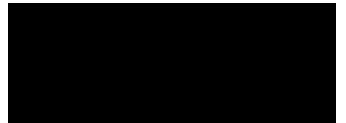


Stefano Scialò

Work Address

Dip. di Scienze Matematiche
Politecnico di Torino
Turin, Italy
Tel: +30 011 090 7547

Home Address



CURRENT POSITION

Researcher (RTD legge 240 lett b)
Dipartimento di Scienze Matematiche, Politecnico di Torino, Turin, Italy

Italian *Abilitazione Scientifica Nazionale*
Settore Concorsuale 01/A5 - II Fascia valid through 31/08/2024

EDUCATION

PhD, Matematica per le Scienze dell'Ingegneria - SSD MAT-08

Politecnico di Torino, Turin (IT) March 14 2014
Thesis Title: Development and analysis of a novel optimization approach for the simulation of the flow in large scale discrete fracture networks with non-conforming finite elements

Master Degree, Aerospace Engineering

Politecnico di Torino, Turin (IT) October 2007
Thesis Title: Performance simulation and investigation of an intercooled recuperated aeroengine

RESEARCH ACTIVITY

Junior Researcher, (legge 240/2010 lett. a)

Politecnico di Torino, Turin (IT)

07/01/2016 to 31/07/2018

Visiting Researcher

Bergen University, Bergen (NO).

02/09/2017 – 14/10/2017

Postdoctoral research grant (legge 240/2010)

Politecnico di Torino, Turin (IT)

January – December 2015

Postdoctoral research grant (legge 240/2010)

Politecnico di Torino, Turin (IT)

January – December 2014

Scholarship for research activity

Politecnico di Torino, Turin (IT)

29/05/2013 – 28/07/2013

Visiting student 25/06/2013 – 26/07/2013
Prof. Alfio Borzì, Wurzburg University, Wurzburg (Germany)

CINECA summer school on Parallel Computing 3/09/2012 – 14/09/2012
Casalecchio di Reno (BO), Italy

MAIN RESEARCH INTERESTS

- Flow simulation in poro-fractured media with unconventional discretization strategies (XFEM,VEM) on 2D e 3D non conforming/polyhedral meshes
- Uncertainty quantification techniques applied to subsoil simulations
- PDE-constrained optimization
- Parallel computing techniques (MPI, openMP, CUDA)
- Multigrid preconditioners

RESEARCH PROJECTS

Principal Investigator of “Progetto di ricerca 2018 GNCS” ONGOING
Research themes: Advanced numerical techniques for heterogeneous problems in complex domains.

Participant to project “Progetto di ricerca 2017 GNCS” 2017
Principal Investigator: Stefano Berrone
Research themes: Advanced numerical techniques based on discretizations with polygonal/polyhedral elements for applications characterized by high geometrical complexity.

Principal Investigator of project: “Finanziamento Giovani Ricercatori 2015 GNCS” 2016
Research themes: Simulation of the flow in poro-fractured media with advanced numerical techniques.

Participant to project “Progetto di ricerca 2015 GNCS” 09/02/2015 – 08/02/2016
Principal Investigator: Sandra Pieraccini
Research themes: Numerical methods for large scale fracture networks.

Participant to project “PROGETTO IDEA
Technology Platform in Automotive (POR FESR 2007/2013)” 01/01/2014 - 31/12/2014
Research project partly funded by Regione Piemonte and Industrial Partners for the assessment of innovative “model based” control techniques for optimized diesel engine combustion management.

Participant to project “PRIN 2012” 08/03/2014 – 08/03/2017
Scientific Director: Claudio Canuto
Research themes: New methodologies in numerical modelling

Participant to project “PRIN 2008” 22/03/2010 – 22/09/2012
Scientific Coordinator: Franco Brezzi
Scientific Director: Lucia Gastaldi
Research themes: Interaction among differential models and different discretization techniques for their numerical treatment

NATIONAL/INTERNATIONAL CONFERENCES

SIMAI 2018.

2 – 6 July 2018, Rome, Italy

Invited Speaker.

Presentation title: “Two methods for flow simulations in poro-fractured media”.

INTERPORE 2018.

14 – 17 May 2018, New Orleans, USA

Invited Speaker.

Presentation title: “Coupling different numerical approaches for efficient simulations in porous and fractured media”.

ENUMATH 2017.

25 – 29 September 2017, Voss, Norway

Invited Speaker.

Presentation title: “Flow simulations in poro-fractured media with a VEM-BEM coupled approach”.

SIAM-GS 2017.

11 – 14 September 2017, Erlangen, Germany

Invited Speaker.

Presentation title: “An optimization approach for flow simulations in 3D poro-fractured media”.

POEMS 2017

5 – 7 July 2017, Milano, Italy

Invited Speaker.

Presentation title: “VEM-BEM coupling for hybrid-dimensional flow problems in poro-fractured media”.

XDMS 2017

19 – 21 June 2017, Umea, Sweden

Speaker.

Presentation title: “Flow simulations in a fractured porous medium with an optimization approach and non conforming meshes”

INTERPORE 2017

8 – 11 May 2017, Rotterdam, NL

Minisymposium organizer and Speaker.

Presentation title: “An optimization approach for flow simulations in 3D poro-fractured media”

SIMAI 2016

13 – 16 September 2016, Milan, IT

Speaker.

Presentation title: “Flow and transport simulations in fractured media with non-conforming meshes”

MAFELAP 2016

14 – 17 June 2016, London, UK

Speaker.

Presentation title: “Non-stationary advection-diffusion problems in networks of fractures with an optimization approach”

INTERPORE 2016

9 – 12 May 2016, Cincinnati, Ohio, USA

Minisymposium organizer and Speaker.

Presentation title: “Simulation of the flow in complex networks of fractures with a robust optimization approach”

XDMS 2015

9 – 11 September 2015, Ferrara, IT

Speaker.

Presentation title: “Flow simulation in heterogeneous large-scale DFNs with a robust optimization based approach”

DFNE 2014

19 – 22 October 2014, Vancouver, CA

Speaker.

Presentation title: “A family of methods with arbitrary meshes for DFN flow simulations”

MAFELAP 2013

11 – 14 June 2013, London, UK

Speaker.

Presentation title: “An optimization approach to large scale simulations of fluid flows in fractured media with finite elements on nonconforming grids”

SIMAI 2012

25 – 28 June 2012, Turin, IT

Speaker.

Presentation title: “An extended finite element optimization method for simulating discrete fracture network flows”

TEACHING

ACADEMIC YEAR 2017-2018 - Politecnico di Torino

Lectures: 60 hours in Master degree courses

Lectures: 10 hours in Doctorate courses

ACADEMIC YEAR 2016-2017 - Politecnico di Torino

Lectures: 60 hours in Master degree courses

ACADEMIC YEAR 2016-2017 2015-2016 - Politecnico di Torino

Lectures: 60 hours in Master degree courses

ACADEMIC YEAR 2014-2015 - Politecnico di Torino

Lectures: 60 hours in Master degree courses

Participant to project for didactics “MATCOL” (60 hours)

ACADEMIC YEAR 2013-2014 - Politecnico di Torino

Lectures: 60 hours in Master degree courses

Participant to project for didactics “MATCOL” (100 hours)

ACADEMIC YEAR 2012-2013 - Politecnico di Torino

Lectures: 60 hours in Bachelor degree courses

ACADEMIC YEAR 2011-2012 - Politecnico di Torino

Lectures: 40 hours in Bachelor degree courses

LANGUAGE SKILLS

Italian – Mother language

English – Very Good (PET, Pass with Merit, IELTS, 6.5 (2006))

PROGRAMMING SKILLS

OS: Linux-Ubuntu, Windows, macOS

Software: Matlab, Latex, Bash, C, Office

PRIZES/AWARDS

Awarded "Finanziamento GNCS Giovani Ricercatori 2015" - IndAM - GNCS

Awarded funding for base research from Italian MIUR rif: Avviso pubblico dell'ANVUR n. 20/2017 date: 15-06-2017

PUBLICATIONS

JOURNAL ARTICLES

- Fumagalli, A., Keilegavlen, E., Scialò, S Conforming, non-conforming and non-matching discretization couplings in discrete fracture network simulations (2019) *Journal of Computational Physics* 376, pp. 694–712. DOI: 10.1016/j.jcp.2018.09.048
- Berrone, S., Fidelibus, C., Pieraccini, S., Scialò, S., Vicini, F. Unsteady advection-diffusion simulations in complex Discrete Fracture Networks with an optimization approach (2018) *Journal of Hydrology*, 566, pp. 332–345. DOI: 10.1016/j.jhydrol.2018.09.031
- Berrone, S., Borio, A., Fidelibus, C., Pieraccini, S., Scialò, S., Vicini, F. Advanced computation of steady-state fluid flow in Discrete Fracture-Matrix models: FEM–BEM and VEM–VEM fracture-block coupling (2018) *International Journal on Geomathematics* 9, pp. 377–399. DOI: 10.1007/s13137-018-0105-3
- Wang, B., Feng, Y., Pieraccini, S., Scialò, S., Fidelibus, C. Iterative coupling algorithms for large multidomain problems with the boundary element method (2018) *International Journal for Numerical Methods in Engineering*. In Press DOI: 10.1002/nme.5943
- Berrone, S., Canuto, C., Pieraccini, S., Scialò, S. Uncertainty Quantification in Discrete Fracture Network Models: Stochastic Geometry (2018) *Water Resources Research*, 54, pp. 1338-1352. DOI: 10.1002/2017WR021163
- Benedetto, M. F., Borio, A., Scialò, S. Mixed Virtual Elements for discrete fracture network simulations (2017) *Finite Elements in Analysis and Design*, 134, pp. 55-67. DOI: 10.1016/j.finel.2017.05.011
- Berrone, S., Pieraccini, S., Scialò, S. Flow simulations in porous media with immersed intersecting fractures (2017) *Journal of Computational Physics*, 345, pp. 768-791. DOI: 10.1016/j.jcp.2017.05.049
- Berrone, S., Pieraccini, S., Scialò, S. Non-stationary transport phenomena in networks of fractures: Effective simulations and stochastic analysis (2017) *Computer Methods in Applied Mechanics and Engineering*, 315, pp. 1098-1112. DOI: 10.1016/j.cma.2016.12.006
- Benedetto, M.F., Berrone, S., Borio, A., Pieraccini, S., Scialò, S. Order preserving SUPG stabilization for the virtual element formulation of advectiondiffusion problems (2016) *Computer Methods in Applied Mechanics and Engineering*, 311, pp. 18-40. DOI: 10.1016/j.cma.2016.07.043
- Berrone, S., Pieraccini, S., Scialò, S. Towards effective flow simulations in realistic discrete fracture networks (2016) *Journal of Computational Physics*, 310, pp. 181-201. DOI: 10.1016/j.jcp.2016.01.009
- Benedetto, M.F., Berrone, S., Scialò, S. A globally conforming method for solving flow in discrete fracture networks using the Virtual Element Method (2016) *Finite Elements in Analysis and Design*, 109, pp. 23-36. DOI: 10.1016/j.finel.2015.10.003
- Benedetto, M.F., Berrone, S., Borio, A., Pieraccini, S., Scialò, S. A hybrid mortar virtual element method for discrete fracture network simulations (2016) *Journal of Computational Physics*, 306, pp. 148-166. DOI: 10.1016/j.jcp.2015.11.034
- Berrone, S., Borio, A., Scialò, S. A posteriori error estimate for a PDE-constrained optimization formulation for the flow in DFNs (2016) *SIAM Journal on Numerical Analysis*, 54 (1), pp. 242-261. DOI: 10.1137/15M1014760

- Berrone, S., Canuto, C., Pieraccini, S., Scialò, S. Uncertainty quantification in Discrete Fracture Network models: Stochastic fracture transmissivity (2015) *Computers and Mathematics with Applications*, 70 (4), pp. 603-623. DOI: 10.1016/j.camwa.2015.05.013
- Berrone, S., Pieraccini, S., Scialò, S., Vicini, F. A parallel solver for large scale DFN flow simulations (2015) *SIAM Journal on Scientific Computing*, 37 (3), pp. C285-C306. DOI: 10.1137/140984014
- Benedetto, M.F., Berrone, S., Scialò, S. Efficient combustion parameter prediction and performance optimization for a diesel engine with a low throughput combustion model (2015) *Energy Conversion and Management*, 96, pp. 105-114. DOI: 10.1016/j.enconman.2015.02.071
- Benedetto, M.F., Berrone, S., Pieraccini, S., Scialò, S. The virtual element method for discrete fracture network simulations (2014) *Computer Methods in Applied Mechanics and Engineering*, 280, pp. 135-156. DOI: 10.1016/j.cma.2014.07.016
- Berrone, S., Fidelibus, C., Pieraccini, S., Scialò, S. Simulation of the Steady-State Flow in Discrete Fracture Networks with Non-Conforming Meshes and Extended Finite Elements (2014) *Rock Mechanics and Rock Engineering*, 47 (6), pp. 2171-2182. DOI: 10.1007/s00603-013-0513-5
- Berrone, S., Pieraccini, S., Scialò, S. An optimization approach for large scale simulations of discrete fracture network flows (2014) *Journal of Computational Physics*, 256, pp. 838-853. DOI: 10.1016/j.jcp.2013.09.028
- Berrone, S., Pieraccini, S., Scialò, S. A PDE-constrained optimization formulation for discrete fracture network flows (2013) *SIAM Journal on Scientific Computing*, 35 (2), pp. B487-B510. DOI: 10.1137/120865884
- Berrone, S., Pieraccini, S., Scialò, S. On simulations of discrete fracture network flows with an optimization-based extended finite element method (2013) *SIAM Journal on Scientific Computing*, 35 (2), pp. A908-A935. DOI: 10.1137/120882883

BOOK CHAPTERS

- Pieraccini, S., Scialò, S. On a PDE-constrained optimization approach for flow simulations in fractured media in: *Advances in Discretization Methods*, SEMA SIMAI Springer Series, Springer International Publishing, Switzerland, 2016.

CONFERENCE PROCEEDINGS

- Berrone, S., Borio, A., Pieraccini, S., Scialò, S. New strategies for the simulation of the flow in three dimensional poro-fractured media (2018) *Numerical Mathematics and Advanced Applications*, proceedings of ENUMATH 2017 conference.
- Benedetto, M.F., Berrone, S., Borio, A., Pieraccini, S., Scialò, S. The virtual element method for Discrete Fracture Network flow and transport simulations (2016) *ECCOMAS Congress 2016 - Proceedings of the 7th European Congress on Computational Methods in Applied Sciences and Engineering*, 2, pp. 2953-2970.
- Benedetto, M.F., Berrone, S., Borio, A., Pieraccini, S., Scialò, S. The Virtual Element Method for large scale Discrete Fracture Network simulations: fracture-independent mesh generation *PAMM - Proc. Appl. Math.* 15, 19 – 22 (2015) DOI 10.1002/pamm.201510006
- Benedetto, M.F., Berrone, S., Fidelibus, C., Pieraccini, S., Scialò, S., Vicini, F. A family of methods with arbitrary meshes for DFN flow simulations *In Proceedings of DFNE 2014 International Discrete fracture network engineering conference*. Vancouver CA, 19-22 Ottobre 2014 <http://www.carma-rocks.ca/resources/proceedings-dfne-2014/>