic Pathways**

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### **Making the most out of a hydrological model data set: Sensitivity analyses to open the model black-box**

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### **On the Boolean extension of the Birnbaum importance to non-coherent systems**

ALIEE, H., E. BORGONOVO, M. GLASS, J. TEICH, "On the Boolean extension of the Birnbaum importance to non-coherent systems", *Reliability Engineering & System Safety*, 2017, vol. 160, pp. 191-200

### **Deciding with Thresholds: Importance Measures and Value of Information**

BORGONOVO, E., A. CILLO, "Deciding with Thresholds: Importance Measures and Value of Information", *Risk Analysis*, 2017, vol. 37, no. 10, pp. 1828-1848

### **A Common Rationale for Global Sensitivity Measures and Their Estimation**

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### **A new time-independent reliability importance measure**

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### **A Protocol for the Global Sensitivity Analysis of Impact Assessment Models in Life Cycle Assessment**

BORGONOVO, E., S. CUCURACHI, R. HEIJUNGS, "A Protocol for the Global Sensitivity Analysis of Impact Assessment Models in Life Cycle Assessment", *Risk Analysis*, 2016, vol. 36, no. 2, pp. 357-377

### **Sensitivity analysis: A review of recent advances**

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### **Invariant methods for an ensemble-based sensitivity analysis of a passive containment cooling system of an AP1000 nuclear power plant**

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### **Decision analysis under ambiguity**

BORGONOVO, E., M. MARINACCI, "Decision analysis under ambiguity", *European Journal of Operational Research*, 2015, vol. 244, no. 3, pp. 823-836

### **Elicitation of Multiattribute Value Functions through High Dimensional Model Representations: Monotonicity and Interactions**

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### **Elicitation of multiattribute value functions through high dimensional model representations:**

#### **Monotonicity and interactions**

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### **Decision-network polynomials and the sensitivity of decision-support models**

BORGONOVO, E., F. TONOLI, "Decision-network polynomials and the sensitivity of decision-support models", European Journal of Operational Research, 2014, vol. 239, no. 2, pp. 490-503

### **Quando ai manager danno i numeri**

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### **Transformations and invariance in the sensitivity analysis of computer experiments**

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### **Uncertainty in Climate Change Modeling: Can Global Sensitivity Analysis Be of Help?**

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### **Effects of temperature on flood forecasting: Analysis of an operative case study in Alpine basins**

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### **Global sensitivity measures from given data**

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### **On the importance of uncertain factors in seismic fragility assessment**

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**Risk Analysis with contractual default. Does Covenant Breach Matter?**

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**Composite multilinearity, epistemic uncertainty and risk achievement worth**

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**Sampling strategies in density-based sensitivity analysis**

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**A Study of Interactions in the Risk Assessment of Complex Engineering Systems: an Application to Space PSA**

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**Cancer cell reprogramming, 2010: stem cell differentiation stage factors and an agent based model to optimize cancer treatment**

BIAVA, P. M., M. BASEVI, L. BIGGIERO, A. BORGONOVO, E. BORGONOVO, F. BURIGANA, "Cancer cell reprogramming, 2010: stem cell differentiation stage factors and an agent based model to optimize cancer treatment", Current Pharmaceutical Biotechnology, 2011, vol. 12, no. 2, pp. 231-242

**Finite Change Comparative Statics for Risk-Coherent Inventories**

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**La progettazione dei sistemi di incentivazione del personale. Un modello sperimentale**

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**Managerial Insights from Service Industry Models: A New Scenario Decomposition Method**



BORGONOVO, E., L. PECCATI, "Managerial Insights from Service Industry Models: A New Scenario Decomposition Method", Annals of Operations Research, 2011, vol. 185, no. 1, pp. 161-179

#### **Moment Independent Importance Measures: New Results and Analytical Test Cases**

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#### **Sensitivity Analysis of Portfolio Properties with Budget Constraints**

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#### **What drives value creation in investment projects? An application of sensitivity analysis to project finance transactions**

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#### **The reliability importance of components and prime implicants in coherent and non-coherent systems including total-order interactions**

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#### **A Methodology for Determining Interactions in Probabilistic Safety Assessment Models by Varying One Parameter at a Time**

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#### **Sensitivity analysis with finite changes: An application to modified EOQ models**

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### **Uncertainty propagation in decision support models**

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### **Sensitivity Analysis of Model Output with Input Constraints: A Generalized Rationale for Local Methods**

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### **Moment independent and variance-based sensitivity analysis with correlations: An application to the stability of a chemical reactor**

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### **Decision Making During Nuclear Power Plant Incidents—A New Approach to the Evaluation of Precursor Events**

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### **A new uncertainty importance measure**

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### **Global sensitivity analysis in inventory management**

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