

Annual Report 2016



Photo credit: Noel Rowe

History

Centre ValBio (CVB) was created by Professor Patricia Wright in 2003 under the Institute for the Conservation of Tropical Environments' agreement with the Government of Madagascar. The richness of the critically endangered plants and animals contrasted with the poverty of the people and inspired her to help both survive in harmony.

CVB's mission is:

- To promote world-class research in one of the world's most biologically diverse and unique ecosystems;
- To encourage environmental conservation by developing ecologically sustainable economic development programs with local villages;
- To provide the local villagers with the knowledge and tools to improve their quality of life through projects focused on sanitation, diet, and education, and ultimately reduce poverty in the area.



Content

	Page
Letter from Executive Director	1
Memoriam	2
Year in Numbers	3
Research Station	4
Programs	
Research	6
Conservation	14
Training	16
Community Outreach	20
Looking Ahead to 2017	26
Financial Statement	27
Donors	28

Advisory Board

James Herrnstein - *Interim Chair*
Robin McGary Herrnstein
Susan Cummings-Findel

Jonathan Aronson
Joan Abrahamson
Thomas E. Lovejoy
James Herrnstein
James E. Brumm
Jane Alexander

Mark Krasnow
Tom Gillespie
Stuart Pimm
Barbara Wold
John Allman
Steig Johnson
Rhett Butler
Noel Rowe
Wai Poc





Dear CVB friends and supporters,

2016 has been a very transformative year with expansions in staff, infrastructure and partnerships, as well as new discoveries and major accomplishments.

This year, we welcomed Jane Alexander to our Advisory Board. Maya Moore joined the team as CVB's Chief Technical Advisor in Ranomafana, and new administrative support staff based at Stony Brook University's Global Health Institute (GHI) started in New York. Sonya Lorraine, Hodan Hassan and Jeanne O'Neill assist with finance, grant writing and the SBU study abroad programs. Jesse McKinney also moved from CVB's part-time Chief Technological Advisor to full-time through our partnership with GHI.

Thanks to Dorothy Lichtenstein and the Lichtenstein Fund, we were able to expand and upgrade our kitchen, as well as to expand the dining room and offices in LovaBe Hall. Madame Monique Rasoazanana, the Minister of Higher Education and Research, cut the ribbon at the inauguration ceremony in July. We also made major network overhauls, including improving the LovaBe network to support 400% faster data rates.

In 2016, we forged new partnerships and strengthened existing ones. Dr. Mark Krasnow and his lab from Stanford University returned to work on their "Mouse Lemur Genome Project", and new friends from Stanford, Kathy Burke and Manu Prakash and his team, visited Madagascar for the first time. We expanded our reforestation efforts through a new collaboration with Catholic Relief Services, and

explored new areas for potential protected status with Rainforest Trust, including a 1,400 ha isolated rainforest in the Horombe Plateau that I recently discovered. This "unexpected" forest has a unique community of plants and animals, many of which are likely new to science.

Our partner NGO, Pivot, has continued to grow as well, with over 130 employees and a new Country Director, Mohammed Ali Ouenzar. Having contributed to the improvement of Ifanadiana District hospital and local health systems, Pivot will join CVB in bringing health care out into communities.

We have begun to explore the use of technology in our community outreach work. Peter Small, Director of GHI, successfully flew drones carrying medicine to remote villages, and Jesse McKinney is working with Jeff Nagel and Eric Bergerson to design a program for engineers to find solutions to problems found in everyday Malagasy life.

We also celebrated a quarter century of protecting Ranomafana Forest and organized a 25th Anniversary Celebration of Ranomafana National Park with local partners. We successfully completed the first year of My Rainforest, My World (Three Graces Foundation) with an end of year presentation event with fourth grade students.

I am proud of all that we have accomplished together this year and I would like to thank everyone that makes this work possible, especially the 88 hardworking CVB staff on the ground in Ranomafana, and Benjamin Andriamihaja and his team at MICET in Antananarivo who make miracles happen. Thank you!

With all of your continued support and hard work, I am positive that 2017 will bring about many more advancements toward our goal to preserve Madagascar's biodiversity while contributing to the improvement of human wellbeing.

Sincerely,

Dr. Patricia Wright
Founder and Executive Director, CVB



Florent Ravoavy

1957-2016

Head of Education, Conservation and
Community Outreach, CVB

We dedicate this report to our friend and colleague who left us to join the ancestors this past November. Florent worked with us from the beginning of the Ranomafana National Park Project. We will miss his wisdom and clarity of vision for the communities, and his kindness.

Year in Numbers

CVB scientific publications: **38**

Ex-Presidents visiting CVB: **2** (Madagascar and Finland)

Deans from Stony Brook University visiting CVB: **3**
(School of Medicine, Dental School, and International Academic Programs and Services)

Number of Stony Brook University Study Abroad groups: **3**
(Winter, Spring, Fall)

Number of CVB field biodiversity research expeditions: **15**

Age Ranomafana National Park turned in 2016: **25**

Number of Golden Bamboo Lemur in Talatakely : **37**
(up from **15** in 2000)

Number of international meetings attended: **2**
(Association for Tropical Biology and Conservation, International Primatology Meeting)

Number of visits that Dr. Wright made to the Culinary Institute of America: **1**

Roundtrips that Dr. Wright made from U.S. to Madagascar: **8**

Number of times ABC Nightline News came to CVB and filmed lemurs: **1**

Number of new Society for Conservation (SCB) Chapters established in Madagascar: **1**

Number of SCB Meetings attended in Tana: **2**

Likes on Facebook: **9,645** (Centre ValBio) / **2,959** (Institute for the Conservation of Tropical Environments)

Followers on Twitter: **515**

Editions of VaoVao ValBio newsletter in 2016: **2**

Articles in Tana Planete about Centre ValBio and RNP: **1**
(Dec. 2016 edition)

Posters created for CVB by Alain Rasolo: **2**
(lemurs and amphibians/reptiles of RNP)



Research Station Use & Visitation

Centre ValBio is an international research station which attracts students, researchers, training programs, partners and tourists from around the world due to its excellent reputation, proximity to Ranomafana National Park, and increasing global interest in biodiversity and the people of Madagascar.

In 2016, Centre ValBio hosted **526** individuals from **30** countries including the U.S., Madagascar, Italy, Comoros, France, Germany, Sweden, Spain, the U.K., Japan, Canada, Finland, Belgium, India, Taiwan, Portugal, Australia, Brazil, Austria, the Netherlands, Costa Rica, Slovenia, China, Ghana, South Korea, Mauritius, Rwanda, Kenya, Ethiopia and Uganda. This is a significant increase from last year, with **280** individuals visiting from **20** countries in 2015.

Station Days

The total number of station days in 2016 increased to **6,703** compared to **6,477** in 2015, **4,561** in 2014, and **4,692** in 2013.



Researchers

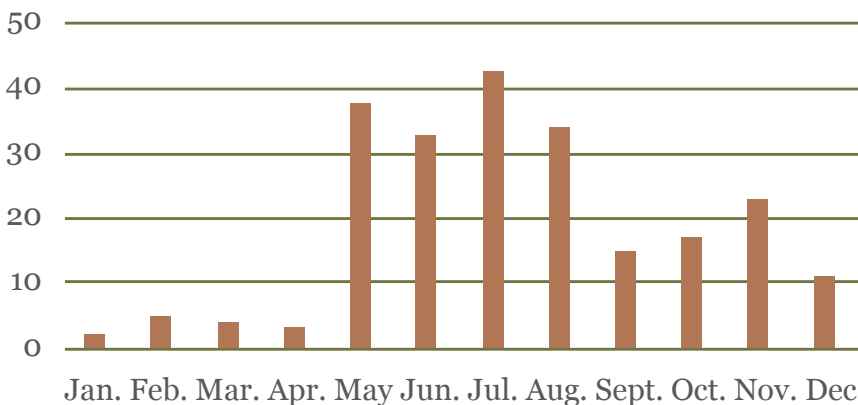
228 researchers stayed at CVB in 2016, with the average length of stay of each researcher being **21.92** days. Our high season continues to be May – December.

The majority of our researchers come from the U.S. (**41%**) and Madagascar (**37%**). Thanks to student research scholarships from the Lichtenstein Foundation Fellowship Fund, we were able to financially support **15** Malagasy students and **three** instructors from the Universities of Fianarantsoa, Tulear, and Antananarivo in 2016.

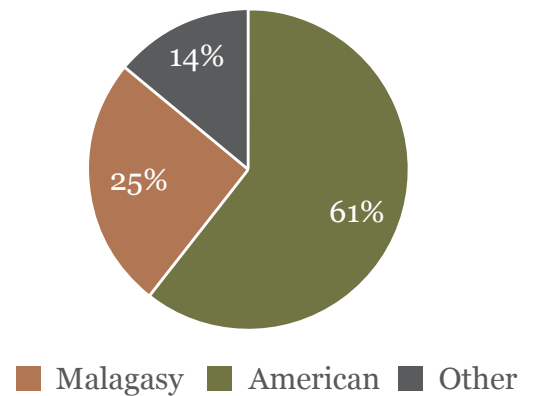
Laboratory Use

69 researchers used CVB labs in 2016, for a total number of **231** days of lab use.

Researchers per Month 2016



Nationalities of Visitors 2016



“The lab space was fantastic. We planned our trip/work in a short duration and it was fantastic for everyone to be so accommodating and helpful. I have worked in the field for the last five years; and not had such fantastic facilities as a field lab before. A truly unique and spectacular resource.”

Manu Prakash, Professor, Stanford University

Special Visitors

Former Madagascar President **Marc Ravalomanana** and his wife **Lalao Ravalomanana**, current mayor of Antananarivo, the capital city of Madagascar, paid a surprise visit to CVB and spent several hours touring CVB and learning about CVB's programs in research, conservation and community outreach.

Former President of Finland, **Tarja Halonen**, came as part of the University of Helsinki Alumni group. Their visit overlapped with the 25th Anniversary of Ranomafana National Park and they were able to enjoy some of the festivities.

Alex Marquardt, war correspondent for ABC Nightline News, spent a week at CVB filming the lemurs and wildlife of Ranomafana National Park.

This year, three deans from Stony Brook University visited Madagascar and CVB to learn more about our programs and discuss possibilities for further collaboration. **Dr. Mary Truhlar**, Dean of SBU Dental School, and **Dr. Ken Kaushansky**, Dean of the SBU School of Medicine, visited in July. **Dr. Jun Liu**, Vice Provost for Global Affairs and Dean of International Academic Programs and Services, also visited CVB in September.

We were also very pleased that six CVB board members, **Drs. Jim and Robin Herrnstein**, **Dr. Mark Krasnow**, **Dr. Steig Johnson**, **Noel Rowe** and **Susan Cummings-Findel** could visit with us this year.



Other special guests in 2016 included:

- **Monique Rasoazanana**, Minister of Higher Education and Research, Madagascar
- **Eric Rakotoarisoa**, Chief Justice of the Supreme Court, Madagascar
- **Dr. Laurie Landeau** and **Dr. Robert Maze**, Veterinarian, Biologist
- **Patricia** and **Jonathan Holtzman**, Holtzman Wildlife Foundation
- **Dr. Manu Prakash**, Professor at Stanford, MacArthur Fellow
- **Dr. Jean-Christophe Vie**, Director of IUCN Saving our Species Program
- **Dr. Russ Mittermeier**, Chair of IUCN Primate Specialist Group
- **Katherine Burke**, Deputy Director of Center for Innovation in Global Health, Stanford
- **Henry Frischknecht**, Social Studies Teacher, Rhinebeck, NY
- **Pamela Reed-Sanchez**, Executive Director, Seneca Park Zoo, Rochester, NY
- **Tom Snyder**, Director of Programming and Conservation Action, Seneca Park Zoo
- **Dr. Christopher Meyer**, Invertebrate Zoologist, Smithsonian Institution, Washington, DC
- **Dr. Scott Robinson**, Dean of Biology, University of Florida, Gainesville
- **Dr. Peter Small**, Director, Global Health Institute, Stony Brook University (SBU)
- **Dr. Marvin H. O'Neal III**, Director of Introductory Biology Laboratories, SBU
- **Fontaine Rafamantanantsoa**, President of University of Fianarantsoa

Research

In 2016, CVB continued its long term research on lemurs and lemur food plants:

Sifaka

For over **30** years, Patricia Wright and CVB teams have been following *Propithecus edwardsi* groups. This year, we continued to follow groups at Sahamalaotra Forest (Vohiparara) and two groups at Valohoaka Trail System and noted an abundance of sifaka births this past season. Our field teams discovered **10** babies in the six groups that we follow.

Patricia Wright, Alicia Lamb and the techs also conducted health surveys of *Propithecus edwardsi* at Sahamalaotra and Mangevo, two sites within Ranomafana National Park. **7** individuals (**4** in Mangevo, and **3** at Sahamalaotra) were captured to collect ectoparasites and place radio collars on them for future long-term study. Fecal samples were collected for identification of intestinal parasites.



The phenology of **342** feeding-trees (**71** species, **46** genera, and **24** families) of *Propithecus edwardsi* at Talatakely, Ranomafana National Park, has been monitored monthly since 1987. Every month, observations are made as to whether the trees are flowering, fruiting, and the state of their vegetative parts (young, mature leaves, etc.). DBH data is collected twice a year (May and November) to measure tree growth. We have noted that 2016 had more fruiting trees than the previous year.

Bamboo Lemurs

CVB continued its long-term daily monitoring of the golden bamboo lemur (*Haplemur aureus*) and greater bamboo lemur (*Prolemur simus*) within Talatakely, Ranomafana National Park. Wonderful news that the critically endangered golden bamboo lemur has more than doubled in population size. *H. aureus* have been followed since 2000 when there were **15** individuals in Talatakely. There are now **37** individuals in the same area.

The single RNP *P. simus* group consists of just two individuals, a father and daughter.



Dr. Eileen Larney's project to inventory *P. simus* in the bamboo forest at Ivato, Vondrozo also continued. A total of **80** individuals within three groups were found; among them were **11** infants. The team also discovered a **6.5**-hectare area of cleared forest within the bamboo forest.

Elise Lauterbur, SBU graduate student has been working with CVB staff to better understand the genetic and physiologic basis of cyanide tolerance in bamboo lemurs. Samples have been collected in Talatakely Trail system from the golden bamboo lemurs. In addition **59** urine samples were collected from three groups (**110** individuals) of *Prolemur simus* at Vohitrarivo.

Tropical Ecology Assessment and Monitoring (TEAM)

TEAM works at **17** field sites across tropical humid rainforest ecosystems to monitor long-term trends in biodiversity through a network of field stations, with the goal of recording changes in and threats to biodiversity status that can be used to guide conservation action. The Ranomafana TEAM site, initiated in 2010 and now entering its 7th year, is a partnership between Conservation International (CI) and CVB. TEAM monitoring for FY16 (2015-2016) began in October 2015.

A standardized methodology of three different protocols (vegetation, terrestrial vertebrates, and climate) is used by all of the TEAM projects around the world. Data is collected and then uploaded to a central database (TEAM Portal) after each expedition in order to facilitate exchange and comparison of information.



Vegetation

One-hectare botanical plots were set up at each of six sites. **6,747** vegetation stems were monitored and DBH measured at breast height. Voucher specimens were collected for identification of unknown species. During this monitoring period, more than **50%** of the individual stems within the six plots had changed their DBH measurement. Identification of the unidentified stem at the species level was conducted in collaboration with botanists at *Parc Zoologique et Botanique de Tsimbazaza* (PBZT) in Antananarivo. **96.72%** of specimens have now been identified to the species level.

Terrestrial vertebrates

Camera traps at **60** points and three locations are used to monitor terrestrial vertebrates. Each camera trap point has its own characteristic habitat. A total of **10,264** images captured images **22** vertebrate species, including seven bird species, four primate species, five carnivores species, three Rodentia species, two Cetartiodactyla species, and one Afrosoricida.

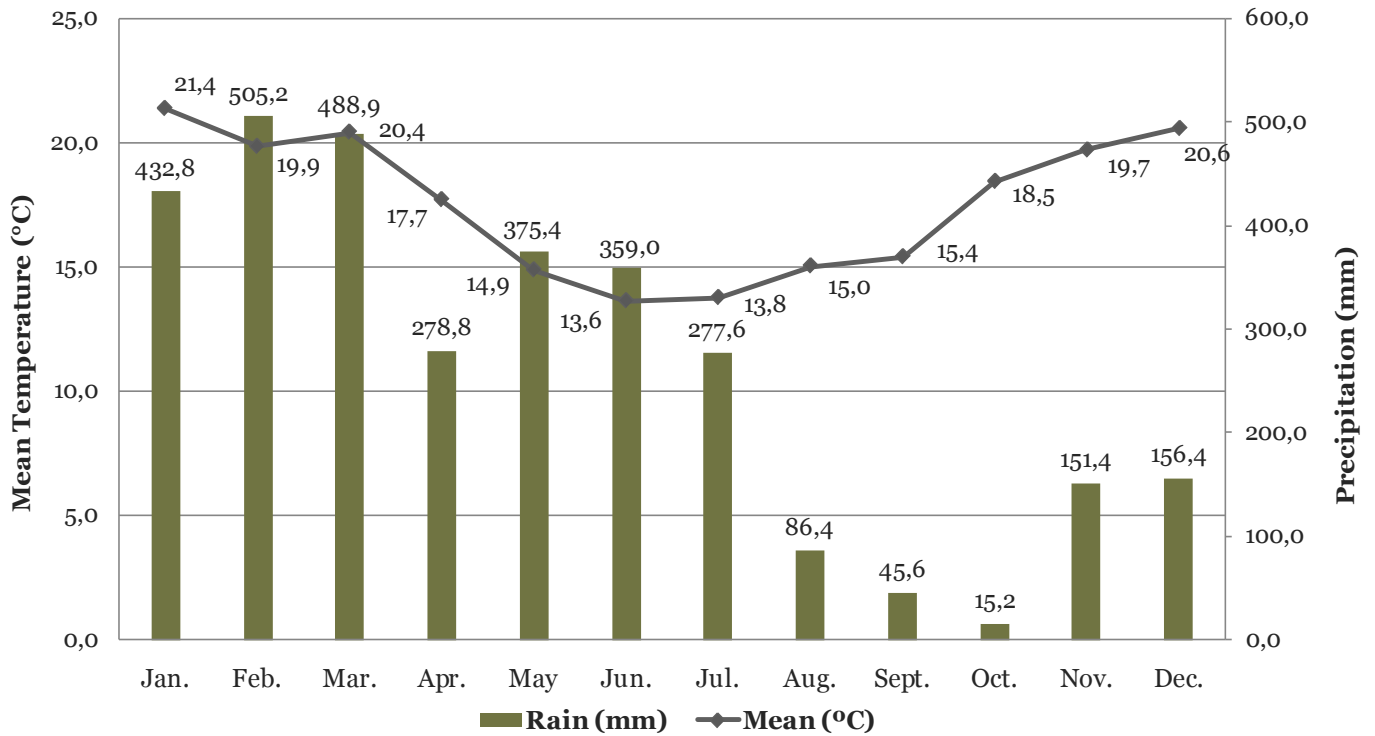
The most important findings from these photos is the top predator, *Cryptoprocta ferox* (big fossa), the rare *Galidictus fasciata*, and the more common *Fossa fossana* and *Galidia elegans*. The largest bird, the crested ibis, is hunted out of most forests, and detected by the traps. Bush pigs are large and cryptic and detected in the forest. Even lemurs such as the red-bellied, the red-fronted brown appear in the traps, as well as the rarer aye-aye and greater bamboo lemur. Humans and their dogs occasionally are filmed by the traps.



Climate

Climate data is recorded using automatic data loggers installed at the CVB Climate Station which was officially inaugurated by the Secretary General of the Ministry of Tourism, Transport and Meteorology on World Meteorological Day (March 23, 2016). Measurements of climate variables, such as air temperature, relative humidity, global solar radiation, and precipitation are automatically recorded every 5 minutes. Standardized maintenance and sensor calibration procedures were adopted by all TEAM sites.

The data from this climate station demonstrated that the total rainfall in 2016 was **3172.7 mm**. February was the wettest month for Ranomafana with **505,2 mm** of rainfall. During this monitoring period, the average relative humidity varied between **83% to 93%**.



Participatory Ecological Monitoring

CVB has conducted Participatory Ecological Monitoring (PEM) with community members living near several fragmented forest at the peripheral zones of Ranomafana National Park (Mangevo, Sahavanana, Amboasary, Ambodivoangy, Andemaka, Bevoahazo, Ampitanana, Ambatolahidimy, Andoharano, Sahavondrona, Amboditanimena, and Vohiparara) since 2007. Transects are used to conduct surveys of diurnal and nocturnal lemur species to estimate densities at each of these sites.



“I learnt from this project how to monitor the wildlife in the forest. We can now develop the ecotourism to increase our source of incomes and to protect and value the biodiversity in our forest. To do so, we need more guide touring training and foreign languages teaching.”
RAKOTOVAO Joseph, Local Guide of PEM project in Sahavondronina

CVB Research in 2016

In 2016, many researchers and students from around the world came to CVB and Ranomafana National Park (RNP) to conduct research ranging from animal behavior and plants, to infectious disease and genetics.

The “Mouse Lemur Genome Project” continued with an annual molecular biology training course in October - November 2016. The Stanford team, including **Dr. Mark Krasnow** and his post-doctoral fellow **Dr. Caitlin Karanewsky**, trapped mouse lemurs and produced mouse lemur fibroblasts in our CVB laboratory. Over **750** mouse lemurs have been trapped and provided with microchip transponders for identification and long-term monitoring.



Dr. Manu Prakash, recent MacArthur Fellowship recipient and a world expert in frugal science, and his team from Prakash Labs at Stanford University carried out field testing of disease vectors, such as mosquitos and snails, to develop diagnostics for low-resource settings.

Dr. Omer Nevo from the University of Ulm, Germany, has initiated a project to examine the chemical odors emitted by fruits consumed by lemurs to better understand lemur seed dispersal. He used CVB labs to measure the odors and our botany staff to help collect the fruits.

Dr. Brett Scheffers and his team from the University of Florida climbed into the canopy to study the effects of climate change on frogs, especially those found in bird’s nest ferns. They scaled **70** different trees and detected **544** frogs of **39** species).



Dr. Mar Cabeza-Jaimejuan and the Global Change and Conservation (GCC) group from the University of Helsinki examined local attitudes towards bats in villages around RNP. They found that **13** endemic bat species. The project also developed an archive of Tanala and Betsileo stories, myths and songs about bats, and documented several local uses of bats in the area, such as hunting of flying foxes for human consumption, widespread guano collection as a fertilizer, and medicinal treatments based on oils from bat fat.

Dr. Angelica Crottini, University of Porto, and **Dr. Matt Fischer**, Imperial College, led an expedition to further study chytrid disease in amphibians in RNP. This fungus negatively affecting amphibians has been found in Ranomafana, but the good news is that it may not be as virulent as in other parts of the world.



“Conducting field work often entails a trade-off between proximity to natural habitats where samples are collected and availability of laboratories in which they can be processed and analyzed. The CVB lab offers a unique setting of a well-equipped and spacious lab with direct access to the rainforest. The CVB lab staff and scientific and logistic personnel are extremely helpful and available, making the CVB lab a unique facility which makes the complicated easy.”

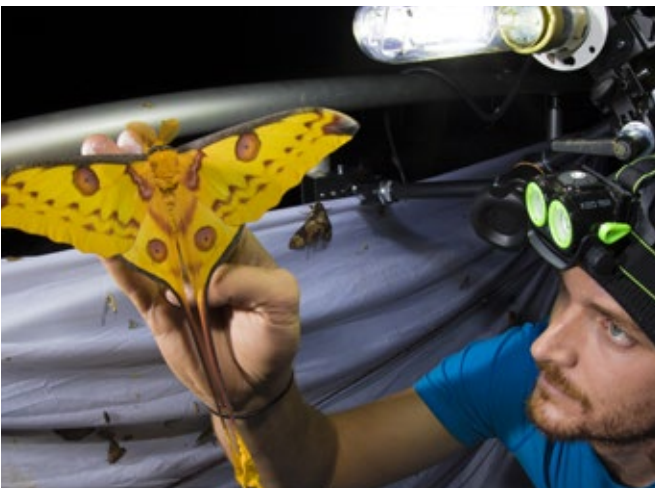
Omer Nevo, post doctoral fellow from University of Ulm, Germany



Dr. Amy Dunham, professor, and Onja Razafindratsima (recent Ph.D), Rice University, are interested in plant-frugivore interaction as a determinant of the diversity and structure of plant community. They conducted surveys of seed dispersal by birds and animals within one-hectare plots at Valohoaka and Vatoharanana by setting up seed traps and studying lemur species feeding on different species of the mistletoe *Tongolahy* (Bakerella).

Dr. Sarah Zohdy, assistant professor at Auburn College, carried out an assessment and inventory of mosquitos in Andasibe as part of her work looking at their role in malaria transmission. This is part of a comparative study with Ranomafana National Park (RNP).

In Mangevo, Peter Houlihan and Ian Segebarth from the Florida Natural History Museum, studied hawk moth pollination of Darwin's Star orchid. Although finding the orchid plants with closed flowers, the constant rains in May and June resulted in no orchids blooming. This team joined Patricia Wright in the first expedition south of Ihozy to look at the large caverns and unique rainforest there.



Scientists from Kew Gardens-Madagascar conducted inventories and surveys of Ranomafana plant species for herbarium and voucher collect at three sites in and around RNP. In Sahamalaotra they recorded **26** species of plants and **4** species of mushroom were recorded.

Sylvain Razafimandimbison and Ulf Stephenson from Sweden, along with botanists from PBZT, also inventoried plant specimens for herbarium collection and voucher collection of five samples per species within Talataky, Sahamalaotra, and along National Route 25.

Herman Rafalinirina continued his research on *Cheirogaleus crossleyi*, Crossleyi's dwarf lemur. Herman presented his results at the International Society of Primatology in Chicago in August, 2016. He has captured over **80** individuals and several have radio collars.



Dr. Summer Arrigo-Nelson led a California University in Pennsylvania Study Abroad to continue a long term study to monitor the exotic rat, *Rattus rattus*, population within RNP and near the village of Vohiparara. The good news is there has not been a decrease in the number of invasive rats compared to endemic nocturnal rats, such as *Eilurus webbii* and *Eilurus tanala*.

Dr. Zach Farris of the Mad Dog Initiative continued his work on wild dog populations by conducting surveys and using camera traps. His team also captured dogs to collect blood and ectoparasite samples, as well as to perform castration/sterilizations and give vaccinations.

Katherine Kling, Stony Brook University anthropological sciences graduate student with Patricia Wright as advisor, assessed the impact of thirteen years of continued fragmentation and human influence on the populations of lemurs and lemur predators living within fragments north of RNP that were part of a 2003 survey of conducted by Dr. Alex Dehghan. Re-evaluation of the sites, as opposed to evaluation of new sites, is particularly important for documenting change across time.

Isabelle Clark, Duke University, spent the month of July collecting fecal samples from seven diurnal lemur species living at two sites in RNP (*Hapalemur aureus*, *Hapalemur griseus*, *Prolemur simus*, *Propithecus edwardsi*, *Eulemur rufifrons*, *Eulemur rubriventer*, and *Varecia variegata*). She will compare the intestinal microbiome of all these species.



Randrianasolo Rivoarison conducted ethno-botanic surveys with local villagers and collected medicinal plant specimens for identification and chemical analysis.

Alicia Lamb, Stony Brook University Ecology and Evolution graduate student with Patricia Wright as advisor, continued the study on *Propithecus edwardsi* gut microbiomes and added a stress component to the project. She collected fecal samples for genetic analysis, surveyed focal individuals, and collected GPS points on their feeding-trees.

Akiko Sawada from Japan, is studying cyanide tolerance in the critically endangered bamboo lemurs. She investigated the microbiome within their intestinal tract by collecting feces.

Mariana Matos, University Trás-os-Montes e Alto Douro, studied *Propithecus edwardsi* groups in Mangevo and Vohiparara, comparing their behavior and ecology for her Master's theses.

Daniella Rabino, Centre for International Education at the University of Sussex, is spending several months at a remote village near Tolongoina to carry out her doctoral research on children's learning through play.



Mariah Donohue, Stony Brook University Ecology and Education graduate student with Patricia Wright as advisor, studied the gut microbiome in black and white ruffed lemurs across different habitat disturbance regimes (two sites with RNP and two fragments in Manombo, a coastal forest near Farafangana)

Amanda Mancini, City University of NY Graduate School, is studying conservation genetics of black and white ruffed lemurs (*Varecia variegata*) in RNP, in forest fragments and in the forested corridor south of Ranomafana. Through genotyping fecal samples from over **200** individuals and using remotely sensed landscape data she will identify how landscape heterogeneity affects the genetic structure of this critically endangered primate. Amanda is advised by Dr. Andrea Baden, who studied the genetics and behavior of RNP *Varecia* for her dissertation.

2016 Publication List

- Aivelo, T., Laakkonen, J., & Jernvall, J. (2016). Population- and Individual-Level Dynamics of the Intestinal Microbiota of a Small Primate. *Applied and Environmental Microbiology*, 82, 3537-3545.
- Baden, A. L., Webster, T. H., & Kamilar, J. M. (2016). Resource seasonality and reproduction predict fission–fusion dynamics in black- and-white ruffed lemurs (*Varecia variegata*). *American Journal of Primatology*, 78, 256-279.
- Bonds, M. H., Gikic D., Cordier, L. F., Garchitorena, A., Hall, L., McCarty, M. G., Ramananjato, R., Rafaralahy, V., Andriambolamanana, H., Rakotonirina, L., Raveloson, T., Gillespie, T. R., Farmer, P. E., Andriamihaja, B., Wright, P. C., Herrnstein, R., Herrnstein, J., & Rich, M. L. (2016). Advancing a science of sustaining health in Madagascar. *Annals of Global Health*. 82,378-379.
- Costanzo, J., Baden, A. L., & Tecot, S. R. (2016). The relationship of estradiol to paternal care behavior in wild-living red-bellied lemurs (*Eulemur rubriventer*). *American Journal of Physical Anthropology*, 159, 123-123.
- Deppe, A. M., Baden, A., & Wright, P. C. (2016). The effects of the lunar cycle, temperature, and rainfall on the trapping success of wild brown mouse lemurs (*Microcebus rufus*) in Ranomafana National Park, southeastern Madagascar. In: Lehman, S. M., Radespiel, U., & Zimmermann, E. (Eds.), *The Dwarf and Mouse Lemurs of Madagascar: Biology, Behavior and Conservation Biogeography of the Cheirogaleidae*, (pp. 105-209). Cambridge, UK: Cambridge University Press.
- Frankel, D. C., Jacobs, R. L., Rice, R. J., & Bradley, B. J. (2016). Parentage complexity in socially monogamous wild lemurs (*Eulemur rubriventer*). *American Journal of Physical Anthropology*, 157, 147.
- Giordano, R. C., Rist, C. L., Parsons, M. B., Ramananjato, R., Wright, P. C., Bliska, J. B., Bonds, M., & Gillespie, T. R. (2016). Behavioral and Socio-Economic Risk Factors of Pathogenic Enterobacteria Infection and Antibiotic Resistance in Ranomafana Commune, Madagascar.
- Herrera, J. P. (2016). Interactions between plants and primates shape community diversity in a rainforest in Madagascar. *Journal of Animal Ecology*, 85, 982-993.
- Herrera, J. P., Lydia, T., & Wright, P. C. (2016). Contact zones and species sympatry in dwarf lemurs (genus *Cheirogaleus*): the roles of ecological adaptation and sexual selection. *The Dwarf and Mouse Lemurs of Madagascar: Biology, Behavior and Conservation Biogeography of the Cheirogaleidae*. In: Lehman, S. M., Radespiel, U., & Zimmermann, E. (Eds.), *The Dwarf and Mouse Lemurs of Madagascar: Biology, Behavior and Conservation Biogeography of the Cheirogaleidae*, (pp. 113-132). Cambridge, UK: Cambridge University Press.
- Jacobs, R. L., Spriggs, A. N., Baden, A. L., Irwin, M. T., Wright, P. C., Louis, E. E., Lawler, R. R., & Bradley, B. J. (2016). Primate genotyping via High Resolution Melt Analysis (HRMA): Rapid and reliable identification of color vision status in wild lemurs. *Primates*, 57, 541-547.
- Jacobs, R. L., & Bradley, B. J. (2016). Considering the influence of non-adaptive evolution on primate color vision. *PLoS one*, 11, e0149664.
- Jacobs, R. L., Veilleux, C. C., & Melin, A. D. (2016). Dichromacy as an adaptation for foraging in red-bellied lemurs (*Eulemur rubriventer*). *American Journal of Physical Anthropology* 159, 183.
- Kamilar, J. M., & Tecot, S. R. (2016). Anthropogenic and climatic effects on the distribution of *Eulemur* species: A niche modeling approach. Special Issue: New Research Directions in the Genus *Eulemur*. *International Journal of Primatology*, 37, 47-68.
- Kavanaugh, D. H., & Rainio, J. (2016). Twenty-six New Species of Predaceous Ground Beetles (Coleoptera: Adephaga: Carabidae) from Ranomafana National Park, Madagascar. *Proceedings of the California Academy of Sciences*. 63, 201–268.
- Kling, K. J., Lauterbur, M. E., & Wright, P. C. (2016). Do grooming bouts diminish ectoparasite load in wild *Propithecus edwardsi* in the rainforests of Madagascar?: Presented at the 85th Annual American Association of Physical Anthropologists conference, Atlanta, GA.
- Kling, K. J., Dehgan, A., & Wright, P. C. (2016). Fragmentation and population viability analyses of *Eulemur rufifrons* and *Propithecus edwardsi* in Eastern Madagascar: making sense of fragmented results: Presented at the 26th Annual International Primatological Society conference, Chicago, IL.

- Lamb, A. L., Lauterbur, M.E., & Wright, P. C. (2016). Propithecus playing around: Does female leadership influence play?: Presented at the 85th annual American Association of Physical Anthropologists conference, Atlanta, GA.
- Lauterbur, M. E. (2016). Lemurs are not Special, but Aye-Ayes are: Primate Basal Metabolic Rates in Phylogenetic Context: Presented at the 85th annual American Association of Physical Anthropologists conference, Atlanta, GA.
- Lauterbur, M.E. (2016). Testing the energy conservation hypothesis: rethinking the role of environmental constraints in basal metabolic rates. Presented at the 26th Annual International Primatological Society conference, Chicago, IL.
- Nunn, C., & Gillespie, T. R. (2016). Pathogens and Primate Conservation. In: Wich S. A. & Marshall, A. J. (eds). *An Introduction to Primate Conservation*. (ch. 10). Oxford University Press, Oxford, UK.
- Ragazzo, L. J., Zohdy, S., Velonabison, M., Herrera, J., Wright, P. C., & Gillespie, T. R. (2016). *Entamoeba histolytica*, the causative agent of amoebic dysentery, in the lemur community of Ranomafana National Park, Madagascar. *EcoHealth*.
- Rakotonirina, H., Kappeler, P. M., & Fichtel, C. (2016). The role of acoustic signals for species recognition in redfronted lemurs (*Eulemur rufifrons*). *BMC Evolutionary Biology*, 16, 100.
- Razafindratsima, O. H., & Dunham, A.E. (2016). Co-fruiting plant species share similar fruit and seed traits while phylogenetic patterns vary through time. *Journal of Ecology*, 104, 1789-1798.
- Razafindratsima, O.H., & Dunham, A.E. (2016). Frugivores bias seed-adult tree associations through nonrandom dispersal: a phylogenetic approach. *Ecology*, 97, 2094-2102.
- Rist, C. L., Smith, K. M., Ramananjato, R., Randrianarivojosia, M., Wright, P. C., Bonds, M. H., & Gillespie, T. R. (2016). Economic and demographic associations with soil-transmitted helminthiasis, anemia, and stunting in Ranomafana, Madagascar. *American Journal of Tropical Medicine and Hygiene*.
- Scheffers, B.R., Meester, L. D., Bridge, T. C. L., Hoffmann, A. A., Pandolfi, J. M., Corlett, R. T., Butchart, S. H., Pearce-Kelly, P., Kovacs, K. M., Dudgeon, D., Pacifici, M., Rondinini, C., Foden, W. B., Martin, T. G., Mora, C., Bickford, D., & Watson, J. E. M. (2016). The broad footprint of climate change from genes to biomes to people. *Science*, 354,719.
- Strauß, A., Guilhaumon, F., Randrianiaina, R. D., Valero, K. C. W., Vences, M., & Glos, J. (2016). Opposing Patterns of Seasonal Change in Functional and Phylogenetic Diversity of Tadpole Assemblages. *PloS one*, 11, e0151744.
- Tecot, S. R., Singletary, B., & Eadie, E. (2016). Why “monogamy” isn’t good enough. *American Journal of Primatology*, 78, 340-354.
- Tecot, S. R., Costanzo, J., Eadie, E., Jacobson, K., Hawley, C., Razanajatovo, S., Arroyo, A. S., & Baden, A. L. (2016). Endocrine mechanisms underlying phenotypic variation in infant care in the red-bellied lemur, *Eulemur rubriventer*. Presented at the 26th Annual International Primatological Society conference, Chicago, IL.
- Tecot, S.R, Costanzo, J., Eadie, E., Hawley, C., Razanajatovo, S., Arroyo, A. S., & Baden, A. L. (2016). Profiling caregivers: hormonal variation underlying allomaternal care in wild red-bellied lemurs. Presented at the 85th annual American Association of Physical Anthropologists conference, Atlanta, GA.
- Tecot, S. R. & Overdorff, D. J. (2016). Red-bellied lemur, *Eulemur rubriventer*. In: N. Rowe & M. Myers (eds.). *All the World’s Primates*. NY: Pogonias Press.
- Rafalinirina, A. H., & Wright, P. C. (2016). Parasites Lost: Canopy lemurs may have less intestinal parasites. Presented at the 26th Annual International Primatological Society conference, Chicago, IL.
- Rice, K. S., Zohdy S., Crowley, B. E., & Tecot, S. R. (2016). Healthy forests, healthy lemurs? The effect of habitat disturbance on diet, parasitism, and immunity in brown mouse lemurs (*Microcebus rufus*). Presented at the 26th Annual International Primatological Society conference, Chicago, IL.
- Zohdy, S., Derfus, K., Headrick, E. G., Andrianjafy, M. T., Wright, P. C., & Gillespie, T. R. (2016). Small-scale land-use variability affects *Anopheles* spp. distribution and concomitant Plasmodium infection in humans and mosquito vectors in southeastern Madagascar. *Malaria journal*, 15, 114.

Conservation

Celebrating 25 years of protecting Ranomafana National Park!

On November 19th, CVB, Pivot, Madagascar National Parks, Help Simus, and the Mayor of Ranomafana organized a major celebration of the 25th Anniversary of Ranomafana National Park.

Inaugurated in 1991, the **41,601**-hectare RNP became just the fourth national park in Madagascar. Over the last quarter century, RNP, also a UNESCO World Heritage Site, has grown to become a popular destination for scientific researchers and eco-tourists, making it one of the top three protected areas visited in all of Madagascar.



Purchasing Rainforest and Creating New Protected Areas

CVB was able to successfully negotiate the purchase of **20**-hectare of unprotected forest in the peripheral zone of Ranomafana National Park (Ambatolahidimy), thanks to support from Seneca Park Zoo.

CVB has also joined forces with U.S.-based Rainforest Trust to explore a **1400**-hectare forest to the southeast of Ihosy and begin the process of creating a new co-managed protected area with a local community association in the heart of Bara country. Leona Rasolonirina, a recent graduate of tourism school in Antananarivo first alerted Pat Wright and Pascal Rabeson of large caverns and rainforests in her home town south of Ihosy. An initial two-day reconnaissance by Peter Houlihan, Ian Segebarth, Leona, Pat and Pascal sparked interest and both National Geographic and Rainforest Trust sent pilot funds. CVB accomplished two biodiversity inventories. We are awaiting genetic confirmation, but we may have two new nocturnal lemur species.

Rainforest Trust is also supporting CVB to conduct amphibian inventories in order to identify new important sites for protection. To date, CVB has conducted one inventory in Bevoahazo in the peripheral zone of Ranomafana, and also plans to inventory Tsinjoarivo in early 2017 where populations of the critically endangered frog, *Mantella cowani*, are thought to occur.



Reforestation

The main objective of CVB's reforestation project, headed by Nicolas Rasolonjatovo, is to plant native forest trees on degraded land surrounding Ranomafana National Park. This year, CVB grew **7025** tree seedlings of **33** species in its Upper Campus nursery, and held **9** reforestation sessions in Ifanadiana District in which **3289** seedlings were planted. CVB also received funding from Catholic Relief Services (CRS) to carry out a large-scale reforestation project with **13** villages around the Commune of Kelilalina as part of the Reforestation, Education and Community Development (RECD) Project.

Each village selected one representative to attend a training workshop on tree nurseries. Community members then collaborated to construct nurseries in each of their villages. More than **100,000** native tree seeds were collected and planted in the nurseries. Each village aims to produce a minimum of **10,000** native tree seedlings which will be transplanted on to **65**-hectare of degraded land in February of 2017.

Villagers also received trainings in sustainable agriculture and animal husbandry to help them find alternative income sources while improving upon traditional agricultural practices to decrease the use of tavy, or slash and burn agriculture. Five trainings were held for **89** participants from the **13** villages in the RECD project. Topics included chicken, fish and bee farming and how to grow beans and vegetables.

Wild pepper, because of its high quality and high prices, was selected as a prime cash crop, and CVB is participating in a project to investigate the productive and commercial potential of *tsiperifery* (called *sakarivovahy*

in the Ranomafana region), a type of wild pepper liana found only in the tropical forests of Madagascar. Trials to domesticate the wild pepper in several local villages and at CVB's tree nursery are underway.



"This wild pepper project is really important for the environment and for the local community. I learnt from this project that this resource is threatened because of how it is currently collected and may disappear one day. So thank you for helping us to domesticate this resource!"

Eli Tinarson, Member of the Wild Pepper Collectors Association in Ambodirafia



"I have gained good skills concerning the management of a native nursery from this reforestation project. This project is really important because we save future generations when we reforest now. Whatever project you want to do here in the village, we are always ready. We are really thankful for the project."

Edmond Lahy, Nurseryman in Mandrivany village

Training

Study Abroad Programs

SBU Study Abroad

We offered **three** SBU Study Abroad programs in 2016. The Summer Session had **21** students from SBU and California University of Pennsylvania, the Fall Semester Abroad had **18** students and for the first time, SBU offered a Winter Internship program for **six** students during the month of January, 2016. David Hicks was the Instructor for the Summer Cultural Anthropology with Elise Lauterbur was Teaching Assistant. Patricia Wright was Professor for the Fall program with Tharicse Ukitinzambara, the Resident Coordinator. Franck Naina Rabenahy was the Logistics Coordinator for all three programs.



“When you think about life as an adventure, the only objective is discovery. Going to Madagascar guided me in discovering a broader sense of self, and of the world. It’s a humbling experience to be welcomed so intimately into another culture; an opportunity like this is one of a kind.”

Leila Esmailzada, Fall 2016 Study Abroad Student

Allendale Columbia School

For the first time, CVB hosted a group of **15** high school students from Allendale Columbia School led by their teacher, Beth Guzzetta. The group spent two weeks working alongside wildlife photographer, David Liittschwager, scientists from the Smithsonian and Seneca Park Zoo, to document all of the biodiversity found in “one cubic foot” of Ranomafana rainforest. Throughout the course of one day, every plant and animal species that moved in and out of the three-dimensional stainless steel frame was photographed. Beth plans to bring students again in 2018.

Dental Mission

Centre ValBio has long collaborated with Stony Brook University’s (SBU) School of Dental Medicine and Madagascar Ankizy Fund, a non-profit organization through the Stony Brook Foundation, to improve the oral health of underserved communities in the Ranomafana area. These dental missions address a dire need in these communities, and their impact is often lasting, for the patients as well as the dental students. In 2016, dental students treated **420** patients during **three** weeks of free clinics.



Volunteer and Interns

CVB is grateful for all of the help received from our many interns and volunteers this year.

- **Molly Madden** from DePau University and **Prerna Bhat** from Harvard University interned with our reforestation program.
- **Elizabeth Wallace** from Stanford University worked on the SOS Lemur radio program.
- **Kelly Chung** and **James Wu**, interns from Duke University, carried out research on the behavior of Propithecus, as well as using GPS to map the four territories.
- **Nick Wendt** helped with World Lemur Day and used his artistic expertise for face-painting and clay sculpturing with children in the My Rainforest, My World project.
- **Jake Krauss**, an undergraduate from Rice University, was a research assistant for sifaka behavioral ecology in Mangevo.
- **Morgane Scalbert**, intern from University of Liège, helped with the sifaka microbiome project.
- **Lucia Rodriguez** from Costa Rica and a volunteer with the Pet Lemur project, looked at the economic impact that the National Park has on surrounding communities.
- **Roger Ledgister**, educator for Vanderbilt Museum and Planetarium, NY, visited Ankazotsara and Ampitambe and introduced sky observations to children there (he then donated the telescope to CVB).
- **Franckoela Ramanandrianina**, worked tirelessly to assist Némèse Randriarimanana with the CVB Rainforest Class education program this year, and was a huge asset to the team.

Medical Interns

Four medical students from Stony Brook University's medical school, **Jaydon Kiernan**, **Paul Castle**, **Lee Hakami**, **Koeun Choi**, were the first group of medical student interns. They were supervised by Dr. Peter Small and the Global Health Institute, a new initiative at SBU which is driving cutting-edge health research, to examine the cultural and epidemiological factors that perpetuate worm infections resulting in neurocystercercosis in villagers living around Ranomafana National Park. The students worked closely with the CVB Health Team and the Institute Pasteur of Madagascar to collect samples in the field and analyze them back at the CVB labs.



“My two-month stay in Madagascar was the best experience of my life. It was the first time that I travelled alone and it was a really positive for many reasons. The forest was magnificent, the lemurs were amazing, the food was good and the staff of CVB were really nice to me. But the thing that made the most impact on me were the different people that I met. I made a lot of really good friends from all over the world (Portugal, USA, Austria, Madagascar...) and they all mean a lot to me.”

Morgane Scalbert, Intern

Workshops, Meetings, and Trainings

In 2016, World Wildlife Fund held their team-building at CVB, Wildlife Conservation Society and GERP organized a one-day workshop on the new Lemurs Portal for **16** participants, Peace Corps Volunteers held a “Men as Partners” camp, and Matthew Bonds, co-CEO of Pivot, organized the first ever “Ranomafana Research Summit on Planetary Health”.



The “Ecological and Epidemiological Modeling in Madagascar” six-day workshop was organized by Cara Brook, Princeton University and Matt Bonds, Stanford University, for **19** participants and **8** trainers.

For one month, the Zoological Society of London EDGE program involved **10** African conservationists from six different African countries in a training in conservation tools and methods. This outstanding team led by Olivia Couchman paves the way for more European and African conservation and development organizations to hold courses at CVB.

CVB partner, Catholic Relief Services, organized two workshops on the cultivation of wild pepper. They also organized two week-long trainings with the No Strings International puppeteering team on how to incorporate their two new puppet films focusing on decreasing slash and burn agriculture and creating healthier vegetable-filled diets into environmental education outreach.



Scientific Tourists and Tour Groups

CVB worked with Madagascar Grace Tours, Wilderness Travel, Tamana Tours, Sierra Club, Za Tours and Bellavista Cloud Forest Tours. Over **5000** Malagasy students and **890** tourists toured the CVB.

In addition to tours of CVB, we offer lectures and help to arrange activities for our visitors, such as visits to our women’s weaving group and medicinal plant gardens, as well as organizing basket weaving workshops and dance performances at CVB.



Malagasy Undergraduate Student Research

Dr. Jean Claude Razafimahaimodison, Head of CVB Research, served on the advisory and jury committees of **18** Malagasy University students completing their degrees (**2** DTS, **16** licenses)

Andriambololmanantsoa Safiditiana and **An-drianirina, ISTE**, contributed to the study of the functioning of Madagascar forest ecosystem, case of MNP.

Velomahafaly Tolojanahary Omjanirina Arin-jakatiana, ISTE, Contribution to the valorization of aromatic and medicinal plants: *Canarium madagascariense*, *Brochoneura acuminata*, *Vepris apody*, within the rural commune of Ranomafana

Randrianasolo Fifaliana and **Razafiarivony Nomenjanahary Lalatiana, ISPM** Antananarivo, Evaluation of the pharmacodynamic effect of the FLO16 coded-plant on arterial hypertension

Randrianarivo Holiarisoa and **Raminosoa Dimbiniaina Tantely Fanantenaina, ISPM** Antananarivo, Pharmacodynamic evaluation of the anti-eczematic activity of the BR075 coded-plant

Elimanantsoa Iarsthine, ISTE, Contribution to the study of pandanicole frog population in Sahamalaotra forest, Ranomafana National Park

Andriniaina Fenoza Marine, ISTE, Contribution to the conservation of *Cathariostachys madagascariensis* within the Environmental Education program of Centre ValBio Ranomafana

Vahanandrasana Notahinjanahary Louise Tantina, ISTE, Analysis of the existing Environmental Education around Ranomafana National Park with regards to the international context: case of the villages of Ankazontsara, Mandrivany, and Ampitambe

Heritiana Luc Modeste, ISTE, Comparative study of the efficiency of CVB and partner proposed alternatives: case of the villages Ambatovaky and Sahavondronina, CR Androy, District Lalangina, Region Haute-Mahatsiatra

Ranjarasoa Narindralalaina Sehenonjatovo, ISTE, Evaluation of the Environmental Education concept at the theoretical and practical

point of view, within the primary schools of the Kelilalina Commune: case of the villages of Ankazontsara, Mandrivany, and Ampitambe

Randrianarivelo Hajanirina, ISTE, Analysis of the Environmental Education through the “Rainforest class” within the remote peripheral zones of Ranomafana National Park: case of the villages of Ankazontsara, Mandrivany, and Ampitambe; Kelilalina Commune – Ifanadiana District

Rasoanirina Harilalao Louissette, ISTE, Study of the Environmental Education on sustainable alternative activities through vegetable garden: case of the peripheral villages of Ranomafana National Park

Ratsizafy Andriamirado Pascal, ISTE, Contribution of Environmental Education to the sustainable development within the peripheral zones of Ranomafana National Park

Ratsimbazafy Dinasoa, ISTE, Place of the arboretum and fruiting botanical gardens within local education of school children

Boba Alexis Francisco, University of Tulear, Principal activity of the species *Haplemur aureus* and *H. griseus*, and the availability of food resources within Ranomafana National Park

Davidson Jean Bien Aimé, University of Tulear, Inventory of frugivorous birds and food resource availability within Ranomafana National Park: Case of sites Sahamalaotra and Ranomena



Community Outreach

Around Ranomafana National Park live Tanala and Betsileo people from **130** villages whose lives are intricately connected to the forest. Dr. Wright has long recognized that in order to protect the forest, it is necessary to work with these local communities in order to try and understand and address their needs. That is why, since the beginning, ICTE/CVB has included community outreach projects such as healthcare delivery in rural villages, environmental education, as well as income-generating and community development projects.

Mobile Health Team

This year, in addition to assisting with health-related research projects, our mobile health team continued to provide critical mobile health delivery to remote villages – delivering free diagnostics, treatment and preventative education to **20** rural communities in three communes around Ranomafana National Park. Our principle activity is to raise awareness on health and hygiene, according to the philosophy, “It is better to prevent than heal”. We also encourage communities to build latrines and garbage pits, as well as to visit local clinics and hospitals in the area during our absence.

Our current mobile health team consists of three health agents, Rakotoarison Miarintsoa Fara (midwife), Nambinintsoa Fara Mara Violette (nurse), and Lovasoa Francis Daniel (nurse), and we have plans to double our team in 2017. The **20** villages which we serve are divided into four zones. In 2016, we visited each zone two times and each of the 8 expeditions lasted approximately **15** days. In this way, we are currently able to visit each village once every six months.

Thanks to our partner, Pivot, we have **40** medicines in our traveling medical kit with which to treat patients with. Over the course of the year, the health team saw over **1,000** patients, mostly between 25 and 59 years of age. **57%** of the patients were women and

girls. The most frequent illnesses encountered were respiratory illnesses, the common cold, malaria, toothaches, ear infections and high blood pressure. **46%** of patients with fever tested positive for malaria.



“From the CVB Mobile Health Team, the people are pleased with the health care. They come here to heal us and give medicines and we don’t need to go to Ranomafana, except in case of serious illness. We only wish that they would come more often.”

KOTOSON Andre, elder of Bevoahazo

Environmental Education

Rainforest Class (“Road School”) Program

Since 2004, CVB has been running its Rainforest Class program to enrich Malagasy school children’s understanding of the value and importance of protecting the environment and its biodiversity and to insure the sustainability of the conservation of Ranomafana National Park (RNP).

During the 2015-2016 school year, Némèse Randriarimanana held rainforest classes in **24** schools (**14** primary, **6** middle school, **4** high school) around RNP, reaching **5989** students. Némèse visited each school once per month and held both indoor and “outside the classroom” lessons. Classroom lessons focused on RNP and its biodiversity, climate change and the water cycle, ecosystems and food chains, and health and hygiene. Outdoor class sessions incorporated tree planting activities and the development of native tree nurseries.



World Lemur Day

World Lemur Day is celebrated across Madagascar and the world, and 2016 marked the third annual World Lemur Day celebration in Ranomafana. Community members, local authorities, and CVB health and conservation partner organizations such as Pivot, Help Simus and Madagascar National Parks, gathered to learn more about these animals found only in Madagascar.

The morning started off with a lively parade through the town of Ranomafana. Local area children and CVB staff wore lemur masks and furry lemur costumes. Stony Brook University’s study abroad students joined in the fun by painting children’s faces. Authorities shared messages with the attendees on the importance of lemurs to the ecosystem as well as to eco-tourism. Following the speeches by the authorities, local groups gave dance performances and sang songs about lemurs, and special guest Ben Mirin took the audience on a journey around the world using the sounds of nature.

“This Lemur Life” Radio Program

As outlined in the IUCN’s Lemur Action Plan 2013-2016, lemur conservation action should be fostered through education and outreach. To this end, and thanks to the support of the IUCN’s Save our Species (SOS) Lemur program, Centre ValBio has been working to produce **10** radio podcast episodes that focus on the **13** lemur species native to RNP.

Each episode highlights a unique ecological and behavioral trait of each featured lemur species. They also incorporate tales by village elders and personal observations of Tanala children. These episodes will be aired each week but will also be developed into podcasts that can be used to augment the MRMW curriculum. The SOS team is developing specific classroom activities and lesson plans surrounding each SOS episode.

Katherine Kling, Emma Browne, Vanessa Crowley and Daniella Rabino all contributed greatly to this project.



“My Rainforest My World” Science Education Project

In July we celebrated the completion of the first year (school year 2015-2016) of CVB’s new education project, “My Rainforest, My World” (MRMW), funded by the Three Graces Foundation. Parents and teachers accompanied **167** of the **195** total (**55%** boys / **45%** girls) participating students as they gave presentations and performances to a large audience at CVB.

MRMW was created to teach children in remote villages around Ranomafana National Park (RNP) about the environment and conservation through participatory science. To this end, CVB education staff trained and supported **10** student teachers from a teaching college in Fianarantsoa who spent **10** months in remote villages around RNP.

Working alongside local teachers, they led after-school science lessons to fourth grade students aimed at enhancing critical thinking skills and creativity. The program also provides a hot lunch of rice and healthy vegetable sides to augment the main dishes of beans and cassava leaves that the parents help cook for the students each day.

The project is overseen by Lova Razafindravony, with the help of three CVB education assistants and interns from the Institute for Science and Technology for the Environment. The CVB team made **41** expeditions to visit the remote schools during the year.

Through a series of workshops, curriculum and teaching materials were developed, including a map of the various ecosystems found throughout Madagascar. Experts in science education, Dan Flynn and Betty Villetta from Oakland Park Zoo in San Francisco, Daniella Rabino from the University of Sussex, UK, Lova Rakotoarisoa, Mirah Ramiandrasoa, and Fela Razafiarison guided the development of the “hands-on” participatory curriculum.

To evaluate the student’s learning progress, students were given a pre-test which had questions surrounding environmental prob-

lems faced by their community, basic scientific concepts, and health and hygiene practices. After a year of MRMW instruction targeting these areas, students were tested again. The success in the transmission of this information can be seen in the increase in comprehension from the pre-test to the post-test, from **50%** to over **80%** answering questions correctly.



“We clearly saw the change in student’s behavior. When we first arrived, the students were very shy and did not have the courage to give their opinions...But over the course of the school year, they have changed. On my departure, they play together, give their opinions, even exchange ideas. Now they are considerate about damaging their natural resources because they understand its value.”

RAFANOMEZANTSOA Onjaniaina, Student teacher in Ambodivoangy

Conservation Clubs and Income-Generating Projects

Thanks to funding from Catholic Relief Services, we were able to bring Caroline Rojosoanotahina and Henintsoa Ratsimandresy to join Anne Louise Heritiana (Hery) in overseeing the CVB Conservation Club Program, and expand our activities in Kelilalina Commune to work with **18** new clubs for a total of **34** Conservation Clubs in 2016.

Sunshine Comes First Foundation continued to support women and artisan associations with technical support, advice on administrative and financial issues, as well as trainings.

CVB administrative liaison, Santatra Razanakolona, helped MAEVA Association, the women's basket-weaving association in Sahavondronina, create a new sign, receipt books, business cards, product labels and brochures. The group was also invited to CVB to hold several weaving demonstrations and teaching workshops for our visitors.

FIMARA Association of Elders and Traditional Healers received several trainings in essential oil production. In April, Trey Murphy, former Stony Brook University (SBU) study abroad student majoring in business, and his family donated a **500**-liter essential oil distillation machine to the association. In September, several members of the association visited a similar essential oil-making project in Mananjary, and by November we were selling Ravintsara oil at the CVB EcoShop. Dana Cutolo, also a former SBU study abroad student, has opened an online natural beauty business, Ny'Ala, and hopes to soon be able to purchase these oils and incorporate them into her products.

FAMIOVA, now in its 11th year, is a women's association which weaves silk scarves in Ranomafana. In 2016, they moved into a larger workshop and boutique space, as well as

planted **200** mulberry bushes, the main food of the silkworm.



In October, CVB Chef Solo trained **24** women from the Ambalakinresy women's vegetable gardening club on how to properly clean and prepare vegetable meals. While in Ranomafana, the trainees also visited Ranomafana National Park for the first time and took a dip in the town's famous hot springs.



"Before joining MAEVA Association I did not have any income. I just took care of my family while my husband worked. I really wanted to help him earn money but I didn't know how. After joining the MAEVA Association, I can provide for my children and even buy them school supplies. CVB helps to make sure that our association is running well."
Fara, MAEVA Sahavondronina

Environmental Arts Program

CVB continues to work with five different music and dance groups from the villages of Sambiviny, Ambodiaviavy, Kelilalina, Ambatolahy and Ranomafana. These groups performed at CVB on six different occasions in 2016.

In addition, a six-day training with renowned Malagasy musician and audio recording engineer, Mika Anatole Rakoto Razafy, was held in CVB's recording studio for five members of the CVB team. Local musicians then had the chance to come into the studio and record professionally for the first time. The team was also able to record the theme song for the SOS Lemur Radio project, as well as a song written and performed by Endemika, a local Ranomafana band, to commemorate the 25th Anniversary of Ranomafana National Park (RNP).



Artists-in-Residence

Alain Rasolo, a Malagasy wildlife illustrator, spent six months at CVB and produced two new posters, one of lemurs and the other of reptiles and amphibians of RNP, as well as logos for the “My Rainforest, My World” and SOS Lemur Radio projects.

Jana Grabner, an artist and art educator from Austria, spent the month of August working with local area artisans to design wildlife puppets for a storytelling project created by Daniela Rabino.

Ben Mirin (aka DJ Ecotone) is an internationally recognized beatboxer who travels the world making music from nature. This fall, Ben, along with Drew Fulton and Craig Bundy, came to CVB and spent time recording the sounds of Madagascar, from the forests to the villages. He then used these sounds, such as the calls of ring-tailed lemurs and zebu, to create music which he shared with audiences at the University of Fianarantsoa and at World Lemur Day.



Community Development and Disaster Relief

Diane Powers and Madaworks supported three girls to attend high school in 2015-2016, and Dr. Wright and Seneca Park Zoo sponsored another seven children of CVB staff to attend university. Congratulations to Julie Rakotozafy from Savondronina who was the first Madaworks scholarship recipient to pass the baccalaureat exam and complete high school. She plans to attend University next year.

CVB also contributes to community relief in times of disaster. After a devastating fire in the Ranomafana market, CVB and Pivot contributed to its complete rebuilding which is now underway. When the entire village of Antaretra (138 houses, population 700+) burned in October 2016, CVB also joined with Pivot to provide **600** kilos of rice and other needed materials to help rebuild their lives.

Finally, after many years, electric poles and wires have been installed in the village of Ambatolahy, thanks to the fundraising efforts of Dr. Stacey Tecot (University of Arizona) and CVB. We are hopeful that the lights will be on by early 2017.

Thanks again to Trey Murphy and his family, a garbage clean-up project was initiated with the Commune of Ranomafana. Trey donated a motorized tricycle and large plastic garbage bins to facilitate trash collection.



Technology

2016 saw the implementation of a number of technology initiatives that confirm CVB's position as a modern, future forward research campus. These included the creation and procurement of seed funding of Xchange, a design and engineering program that links creative minded people from all over the world through a physical and digital community to solve the challenges and problems faced by rural environments such as the countryside of Madagascar.

Dr. Peter Small, Director of the Global Health Institute at Stony Brook University, initiated an innovative project incorporating drones designed by Vayu to deliver medicine to remote Malagasy communities.



Looking Ahead to 2017

We have an ambitious and challenging program ahead of us for 2017.

In 2017, we plan to expand our presence to other regions of Madagascar. Through our partnership with Rainforest Trust, we will lay the ground work for the creation of a new co-managed protect area with local communities, including Ivohibory Forest. We will also propose new sites of protection for critically endangered frogs throughout southern Madagascar. Currently we are exploring fragmented forests around Ranomafana National Park (RNP) as well as Tsinjoarivo Forest with Dr. Mitch Irwin and the NGO, Sadabe.

We will also be expanding the CVB campus at Ranomafana. Thanks to funding from IUCN's Save our Species (SOS) program, we will construct a Biodiversity Building and Science Education Center on the lower campus. With support from the Holtzman Wildlife Foundation, we will be able to develop a lemur health clinic with outdoor enclosures on the upper campus as well.

We have also planned a suspension footbridge from CVB across to RNP so that researchers can have their own direct access to the park.

We will continue exploring the use of drones to deliver medicine to remote villages, and also expand Xchange, a social wellbeing program developed by Jeff Nagel, Eric Bergerson and Jesse McKinney to enlist engineers from around the world to design solutions for both large challenges as well as problems that occur in everyday village life.

Our lemur projects will continue to involve genetics, microbiomes and population surveys. We are hoping to accomplish translocations of endangered species where needed and perhaps even describe new species.

We will expand our environmental education, community health and reforestation programs. We will be hiring a new Head for the Community Outreach Department. Thanks to support from an anonymous donor, we will also be able to double the size of our health team in 2016.

We are also exploring ways to incorporate family planning into our program. More collaborations with Pivot are planned. We hope to double the number of schools participating in the My Rainforest, My World program from 10 to 20, and we will plant 100,000 endemic trees on 65-hectares of degraded land while exploring the possibility of putting wild pepper and vanilla into the understory.

We will also work with Madagascar National Parks and local authorities to develop strategies for stopping the illegal gold mining that is occurring inside of RNP.

We will continue to work towards making CVB Research Station financially sustainable by increasing the use of our dormitory, conference rooms and laboratories, as well as hosting more student groups (such as a new joint National Geographic-Putney Student Travel trip in July 2017).

Last but not least, our goal in 2017 is to raise funds to begin an endowment of CVB and the creation of an Endowed Chair for a CVB Conservation Biologist.



Financial Statement 2016

Operating Income Madagascar USD

Station fees and services	444,152
Field services (Research and programs)	184,728
Contribution re 2015 electricity costs	25,685
Other income: Donations, Ecoshop	14,806

Total Operating Income Madagascar 669,370

Operating Expenses Madagascar

Station running costs	453,396
Field expenses (Research and programs)	156,905

Total Operating Expenses Madagascar 610,301

Operating surplus in the year Madagascar 59,069

Income in US

Restricted Funds	231,153
Donations Rainforest Conservation Fund	275,324
Stonybrook contribution to management costs	128,300

Total Income in US 634,777

Less transferred to CVB	(154,688)
Income retained in US	480,089

Expenses in US

Restricted Funds	69,849
Rainforest Conservation Fund	231,530
Stonybrook Expenses	145,431

Total Expenses in US 446,810

Surplus in the year US 33,279

Total Increase in assets for the year 92,348

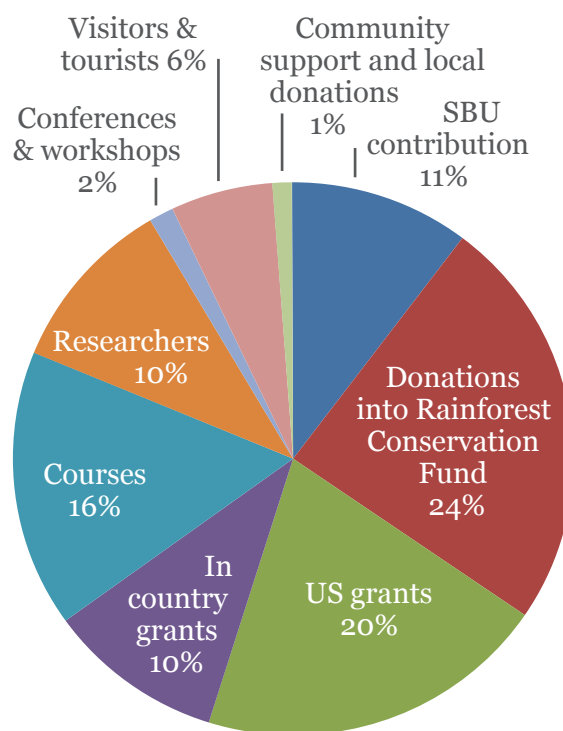
Net assets at 1/1/2016 342,495

Net assets at 12/31/16 434,844

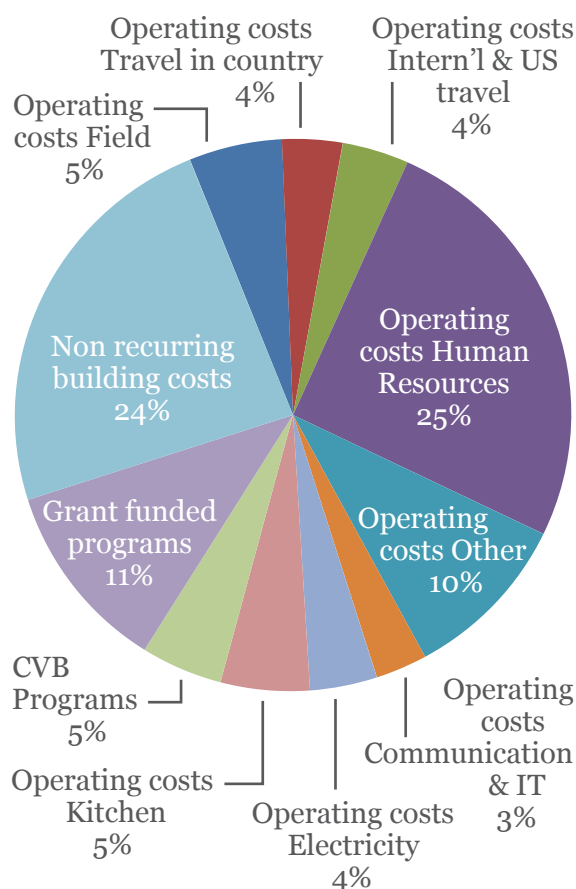
Cash and bank	502,666
Accounts receivable	37,981
Balances held for customers	(105,803)

Total 434,844

Total Income



Total Expenses



2016 Donors

With sincere appreciation, we recognize our loyal and committed friends who generously support our mission.

\$500,000

Dorothy Lichtenstein

\$100,000 and above

Anonymous (1)
Catholic Relief Services
Three Graces Foundation, Inc.

\$50,000-\$99,999

Robert W. Lourie

\$10,000-\$49,999

Conservation International
IUCN-SOS (Save our Species) Fund
Jeffrey and Mickie Nagel
National Geographic
Linda Berry Stewart
Rainforest Trust

\$5,000-\$9,999

Mallory Brown
Eric and Trey Murphy
Frederick and Margaret L. Weyerhaeuser
Foundation

\$1,000-\$4,999

East Bay Zoological Society
Royal African Foundation, Inc.
Darrel and Diana Samuels
Samuels Family Trust
Nancy and Grover Sherlin
Peter M. Small

\$500-\$999

Lana Abernathy Bump
Tracy Austin
Anne D. Ehrlich and R.A. Wodehouse
Alexander L. and Annmarie Harris
Hugh Lawrence
Ny' Ala Skin Care
Seneca Park Zoo Society
Edward W. and Jennifer A. Testa, Jr.

\$100-\$499

Anonymous (2)
Catherine Babinski
Joseph Babinski
Charles T. Bennett
Darlene A. Benzon
Anne and Alec Binnie
Dalia Bloze
Jennifer Bowman
Julia Bradford
Mario J. and Shoshana Craig
Blaise deSibour
Heather F. Eng
Helen Foley
Sharon Fox
Michael and Stacey Gargiulo
Carol R. Glass
Ronda R. Graves
Andreas Helbig
Barbara Hendry
Steig E. Johnson
Ryan C. and Lola Klis
Thomas E. Lovejoy
Charles and Paula Lucore
Karen and John Pihl
Joseph J. Pimentel
David Quammen
Daniel and Sarah Kariko Rossman
Noel B. Rowe
Marjorie Seward
Kim M. Unertl
Diane M. Waddle-Stock
Thomas E. Zimmerman
Steven W. Zucker

Under \$100

Anonymous (1)
Barb's Frame of Mind
Victoria Bender
Lucille Betti-Nash
Annika E. Browne
Diane and Perry Caminis
Daniel M. Condon
John M. Dobbs
Victor Edgerton
Christina M. Fink

Jillian I. Finker
 Alan G. Fix
 Carol Graham
 Suzanne Johnson
 Edward S. and Wendy F. Katkin
 Derya Kovey
 Konstanty and Alina Krylow
 Kiran A. Loric
 Elizabeth Low
 Margaret J. MacDonnell and Vincent
 Monahan

Kyle McDaniel
 William S. McGraw
 Tobe Mizels
 Alice M. Pleasnick
 Priya Rani
 Helen Rowe-Drake
 MaryLee Sammis
 Kathryn Scheriff
 Willard N. and Michaele A. Stooke
 Elaine Vozar
 Anne Wister Garnett

Congratulations!

Dr. Onja Razafindratsima, a CVB researcher who recently received her doctorate from Rice University, has been awarded a prestigious Sara Hrdy Postdoctoral Fellowship in Conservation from Harvard University.

We are also very proud that Dr. Mamy Rakoatoarijaona, former Ranomafana National Park Director, received his doctorate on conservation in villages around Ranomafana National Park.



Chief Editors

Dr. Patricia C. Wright

Maya Moore

Graphic Designers

Désiré Randrianarisata

Alain Rasolo

Centre ValBio

BP:33 Ranomafana, 312 Ifanadiana
Madagascar

+261 34 13 581 71 / +261 34 38 864 12

USA Office: ICTE/Stony Brook University
SBS Building, Room N-537
Stony Brook, NY 11794-4363
(631) 632-9440
www.centrevallbio.org

