ERL Students and Postdocs

MIT Earth Resources Laboratory
2017 Annual Founding Members Meeting
Wednesday, May 31, 2017

Massachusetts Institute of Technology

Earth Resources Laboratory

Students

Omar Al-Dajani
Ammar Alali
Josimar Alves da Silva
Ignacio Arzuaga Garcia
Lubna Barghouty
Eric Beauce
Ekaterina Bolotskaya
Jane Chui
Victoire Denis du Peage
Aarti Dwivedi
Greg Ely

Manuel Florez Torres
Eva Golos
Ehsan Haghighat
Na-Hyan Jung
Hao Kang
Matthew Li
Bing Li
Wei Li
Shujuan Mao
Harry Matchette-Downes
Saied Mighani

Justin Montgomery
Amir Pahlavan
Kai Pan
Jamie Potter
Anna Rogers
Yuval Tal
Rafael Villamor Lora
Seonkyoo Yoon
Elezhan Zhakiya
Robin Zhao

Postdocs

Pawan Bharadvaj
Martina Coccia
Marie Julie Dalbe
William Frank
Niels Grobbe
Chen Gu
Chunfang Meng
Omid Moradian
Aurelien Mordret
Stephen Morgan
Yusuke Mukuhira
Jide Ogunbo
Piero Poli
Ranjan Pramanik
Farrokh Sheibani
Matthias Taus
Matthias Trojer
Hua Wang
Zhibing Yang

Recent Graduates

MSc

Ali AlJishi – Saudi Aramco
Marwah Al Ismael – Saudi Aramco
Saleh Al Nasser – PhD Program
Anna Rogers – Shell

PhD

Lucas Bram Willemsen – ExxonMobil
Chen Gu – Postdoc MIT
Bruno Goncalves Da Silva – New Jersey Institute of Technology
David Wang – ExxonMobil
Ruby Fu – Postdoc MIT
Martina Coccia – Postdoc MIT

Today's One-minute Introductions

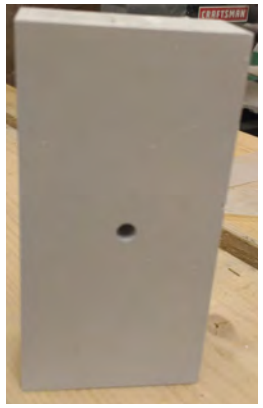
Ignacio Arzuaga Garcia
Victoire Denis du Peage
Aarti Dwivedi
Ehsan Haghighat
Charles Ildstad
Matthew Li
Harry Matchette-Downes
Jamie Potter
Anna Rogers
Elezan Zhakiya

Ignacio Arzuaga García

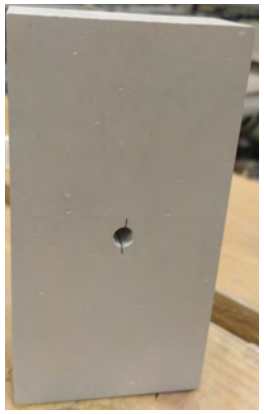
Graduate student working with Prof. H. H. Einstein
B.S. in Civil Engineering, University of Buenos Aires, 2013

Current Research Interests:

Investigation of the Effect of Flaw Shape on Fracture Propagation in Gypsum

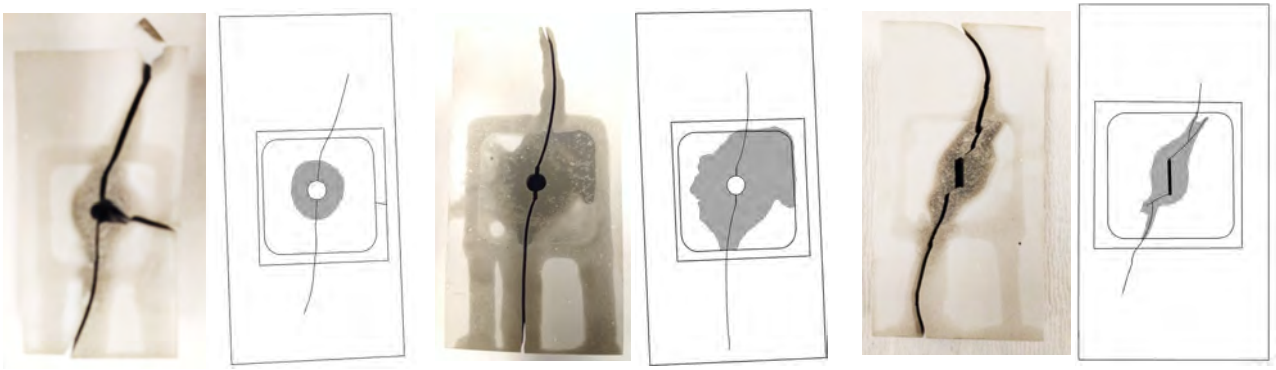


circular hole



circular hole with notch

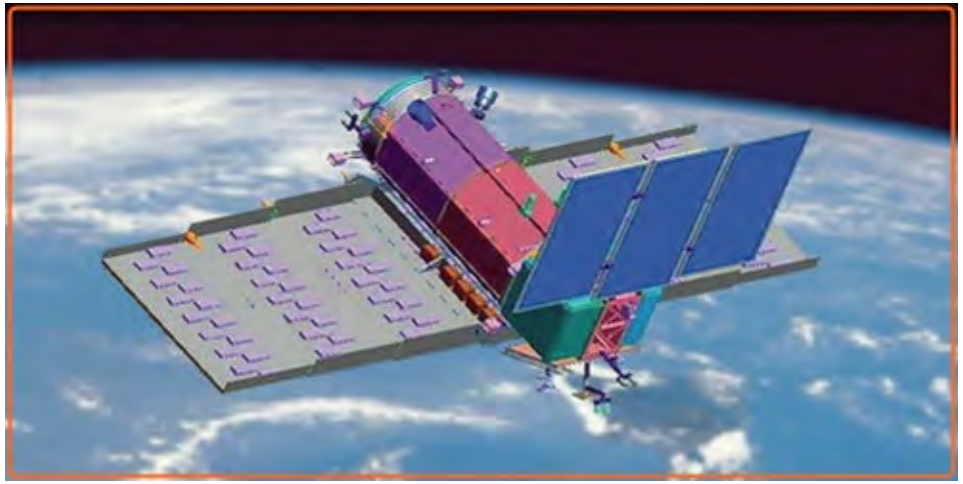
single vertical flaw



Past Research Interests:

Structural analysis employing FEM (Finite Element Method)

- **port structures (reinforced concrete)**
- **aerospace structures (satellites and payload instruments)**



SAOCOM satellite

(Argentinean Satellite for Observation through Microwaves)

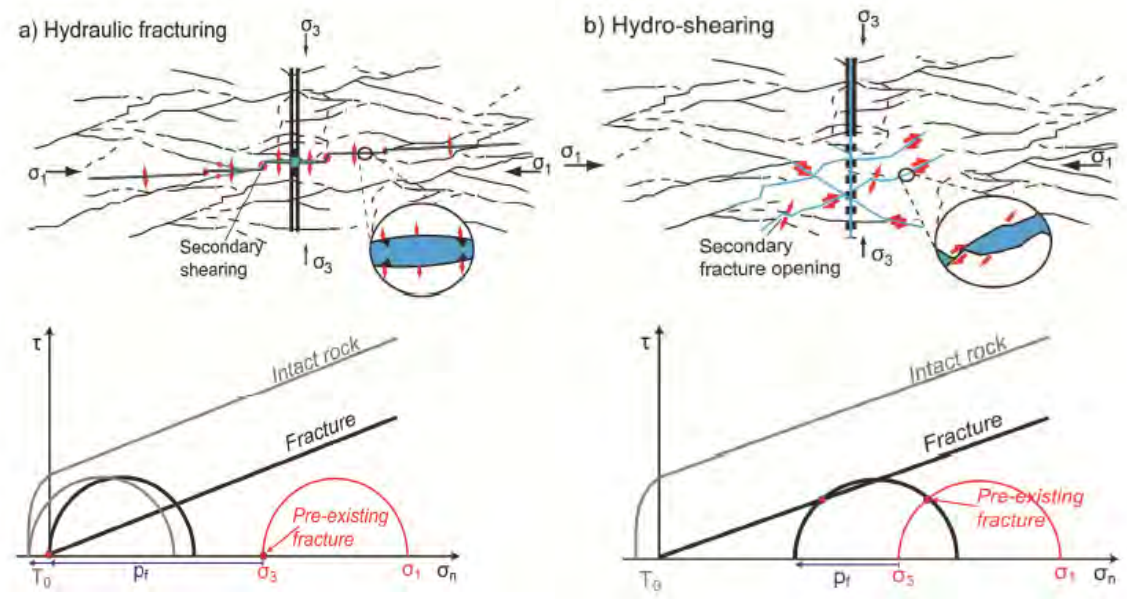
Victoire Denis du Peage

Visiting Student working with Prof. H.H. Einstein

BSc. Civil Engineering, Federal Institute of Technology of Lausanne, 2015

Current Research Interests:

Comparison of Induce Seismicity in Enhanced Geothermal System and Shale Gas



Gischig and Preisig, 2015

Past Research Interests:

Interdisciplinary project

Strategies for the renovation of early XXth century building, GE

Design project

By-pass road – Champagne, NE, Switzerland

Laboratory project

Brittle versus ductile deformation as the main control of fluid circulation in the continental crust

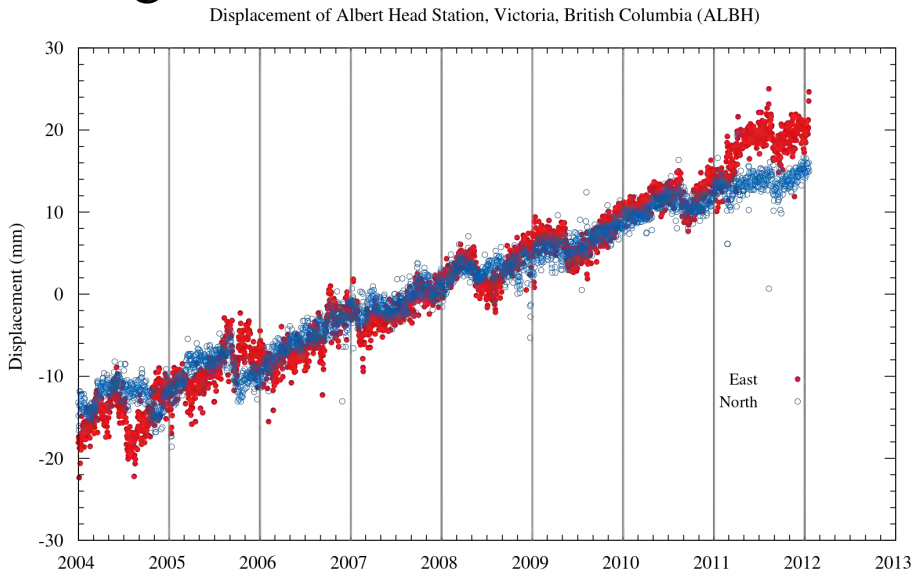
Aarti K. Dwivedi

Ph.D. Student working with Prof. T. A. Herring
Integrated M.Tech Geophysics, IIT Roorkee, 2016

Current Research Interests:

1.Investigation of slow-slip events in Northern California.

2. Investigation of crater distribution with latitude and longitude on Pluto.



Past Research Interests:

1. Characterization of tsunamigenic sources using real time water level inversion.

2. Inversion of EM data using Immersed Interface Method

3. Crustal deformation of Antarctica

Ehsan Haghighat

Postdoctoral Associate working with Prof. Juanes
Ph.D., McMaster University, Canada, 2015
Prior: Lead Mechanics Scientist, Forming Technologies Inc.

Current Research Interests:

Modeling of deformation and sliding of faults

- Stability of numerical methods for quasi-static and dynamic simulations
- Mechanics of fault, friction, and propagation
- Intersecting faults

Reservoir-geomechanics coupling and understanding of induced seismicity

Use of machine-learning tools in earth simulations

- Identification of mechanical properties from limited sensor observations
- Acceleration of costly three-dimensional simulations

Past Research Interests:

Mechanics of solids and porous media

- Plasticity and Damage
- Fracture
- Contact and moving bodies
- Geometrical Nonlinearity
- Anisotropy and Heterogeneity
- Flow in porous media

Scientific computations

- Solution methods for ODEs and PDEs
- FEM/BEM/FDM
- Enriched methods
- Nonlinear integration schemes/constrained optimization
- Stability analysis and error estimation

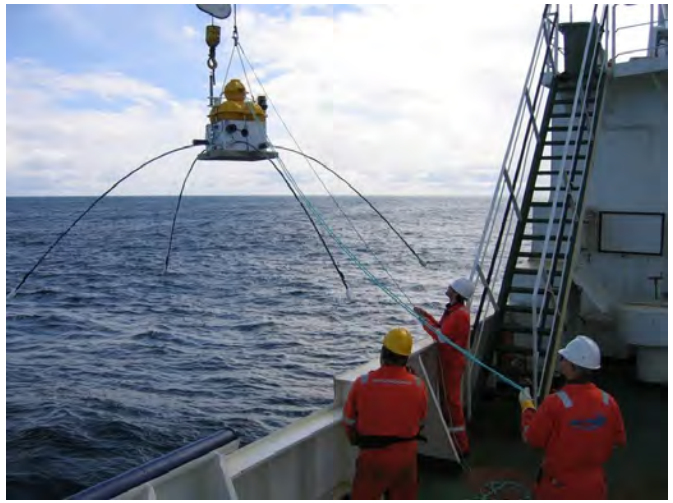
Charles Rutherford Ildstad

Special Graduate Student working with Prof. Laurent Demanet
MSc, Norwegian University of Science and Technology(NTNU), 2018

Current Research Interests:

Applied mathematics and inversion problems in geophysics
- Machine Learning,

Extraction of deep sea minerals,
- Electromagnetics,
- AUV-swarms for imaging,



Past Research Interests:

Light attenuation in thin films,

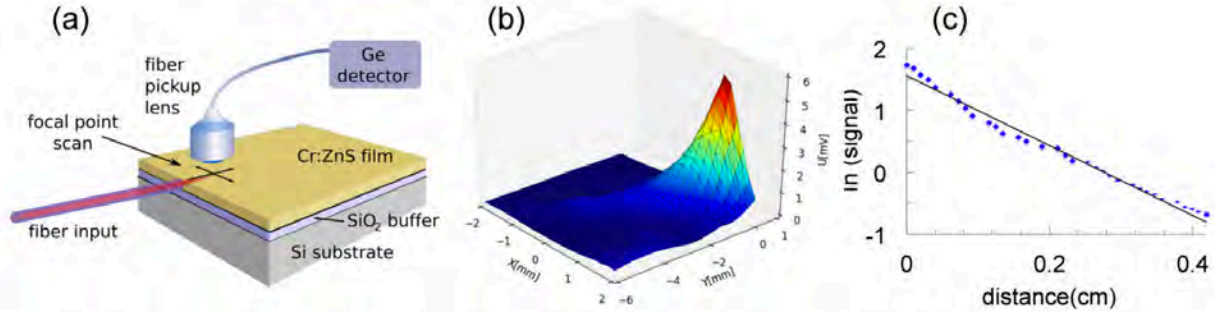


Fig. 4. (a) Schematic of measurement system, (b) 2-d scan of the intensity of scattered light from within the waveguide for the ET film shown in Fig. 2 and 3 (c) Plot of the natural log of the maximum intensity at each position along the length of the waveguide streak, along with an curve fit used to determine the attenuation.

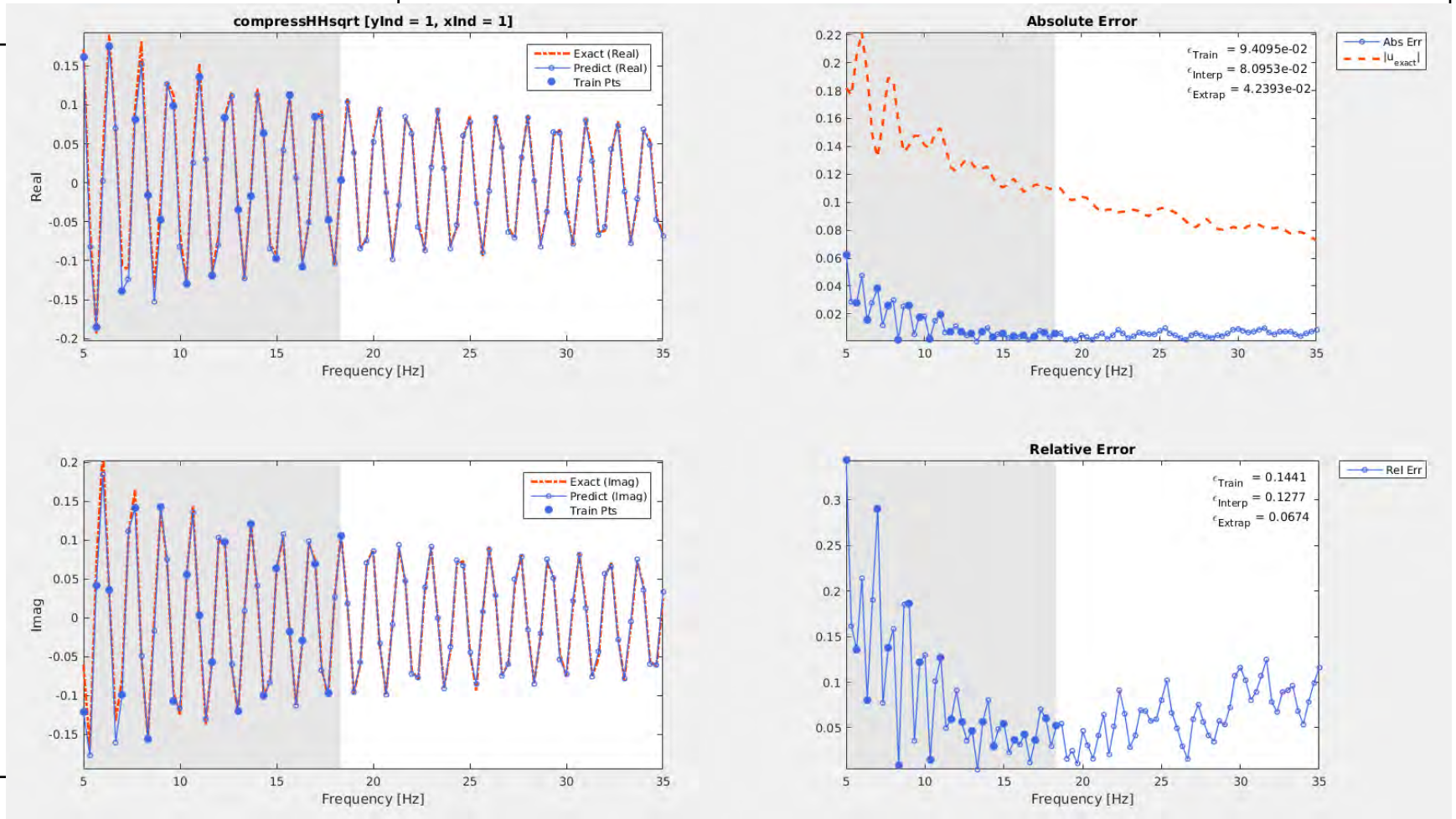
Eric A. Karhu, Charles R. Ildstad, Stefano Poggio, Vedran Furtula, Nikolai Tolstik, Irina T. Sorokina, Joseph J. Belbruno, and Ursula J. Gibson, "Vapor deposited Cr-doped ZnS thin films: towards optically pumped mid-infrared waveguide lasers," Opt. Mater. Express 6, 2947-2955 (2016)

Matthew Li

Graduate Student working with Prof. Demanet
BASc, MASc, University of Toronto, 2015

Current Research Interests:

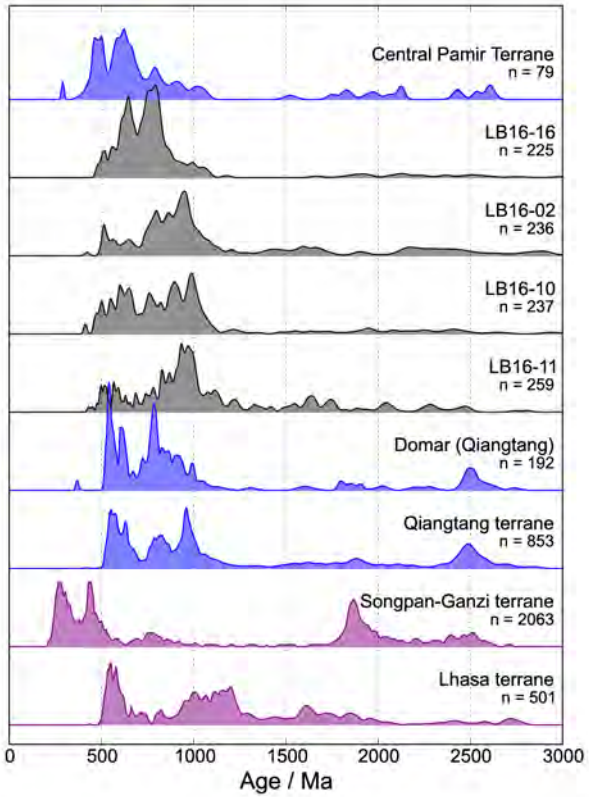
- Signal extrapolation, superresolution
- Reduced Order Modeling for High Frequency Helmholtz
- FWI and UQ

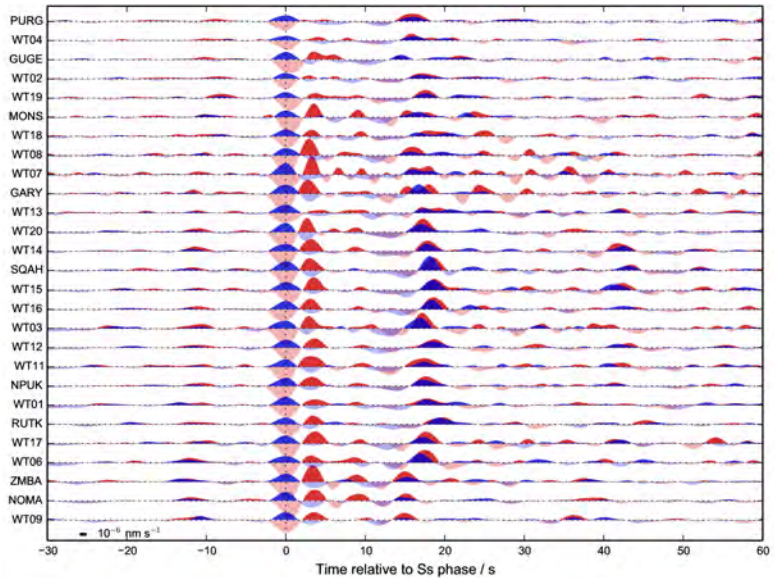


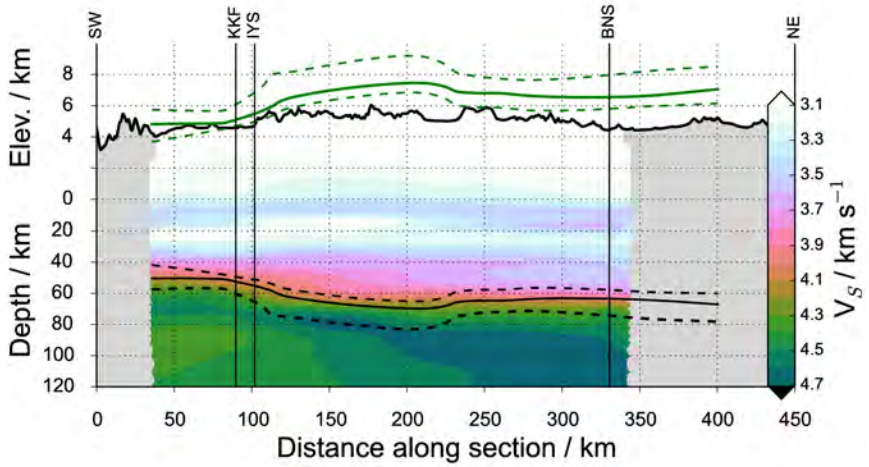
Harry Matchette-Downes

Graduate student working with Prof. Rob van der Hilst
B.A., M.Sci., University of Cambridge, 2015

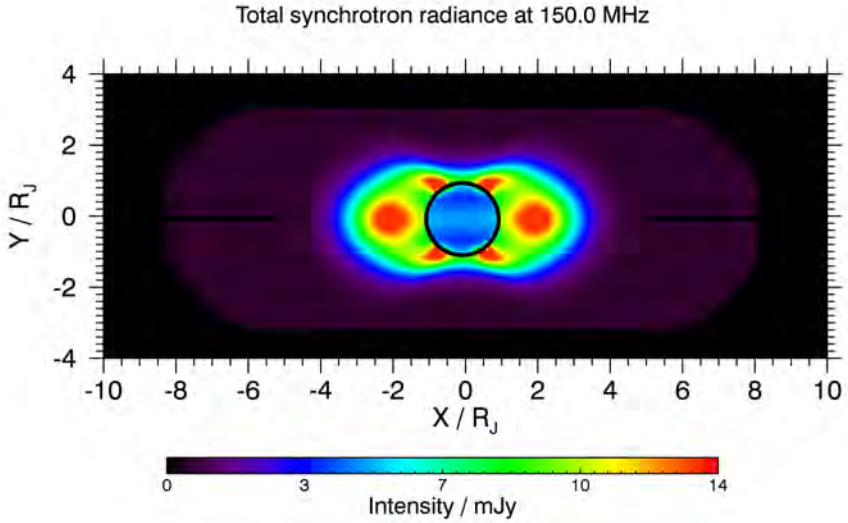
Current Research Interests:

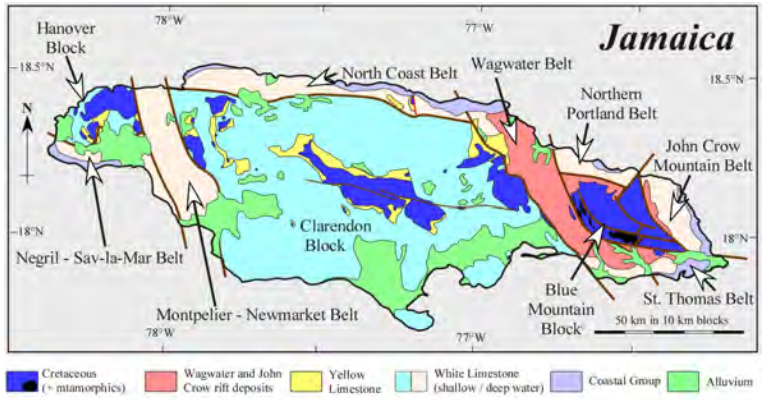






Past Research Interests:





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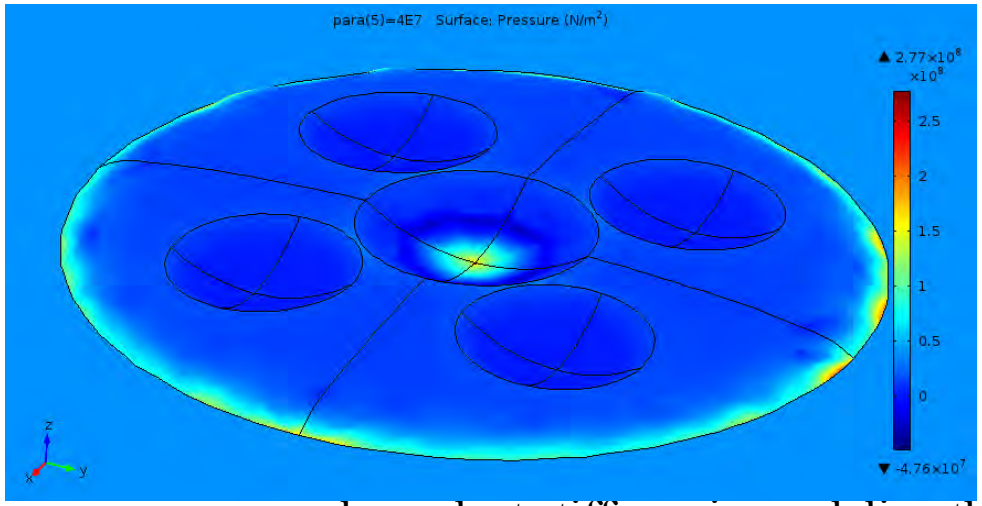
Jamie Potter

2nd year Masters student working with Prof. Hager
BE Mechanical Engineering, Dartmouth College, 2015
BA Physics (minor in Geosciences), Skidmore College, 2014

Current Research Interests:

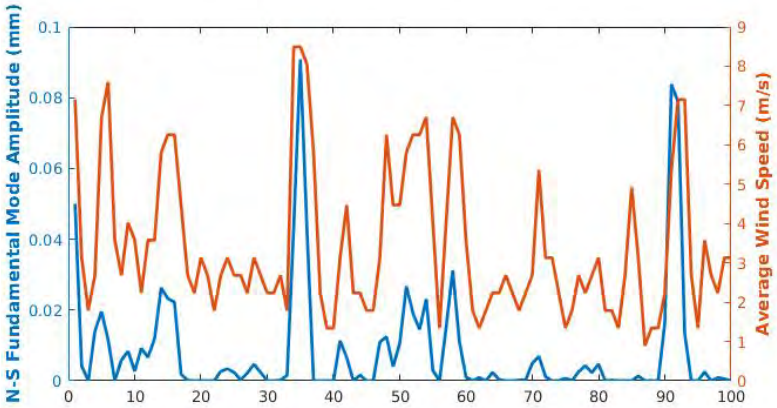
Determining the Effects of Pore Pressure Changes on the Stiffness of Fractured Rock through Numerical Modeling



Using pore pressure dependent stiffness in modeling the surface deformation associated with the In Salah CO_2 Storage Project

Past Research Interests:

Measuring the amplitude of the vibrations of the Al Hamra tower through GPS and comparing to wind speed



Anna Rogers

MSc Candidate working with Prof. Brad Hager
BScH Physics Major, Geology Minor, Queen's University, 2014

Current Research Interests:

- Investigation of the coupling between fluid flow and subsurface stress
  - Poroelasticity module in COMSOL

1. Lorca, Spain
- Earthquake on May 11, 2011
- Groundwater extraction

2. White Wolf Fault, California
- Earthquake on July 21, 1952
- Oil and Gas extraction

Past Experience:

1. ESG Solutions
- Geophysical Analyst
- Microseismic Monitoring for Hydraulic Fracturing

2. Shell Oil and Gas Intern
- Interpretation Geophysics
- Production and Development Unit
- 3D Seismic Interpretation in the Gulf of Mexico

Thank You!