

# The Center for Geothermal Studies

## CGS GOALS

The University of Southern California Center for Geothermal Studies (USC CGS):

- Promotes excellence in geothermal research and development by offering a multi-disciplinary program in geothermal energy development.
- Focuses on different technical and operational challenges associated with developing geothermal energy, ranging from exploration and production of geothermal energy in safe and cost-effective ways and conduct the necessary R&D.
- Provides high quality training and technology transfer on geothermal technologies.

## Collaboration

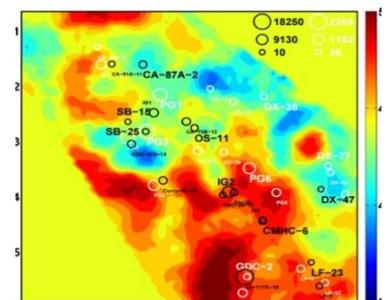
Research and development at USC CGS is facilitated by collaboration with other USC entities where potential applications to geothermal energy are identified. CGS works with USC's Petroleum Engineering Program and Earth Sciences Department as well as the Southern California Earthquake Center, to achieve its objectives. CGS also fosters professional relationships with major geothermal producers, the US Department of Energy (DOE), USAID and various US National Laboratories to ensure their relevance and fulfilling to the needs of the industry while addressing scientific challenges.

*Dr. Fred Aminzadeh, Director of CGS discussing the Geothermal Education and Research activities at USC //youtu.be/net2vsf6s6s*

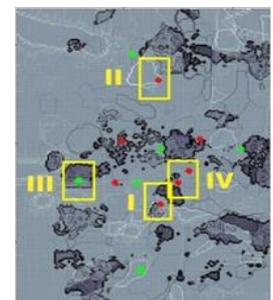


## Some CGS Research Results

- Tafti, T. and Aminzadeh, F., 2012, *Fracture network interpretation through high resolution velocity models: Application to The Geysers geothermal field*, Geothermal Resources Council Transactions, Vol. 36, pp. 550-560. **Best Paper Award.**
- Aminzadeh, F., Tafti, T. A. and Maity, D., 2013, *An integrated methodology for sub-surface fracture characterization using microseismic data: A case study at the NW Geysers*, Computer and Geosciences Journal, Vol. 54, April, pp. 39-49.
- Tafti, T. A., Sahimi, M., Aminzadeh, F. and Sammis, C., 2013, *Use of microseismicity for determining the structure of the fracture network of large-scale porous media*, Physical Review Letter E, Vol. 87, No 3.
- Maity, D. and Aminzadeh, F., 2013, *Fracture characterization in unconventional reservoirs using active and passive seismic data with uncertainty analysis through geostatistical simulation*, SPE, New Orleans, LA, September 28-October 2, 2013.
- White, L., Aminzadeh, F. and Rose, A., 2014, *Post-audit of geothermal development in California's Imperial Valley*, Journal of Sustainable Energy Engineering, Vol. 2
- Smillie, A., Satar, S., Saptadji, N., Aminzadeh, F. and Setianingsih, R., 2015, *Capacity building in the geothermal sector in Indonesia, a unique collaboration*, World Geothermal Congress, Australia, April 19-24, *the fracture network of large-scale porous media*, Physical Review Letter E, Vol. 87, No 3.



*Normal stress distribution NW Geysers.*



*Permeability Distribution in Brawley Field*

## U.S. - Indonesia Geothermal Education Capacity Building



As geothermal development expands worldwide, the demand for geothermal engineers and earth scientists has never been greater. Thanks to a grant from USAID, USC has joined forces with the Institute of Technology in Bandung (ITB) to expand educational opportunities in geothermal technologies in Indonesia. The US - Indonesia Education Capacity Building (USIECB) Program also provides opportunities for USC and ITB to collaborate in the development and enhancement of geothermal education programs through partnerships in Indonesia, one of the most geothermal resource-rich areas of the world. The active involvement of the industry advisory board ensures geothermal industry participation in education initiatives and coordination between academia and industry.

Thanks to the success of the 2012-2013 USIECB program, USAID extended the support through 1Q 2015. Some key elements are:

- ITB-USC Geothermal Seminar and Workshops
- Teaching material for a course "Environmental Impact Assessment"
- Develop a course on "Introduction to Geothermal Systems"
- Initiation of Geothermal Research Center
- Measurements and testing course for polytechnic schools



*U.S. - Indonesia Geothermal Education Capacity Building project partners at the GRC 2012 Annual Conference in Reno, Nevada.*

"The collaboration between the US and Indonesian universities for geothermal education capacity building in Indonesia has proven to be a successful model of partnership. USIECB has begun to strengthen sustainability of geothermal training in Indonesia. Through this program, 1300 people were impacted by the Geothermal Seminar activity. ITB has increased the number of graduate students in geothermal energy, providing high quality and quantity of the manpower to the Indonesian geothermal industry. I am looking forward to working closely with Prof. Aminzadeh the project principal investigator and Prof. Saptadji of ITB, the CO-PI."

**Ashley King of the USAID.**

*King, the USIECB Pprogram Manger addresses the ITB- USC 2014 Geothermal Workshop*



### Joe Iovenitti Joins CGS

Joe Iovenitti is a geologist with over 37 years of experience in applied geoscience. He has expertise geothermal energy, hydrothermal and EGS, and has conducted projects in western US and Hawaii as well as Indonesia, The Philippines, Honduras, American Samoa, Turkey and Guatemala.

