



# Laboratory of hydraulic Structures and GeoEnvironmental engineering EGGs

2024 spring version



## OUR MOTTO

*Pursuit of Knowledge and Technology for Future Generations*

Several *keywords* we have are



### REPRESENTATIVE RESEARCH TOPICS:

- Quantification of groundwater and solute transport phenomena in heterogeneous aquifers
- Development of eco-friendly construction materials and high-performance concrete
- Diagnosis of surface and subsurface dams using machine learning and artificial intelligence

# Research topics



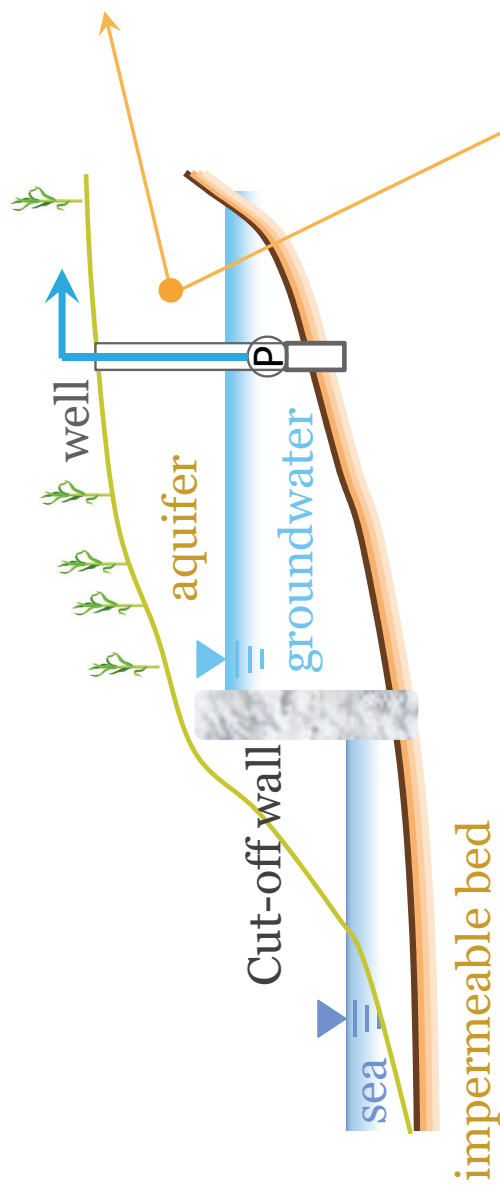


## OUR RESEARCH TOPICS

### SUBSURFACE DAM

We have a research field in KIKAI island, Kagoshima prefecture in order to clarify the water and solute transport phenomena and to contribute an effective management of subsurface dam reservoir. Laboratory scale experiments related to salt water intrusion and solute transport in highly heterogeneous porous formations are also conducted.

## Subsurface dams



Groundwater is stored within these pores.



Subsurface dam is a wall structure designed to dam up the **groundwater flow** and store groundwater in a suitable geological formation and contribute to the increase of agricultural production and sustainable water use.

## OUR RESEARCH TOPICS



### UNIQUE CONCRETE

The deficit of natural sand arises the need of alternative materials for replacement of natural sand. As for concrete structure, we explore the utilization of **crushed stone** powder which is locally available stone waste material. This study is expected to reduce the material cost and construction cost and **to promote the SDGs**. We are also developing some concrete materials involving porous concrete and fiber-reinforced concrete.





## OUR RESEARCH TOPICS



### ARTIFICIAL INTELLIGENCE

Seepage rate through, below, or around dams is **an essential indicator of the health and condition of the dam**. Any abrupt change in the amount of leakage may be a serious sign of deterioration of dam body. We aim to create an artificial intelligence capable of predicting seepage rate and giving an alert for dam management.



## Meet our professors and students







**Dr. Mariko SUZUKI**

Assistant Professor

- Eco-friendly construction materials
- High performance concrete
- Embankment

## Professors



**Dr. Kazuya INOUE**

Professor

- Seepage & solute transport
- Inverse analysis & random walk theory
- Machine learning & artificial intelligence

## Meet our students

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Kentarou ISHIMOTO, M2

Comparison of flowability reduction of high-water content **muddy soil** improved by powdery by-products



Yui TAKEUCHI, M2

Development of diagnosis function test of **subsurface dam**

*Maeslant Barrier, Hoek van Holland, The Netherlands*



Momoko MAKINO, M2

Application of **persistent homology** to limestone porosity identification by artificial intelligence



Naoki YAMASHITA, M2

**Non-Fickian** and anomalous solute transport phenomena

## Meet our students

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Hokuto OKABE, M1

Chaos and fractal

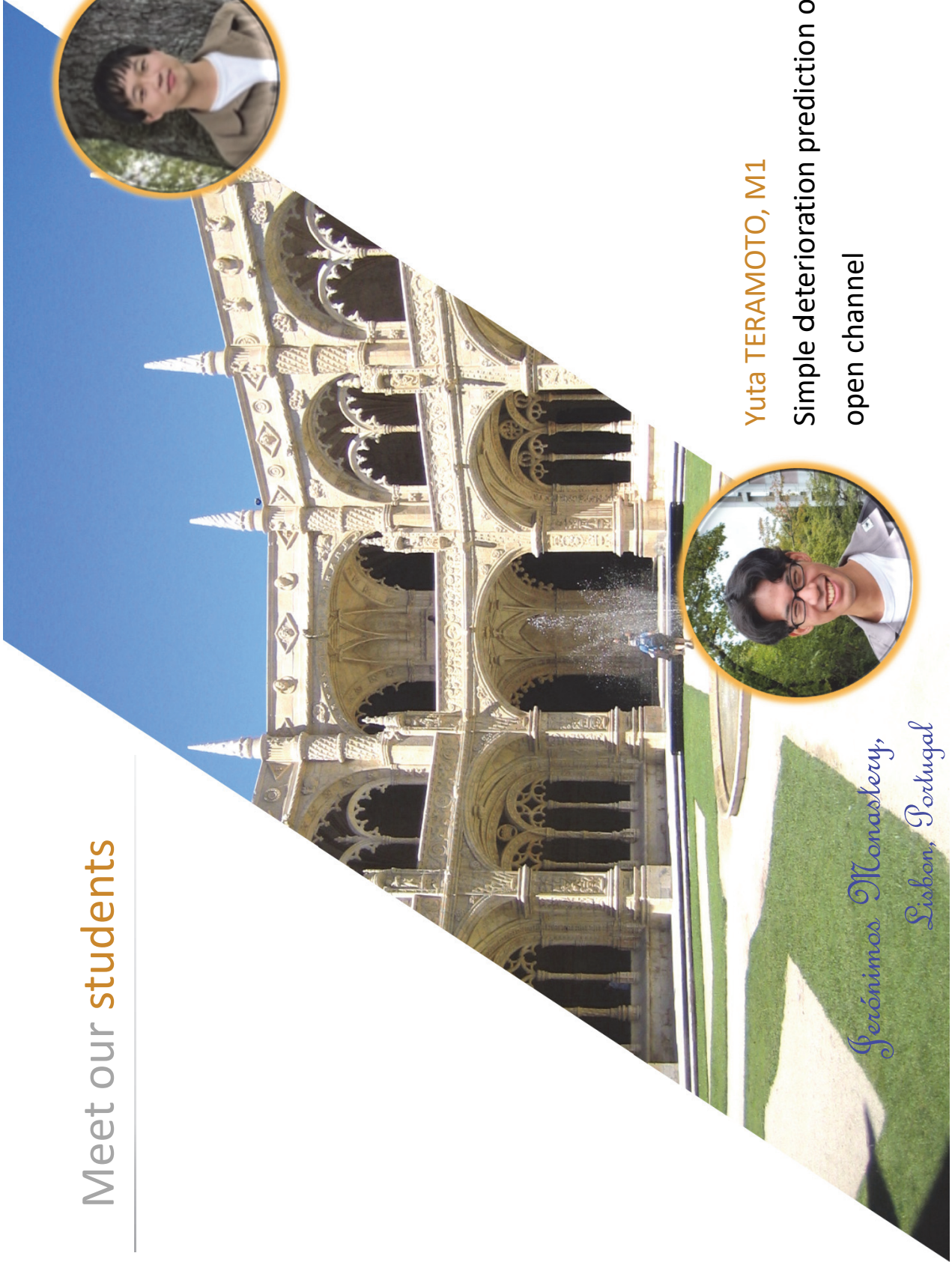
hydraulic conductivity  
modeling



Yuta TERAMOTO, M1

Simple deterioration prediction of concrete  
open channel

*Jerónimos Monastery,  
Lisbon, Portugal*



# Meet our students



**Shun INOUE, B4**

Alerting water resources in aquifer  
using **artificial intelligence**



**Tamami KOMOIKE, B4**

Mechanical properties of crashed stone  
dehydrated cake treated by **cement**



*Oscar Fredrik Church,  
Solhemburg, Sweden*



**Kanako FUJIEDA, B4**

Spatial health diagnosis of  
rockfill dams using **hammering  
sounds**



**Honatsu FUJITA, B4**

Identifying aquifer characteristics  
using **swarm intelligence**

Get in touch with us!



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URL: <https://www.research.kobe-u.ac.jp/ans-hysteng/index.html>

