



# The KU Geologic Record

Volume 1, 2004



## Alumni and Friends of the University of Kansas Department of Geology:

Welcome to the first issue of *The KU Geologic Record*, the newsletter focusing on special accomplishments of University of Kansas Department of Geology students and faculty. The KU Department of Geology is fortunate to have high-caliber faculty and students. The faculty continue to provide an excellent education for the next generation of geoscientists, perform world-class research, and serve and support KU and the geoscience and global communities. We are proud of the recent accomplishments of the program and hope that you enjoy keeping abreast of them. Keep your eyes peeled for future installments, which should come out several times each year.

## DISCOVERIES OF KU GEOSCIENTISTS RECOGNIZED IN *GEOTIMES*

Each year, the American Geological Institute publishes an issue of *Geotimes* summarizing the highlights of recent major discoveries in the Earth Sciences. This year, the issue is separated into sections on Solid Earth, Water and Climate, Beyond Earth, Life

Through Time, and Resources. It is quite an accomplishment to have even a single mention in this volume, but KU geoscientists have a major presence in it. As well as having a number of research discoveries cited, KU researchers were invited to write one of the articles.

✓ KU has one of the strongest research groups in the world working on carbonate rocks. *Geotimes* invited this productive group to write the article on Recent Discoveries in Carbonates. **Jennifer Roberts** (KU Geology faculty), **Luis González** (KU Geology faculty), **Bob Goldstein** (KU Geology faculty), **Evan Franseen** (KU Geology courtesy faculty; KGS scientist), and **Paul Enos** (KU Geology faculty) all contributed. Ultimately, the article was written with the entire KU Carbonate Research Group in the author line.

✓ KU Geology faculty members **Jennifer Roberts**, **Luis González**, **Gwen Macpherson**, and **Phil Bennet** (University of Texas) were credited with being the first to precipitate the mineral dolomite under controlled, low-temperature experimental conditions using methanogenic microorganisms. Low-temperature precipitation of dolomite has been one

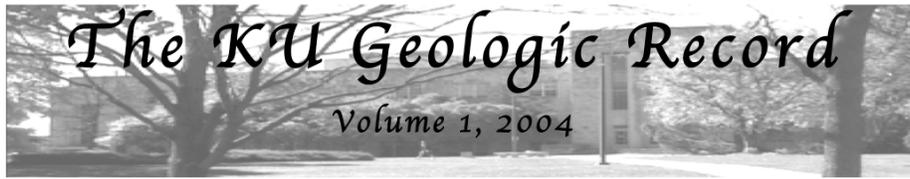
of those experimental goals just out of the reach of geochemists, until now. Dolomite is one of the more common minerals in the record of sedimentary rocks, and evaluating its origin has been so difficult that it still is commonly addressed as the "dolomite problem."

✓ **Jason McKirahan** (MS '99), **Bob Goldstein**, and **Evan Franseen** were cited for their work on *build-and-fill sequence stratigraphy*, a new concept in stratigraphy that integrates paleotopography and sea-level history.

✓ **Anita Csoma** (PhD '03) and **Bob Goldstein** were cited for developing the *diagenetic salinity cycle* technique, an approach that uses tiny growth zones in crystals to reconstruct sea level and climate history.

✓ The paper by **Dave Newell** (PhD '96; KGS scientist), **Bob Goldstein**, and **Carl Burdick** (ConocoPhillips) was cited as the example of resurgent focus on hydrothermal oil and gas reservoirs. These are systems in which hot fluids move through rocks and enhance porosity. Such studies integrate hydrogeology, tectonics, and petroleum geology.

✓ **Rolfe Mandel** (KGS scientist and KU Anthropology faculty) was mentioned for his work in organizing a pre-meeting field trip in asso-



ciation with the upcoming Geological Society of America meeting.

International recognition can only serve to strengthen our Department, and such a major presence in the *Geotimes Highlights of Discoveries* issue is a prominent "feather in the cap" of KU researchers.

### **NEW TECHNIQUES FOR CLEANER AQUIFERS**

Groundwater is an important resource for Kansas and for the Nation. Contributions by KU researchers are helping to solve some of the most important problems in hydrogeology. Faculty members **Carl McElwee, Rick Devlin,** and John Healy (KGS research assistant) have just received a grant from the US Army. This is a three-year grant for \$369,000 on Hydraulic Tomography and High-Resolution Slug Testing to Determine Hydraulic Conductivity Distributions. The focus of this research is on developing techniques useful in remediation of contaminated groundwater.

Since spatial changes in hydraulic conductivity are a major factor governing the transport and fate of a pollutant as it moves through an aquifer, the objective is to improve field techniques for

better definition of three-dimensional spatial distribution of hydraulic conductivity in contaminated aquifers. If successful, this research is likely to expand KU funding into a large number of contaminated sites managed by the US Army. Ultimately, it could make a difference in developing better techniques for cleaning contaminated aquifers, leading to a safer and more reliable groundwater resource, greatly impacting the Kansas community as well as global water resources.

### **HISTORY OF THE COLORADO PLATEAU**

A grant proposal by **Dan Stockli** (KU Geology faculty) has been approved by the National Science Foundation. This is a two-year grant for \$115,000 to look at the Colorado Plateau region of the Western United States. It concentrates on the tectonic controls on erosional stripping of rocks off of the surface, recorded from the cooling history of underlying rocks. As there is a predictable increase in temperature as one goes deep into the crust, the record of cooling below certain temperature thresholds can be used as a record of timing of erosion of rocks off of the surface.

This study uses the (U-Th)/He lab and other facilities that Stockli has built at KU. There are only a small number of labs producing this kind of data in the United States, so his work is very much in demand. Recently, Stockli also was successful in acquiring NSF funding for a technician in this laboratory. With this extra manpower, KU should be able to handle a large volume of data from around the world, thus bringing more focus to the Department and its programs.

### **CUTTING-EDGE LAB TO BE ESTABLISHED**

**Luis González** and **Bob Goldstein** received a \$450,000 grant from the W. M. Keck Foundation for funding of a Paleoenvironmental and Environmental Stable Isotope Laboratory. **Dale Slusser** was the coordinator from KU Endowment and contributed greatly to the proposal's success.

This laboratory will strengthen and expand synergy among KU researchers. Researchers specifically identified as benefiting from the laboratory, and whose research statements contributed to its success, are from the Department of Geology, Department of Ecology and Evolutionary Biology, and



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Department of Geography: **Steve Hasiotis; Jennifer Roberts; Rick Devlin;** Joy Ward (KU E&EB faculty); Sharon Billings (KU Biology faculty); **Luis González;** James Thorp (KU faculty and Kansas Biological Survey); **Bob Goldstein; Bruce Lieberman; Roger Kaesler; Gwen Macpherson;** Bill Johnson (KU Geography faculty); Tom Taylor (KU E&EB faculty); and Edith Taylor (KU E&EB faculty).

The researchers' unified efforts in establishing this facility have the goals of:

- ✓ Understanding the modern feedbacks between biological processes and environmental states, changes, or thresholds;

- ✓ Developing techniques for evaluating how such biological responses or environmental parameters are preserved in geological materials; and

- ✓ Analyzing geological materials to reconstruct paleoenvironment and evolutionary or ecosphere response.

This new grant will be pooled with other funding from KU and NSF, both to Luis González, to total **\$1,157,000** for the facility. It should be one of the finest facilities for stable isotopic analysis in environmental research in the United States.

The strong financial and

space commitment from KU impressed the Keck representatives as did support and enthusiasm from Kim Wilcox (College Dean), Rob Weaver (College Associate Dean), George Wilson (Associate Vice Provost), and Robert Hemenway (Chancellor), who all made a solid and very positive impact during the site visit.

## BIODIVERSITY IN GROUNDWATER ECOSYSTEMS

**Jennifer Roberts,** David Graham (KU Environmental Engineering faculty), Bill Picking (KU Microbiology faculty), and a colleague from Allegheny College had their biogeosciences proposal funded through NSF. The grant will be about \$400K over four years.

This joint project is oriented toward examining "Groundwater ecosystems: The interdependence of microbial mineral weathering and population diversity." Results from this project will lend insight into how mineral composition and weathering reactions impact the biodiversity of the surface-colonizing microbial communities for a variety of groundwater ecosystems. This study will lend greater insight into issues of groundwater quality.

Roberts is performing the geochemistry and mineralogy work while Graham and Picking will be examining the microbiology aspect of this study. The collaboration with Allegheny will involve their students coming to KU for a summer research program as well as a cross-country, team-taught undergraduate course in Geomicrobiology. Not only will this give a hands-on look at this information to a broader audience, it may serve as a useful recruiting tool for KU Geology.

We are proud of Roberts's accomplishments and are excited to see the degree to which research in microbial biogeoscience is strongly supported and funded by the geological community.

## ANCIENT OCEANOGRAPHY

**Luis González** has just published a new paper on Ordovician rocks. The study shows how isotopic techniques can be used successfully in reconstructing paleoceanography (Ludvison, G. A., Witzke, B. J., **González, L. A.**, Carpenter, S. J., Schneider, C. L., and Hasiuk, F. H., 2004, Late Ordovician carbon isotope excursions and their paleoceanographic significance: *Palaeogeography, Palaeoclimatology, Palaeoecology*, v. 210, p. 187-



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214). This kind of work is very important in global change research. Global perturbations in Earth's carbon cycle are easily detectable with carbon isotopes in ancient marine rocks. Such studies should have a major impact on the understanding of the past and future of Earth's ecosystem. Perturbations in atmospheric carbon dioxide lead to major changes in Earth's climate, which affected organisms of the past.

## WHAT LIVES IN ACID MINE DRAINAGE?

A paper by **Steve Hasiotis** came out recently in *Geomicrobiology* and looks at the conditions in modern acid mine drainage as possible analogs for ancient systems that may have existed on Earth. Steve, as well as **Jennifer Roberts**, **Bob Goldstein**, and **Tony Walton** (KU Geology faculty) continue to find ways to integrate microbiology into the geological sciences. A recently approved tuition-enhancement position, allocated to the Department, will further our efforts to excel in what is likely to be one of the hot and exciting areas of the geological sciences in the near future.

Steve's paper is: Brake, S., **Hasiotis, S. T.**, and Dannelly, K., 2004, Diatoms in

acid mine drainage systems and their role in the formation of iron-rich stromatolites. *Geomicrobiology Journal*, v. 21, p. 1-10.

## NEW VOLUME ON SPONGES

**Roger Kaesler** and the Paleontological Institute have produced the newest *Treatise of Invertebrate Paleontology* volume. This is the most important reference series used in invertebrate paleontology. The new volume is on the sponges, a group that has seen significant revision in recent years. Along with the 46 volumes that have been published, and the 21 volumes in progress, the *Treatise* will continue to be an indispensable contributor to the field of paleontology.

## FRACTURES IN AQUIFERS

**George Tsoflias** (KU Geology faculty), Van Gestel, Stoffa, Blankenship, and Sen just published "Vertical Fracture Detection by Exploiting the Polarization Properties of GPR Signals," *Geophysics*, Vol. 69, No. 3, p. 803-810. The paper investigates high angle of incidence transmission of radar waves through vertical fractures and uses the polarization characteristics of electromagnetic waves to de-

tect the location and orientation of these fractures. The significance of the paper is that for the first time a method is presented for the detection of non-reflecting, steeply dipping fractures.

Fractures are important conduits for fluid flow in aquifers, and vertical fractures are amazingly common (just look at any road cut of limestone that you see anywhere in eastern Kansas). The new technique explored in this paper can be used to remotely sense vertical fractures in aquifers. Thus, it could be very useful as a method for tracing contaminant plumes in the subsurface. This paper and its findings will aid in improving groundwater quality in contaminated sites.

## GLOBAL STANDARD FOR A CAMBRIAN STAGE BOUNDARY

**Dick Robison** (KU Geology faculty) co-authored a paper in *Geobios* entitled "Potential global standard stratotype section and point (GSSP) for a Cambrian stage boundary defined by the first appearance of the trilobite *Ptychagnostus atavus*, Drum Mountains, Utah, USA." This work figures into a large-scale effort in the geologic community to refine the geologic time scale and apply it



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to the rock record.

## STUDENTS IN GEOPHYSICS RECEIVE AWARDS

**Steve Sloan** received the 2004-05 GSH/Charlie and Jean Smith SEG Scholarship. Steve is an MS student in near-surface seismology. His advisor is **Don Steeples**.

**Robert Eslick** received the 2004-05 ExxonMobil Upstream Research Co. SEG Scholarship. Rob is a senior working on a near-surface seismology senior thesis project with **George Tsoulias**.

## STUDENT IN PALEONTOLOGY RECEIVES AWARD

One of our Ph.D. students, **Dan Hembree** (MS '03), has just received the Society of Vertebrate Paleontology's Bryan Patterson Award, a student research grant. The society gives only one of these awards each year. Dan earned this honor for his proposal "Using modern burrowing organisms to determine the paleoenvironmental and paleoclimatic significance of continental ichnofossils in the Eocene-Oligocene White River Formation, Colorado."

## OLD CRUST FROM BRAZIL

**Randy Van Schmus** (KU Geology faculty) has just published a paper documenting tectonic conditions associated with the earliest conditions of continent formation in South America. Randy's work on Precambrian history in Brazil earned him induction into the Brazilian Academy of Sciences last year. See: Dantas, **Van Schmus**, Hunsacker, Fetter, Brito Neves, Cordani, Nutman, Williams, 2004, The 3.4-3.5 Ga São Jose do Capeste massif, NE Brazil: remnants of the oldest crust in South America: *Precambrian Research*, 113-137.

## NEW FINDS ON TRACE FOSSILS IN CONTINENTAL SETTINGS

**Steve Hasiotis** continues to blur the boundaries between sedimentology, stratigraphy, paleontology, and geomicrobiology, enhancing KU's reputation in these fields as he does it. Just this summer, he has made an impressive impact by publishing 158 pages in 6 journal articles. One of the papers came out in *Sedimentary Geology*. Steve calls this 91-page paper a reconnaissance! The paper concerns trace fossils in sedimentary rocks deposited in continental settings, as opposed to the

more commonly studied marine settings. Trace fossils are the products of interactions between organisms and sediment, such as tracks, trails, and burrows. Steve is the world leader in using these trace fossils for reconstructing paleoenvironment and paleoclimate. The *Sedimentary Geology* paper is on Jurassic paleoenvironment and paleoclimate. It will have an impact on the deep-time paleoclimate community, the oil industry, and the vertebrate paleontologists who study dinosaurs.

Steve's most recent papers are: **Hasiotis, S. T.** 2004, Reconnaissance of Upper Jurassic Morrison Formation ichnofossils, Rocky Mountain region, USA: environmental, stratigraphic, and climatic significance of terrestrial and freshwater ichnocoenoses. *Sedimentary Geology*, v. 167, p. 277-368; **Hasiotis, S. T.**, Wellner, R. W., Martin, A., and Demko, T. M., 2004, Vertebrate burrows from Triassic and Jurassic continental deposits of North America and Antarctica: their paleoenvironmental and paleoecological significance. *Ichnos*, v. 11, p. 103-124; Kvale, E. P., **Hasiotis, S. T.**, Mickelson, D., and Johnson, G. D., 2004, The history of dinosaur track discoveries in Wyoming with emphasis on the Bighorn Basin. *Ichnos*, v. 11, p. 3-9; **Hembree, D. I.**, **Martin, L.** (KU faculty), and **Hasiotis, S.**



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**T.**, 2004, Amphibian burrows and ephemeral ponds of the lower Permian Speiser Shale, Kansas: Evidence for seasonality in the Midcontinent. *Palaeogeography, Palaeoclimatology, Palaeoecology*, v. 203, p. 127-152.

## FUTURE HABITABILITY OF PLANET EARTH

Four KU faculty members (**Luis González**, **Bob Goldstein**, **Steve Hasiotis**, and Edith Taylor) recently attended an NSF workshop on research subjects related to deep-time paleoclimate. This workshop is part of a deep-time paleoclimate and geosystems initiative that seems likely to generate significant new NSF funding. The focus is on predicting the long-term habitability of planet Earth by understanding its past. The KU researchers represent a complementary team that is already interacting on paleoclimate reconstruction and the interaction between paleoclimate and life on Earth.

## THE MORPHOLOGY OF STEVE?

**Steve Hasiotis** is a co-author of a paper entitled "The Morphology of Steve." "The paper ... in the *'Annals of Improbable Science'* ... originated as a parody of the

creationist practice of compiling lists of 'scientists who doubt Darwinism'--such lists being intended to cast doubt that evolution is based on sound science. People at the NCSE (National Center for Science Education) decided to do a parody of this approach taken by the Discovery Institute, where the so-called 'intelligent design' creationists have an online-list of about 100 scientists, engineers, and physicians who 'doubted Darwinism.' [Excerpted from the citation.] (Scott, E. C., **Hasiotis, S. T.** 2004, The Morphology of Steve. *Annals of Improbable Research*, July-August, p. 24-29).

## KU GEOLOGISTS IMPRESSIVE AT 2004 AAPG CONVENTION

The annual meeting of the American Association of Petroleum Geologists was held in Dallas this spring, and it was a big one for KU! Not only did Jayhawks appear to be ubiquitous at the meeting, with 32 presentations, but their contributions continued to receive prestigious awards. The following are the honors and awards garnered by KU faculty, students, and alumni:

✓The Jules Braunstein Memorial Award is given each year at the annual convention in recognition of the

best poster session paper presented the previous year at the annual convention. This year the award was presented to current Jayhawks, **Alan Byrnes** (KGS scientist), **Evan Franseen**, **W. Lynn Watney** (KGS scientist), and **Marty Dubois** (MS '81, KU PhD student, KGS geologist) for their poster entitled "The role of moldic porosity in Paleozoic Kansas reservoirs and the association of original depositional facies and early diagenesis with reservoir properties."

✓ Each year, the best paper published in the Society for Sedimentary Geology's *Journal of Sedimentary Research* is awarded at the convention. This year's award went to alumnus **Gene Rankey** (PhD '97) for his paper entitled "Spatial patterns of sediment accumulation on a Holocene carbonate tidal flat, northwest Andros Island, Bahamas."

✓At each convention, AAPG runs a special poster session for students; and this year two KU PhD students received awards. **Galo Salcedo** was awarded second place for "Depositional Environments of Lower Pennsylvanian Reservoir Sandstones, Southwestern Kansas", and **Qi Lianshuang** was awarded fourth place in the session for "Geostatistical 3D Reservoir Modeling of Mississippian



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St. Louis Carbonate Reservoir Systems, Kansas."

✓ Following is a list of the 32 presentations by Jayhawks at the meeting. It is an impressive list of cutting-edge science of outstanding diversity.

- Recognizing Continental Trace Fossils in Outcrops and Core (SEPM Short Course), **Stephen T. Hasiotis** and Robert W. Wellner
- Geological and Geochemical Factors Influencing the Emerging Coalbed Gas Play in the Cherokee and Forest City Basins in Eastern Kansas, **K. David Newell**, **Troy A. Johnson** (KU MS student), **W. Matthew Brown** (KU MS student), **Jonathan P. Lange** (MS '04), and **Timothy R. Carr** (KGS scientist).
- Geostatistical 3D Reservoir Modeling of Mississippian St. Louis Carbonate Reservoir Systems, Kansas, **Qi Lianshuang**.
- Regional Mapping of Formation Waters from Brine Chemistry Integrated with Petrophysical Data, **John H. Doveton** (KGS scientist), and Dana Adkins-Heljeson
- Thermal Regime of the Midcontinent El Dorado Oil Field (Kansas) interpreted from High Resolution Temperature Logs, Jason R. McKenna, **Daniel F. Merriam** (KGS scientist), and David D. Blackwell
- Depositional Environments of Lower Pennsylvanian Reservoir Sandstones, Southwestern Kansas, **Galo Aristides Salcedo**.
- Microbial Precipitation of Dolomite in Methanogenic Groundwater, **Jennifer Roberts**, **Luis A. González**, and **G. L. Macpherson**.
- Models for Environmentally Sound and Economically Viable Carbon Dioxide Sequestration Opportunities, **Timothy R. Carr**, **Alan P. Byrnes**, **Martin K. Dubois**, and Scott W. White (KGS scientist).
- Theory and Practice of a Web-based Intelligent Agent in the Location of Pay Zones on Digital Well-

Log Files, **John H. Doveton**, **W. Lynn Watney**, and **Geoffrey C. Bohling** (BA '86, BS '87, PhD '99, KGS scientist).

- Build-and-Fill Sequences: Predictable Patterns of Creation and Destruction of Paleotopography in Small-Scale Sequences, **Evan K. Franseen** and **Robert H. Goldstein**.
- Diagenetic and Sea-Level Controls on Porosity Preservation: An Example from Oolitic and Crinoidal Carbonates, Mississippian, Kansas and Missouri, **Matthew E. Ritter** (MS '04) and **Robert H. Goldstein**.
- Linking Biota, Soils, Hydrology, and the Soil-Water Budget in northeastern Kansas: Developing Ichnologic Signatures as proxies for Ancient Climates through actualistic studies, **Stephen T. Hasiotis**, **Daniel I. Hembree**, **Kristen L. Myshrall** (MS '03), **Emily A. Laut** (KU undergraduate student), **Rachel Mathis** (KU undergraduate student), and **Jennifer Roberts**.
- Rates and Character of Opposite-Sense Small-Scale Tectonic Rotations Associated with Sinistral Transcurrent Shear Zones, Cabo de Gata Region, SE Spain, Paul Montgomery, **Evan K. Franseen**, **Robert H. Goldstein**, and Mark W. Hounslow.
- Casts of Modern Continental Burrows as Trace Fossil Analogs in the Reconstruction of Paleoenvironment and Paleoclimate, **Daniel I. Hembree** and **Stephen T. Hasiotis**.
- Use of Relational Database and GIS Tools to Assess Carbon Sequestration Volumes: The MIDCARB Database, Beverly Seyler, Scott M. Frailey, **Timothy R. Carr**, James A. Drahovzal, Brandon C. Nuttall, John A. Rupp, Wilfrido Solano, and Lawrence H. Wickstrom.
- Collaborative Geo-Engineering Reservoir Characterization and Modeling on the Web, **W. Lynn Watney**, **John H. Doveton**, **Timothy R. Carr**, **Geoffrey C. Bohling**, **John Victorine** (KGS systems analyst), **JP Pakalapati** (Networking & Telecommunications Systems Program-

mer), **Saibal Bhattacharya** (KGS scientist), **Alan P. Byrnes**, **Glen Gagnon** (KGS systems analyst/programmer), **Ken Stalder** (KGS web administrator), **Melissa Moore** (KGS systems analyst), **Martin K. Dubois**, **Willard J. Guy** (KGS coordinator), and **Kurt Look** (KGS program assistant).

- Controlled Instantaneous Supersaturation: Experimental Carbonate Precipitation Under Geologically Plausible Scenarios, **Luis A. González**, **Vionette De Choudens** (KU PhD student), and **Jennifer Roberts**.
- The Indian Basin, New Mexico: A Tectonically Valved Hydrothermal Dolomite Reservoir, **Erik J. Hiemstra** (MS '04) and **Robert H. Goldstein**.
- Geologic Factors Controlling Natural Gas Distribution Related to the January 2001 Gas Explosions in Hutchinson, Kansas, **Susan E. Nissen** (KGS research geophysicist), **W. Lynn Watney**, **Saibal Bhattacharya** (KGS scientist), **Alan P. Byrnes**, and **David Young** (KGS research assistant).
- Identification of Dinosaur Tracks in Palustrine-lacustrine Deposits of the Morrison Formation: Their Significance to Lacustrine Sequence Stratigraphy, **Debra S. Jennings** (KU MS student).
- Incised Valleys within Tidally Influenced Deltaic Strata: Torrey Member of the Lower Triassic, Moenkopi Formation, **Timothy E. Perkins** (KU MS student) and **Diane L. Kamola** (KU Geology faculty).
- Variations of in situ stresses as indicators of active fractures and faults, **M. Lee Allison** (KGS senior geologist).
- Evaluating Uplift Rates, Subsidence Rates, and Origin of Drowning Unconformities Using Marine Cements, Gianni Mallarino, **R. H. Goldstein**, and Pietro Di Stefano.
- Examples of how Ancient Soil Biota Mediated Features in Paleosols: Lower Eocene Willwood Formation, Wyoming, **Stephen T. Hasiotis** and Mary J. Kraus.



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- Integrating Ichnofossils and Substrates to Interpret Avulsion in Floodplain Deposits in the Upper Jurassic Morrison Formation, Big Horn Basin, Wyoming, **Brian F. Platt** (MS '04, KU PhD student), **Stephen T. Hasiotis**, and Mary J. Kraus.
- Interoperability of Databases and Software Tools: Building Geoinformatics and the Cyberinfrastructure, **M. Lee Allison**.
- Sequence Stratigraphy of the Lower Sekwi Formation, Selwyn Basin, Northwest Territories, Canada, Kelly A. Dilliard, Michael C. Pope, **Stephen T. Hasiotis**, and **Bruce S. Lieberman**.

- Stratal Architecture and Paleoclimate in Continental Depositional Systems: The Record of Landscape Evolution in the Upper Triassic Chinle and Upper Jurassic Morrison Formations, Colorado Plateau, USA, Timothy Demko and **Stephen T. Hasiotis**.
- Controls on Differential Evolution of Triassic Carbonate Platforms of the Nanpanjiang Basin, Guizhou, Guangxi, and Yunnan, South China, **Daniel J. Lehrmann** (PhD '94), **Paul Enos**, **Marcello Minzoni** (KU PhD student), **Donghong Pei** (KU PhD student), Paul Montgomery, and Jiayong Wei.
- Porosity Reduction in Meteoric-Marine Mixing Zones: Case Studies

Illustrate some of the Controls on Calcite and Aragonite Precipitation in Mixing-Zones, **Anita E. Csoma** and **Robert H. Goldstein**.

- Preliminary report on the ichnofossils of the Lower Cretaceous Cedar Mountain Formation, north-central Utah, **Emily S. Tremain** (KU MS student), **Stephen T. Hasiotis**, and Julie A. Maxson.
- Paleotopographic and Sea-level Controls on the Sequence Stratigraphic Character of a Heterozoan Carbonate Succession: Pliocene Carboneras Basin, Southeast Spain, **Peter Dillett** (MS '04), **Robert H. Goldstein** and **Evan K. Franseen**.

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