NAVIN THAPA
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Center for Earthquake Research and Information
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CONTACT

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EDUCATION

PhD in Earth Sciences (Concentration: Geophysics), Center for Earthquake Research and Information, Department of Earth Sciences, The University of Memphis, TN, USA — **2021-Present**
Topic: A comprehensive study of microseismicity, b-value, pore pressure, and repeating seismic events during seismic cycles: insight from laboratory experiments
Advisor: Dr. Thomas Goebel, Assistant Professor

MSc. in Geology (Concentration: Engineering Geology), Central Department of Geology, Tribhuvan University, Kathmandu, Nepal — **2015-2017**
Thesis: Frequency Dependent Damage Pattern in Kathmandu Valley Due to Mw 7.8 Gorkha Earthquake
Advisor: Dr. Subesh Ghimire, Associate Professor, CDG, Tribhuvan University

BSc. in Geology (Concentration: Geology, Physics and Mathematics), Tri-Chandra Multiple Campus, Tribhuvan University, Kathmandu, Nepal — **2010 -2013**

RESEARCH EXPERIENCES

Doctoral Research Assistant — **January 2021 – Present**

Organization: Center for Earthquake Research and Information, The University of Memphis
Research: Laboratory earthquakes and physics of faulting, statistics of micorseismicity, induce seismicity, fault friction, repeating earthquakes, volcano monitoring, seismic network management, real time processing of volcano seismicity of Santa Ana Volcano, El Salvador.

RESEARCH INTEREST

- Earthquake physics
- Induced seismicity
- Field Seismology
- Volcano seismicity
- Regional Seismicity
- Data science

PUBLICATIONS

- **Thapa N**, Pandey K, Ghimire S, Acharya KK (2020) Frequency Dependent Damage Pattern in Kathmandu Valley Due to Mw 7.8 Gorkha Earthquake. J Geol Geophys 9:471.10.35248/2381-8719.20.9.471

CONFERENCE ABSTRACTS

- Goebel, T., Kwiatek, G., Davidsen, J., **Thapa, N.**, Georg, D., (2023) Micro-Seismicity Clustering, Aftershock Decay and b-Values During Laboratory Fracture and Stick-Slip Experiments, Annual Meeting 2023 Seismological Society of America, V.94, 2B, pp.1152.
- Thapa, N., Dresen, G., & Goebel, T. (2023). Does b-value Increase with Higher Pore Pressure? AGU23.
- Pandey, K., **Thapa, N.**, Dresen, G., & Goebel, T. (2023). Repeating Micro-Seismic Events on Laboratory Faults with Different Roughness and Gouge Composition. AGU23.
- Hosain, Alamgir, Thomas Goebel, Sonia Bazargan, **Navin Thapa**, Sadia Marium Rinty, Khadija Nadimi, Hadi Heydarizadeh Shali, and Kuruvitage Chameera Silva. "Dynamic Triggering of Earthquakes in the Central and Eastern USA." AGU23 (2023).
- Durga Acharya, **Navin Thapa**, Subarna Dhakal, Indra Lamsal, Prakash Luitel, M Kaj Johnson (2023). Surface Roughness Evaluation in Anisotropic Rocks. AGU Annual Meeting 2023.

RESEARCH PROJECT

Contributor to the NSF-Supported Project **March 2023 - Present**

Project Title: CAREER: From slow to fast, micro to macro, single events to cascades: A multi-scale study of seismic event triggering in lab and nature.
Award Number: 2142489
Principal Investigator: Dr. Thomas Goebel
Total Intended Award Amount: $611,610.00

Field Geologist to the NSF-Supported Project **June 2015 – August 2016**

Project Title: RAPID: Collaborative Research: Nepal Array Measuring Aftershock Seismicity Trailing Earthquake (A Joint project of Oregon State University, University of Texas at El Paso and Department of Mines and Geology)
Award Number: 1545933
Principal Investigator: Dr. Marianne Karplus
Total Intended Award Amount: $131,790.00
Main Activity: Assisting in deployment of seismometer and maintenance of stations, geological inspection of seismic station site. Deployed an array of 41 broadband and short-period seismometers and 14 strong motion sensors across eastern and central Nepal after 2015 Mw 7.8, Gorkha Earthquake.

ACADEMIC RESEARCH PROJECTS

2023 Sep. – Dec.	Develop python program for “Dynamic Triggering of Earthquakes in the Central and Eastern USA”
2022 Jan. - May	Processing of Seismic Reflection Survey Data of Sugar Creek Fault Area, West Tennessee
2022 Jan. - May	Denoising seismic signal using deep autoencoder
2022 Jan. - May	Seismic event location using Grid-search and Monte Carlo Techniques for Acoustic Emission recorded in laboratory shear experiment

2021 Sep. -Dec.	Development of python function for estimation of Gutenberg-Richter b-value from maximum likelihood method
2021 Sep. -Dec.	Short Time Fourier Transform and Continuous Wavelet Transform of Laboratory Earthquake
2021 Sep. -Dec.	Construction and calibration of Seismograph using Raspberry Pi System
2021 Jan. - May	Probabilistic Seismic Hazard Assessment of Nepal Himalayan Region
2021 Jan. - May	Inversion of bouguer gravity anomaly data using Newton's and Monte Carlo method Performed with a set of Bouguer gravity anomaly data of intrusive and volcanic rock near Grand Marais (Northeast of Minnesota).
2021 Jan. - May	Review of application of machine learning to Earth science special focus on seismology

SCHOLARSHIPS AND GRANT

- Doctoral Research Assistantship, The University of Memphis, 2021 – Present
- Travel Support, Distributed Acoustic Sensing RCN Workshop, Madison, Wisconsin, EarthScope. June 13 – 14, 2023.
- Travel Grant, 2022 Crustal Deformation Modeling Workshop, Colorado School of Mines in Golden, Colorado. June 20-24, 2022.
- Merit Scholarship, Center Department of Geology, Tribhuvan University, 2015 – 2017

SCHOLARLY ACITVITES

Chief Editor, GEOWORLD: Student's Journal Volume V, Department of Geology, Tri- Chandra Multiple Campus, Ghantaghar. (2014).

PROFESSIONAL ASSOCIATION

Student Member, American Geophysical Union, (2022 – Present)
Student Member, Seismological Society of America, (2022 – Present)
Student Member, Society of Exploration Geophysicist, (2022 – Present)
Life Member, Nepalese Society of Engineering Geologists, Kathmandu, Nepal (2019)
Life Member, Nepal Geological Society, Kathmandu, Nepal (2018)

SKILLS

Programming Languages: Python, MATLAB
Seismic Network: SeisComP 5.5 for seismic data acquisition, processing, distribution, and interactive analysis.
Geophysics program: Seismic Unix (SU), Seismic Analysis Code (SAC), Generic Mapping Tools (GMT), RES2DINV, SeisImager/2D, SeisImager/SW
Graphis and mapping software: ArcGIS, CorelDraw, Microsoft office, Surfer, Grapher,
Language: English, Nepali, Hindi, Doteli (Local Language)

PROFESSIONAL EXPERIENCE

Graduate Research Assistant
CERI, UNIVERSITY OF MEMPHIS, MEMPHIS, TN, USA **08/2019 – PRESENT**

- Systematized SeisComP Server for automatic data acquisition, real time processing, waveform archiving, event detection and location.
- Maintained seismic network using SeisComP for real-time monitoring of earthquakes and other seismic events (Long period, volcano tremor etc.)
- Deployed seismic network of 7 seismometer instrument for monitoring of volcano seismicity in Santa Ana Volcano Santa Ana, El Salvador.

- Instrumented transient strain and acoustic emission measurements in laboratory-scale earthquake experiments.
- Conducted theoretical studies on earthquake physics, including investigations of pore pressure and microseismicity statistics.
- Created and investigated repeating earthquakes in laboratory stick-slip experiments.
- Utilized seismic velocity monitoring and interferometry techniques to study lab and natural earthquakes.
- Applied digital image processing techniques to analyze laboratory slip behavior and capture bulk strain distribution information.

Co-Founder, Geophysicist
MANIFOLD CONSULT PVT. LTD. 08/2018-12/2020

Conducted Geophysical Investigation: Electrical Resistivity Tomography Survey (ERT), Vertical Electrical Sounding, Seismic Refraction Tomography Survey (SRT), Multichannel Analysis of Surface Wave Survey (MASW), Microtremor Array Measurement (MAM), Data Acquisition, Analysis and Interpretation, and Report Writing. Worked directly with clients to ensure scope is clearly defined and understood, disseminating to Manifold personnel for technical support, overseeing and managing implementation to meet scope, schedule, and budget constraints. Conducted geologic and engineering analyses including soil and rock slope stability, rock mass characterization, block modeling, and liquefaction analyses.

Completed Projects:

2020

- 1D-MAM, 1D-MASW, 2D-SRT, 2D-ERT and Engineering Geological mapping of Fushrekhola-Gunikhola Road Tunnel, Pokhara and Syangja.
- 1D-MASW and 2D-SRT of Tiplyang Kaligandaki Hydroelectric Project, Mayagdi.
- 2D-Electrical Resistivity Tomography and 2D-MASW survey for bridge foundations at Kathmandu-Terai Fast Track Project (Package CP-6 and CP-7), Makwanpur District.
- 2D-Electrical Resistivity Tomography of Marsyangdi-3 HPP, Lamjung and Tanahun Districts.
- 2D-MASW Survey for Arun Hub Priority Transmission Line Project, Sankhuwasabha, Bhojpur, Dhankuta and Sunsari District.
- 2D-MASW Survey and 2D-Electrical Resistivity Tomography of Hongu Khola HPP, Solukhumbhu District.
- 2D-Electrical Resistivity Tomography of Lower Indrawati HEP, Sindhupalchowk District.
- 2D-MASW Survey and 2D-Electrical Resistivity Tomography of Lower Doodh Khola HPP (65 MW), Manang District.
- Geological and Geophysical investigation (2D-SRT, 2D-ERT) of Dharan-Leuti Road Tunnel, Dhankuta and Sunsari District.
- Geophysical investigation (2D-ERT) of Hongshi-Shivam Mine Belt Tunnel Project, Nawalparasi District.

2019

- Geophysical (2D-ERT) and geotechnical studies around British Gurkhas Nepal Headquarters area, Lalitpur.
- Geophysical Investigation (2D-ERT and 2D-MASW) of Thuligad Khola Hydropower Project, 17 MW, Doti.
- Geophysical Investigation (2D-ERT) for identification of potential groundwater source identification at various water supply projects of Water Supply and Sanitation Division Office, Rupandehi.
- Geophysical Investigation (2D-MASW) for obtaining geotechnical parameters at various water supply projects, Nawalpur.

- Geophysical Investigation (2D-ERT) for identification of potential groundwater source identification at Custom Office Premises, Kakarvitta, Jhapa.
- Geophysical Investigation (2D-ERT) for identification of potential groundwater source identification of Dhulabari Water Supply Project, Jhapa.
- Geophysical Investigation (2D-MASW) of hostel area of Sankha Devi Secondary School, Majhimtar, Dhading.
- Geophysical Investigation (2D-ERT) of Langtang HPP, 100 MW, Rasuwa.
- Geophysical Investigation (2D-MASW and 2D-SRT) of Upper Sardi Khola HPP, Kaski.
- Geophysical (2D-ERT) and Geological Investigation of proposed structure area of Kunda Himalayan Nest, Solukhumbu.
- Geophysical Investigation (2D-MASW) of slide prone area of Bhotekoshi Hydropower Transimission Tower 11A, 11B, Sindhupalchowk.
- Geophysical and Geotechnical Investigation of Nyasim Khola Hydropower Project, 35 MW, Sindhupalchowk.
- Geophysical, Geological Investigation and Construction Material Survey of Chepe Doodhpokhari HPP, 8.8 MW, Gorkha.

2018

- Geophysical and Engineering Geological Investigation of landslide prone area of Baglung Water Supply area, Baglung Bazar.
- Geophysical Investigation (2D- ERT and 2D-MASW) of BICC area for exploration of potential subsidence.
- 2D-ERT Survey for Groundwater Exploration, Changunarayan Municipality, Bhaktapur.
- 2D-MASW Survey for potential subsidence zone identification, British Gurkha Camp Area, Lalitpur.
- 2D-ERT Survey for Groundwater Exploration, Khimti & Gunsi Bhadaure, Sunakothi R.M. – 01, Ramechhap, Nepal.
- Geophysical Investigation (2D-ERT and 2D-MASW) of Upper Piluwa 3 Hydropower Project (4.9 MW).
- 2D-ERT Survey for Groundwater Exploration, Tripura Sundari R.M., Dhading, Nepal.
- Seismic hazard analysis of Dhap Dam project, Bagmati River Basin Improvement Project, Government of Nepal, Ministry of Urban Development.
- Geophysical Investigation of Sunkoshi –II (1,110 MW) and Sunkoshi-III (536 MW) projects.
- Seismic hazard analysis of Bhaktapur Municipality.
- Geophysical (Seismic and Resistivity) Investigation of Railway Alignment Package – 04, Across the Shivganga, Chaumala, and Gauriganga River, Kailali, Nepal
- 2D-ERT Survey for Groundwater Exploration, Ninali, Ajaymeru, Dadeldhura, Nepal
- 2D-ERT Survey for Groundwater Exploration Kanakot, Ajaymeru-06, Dadeldhura, Nepal
- 2D-ERT Survey for Groundwater Exploration Chipur, Ajaymeru-04, Dadeldhura, Nepal
- Study of Role of Rainwater filled recharge pits and ponds to increase the yield of existing spring sources using 2D-ERT Geophysical Method
- Geophysical Survey (2D-ERT) of Midim Khola HEP, Lamjung, Nepal
- Geophysical Survey (2D-ERT) of Banepa Domestic Airport, Kavere , Nepal
- Engineering Geological site investigation and geophysical survey of Sindhuli – Khurkot Road Tunnel
- Engineering Geological site investigation and geophysical survey of Kulekhani – Bhimphedi Road Tunnel
- Engineering Geological site investigation and geophysical survey of Pokhara – Baglung Road Tunnel

- Engineering Geological site investigation and geophysical survey of Butwal – Narayanghat Road Tunnel at Daunni Khanda.
- Engineering Geological site investigation and geophysical survey of Lamabagar Road Tunnel

Project Geologist
ERMC GEOTECH PVT. LTD. 04/2018-08/2018

Geological Mapping, Geo-technical Investigation and testing materials, Engineering Geological Investigation, Data Analysis and Interpretation, and Report Writing. Assisted geologic and hydrologic studies, including fieldwork, and other hydrologic, geologic, and geophysical tasks both locally and nationally. East West Railway Project; Sunkoshi Hydropower Project

Completed Projects:

- Feasibility Study of East-West Electrified Railway Project, Package-03
- Geotechnical Study of Siwa Khola Hydropower Project, 9.3 Mega Watt
- Geotechnical Study of Simbuwa Khola Hydropower Project, 70.34 Mega Watt

Assistant Geophysicist
CENTER FOR GEO-ENVIRONMENT AND ENGINEERING RESEARCH PVT. LTD.
11/2016-04/2018

Investigates and measures seismic, electrical properties of affecting earth, Geophysical data analysis and interpretation, report writing, geological and engineering geological investigation of various projects.

- Electrical Resistivity Tomography (ERT) and Seismic Refraction Tomography (SRT) Survey of Upper Rukum Gadh Hydropower Project, Rukum Nepal
- ERT and SRT Survey of Nalgadh Hydroelectric Project (404 MW), Jajarkot, Nepal
- Geological, Geophysical and Geotechnical Study of Dandkharka Landslide, Dolakha
- ERT and SRT survey of Inkhu Khola Small Hydropower Project (20MW), Solukhumbu, Nepal
- ERT and SRT Survey of Lower Hongu Khola Small Hydropower Project (23.5 MW), Solukhumbu, Nepal

CONSULTING WORK AS A GEOLOGIST

2017

- **Organization and Location:** Diksha Consulting and Training Pvt. Ltd., Ghattekulo, Kathmandu
  Project: Feasibility Study for Relocation of Settlement at Kerauja VDC, Gorkha.
- **Organization and Location:** Development Support Consult Pvt. Ltd., Sinamangal, Kathmandu
  Project: Feasibility Study for Relocation of Settlement at Khalde Village, Rasuwa
- **Organization and Location:** National Synergy Engineering Solutions Pvt. Ltd., Sinamangal, Kathmandu
  Project: Feasibility Study for Relocation of Settlement at Dhikure, Nuwakot.

2016

- **Organization and Location:** MULTI Disciplinary Consultants (P) LTd. , Kathmandu, Nepal
  Project: Survey and Study Preparation of Master Plan of Jure Landslide for Mitigation Measures, Sindhupalchowk, Nepal.
- **Organization and Location:** Sitara Consult Pvt. Ltd., Pulchowk, Kathmandu, Nepal
  Project: 1. Engineering Geological study and Site Investigation of Kulechaur Primary School, Sindhupalchowk, Rehabilitation of Earthquake Affected Schools in Sindhupalchowk. **2.** Engineering Geological study and Site Investigation of Helambu Primary School, Sindhupalchowk, Rehabilitation of Earthquake Affected Schools in Sindhupalchowk, Nepal, CARITAS. **3.** Engineering Geological study and Site Investigation of Sorbodaya Lower Secondary School, Sindhupalchowk, Rehabilitation of Earthquake Affected Schools in Sindhupalchowk, Nepal, CARITAS

2015

- **Organization and Location:** Soil Investigation and Solution Pvt. Ltd., Thapathali, Kathmandu, Nepal
  Project: Engineering Geological Site Investigation and Drilling for Dangote Cement Plant Site, Hetauda, Makwanpur.

2014

- **Organization and Location:** Barjugadh Microhydro Pvt. Ltd.
  Project: Engineering Geological Mapping and Mitigating Measures for Barjugaad Landslide, Bajura District, Far-western Nepal.