



Victor Chukwudi Osamor

**SIMULTANEOUS AND  
SINGLE GENE EXPRESSION**  
COMPUTATIONAL ANALYSIS FOR MALARIA  
TREATMENT DISCOVERY

VDM  
Verlag  
Dr. Müller



Victor Chukwudi Osamor

**SIMULTANEOUS AND  
SINGLE GENE EXPRESSION**  
COMPUTATIONAL ANALYSIS FOR MALARIA  
TREATMENT DISCOVERY

Victor Chukwudi Osamor

# **SIMULTANEOUS AND SINGLE GENE EXPRESSION**

**COMPUTATIONAL ANALYSIS FOR MALARIA  
TREATMENT DISCOVERY**

VDM Verlag Dr. Müller

**Impressum/Imprint (nur für Deutschland/ only for Germany)**

Bibliografische Information der Deutschen Nationalbibliothek: Die Deutsche Nationalbibliothek verzeichnet diese Publikation in der Deutschen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet über <http://dnb.d-nb.de> abrufbar.

Alle in diesem Buch genannten Marken und Produktnamen unterliegen warenzeichen-, marken- oder patentrechtlichem Schutz bzw. sind Warenzeichen oder eingetragene Warenzeichen der jeweiligen Inhaber. Die Wiedergabe von Marken, Produktnamen, Gebrauchsnamen, Handelsnamen, Warenbezeichnungen u.s.w. in diesem Werk berechtigt auch ohne besondere Kennzeichnung nicht zu der Annahme, dass solche Namen im Sinne der Warenzeichen- und Markenschutzgesetzgebung als frei zu betrachten wären und daher von jedermann benutzt werden dürften.

Coverbild: [www.ingimage.com](http://www.ingimage.com)

Verlag: VDM Verlag Dr. Müller Aktiengesellschaft & Co. KG  
Dudweiler Landstr. 99, 66123 Saarbrücken, Deutschland  
Telefon +49 681 9100-698, Telefax +49 681 9100-988  
Email: [info@vdm-verlag.de](mailto:info@vdm-verlag.de)  
Zugl.: Ota, Covenant University, Diss., 2009

Herstellung in Deutschland:  
Schaltungsdienst Lange o.H.G., Berlin  
Books on Demand GmbH, Norderstedt  
Reha GmbH, Saarbrücken  
Amazon Distribution GmbH, Leipzig  
**ISBN: 978-3-639-25718-2**

**Imprint (only for USA, GB)**

Bibliographic information published by the Deutsche Nationalbibliothek: The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the Internet at <http://dnb.d-nb.de>.

Any brand names and product names mentioned in this book are subject to trademark, brand or patent protection and are trademarks or registered trademarks of their respective holders. The use of brand names, product names, common names, trade names, product descriptions etc. even without a particular marking in this works is in no way to be construed to mean that such names may be regarded as unrestricted in respect of trademark and brand protection legislation and could thus be used by anyone.

Cover image: [www.ingimage.com](http://www.ingimage.com)

Publisher: VDM Verlag Dr. Müller Aktiengesellschaft & Co. KG  
Dudweiler Landstr. 99, 66123 Saarbrücken, Germany  
Phone +49 681 9100-698, Fax +49 681 9100-988  
Email: [info@vdm-publishing.com](mailto:info@vdm-publishing.com)

Printed in the U.S.A.  
Printed in the U.K. by (see last page)  
**ISBN: 978-3-639-25718-2**

Copyright © 2010 by the author and VDM Verlag Dr. Müller Aktiengesellschaft & Co. KG and licensors  
All rights reserved. Saarbrücken 2010

### **Impressum/Imprint (nur für Deutschland/ only for Germany)**

Bibliografische Information der Deutschen Nationalbibliothek: Die Deutsche Nationalbibliothek verzeichnet diese Publikation in der Deutschen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet über <http://dnb.d-nb.de> abrufbar.

Alle in diesem Buch genannten Marken und Produktnamen unterliegen warenzeichen-, marken- oder patentrechtlichem Schutz bzw. sind Warenzeichen oder eingetragene Warenzeichen der jeweiligen Inhaber. Die Wiedergabe von Marken, Produktnamen, Gebrauchsnamen, Handelsnamen, Warenbezeichnungen u.s.w. in diesem Werk berechtigt auch ohne besondere Kennzeichnung nicht zu der Annahme, dass solche Namen im Sinne der Warenzeichen- und Markenschutzgesetzgebung als frei zu betrachten wären und daher von jedermann benutzt werden dürften.

Coverbild: [www.ingimage.com](http://www.ingimage.com)

Verlag: VDM Verlag Dr. Müller Aktiengesellschaft & Co. KG

Dudweiler Landstr. 99, 66123 Saarbrücken, Deutschland

Telefon +49 681 9100-698, Telefax +49 681 9100-988

Email: [info@vdm-verlag.de](mailto:info@vdm-verlag.de)

Zugl.: Ota, Covenant University, Diss., 2009

Herstellung in Deutschland:

Schaltungsdienst Lange o.H.G., Berlin

Books on Demand GmbH, Norderstedt

Reha GmbH, Saarbrücken

Amazon Distribution GmbH, Leipzig

**ISBN: 978-3-639-25718-2**

### **Imprint (only for USA, GB)**

Bibliographic information published by the Deutsche Nationalbibliothek: The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the Internet at <http://dnb.d-nb.de>.

Any brand names and product names mentioned in this book are subject to trademark, brand or patent protection and are trademarks or registered trademarks of their respective holders. The use of brand names, product names, common names, trade names, product descriptions etc. even without a particular marking in this works is in no way to be construed to mean that such names may be regarded as unrestricted in respect of trademark and brand protection legislation and could thus be used by anyone.

Cover image: [www.ingimage.com](http://www.ingimage.com)

Publisher: VDM Verlag Dr. Müller Aktiengesellschaft & Co. KG

Dudweiler Landstr. 99, 66123 Saarbrücken, Germany

Phone +49 681 9100-698, Fax +49 681 9100-988

Email: [info@vdm-publishing.com](mailto:info@vdm-publishing.com)

Printed in the U.S.A.

Printed in the U.K. by (see last page)

**ISBN: 978-3-639-25718-2**

Copyright © 2010 by the author and VDM Verlag Dr. Müller Aktiengesellschaft & Co. KG and licensors

All rights reserved. Saarbrücken 2010

# **Simultaneous and Single Gene Expression: Computational Analysis for Malaria Treatment Discovery**

**Victor Chukwudi Osamor**

Department of Computer and Information Sciences  
College of Science and Technology, Covenant University

Supervisors: 1. **Dr Ezekiel F. Adebisi**

Department of Computer and Information Sciences  
College of Science and Technology, Covenant University  
Ota, Ogun State, Nigeria.

2. **Prof. Seydou Doumbia**

Malaria Research Training Centre (MRTC)  
Faculty of Medicine, Pharmacy and Odonto-stomatology  
University of Bamako, BP 1805, Bamako, Mali.

A Thesis Submitted in Partial Fulfillment of the Requirement for the Award of  
Doctor of Philosophy (Ph.D) in Computer Science (Bioinformatics) of  
Covenant University, Ota, Ogun State, Nigeria.

June, 2009

**SUMMARY:** This book with eight chapters introduced the concept of simultaneous and single gene expression using Microarray (for thousands of genes), PCR (for single gene) and algorithm design to study diseases for early intervention and treatment e.g. malaria at liver stage. Chapter one introduced the book's aim and objectives. Chapter two highlighted the malaria challenge and existing solutions including global initiatives and local efforts in malaria problem. Chapter three gave an account of the DNA microarray technology and PCR. In Chapter four, we discussed the clustering techniques and Chapter five described traditional k means enhancement, designing our new algorithm, the Metric Matrices k-means (MMk-means) to reduce the time requirement, test and prove algorithms correctness and complexity analysis. Chapter six reported computational experiments on "Comparative Functional Classification of Plasmodium falciparum Genes Using k-means" to discover the functional role of new sets of genes. Chapter seven discussed the in-silico prediction for possible PCR-based detection of malaria infection at the liver stage. In chapter eight, we concluded the whole work.



**Victor Chukwudi Osamor**

Dr V.C. Osamor is a Lecturer of Computer Science at Covenant University, Ogun State, Nigeria. His degrees span from Zoology to Ph.D Computer Sc. (Bioinformatics option). He is married with a child currently. Having won grants to UK, Italy, Israel etc., he is an internationally published scholar researching on Genomics, Drug design and Proteomics.



9 783639 257182

978-3-639-25718-2