



# AAPG

## Research LAUNCHER Program

### About You

(1) First Name: Michael Last name: Holmes

(2) First Name: Michael Last name: Dolan

Company/University: 1) Digital Formation, Inc. 2) Dolan Integration Group

Check which apply to you:  Student  Non Student  Independent Researcher  Professor  Corporate Research  Other

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Short Bio: (250 words or less)

**Michael Holmes** has been involved in oil and gas exploration activities for 47 years. He started his career with British Petroleum working in England, Libya, East Africa, and the North Sea. He then joined Shell Canada, working the west coast offshore Canadian Basin. Subsequently he was with Marathon Oil Company, research division, and Berry Wiggins, UK. For the past 30 years he has been in all aspects of exploration and exploitation activities worldwide, with particular emphasis in petrophysics. In 1994 he formed Digital Formation, Inc., a consulting and software development company, with his two sons as partners. Dr. Holmes has a BSc and PhD degrees in geology from the University of London, and an MSc in Petroleum Engineering from the Colorado School of Mines.

**Michael Dolan** is a proven petroleum systems integrator. He provides geologic and geochemical consulting services and seeks to assist with the exploration, development and production of oil and gas. As a result, a framework of geochemical data and interpretation are the cornerstone of this work. Over the past decade, North American unconventional plays have been his focus. He is an AAPG Certified Petroleum Geologist (#6085) specializing in organic geochemistry. He has 17 years of oil and gas industry experience as a successful oil and gas exploration geochemist at companies including Mobil, ExxonMobil and DIG. He holds a BSc in Geology from the University of Illinois at Chicago and an MSc in Geochemistry from the Colorado School of Mines. He is also First Vice President of RMAG and a member of SPE.

### Project Description

1. Name of project Comprehensive Petrophysical and Geochemical Integration Studies, Rocky Mountain Basins.

2. Brief synopsis/areas of geosciences or engineering (50-75 words)

This project will integrate petrophysical and geochemical analyses of reservoirs of major importance in the Rocky Mountain area, including (but not restricted to) the Bakken, Niobrara and Mesa Verde. As available, geophysical data interpretations will be incorporated.

3. Bullet list of 5-7 main outcomes/goals.

- Petroleum Systems Interpretation of subsidence and thermal history.
- Better understanding of geochemical data significance, quality and sampling efficiency through integration of multiple datasets with the wireline. Emphasis on TOC variation, T max variation, heat flow variation.
- Improved pre-drill and cost-effective fluid quality prediction EUR inputs with work process defined.
- In-Place hydrocarbons calculations.
- Geochemical data to set framework for compartmentalization and communication evaluation and its effect on EUR.
- Integration of Geochemical and Petrophysical properties of major reservoirs.
- Geophysical correlation results (as available).

4. In two or three sentences, describe why your research is important. Please mention who will benefit from your work.

No other publically available studies exist of this type including comprehensive integrated analysis. Companies and academic institutions interested or operating in the study areas will be interested.

5. Timeline with milestones (12 month/18 month)

1) 12 month – DJ Basin, Piceance Basin, 2) 18 months – Williston Basin, Powder River Basin

- Develop workflows for accurate pre-drill predictions of petrophysical parameters, organic richness, maturity modeling and geochemical analyses of the DJ Basin.
  - 1) Integrate acquired data with established rock and fluids database. Acquire wireline log data, core and mud log data. Acquire geochemical rock and fluids data. Also access any public seismic data, especially 3-D interpretation data.
  - 2) Produce highly detailed reservoir quality and geochemical prediction maps. Perform detailed petrophysical analysis. Compare with core and mud log data. Incorporate geochemical data, primarily TOC.
    - TOC Prediction Maps
    - Vitrinite Reflectance Equivalence (VRE) Maps
    - Fluid Type and quality including Gas to Oil Ratio Prediction Maps
  - 3) Map petrophysical reservoir property variation by formation including:
    - In place hydrocarbons
    - Fracture intensity
    - Mechanical properties (brittle vs. ductile) and compare with any available seismic interpretations
    - Petrophysical properties of the shale interval
    - Integrate petrophysics with geochemistry
- Develop geochemical baselines and apply geochemical analyses to understand reservoir quality, reservoir fluid communication and compartmentalization specific to the basins studied.
- Design safe and cost-efficient geochemical sampling techniques for acquiring the critical data types.
  - Data designed to support development and production decisions.
  - Develop criteria for sampling time and location best practices.

- Establish best practices for managing geochemical data libraries to ensure their security, accessibility and future value.

6. Funding amount needed to achieve first basic goals within 12 months. Please provide a brief summary overview of your budget. List costs of 5-10 main items.

1) Data acquisition \$50,000

- Initial stage data acquisition and initial model delivery can occur within 6 months of project start.
- Initial data can be incorporated within three months of all existing data receipt.
- All analysis and interpretation as is finalized in the project plan can be analyzed and interpreted within six months of receipt of all new samples.

2) Consulting Time \$100,000

- Shepherding the acquisition and interpretation of all data delivered to the project will occur over the duration of the project.

3) Report preparation and presentation \$30,000

- If all samples can be delivered within the first six months of the project, the final delivery can occur within eighteen months from start of the project.
  - Interim products including analysis and interpretation can be delivered in stages, as available.

7. In the process of gaining background knowledge in the field of your proposed research, who did you find to be the top two or three researchers? What are the main concepts that are being explored? Please briefly describe.

Michael Lewan; mineral matrix effects on expulsion efficiency in organic rich rocks.

Jeff May, Keven Bohacs; Sequence stratigraphic relationships of source rock deposition.

Quinn Passey; wireline prediction of TOC – geochemistry and petrophysical integration.

Paul Worthington - Petrophysics

8. Please provide a photo of yourself and a photo related to your proposed project. It will be very helpful in publicizing your project and potentially securing funding.



Michael Dolan



Michael Holmes

9. Who will benefit? AAPG membership will be the primary beneficiary, followed by academic and industry research into wireline prediction of geologic and geochemical parameters.

**AAPG Research LAUNCHER supporters receive**

The opportunity to work directly with you and receive reports, information, and findings, depending on the level of support.

## The Deal

The researcher agrees to:

- ❖ Develop a brief public presentation on the research to be made available to AAPG
- ❖ Share an annotated bibliography and review of relevant published articles
- ❖ Present research findings on project at an AAPG Forum, GTW, or Research Symposium
- ❖ Write a detailed report on the results of your research to be made available to LAUNCHER supporters
- ❖ Write an extended abstract on the results of your research to be made available to AAPG

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Thank you for submitting your research proposal to the AAPG Research LAUNCHER Program. Your proposal will be reviewed and upon acceptance you will be contacted by AAPG Education/Research. If your proposal is accepted, we will publicize your proposal and encourage funders to contact you directly. AAPG does not guarantee funds nor have any connection with the success or failure of the endeavor. The goal is to support scientific research in the petroleum geosciences and engineering and launch the next generation of geological advances.

**Michael Holmes**

**Michael Dolan**

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Research Candidate (print)

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Date

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AAPG Education/Research (print)

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Research Candidate (sign)

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AAPG Education/Research (sign)

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Date

## AAPG Education/Research

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