Dr. Aditi K Dave-narrative CV

Charting new frontiers in quartz geochronology and provenance: an international journey enriching earth science, paleoclimatology, and archaeology

Dr. Aditi K. Dave is presently a postdoctoral researcher in the European Research Council (ERC) project PROGRESS (Reading Provenance from ubiquitous quartz: understanding the changes occurring in its lattice defects in its journey in time and space by physical methods) led by Prof. Alida Timar-Gabor at Babes-Bolyai University, Cluj-Napoca, Romania. She did her B.Sc. and M.Sc. in Chemistry from the University of Delhi, India (2009 -2014). Following which, she pursued an M.Sc. in Archaeological Sciences as a fully-funded Felix Scholar at the University of Oxford (2014-15). After her Masters, Aditi was a visiting scientist (2015-16) at the Luminescence Laboratory in the Physical Research Laboratory (PRL), Ahmedabad India. Post PRL, she moved to Germany and did her PhD in Geology at the Max Planck Institute for Chemistry, Mainz (2017-2021). During her doctoral work, apart from establishing a chronological framework and quantifying the rates of aeolian landscape evolution in Central Asia, Aditi developed a new methodology for characterising the provenance of quartz using defects centres in the quartz crystal lattice. For this work, she was awarded the *Martin Aitken Prize for Fundamental Research* at the 16th International Luminescence and Electron Spin Resonance Dating Conference in 2021. After her PhD, Aditi was a Postdoctoral fellow in the Department of Geosciences at University of Tübingen, Germany (2021-2022), and subsequently moved to Romania in August 2022, where she is currently based.

Aditi has been involved in the field of trapped charge dating (Luminescence and Electron Spin resonance) for the past 9 years and has had the opportunity to work in different parts of the world as well as on different sedimentary archives in the field of geology and archaeology. Her primary research interest lies in understanding the behaviour of luminescence and ESR signals in quartz from rocks and sediments using trapped charge techniques to better understand its application as a proxy for provenance as well as developing absolute chronological records to understand the rate and processes of landscape change over time and space. Over the span of her Masters and PhD, Aditi received numerous awards for her research work: *Nicolas Copernicus award for rising young stars in Luminescence dating* (15th International Luminescence and Electron Spin Resonance Dating Conference), *Best Poster Award* (U.K. Luminescence and Electron Spin Resonance Dating Conference, Copenhagen), *Best Oral Presentation* (German Luminescence and Electron Spin Resonance Dating Conference, Bingen) and *Martin Aitken Prize for Fundamental Research* (16th International Luminescence

and Electron Spin Resonance Dating Conference). To date, Aditi has 11 articles in peer reviewed international Q1 and Q2 journals. Of these, she is the first author on 4, and has co-authored 7 journal articles and has a h-index of 4, with 189 citations.

In her present position in the ERC project-PROGRESS, Aditi's research is focused on investigating luminescence and ESR signals in Quartz extracted from rocks and sediments of different lithologies and sedimentary histories and aims at gaining an insight on the variation of these trapped-charge parameters through time and space, thus, elucidating its importance as provenance indicators. The current research facilities (i.e., Luminescence and ESR laboratories) and the soon-to be available facilities like Cathodoluminescence and Scanning electron microscope as part of the ongoing ERC project at BBU will enable Aditi to extend the frontiers of her current research by combining radiation dosimetry techniques with spectroscopic mineralogical investigations on quartz, which will aid cutting-edge interdisciplinary research across the fields of radiation physics, mineralogy and geology.

In addition to her research pursuits, Aditi has been actively engaged in various scientific organisational activities that promote and foster the development and engagement of early-career researchers (ECR) within the palaeoclimate community. Presently, she serves as steering committee member of the PAGES - Early career network (PAGES-ECN) as well as an organising member of the Landscape live virtual seminar series of the Geomorphology division of the European Geosciences Union (EGU). During her PhD as well as post-doc, Aditi co-organised various international conferences (German Luminescence and Electron spin Resonance Dating Conference in Bingen in 2019) and workshops (ECR Workshop at the Loessfest held in Yanán , China in 2022). Furthermore, post-PhD Aditi has also taught various courses in sedimentology and geochronology as a lecturer and guest-lecturer at the Department of Geosciences, University of Tuebingen, Germany and the Faculty of Environmental Sciences and Engineering, Babes-Bolyai University, Cluj-Napoca, Romania, respectively.

Annex- Career timeline and listed achievements

Personal Information

Family name, First name: Dave, Aditi Krishna

Date of birth: 30 June 1991

Researcher unique identifier(s) ORCID 0000-0002-2836-9155, Scopus ID: 57202114992, Google Scholar: https://scholar.google.com/citations?user=KJqt5x4AAAAJ&hl=en

h-index = 4 (since 2019)

Education

2017-2021: PhD in Geology, Max Planck Institute of Chemistry and Johannes Gutenberg University, Mainz, Germany, supervised by Prof. K.E. Fitzsimmons; PhD thesis title: *"Understanding Quaternary aeolian landscape-climate interactions in the piedmonts of Central Asia using luminescence and electron spin resonance techniques"*

2014-2015: M.Sc. Archaeological Sciences, University of Oxford, U.K. Master thesis: *Application and development of luminescence dating techniques for sediments and burnt flints from the palaeolithic site of Riparo Mochi, Italy.*

2012-2014: M.Sc. Chemistry, University of Delhi, India.

2009-2012: B.Sc. (Honours) Chemistry, Miranda House College, University of Delhi, India.

Current Position: 2022-Present: Postdoctoral researcher in ERC Project - PROGRESS, Babes-Bolyai University, Cluj-Napoca, Romania.

Previous Position(s): 2021-2022 Postdoctoral researcher, Department of Geosciences, University of Tuebingen, Germany. **2015-2016**: Visiting scientist, Physical Research Laboratory, Ahmedabad, India.

Awards and Achievements

2024: Award for Outstanding paper by an Early-career researcher (ECR) in Journal of Quaternary Science (Wiley) in 2023 *titled, "The patchwork loess of Central Asia: Implications for interpreting aeolian dynamics and past climate circulation in piedmont regions".* **2021:** Martin Aitken prize for Fundamental research (best Oral presentation) at the 16th International Luminescence and Electron Spin Resonance Dating (LED) Conference. **2020:** Best Oral Presentation award at the German LED Conference, Leipzig **2019**: Best Poster award at the

U.K. LED Conference, Copenhagen. **2017:** Nicolas Copernicus award for rising young stars in luminescence dating at the 15th International LED Conference, Cape town.

Teaching activities

2021-2022: Lecturer at the Department of Geosciences, University of Tuebingen, Germany. **2023 – Present**: Guest Lecturer at the Faculty of Environmental Science and Engineering, Babes-Bolyai University, Cluj-Napoca, Romania.

Organisational activities

2022-Present: Organising member of the Landscape Live Seminar Series of the Geomorphology Division of the European Geosciences Union (EGU). **2023-Present**: Steering Committee member of Past Global Changes (PAGES) - Early Career Network (ECN). **2022:** Co-organiser of the ECR Workshop at the Loessfest in Yan'an, China **2019:** Co-organiser of the German luminescence and Electron Spin resonance Dating Conference in Bingen Germany.

Reviewing activities

Reviewer for the following Journals: Quaternary Geochronology, Catena, Frontiers in Earth Science and Palaeogeography, Palaeoclimatology, Palaeoecology

List of publications:

Articles in indexed journals:

1. Li, G., Yan,Z., Song,Y., Fitzsimmons,K.E., Yi,S., Kang,S., Chongyi E., Stevens,T., Lai,Z., **Dave, A.K.,** Chen,C., Deng,Y., Yang,H., Zhang, X., Qin, C., Zhao, Q., Buylaert, J-P., Lu,T., Wang, Y., Liu, X., Ling, Z., Chang,Q., Wei,H., Wang, X. 2024. A comprehensive dataset of luminescence chronologies and environmental proxy indices of loess-paleosol deposits across Asia. ***npj Climate and Atmospheric Science*** 7 (7). https://doi.org/10.1038/s41612-023-00555-4
2. Timar-Gabor, A., Kabacińska, Z., Constantin,D., **Dave, A.K.**, Buylaert, J-P. 2023. Reconstructing dust provenance from quartz optically stimulated luminescence (OSL) and electron spin resonance (ESR) signals: Preliminary results on loess from around the world. ***Radiation Physics and Chemistry***. https://doi.org/10.1016/j.radphyschem.2023.111138.
3. **Dave, A. K.,** Lisa, L., Scardia, G., Nigmatova, S., and Fitzsimmons, K. E. 2023. The patchwork loess of Central Asia: Implications for interpreting aeolian dynamics and

past climate circulation in piedmont regions. ***Journal of Quaternary Science***. https://doi.org/10.1002/jqs.3493

4. Li, Y., Song, Y., Fitzsimmons, K.E., **Dave, A.K.**, Liu, Y., Zong, X., Sun, H., Liu, H., Orozbaev, R. 2022. Investigating potential links between fine-grained components in loess and westerly air-flow: evidence from East and Central Asia. ***Frontiers in Earth Science*** 10:901629. https://doi.org/10.3389/feart.2022.901629
5. Frouin, M., Douka., K, **Dave, A.K.**, Schwenninger, J-L., Mercier, N., Murray, A.S., Santaniello, F., Boschian, G., Grimaldi, S., Higham, T. 2022. A refined chronology for the Middle and the early Upper Palaeolithic at Riparo Mochi (Liguria, Italy). ***Journal of Human Evolution*** (169), 103211. https://doi.org/10.1016/j.jhevol.2022.103211
6. **Dave, A. K**., Timar-Gabor, A., Kabacińska, Z., Scardia, G., Safaraliev, N., Nigmatova, S., Fitzsimmons, K. E. 2022. A novel proxy for tracking the provenance of dust based on paired E1'-peroxy paramagnetic defect centers in fine-grained quartz. ***Geophysical Research Letters***, 49, e2021GL095007. https://doi.org/10.1029/2021GL095007.
7. **Dave, A. K**., Timar-Gabor, A., Scardia, G., Safaraliev, N., Fitzsimmons, K. E. 2022. Variation in Luminescence Characteristics and Paramagnetic Defect Centres in Fine-Grained Quartz From a Loess-Palaeosol Sequence in Tajikistan: Implications for Provenance Studies in Aeolian Environments. ***Frontiers in Earth Science***. 10:835281. doi: 10.3389/feart.2022.835281
8. Fitzsimmons, K.E.; Perić, Z.; Nowatzki, M.; Lindauer, S.; Vinnepand, M.; Prud'homme, C.; **Dave, A.K**.; Vött, A.; Fischer, P. 2021. Luminescence Sensitivity of Rhine Valley Loess: Indicators of Source Variability? ***Quaternary*** 5 (1). https://doi.org/10.3390/quat5010001
9. Fitzsimmons, K.E., Nowatski, M., **Dave, A.K**., Harder, H. 2020. Intersections between wind regimes, topography and sediment supply: Perspectives from aeolian landforms in Central Asia***. Palaeogeography, Palaeoclimatology, Palaeoecology*** 540, 109-531. https://doi.org/10.1016/j.palaeo.2019.109531
10. **Dave, A.K**., Courty, M.A., Fitzsimmons, K.E., Singhvi, A.K. 2019. Revisiting the contemporaneity of a mighty river and the Harappans: Archaeological, stratigraphic and chronometric constraints. ***Quaternary Geochronology*** 49, 230-235. https://doi.org/10.1016/j.quageo.2018.05.002

11. Schaetzl, R.J., Bettis, E.A., Crouvi, O., Fitzsimmons, K.E., Grimley, D.A., Hambach, U., Lehmkuhl, F., Marković, S.B., Mason, J.A., Owczarek, P., Roberts, H.M., Rousseau, D.-D., Stevens, T., Vandenberghe, J., Zarate, M., Veres, D., Yang, S., Zech, M., Conroy, J.L., Dave, A.K., Faust, D., Hao, Q., Obreht, I., Prud'homme, C., Smalley, I., Tripaldi, A., Zeeden, C., Zech, R. 2018. Approaches and challenges to the study of loess. Quaternary Research (89), 563-618.
doi:10.1017/qua.2018.15