

DR. HUGO ROUSSEAU

Born in Lyon (France), June, 14th 1994

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EDUCATION

- 2022/04-
pres **Post-doctoral researcher**
Implementation and analysis of a Material Point Method for numerical modelling of fractures in rapid ice flow
Department of Geography - University of Zürich, Switzerland
Alpine Mass Movements - ETH Zürich, Switzerland
Supervisors: J. Gaume and M.P. Lüthi
- 2018/10-
2021/11 **PhD degree**
Grenoble-Alpes University, INRAE, UR ETNA, Grenoble, France
From particle scale to continuum modelling of size segregation in bedload transport: theoretical and experimental study
Supervisors: P. Frey and J. Chauchat
- 2017–2018 **Master’s degree “Multi-phase flows, Energetics and Combustion”**
Aix-Marseille University, Marseille, France
Rank: first of the promotion
- 2015–2018 **Engineering school POLYTECH Marseille, France**
Mechanics and Energetics with major in advanced simulations
Distinction: first prize by the jury
- 2013–2015 **2-year selective preparatory classes leading to the French Grandes Écoles**
Lycée Champollion, Grenoble, France
Speciality physics and engineering science
- 2009–2013 **Student in high-school specialised in mountaineering, ski and climbing**
Moutiers, French-Alps, France
 - Baccalauréat (national high school leaving diploma) majoring in science
 - First degree of ski patrol rescuer (French national degree)

ADDITIONAL RESEARCH EXPERIENCES

- 2018/02-
2018/08 **Toward two-phase flow modelling of granular size segregation**
Internship at Laboratoire des Ecoulements Géophysique et Industriels (LEGI), Grenoble, France
Supervisor: J. Chauchat
- 2017/05-
2017/08 **Validation of a Material Point Method (MPM) model using experiments**
Internship at Ecole Polytechnique Fédérale Lausanne (EPFL), Switzerland
Supervisor: G. Rousseau and C. Ancey

PUBLICATIONS

Publications in international journals

1. Dedieu, B., **Rousseau, H.**, Chauchat, J., & Frey, P.. Exploring the size ratio impact on an intruder segregating in bedload transport . (Under review in Physical Review Fluids)
2. **Rousseau, H.**, Gaume, J., Blatny, L., Lüthi, M. P. (2024). Transition between mechanical and geometric controls in glacier crevassing processes. Geophysical Research Letters, 51(9), e2024GL108206. <https://doi.org/10.1029/2024GL108206>
3. Rousseau, G., Métivet, T., **Rousseau, H.**, Daviet, G., & Bertails-Descoubes, F. (2023). Revisiting the role of friction coefficients in granular collapses: confrontation of 3-D non-smooth simulations with experiments. Journal of Fluid Mechanics, 975, A14. <https://doi.org/10.1017/jfm.2023.835>
4. **Rousseau, H.**, Chauchat, J., & Frey, P. (2022). Experiments on a single large particle segregating in bedload transport. Physical Review Fluids, 7(6), 064305. <https://doi.org/10.1103/PhysRevFluids.7.064305>
5. **Rousseau, H.**, Chassagne, R., Chauchat, J., Maurin, R., & Frey, P. (2021). Bridging the gap between particle-scale forces and continuum modelling of size segregation: Application to bedload transport. Journal of Fluid Mechanics, 916, A26. <https://doi.org/10.1017/jfm.2021.218>

Communications in international and national conferences

1. Rousseau, H., Gaume, J., Blatny, L., and Lüthi, M. P.: Modelling discontinuities in ice flow using the Material Point Method and elastoplasticity, **EGU General Assembly 2023**, Vienna, Austria, 24–28 Apr 2023, EGU23-11460, <https://doi.org/10.5194/egusphere-egu23-11460>, 2023.
2. Wehrlé, A., Lüthi, M. P., Nap, A., Kneib-Walter, A., Juvet, G., Rousseau, H., and Walter, F.: Calving response to the propagation of a speedup pulse through the ice stream of Sermeq Kujalleq in Kangia (Jakoshavn Isbræ), Greenland, **EGU General Assembly 2023**, Vienna, Austria, 24–28 Apr 2023, EGU23-11695, <https://doi.org/10.5194/egusphere-egu23-11695>, 2023.
3. Rousseau, H., Chauchat, J. & Frey, P. Combining theory, numeric and experiments to model size segregation in bedload transport. **Journée Mech’Alps Jeunes Chercheurs**, col de Porte, Grenoble, France, May 4th & 5th, 2022.
4. Rousseau, H., Chauchat, J. & Frey, P. Experimental investigation of a large particle segregating in bedload transport, 25th **International Congress of Theoretical and Applied Mechanics (ICTAM)**, Milano, Italy, August 22th-27th, 2021.
5. Rousseau, H., Chassagne, R., Chauchat, J., Maurin, R., & Frey, P. Continuous modelling of grain-size segregation in bedload transport, **EGU General Assembly Conference**, Vienna, Austria, May 4th-8th, 2020.
6. Rousseau, H., Chassagne, R., Chauchat, J., & Frey, P. Continuous modelling of grain-size segregation in bedload transport. **Winter school-Multi scale approaches and multiphysics couplings in fluid and solid mechanics**, Grenoble, France, January 20th-20th, 2020. (Poster session)
7. Frey, P., Rousseau, H., Chassagne, R., Maurin, R., & Chauchat, J. Sediment transport : from discrete element methods to continuum models, **AGU Fall Meeting**, San Francisco, CA, December 9th-13th, 2019. (Poster session)

8. Rousseau, H., Chauchat, J., & Frey, P. Toward Eulerian-Eulerian two-phase flow modelling of grain-size segregation in bedload transport, **Two-pHase modEling for Sediment dynamIcS (THESIS)**, University of Delaware, USA, September 18th 2019.
9. Rousseau, H., Chauchat, J., & Frey, P. Modelling grain-size segregation in sediment transport using a Eulerien-Eulerian two-phase flow model, 3rd **IMA conference on Dense Granular Flows**, Cambridge, England, July 2nd 2019.

REVIEWING ACTIVITIES

- Reviewer for the international journal *Journal of Geophysical Research - Earth Surface*
- Reviewer for the international journal *The Cryosphere*

TEACHING ACTIVITIES

- 2018–2021 Teaching Granular Mechanics at ETH Zürich:
- *Lectures on grain size-segregation (3 hours)*
 - *Tutorials on RockyDEM a software for discrete element simulations (3 hours)*
- 2018–2021 Teaching at INP Grenoble engineering school for water, energy and environment (ENSE³):
- *Tutorials in numerical simulations with OpenFOAM (12 hours)*
 - *Laboratories on sediment transport (64 hours)*
- Teaching at Grenoble-Alpes University (UGA):
- *Lectures (in english) on free surface flows, Master Environmental Fluid Mechanics (12 hours)*

POPULARIZATION ACTIONS

- 2019
- Presentation of experiments on snow and granular avalanches at “Les Tribulations savantes” to students from 6 to 14 years old.
 - Presentation of experiments on snow and granular avalanches at “la Fête de la science” to students and interested peoples.
- 2017-2018 Creation of an organization named “Pôle Avenir” to organize conferences at the engineering school Polytech Marseille.

COMPUTING SKILLS

- Knowledge of RockyDEM, a software dedicated to Discrete Element Modelling of Granular Materials
- Programming in various languages: Python, Fortran, C++, Matlab, L^AT_EX
- Knowledge of Houdini FX, a software for 3D visualization, rendering and animation

LANGUAGES

French: Mother tongue
English: C1 level
Spanish: School level

OTHER INTERESTS

- Alpinism, rock-climbing, ski, paragliding
- Drama