Mario Putti

Curriculum Vitae

Personal data

Nome	Mario Putti
Nationality	Italian
Born	5 May, 1959
Affiliation	Department of Department of Agronomy, Food, Natural resources, Animals and Environment - University of Padova
Address	Campus of Agripolis - V.le dell'Università, 16 — 35020 Legnaro (PD) - ITALY
E-mail	mario.putti@unipd.it

Positions

2022-	Full Professor (SSD MAT/08), Department of Agronomy, Food, Natural resources, Animals and Environment - University of Padova - Italy
2012-2022	Associate Professor (SSD MAT/08), Department of Mathematics "Tullio Levi-Civita", University of Padova - Italy
2001-2012	Associate Professor (SSD MAT/08), Dipartment of Mathematical methods and models for Applied Sciences, Unversity of Padova - Italy
1990-2001	Assistant Professor (Ricercatore) (SSD MAT/08), Dept. of Mathematical Methods and Models for Scientific Applications, University of Padua, Italy
1989-1990	Postdoctoral Fellow, University of California Los Angeles
2009-2010	Professor, Scuola Galileiana di Studi Superiori, Università degli Studi di Padova
2007-2008	Visiting Professor, University of California at Los Angeles, USA

Education

1989	Ph.D., Civil Engineering, University of California at Los Angeles Supervisors Prof. William W-G. Yeh, Prof. Wim A. Mulder, Prof. Stanley Osher
1987	M.S., Civil Engineering, University of California at Los Angeles Supervisor prof. William W-G. Yeh
1984	Laurea, Ingegneria Civile Idraulica, Università degli Studi di Padova

Teaching

2020-2024	Matematica-STAg/STVE, 1st year undergradate School of Agriculture and Veterinary, University of Padova
2021-2024	Numerical Methods for Differential Equations, 1st year graduate school (LM) of Matematics, University of Padova
2020-2021	Hydrological modeling of flow and transport of water and solutes: mathematical and numerical challanges. Intensive course (8 hours) Scuola Superiore IANUA-ISSUGE, University of Genova

2015-2021 Numerical Methods for Continuous Systems (in English), 1st year graduate school (LM) in Mathematical Engineering, University of Padova

2013-2021 Metodi Numerici per Equazioni Differenziali, 1st year graduate school (LM) of Matematics, University of Padova

2013-2017 Introduction to hyperbolic conservation laws and their numerical solution (in English), Phd School in Civil and Environmental Engineering Sciences, University of Padova

2009-2010 Metodi Numerici per PDE, Scuola Galileiana di Studi Superiori, University of Padova

2007-2008 Groundwater Hydrology, Graduate School of Engineering, UCLA, USA

1996-2007 Metodi Numerici per l'Ingegneria, IV anno, Scuola di Ingegneria, Università degli Studi di Padova

1990-2020 Calcolo Numerico e Programmazione, 1st year, undergraduate School of Engineering, University of Padova

Professional membership

Member of SIAM (Society for Industrial and Applied Mathematics)

Member of AGU (American Geophysical Union)

Member of GNCS (Gruppo Nazionale per il Calcolo Scientifico)

Professional Services

2016- **Associate Editor**: Dolomites Research Notes in Approximation

2018-2020 **Associate Editor**: Advances in Water Resources

Project proposal reviewer for the following Research Organizations:

ITALIAN CIVR, MIUR; US National Science Foundation; Spanish National Science Foundation; Swiss National Science Foundation; Israel-US Bilateral Science Foundation; ANR-the French National Research Agency, EU FP-7, EU-Horizon2020.

Reviewer for a number of mathematics, physics, and engineering journals such as:

ACM Trans. Math. Soft., Adv. Water Res., Calcolo, CAMWA, Comput. Geosci., Cont. Mech. Thermo., Int. J. Numer. Meth. Engng., J. Comput. Physics, J. of Hydrology, Math. Comp., Nature, PlosOne, PNAS, Royal Society Open Society, SIAM J. Sci. Comput., SIAM J. Numer. Anal., SIAM J. Matrix Anal., SIAM J. Appl. Math., Transp. Porous Media, Water Resour. Res.

Professional Achievements

Co-founder University spin-off M3E s.r.l. (Mathematical Methods and Models for Engineering, http://www.m3eweb.it)

Software Licence (GPL) simulation model CATHY (employed in more than 20 research institutions worldwide)

Thesis Supervision

Bachelor and Master thesis

More than 20 "Laurea Triennale" thesis in Engineering and Mathematics

More than 50 "Laurea Magistrale" thesis in Engineering and Mathematics

PhD supervision and co-supervision (in Italy and abroad)

2020- Amna Moshin, second year PhD in Mathematics, University of Padova

2020-2023 Nicola Segala, PhD in Mathematics, University of Padova (now at 2F-Water-Venture srl, Padova)

2019-2022 Piero Deidda, PhD in Mathematics, University of Padova (now Post-doc at Gran Sasso Sscience Institute de L'Aquila, and Centro De Giorgi, Scuola Normale Superiore di Pisa)

2016-2020 Elena Bachini, PhD in Mathematics, University of Padova (now Assistant Professor, Department of Mathematics, University of Padua)

2014-2018 Enrico Facca, PhD in Mathematics, University of Padova (now Marie Courie Fellow at Dept. Mathematics, University of Bergen, Norway)

2013-2016 Carlotta Scudeler, (with Claudio Paniconi) PhD in Engineering, double degree program at University of Padova and Quebec University, Canada (now Lead Catastrophe Modeler at RMS, London UK)

2011-2014 Gabriele Manoli, PhD in Engineering, University of Padova (now Associate Professor EPFL Lausanne, CH)

2010-2013 Damianio Pasetto, PhD in Engineering, Università di Padova (now Associate Professor Ca' Foscari University, Venezia

2010-2013 Daniele Schiavazzi, PhD in Engineering, Università di Padova (now Associate Professor at Univesity of Notre Dame, USA)

2007-2012 Adam Siade, (with William W-G Yeh) PhD in Engineering, UCLA (now Research Fellow at University of Western Australia)

2007-2010 Cesare Corrado, (with Stefano Lanzoni) PhD in Engineering, Università di Padova (now Research Associate at King's College, London, UK)

2007-2010 Francesca Zanello, PhD in Engineering, University of Padova (now Project Manager at IDROSTUDI srl, Trieste)

2007-2010 Omar Tosatto, (with Marco Marani) PhD in Engineering (now Project Manager at M3E srl, Padova)

2005-2008 Martina Monego, (with Andrea Rinaldo) PhD in Engineering, University of Padova (now Senior Engineer at Autorità di Bacino, Venezia)

2003-2007 Giulia Passadore, (with Andrea Rinaldo) PhD in Engineering, University of Padova (now research staff at University of Padova)

2003-2006 Matteo Camporese, (with Paolo Salandin) PhD in Engineering, University di Padova (now Associate Professor at at University of Padova)

1996-2000 Anna Chiara Bixio, (with Giuseppe Gambolati) PhD in Engineering, University of Padova (now Professional Engineer at Nordest Ingegneria S.r.l., Padova)

1994-1997 Annamaria Mazzia, (with Giorgio Pini) PhD in Matematics, University of Padova (Now Associate Professor at University of Padova)

Post-doctoral scholars

Matteo Camporese, Sylvain Weill, Giuseppe Fadda, Damiano Pasetto, Federico Piazzon, Emma Perracchione, Wolfgang Erb, Enrico Facca, Elena Bachini

PhD services (selection of recent activities)

Participation to PhD Committees

2014- Member of "Collegio Docenti" of PhD School in Mathematics, University of Padova

2010-2014 Member of "Collegio Docenti" of PhD School on Civil and Environmental Engineering, University of Padova

2025 "Final PhD Examination Committee" Department of Mathematics, Politecnico di Milano

2018 Lead Opponent in "Final PhD Examination Committee" Department of Mathematics, University of Bergen, Norway

2014 "Final Examination Committee" Dip. Ingegneria Civile e Ambientale, PhD in Environmental Engineering, University of Trento

2014 "Final Examination Committee" Dip. di Ingegneria Civile e Ambientale, PhD in Environmental and Infrastructure Engineering, Politecnico di Milano

2014 "Final Examination Committee" Dip. di Matematica "F. Brioschi". Ph.D. Course in Mathematical Models and Methods for Engineering Politecnico di Milano

2013 "Final Examination Committee", PhD Program in Fluid Mechanics, University of Zaragoza, Spain

PhD thesis referee

2025 Thesis Reviewer, Dip. di MATEMATICA Ph. D. course in Mathematical and Methods for Engineering. Politecnico di Milano

2025 Thesis Reviewer, Dip. di MATEMATICA Ph. D. course in Mathematical and Methods for Engineering. Politecnico di Milano

2025 Thesis Reviewer, Dip. di MATEMATICA Mathematics Area - PhD course in Mathematical Analysis, Modelling, and Applications, SISSA (TS)

2018 Thesis Reviewer, Dip. di Matematica F. Brioschi Ph. D. course in Mathematical and Methods for Engineering. Politecnico di Milano

2012 Thesis Reviewer, Dip. Ingegneria del Territorio, Corso di Dottorato in Ingegneria del Territorio. Università degli Studi di Cagliari

2010 Thesis Reviewer, Dip. Matematica F. Brioschi Ph. D. course in Mathematical Engineering. Politecnico di Milano

Prize and Promotion Committees (selection of recent activities)

2024 Member early-career and career SIAM prizes

2023 Member "Commissione di Concorso Ricercatore tipo B", Salento University, Lecce

2023 Member "Commissione di Concorso Ricercatore tipo B", University of Padua

2022 Member "Commissione di Concorso Ricercatore tipo A", University of Padua

2022 Member "Commissione di Concorso Ricercatore tipo A", Turin Polytechnic University

2021 Member "Commissione di Concorso Ricercatore tipo A", University of Padova

2021 Member "Commissione di Concorso Ricercatore tipo A", University of Torino

2021 Member "Commissione di Concorso Ricercatore tipo B", Ca' Foscari University, Venezia

2020 Member "Commissione di Concorso Ricercatore tipo B", University od Padova

2020 Member "Commissione di Concorso Professore II Fascia", Milan Polytechnic University

2017 Member "Commissione di Concorso Ricercatore tipo B", Milan Polytechnic University

2016 Member "Comitè de selection pour l'emploi de professeur des université - $1^{\text{ère}}$ classe", Université Pierre et Marie Curie - Sorbonne, Paris, France

2016 Member "Commissione di Concorso Ricercatore tipo A", University of Padova

2016 Member "Commissione di Concorso Ricercatore tipo A", University of Verona

Promotion support letters for promotion and selection committees for the following institutions:

Ben Gurion University of the Negev, Israel; Colorado School of Mines, USA; Ohio State University, USA; Sandia National laboratories, USA; UC Los Angeles, USA; UC Santa Barbara, USA; UT-Austin, USA; UT-El Paso, USA.; Princeton Univ., USA; ETH, Switzerland; EPFL, Switzerland; Flinders Univ., Australia; Strasbourg Univ., France, Melbourne Univ., Australia;

Invited presentations (selection of recent activities)

2023 Invited Seminar. "Optimal Transportation theory and natural forms". URBES Workshop 2023, On the form and function of complex systems - design in Nature and Society, EPFL, Lausanne, Switzerland

2023 Invited Seminar. "Gradient flow for L I optimal transport and its extensions to ramified transport". Optimal TransportTheory: Applications to Physics. Les Houches School of Physics

2021 Research Seminar. "Numerical LI Optimal Transport Via Gradient Flow." Kolloquium Angewandte Mathematik, University of Erlangen-Nürnberg, Germany

2021 Invited Speaker. "Geometrically Intrinsic Shallow Water Equations on Fixed and Moving Beds" NUMHYP 2021, Trento, Italy

2020 Plenary Speaker. "Optimal Transportation theory and natural networks: applications to rivers and plant roots" . Computational Methods in Water Resources 2020, Stanford, USA

2020 International Workshop on Recent Developments in Modelling, Analysis, and Simulation of Processes in Porous Media. In honor of Peter Knabner's 65th birthday

2019 Research Seminar. "Dynamic L^1 Optimal Transport and Energy". Department of Mathematics, University of Trento, Italy

2019 Research Seminar. "Dynamic L^1 Optimal Transport and Energy". Department of Mathematics, University of Trento, Italy

2019 Research Seminar. "Geometrically Intrinsic Modeling of Shallow Water Flows" Lecture Series Scientific Computing (WS 19/20), Faculty of Mathematics, Physics & Computer Science, University of Bayreuth, Germany

2018 Invited Workshop Presentation. "Reactive Flows in Deformable, Complex Media", Oberwolfach, Germany

2018 Invited Workshop Presentation. "Solvers for problems with irregular structure arising in branch transport problems" Finse, Norway

2017 Invited Workshop Presentation. "Modeling plant root dynamics via Optimal Transport." INRIA

2017 Invited Presentation. "A Monge-Kantorovich based model of plant root dynamics in soils." ENUMATH-Voss

2017 Research Seminar. "Numerical solution of optimal transportation problems via a biologically inspired formulation." Los Alamos National Laboratory, GT5

2017 Research Seminar. "Biologically inspired formulation of optimal transportation problems. An anexpected branching source." Santa Fe Institute of Complexity

2017 Invited Workshop Presentation. "Biologically inspired formulation of optimal transportation problems", Workshop Transport problems in Zurich

2016 Invited Workshop Presentation. "A biologically inspired deduction of the Monge-Kantorovich equation: an anexpected branching source." Working day on Branched Transport, Université Paris-Sud, Orsay, France

2015 Research Seminar. "Theory, numerics and applications of optimal transportation problems" Kolloquium Angewandte Mathematik, University of Erlangen-Nürnberg, Germany

2015 Research Seminar. "Modeling Shallow Water Flow on General Terrain" Institute of Mechanics, Materials and Civil Engineering, Université Catholique de Louvain, Belgium

2014 Research Seminar. "Computational fluid-dynamics and applications to environmental problems". Lectures on Computational Fluid Dynamics and Applications. Seminario LIFTEC, Campus Rio Ebro, Universidad Zaragoza, Spain

2014 Invited Presentation. "Some mechanisms of soil-plant-atmosphere interaction." 6th International Conference on Porous Media & Annual Meeting, Milwaukee, USA

2013 Research Seminar. "Finite volumes and mixed finite elements for anisotropic diffusion equations" Kolloquium des Departments Mathematik, University of Erlangen-Nürnberg, Germany

2012 Invited Workshop Presentation. "Data assimilation in integrated surface-subsurface flow models of catchment dynamics", SIMAI Conference, Turin

2011 Research Seminar. "POD-based Monte Carlo techniques for the solution of stochastic groundwater flow problems", LHyGeS, University of Strasbourg, France

2011 Invited Presentation. "POD-based Monte Carlo technique for the solution of stochastic groundwater flow problems", ENUMATH Conference, Leicester, UK

2011 Invited Presentation. "Intercomparison of fully coupled surface/subsurface hydrologic models: an ongoing effort", Water Research Horizon Conference, UFZ, Berlin

2010 Invited Presentation. "Ensemble Kalman Filter vs. Particle Filter for a Physically Based Coupled Model of Surface-Subsurface Flow", AGU Fall Meeting, San Francisco

2009 Invited Presentation. "Surface-groundwater flow coupling based on boundary condition switching"; SIAM Conference on Mathematical and Computational Issues in the Geosciences, Leipzig, Germany

2009 Invited Presentation. "Effective permeability in the numerical solution of anisotropic diffusion Problems"; workshop on Discretization methods for viscous flows. Porquerolles, France

2008 Research Seminar. "Data assimilation in an integrated surface-subsurface flow model"; Lawrence Livermore National Laboratory, Livermore, CA, USA

2008 Research Seminar. "Ecohydrological Processes in Salt Marshlands of the Venice Lagoon"; Research Seminar Series, USGS, Menlo Park, CA, USA

2007 Research Seminar. "Surface-subsurface water interaction in catchment simulations"; UCLA, Los Angeles, CA, USA

2017 Research Seminar. "Soluzione numerica delle equazioni di flusso e trasporto in mezzi porosi in presenza di anisotropia"; IMATI-CNR-Pavia

2007 Key Note Plenary Lecture. "Modellizazione matematica dei bacini fluviali", Conference MUA2007 La Matematica Oggi per l'Uomo e per l'Ambiente, Florence, Italy

2006 Key Note Plenary Lecture. "Modeling surface-subsurface water interactions at the catchment scale"; XVII Conference on Computational Methods in Water Resources, Copenhagen, Denmark

2004 Invited Presentation. "Time step and stability control for a coupled model of surface and subsurface flow"; XVI Conference on Computational Methods in Water Resources, Chapel Hill, North Carolina, USA

Organization of International Conferences and Workshops (selection of recent activities)

2025 Co-organizer with E. Bachini and J. Perez and E. Abreu of Minisymposium: Advances in Lagrangian-Eulerian schemes for hyperbolic systems of conservation laws. ENUMATH 2025

2024 Co-organizer with E. Bachini and M.W. Farthing of Minisymposium: Coupled Groundwater-Surface Water Modelling. ECCOMAS 2024, Lisbon

2023 Co-organizer with C. Trahan and M.W. Farthing of Minisymposium: Coupled Groundwater-Surface Water Modelling. Coupled Problems 2023, Crete

2021 Co-organizer with Marco Berardi of Minisymposium: Modeling of flow and transport in the soil-plant-atmosphere continuum, SIAM Conference on Mathematical and Computational Issues in the Geosciences, Milano, online

2021 Co-organizer with Piero Deidda and Francesco Tudisco of Minisymposium: Nonlinear Laplacians on Graphs and Manifolds with Applications to Data and Image Processing, SIAM Conference on Applied Linear Algebra LA21, online

2021 Co-organizer with Marco Berardi, Matteo Icardi, and Bagus Muljadi of Minisymposium: Novel Modelling And Numerical Approaches For Flow And Transport Processes In Porous Media. World Congress on Computational Mechanics - ECCOMAS, online

2019 Co-organizer with Elena Bachini and Matthew Farthing of Minisymposium: Mathematical and numerical solution of PDEs on manifolds ENUMATH, Egmond aan Zee, The Netherlands

2018 Co-organizer with Michel Kern, Geraldine Pichot and Carol Woodward of Minisymposium: Advances in Numerical Solvers for Water Resources Applications. Computational Methods in Water Resources, Saint Malo

2017 Co-organizer, SIAM GS 2017 SIAM Conference on Mathematical and Computational Issues in the Geosciences, Erlangen, Germany

2016 Co-organizer with Reed Maxwell of Minisymposium: Integrated hydrologic models: Advancements and applications. Computational Methods in Water Resources, Toronto, Canada

2015 Co-organizer with Stefano Lanzoni and Simona Perotto of Minisymposium: Mathematical and numerical solution of PDEs on manifolds, SIAM Geoscience, Stanford, USA

2015 Chair of VII Interpore Annual Meeting, Padova, Italy

2014 Co-organizer with Dirk Pflüger of Minisymposium: Advances in Nonlinear and Linear Solvers. Computational Methods in Water Resources, Stuttgart, Germany

2014 Co-organizer with Claudio Paniconi of Interdisciplinary Workshop on Frontiers in Hydrology and Geoscience, Venice International University, Venice

2013 Chair of 2013 SIAM Conference on Mathematical and Computational Methods in the Geosciences, Padova

2012 Co-organizer with Carol Woodward of Minisymposium: Advances in Nonlinear and Linear Solvers for Water Resources Applications. Computational Methods in Water Resources, Urbana Champagne, USA

2011 Co-organizer with Stephan Kollet and Reed Maxwell of Workshop: Integrated Hydrologic Model Intercomparison Workshop: Benchmark Simulations, Colorado School of Mines, USA

2011 Co-organizer with Carol Woodward of Minisymposium: Iterative Solvers for Environmental Simulations, SIAM Geoscience, Long Beach, USA

2008 Co-organizer International Symposium: Water Resources Systems Analysis: the Contributions of William Yeh. UCLA

2008 Co-organizer with Reed Maxwell of Special Session: Coupled surface-subsurface modeling across a range of temporal and spatial scales. Computational Methods in Water Resources, San Francisco, USA

Research Grants (selection of recent grants)

2022-2025 PI of local RU. Project financed by MUR-Italy. 750 kEuro

2022-2023 PI - Project financed by ENI. 80 kEuro

2021-2022 PI - Project financed by ENI. 130 kEuro

2017-2020 PI - (Competitive) Project financed by Miur-COFUND program, GEO-Essential. Essential Variables Workflows for Resource Efficiency and Environmental Management. 70 kEuro

2017-2020 PI - (Competitive) Project financed by EU Horizon 2020. ERA-NET-COFUND program, ERA-PLANET: The European network for observing our changing planet. 150 kEuro

2017-2018 PI - (Competitive) Project financed by University of Padova. Approximation and Discretization Methods for PDEs on Manifolds for Environmental Modeling. 40 kEuro

2014-2018 Co-PI - (Competitive) Project financed by EU Framework Programme 7 Collaborative Project GLOBAQUA, Managing the Effects of Multiple Stressors on Aquatic Ecosystems under Water Scarcity, G.A. no. 603629. 190 kEuro.

2010-2015 PI - Project financed by Ministero dell'Agricoltura e Foreste. CARBOSTOP. 250 kEuro

2010-2013 Co-PI - (Competitive) Project financed by EU Framework Programme 7 Collaborative Project. CLIMB. Theme 6.3 Environmental Technologies, ENV.2009.1.1.5.2. 250 kEuro.

2010-2013 Co-PI - (Competitive) Project financed by Fondazione Cariparo. Nonlinear Partial Differential Equations: models, analysis, and control-theoretic problems. 180 kEuro.

2008-2011 Co-PI - (Competitive) Project financed by Fondazione Cariparo. Transport phenomena in hydrological catchments: hydrological and geophysical experiments and modelling. 200 kEuro.

2006-2008 PI - (Competitive) Project financed by University of Padova. Multiscale monitoring of CO2 fluxes from agricoltural soils and modeling of the spatial variability of the sources for quantification and control of emission into the atmosphere. 50 kEuro.

Bibliometric indices

Scopus: # papers 143, # citations 4004, h-index: 32

ISI-WOS: # papers 149, # citations 4016, h-index: 32

Google scholar: # citations 6533, h-index: 42

Padova, 31 gennaio 2025

List of Publications

Preprints

[1] M. Camporese, C. Paniconi, and M. Putti. Groundwater recharge is not the whole story: saturated storage dynamics provides a complete picture of subsurface water availability, 2025.

[2] P. Deidda, M. Burger, M. Putti, and F. Tudisco. The graph ∞-laplacian eigenvalue problem, 2024.

[3] E. Bachini and M. Putti. Convergence analysis of the intrinsic surface finite element method, 2024.

[4] F. Piazzon, E. Facca, and M. Putti. Computing the L^1 optimal transport density: a FEM approach, 2024.

Journal Articles

[5] P. Deidda, N. Segala, and M. Putti. Graph p-laplacian eigenpairs as saddle points of a family of spectral energy functions. *SIAM J. Matrix Anal.*, accepted:in print, 2025.

[6] E. Abreu, E. Bachini, J. Perez, and M. Putti. A geometrically intrinsic lagrangian-eulerian scheme for 2d shallow water equations with variable topography and discontinuous data. *Appl. Math. Comp.*, 443:127776, 2023.

[7] L. Berti, E. Facca, and M. Putti. Numerical solution of the l^1-optimal transport problem on surfaces. *Adv. Comp. Sci. Eng.*, 1(4):424–442, 2023.

[8] P. Deidda, M. Putti, and F. Tudisco. Nodal domain count for the generalized graph p-Laplacian. *Appl. Comp. Harm. Anal.*, 64:1–32, 2023.

[9] A. Lonardi, E. Facca, M. Putti, and C. De Bacco. Infrastructure adaptation and emergence of loops in network routing with time-dependent loads. *Phys. Rev. E*, 107(2):024302, 2023.

[10] E. Bachini, E. Bellizia, M. Putti, S. Donnicic, F. Madricardo, A. D'Alpaos, and M. Ghinassi. Two-dimensional model of flow and transport in porous media: linking heterogeneous anisotropy with stratal patterns in meandering tidal channel deposits of the Venice Lagoon (Italy). *Environ. Mod. Software*, 157:105535, 2022.

[11] E. Facca, L. Berti, F. Fassó, and M. Putti. Computing the cut locus of a Riemannian manifold via optimal transport. *ESAIM Math. Model. Num. Anal.*, 56(6):1939–1954, 2022.

[12] E. Facca, F. Piazzon, and M. Putti. L^1-transport energy. *Appl. Math. Optim.*, 86(21), 2022.

[13] A. Lenci, Y. Méheust, M. Putti, and V. Di Federico. Monte carlo simulations of shear-thinning flow in geological fractures. *Water Resour. Res.*, page e2022WR032024, 2022.

[14] A. Lenci, M. Putti, V. Di Federico, and Y. Méheust. A lubrication-based solver for shear-thinning flow in rough fractures. *Water Resour. Res.*, 58(8):e2021WR031760, 2022.

[15] A. Lonardi, M. Putti, and C. De Bacco. Multicommodity routing optimization for engineering networks. *Sci. Rep.*, 12(1):1–11, 2022.

[16] E. Bachini, M. W. Farthing, and M. Putti. Intrinsic finite element method for advection-diffusion-reaction equations on surfaces. *J. Comp. Phys.*, 424:109827, 2021.

[17] E. Bachini, G. Manzini, and M. Putti. Arbitrary-order intrinsic virtual element method for elliptic equations on surfaces. *Calcolo*, 58(3):1–28, 2021.

[18] S. Dutta, M. W. Farthing, E. Perracchione, G. Savant, and M. Putti. A greedy non-intrusive reduced order model for shallow water equations. *J. Comp. Phys.*, 439:110378, 2021.

[19] E. Facca, F. Cardin, and M. Putti. Branching structures emerging from a continuous optimal transport model. *J. Comp. Phys.*, 447:110700, 2021.

[20] A. Lonardi, E. Facca, M. Putti, and C. De Bacco. Designing optimal networks for multicommodity transport problem. *Phys. Rev. Let.*, 3:043010, Oct 2021.

[21] B. Mary, L. Peruzzo, V. Iván, E. Facca, G. Manoli, M. Putti, M. Camporese, Y. Wu, and G. Cassiani. Combining models of root-zone hydrology and geoelectrical measurements: Recent advances and future prospects. *Frontiers in Water*, 3, 2021.

[22] E. Bachini and M. Putti. Geometrically intrinsic modeling of shallow water flows. *ESAIM Math. Model. Num. Anal.*, 4:2125–2157, 2020.

[23] D. Baptista, D. Leite, E. Facca, M. Putti, and C. De Bacco. Network extraction by routing optimization. *Sci. Rep.*, 10(1):1–13, 2020.

[24] E. Facca, S. Daneri, F. Cardin, and M. Putti. Numerical solution of Monge-Kantorovich equations via a dynamic formulation. *J. Sci. Comput.*, 82(3):1–26, 2020.

[25] C.-A. Xia, D. Pasetto, B. X. Hu, M. Putti, and A. Guadagnini. Integration of moment equations in a reduced-order modeling strategy for Monte Carlo simulations of groundwater flow. *J. Hydrol.*, 590:125527, 2020.

[26] L. Bergamaschi, E. Facca, A. Martínez, and M. Putti. Spectral preconditioners for the efficient numerical solution of a continuous branched transport model. *J. Comput. Appl. Math.*, 354:259–270, 2019.

[27] S. Bersan, A. R. Koelewijn, M. Putti, and S. P. Large-scale testing of distributed temperature sensing for early detection of piping. *J. Geotech. Geoenviron.*, 145:04019052, 2019.

[28] M. Camporese, C. Paniconi, M. Putti, and J. J. McDonnel. Fill and spill hillslope runoff representation with a Richards equation-based model. *Water Resour. Res.*, 55:8445–8462, 2019.

[29] G. Manzini, G. Maguolo, and M. Putti. The high-order mixed mimetic finite difference method for time-dependent diffusion problems. *J. Sci. Comput.*, 80:1805–1830, 2019.

[30] I. McCallum, C. Montzka, B. Bayat, S. Kollet, A. Kolotii, N. Kussul, M. Lavreniuk, A. Lehmann, J. Maso, P. Mazzetti, A. Mosnier, E. Perracchione, M. Putti, M. Santoro, I. Serral, L. Shumilo, D. Spengler, and F. S. Developing food, water and energy nexus workflows. *Int. J. Digit. Earth.*, 19:299–308, 2019.

[31] M. Previati, D. Canone, E. Iurato, D. Gisolo, S. Ferrari, P. Teatini, M. Putti, and S. Ferraris. Thorough wetting and drainage of a peat lysimeter in a climate change scenario. *Hydrol. Proc.*, 2019.

[32] E. Facca, F. Cardin, and M. Putti. Towards a stationary Monge-Kantorovich dynamics: the Physarum Polycephalum experience. *SIAM J. Appl. Math.*, 78(2):651—676, 2018.

[33] I. Fent, M. Putti, C. Gregoretti, and S. Lanzoni. Modeling shallow water flows on general terrains. *Adv. Water Resources*, 121:316–332, 2018.

[34] M. Bogoni, M. Putti, and S. Lanzoni. Modeling meander morphodynamics over self-formed heterogeneous floddplains. *Water Resour. Res.*, 53:5137–5157, 2017.

[35] K. Haaken, G. P. Deidda, G. Cassiani, R. Deiana, M. Putti, C. Paniconi, C. Scudeler, and A. Kemna. Flow dynamics in hyper-saline aquifers: Hydro-geophysical monitoring and modeling. *HESS*, 21:1439–1454, 2017.

[36] S. Kollet, M. Sulis, R. M. Maxwell, C. Paniconi, M. Putti, G. Bertoldi, E. T. Coon, E. Cordano, S. Endrizzi, E. Kikinzon, E. Mouche, C. Mügler, Y.-J. Park, J. C. Refsgaard, S. Stisen, and E. Sudicky. The integrated hydrologic model intercomparison project, IH-MIP2: A second set of benchmark results to diagnose integrated hydrology and feedbacks. *Water Resour. Res.*, 53:867–890, 2017.

[37] D. Pasetto, M. Ferronato, and M. Putti. A reduced order model-based preconditioner for the efficient solution of transient diffusion equations. *Int. J. Numer. Methods Eng.*, 109:1159–1179, 2017.

[38] C. Scudeler, C. Paniconi, D. Pasetto, and M. Putti. Examination of the seepage face boundary condition in subsurface and coupled surface/subsurface hydrological models. *Water Resour. Res.*, 53:1799–1819, 2017.

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