

Europass Curriculum Vitae



Personal information

Surname / First name

Address

Telephone

Email

Nationality

Date of birth

Gender

Giuliani, Matteo

Largo Camussi 8, Gallarate (VA), Italy

+39.02.2399.9040

Mobile: +39.347.8717840

matteo.giuliani@polimi.it

Italian

6 June 1986

Male

Current Position

February 2014 - till date

Postdoctoral Research Fellow

Dept. of Electronics, Information, and Bioengineering, Politecnico di Milano, Italy

Education

January 2011 - February 2014

PhD in Information Technology

Dept. of Electronics, Information, and Bioengineering, Politecnico di Milano, Italy

PhD Thesis: *Agent-based water resources management in complex decision-making contexts*

Supervisor: Prof. Rodolfo Soncini-Sessa

Co-Supervisor: Prof. Andrea Castelletti

June 2011

Alta Scuola Politecnica Diploma (ASP, V cycle)

Politecnico di Milano and Politecnico di Torino, Italy

Multidisciplinary Project: *VALORIVER – sustainable valorization project of the Sangone River*

The project involved Provincia di Torino, Autorità di Bacino del fiume Po, Regione Piemonte, AIPO (Agenzia Interregionale per il fiume Po), Ente Parco fluviale del Po, 11 Municipalities belonging to the Sangone catchment, Sferalab e ASSOT (Agenzia Sviluppo Sud Ovest Torino)
Supervisor: Prof. P. Tosoni (Dept. of Housing and City, Politecnico di Torino).

September 2008 - October
2010

Master's Degree in Environmental and Land Planning Engineering

Politecnico di Milano and Politecnico di Torino, Italy

Master Thesis: *Dealing with Multi Criteria Problems in Water Resources Planning and Management*

Supervisor: Prof. Rodolfo Soncini-Sessa - Mark 110/110 magna cum laude

September 2005 - September
2008

Bachelor's Degree in Environmental and Land Planning Engineering

Politecnico di Milano, Italy

Bachelor Thesis: *Gli indicatori di progetto nella gestione delle risorse idriche: analisi di correlazione contro analisi delle componenti principali (Design indicators in water resources management: correlation analysis against principal component analysis)*

Supervisor: Prof. Rodolfo Soncini-Sessa - Mark 110/110 magna cum laude

2000 - 2005

High School Scientific Diploma

Liceo Scientifico "Galileo Ferraris", Varese (Italy)

Mark 100/100

PhD Courses

| | |
|----------------|---|
| March 2011 | Intelligent Multiagent systems Prof. F. Amigoni (Dept. of Electronics and Information, Politecnico di Milano, Italy) |
| May 2011 | Game Theoretical Models in Engineering Prof. R. Lucchetti (Dept. of Mathematics, Politecnico di Milano, Italy) |
| June 2011 | Genetic Algorithms and other Evolutionary Techniques Prof. P.L. Lanzi (Dept. of Electronics and Information, Politecnico di Milano, Italy) |
| July 2011 | XV National School SIDRA for PhD students <i>Distributed optimization and game theory</i> <i>Introduction to Model Predictive Control</i> SIDRA - Società Italiana Docenti e Ricercatori in Automatica (Italian society of professors and researchers in control theory), Bertinoro (FC), Italy |
| September 2011 | Analysis of Innovation and Competition Processes Prof. F. Dercole (Dept. of Electronics and Information, Politecnico di Milano, Italy) |
| October 2011 | Spatial Dynamics and Applications to Biological Problems Prof. M. Gatto (Dept. of Electronics and Information, Politecnico di Milano, Italy) |
| February 2012 | Methods and Models for Decision Making Prof. A. Colorni (Dept. of Industrial Design, Arts, Communication and Fashion, Politecnico di Milano, Italy) |

ASP Courses

| | |
|------------|---|
| March 2009 | Innovation: why and for whom? Prof. M. Bucchi (Dept. of Sociology and social research, Università degli studi di Trento) |
| April 2009 | Global Change and sustainability Prof. B. Betti (Dept. of Environmental, Hydraulic, Infrastructures and Surveying Engineering, Politecnico di Milano), Prof. M. Gatto (Dept. of Electronics and Information, Politecnico di Milano,), Prof. S. Consonni (Dept. of Energy, Politecnico di Milano) |
| July 2009 | Management of innovation Prof. M. Calderini (Dept. of Production Systems and Business Economics, Politecnico di Torino) |
| March 2010 | Decision Making Prof. B. Dente (Dept. of Architecture and Planning, Politecnico di Milano) |
| May 2010 | The art of modelling Prof. S. Rinaldi (Dept. of Electronics and Information, Politecnico di Milano) |
| July 2010 | The dynamics of creativity Prof. Balducci (Dept. of Architecture and Planning, Politecnico di Milano) |

Spoken languages

Mother tongue

Self-assessment
European level^()*

English

Italian

| Understanding | | Speaking | | Writing |
|---------------|---------|--------------------|-------------------|---------|
| Listening | Reading | Spoken interaction | Spoken production | |
| C1 | C1 | B2 | B2 | C1 |

^(*) Common European Framework of Reference (CEF) level

ETS-TOEFL Internet Based: total score = 100/120 (November 2009)

Technical Skills

Operating Systems
Programming Languages
Mathematical Software

Windows, Mac OS X, GNU/Linux
C, C++, Java
Matlab

DataBase Systems
GIS Software
MS Office Package
Other Software

MySQL
ArcGIS, ArcView, QGis
Word, Excel, Power Point
Adobe Photoshop, Adobe Illustrator, L^AT_EX, MySQL Workbench (design of DB systems), Amaci (decision support system), WODA (river quality simulation)

Activities

Research Activities

My research activity deals with the integrated and participatory planning and management of water resources through the development and application of novel methodologies and tools in complex environmental systems, characterized by the presence of multiple decision makers and many conflicting stakeholders.

My primary research topics include: 1) agent-based water resources management; 2) many-objective optimization for water resources management; 3) robust decision making, especially under global change; 4) agricultural water management.

International Experience

September - December 2012

Visiting PhD student

Hydroinformatics Research Group, Department of Civil and Environmental Engineering – Penn State University, University Park, Pennsylvania, USA

Research Projects

SmartH2O

SmartH2O is an FP7 project founded by the European Commission started in 2014. The project aims at developing an ICT platform to understand and model the consumers' current behavior, based on historical and real-time water usage data, predict how the consumer behavior can be influenced by various water demand management policies: water savings campaigns, social awareness campaigns, to dynamic water pricing schemes, and raise the awareness of water consumers on their current water usage habits and their lifestyle implications and to stimulate them to reduce water use. Results will be deployed in two challenging use cases, in selected districts of London (UK) and Locarno (CH), potentially reaching millions of users.

IMRR

The IMRR - Integrated and Sustainable Water Management of Red-Thai Binh River System is a research project started in 2012 and founded by the Italian Ministry of Foreign Affairs - Vietnamese Ministry of Agriculture and Rural Development. The project aims at developing and promoting strategies for the sustainable management of the Red-Thai Binh Rivers System in Vietnam through coordinated decision-making and negotiation, supported by modeling and optimization tools and through capacity building of local authorities in the water sector.

Teaching Activities

March 2015

Lecturer for the Advanced Course: *Tools and methods for climate change impact analysis of water resources systems*
Institute for Water Resources Planning, Hanoi, Vietnam

A.Y. 2014-2015

Teaching Assistant of the Master Course (in English): *Natural Resources Management*
Prof. A. Castelletti, Politecnico di Milano

A.Y. 2013-2014

Teaching Assistant of the Master Course: *Gestione delle Risorse Naturali*
Prof. A. Castelletti, Politecnico di Milano

Teaching Assistant of the Master Courses (in English): *Natural Resources Management + Integrated Water Resources Management*

Prof. A. Castelletti, Politecnico di Milano - Como campus

A.Y. 2012-2013

Teaching Assistant of the Master Course: *Gestione delle Risorse Naturali*
Prof. A. Castelletti, Politecnico di Milano

A.Y. 2011-2012 Teaching Assistant of the Master Courses (in English): *Natural Resources Management + Integrated Water Resources Management*
Prof. A. Castelletti, Politecnico di Milano - Como campus

A.Y. 2011-2012 Teaching Assistant of the Master Course (in English): *Natural Resources Management*
Prof. A. Castelletti, Politecnico di Milano - Como campus

A.Y. 2010-2011 Laboratory Tutor of the Bachelor Course: *Analisi e Gestione dei Sistemi Ambientali (Analysis and management of environmental systems)*
Prof. R. Soncini-Sessa, Politecnico di Milano

A.Y. 2010-2011 Teaching Assistant of the Master Course (in English): *Natural Resources Management*
Prof. A. Castelletti and Prof. S. Galelli, Politecnico di Milano - Como campus

Review Activities

Water Resources Research - Wiley
Environmental Modelling & Software - Elsevier
Journal of Water Resources Planning and Management - ASCE
Journal of Hydrologic Engineering - ASCE

Memberships

Since 2014, member of the Environmental & Water Resources Systems community (EWRS/ASCE). Since 2013, member of the Environmental & Water Resources Institute of the American Society of Civil Engineers (EWRI/ASCE). Since 2012, member of the American Geophysical Union (AGU), the International Association of Hydrological Sciences (IAHS) and the International Environmental Modeling & Software Society (iEMSs).

Awards and Fellowships

2014 Outstanding Reviewer for the *Journal of Water Resources Planning & Management*
Fondazione Fratelli Confalonieri PhD fellowship, 2011-2013
Alta Scuola Politecnica fellowship, 2008-2010

Publications

Journals

- [A.1] M. Giuliani, A. Castelletti, F. Pianosi, E. Mason, and P. Reed, "Curses, tradeoffs, and scalable management: advancing evolutionary multi-objective direct policy search to improve water reservoir operations," *Journal of Water Resources Planning and Management*, 2015. doi: 10.1061/(ASCE)WR.1943-5452.0000570
- [A.2] A. Cominola, M. Giuliani, D. Piga, A. Castelletti, and A. Rizzoli, "Benefits and challenges of using smart meters for advancing residential water demand modeling and management: A review," *Environmental Modelling & Software*, vol. 72, pp. 198–214, 2015. doi: 10.1016/j.envsoft.2015.07.012
- [A.3] M. Giuliani, A. Castelletti, F. Amigoni, and X. Cai, "Multiagent Systems and Distributed Constraint Reasoning for Regulatory Mechanism Design in Water Management," *Journal of Water Resources Planning and Management*, vol. 141, no. 4, 2015. doi: 10.1061/(ASCE)WR.1943-5452.0000463
- [A.4] H. Maier, Z. Kapelan, J. Kasprzyk, J. Kollat, L. Matott, M. Cunha, G. Dandy, M. Gibbs, E. Keedwell, A. Marchi, A. Ostfeld, D. Savic, D. Solomatine, J. Vrugt, A. Zecchin, B. Minsker, E. Barbour, G. Kuczera, F. Pasha, A. Castelletti, M. Giuliani, and P. Reed, "Evolutionary algorithms and other metaheuristics in water resources: Current status, research challenges and future directions," *Environmental Modelling & Software*, vol. 62, no. 0, pp. 271–299, 2014. doi: 10.1016/j.envsoft.2014.09.013
- [A.5] M. Giuliani, J. Herman, A. Castelletti, and P. Reed, "Many-objective reservoir policy identification and refinement to reduce policy inertia and myopia in water management," *Water Resources Research*, vol. 50, pp. 3355–3377, 2014. doi: 10.1002/2013WR014700
- [A.6] M. Giuliani, S. Galelli, and R. Soncini-Sessa, "A dimensionality reduction approach for Many-Objective Markov Decision Processes: application to a water reservoir operation problem," *Environmental Modeling & Software*, vol. 57, pp. 101–114, 2014. doi: 10.1016/j.envsoft.2014.02.011
- [A.7] A. Castelletti, H. Yajima, M. Giuliani, R. Soncini-Sessa, and E. Weber, "Planning the Optimal Operation of a Multi-Outlet Water Reservoir with Water Quality and Quantity Targets," *Journal of Water Resources Planning and Management*, 2014. doi: 10.1061/(ASCE)WR.1943-5452.0000348
- [A.8] M. Giuliani and A. Castelletti, "Assessing the value of cooperation and information exchange in large water resources systems by agent-based optimization," *Water Resources Research*, vol. 49, pp. 3912–3926, 2013. doi: 10.1002/wrcr.20287

Conferences

- [B.1] A. Cominola, M. Giuliani, D. Piga, A. Castelletti, A. Rizzoli, and M. Anda, "Modelling residential water consumers' behaviors by feature selection and feature weighting," in *Proceedings of the 36th IAHR World Congress*, The Hague (the Netherlands), 28 June – 3 July 2015
- [B.2] D. Piga, A. Cominola, M. Giuliani, A. Castelletti, A. Rizzoli, and M. Anda, "A convex optimization approach for automated water and energy end use disaggregation," in *Proceedings of the 36th IAHR World Congress*, The Hague (the Netherlands), 28 June – 3 July 2015
- [B.3] F. Amigoni, A. Castelletti, and M. Giuliani, "Modeling the Management of Water Resources Systems Using Multi-Objective DCOPs," in *Proceedings of the 14th International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2015)*, Istanbul (Turkey), 4-8 May 2015
- [B.4] M. Giuliani, E. Mason, A. Castelletti, F. Pianosi, and R. Soncini-Sessa, "Universal approximators for direct policy search in multi-purpose water reservoir management: A comparative analysis," in *Proceedings of the 19th IFAC World Congress*, Cape Town (South Africa), 24-29 August 2014
- [B.5] M. Giuliani, A. Castelletti, and P. Reed, "Improving the protection of aquatic ecosystems by dynamically constraining reservoir operation via direct policy conditioning," in *Proceedings of the 19th IFAC World Congress*, Cape Town (South Africa), 24-29 August 2014
- [B.6] L. Beltrame, D. Carbonin, S. Galelli, A. Castelletti, and M. Giuliani, "Quantifying ENSO impacts at the basin scale using the Iterative Input variable Selection algorithm," in *Proceedings of the 7th International Congress on Environmental Modeling and Software (iEMSs 2014)*, San Diego (CA), 15-19 June 2014
- [B.7] C. Arias, M. Brovelli, and M. Giuliani, "A FOSS based web geo-service architecture for data management in complex water resources contexts," in *Proceedings of the International Conference on Hydroinformatics (HIC2014)*, New York (NY), 17-21 August 2014
- [B.8] P. Biglarbeigi, M. Giuliani, and A. Castelletti, "Many-objective direct policy search in the Dez and Karoun multireservoir system, Iran," in *Proceedings of the World Environmental & Water Resources Congress (ASCE EWRI 2014)*, Portland (Oregon), 1-5 June 2014
- [B.9] M. Giuliani, A. Castelletti, S. Galelli, R. Soncini-Sessa, and E. Weber, "Many-objective operation of selective withdrawal reservoirs including water quality targets," in *Proceedings of the World Environmental & Water Resources Congress (ASCE EWRI 2013)*, Cincinnati (Ohio), 19-23 May 2013
- [B.10] M. Giuliani, A. Castelletti, F. Amigoni, and X. Cai, "Multi-Agent Systems optimization for distributed watershed management," in *Proceedings of the 6th International Congress on Environmental Modeling and Software (iEMSs 2012)*, Leipzig (Germany), 1-5 July 2012
- [B.11] M. Giuliani, A. Castelletti, and R. Soncini-Sessa, "Multi-Agent Water Resources Management: centralized vs decentralized approach," in *Proceedings of the International Conference on Hydroinformatics (HIC2012)*, Hamburg (Germany), 14-18 July 2012
- [B.12] A. Anand, S. Galelli, M. Giuliani, L. Samavedham, and D. Schwanenberg, "Coordinating multiple model predictive controllers for water reservoir networks operation," in *Proceedings of the International Congress on Modelling and Simulation (MODSIM2011)*, Perth (Australia), 12-16 December 2011
- [B.13] S. Galelli, M. Giuliani, and R. Soncini-Sessa, "Dealing with many-objectives problems in water resources planning and management," in *Proceedings of the 18th IFAC World Congress*, Milan (Italy), 28 August - 2 September 2011

Abstracts

- M. Giuliani, A. Castelletti, F. Pianosi, E. Mason, and P. Reed, "Curses, tradeoffs, and scalable management: advancing evolutionary multi-objective direct policy search to improve water reservoir operations," in *World Environmental & Water Resources Congress (ASCE EWRI 2015)*, Austin (Texas), 17-21 May 2015
- Y. Li, M. Giuliani, and A. Castelletti, "An agent based decision framework to advance agricultural water management under global change," in *World Environmental & Water Resources Congress (ASCE EWRI 2015)*, Austin (Texas), 17-21 May 2015
- A. Cominola, M. Giuliani, D. Piga, A. Castelletti, and A. Rizzoli, "The SmartH2O platform: advancing residential water management by smart metering and data intensive modeling of consumers' behaviors," in *World Environmental & Water Resources Congress (ASCE EWRI 2015)*, Austin (Texas), 17-21 May 2015
- J. Zatarain-Salazar, P. Reed, J. Herman, M. Giuliani, and A. Castelletti, "Diagnostic Assessment of the Difficulty using Direct Policy Search in Many-Objective Water Reservoir Control," in *World Environmental & Water Resources Congress (ASCE EWRI 2015)*, Austin (Texas), 17-21 May 2015
- A. Castelletti, M. Giuliani, J. Zatarain-Salazar, J. Hermann, F. Pianosi, and P. Reed, "Challenges and Benefits of Direct Policy Search in Advancing Multiobjective Reservoir Management," in *EGU General Assembly (Invited)*, Vienna (Austria), 12-17 April 2015
- S. Culley, S. Noble, M. Timbs, A. Yates, M. Giuliani, A. Castelletti, H. Maier, and S. Westra, "A bottom-up, vulnerability-based framework for identifying the adaptive capacity of water resources systems in a changing climate," in *EGU General Assembly*, Vienna (Austria), 12-17 April 2015
- M. Giuliani, D. Anghileri, A. Castelletti, and R. Soncini-Sessa, "The role of water reservoir operation in climate change impact assessments: expanding uncertainties and evolving tradeoffs," in *EGU General Assembly*, Vienna (Austria), 12-17 April 2015
- A. Alsahaf, M. Giuliani, S. Galelli, and A. Castelletti, "Model reduction of process-based hydro-ecological models: a comparison between projection- and selection-based methods," in *EGU General Assembly*, Vienna (Austria), 12-17 April 2015
- S. Denaro, D. Anghileri, A. Castelletti, E. Fumagalli, and M. Giuliani, "Modeling the water-energy nexus under changing energy market and climate conditions: a case study in the Italian Alps," in *EGU General Assembly*, Vienna (Austria), 12-17 April 2015
- M. Giuliani, D. Anghileri, A. Castelletti, E. Mason, M. Micotti, R. Soncini-Sessa, and E. Weber, "Integrated and Sustainable Water Management of Red–Thai Binh Rivers System Under Change," in *2014 AGU Fall Meeting*, San Francisco (California), 15-19 December 2014
- J. Zatarain-Salazar, P. Reed, J. Herman, M. Giuliani, and A. Castelletti, "Diagnostic Assessment of the Difficulty Using Direct Policy Search in Many-Objective Reservoir Control," in *2014 AGU Fall Meeting*, San Francisco (California), 15-19 December 2014
- S. Denaro, M. Giuliani, and A. Castelletti, "Informing Water Management by Direct Use of Snow Information as Surrogate of Medium-to-Long Range Streamflow Forecast," in *2014 AGU Fall Meeting*, San Francisco (California), 15-19 December 2014
- Y. Li, A. Castelletti, and M. Giuliani, "Assessing the Value of Post-processed State-of-the-art Long-term Weather Forecast Ensembles within An Integrated Agronomic Modelling Framework," in *2014 AGU Fall Meeting*, San Francisco (California), 15-19 December 2014
- S. Galelli, M. Giuliani, A. Castelletti, and A. Alsahaf, "Projection- vs. selection-based model reduction of complex hydro-ecological models," in *2014 AGU Fall Meeting*, San Francisco (California), 15-19 December 2014
- A. Castelletti, S. Galelli, and M. Giuliani, "Dynamic emulation modelling for the optimal operation of water systems: an overview," in *2014 AGU Fall Meeting (Invited)*, San Francisco (California), 15-19 December 2014

A. Cominola, R. Nanda, M. Giuliani, D. Piga, A. Castelletti, A. Rizzoli, A. Maziotis, P. Garrone, and J. Harou, "The SmartH2O project: a platform supporting residential water management through smart meters and data intensive modeling," in *2014 AGU Fall Meeting*, San Francisco (California), 15-19 December 2014

M. Giuliani, J. Herman, A. Castelletti, and P. Reed, "Many-objective reservoir policy identification and refinement to reduce institutional myopia in water management," in *EGU General Assembly*, Vienna (Austria), 27 April - 2 May 2014

M. Giuliani, E. Mason, A. Castelletti, and F. Pianosi, "Universal approximators for multi-objective direct policy search in water reservoir management problems: a comparative analysis," in *EGU General Assembly*, Vienna (Austria), 27 April - 2 May 2014

M. Giuliani, J. Herman, A. Castelletti, and P. Reed, "A decision analytic framework to overcome policy inertia and myopia in river basin management," in *World Environmental & Water Resources Congress (ASCE EWRI 2014)*, Portland (Oregon), 1-5 June 2014

M. Giuliani, A. Castelletti, and R. Soncini-Sessa, "Integrated and sustainable water management of Red-Thai Binh Rivers System," in *World Environmental & Water Resources Congress (ASCE EWRI 2014)*, Portland (Oregon), 1-5 June 2014

M. Giuliani, J. Herman, A. Castelletti, and P. Reed, "Many-objective reservoir policy identification and refinement to reduce institutional myopia in water management," in *2013 AGU Fall Meeting*, San Francisco (California), 9-13 December 2013

M. Giuliani, Y. Li, M. Mainardi, C. A. Munoz, A. Castelletti, and C. Gandolfi, "Co-adapting water demand and supply to changing climate in agricultural systems, a case study in northern Italy," in *2013 AGU Fall Meeting*, San Francisco (California), 9-13 December 2013

M. Giuliani, M. Mainardi, A. Castelletti, and C. Gandolfi, "Water demand and supply co-adaptation to mitigate climate change impacts in agricultural water management," in *EGU General Assembly*, Vienna (Austria), 7-12 April 2013

M. Giuliani, A. Castelletti, and R. Soncini-Sessa, "Independent, coordinated and cooperative management of the Zambezi River via agent-based optimization," in *World Environmental & Water Resources Congress (ASCE EWRI 2013)*, Cincinnati (Ohio), 19-23 May 2013

M. Giuliani, A. Castelletti, and P. Reed, "Evolutionary agent-based models to design distributed water management strategies," in *2012 AGU Fall Meeting*, San Francisco (California), 3-7 December 2012

M. Giuliani, A. Castelletti, and R. Soncini-Sessa, "The role of cooperation and information exchange in transnational river basin: the Zambezi River case," in *2012 AGU Fall Meeting*, San Francisco (California), 3-7 December 2012

M. Giuliani, A. Castelletti, M. Mainardi, E. Chiaradia, and C. Gandolfi, "Coupling pre-season farmers planning and optimal water supply management to mitigate climate change impacts," in *2012 AGU Fall Meeting*, San Francisco (California), 3-7 December 2012

M. Giuliani and A. Castelletti, "Assessing the value of cooperation and information exchange in large water resources systems by multi-agent optimization: the Zambezi River case," in *EGU General Assembly*, Vienna (Austria), 22-27 April 2012

D. Anghileri, M. Giuliani, and A. Castelletti, "Different approaches for centralized and decentralized water system management in multiple decision makers' problems," in *EGU General Assembly*, Vienna (Austria), 22-27 April 2012

M. Giuliani, A. Castelletti, F. Amigoni, and X. Cai, "Multiagent distributed watershed management," in *EGU General Assembly*, Vienna (Austria), 22-27 April 2012

A. Castelletti, M. Giuliani, and R. Soncini-Sessa, "Multi-agent water resources management," in *2011 AGU Fall Meeting*, San Francisco (California), 5-9 December 2011

Technical report

R. Casagrandi, G. Fiorese, M. Gallia, M. Giuliani, M. Radeta, M. Sangiorgio, M. Triverio, E. Martelli, S. Consonni, and S. Caserini, "Playing seriously with mitigation strategies for climate change: the polygame," in *Congresso Nazionale della Società Italiana di Ecologia*, Rome (Italy), 27-30 September 2010

[D.1] M. Giuliani, "An Active Reinforcement Learning approach to reduce sample-set size," Department of Electronics and Information, Politecnico di Milano, Tech. Rep. 2012.16, 2012