SAGAR P PARAJULI

Santee, CA 92071

heal.sdsu.edu | Google Scholar ID | +1 858 283 6580 | psagar@utexas.edu

EXPERTISE/SKILLS

- Climate modeling and numerical weather prediction (WRF/WRF-Chem, CESM), climate dynamics, extreme climate
- Extreme heat (heatwaves) and heat risk modeling (Wet Bulb Globe Temperature)
- Environmental remote sensing, satellite data analysis, and field monitoring
- Air pollution monitoring and forecasting (natural and anthropogenic aerosols, particular matter)
- Big data analysis, supervised and unsupervised machine learning, artificial neural network (ANN), hierarchical linear models, logistic regression, time-series analysis, principal component analysis (PCA), multivariate empirical orthogonal function (MV-EOF)

EDUCATION

PhD, Geosciences (Adviser: Zong-Liang Yang, GPA: 3.87/4.0)

May 2016

The University of Texas at Austin, Jackson School of Geosciences

M.Sc., Water and Environmental Engineering (GPA: 3.87/4.0)

May 2012

Masdar Institute, Abu Dhabi, UAE (A cooperative program with MIT)

B.E., Civil Engineering

Sep 2005

Tribhuvan University, Lalitpur, Nepal

WORK EXPERIENCE

Research Scientist/Adjunct Faculty

Oct 2023 – present

Department of Geography, San Diego State University, San Diego, California

- Developed workflows for running the WRF (Weather Research and Forecasting) model in hindcast and forecasting modes on the Expanse supercomputer (SDSC) and local Linux clusters
- Streamlined access to ~80 TB of Earth and atmospheric data, enabling advanced analysis for researchers and scientists.
- Modeled farmworkers' risk of heat stress using a regional climate model (WRF) at high spatiotemporal resolution (1 km, hourly) with correlation up to 0.99 with station-derived values
- Developed a Python-based model to forecast Wet Bulb Globe Temperature (WBGT) achieving over 98% accuracy
- Used gridded climate model outputs to identify heatwaves and air pollution episodes and predict health outcomes by collaborating with interdisciplinary teams of epidemiologists, mathematicians, physicists and statisticians
- Installed heat stress sensors in the Imperial Valley to complement community-based data collection initiatives

Atmospheric Scientist

Feb 2023 – Aug 2023

CW3E, Scripps Institution of Oceanography, University of California, San Diego

- Conducted West-WRF model verification study
- Carried out aerosol-aware and lightning simulations with West-WRF

Research Scientist (PI: Georgiy Stenchikov)

Sep 2019 – Feb 2023

King Abdullah University of Science and Technology (KAUST), Saudi Arabia

- Successfully handled and analyzed large-scale climate datasets including General Circulation Models (GCMs) outputs (e.g., CMIP5/CMIP6) comprising terabytes of data (~ 180 TB) to understand past and future climate scenarios
- Improved rainfall prediction in WRF by incorporating dust-cloud interactions
- Used LIDAR, sun photometer, and airborne data to improve simulation of aerosol vertical profiles
- Tested the sensitivity of boundary conditions, resolutions, and various parameterization schemes on WRF model's performance in understanding climate variability
- Modeled particulate matter (PM) concentrations across the Arabian Peninsula using WRF-Chem with skill scores above ~ 0.9
- Mentored undergraduate and graduate researchers equipping them with essential skills in Exploratory Data Analysis (EDA)

Postdoctoral Researcher (PI: Charles Zender)

June 2016 – Aug 2017

Department of Earth System Science, University of California, Irvine

- Developed global dust source maps using machine learning technique (supervised) on satellite RGB data
- Utilized geospatial tools and Geographic Information Systems (GIS) to integrate satellite and land cover data, enabling comprehensive spatial analysis and visualization of dust sources at regional and global scales
- Conducted air quality forecast of Salton Sea region under a climate change scenario

Graduate Research Assistant/Teaching Assistant

Aug 2012 – May 2016

The University of Texas at Austin, Jackson School of Geosciences

- Analyzed extensive Big Earth Data from climate models, reanalyses (NCEP, ECMWF, MERRA2, NARR), Satellite data (MODIS, TEMPO, CALIPSO, SEVIRI) and meteorological observations, and processed ~ 50 TB of data in supercomputers (Stampede/Ranger) leading to identification of significant regional and global climate patterns
- Developed an algorithm using Multivariate Empirical Orthogonal Function (MV-EOF) to separate coarse and fine mode aerosols from satellite and reanalysis data with ~ 95% explained variance
- Developed a multiple regression model to predict dust storms
- Conducted wind tunnel experiments at USDA (Lubbock) and UT-Austin
- Conducted lab sessions for GEO 302C/391/371T and managed courses in Canvas/Blackboard
- Conducted global simulation of dust using Community Earth System Model (CESM) at NCAR, Boulder, CO
- Mentored two undergraduate students at UT Austin, 2012-2015

Graduate Research Assistant

Sep 2010 – May 2012

Masdar Institute, Abu Dhabi, UAE

District Engineer

Dec 2006 – Aug 2010

Department of infrastructure and agricultural roads (DoLIDAR), Lalitpur, Nepal

- Implemented infrastructure projects in hydropower, buildings, water supply, irrigation, and roads
- Procured construction works and materials in internationally funded infrastructure projects (e.g., Asian Development Bank, World Bank)

Lecturer

July 2006 – Dec 2006

Western Region Engineering Campus, Tribhuvan University, Pokhara, Nepal

- Taught civil engineering courses for undergraduate and diploma level students
- Supervised a project work on hydropower development

GRANTS/PROPOSALS

- Khargonekar, P. (Lead Editor) and **Parajuli S. P.** (Deputy Lead Editor), Editorial Board Leadership for editing California's Fifth Climate Change Assessment Report, $350K, California Governor's Office of Land Use and Climate Innovation (LCI) (active).
- **Parajuli S. P. (PI)**, Biggs, T., Quintana, P., Perez, M. A. Z., de Sales, F., Shen, S., Development of a high-resolution air quality forecast model (1-km) for agricultural regions of Southern California, $1.05M, NOAA, 2025-2028 (pending)

- Perez, M. A. Z., **Parajuli, S. P. (Co-PI)**, Nara, A., Li, H., Regional Challenges: Air quality and extreme heat in the Southwest Region, $500K, NSF, 2025-2028 (Pending)
- Axisa D., Monache L. D., **Parajuli S. P. (Co-PI)**, Advancing precipitation enhancement strategies for hydropower generation in California, $1.5M, California Energy Commission (CEC), 2023-2027 (not funded).
- Stenchikov, G., **Parajuli S. P. (Co-PI)**, Rain enhancement through sea breeze circulation enhancement, $1.5M, UAE-REP, 2022-2025 (not funded).

SOFTWARE SKILLS

- Python, MATLAB, FORTRAN, NCL, Github, GrADS, CDO, Bash, Matplotlib, Seaborn, Plotly, SQL, Jupyter Notebook, Scikit-Learn, Pandas, Numpy, Google Colab, Google Cloud Shell, Amazon Web Services (AWS), ArcGIS, MS Office

TECHNICAL TRAININGS

- IBM Data Science Professional Certificate issued by Coursera; certificate viewable at: https://coursera.org/share/8e9bc23d4edd268c529fdbc882ff348d
- Design Thinking for Innovation (University of Virginia, through Coursera)
- Logical Framework based Project Cycle Management (30 days)
- Public Audit Training (3 days)
- Insurance Surveyor's Training (4 days)
- Environmental Modeling and Risk Assessment using RBCA
- Water supply and sanitation project design (7 days)
- Life cycle assessment using SimaPro

SELECT PUBLICATIONS

1. **Parajuli, S.P.**, Biggs, T., Galvez, N.L. et al. Heat-related rest-break recommendations for farmworkers in California based on wet-bulb globe temperature. Commun Earth Environ 6, 359 (2025). https://doi.org/10.1038/s43247-025-02327-9
2. **Parajuli, S.P.** et al. (2024). Impact of irrigation on farmworker's heat stress in California differs by season and during the day and night. Commun Earth Environ 5, 787 (2024). https://doi.org/10.1038/s43247-024-01959-7.
3. Thompson, C.F., Jones, C., Biggs, T, …**Parajuli, S.,** Ciborowski, H, McMahon, C. A (accepted). Climatology of Summertime Wet Bulb Globe Temperature in California's Imperial Valley. Journal of Applied Meteorology and Climatology.
4. Malik, A., Stenchikov, G., Mostamandi, **S., Parajuli, S.**, Lelieveld, J., Zittis, G., et al. (2024). Accelerated historical and future warming in the Middle East and North Africa. Journal of Geophysical Research: Atmospheres, 129, e2024JD041625. https://doi.org/10.1029/2024JD041625.
5. **Parajuli, S. P.**, et al. (2023). Simulation of a dust-and-rain event across the Red Sea using WRF-Chem. Journal of Geophysical Research: Atmospheres, 128, e2022JD038384. https://doi.org/10.1029/2022JD038384
6. **Parajuli, S. P.** et al. (2022). Effect of dust on rainfall over the Red Sea coast based on WRF-Chem model simulations, Atmos. Chem. Phys., 22, 8659–8682, https://doi.org/10.5194/acp-22-8659-2022, 2022.
7. Lopatin, A., Dubovik, O., Fuertes, D., Stenchikov, G., Lapyonok, T., Veselovskii, I., Wienhold, F. G., Shevchenko, I., Hu, Q., and **Parajuli, S.** (2021), Synergy processing of diverse ground-based remote sensing and in situ data using GRASP algorithm, Atmos. Meas. Tech., 14, 2575–2614, https://doi.org/10.5194/amt-14-2575-2021
8. Mostamandi, S., Predybylo, E., Osipov, S., Zolina, O., Gulev, S., **Parajuli, S.**, and Stenchikov, G. (2021), Sea breeze geoengineering to increase rainfall, Journal of Hydrometeorology, 23(1), pp. 3-24, https://doi.org/10.1175/JHM-D-20-0266.1
9. **Parajuli, S. P.,** et al. (2020), Aerosol vertical distribution and interactions with land/sea breezes from lidar data and high-resolution WRF-Chem simulations, Atmospheric Chemistry and Physics, https://doi.org/10.5194/acp-2020-444
10. **Parajuli, S. P.**, Stenchikov, G. L., Ukhov, A., and Kim, H. (2019), Dust emission modeling using a new high-resolution dust source function in WRF-Chem with implications for air quality, Journal of Geophysical Research: Atmospheres, 124, https://doi.org/10.1029/2019JD030248 (Recognized by Wiley as top downloaded paper in 2018-2019)
11. Jin, Q., J. Wei, B. Pu, Z.-L. Yang, **S. P. Parajuli** (2018), High aerosol loadings over the Arabian Sea in summer and their transport pathways (2018), Journal of Geophysical Research: Atmosphere, 123, https://doi.org/10.1029/2018JD028588
12. **Parajuli, S. P.** and C. Zender (2018), Projected changes in dust emissions and regional air quality due to the shrinking Salton Sea, Aeolian Research, 33, 82-92, https://doi.org/10.1016/j.aeolia.2018.05.004

13. **Parajuli, S. P**. and C. Zender (2017), Connecting geomorphology to dust emission through high-resolution mapping of global land cover and sediment supply, Aeolian Research, 27, pp. 47-65, https://doi.org/10.1016/j.aeolia.2017.06.002
14. **Parajuli, S. P.** and Z.-L. Yang (2016), Understanding dust emission in the Bodélé region using principal component analysis, Aeolian Research, 24, pp. 105-113, https://doi.org/10.1016/j.aeolia.2017.01.001
15. **Parajuli, S. P.**, T. Zobeck, G. Kocurek, Z.-L. Yang, and G. Stenchikov (2016), New insights into the wind-dust relationship from wind tunnel experiments, Journal of Geophysical Research: Atmosphere, 121, https://doi.org/10.1002/2015JD024424
16. **Parajuli, S. P.**, D. Lawrence, and Z.-L. Yang (2016), Diagnostic evaluation of the Community Earth System Model in simulating mineral dust emission with insight into large-scale dust storm mobilization in the Middle East and North Africa (MENA), Aeolian Research, 21, pp. 21-35, https://doi.org/10.1016/j.aeolia.2016.02.002
17. Shi, M., Z.-L. Yang, G. Stenchikov, **S. P. Parajuli**, W. Tao, and S. Kalenderski (2015), Quantifying the Impacts of Landscape Heterogeneity and Model Resolution on Dust Emissions in the Arabian Peninsula, Environmental Modeling and Software, 78, pp. 106-119, https://doi.org/10.1016/j.envsoft.2015.12.021
18. **Parajuli, S. P.**, Z.-L. Yang, and G. Kocurek (2014), Mapping erodibility in dust source regions based on geomorphology, meteorology, and remote sensing, Journal of Geophysical Research: Earth Surface, 119, pp. 1,977-1,994, https://doi.org/10.1002/2014JF003095
19. **Parajuli, S. P.**, I. Gherboudj, and H. Ghedira (2013), The effect of soil moisture and wind speed on aerosol optical thickness retrieval in a desert environment using SEVIRI thermal channels, International Journal of Remote Sensing, 34 (14), pp. 5,054-5,071, https://doi.org/10.1080/01431161.2013.788262
20. **Parajuli, S. P.**, M. Naizghi, B. Warshay, and H. Arafat (2011), A comparative Life Cycle Assessment (LCA) of Using Virgin Crushed Aggregate (VCA) and Recycled Waste Concrete Aggregate (RCA) in Road Construction, International Conference on Water, Energy and Environment, Sharjah, UAE, https://doi.org/10.13140/2.1.3835.5841

CONFERENCE/TALKS

- Oral/poster presentation in *AGU Fall Meeting*, San Francisco/Washington DC, 2024, 2015, 2014, 2011
- Guest lecture on 'Geoengineering and cloud seeding', GEOG 360: Human Dimensions of Climate Change, SDSU, Oct 2024.
- Invited talk on Heat Stress modeling in irrigated lands of Imperial Valley, NCAR, Boulder, June, 2024
- Invited talk on Heat Stress Mapping (Imperial Valley) at Geography Colloquium, San Diego State University, March, 2024
- Selected as a Science Translator and gave a lightning talk to assembly members on the environmental issues around Salton Sea and Imperial Valley at a CCST event, State Capitol, Sacramento, Feb, 2024
- Invited talk on Climatic impact of atmospheric aerosols, UC Santa Barbara, Oct, 2023
- Invited key-note speaker at UAE Rain Enhancement Program webinar, Sep, 2022
- Virtual presentation in EGU General Assembly 2020
- Poster presentation in *The 9th International Workshop on Duststorms*, Tenerife, Spain, 2018
- Poster presentation in *Jackson School Research Symposium*, Austin, Texas, USA, 2015, 2013
- Guest lecturer for GEO 391 (Climate: Past, Present, and Future), UT-Austin, 2015
- Poster presentation in *DUST2014*, Castallaneta, Marina, Italy, 2014
- Poster presentation in *Graduate Climate Conference*, MIT, Cambridge, USA, 2013
- Oral/poster presentation in *IGARSS*, Munich/Vancouver, 2012, 2011
- Poster presentation in *AGU Fall Meeting*, San Francisco, USA, 2011

AWARDS/GRANTS

- Marshall Endowed Presidential Scholarship, The University of Texas at Austin**,** 2016
- Graduate School Summer Fellowship, Jackson School of Geosciences, 2015
- Travel grant, Graduate Climate Conference, MIT, MA, 2013
- Travel Grant, IGARSS, Munich, Germany, 2012
- Five-years guaranteed funding for graduate studies (GRA/TA), UT-Austin (PhD), 2012–2017

- Merit-based Full Graduate Scholarship, Masdar Institute (M.Sc.), 2010-2012
- Full scholarship for B.E. (civil) program, IOE, Pulchowk, Nepal, 2001–2005
- Best Scorer Award (School Leaving Certificate), 2000

LANGUAGES

Nepalese (native), English (fluent), and Hindi (fluent)

PROFESSIONAL SERVICES

- Deputy Lead Editor, California's Fifth Climate Change Assessment Report
- Editorial board member, Communications Earth & Environment (Nature Publishing), 2022-present
- Proposal reviewed for National Science Foundation (NWF): Geoscience Directorate, 2025
- Judge of the S³ Student Symposium, San Diego State University, March, 2024
- Guest associate editor, Frontiers in Environmental Science, 2021
- Proposal reviewed for National Science Foundation (NSF): Environmental Sustainability, 2021
- Reviewer of Research Open Week at KAUST (Sustainability Theme), 2021
- Reviewed proposal on "Aerosol modeling" for Pazy Foundation, 2018
- Reviewer for journals: Atmospheric Chemistry and Physics (ACP), Journal of Geophysical Research, Scientific Reports (Nature Publishing), Geophysical Research Letters (GRL), Science of the Total Environment, Geoscientific Model Development, Aeolian Research, International Journal of Climatology, Geosciences, International Journal of Remote Sensing (IJRS), Journal of Advances in Modeling Earth Systems
- Member of American Geophysical Union (AGU), European Geosciences Union (EGU), and Nepal Engineering Council (NEC)

EXTRA-CURRICULAR SERVICES

- Mentored one visiting graduate student at UC San Diego and one postdoc at KAUST, 2022-23
- Mentored four high-school students under the WISE (3) and SRSI (1) summer internship program at KAUST, 2022
- Mentor of winter online workshop "Writing Support (TU-20/21)", Tribhuvan University, 2020-2021
- Member of Parent Advisory Committee, The KAUST School, Thuwal, Saudi Arabia, 2019-2021
- Coordinated a fund-raising event at UT Austin for the victims of Nepal Earthquake, 2015
- Founded "Writing Club" at Jackson School of Geosciences, 2012-2015
- Mentored two undergraduate students at UT Austin, 2012-2015
- Member of "PhD best speaker award committee" at Jackson School of Geosciences, 2014
- Worked as a part-time Library Assistant for two semesters at Masdar Institute Library, 2011
- Coordinator of 'Civil Engineering Exhibition', IOE, Lalitpur, Nepal, 2004