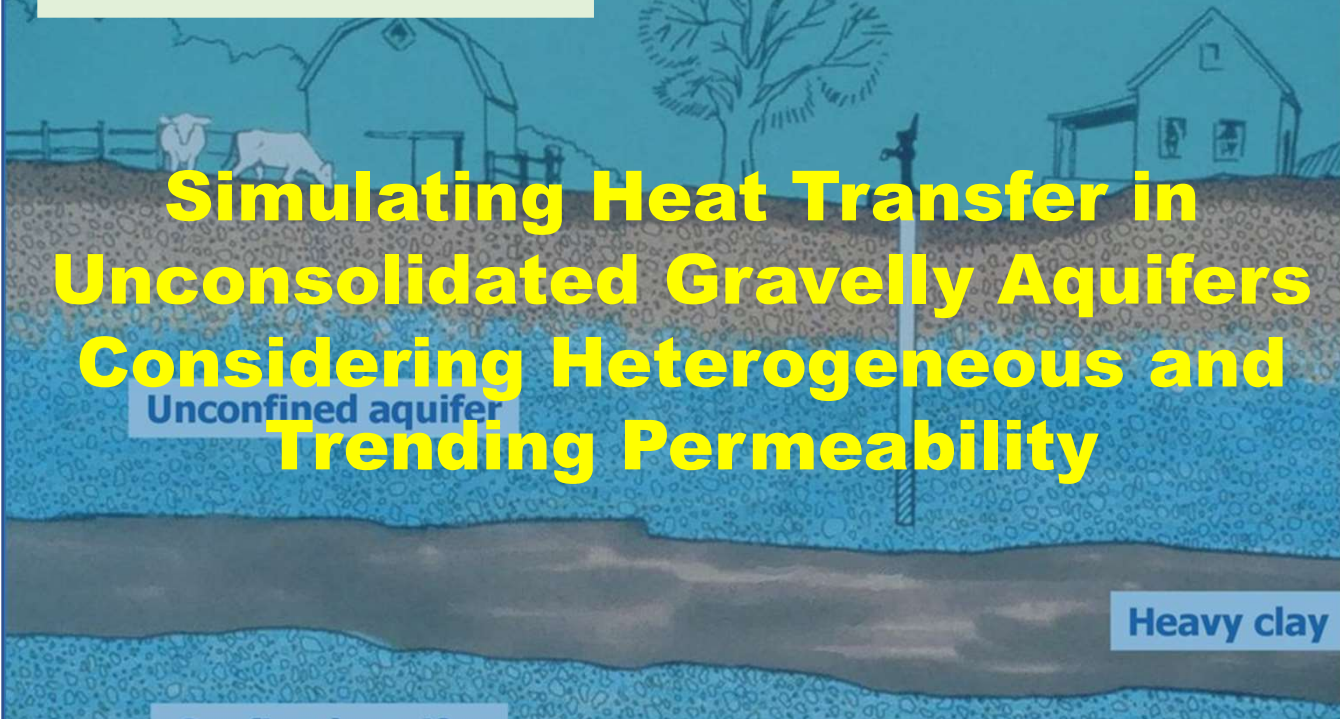




# Simulating Heat Transfer in Unconsolidated Gravelly Aquifers Considering Heterogeneous and Trending Permeability



## Dr. Yoshitaka Sakata

Associate Professor, College of Geoscience and Civil Engineering, Kanazawa University, Japan

In unconsolidated gravelly aquifers, which serve as shallow reservoirs in sedimentary basins, identifying preferential pathways for mass and heat transfer is particularly challenging due to the heterogeneous and trending permeability. Geostatistical methods offer advantages over deterministic approaches to realize heterogeneity considering spatial correlation of variables.

The lecturers demonstrated the elucidation of transitional heterogeneity, particularly vertical trends derived from in-situ data, in the gravel layers of the Toyohira River alluvial fan, Japan. Sensitivity analysis of these trends was conducted using sequential Gaussian simulation, showing that the most plausible permeability distributions—those that aligned observed and simulated temperatures—were obtained only under trending heterogeneity conditions. The results further indicated that while numerical approaches are effective in identifying preferential groundwater pathways in gravelly aquifers, their accuracy is constrained by the availability of calibration data.

**14<sup>th</sup> Nov, 2024**

**4.00 PM IST**

**Google Meet link**

[meet.google.com/gns-powt-gzd](https://meet.google.com/gns-powt-gzd)

Dial-in: (US) +1 575-567-3152

PIN: 192 607 722#

### Host

**Prof. (Dr.) A. K. Sinha**

*Vice-President (Asia), IAH Council  
President, INC-IAH*

*Founder Vice-Chancellor, CSMU  
Navi Mumbai*

*groundwater2008@gmail.com*



### Moderator

**Prof. (Dr.) B. S. Chaudhary**

*Secretary, INC-IAH*

*Professor of Geophysics,*

*Kurukshetra University*

*bschaudhary@kuk.ac.in*



**INC of IAH**

[www.inciah.org](http://www.inciah.org)

Meeting Admin:

Dr Ashok Kumar

M: 9818174707

E: [ashok.kumar@inciah.org](mailto:ashok.kumar@inciah.org)

Meeting coordinator:

Dr Ashwani Kumar Tiwari

M: +91 95076 86521

E: [ashwani.enviro@gmail.com](mailto:ashwani.enviro@gmail.com)





# About Speakers

## Dr. Yoshitaka Sakata

Dr. Yoshitaka Sakata worked as a professional hydrogeologist after graduating from Kyoto University, Japan in March 1998, and received his Ph.D. in Science on March 2013 at Hokkaido University. He started his academic career in a laboratory in the university's faculty of engineering for research regarding shallow geothermal energy utilization in February 2015. He is currently an associate professor in the College of Geoscience and Civil Engineering, Kanazawa University, Japan, from October 2021. He was also a visiting professor at the University of British Columbia, Canada, for international collaboration during 2020-2023. Dr. Sakata has delivered a lot of scientific papers and conference presentations, including respectable paper awards from the Japan Society of Civil Engineering (2019) and the Geothermal Research Society of Japan (2021). He has also published texts regarding geostatistics and the technology of ground-source heat pump systems.

## Program Schedule

16:00 - 16:02 (IST): Welcome to Speaker

16:02 - 16:07 (IST): Welcome speech by Prof A K Sinha, *Vice President (Asia), IAH Council and President (INC-IAH)*

16:07 - 16:10 (IST): Introduction of Speaker by Prof. (Dr.) B. S. Chaudhary, *Secretary, INC-IAH*

16:10 - 16:55 (IST): Lecture by Dr. Yoshitaka Sakata, *Associate Professor, College of Geoscience and Civil Engineering, Kanazawa University, Japan*

16:55 - 17:10 (IST): Question Answer

17:10 - 17:15 (IST): Vote of Thanks by Dr Ashwani Kumar Tiwari. *Executive Member, INC-IAH*

