

HYDROFRAC: Industry – Academia Partnership

Enhancing research and technology





ADVANCED
TECHNOLOGY
PRODUCTS



Cooperation between the Industry and Academia

- FP7 PEOPLE Programme: Industry-Academia Partnerships and Pathways (IAPP) - **Marie Curie Actions**
- Joint expertises and experience of Industry and Academia enable productive collaboration in frame of the HYDROFRAC project
- Strong connection between science, R&D and industry is one of key competitive advantages for business based on advanced technologies and knowledge

PIAP – GA – 2009 – 251475 - HYDROFRAC

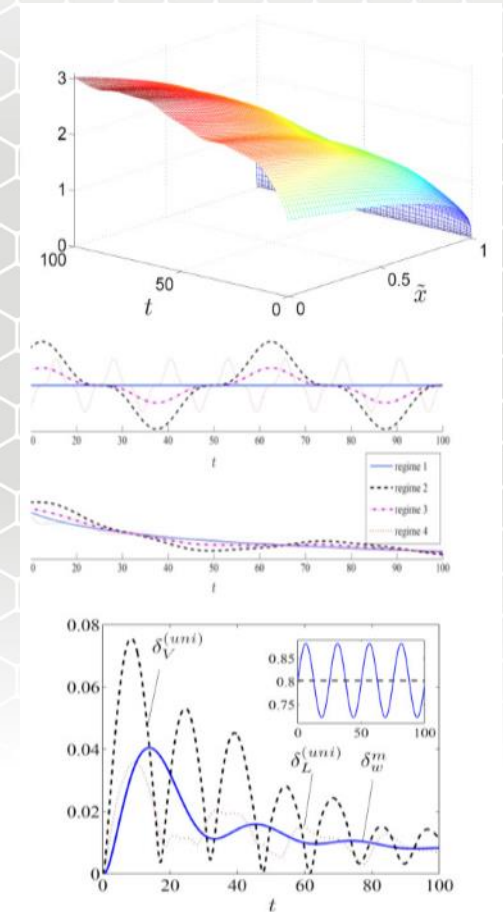
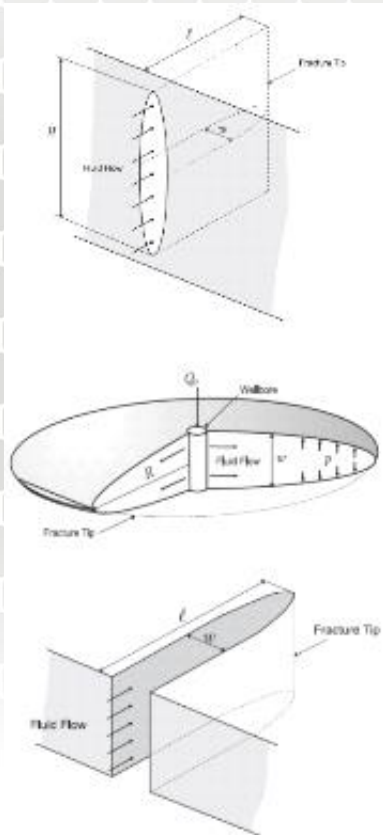
EUROTECH Cooperation with Academia:

- One of the major priorities for Eurotech is permanent development through active participation in research projects dealing with advanced novel and promising technologies
- This is why we established a strong collaboration with a number of Polish, and overseas academic, research and industrial centres
- In particular in the area of oilfield technologies we are engaged in FP7 IAAP project **HYDROFRAC: enhancing hydraulic fracturing on the basis of numerical simulation of coupled geomechanical, hydrodynamic and microseismic processes**

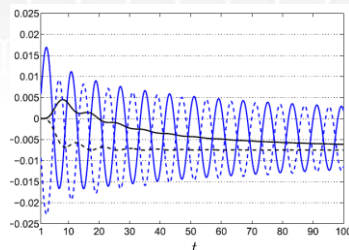
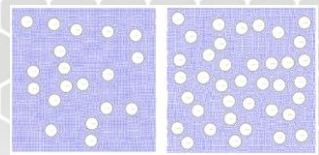
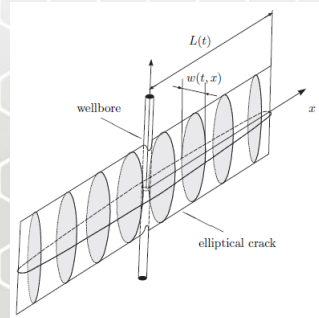
Partners:

HYDROFRAC

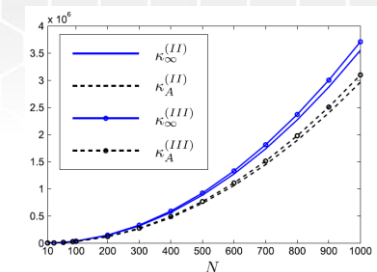
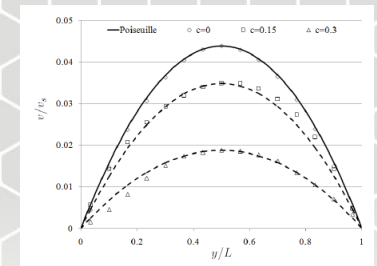
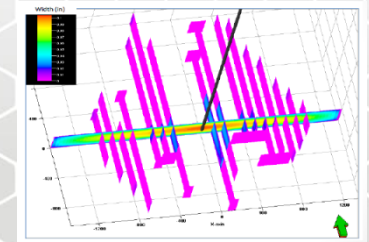
- The project aims to enhance the hydraulic fracturing techniques for increasing productivity of oil and gas reservoirs
- This objective is being pursued by developing numerical simulation of coupled geo – mechanical, hydrodynamic and micro – seismic processes for proper choices of equipment, regimes and parameters of hydraulic fracturing



HYDROFRAC



- The solvers/simulators already developed in the project combine accuracy and efficiency of computation, providing simultaneously excellent flexibility of the algorithms for different elasticity models, fracturing fluids, poropant transport mechanisms and even multifracturing problems
- The key issue to achieve these effects is utilization of standard numerical techniques like: FD, FV, BEM (fast multipole), SPH together with ,proper' formulation of the problem. The latter refers to application of optimal dependent and independent variables and dedicated regularization techniques



The researchers of **HYDROFRAC** consortium **participated in more than 20 international scientific events. Among them:**

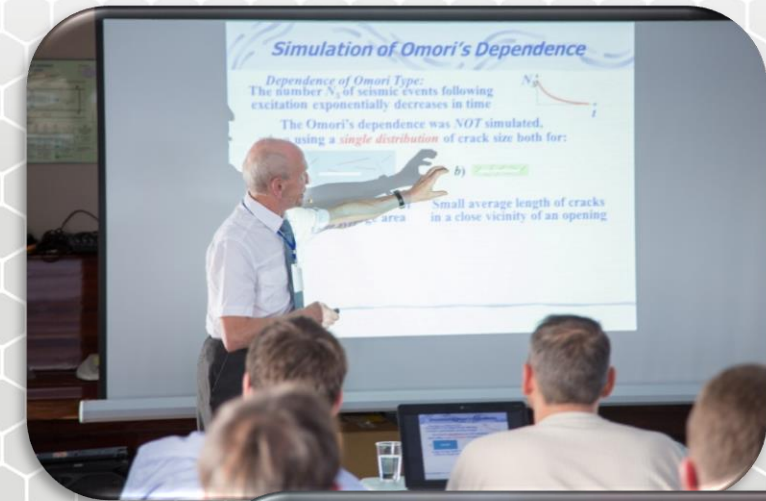
- International Conference for Effective and Sustainable Hydraulic Fracturing (HF2013), Brisbane, 20-22 May 2013, Australia
- IUTAM 2012 Symposium - Fracture Phenomena in Nature and Technology. University of Brescia, Italy, July 1-5, 2012.
- 8-th International Symposium on Rockbursts and Seismicity in Mines. Saint Petersburg-Moscow, Russia; 1 - 8 September 2013.

HYDROFRAC dissemination: more than 30 publications in peer-refereed international scientific journals and conference proceedings.



Conferences organised by HYDROFRAC Consortium


- Dissipative Rheology of Foams, Trinity College Dublin, Ireland (09-12.01.2012)
- The Second Wiener-Hopf Workshop, 2012, Aberystwyth University (25-26.06.2012)
- Minisymposium: Numerical Modelling of Hydraulic Fractures, APM-2012, St. Petersburg, Russia, 3 July
- The British Society of Rheology Midwinter Meeting 2012: Extensional Flows, Aberystwyth University (17-18.12.2012)





Conferences organised by HYDROFRAC Consortium


- APM-2013, Accompanying International Workshop: Recent advances in numerical simulation of hydraulic fracture, St. Petersburg, Russia, 2 July
- RaSiM8, 8th International Symposium on Rockbursts and Seismicity in Mines, St. Petersburg, Russia, 1-7 September 2013



Russia, St. Petersburg July 1 – 6, 2013

APM 2013 Advanced Problems in Mechanics

International Summer School-Conference



IPME RAS



8th International Symposium on Rockbursts and Seismicity in Mines

Russia. St.Petersburg - Moscow. 1-7 September 2013



Looking forward seeing you at upcoming events!

Key-note speakers for the upcoming HYDROFRAC2014 conference
(Recent Advances in Numerical Simulation of Hydraulic Fracture, Rzeszow 14-16 July 2014):

Prof. Charles Fairhurst (University of Minnesota)

Dr Branko Damjanac (ITASCA)

Prof. Mirko van der Baan (University of Alberta)

Recent Advances in Numerical Simulation of Hydraulic Fracture



Rzeszów, Poland, 14th-16th July 2014



THE INTERNATIONAL CONFERENCE

The topics of the conference include but are not limited to:

- The theoretical rationale for hydraulic fracturing
- The application of Newtonian and shear-thinning fluids for hydraulic fracturing
- Enhanced models of proppant movement
- Improved and novel numerical techniques
- Modeling of hydraulic fracture in low-permeable shales and coals
- Simulation of seismicity accompanying hydraulic fracture
- Inversion of microseismic data
- Using observed seismicity and/or tilts for calibration of input data

THE UNIVERSITY AND CITY

Rzeszów University of Technology is named after Ignacy Łukasiewicz, who is remembered as the discoverer of fractional distillation of oil and was a pioneer of the use of paraffin in lamps. He performed most of his work in this part of southeast Poland in the 19th century.

The city is served by an **international airport**. Nearby places of interest include **Łańcut Castle** (a grand 17th century palace) and the majestic monastery at **Leżajsk** (both pictured right), which are 30 minutes from **Rzeszów**. Slightly further afield, the **Bóbrka museum** of oil and gas industries is approximately an hour's journey near the medieval fortified town of **Krosno**, and the old Polish capital **Kraków** with rich heritage is only around two hours away.

KEY-NOTE SPEAKERS

- Prof. Charles Fairhurst (University of Minnesota)
- Dr Branko Damjanac (ITASCA)
- Prof. Dr Mirko van der Baan (University of Alberta)

FURTHER INFORMATION

- Abstract submission: 1 February 2014
- Notification of acceptance: 1 March 2014
- Grants supporting young researchers are available on application
- Registration and other details:
<http://fp7.imaps.aber.ac.uk/hydrofrac2014/>
- Scientific Secretary of the Conference
Dr Liliana Rybarska-Rusinek: hydrofrac2014@prz.edu.pl



Rzeszów University of Technology



Rzeszów



Łańcut Castle



Leżajsk



Selected key-note lectures from the conferences organised so far by HYDROFRAC consortium:

- ***Numerical modelling of seismicity: Theory and applications*** by **Aleksander Linkov** Professor (Rzeszow University of Technology) and Chief Scientist (Institute for Problems of Mechanical Engineering, Russian Academy of Sciences)
- ***“Unconventional” challenges of hydraulic fracturing modeling*** by **Alexei Savitski**, (Shell International Exploration & Production)
- ***Proppant transport in hydraulic fractures: computer simulation of effective properties and movement of the suspension*** by **A.M. Krivtsov** (Russian Academy of Sciences)

HYDR-O-FRAC

Industry - Academia Partnerships & Pathways

Further information available at:

<http://fp7.imaps.aber.ac.uk/hydrofrac.html>