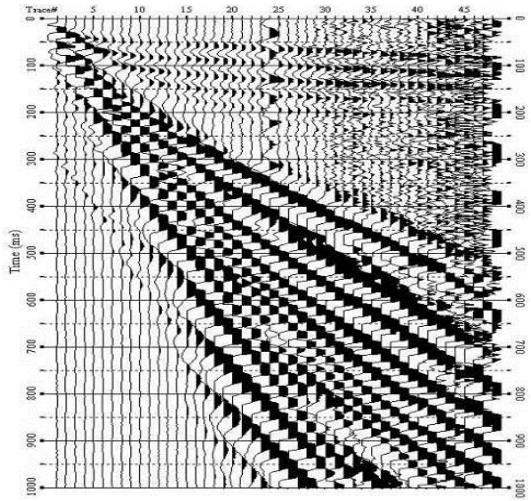
Applied Geophysics: U. of Houston

Earth & Atmospheric sciences

Robert R. Stewart
Director, AGL

Allied Geophysical Laboratories

UNIVERSITY of HOUSTON



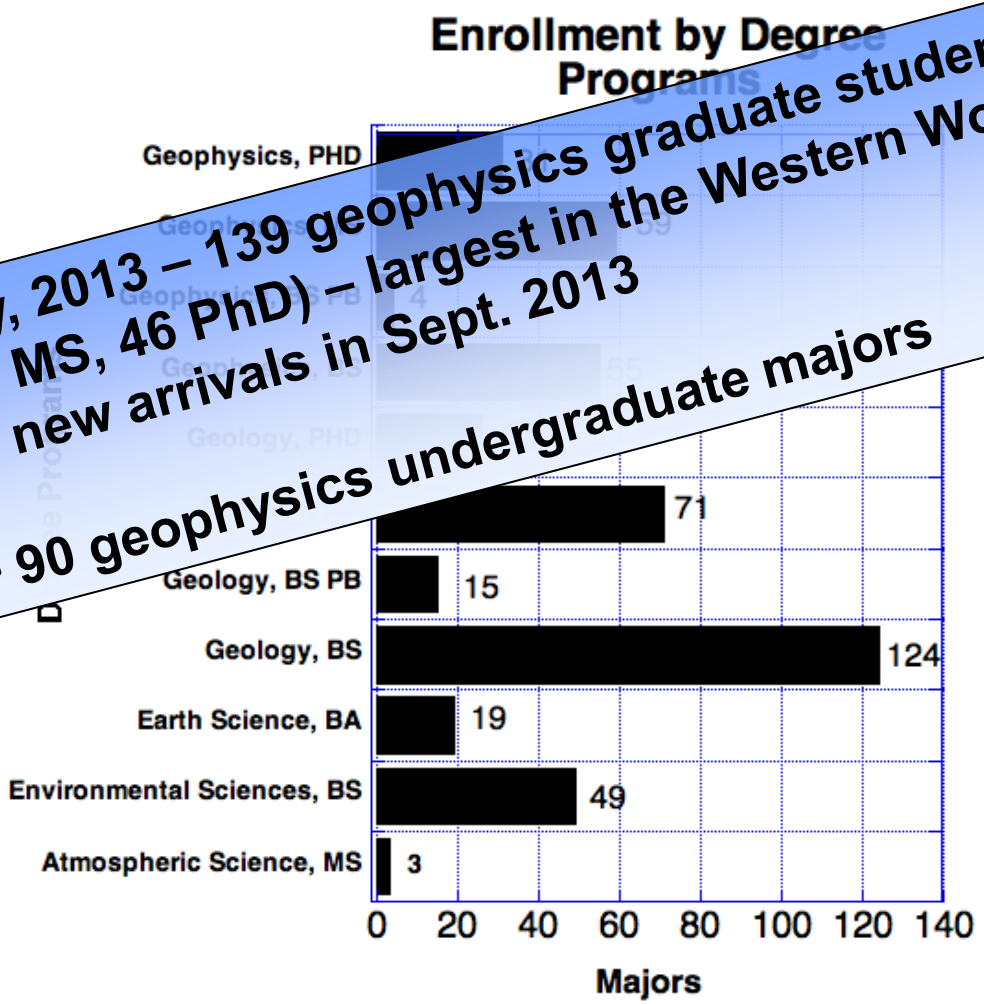
AGL Update Meeting
Houston May 16th, 2013

Geoscience at the University of Houston

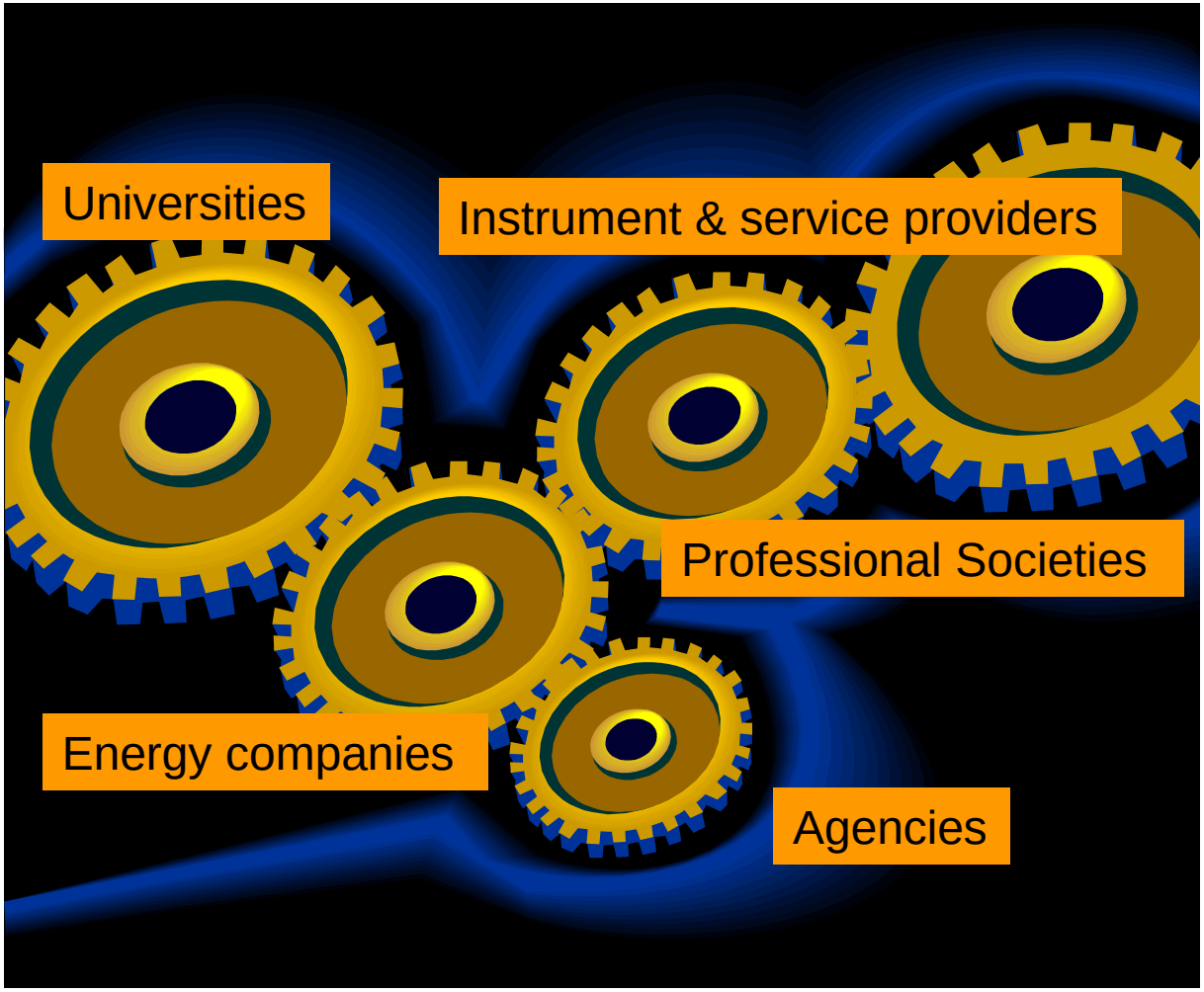
Earth & Atmospheric sciences

May, 2013 – 139 geophysics graduate students (93 MS, 46 PhD) – largest in the Western World.
38 new arrivals in Sept. 2013

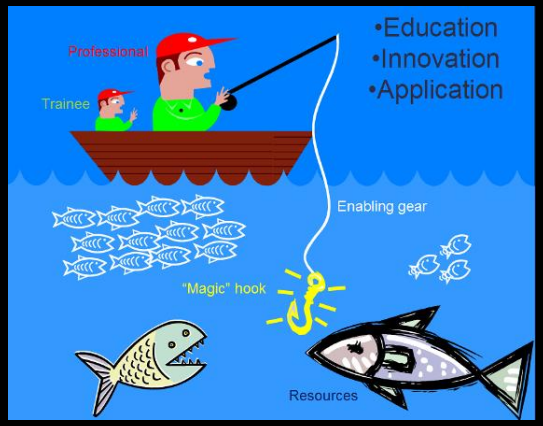
~ 90 geophysics undergraduate majors



Interlocking geoscience partnerships



University's 4C mandate:
Create
Conserve
Communicate,
Commercialize



Successful countries in the 21st century will have: cash, commodities, and creativity (Standard Chartered, 2010)

UH/AGL geophysics faculty & their expertise

	**Robert Stewart** PhD, Massachusetts Institute of Technology Chevron, ARCO, Veritas, University of Calgary	Borehole geophysics (well logging, VSP, crosswell analysis), multicomponent seismic methods
	Hua-wei Zhou - Rock physics, tomography, & migration: Department Head ***Will Sager – Marine geophysics & Bob Wang – Seismology, LiDAR, GPS***	
	**Aibing Li** PhD, Brown University Woods Hole Institute	Seismic tomography, inversion, crustal structure
	**John Castagna** PhD, University of Texas at Austin ARCO, Fusion Geophysical	Rock properties, seismic attributes, AVO
	**Evgeni Chesnokov** PhD, Moscow State University University College of London, University of Oklahoma	Theoretical seismology, anisotropy, fracture monitoring
	**Gennady Goloshubin** PhD, Institute of Solid Earth, Moscow Western Siberian Institute	Seismic exploration, reservoir analysis, permeability prediction
	**De-hua Han** PhD, Stanford University Unocal, HARC	Laboratory rock properties, seismic monitoring
	**Fred Hilterman** PhD, Colorado School of Mines Geophysical Development Corp., Mobil	AVO, seismic processing, petrophysics
	**Leon Thomsen** PhD, Columbia University Amoco, BP, Delta Geophysics	Anisotropy, seismic processing, EM analysis
	**Robert Wiley** PhD, Colorado School of Mines Marathon Oil	Physical modeling, instrumentation, shallow seismic analysis

Further geophysics faculty and their interests:

Edip Baysal – seismic imaging

Stuart Hall – potential fields

Bob Sheriff – exploration geophysics

Jolante Van Wijk – tectonics

Shuhab Khan – GPR, GPS, GIS

UH Graduate Geophysics Courses Fall 2013

Seismic & Ray Theory	Chesnokov
Multicomponent Seismic Exploration	Stewart
Computational Geophysics	Castagna
Applied Geophysics Seminar	Zhou
Seismic Velocity & Imaging	Zhou
Satellite Positioning & Geodesy	Wang
Rock Physics	Castagna
3-D Seismic Exploration	Emmet
Basin Analysis for Petroleum Exploration	Mann
Near-surface Geophysics	Wiley
Geophysics Field School – Analysis Capstone	*Stewart*
Introduction to Geophysics (undergrad)	*Li*

Professional M.S. Program in Geophysics; Intensive Summer Courses in Exploration Geophysics

Allied Geophysical Lab

Allied Geophysical Laboratories
UNIVERSITY of HOUSTON

Applied Geophysics Research, Education, and Application for Resource Exploration

Research

- Instrumentation, Robotic acquisition, Field surveys
- Near-Surface Methods
- Signal Processing & Imaging
- Multi-component Seismic Methods
- Well-logging, VSP, and Petrophysics

Education and Training

- Undergraduate (B.S.) and Graduate (M.S., Ph.D.) Programs
- International Training
- Continuous Professional Learning
- Professional Accreditation

Collaborations & Applications

- Joint Projects/ Group Surveys
- Sponsored-research Transfer
- Other Institutions, Agencies, and Companies

Allied Geophysical Lab & Staff

- Physical (robotic) modeling
  - New recording electronics, piezopins, and films
  - Laser-etched & 3D printed models, anisotropy, 4D

  Mr. Anoop William (systems manager)

  Dr. Nikolay Dyaur (research geophysicist)

  Dr. Robert Wiley (research professor)

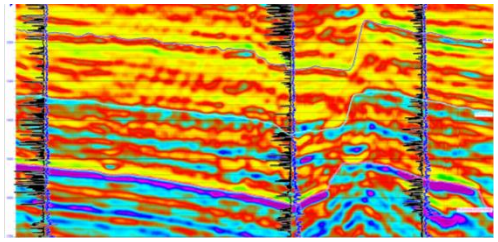
- Field acquisition
  - Vibe truck (P & S), Whackers, 240-channel Geodes
  - Falmouth marine boomer, MicroEel streamer
  - VSP, downhole source, well logging tool suite
  - CG-5 gravimeter, three GPR systems
  - Leica total station, Trimble GPS

  Mr. Ady Geda (geotechnical supervisor)

Allied Geophysical Lab & Staff

- Data processing & interpretation
  - GEDCO VISTA, Paradigm, SU, MATLAB, Hampson-Russell, SMT, Petrel, Landmark, KGS, home-grown code

Mr. Jay Krishnan (Dept. systems manager)



- Geophysical surveys & case histories
  - Pierce Junction, LaMarque, Energy Research Park, Blue Lagoon, Hockley, Needville, Galveston
  - Meteor Crater, AZ; Sacramento, CA; Jemez Pueblo, NM; Elk Basin, MT; Bayou Corne, LA
  - Dickman, OK; Barnett, TX; Bakken, ND; Marcellus, PA; GoMs;
  - Tenerife, Colombia; EOR, Oman

Mr. Li Chang (application geophysicist)

We're very grateful to our AGL supporters:

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ExxonMobil

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Marathon Oil Corporation

Geokinetics

ConocoPhillips

HESS

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SEG

Global Geophysical Services®

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UH Applied Geophysics Direction

- ***Goal:*** **Make major contributions to exploration geophysics via graduates, publications, software, data, …**
- ***Science:*** **Fully understand & use the complete seismic wavefield & other measurements for improved subsurface imaging and assessment**
- ***Application:*** **Help find and responsibly produce energy and other resources**
- ***Strategy*****: Experimental geophysics, industry collaboration, advanced analysis, & full team**

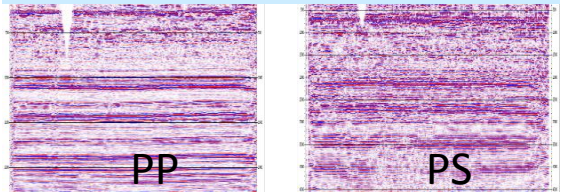
Summary

Allied Geophysical Laboratories

UNIVERSITY of HOUSTON

- Pressing needs for better subsurface imaging & assessment plus education & personnel development
- Remarkable team of geophysical researchers and students assembled in the Allied Geophysical Lab
- Lots of exciting developments in land & marine acquisition and imaging – research needed
- AGL is looking to create further collaborations and projects with you (’all)!

Bakken shale (Hess & AGL)



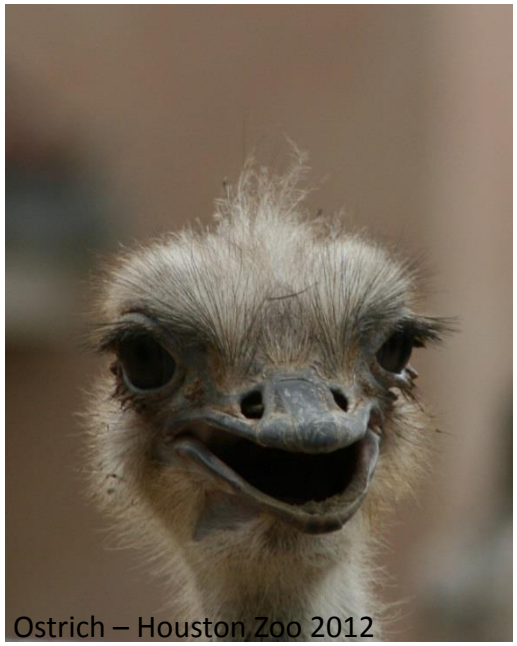
Thank you for your attention …

… on with the program

Agenda

AGL Update Meeting

May 16, 2013



Ostrich – Houston Zoo 2012

8:45 – 10:20	*Technical Presentation I – Field investigations*

1) Welcome, Introduction, & what's new at AGL? **Robert Stewart, Hua-wei Zhou**
2) Outstanding in the field: AGL systems & the La Marque Geophysical Observatory - **Jeff Sposato**
3) Searching for blind faults: the Haiti subsurface imaging project (*Geoscientists Without Borders*) **Eray Kocel**
4) Integrated geophysical analysis of the Needville & Hockley faults, Texas **Kevin Schmidt, Li Chang**
5) Fault imaging using reflected ground roll **Craig Hyslop**

10:20 – 10:40	*Break – Field equipment and poster viewing*
10:40 – noon	*Technical Presentation II – Scaled, robotic modeling*

6) Small is beautiful: AGL physical modeling **Mr. Nikolay Dyaur, Bob Wiley, Anoop William**
7) Locating microseismic events: A physical modeling comparison using P and S waves in surface and borehole geometries **Omer Akbas**
8) Guided waves in shallow water: Understanding, use, and filtering **Jiannan Wang**
9) Fluid substitution for an HTI medium **Long Huang**

Noon – 12:40 pm Lunch

12:40 – 2:00	*Technical Presentation III – The near surface and borehole geophysics*

10) Near-surface characterization and S-wave statics for the Bradford 3D-3C seismic survey (Marcellus) **Soumya Roy**
11) Salt imaging, Pierce Junction oilfield, Houston **Suleyman Coskun**
12) Full-waveform VSP imaging, Tarim oilfield, China **Minyu Zhang**
13) Residual move out analysis after migration in VSP data **Yue Du**

2:00 – 2:20	*Break - Field Equipment and Poster Viewing*
2:20 – 3:50pm	*Technical Presentation IV – Case histories*

14) Extracting polar anisotropy parameters from seismic data and well logs **Leon Thomsen**
15) Seismic attributes of the Barnett and Bakken shales **Bode Omoboya**
16) Multicomponent seismic exploration: Time-lapse imaging in Oman; Sand reservoirs in Tenerife oilfield, Colombia; 3C-3D in the Marcellus **Tania Mukherjee, Virginia Mason, Mouna Gargouri, Robert Stewart**

17) Summary and discussion – **Full group**

AGL Questionnaire – Your interests

Allied Geophysical Laboratories
UNIVERSITY of HOUSTON

1. What are your geophysical interests?

   _____

2. What would be appropriate topics for AGL research?

   _____

3. What would be the best deliverables from us to you?

   _____

4. Would you like us to give a technical presentation at your company?

   _____

5. Would you be interested in joining AGL? Collaborating? Serving on an AGL Advisory Board?

   _____

6. Other comments?

   _____

Name (optional): _____

Company (optional): _____

Thank you for your comments and support!

Robert Stewart Director, Allied Geophysical Lab (rrstewart@uh.edu)

What would be interesting and useful to you and your company?

Denver SEG Meeting 2010