

# International Conference on Coupled Processes in Fractured Geological Media: Observation, Modeling, and Application A Virtual Conference

**CouFrac2020  
goes virtual**



## Invitation

The International Conference on Coupled Processes in Fractured Geological Media: Observation, Modeling, and Application invites you to Seoul, Korea, November 11-13, 2020. The conference, in succession of the 1st one in Wuhan, China in 2018, will focus on new and exciting advances in all areas of coupled processes associated with fractured geological media, including numerical methods, in-situ tests, lab experiments and applications to different subsurface engineering activities. The CouFrac2020 consists of oral and poster presentations, a panel discussion on nuclear waste disposal, keynote presentations and special sessions of emerging young scientists. Due to continued uncertainties surrounding the ongoing COVID-19 pandemic, we have made decision to hold CouFrac2020 as a virtual conference. The online virtual conference platform will facilitate better opportunities, in addition to your great savings of travel time and registration fee, of interactions between presenters, audiences and participants and ubiquitous access to recorded video presentations in CouFrac2020. For further detail information, please visit the Conference website. We look forward to meeting you in Seoul or our virtual conference platform.

Chair of the Conference,  
*Jonny Rutqvist* (LBNL)

Co-Chairs of the Conference,  
*Antonio Rinaldi* (ETH Zürich),  
*Hideaki Yasubara* (Ehime University)

Chairs of Local Organizing Committee,  
*Ki-Bok Min* (SNU),  
*Eui-Seob Park* (KIGAM)

## CONTACT INFORMATION

**Prof. Hyung-Mok Kim** (Sejong University)  
Secretary General of the Conference  
E-mail: hmkim@sejong.ac.kr

**Dr. Linmao Xie** (SNU)  
Co-Secretary General of the Conference  
E-mail: xielinmao@snu.ac.kr

Website <http://www.coufrac2020.org>

## CALL FOR PAPERS

Every subject area of coupled thermal-hydro-mechanical-chemical (THMC) processes in fractured geological media are invited to submit. Extended abstract (2-4 pages) is still open for the one who could not submit the abstract.

## VENUE

Held online from Global Education Center for Engineers (GECE) Convention, Seoul National University, Seoul, Korea

## IMPORTANT DATES

- **Sept. 1**, Registration opens
- **Oct. 1**, Deadline for Extended abstract submission

## REGISTRATION FEE

- Registration **before Oct. 1, 2020** (ISRM Delegate / Non-ISRM Delegate / Student): \$185 / \$245 / \$85
- Registration **after Oct. 1, 2020** (ISRM Delegate / Non-ISRM Delegate / Student): \$235 / \$295 / \$115

## PUBLICATION

Selected papers will be published in a special issue of 'Geomechanics for Energy and the Environment' after a review.

## TENTATIVE PROGRAM

- **November 11 (Wed)** : Keynote lectures, General sessions, Panel discussion
- **November 12 (Thu)** : Keynote and Chin-Fu Tsang Award lectures, General sessions
- **November 13 (Fri)** : Plenary Sessions of Emerging Scientists, Keynote lectures, General sessions

## KEYNOTE SPEAKERS



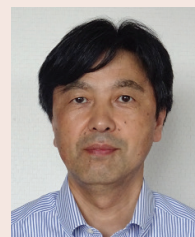
**Inga Berre**  
(U. of Bergen, NORWAY)  
Mathematical and numerical modeling of coupled subsurface dynamics due to fluid injection in fractured formations



**Emily Brodsky**  
(U. of California, Santa Cruz, USA)  
Permeability that changes over time



**Tomasz Hueckel**  
(Duke U., USA)  
Phenomenological versus mechanism modeling of multiphysics coupling in fracturing geomaterials



**Takatoshi Ito**  
(Tohoku U., JAPAN)  
A breakthrough in rock stress measurement applicable deep and high temperature environment



**Chun'an Tang**  
(Dalian U. of Technology, CHINA)  
TOUGH-RFPA: A coupled thermal-hydro-mechanical rock failure process analysis simulator



**Ki-Bok Min**  
(Seoul National U., KOREA)  
*Ove Stephansson memorial lecture:* Outstanding issues in coupled process for engineering fractured rock mass at depth

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**PANEL DISCUSSION**

**Past, current and future of coupled processes in fractured rock:** Nuclear waste disposal research as the main driver for research and development on coupled processes in fractured rocks over the past 40 years



Host  
**Jonny Rutqvist**  
(LBNL, USA)



**Gilles Armand**  
(ANDRA, FRANCE)



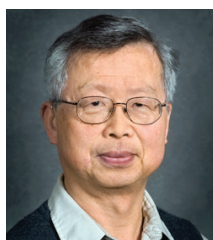
**Jens Birkholzer**  
(LBNL, USA)



**Diego Mas Ivars**  
(SKB, SWEDEN)



**Haeryong Jung**  
(KORAD, KOREA)



**Chin-Fu Tsang**  
(Uppsala U., SWEDEN)



**Ju Wang**  
(Beijing Research Institute of Uranium Geology, CHINA)



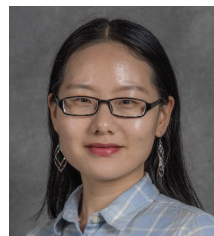
**Hideaki Yasuhara**  
(Ehime U., JAPAN)

**PLENARY SESSION FOR EMERGING SCIENTISTS**



**Kyung Won Chang**  
(SNL, USA)

Multiphysics-based assessment of geological hazards associated with subsurface energy activities



**Mengsu Hu**  
(LBNL, USA)

Modeling coupled processes in fractured media at multiple scales



**Takuya Ishibashi**  
(AIST, JAPAN)

Static / Dynamic characteristics of permeability structure within the fractured rocks



**Peter K Kang**  
(U. of Minnesota, USA)

Predicting fluid flow and reactive transport in fracture media across scales



**Yusuke Mukuhira**  
(Tohoku U., JAPAN)

The physics of induced seismicity discovered by geomechanics and microseismic analysis



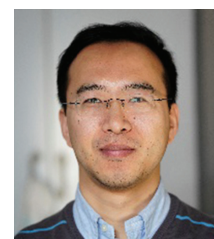
**Jung-Wook Park**  
(KIGAM, KOREA)

Continuum and discontinuum approaches for modeling thermal, hydrological and mechanical processes in rock



**Fengshou Zhang**  
(Tongji U., CHINA)

Modeling hydraulic fracturing complexity in naturally fractured rock masses: challenge and opportunity



**Zhihong Zhao**  
(Tsinghua U., CHINA)

Coupled stress / damage-flow-heat / solute transport processes in rock fractures

**CHIN-FU TSANG COUPLED PROCESSES AWARD**

The Award was established to recognize outstanding contribution of an early career geoscientist to THMC coupled processes in fractured geological media. The winner will be presented a certificate as well as a honorarium to support his/her travel to the Conference. An award lecture by the recipient will be given during the Conference.

**CouFrac BEST PAPER AND POSTER AWARDS**

Prizes will be awarded to the authors of best papers and posters with certificates.

**SHORT COURSES**

Two days short courses on 9th (Mon) and 10th (Tue)

- **CrunchFlow / CrunchClay**, Carl I. Steefel (LBNL) & Christophe Tournassat (BRGM)
- **Reservoir geomechanics**, Maurice B. Dusseault (U. of Waterloo)



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**SPECIAL SESSIONS**

- **Scientific machine learning applications for coupled processes in the subsurface**  
- Conveners: Hongkyu Yoon(SNL), Hoonyoung Jeong (SNU)
- **Development of coupled processes and their validation in nuclear wastes disposal (DECOVALEX)**  
- Conveners: Alexander Bond (Quintessa Ltd), Changsoo Lee (KAERI)

**SESSIONS**

- **Coupled Thermo-Hydro-Mechanical-Chemical (THMC) processes in single fractures**  
- Conveners: Zhihong Zhao, Yuedu Chen
- **Advances in computation of coupled processes in fractured media across scales: numerical modeling and machine learning**  
- Conveners: Mengsu Hu, Adriana Paluszny, Pania Newell, Shaojun Li, Laura Blanco Martin
- **Mechanics of induced seismicity: managing complexity from lab to field scale**  
- Conveners: Víctor Vilarrasa, Roman Makhnenko, Francesco Parisio, Qi Li
- **Coupled multiphysics during coal gas and shale gas extraction**  
- Convener: Wancheng Zhu
- **Numerical modelling of long term THM coupled processes in fractured hard rock**  
- Convener: Diego Mas Ivars
- **Coupled THM hard rock fracture behaviour – laboratory experiments and numerical modelling**  
- Convener: Diego Mas Ivars
- **Coupled THM field experiments in fractured hard rock**  
- Conveners: Diego Mas Ivars, Shaojun Li, Jeoung Seok Yoon
- **Advances in fluid injection induced shear slips on natural fractures**  
- Conveners: Fengshou Zhang, Li Zhuang, Takuya Ishibashi

- **Mechanics of Hydraulic Fracturing in Naturally Fractured Reservoirs**  
- Conveners: Fengshou Zhang, Li Zhuang, Takuya Ishibashi
- **Coupled seismo-thermo-hydro-mechanical-chemical processes in natural fracture networks: from field observation to numerical simulation**  
- Conveners: Qinghua Lei, Jeoung Seok Yoon
- **Long term behavior of fractured geological media under coupled THMC environment**  
- Convener: Pengzhi Pan
- **Experimental Studies for Fracture Characterization of Rock across Scales**  
- Convener: Pania Newell
- **THMC coupling in geological CO2 storage: from lab to the field scale**  
- Conveners: Roman Makhnenko, Víctor Vilarrasa, Laura Blanco Martin
- **Numerical modelling of coupled thermo-hydro-mechanical processes in fractured rocks**  
- Convener: Bruno Figueiredo
- **Numerical modelling of coupled thermo-hydro-mechanical processes associated with hydraulically induced fracture propagation**  
- Convener: Bruno Figueiredo
- **Numerical modelling of the interaction of coupled thermo-hydro-mechanical processes and complex geological settings and heterogeneities**  
- Convener: Bruno Figueiredo
- **Understanding Individual and Coupled Processes through Geo-architected Materials across Scales**  
- Convener: Pania Newell
- **Advances in discontinuum-based simulation of coupled processes during rock progressive failure**  
- Convener: Andrea Lisjak
- **THMC coupling in clays**  
- Conveners: Christophe Tournassat, Carl I. Steefel
- **Enhanced Geothermal Systems (EGS)**  
- Conveners: Hannes Hofmann & Günter Zimmermann

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**CouFrac2020 GOES VIRTUAL**

- CouFrac2020 will be held fully virtually with simultaneous offline event in Seoul.
- All oral and poster presentations will be available online to the registrants.
- Registration fees have been significantly reduced.
- Effective and efficient interactions among participants will be ensured through special virtual platform.
- Detailed instruction will be available later.