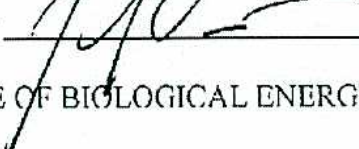


Code of Ethics Agreement for Foreign Researchers undertaking researches  
within the Flora and Fauna of Vanuatu.

Description: The document outlined the terms and conditions for agreement between any Researcher (s)<sup>1</sup> and the Vanuatu Government prior to undertake any related researches for scientific purposes within Vanuatu.

I (Name) \_\_\_\_\_ J. Craig Venter  \_\_\_\_\_ of  
(Institution/Company): THE INSTITUTE OF BIOLOGICAL ENERGY ALTERNATIVES  
(IBEA)

**Agree to the following terms and conditions while collecting and working in Vanuatu:**

1. Arrange to work with a local recognised researcher/organisation in Vanuatu.
2. Respect regulations of Vanuatu, e.g., enter on a research visitor visa; obtain permit from Director of Agriculture where necessary required for birds especially closing season for capturing and killing of birds; observe regulations for export of plants and animals/parts of plants and animals-Quarantine, CITES etc.
3. Obtain permission from National and Provincial authorities and landowners in the areas you want to research.
4. When apply for a travel/study grant, include additional amount to cover the cost of research permit of 50,000 Vatu or an equivalent of US\$350.00; of processing your specimens or other costs of your visit to the collaborating organisation may incur and equal travel expenses and per diems for your local counterpart.
5. Leave a good and complete set of duplicates, most preferably with labels with the curator of the Herbarium or museum / in the care of your collaborators.
6. Ensure that types of species you describe are deposited for Vanuatu in the department of Forest Herbarium/museum/in the care of your collaborators.
7. Inform local herbarium and museum curators/your collaborators where the other duplicates are to be deposited.
8. Where outside of Vanuatu, the duplicates be deposited, they will remain properties of Vanuatu.

<sup>1</sup> Researchers may mean foreign individual or company or an academic institute and others. It may also refer to local researcher or researchers that affiliates with foreign institution(s) or organisation(s).

9. Do not exploit Vanuatu's natural resources by removing large quantities of wild plants and/or animals that have cultural, medicinal, horticultural, and other economic values.
10. Obtained a list of Vanuatu rare and endangered species - plants from the Department of Forest or animals from the Environment Unit. Rare and endangered species shall not be collected without permission.
11. Life endemic species or propagated part of the species shall not be collected for any means, at all, otherwise shall be subject to further agreements with the Vanuatu Government.
12. Collect no more specimens than is strictly necessary.
13. Leave copies of photographs/slides from the research for Vanuatu in the care of your collaborators.
14. Inform the Department of Forest, Department of Fisheries, Department of Agriculture and Rural Development, Quarantine and Inspection Services, Environment Unit of new locality of rare species/ endangered species/ species of economical potential/ species of potential threats to the Vanuatu flora and fauna you find.
15. Provide a report of preliminary findings to collaborator(s) prior to leaving Vanuatu.
16. Ensure that collaborator(s) are consulted with the draft of the research reports prior to publishing of the actual document.
17. Your collaborator (s) Department of Forests/ Department of Fisheries/ Department of Agriculture and Rural Development, Quarantine and Inspection Services/ Environment Unit must have copies of the reprints research reports.
18. Acknowledge collaborators in reports, publications, etc.  
Dates working in Vanuatu: \_\_\_\_\_
19. Any breaching of the agreement may result in the following conditions:
  - i) The Environment Unit and other concerned government departments will investigate the whole process involved in the organisation and arrangement of the research.
  - ii) The Environment Unit and other concerned government departments may cease all data and information collected in any form.

Name of External Organization: The Institute for Biological Energy Alternatives  
Address (overseas): 1901 Research Blvd.  
Rockville, MD 20850  
USA

Tel: 301-309-3400  
Fax: 301-309-3434

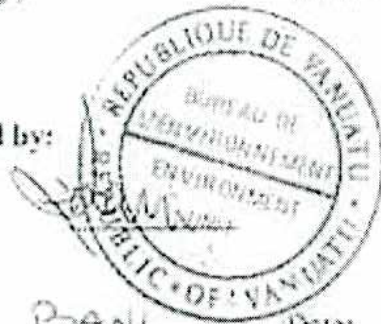
Email: C.Venter@venterscience.org (or Karla Heidelberg, K.Heidelberg@ibea.org for permit issues)

Name of individual represented: Dr. J. Craig Venter

Signed  Date: 4/16/04

Witnessed and approved by:

Name: \_\_\_\_\_



Signed ERNEST BANI Date: 17/08/04  
HEAD of Environment Unit

## Application to undertake Research on Vanuatu Flora and Fauna

### (A) (I) Personal Details of Applicant

Name: Dr. J. Craig Venter

Address: Institute for Biological Energy Alternatives  
1901 Research Blvd., Suite 600  
Rockville, Maryland 20850 USA

Phone: 301-309-3400 ; Fax: 301-309-3434  
Email address: JCVenter@venterscience.org



Date of Birth: 14 October 1946

Sex (M/F): Male

Country of Birth: USA

Nationality: USA

### Educational Background and Training Also see attached Cv (Appendix 1)

Institution	Year	Qualification gained
University of California, San Diego	1972	BA Degree
University of California, San Diego	1975	PhD

### (II) Representative from Institution/Company

Name and Address of Institution:

Brief details of the institution and provide supporting letter to the research by the institute

At the recommendation of another U.S. scientist who frequently works in Vanuatu (Dr. Frederick Taylor, Institute for Geophysics, Univ. Texas), we have been trying to contact

Mr. Tony Tevi  
Director of Geology and Mines  
Ministry of Lands, Energy, Mines & Water Resources  
Phone: 22423; Fax: 22213  
Email: gmines@vanuatu.com.vu

However, we also welcome additional suggestions by in-country officials of the appropriate contact or institute for collaborations.

### (B) (I) Research Details

#### **1. Purpose of the Research**

##### Overview

Microorganisms are responsible for most of the chemical transformations that occur within the major biogeochemical cycles that shape the environment of the earth and oceans. However, microorganisms are the least well known groups of species on the planet, especially in the oceans. One of the fundamental questions in microbial ecology is that of how much "species" diversity is there in a sample. Bacteria lack morphologically distinct characteristics that allow "species" to be differentiated visually, and the vast majority of "species" are non-culturable on laboratory or artificial media.

The Institute for Biological Energy Alternatives (IBEA), a U.S. based, not-for-profit, basic science research institute, is undertaking a global ocean microbial sampling expedition to quantitatively characterize marine and terrestrial microbial community biodiversity. Our research institute is funded by U.S. government agencies, the J. Craig Venter Science Foundation, and the Gordon and Betty Moore Foundation.

Working collaboratively with regional scientists and institutions, we hope to include the territorial waters of Vanuatu as a component of this global survey. Samples will be analyzed using high throughput DNA sequencing and whole genome shotgun assembly techniques developed by Venter and coworkers to decode the human genome. To date, we have successfully applied this new and powerful technique, a “whole environment” shotgun genomics approach, to marine microorganisms in the Sargasso Sea off Bermuda collected on filter paper from 200 L seawater samples. Using this method, we discovered at least 1,800 new microbial species, a far greater number than expected. Other data resulting from this work provided exciting information on microbial organisms that have photoreceptors, changing our view of photobiology in the ocean. Our results were recently published in *Science* magazine (2004, vol. 304: 66-74), a top U.S. scientific journal.

We have expanded the very promising research begun in the Sargasso Sea to other regions of the globe. We have started a circumnavigational cruise, called the Sorcerer II Expedition, (described in section 2.2) to begin to inventory the vast legion of unseen microorganisms that live in our oceans, better understand their overall species diversity, discover and characterize new bacterial and viral species, and evaluate the ecological roles that these dominant (but often unculturable) microbes play in the ecosystem. In addition to the scientific expertise of the scientists at IBEA, the project is being assisted by a distinguished external scientific advisory board, including:

- **Penny Chisholm**, Professor of Civil and Environmental Engineering and Biology, Massachusetts Institute of Technology
- **Ed DeLong**, Senior Scientist, Monterey Bay Aquarium Research Institute
- **Gustavo Fonseca**, Conservation International. Senior Vice President, CI, and Executive Director for Applied Biodiversity Science
- **Robert Gagosian**, **President and Director, Woods Hole Oceanographic Institution**
- **Victor Ariel Gallardo**, Vice-Chair, Scientific Steering Committee, Census of Marine Life and Sub-Director, Center for Oceanographic Research in the Eastern South Pacific, University of Concepcion, Chile
- **Jo Handelsmann**, University of Wisconsin.
- **Dave Karl**, Professor of Oceanography, University of Hawaii
- **Charles Kennel**, **Director, Scripps Institute of Oceanography**
- **Tony Knapp**, Director, Bermuda Biological Station for Research
- **Ken Nealson**, **Wrigly Professor of Geobiology, University of Southern California**
- **E. O. Wilson**, **Pellegrino University Professor Emeritus, Harvard University**

In order to make data rapidly and readily available to the scientific community, all results of the genomic analysis will be released into a freely accessible public domain through a new environmental genomics database at the U.S. National Institutes of Health. IBEA will not be isolating or growing sampled microorganisms, isolating byproducts or bioprospecting. No patents or other intellectual property rights will be sought by IBEA on these genomic DNA sequence data. We anticipate that these data will significantly advance the new discipline of environmental genomics and will be tremendously useful to scientists or institutions for studies of biodiversity, ecology, evolution, and health.

#### **Research methods:**

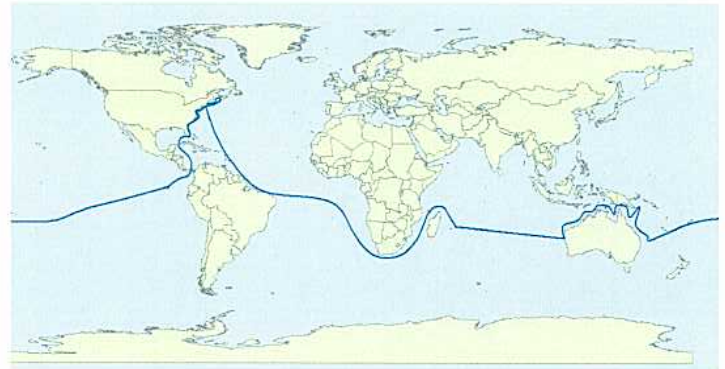
We are sampling approximately every 200 miles as we transit the globe. Where possible in coastal areas, we also choose sampling sites based on differences in marine nutrient regimes, human

impact, concurrent studies, and/or uniqueness of habitat. We are applying to take five open ocean samples in Vanuatu, with locations specified in Section 5.

An oceanographic YSI device will be lowered off the side of the vessel at each site to determine the physical characteristics of the water column (temperature, salinity, chlorophyll, oxygen concentration, and turbidity). Based on the physical profile, a 200 L non-intrusive water sample will be collected from a specified depth (surface, chlorophyll maximum zone, or close to the benthos) using a standard oceanographic water pump and tygon tubing. The collected microbes will be size fractionated by serial filtration through 20  $\mu\text{m}$  nytex, 3  $\mu\text{m}$ , 0.8  $\mu\text{m}$ , and 0.1  $\mu\text{m}$  membrane filters, and finally a 50 Kda cut-off tangential flow filter. The filters, with the captured organisms, will be placed in a -20 °C freezer on the research vessel until transport back to the laboratory. On return to the lab, the filter will be subjected to enzymatic lysis to collect the DNA. The DNA will be randomly sheared and cloned into plasmid vectors for sequencing using previously developed methods in articles cited in Appendix 1.

## **2. Reasons to undertake the research in Vanuatu**

Thus far, we have successfully sampled in waters of Bermuda, Canada, the United States, Mexico, Honduras, Costa Rica, Panama, the Galapagos Islands (Ecuador), and every 200 miles in international waters, working closely with regional scientists in all legs of the voyage. The vessel is currently in waters of French Polynesia, but we will be continuing our voyage across the Pacific and around the world as shown in the accompanying figure. We hope to include samples from waters of Vanuatu as part of our global dataset. After leaving Vanuatu, we will continue on to Australia, sample across the Indian Ocean, proceed around the Cape of Good Hope, South Africa. Lastly, we will continue to sample across the Atlantic, to South America and complete our voyage in the Caribbean. We will engage local scientists in each region for advice, collaborations and expertise whenever possible.



## **3. The benefits of the research to the person/Institution/company undertaking the research**

We are requesting permission to undertake basic scientific research. The results of this research will be published in major scientific journals. All data will be released into a public database where they will be freely available to all. No patents or intellectual property rights will be sought on these data.

## **4. The benefits of the research to Vanuatu.**

We will provide the Government of Vanuatu with a complete list of local microbial species for their inventory of resident species. We anticipate that the resulting genomic sequence data will be tremendously useful to scientists or institutions in Vanuatu, which lacks facilities to perform entire genome analysis. The results from this research in your waters will be useful as a baseline of information for local scientists as they design additional research to further understand marine ecology and for monitoring marine ecosystem health and change. We would also be willing to discuss some opportunities for training a local scientist on how the data could be utilized by the regional scientific community.

## 5. Other research team members:

Name	Title/Profession	Contact Address	Phone/fax/email (through Karla Heidelberg)
Jeffrey Hoffman	Staff Scientist	On vessel at sea	301-309-3400; Fax: 301-309-3434
7 crew members		On vessel at sea	301-309-3400; Fax: 301-309-3434

## 6. List of equipment and materials to be used

Our water samples will be collected using standard oceanographic collection techniques. We will deploy a YSI device at each site to determine the physical characteristics of the water column at each station (temperature, salinity, chlorophyll, oxygen concentration, and turbidity), and a 200 L non-intrusive water sample will be collected from a specified depth (surface, chlorophyll maximum zone, or close to the benthos) using a standard oceanographic water pump and tygon tubing. The water will be then pass through a 20  $\mu\text{m}$  pre-filter, then 3  $\mu\text{m}$ , 0.8  $\mu\text{m}$ , and 0.1  $\mu\text{m}$  membrane filters, and finally a 50 Kda cut-off tangential flow filter. The filters, with the captured organisms, will be placed in a -20 °C freezer on the research vessel until transport back to the laboratory.

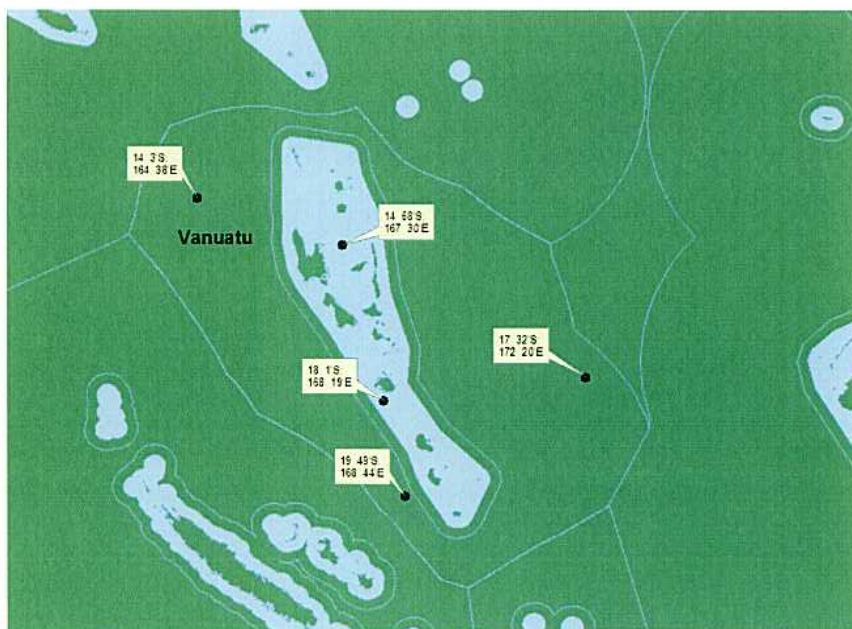
## 7. Length of time to conduct the research while in Vanuatu

We are requesting permission to sample between the dates of 27 June through 9 July 2004. Each sample requires about one hour on station then several hours for processing the sampled water.

## 8. Island (s) intended to conduct the research on:

All water samples will be obtained from open ocean sampling sites. The following coordinates/chart shows the geographical areas and known maritime boundaries of the requested sampling sites.

1. 14° 3' S; 164° 38' E
2. 14° 58' S; 167° 30' E
3. 17° 32' S; 172° 20' E
4. 18° 1' S; 168° 19' E
5. 19° 49' S; 168° 44' E



## 9. Describe arrangements made with your collaborators to undertake the research:

At this time we have not secured an in-country collaborator. We do not require any laboratory facilities, as all sampling gear is on the research vessel. We would appreciate any suggestions from the Government as to an appropriate person/institution who could help us modify our site selection to sample in the areas that would provide the most useful information for Vanuatu.

If the research is supported by donor funding: specify funding support to the research and attached to this application the research proposal for funding.

Funding: Our voyage will be primarily funded by the J. Craig Venter Science Foundation with additional funding from the U.S. Department of Energy Office of Science, the Gordon and Betty Moore Foundation and a pending grant from the U.S. National Science Foundation (NSF). We will be actively seeking funding from other agencies and sources for supplemental funds for the analysis phase of the program.

I agree that:

- > This work shall take place in accord with the laws, policies and procedures of the Republic of Vanuatu.
- > A copy of all reports and publications stemming from this work will be lodged in Vanuatu with: the Government of Vanuatu
- > No samples will be collected without full informed consent of the owners or providers of the resource from which samples are collected.
- > If samples or collections from this work are to be used for any purpose other than specified in B1 above, the Department will be advised in advance, and full effort made to obtain prior informed consent from the owners or providers of the samples.

Sincerely,



J. Craig Venter  
President and Chairman  
J. Craig Venter Science Foundation

Signature of Applicant: \_\_\_\_\_

Date: 12 April 2004

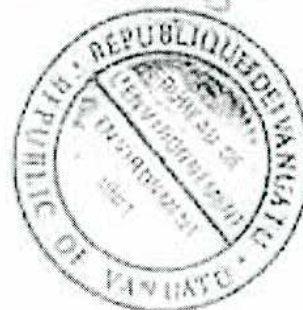
**For official use only**

Approval for the above statement: ERLEST BANI  
(HEAD of Department)

Date: 11th August 2004

Department: ENVIRONMENT UNIT

Address: PMB 1063, PORT VILA, VANUATU





## **Appendix 1: Principle Investigator Biography**

### **J. Craig Venter, Ph.D.**

#### **Founder and President, The Institute for Biological Energy Alternatives**

##### **(i) Professional Preparation**

University of California, San Diego	Biochemistry	BA	1972
University of California, San Diego	Physiology and Pharmacology	PhD	1975

##### **(ii) Appointments**

June 76 - Dec 81	Assistant Professor of Pharmacology and Therapeutics, SUNY at Buffalo, Schools of Medicine and Dentistry
Jan 79 - April 82	Chairman, Interdisciplinary Graduate Group in Biomembranes
Jan 82 - Dec 82	Associate Professor of Biochemistry, State University of New York at Buffalo
Dec 82 - Jan 85	Associate Chief Cancer Research Scientist (Professor), Dept. of Molecular Immunology, Roswell Park Cancer Institute
May 83 - July 89	Adjunct Professor of Biochemical Pharmacology, State University of New York at Buffalo
Jan 84 - Nov 85	Research Professor of Biochemistry, State University of New York at Buffalo (Roswell Park Division)
Nov 84 - Aug 87	Chief, Section of Receptor Biochemistry, LNP, NINCDS, National Institutes of Health, Bethesda, Maryland
Aug 87- May 91	Chief, Receptor Biochemistry and Molecular Biology Section and Co-Director, Laboratory of Molecular and Cellular Neurobiology, NINDS, National Institutes of Health, Bethesda, Maryland
Oct 90 - June 91	Chief, Laboratory of Molecular and Cellular Neurobiology, NINDS, NIH, Bethesda, Maryland
June 88 - July 92	Director, NINDS DNA facility, NIH, Bethesda, Maryland
May 91-July 92	Chief, Receptor Biochemistry and Molecular Biology Section, Office of the Director, NINDS, NIH, Bethesda, Maryland
1992-1998	President, The Institute for Genomic Research, Rockville, Maryland
1998-2002	Founder, President and Chief Scientific Officer, Celera Genomics, Rockville, Maryland
1992-Present	Founder and Chairman of the Board, The Institute for Genomic Research, Rockville, Maryland
2002-Present	Founder and President, The Center for the Advancement of Genomics, Rockville, Maryland
2002-Present	Founder and President, The J. Craig Venter Science Foundation
2002-Present	Founder and President, Institute for Biological Energy Alternatives

##### **(iii) Awards**

Dr. Venter is the recipient of numerous honorary degrees and scientific awards including the 2002 Gardiner Prize, the 2001 Paul Ehrlich and Ludwig Darmstaedter Prize, the 2001 Takeda Award for Techno-Entrepreneurial Achievement for Individual/Humanity Well-Being, the 2000 King Faisal Award in Science, and the Common Wealth Award. Dr. Venter is a member of many scientific organizations including the United States National Academy of Sciences, the American Academy of Arts and Sciences, and The American Society for Microbiology.

#### **(iv) Select Co-authored Publications**

Venter, J.C., Remington, K., Heidelberg, J.F., Halpern, A.L. Rusch, D., Eisen, J.A., Wu, D., Paulsen, I. Nelson, K.E., Nelson, W., Fouts, D.E. Levy, S., Knap, A.H., Lomas, M.W., Nealson, K. White. O., Peterson, J., Hoffman, J., Parsons, R., Baden-Tillson, H., Pfannkoch, C., Rogers, Y., Smith, H.O., Environmental Genome Shotgun Sequencing of the Sargasso Sea. *Science*, 304, 66-74, 2004.

Istrail, S. (+ 36 Authors) Whole-genome shotgun assembly and comparison of human genome assemblies, *PNAS*, 101: 1916-1921, 2004

Venter, J.C., Levy, S., Stockwell, T., Remington, K., Halpern, A., Massive parallelism, randomness and genomic advances, *Nature Genetics*, 33, Supplement: 219-27, 2003.

Adams, M.D., Sutton G.G., Smith, H.O., Myers, E.W., Venter, J.C., The independence of our genome assemblies, *PNAS*, 100, 6, 3025-3026, 2003.

Hamilton O. Smith, Robert Friedman, and J. Craig Venter, Biological Solutions to Renewable Energy, *The Bridge*, National Academy of Engineering, 33, No. 2, 36-40, 2003.

Ewen F. Kirkness, Vineet Bafna, Aaron L. Halpern, Samuel Levy, Karin Remington, Douglas B. Rusch, Arthur L. Delcher, Mihai Pop, Wei Wang, Claire M. Fraser, J. Craig Venter, The Dog Genome: Survey Sequencing and Comparative Analysis, *Science*, 301, 1898-1903, 2003.

Celniker, S.E., (+30 authors) Finishing a whole-genome shotgun: Release 3 of the *Drosophila melanogaster* euchromatic genome sequence, *Genome Biology*, 3, 12, 1-14, 2003.

Mural, R.J. (+ 132 authors), A Comparison of Whole-Genome Shotgun-Derived Mouse Chromosome 16 and the Human Genome, *Science*, 296, 1661-1671, 2002.

Holt, R.A. (+ 118 authors). The Genome Sequence of the Malaria Mosquito *Anopheles gambiae*, *Science*, 298, 129-149, 2002.

Venter, J.C., (+ 273 authors). Sequencing of the Human Genome, *Science*, 291, 1304-1351, 2001.

Myers, E.W., (+ 27 authors) The Whole-Genome Assembly of *Drosophila*. *Science*, 287, 2196-2204, 2000.

Adams, M.D., (+ 188 authors) The Genome Sequence of *Drosophila melanogaster*. *Science*, 287, 2185-2195, 2000.

Zho, S., Malek, J., Mahairas, G.G., Fu, L., Nierman, W.C., Venter, J.C., Adams, M.D. Human BAC Ends Quality Assessment and Sequence Analyses, *Genomics*, 63, 321-332, 2000.

Broder, S. and Venter, J.C. Whole Genomes: the Foundation of New Biology and Medicine. *Current Opinion in Biotechnology*, 11, 581-585, 2000.

#### **(v) BOOKS**

**Series editor for *Receptor Biochemistry and Methodology***, published by Alan R. Liss, NY.

Vol. 1. *Membranes, Detergents and Receptor Solubilization*, 1984;

Vol. 2. *-Receptor Purification Procedures*, 1984;

Vol. 3. *-Molecular and Chemical Characterization of Membrane Receptors*, 1984;

Vol. 4. *-Monoclonal and Anti-Idiotypic Antibodies as Probes for Receptor Structure and*

*Function*, 1984;  
Vol. 5. -*Benzodiazepine-GABA Receptors and Chloride Channels* , 1986;  
Vol. 9. -*Structure and Physiology of Slow Inward Calcium Channel*, 1987.  
Vol. 10. -*Radiation Inactivation/Target Size Analysis of Integral Membrane Proteins*, 1987.

**Adams, M.D., Fields, C., Venter, J.C., eds.** *Automated DNA Sequencing and Analysis.*  
Academic Press Limited- London, England, 1994.

(vi) CHAPTER

**Venter, J.C.** *High-Throughput Sequencing, Information Generation, and the Future of Biology,*  
Chapter in *Firepower in the Lab*, Joseph Henry Press, Washington, DC 2001.

REPUBLIC OF VANUATU  
REPUBLIQUE DU VANUATU

VATU ₪ 50,000

REÇU / RECEIPT No. 419105

REÇU de  
Received from Mr. Jeff Hoffman  
la somme de  
the sum of Fifty thousand Vatu only

pour  
for Research fees Cheque No. Cash Espèce  
Cash

Chapitre budgétaire  
Account Code(s) 4-640-64AB-70MS-6400  
Date 17/08/2004 CASHIER / CAISSIER [Signature]

