



**30<sup>TH</sup> IUGG  
CONFERENCE ON  
MATHEMATICAL  
GEOPHYSICS**



**30th IUGG CONFERENCE ON MATHEMATICAL GEOPHYSICS**

**To honor**

**PROFESSOR ISMAEL HERRERA REVILLA**

**Program**

**Monday June 2, 2014**

<b>OPPENING CEREMONY</b>		
8:30 – 8:40	<b>Francisco J Sánchez-Sesma, Conf Chairman</b>  <b>Welcome and citation of Ismael Herrera</b>	
8:40-9:40	<b>Ismael Herrera</b>  <b>My life in science, as I understand it today</b>	
<b>COMPUTATIONAL SEISMOLOGY (PART 1)</b>		
9:45- 10:15	<b>INVITED SPEAKER: Ismael Herrera</b>	<i>A powerful software for applying massively parallelized supercomputers to the modeling of geophysical systems</i>
10:15- 10:45 Coffe Break		
10:45- 11:10	<b>INVITED SPEAKER: V́ctor M. Cruz Atienza,</b>	<i>Surface-Wave Propagation Modes in the Valley of Mexico: Insights from Realistic 3D Earthquake Simulations</i>
11:10- 11:35	<b>INVITED SPEAKER: Leonardo Raḿrez-Guzḿn</b>	<i>Ground Motion Analysis in the Valley of Mexico Using Large Scale Numerical Simulations</i>
11:35- 11:53	Peter G. Malischewsky and Francisco J. Śnchez-Sesma	<i>The 50 years of Herrera's orthogonality relation and beyond (a review)</i>
11:53- 12:11	Zachary E. Ross and Yehuda Ben-Zion	<i>Automatic picking of direct P, S seismic phases and fault zone head waves</i>
12:11- 12:30	Molino-Minero-Re, E., Rubio-Acosta, E., Brandi-Purata, J., Garća-Nocetti, F., Benítez-Pérez, H.	<i>Application of multifractal analysis to seismic reflections from a velocity model</i>

12:30-14:30 Lunch		
<b>FOUR PARADIGMS IN PREDICTING EXTREMES: LEGACY OF VLADIMIR I. KEILIS-BOROK</b>		
14:30-14:40	Alik Ismail-Zadeh	<i>Introduction</i>
14:40-15:20	<b>INVITED SPEAKER: Andrei Gabrielov</b>	<i>Keilis-Borok's vision of predictive understanding of extreme events</i>
15:20-15:50	<b>INVITED SPEAKER: Maxim Arnold</b>	<i>Lagrangian coordinates for the mass points of planar Burgers equation</i>
15:50-16:20	<b>INVITED SPEAKER: Jorge Ramirez</b>	<i>Two studies in scaling of extreme events in self-similar river networks: peak flows and ecological extinction</i>
16:20- 16:50 Coffe Break		
16:50-17:30	<b>INVITED SPEAKER: George Molchan</b>	<i>Stochastic earthquake source model: Analysis of the omega-square hypothesis</i>
17:30-18:00	<b>INVITED SPEAKER: Robert Shcherbakov</b>	<i>Record-Breaking Events in Non-linear Threshold Systems</i>
18:00-18:30	<b>INVITED SPEAKER: Antonella Peresan</b>	<i>Time-dependent neo-deterministic seismic hazard scenarios: ten years of prospective testing in Italy</i>
19:30	<b>ICEBREAKER AREA</b>	<b>SWIMMING POOL</b>

**Tuesday June 3, 2014**

<b>COMPUTATIONAL SEISMOLOGY (PART 2)</b>		
8:30-8:51	Mathieu Perton, Marcial Alberto Contreras Zazueta, Francisco J. Sanchez-Sesma.	<i>The Indirect Boundary Element Method (IBEM) for Seismic Response of Topographical Irregularities in Layered Media</i>
8:51-9:12	Zachary E. Ross and Yehuda Ben-Zion	<i>An earthquake detection algorithm with pseudo probabilities of multiple indicators</i>
9:12-9:33	Artur Cichowicz and Hiroshi Ogasawara	<i>Methodology for the Automatic Estimation of Seismic Source Parameters and Updating Corrections for Path Effect</i>
9:33-9:54	Rubio-Acosta E., Brandi-Purata J., Molino-Minero E., García-Noceti F., Benítez-Pérez H.	<i>Methodology for graphical analysis of seismic records based on self organized maps (SOM Neural Networks) and Wavelet transform</i>
9:54-10:15	González Herrera Raúl, Mora Chaparro Juan Carlos, Aguirre Gonzalez Jorge, Aguilar Carboney Jorge Alfredo, Narcía López Carlos	<i>Estimation of economic loss in structures associated with seismic hazard in Tuxtla Gutierrez</i>
10:15- 10:45 Coffe Break		
<b>NONLINEAR PHENOMENA IN THE CLIMATE SYSTEM</b>		
10:45-11:05	<b>INVITED SPEAKER:</b> M. Chekroun	<i>From smooth to rough parameter dependence in climate models, and the role of Ruelle-Pollicott Resonances</i>
11:05-11:25	D. Chapman et al.	<i>A MARCH model for ENSO decadal variability</i>
11:25-11:45	<b>INVITED SPEAKER:</b> M. Högele et al.	<i>On the calibration of Lévy driven time series with coupling distances – an application in paleoclimate</i>
11:45-12:05	C. Camp and T. Gibson	<i>A multiple record analysis of the Mid-Pleistocene transition using empirical mode decomposition</i>

12:05-12:25	G. Swaters	<i>The nonlinear steady midlatitude-equatorial dynamics of deep western boundary currents</i>
12:30-14:30 Lunch		
<b>MATHEMATICAL AND NUMERICAL MODELING OF ENHANCED OIL RECOVERY</b>		
14:30-14:51	Julián Tercero Becerra Sagredo, Carlos Málaga and Francisco Mandujano.	<i>Compositional flow in porous media using GPUs</i>
14:51-15:12	Octavio Cazarez-Candia, Pedro V. Verazaluce-Barragán.	<i>Numerical simulation of in-situ combustion in experimental tubes with homogeneous and fractured system</i>
15:12-15:33	D. Cervantes, R. Leriche, A. Salazar, L.M. de la Cruz.	<i>Parallel simulation of the black-oil model using streamlines on non-orthogonal domains</i>
15:33-15:54	Graciela S. Herrera and Ismael Herrera.	<i>Unified formulation of enhanced oil-recovery methods</i>
15:54-16:15	Gustavo Ramos, L.M. de la Cruz, I. Herrera, Emilio Zavala and Rafael Vargas,	<i>Mathematical, numerical and computational models of compositional oil based on streamlines</i>
16:15 - 16:45 Coffe Break		
16:45-17:15	<b>INVITED SPEAKER: Renee J. Perez and Marcelo Epstein.</b>	<i>Optimization of equations of state using the direct search method</i>
17:15-17:36	Teresa Pérez Muñoz, Eliseo Hernández Martínez and Jorge X. Velasco Hernández.	<i>Fractal Analysis of Geophysical Signals for Oil Reservoir Characterization</i>
17:36-17:57	E. Zavala, L. Naranjo, L.M. de la Cruz, R. Perez.	<i>Accelerated PVT flash calculations using GPUs</i>
17:57-18:28	Jesús Manuel Chaidez Félix, Jorge X. Velasco Hernández and Edscott Wilson García.	<i>Fractal properties in naturally fractured reservoir</i>

## Wednesday June 4, 2014

FLUIDS, FRICTION AND RHEOLOGY, IN ROCKS AND POROUS MEDIA		
8:30-8:45	Álvaro A. Aldama, Ismael Herrera and Javier Aparicio.	<i>Stability and spectral attributes of numerical solutions of Richard's equation</i>
8:45-9:00	Guillermo Hernández-García.	<i>DDM applied to subsurface flow and transport</i>
9:00-9:15	Manuel Martínez-Morales, Carlos Gutiérrez-Ojeda and Isaac Bonola.	<i>Field characterization and numerical modeling of an unstable soil</i>
9:15-9:30	Onifade, Yemi Sikiru, Akinyemi, Olukayode Dewumi.	<i>New determined thermal conductivities of some topsoils using improved block method</i>
9:30-10:15	<b>INVITED SPEAKER:</b>  <b>Stefan Bjorklund Nielsen, Elena Spagnuolo, Marie Violay, Giulio Di Toro.</b>	<i>Heat, fluids and weakening: experimental clues on the microscale processes of high velocity sliding friction.</i>
10:15- 10:45 Coffe Break		
10:45-11:30	<b>INVITED SPEAKER:</b>  <b>David W. Sparks, Ronald Bianco, Einat Aharonov, Renaud Toussaint, Liran Goren.</b>	<i>Interactions between pore fluid and granular dynamics in shearing fault gouge</i>
11:30-11:45	Zachary E. Ross, Yehuda Ben-Zion and Lupei Zhu	<i>Isotropic source terms of San Jacinto fault zone earthquakes based on waveform inversions with a generalized CAP method</i>
11:45-12:00	Lucía Torres Fernández, Víctor Manuel Hernández Madrigal, Francisco Javier Domínguez Mota	<i>Focused through the conditional probability Sig create a map of the landslide susceptibility in the municipality of Anganguero, Mich.</i>
12:00-12:15	Maxime Farin, Semih Turkaya, Fredrik Kvalheim Eriksen, Anne Mangeney, Julien de Rosny, Nikolai Shapiro, Knut Jørgen Måløy, Eirik G. Flekkøy, Megan Zecevic, Guillaume Daniel and Renaud Toussaint.	<i>Characterization of blocks impacts and fluidofracture processes from acoustic emissions: energy partitioning, laboratory experiments using optics and accelerometry</i>
12:30-14:30 Lunch		
AMBIENT SEISMIC NOISE, DIFFUSE FIELDS AND INTERFEROMETRY		
14:30-14:45	Xin Liu and Yehuda Ben-Zion.	<i>Inversion of inter-station attenuation from ambient seismic noise records on a linear array</i>
14:45-15:00	Dylan Mikesell and Alison Malcolm.	<i>Investigating isolated velocity changes with coda waves and the dynamic warping method</i>

15:00-15:25	<b>INVITED SPEAKER: Kiwamu Nishida</b>	<i>Seismic interferometry in the global scale: seismic exploration using seismic hum</i>
15:25-15:50	<b>INVITED SPEAKER: Joost van der Neut, Ivan Vasconcelos and Kees Wapenar</b>	<i>An interferometric interpretation of Marchenko redatuming</i>
15:50-16:05	Piero Poli, Pierre Boue, Michel Campillo, Helle Pedersen, Christine Thomas.	<i>Exploring the core mantle boundary with seismic noise</i>
<b>16:05 - 16:35 Coffe Break</b>		
16:35-16:50	Francisco J. Sánchez-Sesma, Michel Campillo, Ursula Iturrarán-Viveros, M. Perton, José Piña-Flores, Juan Camilo Molina-Villegas, Juan J. Perez-Gavilán, Hiroshi Kawase and Shinichi Matsushima.	<i>A Theory for H/V Spectral Ratio based on the Diffuse Field Assumption</i>
16:50-17:05	D. Zigone, Y. Ben-Zion, M. Campillo and P. Roux.	<i>Multi-scale noise-based imaging of the San Jacinto Fault Zone environment</i>
17:05-17:20	Mathieu Perton and Francisco J. Sanchez-Sesma	<i>Normalization during the process of noise correlation</i>
17:20-17:35	Michel Campillo, Pierre Boué, Piero Poli, Helle Pedersen and Philippe Roux	<i>Correlations at the global scale and retrieval of the deep seismic phases in presence of reverberations, coda waves and ambient noise</i>
20:30	<b>DINNER</b>	<b>SWIMMING POOL AREA</b>

**Friday June 6, 2014**

8:30-10:15

**COMPUTATIONAL SEISMOLOGY**

Sunjay and M. Banerjee *Sparse Seismic Signal Recovery By Wavelet Transforms*

Raymundo Domínguez C., Manuel Romero-Salcedo, Luis Velasquillo-Martínez *A methodology to identify complex reflector connections and potentially hidden geological structures on digital images*

**FOUR PARADIGMS IN PREDICTING EXTREMES: LEGACY OF VLADIMIR I. KEILIS-BOROK**

Alejandro Tejedor, Anthony Longjas, Ilya Zaliapin and Efi Foufoula-Georgiou *Defining network robustness using a dual connectivity perspective*

Ilya Zaliapin and Yehuda Ben-Zion *Premonitory patterns of seismic clustering in natural and induced seismicity*

Ishanu Chattopadhyay, Marian Anghelz and Hod Lipsony *Sparse Seismic Signal Recovery By Wavelet Transforms*

Yevgeniy Kovchegov and Ilya Zaliapin *Horton self-similarity of coalescent*

**NONLINEAR PHENOMENA IN THE CLIMATE SYSTEM**

Charles D. Camp and Tanner J. Gibson *A Multiple Record Analysis of the Mid-Pleistocene Transition using Empirical Mode*

Yang Liao and Nicholas T. Ouellette *Nonlinearity in Two-dimensional Turbulence: Scale-to-scale Transfer*

D.J. Shetti *Studies of the dynamics of the Upper Atmosphere using UNB-Ionospheric Modeling*

**MATHEMATICAL AND NUMERICAL MODELING OF ENHANCED OIL RECOVERY**

Norberto C. Vera Guzmán. *Traced Streamlines Using Mixed Models*

**FLUIDS, FRICTION AND RHEOLOGY, IN ROCKS AND POROUS MEDIA**

D. Zigone, Y. Ben-Zion and M. Campillo. *Modeling slow slip events, non-volcanic tremor and large earthquakes in the Guerrero subduction zone (Mexico) with space-variable frictional weakening and creep*

Jon Eriksen, Bjørnar Sandnes, Renaud Toussaint, Knut Jørgen Måløy, and Eirik G. Flekkøy *Fingering during dyke formation - Gravity Induced Ordering of Frictional Fingers*

	Cécile Clément, Renaud Toussaint, Menka Stojanova, Einat Aharonov, and Eirik Grude Flekkøy	<i>The art of sinking: influence of water on seismic liquefaction and quicksand dynamics</i>
10:15- 10:45 Coffe Break		
<b>SURFACE-ATMOSPHERE INTERACTION</b>		
10:45-11:15	<b>INVITED SPEAKER: Victor Brovkin.</b>	<i>Interactive role of terrestrial biosphere in the climate system</i>
11:15-11:30	Fabio D'Andrea.	<i>Surface-atmosphere interaction</i>
11:30-12:00	<b>INVITED SPEAKER: Sasha Madronich.</b>	<i>Limits to the Photochemical Chemical Stability of the Troposphere: The Importance of Natural Emissions of Nitrogen Oxides in Preventing Runaway Growth of Atmospheric Methane</i>
12:00-12:15	Aron Jazcilevich* and Williams Vazquez Morales.	<i>Approaches and Applications to Urban Atmospheric Modeling</i>
12:15-12:30	Jorge Zavala-Hidalgo, Rosario Romero-Centeno, Adriana Mateos-Jasso, and Steven L. Morey.	<i>The response of the Gulf of Mexico to wind and heat flux forcing.</i>