# Enrico Milanese

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## Education

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

## Professional Experience

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

## Publications

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Peer-review journals

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| 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 |

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

Contributions to books

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| 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

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| 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**

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

**Contributions to conferences**

Talks

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| 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

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| 2022 | *Heterogeneous coseismic stress state describes off-fault fracture orientation in the 2019 Ridgecrest sequence*, AGU Fall Meeting, Chicago (IL), USA (December 12-16). |
| 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:
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| 2022 | Mechanisms of Faulting and Earthquakes (I taught 1 lecture) |
| | Special Seminar in Geophysics (2 lectures + seminars organization) |

At École polytechnique fédérale de Lausanne, Lausanne, Switzerland:
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| 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**

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

**Outreach**

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| 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.

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| 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

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

## Professional Memberships

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