Stanford



Tae Wook (Elliot) Kim

Sr Res Scientist-Physical, Energy Science & Engineering

Curriculum Vitae available Online

CONTACT INFORMATION

- **Alternate Contact**

  Tae Wook Kim

  Email kholy7@gmail.com

Bio

BIO

Please, find more detail information at my linkedin profile (https://www.linkedin.com/in/elliot-taewook-kim/)

SUMMARY

- 20+ years in R&D including petroleum, chemical, carbon capture technology, and hydrology
- 5+ years in consulting for carbon capture and storage (CCS) projects
- Inclusive leadership skills to motivate teams and mentor engineers
- Excellent skills in analytical instruments and scientific software to support scientific findings
- Stellar communication and presentation skills

RESEARCH FIELDS:

Geological carbon sequestration; Carbon capture & separation process; Enhanced oil recovery (EOR) capture methods for unconventional reservoirs; Characterization of reservoirs core; Geospatial data analysis with GIS S/W; Oil Shale maturation under field conditions; Hydraulic fracturing on shale formation; Geotechnical properties of shale; Transport phenomena in porous media

ACADEMIC APPOINTMENTS

- Sr Res Scientist-Physical, Energy Science & Engineering

ADMINISTRATIVE APPOINTMENTS

- Senior Research Scientist, Dept. of Energy Resources Engineering, Stanford University, (2019- present)
- Physical Science Research Scientist, Dept. of Energy Resources Engineering, Stanford University, (2016-2019)
- Physical Science Research Associate, Dept of Energy Resources Engineering, Stanford University, (2012-2016)
- Postdoctoral Fellow, Lawrence Berkeley National Laboratory, (2010-2012)
- Postdoctoral Scholar, Dept of Energy Resources Engineering, Stanford University, (2009-2010)

- Research Assistant, University of Southern California, (2003-2008)
- Senior researcher and assistant manager, Samchully city gas corporation, (1996-2003)

HONORS AND AWARDS

- William H. Brigham Memorial Award, Stanford University (June 2020)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Member, Society of Petroleum Engineers (2010 - present)
- Member, American Geophysical Union (2010 - present)
- Journal reviewer, Journal of Petroleum Science & Engineering, RSC Advances, Journal of Materials Chemistry A, Chemical Communications, Journal of Nanomaterials (2012 - present)

PROFESSIONAL EDUCATION

- BS, Inha University , Chemical Engineering (1994)
- MS, Inha University , Chemical Engineering (1996)
- Ph.D, University of Southern California , Chemical Engineering (2008)

PATENTS

- Tae Wook Kim, Yur-hwal Yun, Hae-joong Kim. "South Korea Patent 2003-0045957 Method of making a plastic pipe used by a magnetic substance", Samchully gas corporation and Cosmos Corporation, Nov 6, 0178

LINKS

- my profile Linkedin: https://www.linkedin.com/in/elliot-tae-wook-kim-4b1807a/

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Current research in Stanford University

I am conducting the improved/enhanced oil recovery process for conventional and unconventional reservoirs. My main interested topic of my research is to maintain oil supply with proper methods depend on the status of oil reservoirs.

Also, geologic sequestration of carbon dioxide (CO2) in oil and gas reservoirs is one option to reduce the amount of CO2 released to the atmosphere. The carbon dioxide injection has been used in enhanced oil recovery (EOR) processes since the 1970s; the traditional approach is to reduce the amount of CO2 injected per barrel of oil produced. This minimizes the purchase cost of CO2. For a sequestration process, however, the aim is to maximize both the amount of oil produced and the amount of CO2 stored. My research effort is to get the maximum CO2 storage in oil field with secure risk analysis.

In addition, carbon sequestration in saline formation is one of tools to complete the Zero-carbon target until 2050. My research interest is laid that the finding an optimal CO2 storage saline formation with techno-economic/geospatial analysis through SIMCSS tool.

Publications

PUBLICATIONS

- **Assessment of CO₂ leakage through existing wells and faults for a prospective storage site in the Southern San Joaquin Basin, California** *INTERNATIONAL JOURNAL OF GREENHOUSE GAS CONTROL*
  Kim, T., Li, Y., Kohli, A. H., Kovscek, A. R.
  2025; 144

- **Impact of supercritical carbon dioxide on the frictional strength of and the transport through thin cracks in shale** *JOURNAL OF ROCK MECHANICS AND GEOTECHNICAL ENGINEERING*
  Al Shafloot, T., Kohli, A., Kim, T., Kovscek, A. R.
  2024; 16 (12): 4990-5003

- **In-situ study of CO2-saturated 2-saturated brine reactive transport in carbonates considering the efficiency of wormhole propagation** *ADVANCES IN WATER RESOURCES*
  Aljawad, M., Kim, T., Al Shafloot, T., Kovscek, A. R.
  2024; 192

- **A Methodology for Fueling Mobility Markets with Hydrogen from Natural Gas plus Carbon Capture and Sequestration** *INTERNATIONAL JOURNAL OF GREENHOUSE GAS CONTROL*
  Okoroafor, E. R., Bracci, J., Boness, N. L., Saltzer, S. D., Shrimali, G., Hennessy, E. M., Kim, T., Seamon, A., Benson, S. M., Zoback, M. D., Kovscek, A. R.
  2024; 133

- **Induced Seismicity Hazard Assessment for a Potential CO₂ Storage Site in the Southern San Joaquin Basin, CA** *GEOHAZARDS*
  Kohli, A., Li, Y., Kim, T., Kovscek, A. R.
  2023; 4 (4): 421-436

- **Scoring, ranking, and technoeconomics of carbon capture and storage opportunities in the central valley of California** *INTERNATIONAL JOURNAL OF GREENHOUSE GAS CONTROL*
  Kim, T., Yaw, S., Kovscek, A. R.
  2023; 128

- **Assessment of oil and gas fields in California as potential CO2 storage sites** *INTERNATIONAL JOURNAL OF GREENHOUSE GAS CONTROL*
  Kim, T., Callas, C., Saltzer, S. D., Kovscek, A. R.
  2022; 114

- **Assessment of oil and gas fields in California as potential CO2 storage sites** *International Journal of Greenhouse Gas Control*
  Kim, T., Callas, C., Saltzer, S. D., Kovscek, A. R.
  2022; 114 (103579)

- **Laboratory hydraulic stimulation experiments to investigate the interaction between newly formed and preexisting fractures** *INTERNATIONAL JOURNAL OF ROCK MECHANICS AND MINING SCIENCES*
  Abe, A., Kim, T., Horne, R. N.
  2021; 141

- **Application of Digital Volume Correlation to X-ray Computed Tomography Images of Shale** *ENERGY & FUELS*
  Kim, T., Yun, W., Kovscek, A. R.
  2020; 34 (11): 13636–49

- **Permeability and Porosity Evolution of Organic-Rich Shales from the Green River Formation as a Result of Maturation** *SPE JOURNAL*
  Kim, T., Ross, C. M., Guan, K. M., Burnham, A. K., Kovscek, A. R.
  2020; 25 (3): 1377–1405

- **Investigating fracture propagation characteristics in shale using sc-CO2 and water with the aid of X-ray Computed Tomography** *Journal of Natural Gas Science and Engineering*
  Al Shafloot, T., Kim, T., Kovscek, A. R.
  2020

- **Recovery efficiency of a 28 degrees API crude-oil system as a function of voidage replacement ratio** *JOURNAL OF PETROLEUM SCIENCE AND ENGINEERING*
  Kim, T., Vittoratos, E., Kovscek, A. R.
  2019; 175: 1063–87

- **The Effect of Voidage-Displacement Ratio on Critical Gas Saturation** *SPE JOURNAL*
  Kim, T., Kovscek, A. R.
  2019; 24 (1): 178–99

- **An Experimental Investigation of Viscous-Oil Recovery Efficiency as a Function of Voidage-Replacement Ratio** *SPE JOURNAL*
  Kim, T. W., VITTORATOS, E., Kovscek, A. R.
  2016; 21 (4): 1236-1253
- **Characterization of scalar mixing in dense gaseous jets using X-ray computed tomography** *EXPERIMENTS IN FLUIDS*
  Dunnmon, J., Sobhani, S., Kim, T. W., Kovscek, A., Ihme, M.
  2015; 56 (10)
- **The Role of Boundary Conditions And Characteristic Length On Imbibition in Both Sandstones And Limestones** *SPE Western North American and Rocky Mountain Joint Meeting*
  Kim, T., Kovscek, A.
  2014
- **Brine film thicknesses on mica surfaces under geologic CO2 sequestration conditions and controlled capillary pressures** *WATER RESOURCES RESEARCH*
  Kim, T. W., Tokunaga, T. K., Bargar, J. R., Latimer, M. J., Webb, S. M.
  2013; 49 (8): 5071-5076
- **Capillary pressure and saturation relations for supercritical CO2 and brine in sand: High-pressure P-c(S-w) controller/meter measurements and capillary scaling predictions** *WATER RESOURCES RESEARCH*
  Tokunaga, T. K., Wan, J., Jung, J., Kim, T. W., Kim, Y., Dong, W.
  2013; 49 (8): 4566-4579
- **Wettability Alteration of a Heavy Oil/Brine/Carbonate System with Temperature** *ENERGY & FUELS*
  Kim, T. W., Kovscek, A. R.
  2013; 27 (6): 2984-2998
- **Thickness measurements of nanoscale brine films on silica surfaces under geologic CO2 sequestration conditions using synchrotron X-ray fluorescence** *WATER RESOURCES RESEARCH*
  Kim, T. W., Tokunaga, T. K., Shuman, D. B., Sutton, S. R., Newville, M., Lanzirotti, A.
  2012; 48
- **Transport Phenomena in Functional Hydrotalcite Membranes: Carbon Dioxide Selective and Proton Conductive Membranes**
  Kim, T.
  LAP Lambert Academic Publishing.2012
- **Hybrid Hydrotalcite-Sulfonated Poly(ether ether ketone) Cation-Exchange Membranes Prepared by in situ Sulfonation** *INDUSTRIAL & ENGINEERING CHEMISTRY RESEARCH*
  Kim, T. W., Sahimi, M., Tsotsis, T. T.
  2011; 50 (7): 3880-3888
- **Effect of polystyrene on the morphology and physical properties of silicon carbide nanofibers** *MATERIALS CHEMISTRY AND PHYSICS*
  Elyassi, B., Kim, T. W., Sahimi, M., Tsotsis, T. T.
  2009; 118 (1): 259-263
- **INDUSTRIAL & ENGINEERING CHEMISTRY RESEARCH** *The Preparation and Characterization of Hydrotalcite Thin Films*
  Tae Wook Kim, M. Sahimi, T. T. Tsotsis
  2009; 48 (12): 5794
- **The preparation and characterization of hydrotalcite micromembranes** *CHEMICAL ENGINEERING SCIENCE*
  Tae Wook Kim, M. Sahimi, T. T. Tsotsis
  2009; 64 (7): 1585
- **Industrial & Engineering Chemistry Research** *Preparation and Characterization of Hybrid Hydrotalcite-Sulfonated Polyetheretherketone (SPEEK) Cation-Exchange Membranes*
  Tae Wook Kim, M. Sahimi, T. T. Tsotsis
  2009
- **INDUSTRIAL & ENGINEERING CHEMISTRY RESEARCH** *Study of CO2 diffusion and adsorption on calcined layered double hydroxides: The effect of particle size*
  M. Dadwhal, Tae Wook Kim, M. Sahimi, T. T. Tsotsis

2008; 47 (16): 6150

- **Preparation of Hydrotalcite Thin Films Using an Electrophoretic Technique** *INDUSTRIAL & ENGINEERING CHEMISTRY RESEARCH*
  Tae Wook Kim, M. Sahimi, T. T. Tsotsis
  2008; 47 (23): 9127

PRESENTATIONS

- Interpretation Of Spontaneous Imbibitions With Different Boundary Conditions And Characteristic Lengths On Both Sandstones And Limestones. - 2014 SPE Western North America and Rocky Mountain Joint Regional Meeting (4/14/2014 - 4/18/2014)
- In situ visualization on cores with different boundary conditions through X-ray computed tomography scanner (CT-Scanner) during spontaneous imbibition - The AGU Annual Meeting (12/11/2014)
- Thickness of Nanoscale Brine Films on Mineral Surfaces Under Geologic CO2 Sequestration Conditions Measured with Synchrotron X-ray Fluorescence - The AGU Annual Meeting (12/4/2012)
- Brine Films Thickness on Silica Surfaces Under High Pressure Geologic CO2 Sequestration Conditions Measured with Synchrotron X-ray Fluorescence - The AGU Annual Meeting (12/6/2011)