Enrico Milanese

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Department of Earth, Atmospheric and Planetary Sciences
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Education

2020	PhD in Mechanics EPFL École polytechnique fédérale de Lausanne, Lausanne, Switzerland. Thesis: *Surface roughness evolution in adhesive wear processes* Advisor: Prof. J.-F. Molinari (Computational Solid Mechanics Lab)
2014	BSc - MSc in Civil Engineering – Structural curriculum University of Padova, Padova, Italy (Grade 110/110) Thesis: *Modeling avalanche behavior and ductile fracture in disordered media* Advisor: Prof. B. Schrefler (Civil, Environmental and Architectural Engineering Department)

Professional Experience

2021-	Postdoctoral Fellow Department of Earth, Atmospheric and Planetary Sciences, Massachusetts Institute of Technology (MA), USA
2014-16	Research assistant (part-time) Civil, Environmental and Architectural Engineering Department, University of Padova, Padova, Italy
2014-15	Civil engineer, W.E.I. 'N Venice, Venice, Italy.

Publications

Peer-review journals

2021	Brink, T., **Milanese, E.** & Molinari, J.-F. Effect of wear particles and roughness on nanoscale friction. *Physical Review Materials* 6, 013606 (2021). doi:10.1103/PhysRevMaterials.6.013606
2020	**Milanese, E.**, Brink, T., Aghababaei, R. & Molinari, J.-F. Role of interfacial adhesion on minimum wear particle size and roughness evolution. *Physical Review E* 102, 4 (2020). doi: 10.1103/PhysRevE.102.043001

2020 **Milanese, E.** & Molinari, J.-F. A mechanistic model for the growth of cylindrical debris particles in the presence of adhesion. *International Journal of Solids and Structures* 203, 1-16 (2020). doi: 10.1016/j.ijsolstr.2020.06.040

2019 **Milanese, E.**, Brink, T., Aghababaei, R. & Molinari, J.-F. Emergence of self-affine surfaces during adhesive wear. *Nature Communications* 10, 1–9 (2019). doi: 10.1038/s41467-019-09127-8

2019 Peruzzo, C., Cao, T. D., **Milanese, E.**, Favia, P., Pesavento, F., Hussain, F. & Schrefler, B.A. Dynamics of fracturing saturated porous media and self-organization of rupture. *European Journal of Mechanics-A/Solids* 74, 471–484 (2019). doi: 10.1016/j.euromechsol.2018.12.004

2018 Molinari, J.-F., Aghababaei, R., Brink, T., L. Frérot, & **Milanese, E**. Adhesive wear mechanisms uncovered by atomistic simulations. *Friction* 16, 245–259 (2018). doi:10.1007/s40544-018-0234-6

2017 Cao, T.D., **Milanese, E.**, Remij, E.W., Rizzato, P., Remmers, F., Joris, J.C., Simoni, L., Huyghe, J.M., Hussain, F. & Schrefler, B.A. Interaction between crack tip advancement and fluid flow in fracturing saturated porous media. *Mechanics Research Communications* 80, 24–37 (2017). doi: 10.1016/j.mechrescom.2016.09.011

2017 **Milanese, E.**, Yılmaz, O., Molinari, J.-F., & Schrefler, B.A. Avalanches in dry and saturated disordered media at fracture in shear and mixed mode scenarios. *Mechanics Research Communications* 80, 58–68 (2017). doi: 10.1016/j.mechrescom.2016.08.002

2016 **Milanese, E.**, Yılmaz, O., Molinari, J.-F., & Schrefler, B.A. Avalanches in dry and saturated disordered media at fracture. *Physical Review E* 93, 043002 (2016). doi: 10.1103/PhysRevE.93.043002

In preparation **Milanese, E.** & Cattania, C. Heterogeneous coseismic stress state describes off-fault fracture orientation in the 2019 Ridgecrest sequence.

Contributions to books

2022 **Milanese, E.**, Tao, N., Peruzzo, C., Zaccariotto, M., Galvanetto, U., Mishuris, G.C. & Schrefler, B.A. Forerunning and bridging in dry and saturated fracturing solids. In Aldakheel, F., Hudobivnik, B., Soleimani, M., Wessels, H., Weißenfels, C. & Marino, M. (eds.), *Current trends and open problems in computational mechanics*, 343-353 (Springer, Cham, 2022). doi: 10.1007/978-3-030-87312-7_33

2018 **Milanese, E.**, Cao, T.D., Simoni, L. & Schrefler, B.A. Fracturing in dry and saturated porous media. In Oñate, E., Peric, D., de Souza Neto, E. & Chiumenti, M. (eds.), *Advances in Computational Plasticity*, 265-288 (Springer, 2018). doi: 10.1007/978-3-319-60885-3_13

Awards and fellowships

2021-	Swiss National Science Foundation (SNF) Postdoc.Mobility.
2014	Eccezionalità ("outstanding") grade for my M.Sc. thesis, University of Padova, Italy.
2013-14	LLP-Erasmus Scholarship - Visiting student, Computational Solid Mechanics Laboratory, École polytechnique fédérale de Lausanne (EPFL), Lausanne, Switzerland.

Invited talks

2022	Caltech, Seismolab seminar
2018	Science of wear international workshop, Tsinghua University, Beijing, China

Contributions to conferences

Talks

2022	*Modeling damage in the proximity of rough interfaces: The 2019 Ridgecrest earthquake sequence*, Friction and Wear across Scales Workshop, Ascona, Switzerland (August 15-18).
2018	*Fractal surfaces in adhesive wear processes*, 6th European Conference on Computational Mechanics, 7th European Conference on Computational Fluid Dynamics, Glasgow, United Kingdom (June 11-15). *Continuum versus discrete approach in modeling of wear processes*, 6th European Conference on Computational Mechanics, 7th European Conference on Computational Fluid Dynamics, Glasgow, United Kingdom (June 11-15).
2017	*The role of hardness in the surface roughness evolution during adhesive wear processes*, International Conference on Computational Contact Mechanics., Lecce, Italy (July 5-7).

Posters

2022	*Heterogeneous coseismic stress state describes off-fault fracture orientation in the 2019 Ridgecrest sequence*, SCEC Annual Meeting, Palm Springs (CA), USA (September 11-14).
2021	*Origins of roughness evolution and its effects on the slip response of rate-and-state faults*, AGU Fall Meeting, New Orleans, USA (December 13-17).

	Origins of roughness evolution and strategies for its implementation on rate-state faults, SCEC Annual Meeting, USA (online, September 12-17).
2019	*Emergence of self-affine surfaces under adhesive three-body wear conditions*, Emergence of surface and interface structure from friction, fracture and deformation workshop, CECAM-EPFL, Lausanne, Switzerland (July 24-27).
	Emergence of self-affine surfaces under adhesive three-body wear conditions, Modeling tribology: friction and fracture across scales workshop, CECAM-EPFL, Lausanne, Switzerland (January 28-30).

Teaching and supervision of junior researchers

At Massachusetts Institute of Technology, Cambridge (MA), USA:

2022	Mechanisms of Faulting and Earthquakes (I taught 1 lecture)
	Special Seminar in Geophysics (2 lectures + seminars organization)
	Supervision of 1 undergraduate research project

At École polytechnique fédérale de Lausanne, Lausanne, Switzerland:

2021-	Videomaking for science communication (lecturer)
2017-20	Supervision of 6 undergraduate and 2 graduate semester projects
2018	Numerical modeling of solids and structures (teaching assistant)
2017	Continuum mechanics (teaching assistant)
	Calculus (teaching assistant)
2016	Numerical modeling of solids and structures (teaching assistant)
	Continuum mechanics (teaching assistant)

Professional and university service

-	Reviewer for *Geophysical Research Letters*, *Wear*, *Tribology Letters*, *Sensors*, *Powder Technology*, and *Scientific Reports*.
2021-	MIT Creative Arts Council member

Outreach

2021-	SciFilmIt. Co-founder. Events organization to teach science communication to scientists with filmmaking science films. Switzerland.
2020	NCCPE Engage Festival. Invited panelist (*What works? Art science*

	research collaborations session) UK National Co-ordinating Centre for Public Engagement (NCCPE). United Kingdom.
2020	CERN Science Communication Hackathon (2nd jury award).
2020	Falling Walls x Berlin Science Week – Science Film Rules with SciFilmIt. Public online lecture on science filmmaking. Berlin, Germany.
2019	Imagine Science Film Festival. Film evaluation. New York, USA.
2019	Pint of Science Festival. Invited speaker. Lausanne, Switzerland.
2019	Hello Tomorrow Global Summit. Science short films screening. Paris, France.
2018-19	SNSF AGORA – Exposure Science Film Hackathon. Implementation of 200'000 CHF (~180'000 USD) grant for the organization of science filmmaking. Switzerland.
2018	EPFL ACCES Visualization Contest (Dynamic Category, 2nd prize)
2018	Exposure Science Film Hackathon. Film production (*Searching for love*) Lausanne, Switzerland.
2018	Symbiosis competition at Imagine Science Film Festival. Film production *Wearing well* (password: contact). New York, USA.
2017	Exposure Science Film Hackathon. Organizing team. Lausanne, Switzerland.
2016	Exposure Science Film Hackathon (1st prize). Short science film production (*Better together - Of love, life, and emergent properties*). Lausanne, Switzerland.

Computational skills

Tools: Fractal analysis, molecular dynamics, finite elements, boundary elements
Programming: Python, MATLAB, bash, C++, Fortran, GitHub
Modelling: LAMMPS, Akantu and Strand
O.S.: Linux, Windows
Processors: LaTeX, gnuplot, MS Office, Google Docs suites
CAD, graphics: Rhinoceros, AutoCAD, Inkscape
Other: Adobe Premiere Pro and Davinci Resolve (film editing), Slack, Notion (management)

Language skills

Italian (native)
English (fluent)
French (proficient)
Spanish (basic)
German (basic)

Professional Memberships

American Geophysical Union
Italian Chartered Engineers Association (Ordine degli Ingegneri)