



Davide Zaccagnino

Curriculum Vitae

————— **Contacts**

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————— **Info**

Date of Birth: 25/08/1997

Place of Birth: Rome, Italy

Personal Website: www.davidezaccagnino.com

————— **Bibliometric Data**

H-index: 5 (Google Scholar, November 28, 2023)

Published articles: 11 (Google Scholar, November 28, 2023)

Citations: 98 (Google Scholar, November 28, 2023)

Abstracts at National/International Conferences: 23

————— **Education**

11/2021 - ongoing, **PhD student in Geophysics**, Department of Earth Sciences, Sapienza University

Project title: An integrated approach to mid-term seismic prediction,

Tutors: Prof. Carlo Doglioni, Dr. Luciano Telesca;

10/2019-20/10/2021, **MSc Theoretical Physics**, Sapienza University of Rome, 110/110 with honors;

Thesis title: Near breaking faults

Advisors: Prof. Carlo Doglioni and Prof. Andrea Pelissetto

Co-advisor: Dr. Luciano Telesca

9/2019-20/7/2020, **Scuola di Politiche** by Prof. Enrico Letta;

9/2017 - 12/2019, **Member of RIASISSU** (Rete Italiana degli Allievi delle Scuole e degli Istituti di Studi Superiori Universitari);

10/2016 - 12/2019, Sapienza School for Advanced Studies, Sapienza, Rome;

16/12/2019, **BSc Physics**, Sapienza University of Rome, 110/110 with honors;

Thesis title: Una analisi della tettonica globale

Advisor: Prof. Fulvio Ricci

Co-advisor: Prof. Carlo Doglioni

10/2016, **Winner SSAS selection** 95/100;

11/7/2016, **Scientific High School Diploma** 100/100 with honors;

2011 - 2016, Liceo Scientifico "Isacco Newton", Rome.

▬ Abilities and Scientific Interests

- Physical modeling of non-equilibrium and critical statistical systems with applications to seismology;
- Physics of Seismicity;
- Theoretical seismology;
- Theoretical statistical seismology;
- Seismic Forecasting;
- Theoretical aspects of Earthquake Predictability;
- Physical modeling for Seismic Forecasting;
- Seismotectonics;
- Advanced Statistical Methods;
- Analytic applied mathematical methods (mathematical models for seismology, geodynamics and earthquake seismology);
- Seismic precursors;
- Philosophy of Science.

▬ Computer skills

Basic Obspy, R

Intermediate GMT (PyGMT), Python, C

Advanced Linux, Windows, Microsoft Office, Matlab, LaTeX, Adobe Illustrator.

▬ Languages

Italian C2

English C1

Spanish A2

▬ Research during my university studies

9/2017 SSAS Research Project: "Breve studio sulla sismicità dell'Appennino Centrale" (Advisor: prof. Carlo Doglioni)

9/2018 SSAS Research Project: "Criticità autorganizzata in sistemi di faglie - un modello per la descrizione dei fenomeni sismici" (Advisor: prof. Carlo Doglioni)

9/2019 SSAS Research Project: "Un modello energetico non locale per la dissipazione dell'energia sismica" (Advisor: prof. Carlo Doglioni)

Peer Reviewed Articles

1. **Zaccagnino, D.**, Vespe, F., & Doglioni, C. (2020). Tidal modulation of plate motions. *Earth-Science Reviews*, 205, 103179.
2. **Zaccagnino, D.**, Telesca, L., & Doglioni, C. (2021). Different fault response to stress during the seismic cycle. *Applied Sciences*, 11(20), 9596.
3. **Zaccagnino, D.**, Telesca, L., & Doglioni, C. (2022). Scaling properties of seismicity and faulting. *Earth and Planetary Science Letters*, 584, 117511.
4. **Zaccagnino, D.**, Telesca, L., & Doglioni, C. (2022). Correlation between seismic activity and tidal stress perturbations highlights growing instability within the brittle crust. *Scientific Reports*, 12(1), 1-14.
5. **Zaccagnino, D.**, & Doglioni, C. (2022). Earth's gradients as the engine of plate tectonics and earthquakes. *La Rivista del Nuovo Cimento*, 1-81.
6. **Zaccagnino, D.**, & Doglioni, C. (2022). The impact of faulting complexity and type on earthquake rupture dynamics. *Communications Earth & Environment*, 3(1), 1-10.
7. **Zaccagnino, D.**, Telesca, L., & Doglioni, C. (2022). Variable seismic responsiveness to stress perturbations along the shallow section of subduction zones: the role of different slip modes and implications for the stability of fault segments. *Frontiers in Earth Science*, 2192.
8. **Zaccagnino, D.**, Telesca, L., & Doglioni, C. (2023). Global versus local clustering of seismicity: Implications with earthquake prediction. *Chaos, Solitons & Fractals*, 170, 113419.
9. Nesi, V., Bruno, O., **Zaccagnino, D.**, Mascia, C., & Doglioni, C. (2023). Tidal drag and westward drift of the lithosphere. *Geoscience Frontiers*, 101623.
10. **Zaccagnino, D.**, Telesca, L., Tan, O., Doglioni, C (2023). Clustering Analysis of Seismicity in the Anatolian Region with Implications for Seismic Hazard. *Entropy*, 25, 835. <https://doi.org/10.3390/e25060835>
11. **Zaccagnino, D.**, Doglioni, C. (2023). Fault dip vs shear stress gradient. *Geosystems and Geoenvironment*, 100211.

Abstracts and Conferences

- 13/12/2023 “Feedback processes and fault memory as rulers of seismicity” (Annual Meeting of the American Geophysical Union, San Francisco, California, USA, 2023)
- 12/12/2023 “Can foreshocks be discriminated from seismic swarms?” (Annual Meeting of the American Geophysical Union, San Francisco, California, USA, 2023)
- 18/10/2023 “Fault structure-related variability of seismic activity: a result of local geology or universal physical mechanisms?” (Annual Meeting of the Geological Society of America, Pittsburgh, Pennsylvania, USA, 2023)
- 17/10/2023 “Modeling of the westward drift of the lithosphere” (Annual Meeting of the Geological Society of America, Pittsburgh, Pennsylvania, USA, 2023)
- 17/10/2023 “A simpler explanation for fault dip angles distribution?” (Annual Meeting of the Geological Society of America, Pittsburgh, Pennsylvania, USA, 2023)
- 12/10/2023 “Super-shear cascading rupture envelopes” (Physics-Based Ground Motion Modeling, Seismological Society of America, Vancouver, British Columbia, Canada, 2023)

- 14/07/2023 “New clues for seismic hazard from statistical properties of seismicity, rheology and tectonics” (XXVIII General Assembly of the International Union of Geodesy and Geophysics (IUGG), Berlin, Germany, 2023)
- 12/07/2023 “Tectonic constraints as the origin of heterogeneity in seismic style: new analyses and simulations” (XXI INQUA Congress, Rome, Italy, 2023)
- 09/05/2023 “Physical modeling of seismicity and its implications for seismic hazard” (Department of Geophysics and Geothermics, National and Kapodistrian University of Athens, Athens, Greece, 2023) - **INVITED**
- 24/04/2023 “One to many seismogenic sources: from single earthquakes to seismic sequences” (EGU Annual Meeting, Vienna, Austria, 2023)
- 24/04/2023 “Oscillating stress loading on the brittle crust and viscous lithosphere” (EGU Annual Meeting, Vienna, Austria, 2023)
- 20/04/2023 “Why do we need new models of earthquake occurrence?” (SSA Annual Meeting, San Juan, Puerto Rico, 2023)
- 19/04/2023 “Preliminary Analysis and Model of the Complex Rupture Dynamics Behind the Mw 7.8 and Mw 7.5 Kahramanmaraş Earthquakes in Türkiye” (SSA Annual Meeting, San Juan, Puerto Rico, 2023)
- 18/04/2023 “Not so planar faults: on the impact of faulting complexity and type on earthquake rupture dynamics” (SSA Annual Meeting, San Juan, Puerto Rico, 2023)
- 23/3/2023 “From physical modeling to seismic precursors” (HydroQuake Meeting, Rome, INGV, 2023) - **INVITED**
- 14/12/2022 “Evidence of Westerly Polarized Plate Tectonics” (AGU Fall Meeting, Chicago, 2022)
- 12/12/2022 “Connecting Local Features of Coseismic Rupture to Large-scale Properties of Seismicity” (AGU Fall Meeting, Chicago, 2022)
- 21/9/2022 “How details of faulting affect large scale properties of seismicity and tectonics” (SGI Congress, Torino, 2022)
- 19/9/2022 “Seismic response to tidal stress perturbations sheds new light on how fault patches become unstable” (SGI Congress, Torino, 2022)
- 28/6/2022 “Tectonic style vs double-couple” (GNGTS Conference, Trieste, 2022)
- 26/5/2022 “Assessing crustal stability via fault stress perturbation analysis” (EGU Assembly, Vienna, 2022)
- 6/9/2019 “Do Lunisolar body tides speed up plates?” (7th International Colloquium on Scientific and Fundamental Aspects of GNSS, Zurich, 2019)
- 15/7/2019 “Nuove prospettive di ricerca su origini e dinamiche dei fenomeni sismici” (SSAS Symposium Conference, 2019)

Research Projects

I was involved in the following projects as researcher:

- 2021-2023 **TILDE (Terrestrial Interplate Lithospheric Deformation of Earth; ESA Contract No. 4000133529/20/NL/GP)**- in collaboration with Research Institute of Geodesy, Topography and Cartography (RIGTC) and at the Faculty of Civil Engineering (FCE) of the Czech Technical University in Prague, Centro di Geodesia Spaziale (CGS) dell’Agenzia Spaziale Italiana (ASI). Role: Researcher.
- 11/2022-
4/2023 **Statistical analysis of earthquake clusters for enhanced seismic hazard assessment - AR122180D6B20CC1** 2000 euros funded by Sapienza. Role: Principal Investigator.

Scientific Collaborations

1. **Sapienza University of Rome**, Italy – Departments of Earth Sciences, Physics, Mathematics (Prof. Vincenzo Nesi);
2. **Istituto Nazionale di Geofisica e Vulcanologia (INGV)**, Rome, Italy (Dr. Aybige Akinci, Dr. Andre’ Herrero, Dr. Ilaria Spassiani, Dr. Tommaso Alberti);
3. **Agenzia Spaziale Italiana (ASI)**, Matera, Italy (Dr. Francesco Vespe);
4. **Istituto Nazionale di Astrofisica (INAF)**, Bologna, Italy (Dr. Sonia Negusini);
5. **Consiglio Nazionale delle Ricerche – Istituto di Metodologie per l’Analisi Ambientale (CNR-IMAA)**, Tito Scalo, Potenza, Italy (Dr. Luciano Telesca, Dr. Tony Alfredo Stabile);
6. **Research Institute of Geodesy, Topography and Cartography (RIGTK)**, Prague, Czech Republic (Prof. Jan Dousa and collaborators);
7. **California Institute of Technology (Caltech)**, Division of Engineering and Applied Science, Pasadena, CA, USA (Prof. Oscar Bruno);
8. **Northwestern University**, Department of Earth and Planetary Science, Evanston, IL, USA (Prof. Seth Stein, Dr. James Neely - now Chicago University);
9. **National and Kapodistrian University**, Department of Geophysics and Geothermics, Athens, Greece (Prof. Filippos Vallianatos, Dr. Georgios Michas, Dr. Giannis Spingos and collaborators).

Scientific dissemination activities

- 10/2022 Behind the paper “Double-couple troubles” **Zaccagnino, D.** and Doglioni, C. Nature Portfolio (<https://earthenvironmentcommunity.nature.com/posts/double-couple-troubles>).
- 2/2022 “Tutela dell’ambiente: una questione costituzionale” **Zaccagnino, D.** Journal of the Italian School of Politics (SdP J, 2022) (info here)
- 11/2021 “L’Italia del Rischio Geologico”. **Zaccagnino, D.** Journal of the Italian School of Politics (SdP Journal). (info here))
- 9/2020 Book “Il santo, la strega e l’acchiappalune” **Zaccagnino, D.** Self-published (266 pages). This book collects great part of the results achieved along ten years of historical research. It is focused on the history of a small village, Onelli di Cascia, repeatedly hit by large earthquakes in the past two thousand years (99 BC, 1328, 1599, 1703, 1730, 1859, 1964, 1979 and 2016). The work also contains memories of the inhabitants and several sociological, heraldic and toponymic curiosities.

Teaching activities

- 2023- Advisor of MSc Excellence Projects in “Geologia di Esplorazione”. Students: Flavio Clivet (successfully defended on 19/09/2023)
- 2023- Co-advisor of MSc Theses in “Geologia di Esplorazione”. Students: Stefano Cannata (ongoing)
- 6/3/2023- In-depth seminar for the course “Geodinamica e Bacini Sedimentari”, MSc
13/4/2023 course “Geologia di Esplorazione”, 10 hours; Tutor: Prof. Carlo Doglioni.
- 28/4/2022- In-depth seminar for the course “Geodinamica e Bacini Sedimentari”, MSc
16/5/2022 course “Geologia di Esplorazione”, 10 hours; Tutor: Prof. Carlo Doglioni.

Editorial activities

- 2022- Peer Reviewer for International Journals: Earth and Planetary Science Letters (2); Nature Scientific Reports (1); Frontiers in Earth Science (1); Geomatics, Natural Hazards and Risk (1); Pure and Applied Geophysics (2); Fractals and Fractional (1); Journal of Geodynamics (1); Tectonophysics (1); Acta Geophysica (4); Contributions in Geophysics and Geodesy (1); Nonlinear Processes in Geophysics (3); Geosciences (1); Infrastructures (1); Terra Nova (3); Applied Sciences (1)

Awards

- 2022 **AGLC 'Licio Cernobori' Award**, Trieste. Motivation: for the presentation “Tectonic setting and fault roughness vs. earthquake double couple”. *“Il lavoro si propone di mettere in relazione la complessità strutturale e tettonica di una area sismogenica, con le dinamiche che presiedono all'insorgere dell'evento sismico. Si tratta di un contributo interessante e con potenziali sviluppi in campo sismologico, soprattutto per quanto riguarda la comprensione dei meccanismi della sorgente nei vari contesti tettonici. La presentazione del lavoro in forma chiara ed esaustiva, sia nella parte metodologica che nella parte di potenziali sviluppi applicativi, unitamente alla qualità scientifica dello stesso, sono stati concordemente apprezzati dalla commissione esaminatrice”.*
- 2016 **Merit Certificate “Scienzimpresa - progetto di diffusione scientifica”**, scientific dissemination activities within the project “ScienzaImpresa”.
- 2014 **Romei Prize** (ANP), the national prize awarded by the Italian Association of Headmasters for my excellent results in High School studies.

Memberships of Scientific Societies

- 2022- European Geosciences Union (EGU), American Geophysical Union (AGU), Società Geologica Italiana (SGI), Gruppo Nazionale di Geofisica della Terra Solida (GNGTS)
- 2023- Seismological Society of America (SSA), Geological Society of America (GSA)

Other Scientific Contributions

- 9/2021 Bellucci, E., Bruno, A., Capano, G., Mula, M., Persico, G., **Zaccagnino, D.**
Il ruolo dei Parchi Nazionali per la tutela del Capitale Naturale. Pantelleria
Youth Forum 2021, Pantelleria, Sicily, Italy.
- 6/2021 Ambrosio, G., Comandini, G., Ghisi, F., Nasi, F., Sanna, P., **Zaccagnino, D.**
Piano di rilancio per il sistema universitario nel Sud Italia. Colmare il divario
universitario tra nord e sud (2021, SdP News) (info here).

Media Coverage

My research works appeared in different local and national journals and TV programmes.
Hereafter a selection:

- 05/2023 INSIDER
11/2022 Le Scienze Blog
5/2020 Scientificult
5/2020 Il Sole 24 ore
4/2020 Sky Tg24