Career Opportunities in the Energy Industry

Addressing the concerns of early professionals and students
Presentation Outline

• **Industry Outlook (Section 1)**
  – Where is the market going in the near and long term?
  – What are some of the causes of the current contraction?

• **Careers / Jobs in the Geosciences (Section 2)**
  – Geoscientist across the economy and in Government, Academia, and Industry
  – Broaden your experience!

• **How to Get Started (Section 3)**
  – Personal Stories
    • Story 1
    • Story 2
  – Interviewing
  – Placement
  – Networking
  – Young Professionals (YPs)

• **Q&A Preparation Material and Additional Content**
Note to VG Presenters

• AGI asks AAPG VGs that utilize AGI sourced slides take a 1-hour free online workshop geared towards directing student discussions on career development in the geosciences.

• It explains how best to talk about the AGI career wheel, interviewing techniques, and what amount of education best fits with the students long-term career goals. If further discussing the current downturn and avenues for career development.

http://www.americangeosciences.org/workforce/pow-careers-discussion-course-registration
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Section 1

Industry Outlook
Challenge for the Upstream – today and beyond

Worldwide demand for energy will increase steadily out to 2035 and beyond.

Projected demand for oil and gas in 2035 is 45% more than it is in 2015.

There is a huge GAP between projected production from existing fields and what needs to produced through 2040 to meet the demand.
Global Population Growth

Source: From the UN, as appeared in The Economist, August 23, 2014

 Courtesy of BEG, Dr. S. Tinker, 2015
Source of Energy Demand

Courtesy of ExxonMobil, Tinker, 2015


Assessed basins with resource estimate
Assessed basins without resource estimate

Courtesy of BEG, Dr. S. Tinker, 2015 (MTOE)
What We Need

• We need to drill ‘good’ wells, ones that have low risk and maximize the return on our investments
• Since wells can be very expensive, some cost more than $200 million, we must position each well with care
• We need as accurate an understanding of the subsurface as possible so we can:
  ➢ Maximize oil & gas recovery from known fields
  ➢ Move probable & static assets to proven reserves
  ➢ Discover new reserves beneath & adjacent to known fields
  ➢ Find and produce oil & gas in new areas

Conclusion: The energy industry needs new geoscientists with the talent and drive to find, develop and produce the energy that people will need.
Oil & Gas Prices

• The energy industry goes through cycles (of about 7 – 10 years)

• These cycles are dictated by oil and gas prices and, while unfortunate, a byproduct of maintaining a balance of supply and demand

• Right now prices are low and companies are tightening belts

• 2015/2016 will see a reduced number of job openings and internships

• When prices rebound, the demand for new hires will increase greatly and students and young professionals will be well positioned

• We have to wait for the sun to come out from behind the cloud – AND IT WILL!!
The Economy and Energy

U.S. Economy and Oil Price

Data: BP Statistical Analysis; US Department of Commerce
1970-1983 Arabian Light 1984 Brent dated

Year

GDP Growth (% change on 2000 chained dollars)

Oil Domestic Wellhead Price (2013 $)
Three BIG Positive Factors

1. Energy Demands
2. Technology Needs
3. Industry Demographics
Demand UP, Production less certain

As You Have Seen...

Geoscientists are Needed to Fill this GAP?
Sources of Energy Forecast

Projected Demands

World Energy Demand

Careers in Oil & Gas Remain Important

Billion Barrels of Oil Equivalent per Year (GBOE)

1900 1920 1940 1960 1980 2000 2020 2040 2060 2080 3000

35 Year Career Starting 2015

after Edwards, AAPG 8/97
Technology Needs

• To meet energy demands, we can’t count on simply making ‘giant new discoveries’

• In addition to making new discoveries, we need to get more out of what we already have found:
  – New life in old fields
  – Make ‘uneconomic’ reserves economic

• Technology, and the people to develop and apply it, will be the key
Industry Demographics

Age Brackets for a Typical Major Oil Company (2013)

Staffing is now a HUGE concern!

- 27% in 55-59 age bracket
- 12% in 60+ age bracket
- 19% in 50-54 age bracket
- 12% in 45-49 age bracket
- 6% in 40-44 age bracket
- 9% in 35-39 age bracket
- 7% in 30-34 age bracket
- 8% in 25-29 age bracket

Hiring Slow-down

1977-84 Hiring Boom

Retirements

Geoscience Workforce

Age (YRS): 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60+
Career Forecasts – by 2021

262,627 geoscience jobs today

~130,000 geoscientists expected to retire by 2021

72,000 geoscience job growth by 2021 (BLS)

15,000 total new graduates (MS or PhD)

OR

45,000 total new graduates if also hiring BS/BA

Net deficit of over 150,000 geoscientists by 2021
Two Major Concerns

• Recent drop in the price of oil (down about 50%)

• Number of Geoscience Majors is high

a recent AAPG/SEG Student Expo
Some History: 1946 to 1970

- US demand was less than our production capacity – the spigots were not open 100%
- We did not require imported oil to meet our needs
- Oil prices were quite stable
More Recent History: 1970 - 2014

- US demand **exceed** US production capacity – the spigots **were** opened 100%
- Henceforth we **required** imported oil to meet our energy needs
- World economic and political events drive price extremes
  1. Concerns over supply disruptions
  2. Production quotes of suppliers
  3. World financial instabilities
  4. Production from Unconventionals

*Late 1973 Oil Embargo led to long gas lines*
1. Concerns over supply disruptions
2. OPEC Production quotes of suppliers
Oil Prices: 1988 - 2014

1. Concerns over supply disruptions
2. Production quotes of suppliers
3. World financial instabilities
4. Production - Unconventionals

- Oil Price: $/Bbl
- Real Oil Prices ($2014)
- OPEC Prod. Up to 28 MMBpd
- OPEC Prod. Varies
- OPEC Prod. Averages 30 – 35 MMBpd

Events:
- 9/11 Attacks
- Arab Spring
- Gulf War
- PDVSA Strike
- Asian Growth
- Low OPEC Spare Capacity
- Recession
- Japan in Recession
- Europe on Brink
- Oil Shale Growth
- OPEC Maintains Production to Retain Market Share

Graph showing oil price fluctuations with key events and OPEC production levels.
Current Price Collapse

• Significant production from unconventional has added to our supply

• OPEC has not reduced production (as they traditionally would have)

• We have a slight over-supply (more produced in a day than consumed – exasperated by sluggish global economy)

• This has caused oil prices to drop ~50%

• Wells, especially in unconventional fields, are being shut in, which will lower daily production and eliminate over-supply

• With time, supply and demand will come back into balance and prices will stabilize at $__ /barrel
Now – The bright side!

- Hiring will be hampered over the short term, but those new to the workforce are the ones able to capitalize on the next upturn!

- While many areas of the industry are affected (especially service and exploration companies), the geoscience community is far more diverse than in previous downturns, and many opportunities are available in government, academia, and other areas of the hydrocarbon pipeline.

- And, as upstream companies are cutting because of oversupply, downstream companies are profiting on the growing high-demand of products – US motorists aren’t slowing down!

- Demographic trends continue to work in the favor of early career professional’s over the long run.

- Global, and increasingly, American energy production and demand remains positive and geologist will be needed to continue that trend.
Now – The bright side!

The largest percentages of those released are those over 55 or with less than 5 years of experience – with many those over 55 not returning when hiring returns only exasperating the problem of the lack of talent to replace the retiring late-career professionals.

Oil prices have stabilized and even appear to have begun to rebound slightly, students that can make it through the next year/18 months are positioned nicely for the next recovery!
Continuous change is the norm for energy markets

- **Changing energy mix**
  - gas fastest growing fossil fuel, coal the slowest
  - continued rapid growth in renewables

- **Changing energy trade patterns**
  - increasingly flowing from West to East

- **Changing the carbon emissions path?**
  - no silver bullet, need action on many fronts
  - let the market pick the winners
Continuous change is the norm in the energy industry

- Today’s turbulence is a return to business-as-usual.
- The energy mix changes.
- The balance of demand shifts.
- New sources of energy emerge, such as shale gas, tight oil, ultra-deep water oil or renewables.
- Economies expand and contract.
- Energy production and consumption are affected by disruptions, from wars to extreme weather.
- New policies are created to address climate change or bolster energy security.
Global population and increases in income per person underpin growing energy demand

**Population**
OECD - Organization of Economic Co-Operation and Development Countries

**GDP**
Trillion, $2011 PPP

**Contribution to GDP growth 2013-35**
Trillion, $2011 PPP

- **Population growth**
- **Income growth per person**
Fossil fuels support most of the world’s energy even as it shifts towards lower carbon fuels.

Shares of primary energy

- Oil
- Coal
- Gas
- Hydro
- Nuclear
- Renewables*

2013-35 increments by fuel

- Billion TOE (tons oil equivalent)
  - World
  - OECD
  - Non-OECD

*Includes biofuels

BP Energy Outlook 2035
The power sector takes an increasing share of energy and plays a key role in the energy mix.

Inputs to power as a share of total primary energy:

- 20% in 1965
- 30% in 2000
- Projected to reach 50% by 2035

Primary inputs to power:

- Oil
- Coal
- Gas
- Nuclear
- Renew.
- Hydro

BP Energy Outlook 2035
Share of power from non-fossil fuels increases driven by the rapid growth of renewables

Share of world power generation

- Total non-fossil
- Hydro
- Nuclear
- Renewables

Growth of non-fossil power

- Thousand TWh (tera-watt hours)

OECD
- Renewables
- Hydro
- Nuclear

Non-OECD

1991-2013
2013-2035
1991-2013
2013-2035
Carbon emissions are rising too fast for comfort which could trigger additional abatement policies.

Options that achieve equal CO₂ emissions reductions*

<table>
<thead>
<tr>
<th>Abatement option</th>
<th>Change required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace coal with gas in power (% of total power)</td>
<td>1%</td>
</tr>
<tr>
<td>Add CCS to coal power plants (% of total power)</td>
<td>0.7%</td>
</tr>
<tr>
<td>Increase renewables power generation</td>
<td>11%</td>
</tr>
<tr>
<td>Increase nuclear power generation</td>
<td>6%</td>
</tr>
<tr>
<td>Improve vehicle efficiency</td>
<td>2%</td>
</tr>
<tr>
<td>Improve ‘other sector’ energy efficiency</td>
<td>1%</td>
</tr>
<tr>
<td>Improve efficiency of electricity production</td>
<td>1%</td>
</tr>
</tbody>
</table>

* Normalized for a 1% swing in the coal/gas mix in power generation, equivalent to 110 Mt CO₂. Estimates are based on energy shares in 2013.
Outlook for Careers in the Geosciences

- While the current price collapse has slowed oil and gas hiring in the short-term, long-term career potential is strong based on growth in population and gross energy demand.
- The changing energy mix is producing new career opportunities.
- Careers in government, non-profit, and academia are less affected by oil and gas prices and provide alternately rewarding career paths.
- Cyclical hiring trends are the norm in this industry, the high-reward of working in this industry is tempered by periodic corrections – Don’t panic, and use these times to learn new skills and make new connections, and be stronger when the cycle corrects to the upturn.
- The demographics of experienced professionals exiting the industry and without a sufficiently large mid-career workforce dictates the need for future new hiring and an excellent opportunity for students and YPs to capitalize.
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Section 2

Careers in Geosciences
Outline

• **Industry Context (Section 1)**
  – Where is the market going in the near and long term?
  – What are some of the causes of the current contraction?

• **Careers / Jobs in the Geosciences (Section 2)**
  – Geoscientist across the economy and in Government, Academia, and Industry
  – Broaden you experience and reach your desired level of education

• **How to Get Started (Section 3)**
  – Personal Stories
    • Story 1
    • Story 2
  – Interviewing
  – Placement
  – Networking
  – Young Professionals (YPs)

• **Q&A**
What do you want in a career?

- During challenging times – We must evaluate whether the oil and gas industry is the one we want to work in?

- Are there other industries or experiences that you would like to tackle when work is less prevalent in the traditional exploration path? Can that make you a better professional? Geosciences and technical abilities compliment many industries – Where are exciting opportunities outside of the geosciences?

- During contractions in the market – academic organizations may typically look to recruit those that went to industry during better times. Does the independence, flexibility, and ability to publish excite you? An opportunity to extend study and make a name with research.

- Work for the government? Exciting and wide ranging jobs exist in energy and geoscience in the government/non-profit space.
Career success doesn’t have to be limited to Energy!

**Thomas Kocher**

Was with Shell in the Netherlands and now with an insurance company in Switzerland.

Current position; risk engineer, providing the insurance business with a risk assessment perspective of the activities of their clients (petroleum companies across the upstream and downstream industry). His activity includes looking at exploration and well plans, assessing well integrity management program, surveying offshore installation or refineries.

“Studying geoscience and spending time in the oil industry has taught me a number of valuable skills to bring to the table in insurance: a broad general knowledge of the petroleum industry, familiarity with the terminology and mindset of our clients, strong analytical skills, and a deep technical knowledge of safety critical domains…”
Career success doesn’t have to be limited to Energy!

*Sujatmiko*

Was with **Total**-Indonesia and now busy with a gemstone business in Indonesia.

Initially it was just a hobby but in 1989 Sujatmiko formed a company, GEM-AFIA. Through this company he promoted gemology and helped people improve their knowledge and skill on gemstones.

“I’d suggest the young generation to see gemology as a business opportunity in the future. If you don’t have any skill, it will be difficult to start a new business”
Expand beyond traditional industry jobs

- Consider careers in government and pure research.
  - National Labs
  - Research institutions
  - USGS
  - BOEM
  - BLM
  - Department of State

www.usajobs.gov
University Careers in Geosciences

- University Research positions are immensely rewarding
  - Self-directed research
  - Opportunities to publish and present
  - Extended field work
  - Teaching and mentoring
  - Collaboration with colleagues
  - Career stability

Typically moderately-lower salaries, need history of publishing, and more challenging to find openings.
Which Degree Should I Get

• BS or BA
  – A geotech for a large company, not recruited
  – In the trenches for a small company

• Masters
  – Bulk of people in industry
  – Able to hold any position, may be hard to get into a research role initially

• PhD
  – Can be important for academia and research, but less so for exploration and development
  – Advisable if you want to do applied research for a mega-company
  – Advisable if you may want to become a Professor/Research Sci
  – Small difference in starting salaries for 2+ more years
How Can I Prepare?

• Undergrad Level

  – Excel in all your courses – high GPA
  – Take fundamental, classic geoscience courses
  – Get exposure to all disciplines – attend seminars
  – Scan professional society journals – take note of who is working on topics that interest you
  – ASAP decide on a sub-discipline
  – Choose a “senior topic” that you have a lot of interest in, work it well, be creative and application-minded
  – Search for undergraduate research position at the university or internships away from school
How Can I Prepare?

- Grad Level
  - Choose a high-caliber university with a great geoscience department
  - Excel in all your courses – high GPA
  - Take courses that will give the depth & breadth
  - Look for way to demonstrate leadership potential
  - Get some good work experience – internship
  - Choose a research topic that we have passion for; better to have a superb thesis topic on something unrelated to industry than a mediocre thesis
  - Gain interviewing experience, Polish your resume/CV – sell yourself
  - Get active in the school’s Student AAPG group and participate in IBA
  - Go to the local Prof. Geological meeting get to know the local geoscientists
  - Present research work whenever possible; posters, oral, symposia..
What does this all mean for today’s graduating geoscientists

- Careers in Geosciences remain important
  - Petroleum and minerals are cyclical industries that go through periods of hiring and lay-offs.
  - Roles of geologists have diversified greatly over the past 30 yrs.
- Long term
  - We will need a lot of geoscience professionals to replace those retiring and to accommodate the predicted job growth.
- Short term
  - Currently it is a time when companies are cutting expenses
  - Starting a career in the short term may be challenging
  - Companies will be very selective
  - Great qualifications and a lot of effort
  - When oil prices rise and stabilize, hiring will spike to make up for the slowdown
Industries where graduating students have accepted a job in the geosciences

- Research Institute: 21%
- Oil & Gas: 22%
- Federal Government: 14%
- State or Local Government: 7%
- Other: 11%
- 4-Year University: 43%

Source: AGI Workforce Program, 2013
The Breakdown: Workforce Trends

2013 Median Annual Salaries for Geoscience-Related Occupations

- Management Occ.: $128K
- Engineering Managers: $117K
- Petroleum Engineers: $132K
- Natural Science Managers: $96K
- Environmental Engineers: $104K
- Geologists: $87K
- Petroleum Engineers: $82K
- Hydrologists: $75K
- Soil and Plant Scientists: $61K
- Geographers: $61K
- Atmospheric and Space Scientists: $59K
- Geologic and Petroleum Protection Technicians: $42K
- Environmental Scientists and Specialists: $59K
- Meteorologists: $65K
- Environmental Science and Protection Technicians: $53K
- Marine and Fisheries Scientists: $46K
- Education, Training, and Library Occ.: $53K
- Postsecondary Teachers: $42K
- K-12 Teachers: $52K
- Engineering Postsecondary Teachers: $46K
- Science and Mathematics Postsecondary Teachers: $42K
- Atmospheric, Earth, and Marine Sciences Postsecondary Teachers: $53K
- All U.S. Occupations: $35,080
Recent Oil and Gas Industry Salaries:
0 – 2 Years Experience

<table>
<thead>
<tr>
<th>Degree</th>
<th>B.S</th>
<th>M.S</th>
<th>Ph.D.</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>$92,000</td>
<td>$104,400</td>
<td>$117,300</td>
</tr>
</tbody>
</table>

Source: AAPG Explorer
Resources identified by students as useful for finding geoscience jobs

- Personal Contacts
- Student Organization
- Faculty Referral
- Conference Networking
- Professional Society
- Internet Job Board
- College/University Career Center
- Campus Recruiting Event/Job Fair
- Other

Source: AGI Workforce Program, 2013
The Breakdown: Workforce Trends

US Geoscience Degrees Granted
1973 - 2014

Source: AGI Workforce Program, 2015
Things to Consider for a First Job

- Salary, vacation, work hours
- Location
- People & facilities
- Training program
- Benefits, includes a pension
- Job and work environment (Government, non-profit, Industry, or Academia)
- Stability
- Bureaucracy
- Initial assignment
- Opportunities to grow/move
### Big vs. Small Companies

<table>
<thead>
<tr>
<th>A BIG company</th>
<th>A SMALL company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competition is great</td>
<td>Competition is still high</td>
</tr>
<tr>
<td>Work with great minds</td>
<td>Work more friendly</td>
</tr>
<tr>
<td>Pressure to perform</td>
<td>A bit less pressure</td>
</tr>
<tr>
<td>Can specialize</td>
<td>Jack of all trades</td>
</tr>
<tr>
<td>Able to shift a lot</td>
<td>Not much latitude</td>
</tr>
<tr>
<td>May rank below average</td>
<td>May rank above average</td>
</tr>
<tr>
<td>No special treatment</td>
<td>Individual rewards</td>
</tr>
<tr>
<td>Mega-bureaucracy</td>
<td>Less bureaucracy</td>
</tr>
</tbody>
</table>
What If I Graduate Soon?

A Two-Pronged Strategy

**ENERGY INDUSTRY**
Market yourself to industry
- Apply online
- Polish CV
- Prepare poster
- Present at Expos
- Interview when possible
- Network
- Attend professional society meetings
- Be seen, shake hands, etc.

**OTHER INDUSTRIES**
Market yourself as:
- An accomplished scientist
- A skilled data analyst
- Highly computer literate
- An educator
- Someone interested in business & finance
- Other skills and areas of interest you have acquired
Attrition, Growth and Replacement in the next 10 years in the U.S.

297,000 geoscience jobs exist today (BLS)

143,000 geoscientists expected to retire by 2022 (AGI)

43,000 geoscience job growth by 2022 (BLS)

16,000 new MS/PhD + 35,000 BS/BA graduates (AGI)

51,000 total new graduates (with BS, MS and PhD)

Net deficit of over 135,000 geoscientists by 2022

Equals

Age Distribution of Geoscientists Employed in the Federal Government

Percentage of Total Geoscientists

Age Group
Most oil and gas professionals experience a “change” in employers at some point in their careers – but it doesn’t mean it’s a negative, it’s just a change.

Case Study: **Dr. Kitty Milliken**

Graduate with PhD from the University of Texas in 1985
Hired Exxon 1985
Released in 1986 (Exxon budget cuts)
Returned to UT as Research Assistant in 1986
Taught and performed research at UT until 2006
Joined the Bureau of Economic geology and now Senior Research Scientist

Numerous awards
ground breaking publications
Scientific recognition

“I like research because I like uncertainty, you don’t know what it means so, you go and find out”

She was successful because she was smart, hard working, had an scientific interest and the ethics to see it through. The change in career path did not slow her down!
• In the current contraction, the traditional tract of hiring will be more challenging, decide if the energy industry is right for you, and if so, consider a tangential path (business, statistics, environmental, management) that can get you to a successful career and make you a stronger, more desirable geoscientist.

• Consider altering your academic path by adding additional classes, another degree, or post-doc work. Look for academic research projects that gain you additional experience.

• Careers in government, non-profit, and academia are less affected by oil and gas prices and provide alternately rewarding career paths.

• Evaluate your career desires, and don’t be afraid to try new avenues that can strengthen and broaden your skill set. These connections and skills will be valuable assets during the next industry expansion!
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How to get Started
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  - Networking
  - Young Professionals (YPs)

• Q&A
Personal Stories

Two Examples of how experienced geoscientist had both exciting and rewarding careers in exploration and academia even with the complex nature of the oil and gas industry!
Example 1 – A Training & Career Path

1968

LEHIGH UNIVERSITY

4 years, B.S. in Engineering Physics

Lamont-Doherty Earth Observatory

5 years, M. Phil. and PhD in Marine Geology

Columbia University | Earth Institute

32 years, EPR-URC Seismic R&D, Training

Exxon Research

1972

ExxonMobil Research

6 months as a Visiting Lecturer

ACCIES

3 years as a Tutor

Texas A&M University

3 years as a Geological Advisor

NAUTILUS

2015

noble energy
Coming Out of Grad School

I Was Triple Blessed:

1. Industry just started a hiring boom
2. I received an offer from Exxon Research
3. I was assigned to the Seismic Stratigraphy section and was mentored by:

The Fathers of Seismic Startigraphy

Pete Vail
Bob Mitchum
My Areas of Study

Specialties
- Seismic Interpretation (2D & 3D)
- Seismic Stratigraphy
- Basin Modeling
- Seismic Attribute Analysis
- Volume Interp & Visualization

Main Tasks
1. R&D New Interp Methods
2. Apply New Interp Methods
3. Training/Mentoring

Basin I've Studied 6+ months
Finding and nurturing my passion for geology:
A career is a life long Journey

Pre-college
- M.Sc. & B.Sc. Geology
- Summer programs in oceanography
- Natural aptitude for science
- Encouraging parents
- 7th grade science teacher
- Jacques Cousteau and Diver Dan TV shows

M.Sc. & B.Sc. Geology
- 32 year career as a Geologist / Executive in the Energy Industry
- Independent research / Field work
- Great people
- Freshman physical geology class hooked me

The Future
- Re-defining my passion
- Volunteering with AAPG
- STEM Education
- Ceramics / Gardening

My Age
Formal education… building a solid foundation

B. Sc. Geology
- Senior Thesis
- Optical Mineralogy
- Petrology
- Structure
- Stratigraphy
- Geomorphology
- Oceanography
- Micropaleontology
- Sedimentology
- Coastal Processes
- Mineralogy
- Historical Geology
- Physical Geology

M. Sc. Geology
- Geophysics
- Micropaleontology
- Geol. Oceanography
- Basin Analysis
- Seminars:
  - Paleontology
  - Geochemistry
- Thesis: Fluctuations in the West Antarctic Ice Sheet during the Miocene: Evidence from ice rafted sediments
- Teaching Assistant: Physical Geology and Mineralogy Labs

Science & Math
- Physics
- Chemistry
- Biology
- Introduction & Intermediate Calculus

Liberal Arts
- Native American Religions
- Imperial Russia
- Survey Art History
- French (3 years)
- Economics
Staying competitive throughout a career requires continuous growth.

**Stay technically relevant**
- Business School / Leadership
  - Manager of the Future
  - Change management
  - The New Global Business Environment
  - Leading Innovative Organizations
  - Developing Managerial Excellence
  - Developing International Leadership Skills

**Develop your interpersonal and communications skills**
- Personal Development
  - Ethics
  - Inclusion
  - Breakthrough training
  - Communicating effectively under pressure
  - Basic and advanced facilitation
  - Diversity awareness
  - Facilitation

**Be involved**
- Professional Associations / Community Involvement
  - BP Federal Activities
    - Global subsurface technology network
    - Global business initiative to improve the role of women
    - University recruitment
  - Community Involvement
    - Science by Mail Program mentor Houston Children's Museum
    - Career Mentor: Booker T. Washington High School
    - Houston Geological Society: Continuing Education Committee

**Technical**
- Lots of geology courses
- Drilling practices
- Reservoir engineering
- Petroleum economics

**Keep your technical skills sharp and understand what other disciplines do**
- Career Years
The start of my career!

1st job as a well site geologist on the North slope of Alaska in 1981.

Wide eyed 24 year old
....My Career Path

30 years 2011
Leveraging all the pieces

Finding my leadership voice

Expanding Horizons

10 years 1991

Learning a trade

0 years 1981

30 years 2011
20 years 2001
10 years 1991
0 years 1981

Historical BP Geoscience Career Development Map
Events that rocked my world and shifted my path.

<table>
<thead>
<tr>
<th>Geoscience</th>
<th>Commercial</th>
<th>Technology Leadership</th>
<th>Asset Leadership</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VP Resource Appraisal</td>
<td>VP Paleogene Technology Flagship</td>
<td>Gulf of Mexico Oil Spill</td>
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<td>Creating my own future – Declaring what I wanted to do landed my dream job</td>
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<td>Taking a career risk led to delivering something extraordinary</td>
<td>Geoscience Technology Unit Leader</td>
<td>Sub Salt Imaging Technology Leadership Director</td>
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<tr>
<td>Career disappointment / Not getting what I wanted forced me to broaden my skills to be more competitive</td>
<td>Resource Manager North American Gas</td>
<td>Exploration Group Ldr Gulf of Mexico</td>
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<td>Personal illness Learned not to be afraid to fail Found love</td>
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<td>Business Development GoM</td>
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<td>Snr. Development Geologist Azerbaijan</td>
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<td>Commercial / Planning Analyst</td>
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<td>Development Geologist North Sea</td>
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<td>Exploration Geologist Gulf of Mexico</td>
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<td>Operations / E&amp;A Geologist Alaska</td>
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<td>Going on an adventure Seeing the world</td>
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<td>Embracing the unknown. Be flexible</td>
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A sense of adventure & a desire to see the world
Personal learning

- People get out of the way of someone who knows where they are going
- Content matters / Stay technically relevant
- Ethics matter
- Be flexible and willing to step outside your comfort zone
- Unexpected rewards of taking a risk
- Life occurs
What If I Graduate Soon?

Consider extending your stay in University?

Post-doc or research positions in universities are an excellent mechanism to grow scientifically while weathering the short-term Industry cycles and lack of employment.

This will give you continued access to recruiting, computing, and further research opportunities.

Consider additional degrees – While difficult to consider, additional degrees in business, geoscience, engineering, computer science could have a great long term benefit.
What If I Graduate Soon?

Explore your Universities resources

Don’t neglect your University recruiting and placement offices

– Attend resume and writing workshops
– Attend out of department presentations
– Reach out to professors for advise and what they are hearing in terms of hiring
– Participate in IBA competitions in 2016
– Participate in mock interviews
What If I Graduate Soon?

Market yourself relentlessly!

Present your undergrad and/or graduate research at all applicable venues.

- Internal symposiums
- Local society meetings
- As well as regional or national/international meetings

Fully spend out any presentation or development funds. Use these opportunities to network, show off your work, and hone your presentation skills.

Posters are generally more work, but in many cases, more impactful.
### Different Types of Networking

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<thead>
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<th>Informal</th>
<th>Formal</th>
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<tr>
<td>Conferences</td>
<td>Conferences</td>
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<td>Out with friends</td>
<td>Informational Interviews</td>
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<tr>
<td>On the street</td>
<td>Networking lunches</td>
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<tr>
<td>Anywhere</td>
<td>Career fairs</td>
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“It’s great to identify what [your] dream job would be, and it’s great to pursue it, but don’t pursue it too doggedly so that you don’t see other opportunities out there … The one thing that everyone should take away from every job they’ve ever had is that you learn something in anything you do: you should be developing some skill set that comes out of that. And you build on that. I learned much of my people management skills from being a bartender!”

-Vicki McConnell, Oregon Department of Geology and Mineral Industries
Now incoming Executive Director at the Geological Society of America
“At the end of the day, the most important [elements to being extended a job offer are] a combination of your technical skills plus your people skills. Clicking with a recruiter is the most important step to go forward in the interviewing process ... A recruiter friend of mine told me, ‘I know with[in] only the first 2 minutes of meeting a candidate if I will call him/her for a second interview.’”

- Juan Herrera, Schlumberger
“COMMUNICATION, communication, communication. When you’re in undergrad for a technical degree you’re sitting there and you’re stressing over, ‘how am I going to be a better forecaster and what computer language do I have to learn next?’ Honestly, at my job I spend most of the day communicating with customers. And it was nerve-wracking at first, learning how to explain technical information to a lay person is really important, and that’s something you don’t learn in undergrad.”

- Carrie Suffern, National Weather Service
“If students want to get into the environmental or consulting field, I would recommend that they… Find engineering and consulting firms in their area. And not necessarily look for somebody that is advertising, but just find a contact with each company, send a cover letter and a resume, and then follow up with an email and a phone call. A lot of opportunities don’t get advertised. If your resume crosses a desk, and somebody’s looking to fill a position, you can get a job without having to wait for something to be advertised … That’s the networking thing: Get your qualifications out to as many people as you can [and] talk to as many people as you can.”

- Mike Lawless, Draper Aden Associates
What If I Graduate Soon?

Consider volunteering on committees!

Network – Get involved in your local Societies (Scholastic, Environmental, or Geological).

GCAGS Annual meeting 2014

If you have an interest in working in the Energy Industry – Look for AAPG affiliated societies in your area. They are some of the best ways to meet more experienced geoscientist and make long lasting connections. Offer to work on committees and convention teams.

While degree and scholastic performance may be most critical for the first opportunities, Typically your second job will be based on reputation and your network of connections.
Local Society Networking Events

http://www.aapg.org/about/aapg/leadership/sections
Refer to this website for a list of all Sections

http://www.aapg.org/about/aapg/leadership/regions
Refer to this website for a list of all Regions

Many jobs (possibly 90%) are not advertised and only acquired through networking. There are hidden opportunities at all times during your career.
AAPG Services

AAPG Career Center
• Resources
• Job postings
• Recruiter information*
• Available at meetings

AAPG Division of Professional Affairs
• Layoff Triage Tool*

AAPG Education Services
• Career-focused digital newsletter*

*Not yet available
Networking

Where can I network with professionals outside of the AAPG? Consider YPE

YPE members have access to a network of 40 chapters worldwide with: Engineers, landmen, financial analysts, lobbyists, governments employees, accountants, attorneys, commercial and investment bankers, A&D professionals, principal investors, consultants, roughnecks,
• **Mission:**
YPE aims to facilitate the advancement of young professionals in the energy industry around the world through social, educational and civic service oriented events.

• **Vision Statement:**
YPE prepares its members to be the best leaders for their communities and for the global energy industry.
Societies with YP and Student Opportunities

- Networking
- Education
- Speaking
- Travel and grants
- Cross-discipline
- Research opportunities
Networking

What is networking? It is NOT you trying to get something out of someone else! It is you promoting yourself and getting to know people who can benefit by you and your expertise. It is a WIN-WIN situation.

Networking:
- Is a spectrum of activities
- Begins with an informational, informal interview or introduction
- Is a series of correspondence and actions that add value to both relationships
- Ends only when one or both parties 'drop dead'

What to do?
- Get on LinkedIn ASAP; your resume is your profile
- Make a customized LinkedIn URL
- Make contacts by sending customized messages
• **When times are tough, get educated!**

• Lots of available courses offered through AAPG:

• [http://www.aapg.org/career/training#2168214-in-person-training](http://www.aapg.org/career/training#2168214-in-person-training)

• Bear Trap Scholarships offered for many Courses and forums – highly discounted rate for individuals who have been laid off

Richard Green – Reservoir Eng. for Petr. Geo
AAPG Short Courses

• Short Courses – One to two day course covering a broad list of topics:
  – http://www.aapg.org/Career/Training/In-Person/Short-Courses

• Field Seminars – Locations around the globe to key in on geological understanding and scale:
  – http://www.aapg.org/career/training#Field Seminar

• Forums – Attend talks to brush up on up to date topics across the industry:
  – http://www.aapg.org/career/training#Forum

• Workshops - Classroom courses that strengthen understanding of specific basins and/or geologic interpretation skillsets:
  – http://www.aapg.org/career/training#Workshop

• Online Courses – Cheaper alternative to workshops for those looking to further knowledge in various industry skills:
  – http://www.aapg.org/career/training#2168215-online-training
AAPG Short Course Discounts

• Discounts Available to Students
  – Student member discounts – reduction of cost for student members
  – Grad student projectionist program – help to make courses run more smoothly, and in exchange, be able to take the course

• “Get out of the Bear Trap” Discount – discount for industry professionals laid off during the down turn – up to a 75% discount on course costs!
Students and YPs: How to “weather the storm”

Hiring freezes and layoffs can happen in any industry, but there are a few things recent graduates and YPs can do to help improve their chances of getting and maintaining employment:

- Stay involved in professional and local societies
- Volunteer for committees
- Be engaged in internal groups
- Acquire a broad set of skills
- Take continuing education courses
- Demonstrate curiosity and a desire to learn
- Cultivate leadership and entrepreneurial qualities
- Network with individuals in multiple aspects of the industry
- Be active in the community and stay busy
- Don’t panic!
Be positive and fight on!

- Forecast is for a steady demand for Geoscientists over the next 30 year.
  - Short term may be challenging
- Diverse geosciences career options exist
- Find and follow your passion, love what you do!
- Be technically strong and grow scientifically
- Remain competitive by gaining new skills
- Develop a strong network and stay connected
- Be involved, Be involved, Be involved
Questions?
Possible Questions from Students

Career Path & Advancement
Did you do something to make yourself stand out?
How did you end up studying Geology?

What are some of the key tips that you can offer to us that you can take away from your journey through the petroleum industry?
Which was more stressful/Demanding: Working in Explorations, or production/development?

With the extensive travel that her positions have afforded her, what is the place that upon recollection can still bring a smile to her face and why?

Geology/Technical/Technology Questions
What is the most "geologically interesting" basin you have worked in?
Would you advise students to be technologically savvy if they're majoring in the geosciences? For example, knowing how to code and learning GIS?
What motivated you to find a new imaging technology strategy? Was there a specific point in your career or research where you realized a change in strategy needed to be explored?
Possible Questions from Students

Organizational Leadership, Community Engagement, and Work-Life Balance

How did you motivate people to reach out beyond what they thought was possible and embrace challenge in pursuit of an idea?

How great is the importance of being involved with the community outside from work?

In your personal experience as a professional is it important to have a work-life balance or is it more of a work-life integration atmosphere?

What is the best strategy for students interested in petroleum geology careers during a downturn like now?

Clearly, there are reduced immediate opportunities to be hired, so what is the best course of action for a student not fortunate enough to get an offer for an internship or full-time position?

What initial career path would best prepare them and make them most attractive to be hired when things turn up again?
Career Opportunities in the Energy Industry

Addressing the concerns of early professionals and students

Additional material

“What Geoscientist do”
What We Do in the Energy Industry

- Exploration
- Production
- Marketing
- Refining
- Downstream
- Upstream
What We Need for Success

A Very Simple View

A “Kitchen” Where Organic Material Is Cooked

“Plumbing” To Connect the Container to the Kitchen

A “Container” From Which Oil & Gas Can Be Produced

Correctly Placed Wells

Reservoir Trap Seal

Migration

Source
Example: North Sea

Brent Sandstone
- Reservoir rock
- Migration Pathway
- Coals can generate gas

Schroeder & Sylta, 1993
Example: North Sea

Heather & Sognefjord Shales

- Organic poor
- No HC potential

Schroeder & Sylta, 1993
Draupne Shale
• Primary Source Rock
• More than 15% organic matter
• Can generate oil & gas

Example: North Sea

Schroeder & Sylta, 1993
Example: North Sea

**HC Generation & Expulsion**
- Gas expelled from Brent Coals
- Oil & gas expelled from Draupne

Schroeder & Sylta, 1993
Example: North Sea

HC Migration to Traps
• Percolates into Brent sands
• Molecules move through Brent sands and up fault planes

Schroeder & Sylta, 1993
Example: North Sea

HC Fill & Spill
• Late gas displaces early oil in deeper traps
• Shallow traps fill with spilled oil

Schroeder & Sylta, 1993
Career Opportunities in the Energy Industry

Addressing the concerns of early professionals and students

Additional Material

Anxiety during the downturn
Uncertainty in the Oil Patch - How do you know you have anxiety?

Problems sleeping
Shortness of breath
Heart palpitations (racing heart)
Irritability
Nausea
Muscle tension
Inability to be still or calm

Unaddressed ongoing anxiety is
1. bad for your health,
2. bad for your relationships and
3. can lead to distraction on the job (refer to points 1 and 2)
Healthy ways of Coping with Stressful Situations

RELAX!
- Deep breathing
- Music
- Get a massage
- Practice Yoga
- Meditation (close your eyes, breath for 5 min)
- Soak in a hot tub!
- Escape – go to a movie, play a computer game, veg out a bit

Get Adequate Sleep – It is important to get enough rest.
Exercise Daily – it doesn’t have to be a daily marathon, but do something.
Try and eat a healthy diet.
Think about yourself – Stay calm!
Healthy ways of Coping with Stressful Situations

- Do Your Best – Stop aiming for perfection. Just be proud of your accomplishments. All you can do is the best YOU can do.
- Accept that you can not control EVERYTHING! But you can influence how you respond to things.
- Put your stress in perspective. Is it really as bad as you think?
- Welcome humor. A good laugh goes a long way.
- Get involved – Volunteer, find ways to get involved in your community that gives you a support network and a way to process everyday stress.
- Talk to someone. Tell friends and family that you are feeling overwhelmed and that they can help.