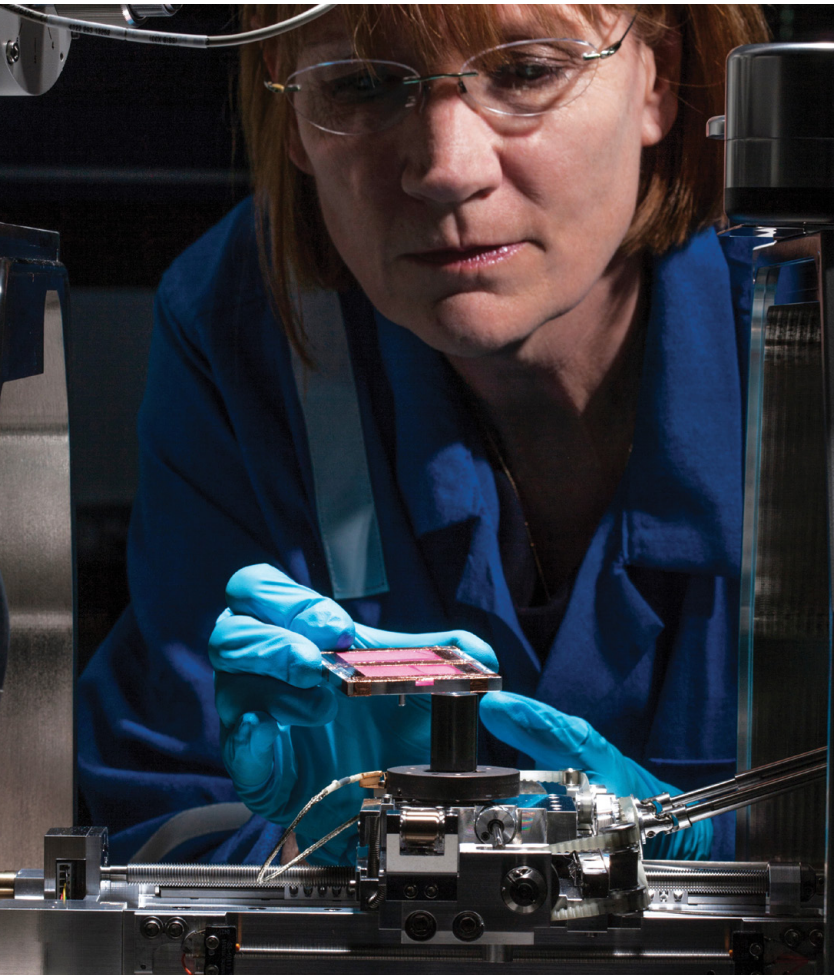


# CoreFlow

Digital Rock and Fluid Analytics Services  
From Schlumberger Reservoir Laboratories



Accuracy from  
Every Angle

**Schlumberger**

# All Together Now

PHYSICAL ANALYSIS



DIGITAL ANALYSIS

CoreFlow\* digital rock and fluid analytics services integrate our routine physical core analysis with the latest in digital analysis technology to give you a more accurate, holistic view of your core sample.

With CoreFlow services, you can know for certain what your reservoir rock looks like at different scales. Our unique combination of physical and digital core analyses gives you a comprehensive, predictive, and actionable digital model through which you can confidently make critical decisions about your most complex challenges.

## **All-in-one approach**

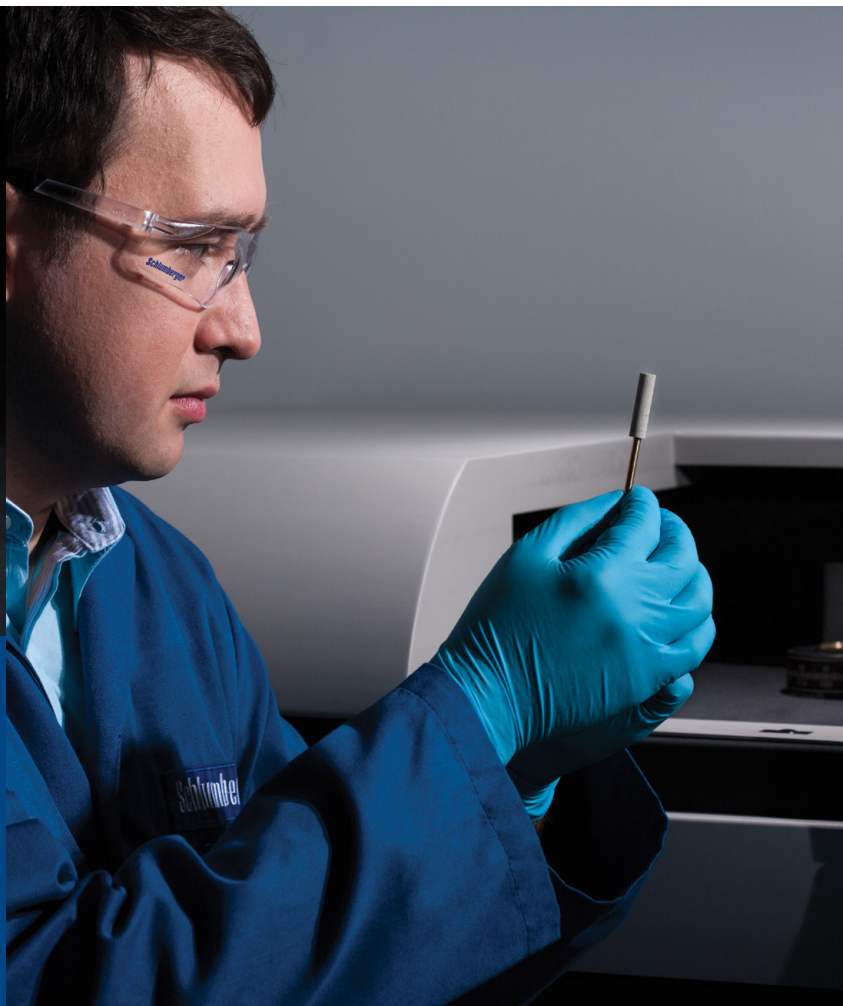
The sophisticated technologies used to perform CoreFlow services are unparalleled in the industry. Unlike other methods, our all-in-one approach of using digital simulations to direct physical laboratory measurements and physical measurements to refine the digital simulations ensures data are properly obtained and appropriately used. We also use our in-depth understanding of fluid properties to create digital fluid models for flow simulation.

## **Speed**

Once you have a proprietary model of both physical and digital characteristics, you can make informed decisions faster. Depending upon the analysis, answers can be delivered in minutes rather than hours, days rather than weeks, and months rather than years, as compared with physical analysis alone.

Digital core analytics services available through CoreFlow services include

- whole-core dual-energy CT scanning and logging
- digital core microCT imaging and analysis
- scanning electron microscope (SEM) imaging and analysis
- DHD\* direct hydrodynamics pore flow simulation.



## VERSATILE TO THE CORE

CoreFlow services can be applied to all reservoir types, including carbonates, sandstones, and shale.

### Whole-Core Dual-Energy CT Scanning and Logging

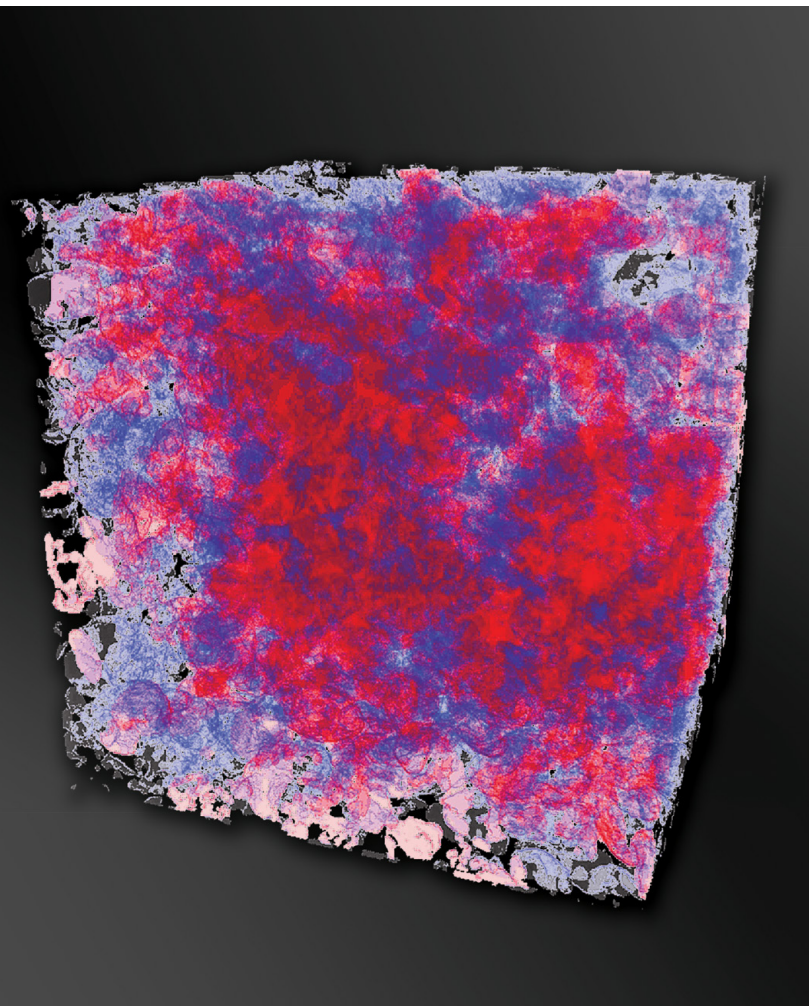
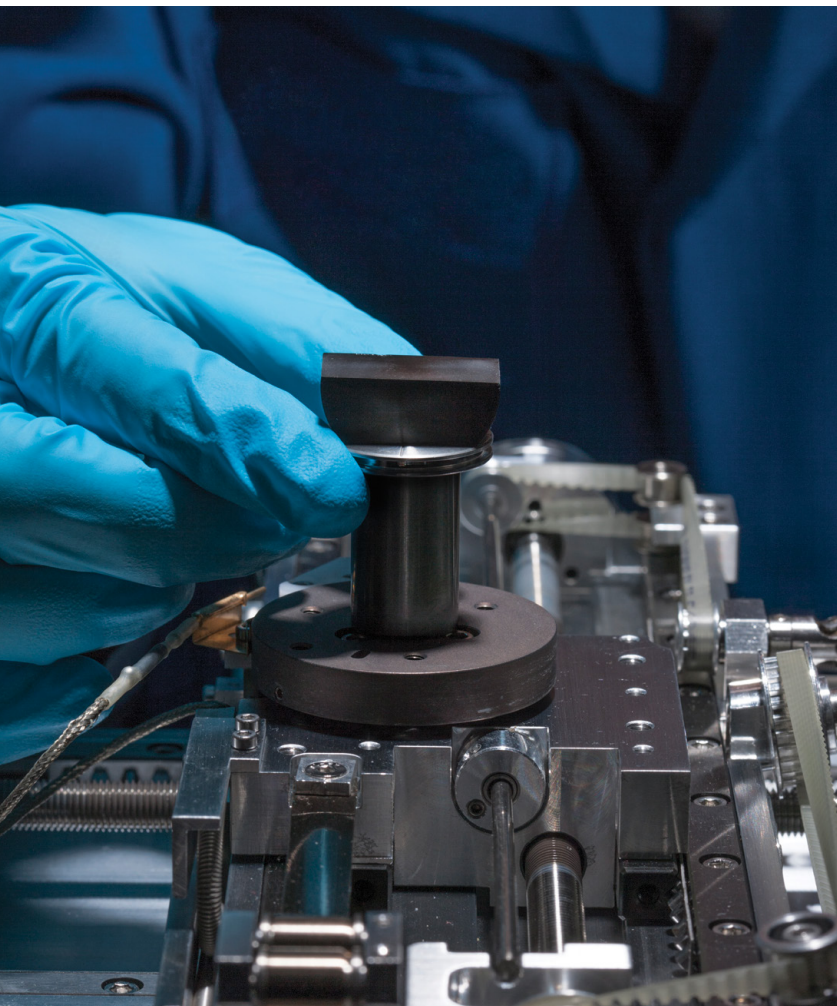
Digital analysis from CoreFlow services often begins with whole-core dual-energy CT scanning. The core—either in an aluminum or plastic liner or with no liner—is scanned with a helical CT scanner. Cross-sectional slices of the rock are spaced as close as 0.5 mm along the length of the whole core. These images are then displayed as a slice-by-slice motion picture on a special viewing application showing the core state. This film of the whole core can be used to select locations of samples for further laboratory or digital analysis, even before removing the rock from its liner.

Incorporating dual-energy CT scanning provides a density log and an effective atomic number. This information can be integrated into TerraTek HRA\* heterogeneous rock analysis service to determine rock typing and distinguish relevant flow units.

### Digital Core MicroCT Imaging and Analysis

To better understand the flow characteristics of conventional reservoirs such as sandstone and carbonate formations, our exclusive digital core microCT imaging and analysis from CoreFlow services unites digital and physical data using one distinct sample size. The porosity of the sample can be directly compared with routine analysis measurements because the sample size is large enough to make direct physical measurements of those properties. Likewise, the sample is small enough to capture microCT images of pores and grains with micron-scale resolution.





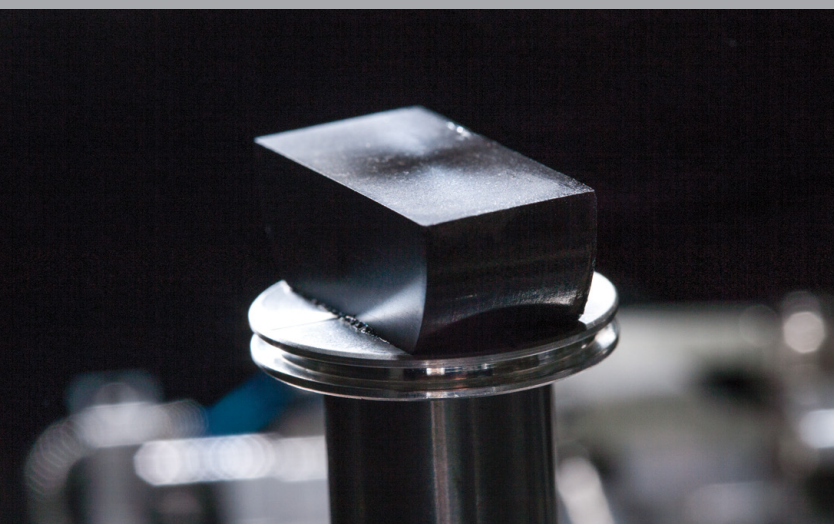
## SEM Imaging and Analysis

At even higher levels of magnification, our SEM imaging and analysis provides 2D and 3D images. The surface is first rendered flat using an argon-ion mill and then imaged in an SEM. In conventional reservoirs, this magnification is useful for evaluation of micritic porosity and other submicron features. In unconventional reservoirs, such as oil or gas shale, features as small as nanopores can be imaged. The texture of the mudstone can be evaluated to give indications of producibility. Image analysis provides a measure of the porosity and organic content. The connectivity of the pores is determined by obtaining 3D images in a focused ion beam (FIB) SEM.

## DHD Simulation

CoreFlow services take core analysis one step further with DHD direct hydrodynamics pore flow simulation, which combines digital rock and digital fluid based on laboratory measurements of fluid properties. With this combination, we can obtain the capillary pressure and relative permeability that are appropriate for your reservoir. These simulations can be combined with laboratory measurements of the properties to obtain better reservoir answers faster than with digital or physical measurements alone.

Schlumberger CoreFlow digital rock and fluid analytics services combine our extensive laboratory expertise with the most advanced testing and modeling technology in the industry, helping you maximize your understanding of the reservoir and the in situ interaction of rocks and fluids. Digital analysis technology gives you a comprehensive view of your core sample so you can achieve accuracy from every angle.



# Schlumberger

[www.slb.com/CoreFlow](http://www.slb.com/CoreFlow)

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