

Luca Dal Zilio

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Current position

2/19 – present **Post-doctoral research fellow at California Institute of Technology, Pasadena**
Understanding megathrust segmentation in Cascadia and Nepal Himalaya
Advisors: [Nadia Lapusta](#), [Jean-Philippe Avouac](#)

Areas of specialisation

Seismic hazard / Earthquakes / Seismic cycle / Numerical modelling / Geodynamics

Education

2/15 – 1/19 **PhD student at Swiss Federal Institute of Technology (ETH) Zürich**
Cross-scale modeling of mountain building and the seismic cycle: From Alps to Himalaya
Advisors: [Taras Gerya](#), [Ylona van Dinther](#)

2012-2014 **MSc (cum laude) in Geology, University of Padova, Italy**
Thesis: *Subduction-induced break-up and drifting of continental plates* [[- pdf](#)]
Advisors: [Manuele Faccenda](#), [Fabio Capitanio](#)

2009-2012 **BSc in Earth Sciences, University of Padova, Italy**
Thesis: Preliminary study of the structural setting of the “Fadalto rumbles”
Advisors: [Nereo Preto](#), [Giulio Di Toro](#)

Visiting

1/2018 **Visiting researcher** — Earth Observatory of Singapore (EOS)
7/2017 **Visiting researcher** — École Normale Supérieure (ENS), Paris, France

Awards

2019 Recipient of the EGU Best Blog Post of 2018 [Competition](#)
2018 EGU Outstanding Student Poster (OSP) [Award](#)
2018 Best Geostory award by [Nature Geoscience journal](#)
2018 Nominated by ETH for the [Global Young Scientists Summit 2018](#), Singapore
2017 Invited keynote speaker at TEDx event – [Earthquakes: prediction or prevention?](#)

Grants

2018 Early Postdoc.Mobility fellowship, Swiss National Science Foundation
2018 Cecil and Sally Drinkward Postdoctoral Scholar in Mechanical Engineering at Caltech
2017 Swiss National Science Foundation, SINERGIA project 1-yr-extension PhD funded
2015 Swiss National Science Foundation, 3 years PhD Research – [SINERGIA Swiss-AlpArray](#)
2014 Uni-Padua fellowship, 3 months research assistant: *Modelling linked to Plate Tectonics*

Supports

2018 Full travel support for the Workshop “Modeling Earthquake Source Processes” (Caltech)
2018 Full travel support for the [Global Young Scientists Summit 2018](#), Singapore
2013 Travel grant by European Geosciences Union (EGU) Summer School 2013.

Students

2018 Semester project: Julian Stypulkowski (*ETH Zurich*), supervisor.
2018 MSc student: Mario D'Acquisto (*ETH Zurich*), supervisor.
2016 PhD student: Eleonora Ficini (*Sapienza University, Rome*), co-supervisor.
2015 MSc student: Eleonora Ficini (*Sapienza University, Rome*), co-supervisor.

Teaching Assistance

2017 Seismotectonics (*ETH Zurich*)
2016 Geophysical field course (*ETH Zurich*)

Scientific Community

2018 ... **Member** of *Sharing Science* network and blog at AGU
2018 ... **Judge** for Outstanding Student Awards at AGU and EGU
2017 ... **Blog editor** for the European Geosciences Union (EGU) — Geodynamic Division
2017 ... **Reviewer** for *GRL*, *EPSL*, *JGR: Solid Earth*, Tectonophysics, *Earth-Science Reviews*

International conference chair and convener:
2018 **EGU-2018:** The Interplay between Earthquakes, the Seismic Cycle and Long-term Deformation
2019 **EGU-2019:** Integrated approaches to bridge Long-term Tectonics and Earthquake cycles

Active collaborations: R. Jolivet (ENS Paris, France), György Hetényi (Lausanne, Switzerland), J.-P. Avouac (Caltech, USA), Manuele Faccenda (Padova, Italy), S. Barbot (NTU, Singapore), Edi Kissling (ETH Zurich), Fabio Capitanio (Monash, Australia), Carlo Doglioni (INGV, Rome).

Fieldwork

2016 The Pyrenean belt (*Languedoc, France*)
2013 Analysis of crystalline basements (*Calabria, Italy*)
2013 Basin analysis (*Umbria-Marche Basin, Apennines, Italy*)
2013 Sedimentology field course (*Tuscan basin, Italy*)
2012 2nd Geology field course (*Saint Florent, Corsica*)
2011 1st Geology field course (*Dolomites, Alps*)
2011 Mineral georesources field course (*Venetian Prealps, Italy*)
2011 Volcanology field course (*Aeolian Arc, Italy*)
2010 Geomorphology field course (*Alps, Italy*)

IT - skills

Software: **GMT, GPlates, PerpleX, Stereonet, FaultKin, LaTeX**
Programming in: **MatLab, C, Python, html**
Computational geodynamics: **finite difference/finite element method**
Numerical codes: **I2VIS, I2ELVIS, STM**
CSI (Classic Slip Inversion): Python tools for active fault slip inversions.

Language skills

Italian (native)
Full professional proficiency in English
Good command of Spanish

Publications

In preparation [P] / submitted [S]

[P2] D'Acquisto, M., **Dal Zilio, L.**, *et al.* Modelling slab retreat and seismicity in the northern Apennines fold-and-thrust belt.

[P1] **Dal Zilio, L.** and Jolivet, R. Interseismic coupling on the Main Himalayan Thrust: Bayesian modeling accounting for prediction uncertainties.

Articles

- [8] **Dal Zilio, L.**, Kissling, E., Gerya, T. (2019) Slab Rollback Orogeny Model for the evolution of the Central Alps — Seismo-Thermo-Mechanical proof. *Geology* (*in review*).
- [7] **Dal Zilio, L.**, van Dinther, Y., Gerya, T., Avouac, J.-P. (2019) Bimodal seismicity in the Himalaya controlled by fault friction and geometry. *Nature Communications* — [doi](#)
- [6] **Dal Zilio, L.** (2018). Subduction-driven Earth machine. *Nature Geoscience (News and Views), Anniversary Retrospective*, 11, 229, — [doi](#)
- [5] **Dal Zilio, L.**, van Dinther, Y., and Gerya, T. V., (2018). Seismic behaviour of mountain belts controlled by plate convergence rate. *Earth and Planetary Science Letters*. 482, 81–92, [doi](#)
- [4] Ficini, E., **Dal Zilio, L.**, Doglioni, C., and Gerya, T. V., (2017). Horizontal mantle flow controls subduction dynamics. *Scientific Reports* 7. — [doi](#)
- [3] **Dal Zilio, L.**, Faccenda, M., and Capitanio, F. A., (2017). The role of deep subduction in supercontinent breakup. *Tectonophysics*. — [doi](#)
- [2] Faccenda, M., and **Dal Zilio, L.**, (2017). The role of solid–solid phase transitions in mantle convection. *Lithos* 268, 198-224. — [doi](#)
- [1] Meyzen, C.M., Massironi, M., Pozzobon, R., and **Dal Zilio, L.**, (2015). Are plumes on motionless plates analogues to Martian plume feeding the giant shield volcanoes? - Volcanism and Tectonism Across the Inner Solar System, *Geological Society of London*, v. 401. — [doi](#)

Invited seminars

- 2019 University of Padova
- 2018 Earth Observatory of Singapore
- 2017 Sapienza University of Rome
- 2017 École Normale Supérieure, Paris
- 2014 ETH Zürich, Geophysical Fluid Dynamics group

Selected meeting presentations

- 2018 **Dal Zilio, L.**, Kissling, E., and van Dinther Y. *Slab Rollback Orogeny Model: A test-of-concept*. AGU meeting, Washington D.C., USA (invited oral).
- Dal Zilio, L.**, Jolivet, R., and van Dinther Y. *Interseismic coupling on the Main Himalayan Thrust: Bayesian modelling accounting for data and prediction uncertainties*. AGU meeting, Washington D.C., USA (oral).
- Dal Zilio, L.** *Modeling mountain building across time scales*. First AlpArray Science Meeting, Zürich, Switzerland (oral).
- Dal Zilio, L.**, Jolivet, R. *Seismic and aseismic slip on the Main Himalayan Thrust: Bayesian modelling accounting for prediction uncertainties*. Himalaya-Karakorum-Tibet (HKT) workshop, Lausanne, Switzerland (oral).
- Dal Zilio, L.**, van Dinther, Y., Gerya, T. and Avouac, J.-P. *Bimodal seismicity in the Himalaya controlled by fault friction and geometry*. EGU meeting, Vienna (poster).
- Dal Zilio, L.**, Jolivet, R. and van Dinther, Y. *Interseismic coupling on the Main Himalayan Thrust: Bayesian modelling accounting for prediction uncertainties*. EGU meeting, Vienna (poster).
- 2017 **Dal Zilio, L.**, van Dinther, Y., Gerya, T. and Avouac, J.-P. *What controls the bimodal seismicity of large Himalayan earthquakes?* AGU meeting, New Orleans, USA (oral).
- Dal Zilio, L.**, Jolivet, R. and van Dinther, Y. *Interseismic coupling and geometry of the Main Himalayan Thrust: A complementary approach*. AGU meeting, New Orleans, USA (poster).
- Dal Zilio, L.**, van Dinther, Y., Gerya, T. and Avouac, J.-P. *Under the hood of the earthquake machine: Toward predictive modeling of the Himalayan seismic cycle*. NetherMod workshop, The Netherlands (poster).
- Liao, J., **Dal Zilio, L.**, and Gerya, T. *Influence of slab rollback on the curvature of the Western Alps*. EGU meeting, Vienna (poster).

Dal Zilio, L., van Dinther, Y. and Gerya, T. *Seismic cycle in the Nepal Himalaya inferred from instantaneous modelling*. EGU meeting, Vienna (oral).

2016

Dal Zilio, L., van Dinther, Y. and Gerya, T. *Seismic cycle in the Nepal Himalaya: Instantaneous Modeling*. AGU meeting, San Francisco (oral).

Dal Zilio, L., van Dinther, Y. and Gerya, T. *Plate convergence rate controls earthquake-size distribution of mountain belts*. AGU meeting, San Francisco (oral).

Dal Zilio, L., van Dinther, Y. and Gerya, T. *Plate convergence rate controls earthquake-size distribution of mountain belts*. GeoMod conference, Montpellier, France (oral).

Ficini, E., **Dal Zilio, L.**, Doglioni, C. and Gerya T. *Numerical modelling of subduction zones: A new beginning*. 35th Int. Geological Congress, Cape Town, South Africa (poster).

Dal Zilio, L., van Dinther, Y. and Gerya, T. *Convergence rate controls seismicity styles in collisional orogens*. EGU meeting, Vienna (oral).

Dal Zilio, L., Faccenda M. and Capitanio, F.A. *The role of deep subduction in supercontinent breakup*. EGU meeting, Vienna (oral).

Ficini, E., **Dal Zilio, L.**, Doglioni, C. and Gerya T. *Numerical modelling of subduction zones: A new beginning*. EGU meeting, Vienna (poster).

2015

Dal Zilio, L., van Dinther, Y. and Gerya, T. *The long-term seismic cycle in collisional margins: insights from Seismo-Thermo-Mechanical models*. AGU meeting, San Francisco (poster).

Dal Zilio, L., van Dinther, Y. and Gerya, T. *Seismo-Thermo-Mechanical modelling of collisional margins*. XIV Int. Workshop on Modelling of Mantle and lithosphere Dynamics, France (poster).

Dal Zilio, L., Faccenda M. and Capitanio, F.A. *Subduction-induced break-up and drifting of continental plates*. XIV Int. workshop on modelling of mantle and lithosphere dynamics, France (poster).

2014

Dal Zilio, L., Faccenda, M., Capitanio, F.A., *The Break-up and Drifting of the Continental Plates in 2D Models of Convecting Mantle*. AGU Fall Meeting, San Francisco (poster).

Meyzen, C., Massironi, M., Pozzobon, R., **Dal Zilio, L.**, *Are terrestrial plumes from motionless plates analogues to Martian plumes feeding the giant shield volcanoes?* EGU meeting, Vienna (poster).

2013

Dal Zilio, L., Nexer, M., and Tennant, C., *Low drainage area channels in the Rio Cordon, Dolomites, Italy*. EGU-Summer School, San Vito di Cadore, Dolomites (oral).

Dal Zilio, L., Massironi, M., Faccenda, M., *Modelling of the Thaumasian mountain range, Mars*. FIST Geotalia, IX Forum of Earth Sciences 2013, Planetary Geology; Pisa, Italy (poster).

Media Coverage

Why massive earthquakes menace the Himalayas **Nature Highlights** ([link](#)).

Devastating quakes are priming the Himalaya for a mega-disaster **National Geographic** ([link](#)).

Waiting for the complete rupture **ETH News** ([link](#)).

Faster tectonic-plate collisions spell bigger earthquakes, **Nature Highlights** ([link](#)).

Why are some earthquakes so much worse than others? **International Business Times** ([link](#)).

Earthquakes – Swiss study shines new light on the risks in the Alps, **Le News** ([link](#)).

Una velocità di collisione delle placche più alta provoca terremoti più forti, **Focus** ([link](#)).

Mega terremoti dalle Alpi all'Himalaya: un modello per localizzarli, **OggiScienza** ([link](#)).

E' la velocità delle placche a determinare l'intensità dei terremoti, **Le Scienze** ([link](#)).

Selected Public Outreach

Terremoti: previsione o prevenzione? **TEDx talk** ([link](#)).

Going with the toroidal mantle flow, **EGU blog** ([link](#)).

Pre-plate-tectonics on early Earth: How to make primordial continental crust, **EGU blog** ([link](#)).

Global Young Scientists Summit 2018: Learning from the Best, **ETH Ambassadors** ([link](#))