Why is structural modeling important?

Scaled experimental models provide valuable information about structural processes, especially those not observed directly in nature. For example, we can observe and document the evolution of fault and fold patterns. Thus, experimental models provide 4D templates for interpreting geological structures.

What are our current research projects?

Our current research examines the following questions:

• What factors affect the propagation and linkage of normal faults? How does the presence of pre-existing normal faults affect the nucleation, growth, and linkage of subsequent normal faults? How does normal-fault development affect depositional processes in rift basins?
• What factors control the reactivation of pre-existing, high-angle strike-slip faults during extension?
• How can the accuracy of balancing and restoration algorithms be improved using modeling results?
• How does mechanical stratigraphy influence the development of compressional fault-related folds?
• How do boundary conditions and strain rate influence the properties of fault populations?
• How do fault growth and linkage contribute to the formation of fault-surface undulations? Are these undulations always parallel to the fault-slip direction?
• What factors promote the development of gravitational-collapse structures?

To address these questions, we use a multi-faceted approach, incorporating scaled experimental modeling, geometric modeling and restoration, 2D and 3D seismic interpretation, and field studies.
Faculty experience

- **Dr. Martha Oliver Withjack** is a professor at Rutgers University and previously worked at Cities Service, ARCO, and Mobil. She was an AAPG Distinguished Lecturer, a recipient of the J.C. "Cam" Sproule Memorial Award, a Distinguished Lecturer for the Petroleum Exploration Society of Australia, and a recipient of the Matson Memorial Award. She has worked on experimental models since 1980.

- **Dr. Roy W. Schlische** is a professor at Rutgers University. He has more than 20 years of experience in structural geology, tectonics, and basin analysis. He has authored 60 scientific papers, and has been working on experimental models since 1996. He recently co-edited a special volume of the *Journal of Structural Geology* on “Fault Zones.”

Publications involving experimental modeling

**Theses involving experimental modeling**


**What facilities are available?**

Our group has a state-of-the-art laboratory designed specifically for scaled experimental modeling. With our versatile equipment, we can simulate most structural styles, including basement-involved extension and contraction, detached extension and contraction, oblique extension and contraction, salt tectonics, and inversion. Rutgers University also has a seismic-interpretation laboratory, equipped with workstations and software for 2D and 3D seismic projects.

**Contact information:**

Prof. Martha Oliver Withjack  ||  Prof. Roy W. Schlische  
Rutgers University, Department of Earth & Planetary Sciences  
Wright Laboratories, 610 Taylor Road  
Piscataway, NJ 08854  U.S.A. 
+1-848-445-6977  ||  +1-848-445-6974  
drmeow3@rci.rutgers.edu  ||  schlisch@rci.rutgers.edu