Giacomo Marangoni

Assistant Professor in Policy Analysis

Integrated Assessment Modelling
Robust Decision Making

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Research Interests

Topics: Climate change risk management, mitigation and adaptation policies, tradeoffs and co-benefits between multiple environmental and economic objectives. Long-term scenarios of energy system decarbonization, innovation in clean energy technologies, energy conservation through behavioral change.

Methods: Integrated assessment modelling (WITCH, RICE50+), Multi-objective evolutionary optimization (BORG), Optimization under uncertainty (Direct Policy Search, Approximate Dynamic Programming), Sensitivity analysis (global, scenario-based decomposition), Unsupervised machine learning

Working Experiences

Sep 2022 – **Assistant Professor (Tenure Track)**, *Multi-Actor Systems Department, Faculty of Technology, Policy and Management*, Delft University of Technology (TU Delft), Netherlands

Jan 2021 –
Aug 2022 **Assistant Professor (RTD-A)**, *Department of Management, Economics and Industrial Engineering*, Politecnico di Milano, Italy

Sep 2018 –
Jan 2021 **Researcher**, *Department of Management, Economics and Industrial Engineering*, Politecnico di Milano, Italy

Sep 2017 –
Aug 2018 **Post Doctoral Scholar**, *Earth and Environmental Systems Institute*, Penn State University, University Park, USA

May 2011 –
Aug 2017 **Junior Researcher**, *Mitigation, Innovation and Transformation Pathways Programme*, Fondazione Eni Enrico Mattei (FEEM), Milan, Italy

Education

Nov 2012 –
Feb 2017 **PhD**, *Department of Management and Applied Economics Engineering*, Polytechnic of Milan, Italy

Jan 2015 –
Jul 2015 **Visiting Scholar**, *Department of Electrical Engineering and Computer Sciences*, University of California, Berkeley, USA

Sep 2008 –
Dec 2010 **Master's**, *Control Systems Engineering*, University of Padova, Italy

Publications

Selected Refereed Journal Articles

2023   A. Mastrucci, L. Niamir, B. Boza-Kiss, N. Bento, D. Wiedenhofer, J. Streeck, S. Pachauri, C. Wilson, S. Chatterjee, F. Creutzig, S. Dukkipati, W. Feng, A. Grubler, J. Jupesta, P. Kumar, **G. Marangoni**, et al. "Modeling Low Energy Demand Futures for Buildings: Current State and Research Needs. Annual Review of Environment and Resources". Annual Review of Environment and Resources. DOI: 10.1146/annurev-environ-112321-102921

2022   C. Guivarch, T. Le Gallic, N. Bauer, P. Fragkos, D. Huppmann, M. Jaxa-Rozen, I. Keppo, E. Kriegler, T. Krisztin, **G. Marangoni** et al. "Using Large Ensembles of Climate Change Mitigation Scenarios for Robust Insights.", Nature Climate Change. DOI: 10.1038/s41558-022-01349-x

2022   F. Colelli, J. Emmerling, **G. Marangoni**, M. Mistry, E. De Cian. "Increased Energy Use for Adaptation Significantly Impacts Mitigation Pathways.", Nature Communications. DOI: 10.1038/s41467-022-32471-1

2021   **G. Marangoni**, J. Lamontagne, J. Quinn, P. Reed, K. Keller. "Adaptive mitigation strategies hedge against extreme climate futures", Climatic Change. DOI: 10.1007/s10640-009-9269-5

2021   **G. Marangoni**, M. Tavoni. "Real-time feedback on electricity consumption: evidence from a field experiment in Italy", Energy Efficiency. DOI: 10.1007/s12053-020-09922-z

2021   P. Gazzotti, J. Emmerling, **G. Marangoni**, A. Castelletti, K. van der Wijst, A. Hof, M. Tavoni. "Persistent inequality in economically optimal climate policies", Nature Communications. DOI: 10.1038/s41467-021-23613-y

2021   E. Brutschin, S. Pianta, M. Tavoni, K. Riahi, V. Bosetti, **G. Marangoni**, B. van Ruijven. "A multidimensional feasibility evaluation of low-carbon scenarios", Environmental Research Letters. DOI: 10.1088/1748-9326/abf0ce

2019   J. Lamontagne, P. Reed, **G. Marangoni**, K. Keller, G. Garner. "Robust abatement pathways to tolerable climate futures require immediate global action", Nature Climate Change. DOI: 10.1038/s41558-019-0426-8

2016   **G. Marangoni**, M. Tavoni, V. Bosetti, E. Borgonovo, P. Capros, O. Fricko, D. Gernaat, C. Guivarch, P. Havlik, D. Huppmann, N. Johnson, P. Karkatsoulis, I. Keppo, V. Krey, E. Ó Broin, J. Price, D. P. van Vuuren. "Sensitivity of projected long-term CO_2 emissions across the Shared Socio-economic Pathways", Nature Climate Change. DOI: 10.1038/nclimate3199

2016   J. Jewell, V. Vinichenko, D. McCollum, N. Bauer, K. Riahi, T. Aboumahboub, O. Fricko, M. Harmsen, T. Kober, V. Krey, **G. Marangoni**, M. Tavoni, D. P. van Vuuren, B. van der Zwaan, A. Cherp. "Comparison and interactions between the long-term pursuit of energy independence and climate policies", Nature Energy. DOI: 10.1038/nenergy.2016.73

2015   V. Bosetti, **G. Marangoni**, E. Borgonovo, L. Diaz Anadon, R. Barron, H. C. McJeon, S. Politis, and P. Friley. "Sensitivity to energy technology costs: A multi-model comparison analysis", Energy Policy. DOI: 10.1016/j.enpol.2014.12.012

2015   M. Tavoni, E. Kriegler, K. Riahi, D. P. van Vuuren, T. Aboumahboub, A. Bowen, K. Calvin, E. Campiglio, T. Kober, J. Jewell, G. Luderer, **G. Marangoni**, D. McCollum, M. van Sluisveld, A. Zimmer, and B. van der Zwaan. "Post-2020 climate agreements in the major economies assessed in the light of global models", Nature Climate Change. DOI: 10.1038/nclimate2475

2014   H. McJeon, J. Edmonds, N. Bauer, L. Clarke, B. Fisher, B. P. Flannery, J. Hilaire, V. Krey, **G. Marangoni**, R. Mi, K. Riahi, H. Rogner, and M. Tavoni. "Limited impact on decadal-scale climate change from increased use of natural gas", Nature. DOI: 10.1038/nature13837

2014 **G. Marangoni** and M. Tavoni. "The clean energy R&D strategy for 2°C", Climate Change Economics. DOI: 10.1142/S201000781440003X

Other Refereed Journal Articles

2021 O. Edelenbosch, D. Rovelli, A. Levesque, **G. Marangoni**, M. Tavoni. "Long term, cross-country effects of buildings insulation policies", Technological Forecasting and Social Change. DOI: 10.1016/j.techfore.2021.120887

2018 J. Rogelj, A. Popp, K. Calvin, G. Luderer, J. Emmerling, D. Gernaat, S. Fujimori, J. Strefler, T. Hasegawa, **G. Marangoni**, V. Krey, E. Kriegler, K. Riahi, D. P. van Vuuren, J. Doelman, L. Drouet, J. Edmonds, O. Fricko, M. Harmsen, P. Havlik, F. Humpenöder, E. Stehfest, and M. Tavoni. "Scenarios towards limiting global mean temperature increase below 1.5°C", Nature Climate Change. DOI: 10.1038/s41558-018-0091-3

2018 A. Vinca, M. Rottoli, **G. Marangoni**, and M. Tavoni. "The role of carbon capture and storage electricity in attaining 1.5 and 2°C", International Journal of Greenhouse Gas Control. DOI: 10.1016/j.ijggc.2018.07.020

2016 E. De Cian, A. F. Hof, **G. Marangoni**, M. Tavoni, D. P. van Vuuren. "Alleviating inequality in climate policy costs: an integrated perspective on mitigation, damage and adaptation", Environmental Research Letters. DOI: 10.1088/1748-9326/11/7/074015

2016 K. Riahi, D. P. van Vuuren, E. Kriegler, J. Edmonds, B. C. O'Neill, S. Fujimori, N. Bauer, K. Calvin, R. Dellink, O. Fricko, W. Lutz, A. Popp, J. C. Cuaresma, S. KC, M. Leimbach, L. Jiang, T. Kram, S. Rao, J. Emmerling, K. Ebi, T. Hasegawa, P. Havlik, F. Humpenöder, L. A. D. Silva, S. Smith, E. Stehfest, V. Bosetti, J. Eom, D. Gernaat, T. Masui, J. Rogelj, J. Strefler, L. Drouet, V. Krey, G. Luderer, M. Harmsen, K. Takahashi, L. Baumstark, J. C. Doelman, M. Kainuma, Z. Klimont, **G. Marangoni**, H. Lotze-Campen, M. Obersteiner, A. Tabeau, and M. Tavoni. "The Shared Socioeconomic Pathways and their energy, land use, and greenhouse gas emissions implications: An overview", Global Environmental Change. DOI: 10.1016/j.gloenvcha.2016.05.009

2016 N. Bauer, K. Calvin, J. Emmerling, O. Fricko, S. Fujimori, J. Hilaire, J. Eom, V. Krey, E. Kriegler, I. Mouratiadou, H. S. de Boer, M. van den Berg, S. Carrara, V. Daioglou, L. Drouet, J. E. Edmonds, D. Gernaat, P. Havlik, N. Johnson, D. Klein, P. Kyle, **G. Marangoni**, T. Masui, R. C. Pietzcker, M. Strubegger, M. Wise, K. Riahi, and D. P. van Vuuren. "Shared socio-economic pathways of the energy sector — quantifying the narratives", Global Environmental Change. DOI: 10.1016/j.gloenvcha.2016.07.006

2016 S. Carrara, **G. Marangoni**. "Including system integration of variable renewable energies in a constant elasticity of substitution framework: The case of the WITCH model", Energy Economics. DOI: 10.1016/j.eneco.2016.08.017

2015 P. L. Lucas, J. Nielsen, K. Calvin, D. McCollum, **G. Marangoni**, J. Strefler, B. C. C. van der Zwaan, D. P. van Vuuren. "Future energy system challenges for Africa: Insights from Integrated Assessment Models", Energy Policy. DOI: 10.1016/j.enpol.2015.08.017

2013 D. McCollum, Y. Nagai, K. Riahi, **G. Marangoni**, K. Calvin, R. Pietzcker, J. Van Vliet, and B. Van Der Zwaan. "Energy investments under climate policy: A comparison of global models", Climate Change Economics. DOI: 10.1142/S2010007813400101

2013 S. Carrara and **G. Marangoni**. "Non-CO_2 greenhouse gas mitigation modeling with marginal abatement cost curves: Technical change, emission scenarios and policy costs", Economics and Policy of Energy and the Environment. DOI: 10.3280/EFE2013-001006

2013   B. C. C. Van Der Zwaan, H. Rösler, T. Kober, T. Aboumahboub, K. V. Calvin, D. E. H. J. Gernaat, **G. Marangoni**, and D. Mccollum. "A cross-model comparison of global long-term technology diffusion under a 2°C climate change control target", Climate Change Economics. DOI: 10.1142/S2010007813400137

2013   C. Carraro, M. Davide, V. Barbi, and **G. Marangoni**. "Science advancements, policy immobility: The two faces of climate (in)action", Economics and Policy of Energy and the Environment. DOI: 10.3280/EFE2013-003001

Other Publications

2020   B. Brian, R. Hanes, C. Hunter, C. Hughes, M. Mann, E. Newes, ..., **G. Marangoni**, et al. 2020. "Workshop Report on Methods for R&D Portfolio Analysis and Evaluation". Golden, CO: National Renewable Energy Laboratory. NREL/TP-6A20-75314

2018   R. Lempert, **G. Marangoni**, K. Keller, and J. Duke. "Is Climate Restoration an Appropriate Climate Policy Goal?", RAND Corporation research report. DOI: 10.7249/RR2442

2017   **G. Marangoni**. "Strategic investment decisions in the energy supply and demand sectors under uncertain technical change and sustainability concerns". PhD Thesis

2017   **G. Marangoni**, G. de Maere, V. Bosetti. "Optimal Clean Energy R&D Investments Under Uncertainty". SSRN

2017   A. Vinca, M. Rottoli, **G. Marangoni**, M. Tavoni. "The Role of Carbon Capture and Storage Electricity in Attaining 1.5 and 2°C". SSRN

2016   J. Emmerling, L. Drouet, L. A. Reis, M. Bevione, L. Berger, V. Bosetti, S. Carrara, E. De Cian, G. De Maere D'Aertrycke, T. Longden, M. Malpede, **G. Marangoni**, F. Sferra, M. Tavoni, J. Witajewski-Baltvilks, P. Havlik. "The WITCH 2016 Model-Documentation and Implementation of the Shared Socioeconomic Pathways". SSRN

2015   D. A. Raitzer, F. Bosello, M. Tavoni, C. Orecchia, **G. Marangoni**, J. N. G. Samson. "Southeast Asia and the Economics of Global Climate Stabilization", Asian Development Bank Report

2013   C. Carraro, T. Longden, G. Marangoni, M. Tavoni. "The Optimal Energy Mix in Power Generation and the Contribution from Natural Gas in Reducing Carbon Emissions to 2030 and Beyond". SSRN

Main Collaborations under Research Grants

2020 − 2022   NEWTRENDS (European Union Horizon 2020 Grant N° 893311) "NEW TRENDS in energy demand modeling making"

2019 − 2022   NAVIGATE (European Union Horizon 2020 Grant N° 821124) "Next generation of AdVanced InteGrated Assessment modelling to support climaTE policy making"

2018 − 2019   COBHAM (European Union ERC-2013-StG Grant N° 336155) "The role of consumer behavior and
2015 − 2017   heterogeneity in the integrated assessment of energy and climate policies"

2017 − 2018   SCRiM (National Science Foundation cooperative agreement GEO-1240507) "Sustainable Climate Risk Management"

2015   ECOCEP (European Union FP7-PEOPLE-2013-IRSES Grant N° 609642) "Economic Modeling for Climate-Energy Policy"

2013 − 2016   ADVANCE (European Union FP7/2007-2013 Grant N° 308329) "Advanced Model Development and Validation for Improved Analysis of Costs and Impacts of Mitigation Policies"

2011 − 2014   LIMITS (European Union FP7/2007-2013 Grant N° 282846) "Low climate IMpact scenarios and the Implications of required Tight emission control Strategies"

Awards

2017	PhD degree with honors
2010	Master's degree with honors
2008	Bachelor's degree with honors

PhD Supervision

2023 –	A. Poujon. "Social-tipping points in sustainability transitions: linking international negotiations to national opinions"
2018 – 2022	P. Gazzotti. "Integrated Assessment and Agent-Based Modeling techniques to explore optimal climate change mitigation policies and countries negotiation strategies in international climate agreements"

Teaching

2023 –	Co-teach MSc course *Machine Learning for Socio-Technical Systems* (TU Delft)
2022 –	Co-teach MSc course *Model-based decision making* (TU Delft)
2019 – 2016 – 2017	Co-teach MSc course *Energy Modelling And Scenarios* (Polytechnic of Milan, Italy)
2021 –	Co-teach MSc course *Integration of Nuclear and Renewable energy for carbon neutral scenarios* (Polytechnic of Milan, Italy)
2021 –	Co-teach MSc course *Global Environmental Challenges* (Polytechnic of Milan, Italy)

Scientific Affiliations

Sep 2018 –	Sustainable Earth Modelling Economics Programme, RFF-CMCC European Institute on Economics and the Environment, Milan, Italy
May 2011 – Aug 2017	Economic analysis of Climate Impacts and Policy Division, Euro-Mediterranean Center on Climate Change (CMCC), Milan, Italy

Professional Services

Contributing Author

2022	IPCC. "AR6 Scenarios Database" [Byers et al.]. Part of "Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change" [Shukla et al.]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
2014	IPCC. "Assessing transformation pathways" [Clarke et al.]. Chapter 6 of "Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change" [Edenhofer et al.]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA

Reviewer of Journals

Nature Climate Change, Nature Communications, Energy Economics, Energy Policy, Energy Efficiency, European Journal of Operational Research, Technological Forecasting and Social Change

International Conferences

IAMC	Integrated Assessment Modeling Consortium Annual Meeting. 2023 2020, 2019.
DMDU	Society for Decision Making under Deep Uncertainty Annual Meeting. 2023, 2018, 2017.
fPET	Forum on Philosophy, Engineering & Technology. 2023.
AMaMeF	Advanced Mathematical Methods for Finance General Conference. 2021.
IEW	International Energy Workshop. 2021, 2019, 2016, 2014, 2013.
DAS	INFORMS Advances in Decision Analysis Conference. 2019.
SSP	Forum on Scenarios for Climate and Societal Futures. 2019.
EGU	European Geosciences Union General Assembly. 2018.
INFORMS	INFORMS Annual Meeting. 2017.
IAEE	International Association of Energy Economists European Conference. 2014.
SISC	SISC Annual Conference. 2014.

Computer Languages

Main:	Python, GAMS, Bash, JavaScript, LaTeX
Secondary:	R, Java, C/C++, SQL, MATLAB, AMPL, Lisp
Coding Examples:	gdxcompare gdxpy