

*Ammonites from USGS Washington, DC, Locality 1066, Shasta County, CA, collected in 1893.*

## One ammonite at a time: Rehousing and digitizing the USGS Menlo Park collection

By Erica Clites

Work is well underway on what we refer to as the “USGS Project”—the rehabilitation of the orphaned US Geological Survey Invertebrate Collection from Menlo Park donated to UC and accessioned into the UC Museum of Paleontology in 1997. The project involves the rehousing and digitization of 100,000 invertebrate specimens and will take place in several phases.

During the past semester, four undergraduate students have been working up to ten hours a week rehousing the fossils into archival museum trays, updating and correcting earlier database records, and conducting research on the pioneering geologists and paleontologists who originally made this collection. The students have experienced firsthand the difficulties inherent to collections management: missing labels, overloaded drawers and difficult-to-read cursive handwriting. There is also the unexpected: the beauty of opening a drawer to discover

a dense assemblage of brittle stars, bivalves identified by T. W. Stanton in 1893, or finding the 1974 correspondence between UC Berkeley alumnus Cliff Nelson and distinguished USGS paleontologist Warren Addicott (see a [blog entry](#) on this correspondence). Equipped with training and hands-on experience, these students will be well prepared to pursue future opportunities working with museum collections and collections management if they so choose.

This summer, two UCMP graduate students will reorganize the collections into the sixty, newly-installed and custom-designed cabinets at the UC Museum’s Regatta Collections facility. The original USGS wooden cabinets housing the fossils were over fifty years old and due to multiple moves and less than ideal storage facilities prior to their transfer to UCMP, doors were missing and many drawers were not in their original

see [USGS](#) on page 4

## An extinction-themed Cal Day

**Cal Day**, the annual UC Berkeley campus-wide open house, was held on Saturday, April 20, and as usual, families, school groups, students, and other Bay Area residents turned out in droves to see what the [Berkeley Natural History Museums](#) (BNHM) had to offer in and around the Valley Life Sciences Building (VLSB). Despite the BNHM’s “gloom and doom” theme of extinction, all the evidence suggested that everyone thoroughly enjoyed themselves! They could not have asked for better weather—it was a beautiful sunny day and about 70°.

Out in the VLSB courtyard, UCMP participated in a collaborative event—involving the [Museum of Vertebrate Zoology](#), the [UC Botanical Garden](#), the [Essig Museum of Entomology](#), and the [University and Jepson Herbaria](#)—simply called “Extinction!” Though focusing primarily on extinctions that have taken place within human history, visitors could see the bones, mounted specimens, and/or pictures of animals and plants that (1) are extinct, e.g., cockroach-like “roachoids,” trilobites, ichthyosaurs,

see [CAL DAY](#) on page 5

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## Our friend and collaborator, Garniss Curtis, passed away on December 19 at the age of 93

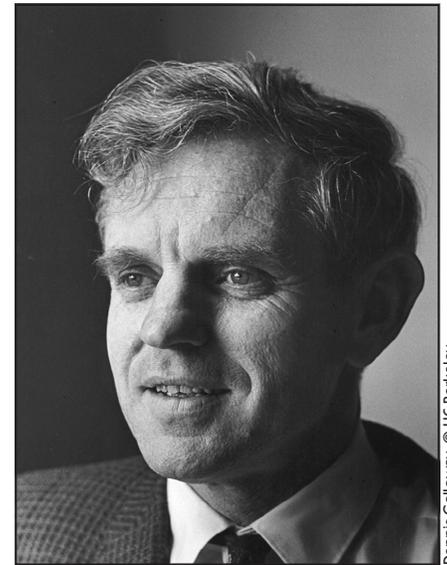
Garniss had a long and distinguished career as a member of the faculty of what is now the [Department of Earth and Planetary Sciences](#). He then moved on to play a major role in the establishment of the [Berkeley Geochronology Center](#). As a member of the faculty, he was an inspiring teacher who contributed to the education of generations of students who were associated with UCMP. Garniss promoted extensive and precise field investigations that provided the geological context of fossil localities.

Early in the 1960s, Garniss and the late UC Berkeley professors John Reynolds and Jack Evernden pioneered the development of radiometric age determinations. Their research was based on the radioactive decay of potassium into argon in volcanic rocks. At the same time, another UC Berkeley professor and long-time member of UCMP, **Donald Savage**, was evaluating what we thought we knew of the sequence of the prehistoric mammalian faunas in North America. In addition to their sequence, how old were they? What was the tempo of their evolution? How did the pattern of evolution of mammals and other terrestrial verte-

brates in North America relate to those of vertebrates on other continents?

Recognizing that many of these faunas came from deposits interbedded with volcanic ashes, Garniss and Don began a series of collaborative research projects. Their first studies focused on the North American fossil record and clearly demonstrated that radiometric age determinations of volcanic ashes could provide a temporal framework for ordering prehistoric faunas. Soon they were investigating the geology and paleontology of deposits in northern Italy and southern France that were formed near the beginning of the Pleistocene and correlating them with North American faunas. The record of the scientifically significant results of subsequent collaborative research projects involving Garniss and members of UCMP is too dense to repeat here.

On retirement from the UC Berkeley faculty, Garniss moved his laboratory facility to what is now the Berkeley Geochronology Center, housed just a block north of the UC campus. The scientists at the Center continue the tradition of close cooperation with members of UCMP. Together their work is produc-



Garniss Curtis, ca 1960s.

Dennis Galloway, © UC Berkeley

ing a clearer appreciation of the global patterns and tempo of evolution of the Earth's biota.

A celebration of Garniss' life will be held at the UC Berkeley Faculty Club from 2:00 to 5:00 PM on September 29, 2013. More recollections of Garniss' remarkable life and additional details of the celebration are available at <http://garnisscurtis.net/>. 🐾

—By Bill Clemens

## Global change in deep time: How the past informs the future

### A pre-Cal day reception and preview of collections by UCMP curators, staff, and students

Clockwise from below: *Diane Erwin* talks about cycads and Equisetum. *Dave Lindberg* explains his interest in the rocky intertidal. *Ashley Poust* shows off some impressive vertebrate fossils. *Kaitlin McGuire* (partially hidden at left), *Susumu Tomiya* and *Natalia Villavicencio* share their research with a guest.



Lucy Chang (all photos)



## Congratulations!

To **Lucy Chang** who received recognition for her student poster at the 2013 **International Biogeography Society** meeting. Her poster was one of two winners in the Conservation and Global Change category.

To **Jennifer Hofmeister** who was recently awarded a Philomathia Scholars Graduate Fellowship of \$20,000 for tuition, fees and/or stipend for the 2013–2014 academic year. This is a one-year award with the possibility of a second year of funding based on research progress.

To **Emily Lindsey** and her husband Martin on the birth of their new son, Christopher Darwin Lindsey Tomasz.

To **Kevin Padian** and Ellen-Thérèse Lamm of the Museum of the Rockies on the recently published *Bone Histology of Fossil Tetrapods: Advancing Methods, Analysis, and Interpretation*, the first comprehensive summary of the field of fossil bone histology; and to alum **Andrew Lee** and grad student **Sarah Werning**, two of the many contributors to the volume.

To **Judy Scotchmoor** on receipt of the 2013 Stephen Jay Gould Prize from the **Society for the Study of Evolution** and the Chancellor's Award for Public Service.

To **Sarah Werning** as the 2013 winner of the **American Microscopical Society** best student oral presentation competition at the annual meeting of the **Society for Integrative and Comparative Biology**. Her talk was entitled *Osteohistological differences between marsupials and placental mammals reflect both growth rates and life history strategies*; and to **Jenna Judge**, one of two students to receive an Honorable Mention. Her talk was entitled *A 3D investigation of the morphology of the lepetellid limpets (*Lepetella sierral*): Hypotheses on feeding ecology and symbiosis*.

## Our student award winners

UCMP is fortunate to have received donations in the form of endowments from individuals dedicated to the support of graduate training and research, especially field work. Each year we use the earnings from these endowments to make research awards to our graduate students, and we are proud to announce this year's recipients and offer them congratulations: **Tripti Bhattacharya**, **Lucy Chang**, **Dori Contreras**, **Elizabeth Ferrer**, **Jenny Hofmeister**, **Winnie Hsiung**, **Jenna Judge**, **Renske Kirchholtes**, **Rosemary Romero**, and **Susan Tremblay**.

## Our soon to be Ph.D.s!

Three UCMP grad students presented their finishing talks in April and will soon be starting the next phase of their professional careers. Congratulations to:

**Theresa Grieco** (Hlusko Lab) spoke on *Adding anurans to our understanding of vertebrate dental development*.

**Joey Pakes** (Caldwell/Lindberg Labs) spoke on *Life in lightless underwater caves: A story of blind crustaceans and associated microbial communities*.

**Sarah Werning** (Padian Lab) spoke on *The evolution of growth and metabolic rates in archosaurs and mammals*.

## Welcome Minda Berbeco

**Minda Berbeco**, the Program and Policy Director at the **National Center for Science Education**, is our newest Museum Associate. An expert on the carbon cycle and the effect of climate change on agriculture, Minda joins the Understanding Global Change project as a research and writing contributor to the planned website.

## Other news

• This August, **Carole Hickman** will be carrying the flag of the **Society of Woman Geographers** to the Tjörnes Seacliff Shellbeds of Northern Iceland. These beds are famous for documenting the Pliocene opening of the Bering Strait, the trans-Arctic invasion of Pacific marine species into the Atlantic, and a major global climate change event. The expedi-

tion will highlight the important UCMP collection of Tjörnes fossils collected in 1964 by David M. Hopkins of the U.S. Geological Survey. These fossils figured prominently in his book *The Bering Land Bridge*, a classic edited volume of papers on the history of Beringian landscapes and faunal and floral migrations. **Sally Walker** (UCMP Ph.D. 1988) and **Doris Sloan** (UCMP Curatorial Associate) will also be participants in the expedition. Previous women who have carried the SWG flag include Amelia Earhart, Margaret Mead, Eugenie Clark, Tanya Atwater, and Silvia Earle.

• Around 10,000 years ago, glyptodons (ancient, Volkswagen-sized armadillos) went extinct, along with many other large, South American mammals. But why? UCMP scientist **Tony Barnosky** just kicked off a scientific collaboration to find out. The group, which includes more than 20 researchers from all over the Americas and scientists of many stripes, from archaeologists to radiocarbon dating experts, just held their first meeting in March 2013 at the Center for Latin American Studies at Stanford University. The team will put together data from many different sources to narrow down the possible causes of the extinctions. Were they caused by climate change as the Earth exited the last ice age? Can we blame them on humans, who were arriving in South America at about the same time? Was there a destructive synergy between these two factors? Stay tuned to find out! The group's work will continue for the next three years. 🐾

### Want to receive UCMP News electronically?

If you would like to receive the *UCMP News* as a color pdf attachment, please let us know. Just send your email address to Chris Mejia at [cmejia@berkeley.edu](mailto:cmejia@berkeley.edu). We are trying to go green wherever possible and reduce costs, but we also understand if you prefer the usual hard copy.



Two California ammonites: at left, USGS Washington, DC, Locality 1519, Tehama County, and at right, USGS Mesozoic Locality M682, Monterey County.

UCMP Invertebrate Collection crew

### USGS from page 1

location. The grad students will face the challenges of placing specimens in the appropriate cabinet, grouping fossils from the same locality, time period or formation. This often requires additional research and a bit of “puzzle-solving” and undoubtedly will also reveal additional unexpected mysteries from this historically-rich and scientifically significant collection.

Also as part of the project, students and UCMP volunteers, **Don Pecko** and **Kathy Zoehfeld**, have begun photographing the oversized USGS specimens, especially the spectacular ammonites. Our very talented and dedicated volunteer photographer, **Dave Strauss**, adapted a copy stand to accommodate a digital SLR camera purchased on the NSF grant. In addition to photographs of individual fossils, a virtual view of the inside of each drawer will be documented by photographing trays of specimens from every locality. The photographs will be accessible through [CalPhotos](#) and linked from associated data in the [UCMP database](#).

What else is on the horizon for the USGS collection? All localities will be added to the UCMP database, allowing new archival labels to be printed and placed with the fossils. As this effort proceeds, we expect an increase in access for

research, teaching, and outreach—and this is what UCMP encourages. Even in its earlier nearly inaccessible state, the USGS collection was important in a variety of research areas: hydrothermal vent paleoenvironments, deep sea whale-fall communities, systematic studies, and geological mapping applications. Making

site information and photographs available online will encourage even further research.

Periodically check [CalPhotos](#) to see new photographs taken by our team of students and volunteers. By the end of the project, everyone will be able to see the results with the click of a mouse! 🖱️



Another ammonite from USGS Mesozoic Locality M2757, Tehama County, California.

UCMP Invertebrate Collection crew

## CAL DAY from page 1

mastodons, moa, and Steller's Sea Cow; (2) are thought to be extinct, e.g., Ivory-billed Woodpecker; (3) are on the brink of extinction, e.g., Siberian Tiger and certain Hawaiian honeycreepers; and (4) were thought to be extinct but are not, e.g., Dawn Redwood (*Metasequoia*) and Franciscan Manzanita.

Downstairs in UCMP's "Fishbowl," a display focused on five mass extinctions in Earth's history. The featured extinctions were the end-Ordovician, end-Permian, end-Cretaceous (dinosaurs!), end-Eocene, and Pleistocene-Holocene. Museum Scientists and grad students showed Cal Day visitors fossils of creatures lost in these extinctions, such as ammonites, marine reptiles, dinosaurs, giant ground sloths, and much more.

Keeping with the extinction theme,

UCMP and the **Department of Integrative Biology** cosponsored four well-attended talks dealing with the end-Ordovician (Curator/Assistant Professor **Seth Finnegan**), end-Permian (grad student **Jeff Benca**), and end-Cretaceous (Curator/Professor **Kevin Padian**) extinctions, as well as the local extinction of sea otters in San Francisco Bay (grad student **Jenny Hofmeister**).

A special UCMP exhibit, put together by Museum Scientist **Jason Carr**, showcased some of the fossils that were recovered during the construction of the Caldecott Tunnel's fourth bore. Jason and his crew were kept busy fielding questions all day.

And it wouldn't be Cal Day at UCMP without the traditional—and always popular—"Fun with Fossils" activity, the

behind-the-scenes tours of the collections (normally closed to the public), and the sale of tee shirts (Radiolarians and *T. rex* made a return appearance).

Next year, the BNHM collaborative event will feature unusual and bizarre specimens from the museums' vertebrate, plant, insect, and fossil collections. UCMP's "Fishbowl" exhibit will examine the question "What is a fossil?" using specimens from its collections to demonstrate different kinds of fossilization, and providing examples of rocks and mineral deposits that may look like fossils but are not. The date for Cal Day 2014 has already been set for Saturday, April 12, so mark your calendars now! 🦕

—By *Dave Smith*



Counterclockwise from left: *Incoming and outgoing Assistant Directors for Education and Public Programs Lisa White (center) and Judy Scotchmoor (with cap), respectively, chat with visitors at the tee shirt table. Crowds bustle about the BNHM extinction display in the VLSB courtyard. Junior paleontologists look for microfossils. Grad student Dori Contreras talks about the fossils of select victims of mass extinctions. Pteranodon soars above the tumult in the Wallace Atrium. Jason Carr (center) has help from grad student Susan Tremblay (second from right) and undergrad Patrick Sysiong (on Jason's right) telling visitors about fossils recovered from the Caldecott Tunnel's fourth bore.*



Dave Smith (all photos)

## UCMP presents a paleontology course for OLLI

This semester, 75 enthusiastic **Osher Lifelong Learning Institute** participants enrolled in a six-week paleontology course. Organized by Marty Pollard, a retired Lawrence Berkeley Laboratory engineer, UCMP curators, staff, and graduate students highlighted current research topics in paleontology. The course started with a history of the UCMP and an overview of paleontology in the Bay Area (**Mark Goodwin**), followed by patterns and consequences of extinctions through time (**Seth Finnegan**), extinctions among large-bodied terrestrial vertebrates (**Emily Lindsey**), multiple approaches to studying the evolution of vertebrates

(**Ashley Poust** and **Sarah Werning**), fossil turtles and climate change (**Pat Holroyd**), and paleontological studies in the Olduvai Gorge (**Leslea Hlusko**). The final course session included a tour of the UCMP collections and the prep lab with participation from **Jason Carr**, **Jenny Hofmeister**, and **Whitney Reiner**. We were delighted by the overwhelming response to the course that was originally expected to draw only 40 people. OLLI participants were clearly impressed by the diversity of research at the UCMP, the high quality of the students, and the overall enthusiasm of the speakers. 🐾



At top, Mark Goodwin explains the geologic history of the San Francisco Bay Area. Jenny Hofmeister tells the class about UCMP's T. rex skeletal mount.

## FRIENDS OF UCMP

We would like to welcome the following new or renewing members to our Friends of UCMP:

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## CALENDAR

### Upcoming events

#### First Wednesday of each month

**East Bay Science Café:** On June 5, ESPM grad student Houston Wilson will be discussing *Making red wine green: Using biodiversity to reduce pesticide use in vineyards*. See [bnhm.berkeley.edu/about/sciencecafe.php](http://bnhm.berkeley.edu/about/sciencecafe.php).

#### Mon–Fri, July 29–August 2, 2013

**Think evolution V: A summer institute for science educators**—Five fun-filled days of evolutionary explorations with biologists and educators at the University of California. Watch [www.ucmp.berkeley.edu](http://www.ucmp.berkeley.edu) for more details.

#### Mon–Thu, August 26–29, 2013

**Evolution of continental food webs in the North American Western Interior across the K-Pg boundary**—This workshop will bring together 15–20 experts in paleo-food web analysis and experts on Cretaceous–Paleogene terrestrial ecosystems.

## LETTER FROM THE DIRECTOR



### A salute to our students

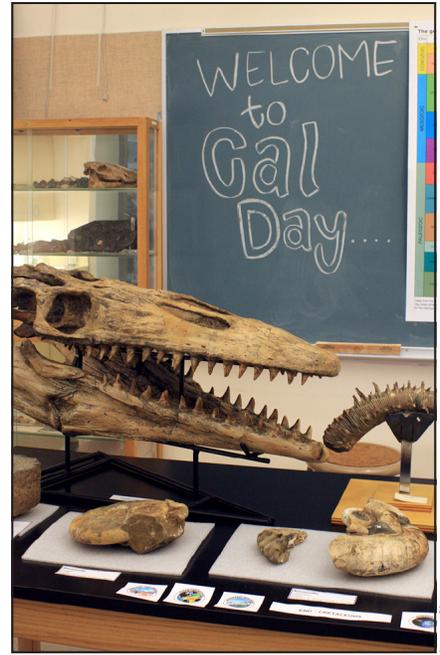
June provides a time of transition for many of us at the UCMP—we close our books on the academic year and make plans for summer fieldwork, writing, research, reflection and relaxation. As I look back on all that we have achieved this year, what stands out most for me was the huge round of applause our graduate and undergraduate students received as I introduced them at one of our UCMP events. I was reminded of the vital source of renewal they bring to UCMP, with their energy, new questions, ideas, and perspectives.

Throughout the year, for example at extremely successful events such as Cal Day, our students serve as enthusiastic ambassadors for the museum. They highlight their research and help to showcase a wide range of projects currently underway in UCMP, from the rehousing of the USGS invertebrate fossil collection, to the preparation of fossils from the CalTrans project, to developing a new

web resource on Understanding Global Change.

As we say farewell to our graduating students this summer, we congratulate them on all of their achievements and wish them well. We also salute our retiring Assistant Director for Education and Outreach **Judy Scotchmoor** for her enormous contributions, which this year are being recognized by her receipt of the 2013 Stephen Jay Gould Prize from the Society for the Study of Evolution and the Chancellor's Award for Public Service. She will be greatly missed by the UCMP family. Her influence on the UCMP programs is beyond easy measure and will be long lasting. We have been greatly enriched by her contributions, enthusiasm, and bridge-building good cheer!

Sincerely,  
**Charles Marshall**



Lucy Chang

# CALDAY

**Cal Day 2014 is set for  
Saturday, April 12,  
so save the date!**

## To become a Friend ▼

### Your gift to the University of California Museum of Paleontology

helps support research, education, and public outreach at the largest, most interactive university paleontology program in America. Become a Friend of UCMP!

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### Who is UCMP?

**Director:** Charles Marshall

**Assistant Directors:**

Mark Goodwin                      Lisa White  
Judy Scotchmoor

**Curators:**

Anthony Barnosky                  Jere Lipps\*  
Roy Caldwell                        Cindy Looy  
William Clemens\*                  Charles Marshall  
Seth Finnegan                        Kevin Padian  
Carole Hickman\*                    James Valentine\*  
Leslea Hlusko                        Tim White  
David Lindberg

**Curatorial Associates:**

Walter Alvarez    Roger Byrne    Lynn Ingram

**Admin. Assistant:** Chris Mejia

**Museum Scientists:**

Erica Clites                              Ken Finger  
Diane Erwin                              Patricia Holroyd

**Prep Lab Manager:**

Jason Carr

**Education & Public Outreach:**

Josh Frankel                              Anna Thanukos  
David K. Smith

Edited by Lisa White and Judy Scotchmoor;  
layout & graphics by David K. Smith

**For the broader UCMP community,** visit the UCMP website: [www.ucmp.berkeley.edu](http://www.ucmp.berkeley.edu); Understanding Evolution: [evolution.berkeley.edu](http://evolution.berkeley.edu); and Understanding Science: [www.understandingscience.org](http://www.understandingscience.org)

\*emeritus

## Think Evolution V: A summer institute for science educators

Monday through Friday, July 29–August 2, 2013  
Valley Life Sciences Building, UC Berkeley  
9:00 am to 3:00 pm

### Middle school, high school, and community college biology teachers and science educators!

Join us for (yet another) fun-filled five days of evolutionary explorations with biologists and educators at the University of California. The Think Evolution Summer Institute, returning for its *fifth* year, will combine lectures by prominent evolutionary biologists with sessions focused on hands-on activities for the middle school, high school, and community college classroom.

The course fills up fast so *register now!* See [http://www.ucmp.berkeley.edu/about/institute\\_reginfo13.php](http://www.ucmp.berkeley.edu/about/institute_reginfo13.php) for the schedule and registration information.

The institute is sponsored by UCMP, the [National Center for Science Education](#), the [Beacon Center for the Study of Evolution in Action](#), the [California Academy of Sciences](#), and the [Howard Hughes Medical Institute](#). 

