

# Dr. RUTU PAREKH



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## RESEACRCH INTERESTS

Planetary geology, geomorphology, laboratory analogue, spectroscopy, planetary volatiles, volcanism, surface process, icy planetary bodies, mass wasting, impact craters, surface modeling, regolith

## RESEARCH AND PROFESSIONAL EXPERIENCE

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<b>Aug. 2018- March 2022</b>	DLR/DAAD PhD Research Fellow at DLR Institute of Planetary Research and Freie University of Berlin on project entitled ' <b>Evaluating Volatile Induced Surface Features on Vesta and Ceres</b> ' Advisors: Prof. Dr. Ralf Jaumann, Prof. Dr. Lena Noack, Dr. Katharina Otto (Magna-cum laude).
<b>April 2018- July 2018</b>	Project Technical trainee at Physical Research Laboratory (PRL), Department of Geoscience, India. Project on ' <b>Martian Volcanism</b> '. Adviser: Dr. Anil D Shukla.
<b>July 2015- Nov. 2015</b> <b>Jan. 2016- May 2016</b>	Academic associate at CEPT University Ahmedabad, India. Subjects: <b>Advance remote sensing, Remote sensing</b> to graduate students (part-time).
<b>Feb. 2015- Aug. 2015</b>	Research Assistant at Faculty of Technology, CEPT University. Project on ' <b>Desertification Status Mapping of India</b> '. Adviser: Prof. Dr. Anjana Vyas.
<b>June 2013- March 2014</b>	Research Assistant at Faculty of Technology, CEPT University. Project on ' <b>Hybrid Polarimetry Signature Study under Desertic Environment (RISAT-1 Utilization program)</b> ' in collaboration with Space Applications Center (SAC, ISRO). Advisers: Dr. R.L. Mehta, Prof. Dr. Anjana Vyas.

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## EDUCATION AND TRAINING

Institution	Degree	Year	Field of study
Freie University of Berlin & Institute of Planetary Research, German Aerospace Center (DLR), Germany	Ph.D.	August 2018- March 2022	Planetary science Thesis Focus: Volatile transportation, Vesta, Ceres, Small planetary objects
University of Bristol, United Kingdom	M.Sc.	2016-2017	Earth Science Thesis Focus: Marsian volcanism and surface geomorphology
Canter for Environmental Planning and technology (CEPT Uni.), India	M.Sc.	2011-2013	Faculty of technology Focus: Geomatics and Remote sensing
St. Xavier's College, Gujarat University, India	B.Sc.	2008-2011	Major: Biochemistry and Chemistry

## MISSION PARTICIPATION

- Oct 2022** - Affiliated to the 'Europa Clipper' science team (mission launching in Oct 2024)
- Aug 2018** - Science team member of the Dawn mission to Vesta and Ceres
- Oct 2018-  
March '22** - Science team member of Mobile Asteroid Surface Scout (MASCOT) lander of Haybusa2 mission to asteroid Ryugu.

## PROPOSAL PARTICIPATION

- Dec., 2021** - ROSES-2021 program element Discovery Data Analysis Program (DDAP) proposal submitted for project entitled '**Volatile distribution and implications for regolith production on Vesta and Ceres**' in collaboration with Airborne Snow Observatories (ASO), California Institute of Technology (Caltech/JPL), Southwest Research Institute (SwRI) and DLR Institute of Planetary Research.  
*Team:* Dr. Elizabeth Carey (ASO), Dr. Jennifer Scully (Caltech/JPL), Dr. Michael Poston (SwRI), Dr. Danielle Wyrick (SwRI), Dr. Katharina Otto (DLR)
- Jan 2020- '21** - Exchange researcher for Personnel Exchange Programme (PPP) proposal\*, DAAD on project '**Volatile Outgassing in Mass-wasting Processes on Vesta and Ceres**' between DLR Institute of Planetary Research and Southwest Research Institute (SwRI).  
*Team:* Dr. Katharina Otto (DLR), Dr. Danielle Wyrick (SwRI). \*Due to COVID-19 pandemic, travel funds were suspended indefinitely.

## LEADERSHIP AND MANAGEMENT

- Oct. 2017-  
Feb. '22 - Serving as **secretary** at **Europlanet Diversity committee**. The responsibilities include preparing the documents related to code of conducts, conference guidelines (EPSCs), encourage early career friendly scientific environments and build diverse planetary science community in Europe.
- Sep. 2019-  
April '22 - **Chair of Europlanet Early career (EPEC) Diversity working group**. As first chair, the management responsibilities include leading and organizing discussion, workshops and lectures at EPEC annual meetings (<https://bit.ly/3flwHk3>). Along with team we also started first YouTube series of "EPEC Motivational Journeys" (<https://bit.ly/2PXcfRA>).
- 2019- '20 - **Helmholtz Spokesperson (HeJu) and PhD representative** of DLR Institute of Planetary Research, Berlin, Germany. Representatives from 19 institution around Germany work together with an aim to improvise working conditions of doctoral researchers.
- 2019- '21 - **Elected as committee member of Geo.X Young Academy** at the research network of Geoscience community in Berlin and Potsdam.
- 2012- '13 - **Lead member** in organizing 8 workshops and guest lectures at Center for Environments planning and technology (CEPT University).

## FELLOWSHIPS, SCHOLARSHIPS AND AWARDS

- 2018- '22 - **DLR/DAAD PhD Research Fellow** for pursuing Ph.D at DLR and FU Berlin.
- 2021 - Student travel grant to present talk at **Geological Society of America (GSA)**.
- 2020- '21 - **USA-DAAD (USA-German) PPP Grant** to carry out joint short-term research project entitled 'Volatile Outgassing in Mass-wasting Processes on Vesta and Ceres' at DLR and SwRI (San Antonio).
- 2020 - **Winner** of button design organized by Geological Society of America, Planetary Geology Division (PGD, <https://community.geosociety.org/pgd/aboutus/pgd-buttons>).
- 2018 - **Europlanet Student Bursary** to attend the European Planetary Science Congress (EPSC) on Sep 16-21.
- 2017 - **Royal Astronomical Society (RAS)** grant for presentation at European Planetary Science Congress (EPSC) on Sept 17-22.
- 2016- '17 - **Chevening fully-funded Royal Scholarship** to pursue Master at University of Bristol, UK.
- 2013 - **Best Graduating Student in Overall performance** during Masters at CEPT University.

## INVITED TALKS

- 2021 - '**Nature of localised pond deposits on Vesta**' in session: Exploring Small Bodies throughout the Solar System, GSA 2021 Portland, Oregon, 10-13 October.

- 2020 - 'Planetary science and GIS' Webinar series at Faculty of Technology, CEPT University, June 18.

## PROFESSIONAL NETWORKS

- 2021 - Student member of **Geological Society of America (GSA)**.  
2020 - Student member of **American Geophysical Union (AGU)**.  
2019 - **Secretary** of Europlanet Diversity committee and **Chair** of Early Career (EPEC) Diversity working group of Europlanet Society.  
2018 - Member of **Royal Astronomical Society (RAS)**.

## RESEARCH EXPEDITIONS, FIELD ANALOGUE STUDIES, TRAININGS

- 2019 - **Vulcano International Summer School** - On Planetary and Ocean Exploration dated June 11-21 at Vulcano Islands, Italy. During the summer school, we successfully produced 3D maps of landslides, compare them with planetary objects, collected sulfur samples and analyze them using spectral tools to understand the volatile outgassing activities.  
2016 - **Field visit to Volcano- Mt. Fuego and Acatenango in Guatemala**. During this visit we trained ourselves in sample collections, analyzing the samples, building the chronology of eruption events, measured the sulfur outgassing using remote sensors.  
2015 - **Mars Orbiter Mission (MOM) Data Analysis Workshop**, Physical Research Laboratory Dept. of Space, Ahmedabad, India dated 4-5 Sep.  
2013 - Applied Geoinformatics for Society and Environment International Workshop & International Society for Photogrammetry and Remote Sensing Workshop.

## SKILLS

- Programming** - C, C++, IDL.  
**GIS** - Quantum GIS, ArcMap & ArcScene.  
**Image processing softwares** - ISIS, Ames Stereo Pipeline, ENVI, ERDAS, RAT, Nest, PolSARpro, Tarang, SARscape.  
**Mission data proficiency** - *Cassini-Huygens Datasets*: Imaging Science Subsystem (NAC, WAC data), Visible and Infrared Mapping Spectrometer. *Mars Datasets*: Mars Reconnaissance Orbiter (CTX, HiRISE, MOLA), Mars Express (HRSC). *Dawn mission datasets*: Framing Camera (HAMO, LAMO, extended phase), Visible and infrared spectrometer (VIS). *Haybusa2 datasets*: MASCOT lander (MASCAM data). *RISAT-1 mission*: SAR C-band data.

## WHITE PAPER PUBLICATIONS

1. Co-author in *The Importance of Field Studies for Closing Key Knowledge Gaps in Planetary Science*, (2021), White paper submitted to in Planetary Science. Bulletin of the AAS, 53(4).

DOI: [10.3847/25c2cfcb.0a087f9f](https://doi.org/10.3847/25c2cfcb.0a087f9f).

2. Co-author in *Science Motivations for the Future Exploration of Ceres, Community white paper for the Planetary Decadal Survey 2023-2032*. Bulletin of the AAS, American Astronomical Society, 2021, 53 (4) DOI: [10.3847/25c2cfcb.542c3be2](https://doi.org/10.3847/25c2cfcb.542c3be2), hal-03391895f.

## PUBLICATIONS IN PEER-REVIEWED JOURNALS

1. Longobardo, A., Carrozzo, F.G., Galiano, A., Scully, J.E.C., **Parekh, R.**, Palomba, E., De Sanctis, M.C., Ammannito, E., Raponi, A., Tosi, F., Ciarniello, M., Zambon, F., Rognini, E., Capria, M.T., Raymond, C.A., Russell, C.T., (2022), *Spectral Analysis of Ceres' Main Linear Features*. Minerals, 12(8), 1013. DOI: [10.3390/min12081013](https://doi.org/10.3390/min12081013)
2. **Parekh, R.**, Otto, K. A., Jaumann, R., Hauber, E., Russell, C.T. Raymond, C.A., *Small-scale pit chains on Ceres and their relation with surface regolith*. Submitted to Icarus. (Under Review).
3. **Parekh, R.**, Matz, K.D., Otto, K.A., Jaumann, R., Krohn, K., Roatsch, T., Kersten, E., Elgner, S., Raymond, C.A., Russell, C.T., (2021b), *Formation of ejecta and dust pond deposits on asteroid Vesta*. JGR: Planets, 126, e2021JE006873. DOI: [10.1029/2021JE006873](https://doi.org/10.1029/2021JE006873).
4. **Parekh, R.**, Otto, K.A., Jaumann, R., Matz, K. D., Roatsch, T., Kersten, E., Elgner, S., Raymond, C.A., (2021a), *Influence of Volatiles on Mass Wasting Processes on Vesta and Ceres*. JGR: Planets, 126(3). DOI: [10.1029/2020JE006573](https://doi.org/10.1029/2020JE006573).
5. Otto, K.A., Matz, K.D., Schröder, S.E., **Parekh, R.**, Krohn, K., Honda, R., Kameda, S., Jaumann, R., Schmitz, N., Stephan, K., Sugita, S., Tatsumi, E., Ho, T-M., Koncz, A., Trauthan, F., Cho, Y., Hayakawa, M., Honda, C., Kouyama, N., Matsukoa, M., Morota, T., Ogawa, K., Preusker, F., Sakatani, N., Sawada, H., Scholten, F., Suzuki, H., Yamada, M., Yokota, Y., Yoshioka, K., (2021), *Surface roughness of asteroid (162173) Ryugu and comet 67P/Churyumov-Gerasimenko inferred from in situ observations*. Monthly Notices of the Royal Astronomical Society, 500(3), 3178-3193. DOI: [10.1093/mnras/staa3314](https://doi.org/10.1093/mnras/staa3314).
6. Brož, P., Bernhardt, H., Conway, S.J., **Parekh, R.**, (2020), *An overview of explosive volcanism on Mars*. Journal of Volcanology and Geothermal Research, 107125. DOI: [10.1016/j.jvolgeores.2020.107125](https://doi.org/10.1016/j.jvolgeores.2020.107125).
7. Jaumann, R., Schmitz, N., Ho, T-M., Schröder, S., Otto, K.A., Stephan, K., Elgner, S., Krohn, K., Preusker, F., Scholten, F., Biele, J., Ulamec, S., Krause, C., Sugita, S., Matz, K.D., Roatsch, T., **Parekh, R.**, Mottola, S. Grott, M., Michel, P., Trauthan, F., Koncz, A., Michaelis, H., Lange, C., Grundmann, J.T., Maibaum, M., Sasaki, K., Wolff, F., Reill, J., Moussi-Soffys, A., Lorda, L., Neumann, W., Vincent, J-B, Wagner, R., Bibring, J-P, Kameda, S., Kameda, S., Yano, H., Watanabe, S., Yoshikawa, M., Tsuda, Y., Okada, T., Yoshimitsu, T., Mimasu, Y., Saiki, T., Yabuta, H., Rauer, H., Honda, R., Morota, T., Yokota, Y., Kouyama, T., (2019), *Images from the surface of asteroid Ryugu show rocks similar to carbonaceous chondrite meteorites*. Science, 365(6455), 817-820. DOI: [10.1126/science.aaw8627](https://doi.org/10.1126/science.aaw8627).
8. **Parekh, R.A.**, Mehta, R.L., Vyas, A., (2016), *Rabi cropped area forecasting of parts of Banaskantha District, Gujarat using MRS RISAT-1 SAR data*. Int. Arch. Photogramm. Remote Sens. Spatial

Inf. Sci., XLI-B8, 1413–1416. DOI: [10.5194/isprs-archives-XLI-B8-1413-2016](https://doi.org/10.5194/isprs-archives-XLI-B8-1413-2016).

9. **Parekh, R.A.**, Mohan, S., Mehta, R.L., Vyas, A., (2015), *Feature Discrimination Using RISAT-1 Dual Polarisation SAR data*. Journal of Geomatics, 9(2), 245-248.

## PUBLICATION IN PIPELINE

1. **Parekh, R.**, Stephan K., Ciarniello, M., Raponi, A., Frigeri, A., De Sanctis, M. C., *Spectral analysis of bright spots within Occator crater using XM2 data* (in preparation).

## CONFERENCE ABSTRACTS

1. **Parekh, R.**, Otto, K. Jaumann, R., Matz, K-D, Roatsch, T., Kersten, E., Elgner, S., Krohn, K., Raymond, C.A., Russell, A.T., (2020), *Characterizing ponded craters on Vesta*, P023-0001, AGU (Virtual, poster presentation).
2. **Parekh, R.**, Otto, K., Jaumann, R., Matz, K.D., Roatsch, T., Kersten, E., Elgner, S., Krohn, K., Raymond, C.A., (2020), *Ponded craters on Vesta*. EPSC 2020-656(Virtual, poster presentation). DOI: [10.5194/epsc2020-656](https://doi.org/10.5194/epsc2020-656).
3. **Parekh, R.**, Roos, M., Heward, A., (2020), *Narrating stories of struggle, motivation and passion*. EPSC 2020-1046. (Virtual, oral presentation). DOI: [10.5194/epsc2020-1046](https://doi.org/10.5194/epsc2020-1046).
4. Stephan, K., Schröder, S., Baqué, M., Rammelkamp, K., Gwinner, K., Hauber, J., Varatharajan, I., Ortenzi, G., Pisello, A., Sohl, F., Jaumann, R., **Parekh, R.**, Thomsen, L., Unnithan, V., (2020), *Multi-spectral analyses (LIBS, Raman and VIS/NIR) of planetary analogue materials on volcanic deposits (Vulcano Island, Italy)*, Physics of Volcanoes 2020, 11 - 12.02. 2020, Hamburg.
5. **Parekh, R.**, Otto, K., Jaumann, R., Matz, K. D., Roatsch, T., Kersten, E., Preusker, F., Raymond, C. A., (2020), *Comparison of mass wasting processes on Vesta and Ceres*. 51<sup>st</sup> LPSC, LPI Contribution no. 2093. (oral presentation).
6. **Parekh, R.**, Jaumann, R., Schmitz, N., Schröder, S., Otto., K., Stephan, K., Matz, K-D., Wagner, R., Elgner, S., Preusker, F., Scholten, F., Roatsch, T., Trauthan, F., Koncz, A., Ho, T-M., (2019), *Morphology and measurement of fractural dimension of boulders on Ryugu*. 50<sup>th</sup> LPSC, LPI Contribution no. 2132. (oral presentation).
7. Schröder, S. E., Jaumann, R., Schmitz, N., Otto, K. A., Staphan, K., Preusker, F., Elgner, S., Matz, K-D., Roatsch, T., **Parekh, R.**, Mottola, S., Krohn, K., Trauthan, F., Koncz, A., Michaelis, H., Neumann, W., Vincent, J-B, Wagner, R., Sugita, S., (2019), *Ryugu as Seen Close-Up by the MASCOT Camera*. 50<sup>th</sup> LPSC, 18-22 March. LPI Contribution no. 2132 (2450) (oral presentation).
8. **Parekh, R.**, Otto K., Jaumann, R., Matz, K.D., Roatsch, T., Kersten, E., Preusker, F., Raymond, C.A., (2019), *Volatile related mass-wasting features on Ceres and Vesta*. EPSC-DPS2019-1395-1(oral presentation).
9. Otto, K., **Parekh, R.**, Matz, K-D., Jaumann, R., Schröder, S., Schmitz, N., Ho, T-M, Elgner, S., Hamm, M., Honda, R., Kameda, S., Krohn, K., Scholten, F., Senshu, K., Sugita, S., Trauthan, F., (2019), *High-resolution Surface Structures of Asteroid Ryugu Derived from*

*MasCam Observations*. EPSC-DPSC2019-628-1 (poster presentation).

10. Otto, K., **Parekh, R.**, Matz, K-D., Jaumann, J., Krohn, K., Stephan, L., Schmitz, N., Ho, T-M, Elgner, S., Hamm, M., Honda, R., Kameda, S., Preusker, F., Scholten, F., Schröder, S., Senshu, H., Sugita, S., Trauthan, F., (2019), *Small-scale surface roughness of Ryugu*. Asteroid Science in the Age of Hayabusa2 and OSIRIS-REx, 5-7 Nov., LPI contribution no. 2189.
11. **Parekh, R.**, Shukla, A., *Nature of cone distribution at aureole of Olympus Mons, Mars*, (2018), EPSC2018-753 (poster presentation).
12. **Parekh, R.**, Otto, K., Jaumann, R., (2018), *Investigation of Mobility-related Surface Features on Asteroids and their Relation to Volatiles*. EPSC2018-626 (poster presentation).
13. **Parekh, R.**, Teanby, N., (2017), *Study of rootless cones on Olympus Mons Aureole, Mars*. EPSC, Riga, Latvia, Vol.11, EPSC2017-566 (poster Presentation).
14. **Parekh, R.**, S., Vijayan, B., Sivaraman, (2016), *Landslide Phenomena on Saturn's Icy Moon: Rhea. Enceladus and Icy Moons of Saturn*, Boulder, Colorado, USA, 3055.

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