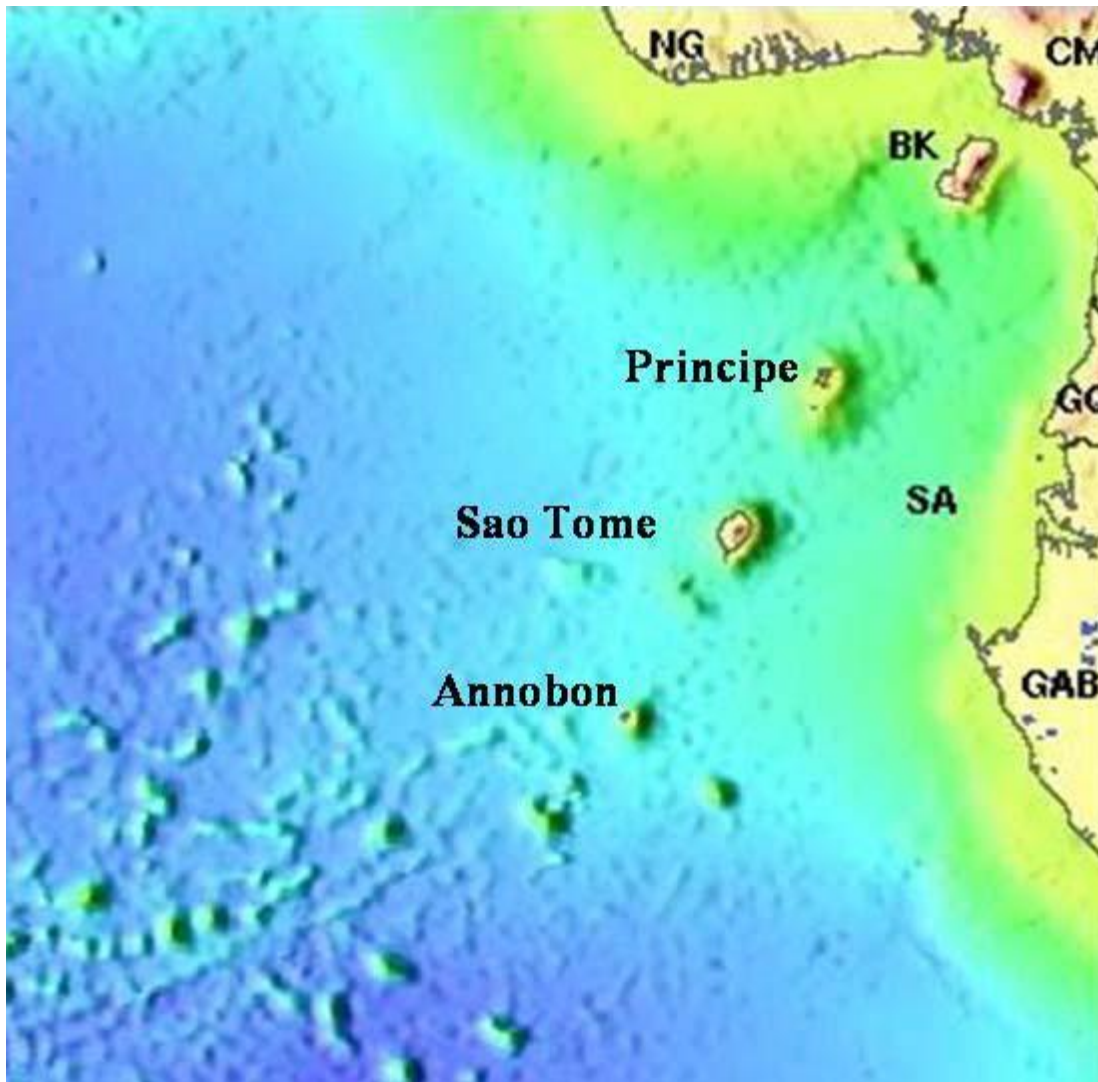


# THE CALIFORNIA ACADEMY OF SCIENCES GULF OF GUINEA EXPEDITIONS

(2001, 2006, 2008, 2009)



# **THE CALIFORNIA ACADEMY OF SCIENCES GULF OF GUINEA EXPEDITIONS**

## **The Academy**

The California Academy of Sciences is the oldest scientific institution in the western United States and holds in excess of 20 million scientific specimens from all over the world. These collections are available to scientists, world-wide. The Academy faculty is made up of PhD researchers, post-doctoral fellows and graduate students in eight departments: Ornithology and Mammalogy, Herpetology, Aquatic Biology, Ichthyology, Invertebrate Zoology and Geology, Anthropology, Entomology and Botany.

The Academy has a rich tradition of multidisciplinary field research that dates back over 100 years and has included fundamental work in the Galapagos Islands, Baja California, Mexico, Africa and Asia. Concurrent with the Gulf of Guinea work detailed below, there are multidisciplinary projects being carried out in Yunnan (China), Madagascar and Myanmar.

The educational and academic activities, scientific collections and history of the California Academy of Sciences may be viewed on [www.calacademy.org](http://www.calacademy.org).

## **The Gulf of Guinea Islands Project**

The Academy of Sciences' involvement in the islands began with herpetologist Dr. Robert C. Drewes and his interest in the origins of the unique amphibian fauna of the islands. Dr. Drewes has organized and led each of the Gulf of Guinea expeditions with the help and assistance of ECOFAC, the several ministries involved with the environment and island non-governmental organizations such as STeP-UP, MARAPA, and MONTE PICO. Drewes has restricted his invitations to scientists who represent disciplines that are poorly known on the islands.

While scientists have known for some time that the fauna and flora of São Tomé and Príncipe are special, this knowledge is based on very old work done at the end of the 19<sup>th</sup> Century; moreover, much of the material supporting this early work was destroyed in a fire at the natural history museum in Lisbon. Although the bird fauna is relatively well-documented, and a flora exists describing the major elements of the island botany, this was written in the 1920's and many other important groups have gone completely unstudied by scientists.

## Goals

**Our goals are to document, analyze and describe the unique endemic fauna and flora of the oceanic islands of São Tomé and Príncipe with emphasis on poorly studied groups. We are fully cognizant of the changes that will come to the islands with the arrival of oil revenues and aware that what remains of the natural environment will likely be impacted negatively. We feel that the citizens of the Republic of São Tomé and Príncipe, along with the rest of the world, must be made fully aware of the unique biological nature of their islands so that informed decisions on future development plans can be made.**

## THE EXPEDITIONS

### **BIOKO**

**In 1998, a preliminary Gulf of Guinea expedition spanning seven weeks was mounted to explore the higher elevations of the island of Bioko, Equatorial Guinea. The field party included three herpetologists and two entomologists. Preliminary results confirm the continental nature of the fauna of Bioko; spider samples are still being analyzed, as are what appear to be two undescribed frog species. Collections of reptiles and amphibians made much earlier are housed in the collections of Doana in Seville, Spain. These have never been scientifically examined and must be analyzed before the fauna and flora of the island are well-understood. It has become clear, however, that Bioko is biogeographically entirely different from São Tomé and Príncipe, which are oceanic in nature. In fact, the Gulf of Guinea Islands represent the only island archipelago in the world that contains both continental and oceanic islands**



## SÃO TOMÉ AND PRÍNCIPE

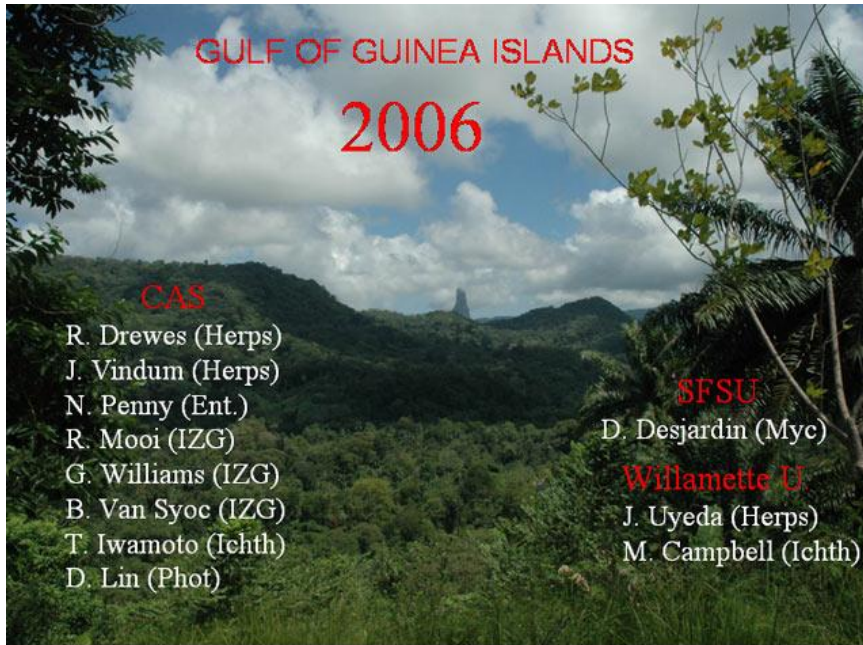
### 2001: First Expedition (GG I)

The first Academy expedition to São Tomé and Príncipe took place over a two-month period in 2001 and included work on both islands. It was funded by the Academy (G. Lindsay Field Research Fund) and included, at various times, 11 scientists and graduate students representing the fields of herpetology (reptiles and amphibians), ichthyology (fish), entomology (insects), botany (diatoms and algae), arachnology (spiders) and mammalogy (bats). In addition to the field work, excellent images of specimens produced by the Academy photographer as well as a short video of the expedition were made and are on display in the public area of our museum.



### 2006: Second Expedition (GG II)

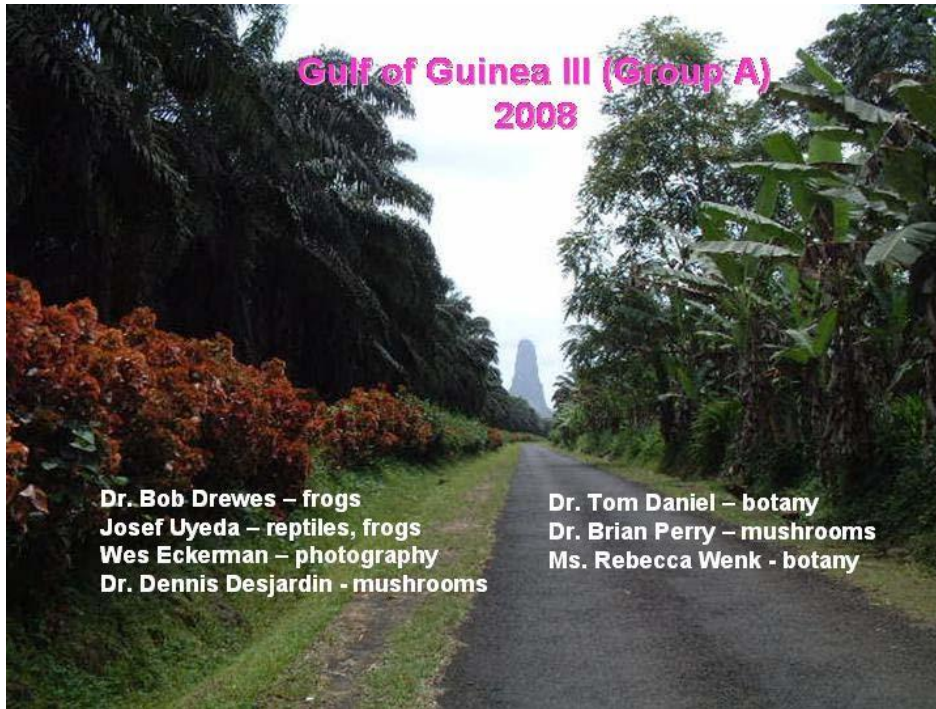
The second expedition to São Tomé and Príncipe was also two-months in duration and included 11 scientists and graduate students arriving at different times. Three herpetologists returned, an entomologist specializing in beetles, three marine scientists working on sea urchins and sand dollars, barnacles and corals, two ichthyologists, and a mycologist (fungi, mushrooms). Again, the expedition was documented by our photographer.



### **2008: Third Expedition (GG III)**

Overall, we know least about the island of Príncipe. While we have made a number of visits there, transportation has been extremely difficult to obtain, and living costs are high. Given the island is geologically at least twice as old as São Tomé, we anticipate many new and novel organisms await discovery there.

Thanks to logistics support from SCD, Team A of the third expedition was able to spend significant time on Príncipe, as well as continuing work on São Tomé; this team left the islands in May. The first mushroom survey ever of Príncipe yielded at least 75 species. Most of the São Tomé mycological species lost in transit in 2006 were recollected. Analysis and description is just beginning, but at least 220 species of fungi are now recorded from both islands. The two botanists in Team A were able to visit the most remote SW slopes of Príncipe which appear to be dominated by members of the Family Rubiaceae. Particularly interesting were collections of the Acanthaceae from both islands; chromosomes and DNA will be extracted from this material, and duplicate specimens were deposited at the herbarium at Bom Sucesso.



### **GG III (Group A)**

Team B is scheduled to travel to the islands late in 2008. Mostly marine scientists, the group will contain a coral specialist, two barnacle specialists and an ichthyologist who will spend much of their time on Príncipe. Team B may be accompanied by an entomologist and a mollusk specialist. We have only scratched the surface of the marine biota, and major groups such as mollusks must be included in future surveys.



### **GG III (Group B)**

## **Results:**

A list of published scientific papers based wholly or in part on material from these expeditions is attached. This list also includes an illustrated popular article describing our research that was written after the expedition of 2001 (Drewes, 2002). All of our publications have been sent or hand-carried to the respective ministries of the São Tomé and Príncipe government and are also available on the Gulf of Guinea Conservation Group website: [www.gcg.st](http://www.gcg.st). A blog on our research was established during GG III; it can be viewed on Wildlifedirect.org “Island Biogeography Race”.

**Publications based upon California Academy of Sciences Gulf of Guinea Expedition materials and research.** \* Names of past field team members are in **bold**.

1. **Drewes, R. C.**\* 2002. Islands at the Center of the World. [\*California Wild\* 55: 8-19.](#) (Popular article)



2. **Drewes, R. C.** and J. A. Wilkinson. 2004. The California Academy of Sciences Gulf of Guinea Expedition (2001) I. The taxonomic status of the genus *Nesionixalus* Perret, 1976 (Anura: Hyperoliidae), treefrogs of São Tomé and Príncipe, with comments on the genus, *Hyperolius*. [\*Proceedings of the California Academy of Sciences\* 55:395-407.](#)



3. **Drewes, R. C.** and **R. E. Stoelting**. 2004. The California Academy of Sciences Gulf of Guinea Expedition (2001). II. Additions and corrections to our knowledge of the endemic amphibians of São Tomé and Príncipe. [\*Proceedings of the California Academy of Sciences\* 55:573-587.](#)



4.. Kavanaugh, D. H. 2005. The California Academy of Sciences Gulf of Guinea Expedition (2001) III. A new species of the endemic genus *Straneo* Basilewsky, 1953, from São Tomé (Insecta: Coleoptera: Carabidae: Platynini). [\*Proceedings of the California Academy of Sciences\* 56:275-283.](#)



5. **Penny, N. D.** 2005. The California Academy of Sciences Gulf of Guinea Expedition (2001). IV. The Neuroptera of São Tomé and Príncipe Islands. [\*Proceedings of the California Academy of Sciences\* 56: 285-293.](#)



6. Pezold, F., **T. Iwamoto** and I. J. Harrison. 2006. The California Academy of Sciences Gulf of Guinea Expedition (2001). V. Multivariate analysis of sicydiines of São Tomé and Príncipe with redescription of *Sicydium brevifile* and *S. bustamantei* (Teleostei: Gobiidae) and a key to West African sicydiines. [\*Proceedings of the California Academy of Sciences\* 57:965-980.](#)





7. Measey, J. G., M. Vences, **R. C. Drewes**, Y. Chiari, M. Melo and B. Bourles. 2007. Freshwater paths across the ocean: Molecular phylogeny of *Ptychadena newtoni* gives insights into amphibian colonization of oceanic islands. [\*Journal of Biogeography\*: 34:7-20.](#)



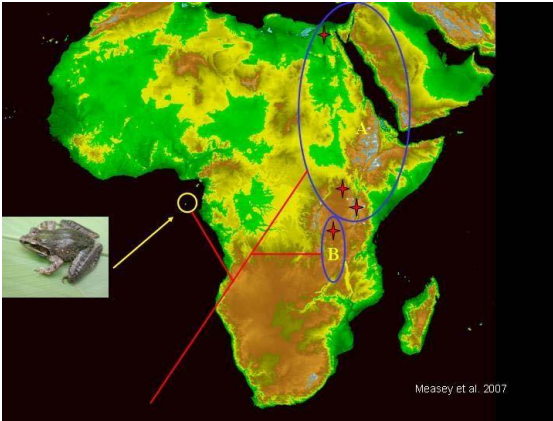
8. Wirtz, P, C. E. L., Ferreira, S. R. Floeter, R., Fricke, J. L. Gasparini, **T. Iwamoto**, L. Rocha, C. L. S. Sampaio and U. K. Schleiwen. 2007. Coastal fishes of São Tomé and Príncipe islands, Gulf of Guinea (Eastern Atlantic Ocean)—an update. [\*Zootaxa\* 1523:1-48.](#)



9. Uyeda, J. C., **R. C. Drewes**, and B. M. Zimkus. 2007. The California Academy of Sciences Gulf of Guinea Expeditions (2001, 2006) VI. A new species of *Phrynobatrachus* from the Gulf of Guinea Islands and a reanalysis of *Phrynobatrachus dispar* and *P. feae* (Anura: Phrynobatrachidae). [\*Proceedings of the California Academy of Sciences\* 58: 367-385.](#)



10. **Drewes, R. C.** 2008. Biogeographic implications of intriguing relationship patterns of endemic amphibians of the Gulf of Guinea Islands (pp.231-234). In: Corti, C. (ed.). 2008. *Herpetologia Sardiniae. Soc. Herp. Ital./ Edizioni Belvedere*, Latina (8), 504p.



11. **Wenk, R. C. and T. F. Daniel.** 2009. Molecular phylogeny of Nelsonioideae (Acanthaceae) and phylogeography of *Elytreria*. *Proceedings of the California Academy of Sciences* 5:53-68.



12. **Desjardin, D. E. and B. A. Perry.** 2009. A new species of *Phallus* from São Tomé, Africa. *Mycologia*



## ON-GOING PROJECTS

Much of our research is ongoing and will take some years to complete; some of the more exciting projects include the following:

1. Prior to the CAS 2001 there had been no studies of diatoms or algae on the islands. The collections made by Dr. Sarah Spaulding during GG I include many new taxa; in fact, the diatom fauna appears to be entirely different from what scientists would predict. We are seeking funding for a post-doctoral fellow to work on these collections for one year.



2. The large spider collections made by Dr. Charles Griswold and Joel Ledford (GG I) are proving an enormous task to study and will be the subject of some effort in coming years. Along with new taxa, there are also specimens hitherto known only from single individuals collected over 100 years ago.



3. Work by Ricka Stoelting confirming the identity of *Schistometopum thomense* (the caecilian, "Cobra bobo") as a true endemic and ancient disperser is being prepared for publication.



4. Prior to our expeditions only four mushroom species had been described from São Tomé. During two weeks in 2006, Dr. Desjardin made 90 collections of over 80 species,

many of them apparently new taxa. Unfortunately, these collections were lost in air transit. During GG III in 2008, Drs Desjardin and Perry were able to recollect most of the species lost and also to make the first study ever of the flora of Príncipe. So far we have 225 species including the first list from Príncipe (75). These collections contain many new species that are currently being analyzed. The first new mushroom from this collection was formally described in 2009.



5. Dr. Richard Mooi continues to work on the extremely rare Gulf of Guinea sand dollar and its relatives. He is attempting to extract DNA from one of the 2006 specimens.



6. Robert Van Syoc and graduate student Dana Carrison are working on a new cryptic species of barnacle discovered during the 2006 expedition. Both scientists returned for GG III (B) and sampled similar marine organisms in Príncipe.; they were joined by a nudibranch specialist and an specialist on marine eels.



7. Dr. Drewes and colleagues have made the startling discovery that the endemic amphibians of São Tomé and Príncipe are genetically more closely related to East African species than to relatives in nearby West Africa. This, plus the relationships between the reptiles of the two islands continue to be on-going herpetological projects.



