

March 2006

MGS Luncheon  
Meeting Schedule  
for March 2006

**Wednesday, March 1,**

MGS Luncheon, "A Systematic and Predictive Look at Phanerozoic Carbonate Reservoirs", AAPG Distinguished Lecturer, James R. Markello, Elks Club, 11:45 am, \$11.00.

**Tuesday, February 28th,**

*note date change -* SPE Luncheon, "Reserves from Unconventional Reservoirs", SPE Distinguished Lecturer, W. John Lee, Billings Petroleum Club, 11:30 am, \$ 18.00, Reservations Contact – [jgilblom@gilblomengineering.com](mailto:jgilblom@gilblomengineering.com).

**Wednesday, March 15,**

MGS Luncheon, "Applying Deltaic and Shallow Marine Outcrop Analogs to the Subsurface", AAPG Distinguished Lecturer, Janok Bhattacharya, Elks Club, 11:45 am, \$11.00.

**TO RSVP FOR MEETINGS:**  
**Call Colleen Duffy ,**  
**406-252-7921.**

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## President's letter...

We have had a very busy few months since I inherited the role of MGS president. We have had special gatherings for the annual MGS Christmas party, the MGS Teacher of the Year award, and the Past President's party. Each of these occasions has opened my eyes to the value of our organization.

Everyone seemed to enjoy the Christmas party as covered in the last newsletter. It is hard to beat the great food, drinks, and socializing that make the annual MGS Christmas party a great event; special thanks to the organizers and donors.

The MGS Teacher of the Year was awarded to Jim Schulz of Helena High School. He has clearly demonstrated many different ways to enlighten students of the importance of geology in our everyday lives. He has accomplished this in a way that catches the students' interest, which is a great start towards learning. In addition to the MGS award, Jim was nominated to RMS-AAPG Teacher of the Year and National AAPG Teacher of the Year. He won both awards. All MGS members can be proud of our choice and I congratulate Jim in his accomplishments. It was a real treat to have Jim's brother-in-law, Scott Tinker, speak at the awards luncheon. Scott is the Director of the Bureau of Economic Geology at the University of Texas in Austin, the State Geologist of Texas, and holder of the Edwin Allday Endowed Chair in the Jackson School of Geosciences. His topic, "Global Energy: Resources, Technology, and Talent" was very timely and informative to me. I was especially interested in his discussion of the role of compromise and the role of science in developing our natural resources. Special thanks to Rob and Betsy who did the lions share of work in the process leading up to the Teacher of the Year award. Additional thanks to Betsy for throwing a great pizza party.



Jim Schulz receiving the MGS Teacher of the Year Award from Jon Reiten.

At the Past President's party, I had the task of roasting last years' president, David Lopez. The tradition carried on by this event is another great part of MGS. This was a great event and the roast was successful; even though I was not able to present David with a past president's pin and plaque signifying his accomplishments. The omission of the plaque was my oversight and I will see that David receives it soon. We are in the process of ordering new pins to make up for a several years backlog to past presidents. The MGS also presented another award, a Distinguished Service award, to Ted Campen acknowledging his years of mentoring individual MGS members in the art and science of geophysical log interpretation. Thanks again to Betsy and all the MGS Board who organized this event and the donors who made this party a success.

There are several speakers scheduled for upcoming luncheons. Check the schedule for dates and locations. Many MGS members are working on organizing the Rocky Mountain Section AAPG conference which is coming up in June. There is a lot of work going into this event and I am looking forward to the conference. In closing, I would like to say that this has been a very busy and enjoyable year and there is much more to come!

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Bob Schalla, Newsletter Editor at  
(406) 656-1647.

## “QUOTE OF THE MONTH”

“To this purpose the philosophers say that Nature does nothing in vain, and more is in vain when less will serve; for Nature is pleased with simplicity, and affects not the pomp of superfluous causes.”

- Sir Isaac Newton, “Rules of Reasoning in Philosophy,”  
*Principia Mathematica, 1687*

## THANKS ...

The MGS would like to extend a special thank you to Billy Roberts and the Rocky Mountain Section Foundation for their generous contribution to the Rocky Mountain College microscope fund. We would also like to thank the Foundation for the financial assistance provided to the MGS for our Earth Science Teacher of the Year presentation on January 18, and the beer and pizza soiree that evening. Thanks also to Betsy and Ted Campen for hosting the evening gathering and for all their hard work on the MGS Education Committee.

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## Abstract:

*note date change - February 28th*

## Reserves from Unconventional Reservoirs

SPE Distinguished Lecturer  
Dr. W. John Lee  
Director of the Center for Unconventional  
Resources at Texas A&M-  
Crisman Institute for Reservoir Management

Growing shortages at rates that markets require have increased the importance of unconventional sources of hydrocarbons, such as tight gas, coalbed methane, heavy oil, shale gas reservoirs, and gas hydrates. This presentation will address the role and importance of unconventional resources, status of critical technologies required to assess and develop these resources, and major research needs.

Submission Deadline for the MGS Newsletters is the **10th** of each month. Submit requests to Bob Schalla, [ras@mcn.net](mailto:ras@mcn.net), 656-1647 or Lisa Reinschmidt at [lreinschmidt@worldnet.att.net](mailto:lreinschmidt@worldnet.att.net), 406-248-7026.

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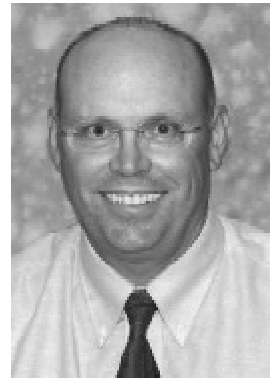
**Abstract:**

# **The Carbonate Analogs Through Time (CATT) Hypothesis – A Systematic and Predictive Look at Phanerozoic Carbonate Reservoirs**

*AAPG Distinguished Lecturer*

*James R. Markello*

*ExxonMobil Upstream Research Co., Houston, TX*



The Carbonate Analogs Through Time (CATT) Hypothesis defines an approach for developing systematic evaluations and predictive models of Phanerozoic carbonate systems and reservoirs for use in exploration, development, and production businesses. The CATT hypothesis simply stated is: “insightful, high-confidence, age-specific predictive models for carbonate systems and reservoir occurrence, composition, stratal attributes, and reservoir properties can be developed by summing the ambient conditions of the carbonate processes and Earth processes at any geologic age.” We term these models age-sensitive patterns. The hypothesis is built upon the knowledge that demonstrates carbonate and Earth processes have differentially varied throughout Phanerozoic time. These processes include: 1) ecologic, oceanographic, sedimentologic process-based controls on carbonate factory development; 2) stratigraphic and accommodation process-based controls on carbonate stratal architecture; 3) secular trends of evolution, grain mineralogy, tectonics, climate, eustasy, ocean circulation, and ocean chemistry. Two key research products are a poster of secular varying geologic controls synchronized to the time-scale, and a global atlas containing 29 paleogeographic maps with details of known Phanerozoic carbonate systems/reservoirs and age-sensitive patterns.

1. Developing an “age-sensitive pattern” is when the paleogeographic map-view configuration and spatial relationships of carbonate systems are convolved with the ambient states of the carbonate and earth processes for that time period. The Ellenberger formation and reservoirs of west Texas are representative carbonate systems/reservoirs basis for the Cambro-Ordovician time-based theme. Expectations for typical Cambro-Ordovician carbonate reservoirs are 1) meter-scale peritidal mud-dominated cycles, 2) thin bedded, heterogeneous layering, 3) thrombolitic/ microbial buildups only, 4) moderate reservoir quality from dolomitization, 5) karst porosity beneath the top-Sauk unconformity, and 6) locally fracturing.

2. Sometimes there are significant differences between carbonate systems and reservoirs within a geologic time period or age. The CATT Hypothesis and Atlas provide an approach and tools for comparative analysis between coeval systems that gives insight for causes of differences. An example is contrasting Late Jurassic systems/reservoirs of the Arabian Basin (Arab Formation fields) with those of the northern Gulf of Mexico (Smackover Formation Fields).

3. The utility of these tools for analog selection is illustrated by explaining the heritage-Mobil example of farming-into Tengiz field in the mid-1990’s. Buying equity in a field under development requires knowledge of field value (working-interest EUR) and measure of investment return. Typically, these numbers are derived by simulation. Mobil engineers asked for the best field/reservoir analog on which to base a Tengiz simulation. Would Arun field (Miocene) in Indonesia be okay? We answered absolutely not! Based on our CATT approach, the best analogs would be Devonian/Carboniferous fields in the Volga-Ural trend or North America.

4. The CATT Hypothesis coupled with basic concepts of carbonate geology, sedimentology, and stratigraphy can be used to construct many different types of predictive concepts. These can range from very simple to quite complex. A simple CATT-based predictive concept is “Late Permian ramps will lack major framebuilt boundstones, be peloid/ooid-dominated, and be mostly dolomitized with associated evaporites. A more complex predictive concept is “for platforms formed during ice-house times (Late Carboniferous to Early Permian; Late Tertiary), 4rd-order high-amplitude, high-frequency sea level changes result in vertically discontinuous sequences with internal lateral facies heterogeneities; marginal boundstones will be vertically separated.

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**JOHN E. GRAUMAN, JR.**

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PETROLEUM GEOLOGIST

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### **Wyoming Website Information**

The Wyoming State Geological Survey’s quarterly publication, Minerals Update, which details developments and activities in Wyoming’s minerals industry is now available online. Articles are available for download and viewing in PDF format from the WSGS website [www.wsgs.uwyo.edu](http://www.wsgs.uwyo.edu). Click on “Wyoming Mineral Updates” in the “Featured Links” section of WSGS home page or go directly to [www.wsgs.uwyo.edu/djvu/default.aspx](http://www.wsgs.uwyo.edu/djvu/default.aspx) and select “Wyoming Minerals Updates.”

While you are at it, you might also like to check out the Wyoming Geological Association’s website at: [www.wyogeo.org](http://www.wyogeo.org). They have their current luncheon speakers listed, along with available publications, membership application, mudlogs and their current newsletter.

## a note from the editor ...

### 2006 NAPE Expo

For those of you who were unable (or unwilling) to attend the recent winter NAPE Expo in Houston, I thought I'd offer my overview of this event; which has evolved into perhaps the most significant annual meeting for the petroleum industry in the U.S. The word I got was that this year's NAPE was the biggest ever (big surprise), with something like 15,000 registrants. Being "pinned-down" in my own booth, I was unable to spend much time investigating available prospects, but I can attest to the fact that it took a long time to traverse the length and breadth of the exhibit hall. Buyers seemed to be out-in-force and from the number of "sold" signs I saw, a lot of deals were being closed. On a personal note, a guy I worked with back in 1979, and hadn't seen since, tracked me down to say "hi". So even if you don't sell a prospect, it remains a great place to maintain your industry contacts.

Inevitably people ask whether I sold any of my deals while I was there. So I am happy to report that I did. The first one was sold to a guy who apparently forgot to bring his checkbook with him (a totally unintended oversight on his part). He wanted my prospect so badly that he asked me to stop showing it while he ran down to an ATM near the convention center to get the cash. I don't know what happened, but I never saw him again. Maybe he got run over by one of those big busses outside the convention center. Anyway, now I can't seem to find his business card either. In any case, I expect to be hearing from him any day now.

The other deal I sold was even better. This guy was some kind of Prince from Lagos, Nigeria. The amazing thing was, he wanted to buy **ALL** of my prospects, even some I haven't generated yet! Apparently he has a lot of money stashed away in Nigeria and all I had to do was send him my Social Security number and a bunch of information on my bank accounts. Once he checks me out, he is going to wire transfer not only the prospect fee, but enough money to drill a well (or two?) on everyone of my prospects! Wow! The money hasn't shown up yet, but I plan to check with my bank again tomorrow.

The bottom line??? If there is any money in my bank account next year, I think I'll use it to go to NAPE !



Ted Campen receiving his Distinguished Service Award from Mac Clark (nice tie Mac!).

MGS Past President David Lopez with wife, Carolyn, looking suitably uncomfortable at his roasting. (At least Don French is having a good time).



**Happy Birthday, Bill !!!**

William Smith, surveyor, canal digger and primordial geologist, was born on March 23, 1769, in Oxfordshire, England.

## ENERGY DEPARTMENT REVISES ENERGY PRICES FORECASTS

On December 12, the Energy Information Administration of the Department of Energy revised their 20-year forecast on energy prices. They concluded that oil prices will remain near \$45 per barrel and average about \$54 per barrel in 2025 compared to earlier projections of prices dropping to \$30 per barrel. They also predicted lower prices for natural gas, falling from current highs of \$14 per thousand cubic feet to less than \$5 per thousand cubic feet as long-term demand, especially for electricity production wanes.

They also scaled back the expected growth of liquefied natural gas in the United States as worldwide demand increases, forecast that coal will remain the primary fuel for producing electricity until at least 2030 and predicted United States energy demand will increase by 1.1% per year until 2030.

The full report is available at <http://www.eia.doe.gov/oiaf/aeo/>

## CONGRESSIONAL VISITS DAY MARCH 28-29

The 11<sup>th</sup> annual Congressional Visits Day (CVD) is scheduled for March 28 and 29, 2006. The CVD is a two-day annual event that brings scientists, engineers, researchers, educators, and technology executives to Washington, D.C. to raise visibility and support for science, engineering and technology. CVD is an important opportunity to make science issues and science funding a priority for Congress. More information about CVD is available at <http://www.aas.org/policy/cvd/>. The site contains a downloadable packet of briefing materials updated to demonstrate the need for sustained federal investment in scientific research. If you are interested in attending the CVD, please contact the American Geological Institute – Government Affairs Program at [govt@agiweb.org](mailto:govt@agiweb.org) for more information.

### A MESSAGE FROM THOSE GREAT FOLKS AT THE IRS

Since it is getting near tax time, the Internal Revenue Service has advised the MGS to remind the membership that because the MGS is not an organization described in section 170(c) of the Code, donors may not deduct contributions.

### New on the MGS Website

The new and improved MGS website is up and running ([www.montanags.org](http://www.montanags.org)). A new feature being offered to MGS members is a business card advertising page. Any member wishing to have their business card posted on the website should contact Betsy Campen at [Betsycampen@bresnan.net](mailto:Betsycampen@bresnan.net) or call 652-1760.

### THIS DAY IN HISTORY

*March 31*

On this date in 1952, an earthquake hit the northwestern part of Montana in the Flathead Lake-Swan Lake area. The quake was felt over an area of 35,000 square miles and caused minor damage along the eastern shore of Flathead Lake. The quake had an intensity of VII measured on the Modified Mercalli Intensity Scale. The Modified Mercalli scale was developed in 1931 and is composed of twelve increasing levels of intensity that range from imperceptible shaking to catastrophic destruction. The scale does not have a mathematical basis; it is an arbitrary ranking based on observed effects.

A intensity VII quake results in negligible damage in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.

### - The Corner for Continuing and/ or Remedial Education -

(The Word of the Month Club – use it three times and it's yours to keep!)

**Definitions: metamorphic petrology**

**Decussate texture** – A microtexture in metamorphosed rocks, in which axes of contiguous crystals lie in diverse, criss-cross directions that are not random but rather are part of a definite mechanical expedient for minimizing internal stress. It is most noticeable in rocks composed largely of minerals with a flaky or columnar habit (Harker, 1939).

**Abstract:**



## Applying Deltaic and Shallow Marine Outcrop Analogs to the Subsurface

*AAPG Distinguished Lecturer*

*Janok P. Bhattacharya*

*University of Houston, Texas (formerly University of Texas at Dallas)*

A fundamental problem in subsurface reservoir characterization is determining the continuity of flow units and flow barriers (i.e. sandstones, shales and cements). In any given field, there will typically exist a combination of field wide-elements, elements that may extend between wells, but not across the entire field, and elements that do not extend between wells.

Our outcrop analog data bases provide:

1. Regional and field-scale studies of reservoir and non-reservoir elements associated with shallow marine, deltaic reservoir types.
2. Detailed 3D facies architectural studies of small-scale, intra-well heterogeneity (cements and “stochastic” shales) in specific depositional sub-environments (e.g delta front facies) that may be incorporated into reservoir models.
3. Conceptual re-evaluations of shoreline and deltaic facies models that may be applied by geologist interpreting or correlating seismic, well log or core data.

The subsurface geologist must use facies models and sequence stratigraphic concepts to correlate well data. We show several examples of deltaic reservoirs depicted as consisting of horizontal layers (layer-cake). Our outcrop examples suggest that sandstones within the delta front dip seaward. This fundamentally challenges reservoir models that invoke flat versus dipping beds and we demonstrate how this can be applied to correlation of core and well log data sets. Our regional-scale stratigraphic results study also suggest very different exploration models in the search for basin-distal reservoir sandstones.

From the perspective of general facies models, historically, “shorefaces: have been assumed to form homogenous, uniform reservoirs that require little effort to produce. These assumptions have not turned out to be valid in the production behavior of many so-called “shoreface” type reservoirs. We show that many wave-dominated shorefaces are actually delta front deposits. Our new model for wave-influenced coastlines suggests a distinct facies asymmetry with homogenous beach and shoreface sands accumulating on the updriest side of the river mouth with significantly more-heterogenous facies on the downdrift side. We have applied this facies model to the re- interpretation of Cretaceous “shoreface” deposits in Wyoming, New Mexico, and Utah and these examples should be applicable to other subsurface deltaic reservoirs.



**William B. Hansen**  
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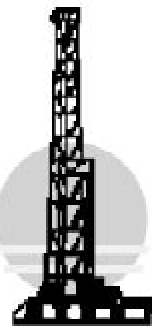
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# REMINDERS

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- March 10**                      **12<sup>th</sup> Annual 3D Seismic Symposium**, Denver, Colorado, for more information contact – The Rocky Mountain Association of Geologists (303) 573-8621 or [RMAGdenver@aol.com](mailto:RMAGdenver@aol.com).
- March 28**                      **BLM – Federal Oil and Gas Lease Sale** (Montana, North Dakota, South Dakota), Billings, Montana, 9:00 am, for more information contact – Tessie (406) 896-5091.
- April 9-12**                      **AAPG Annual Convention**, Houston, Texas, for more information contact the AAPG Convention Dept. (918) 560-2617 or [aapg.org/houston](http://aapg.org/houston).
- May 7-9**                        **14<sup>th</sup> Annual Williston Basin Petroleum Conference and Prospect Expo**, Minot, North Dakota, contact North Dakota Petroleum Council (701) 223-6380.
- May 7-11**                      **AAPG Pacific Section Meeting**, Anchorage, Alaska, detailed information and registration is available at <http://anchorage2006.com>.
- June 11-13**                      **AAPG Rocky Mountain Section Meeting**, Billings, Montana. Information available at <http://www.montanags.org>.

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1978 <i>Economic Geology of the Williston Basin</i> -----	100.00
1971 <i>Catalog of Stratigraphic Names</i> -----	10.00
1969 Guidebook: <i>Economic Geology of Montana</i> -----	8.50
1951 <i>BGS 2nd Annual Central Montana Field Conference</i> -----	12.50
1950 <i>BGS 1st Annual Field Conference</i> -----	12.50

**PHONE ORDERS: Doretta Brush (406) 259-8790**

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