

Dr. Isaac Owino Okoth

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EDUCATION

- PhD in Mathematics, University of Stellenbosch (South Africa), 2012-2015
Dissertation title: *Combinatorics of oriented trees and tree-like structures*
- PGD in Mathematical Sciences, University of the Western Cape (South Africa), 2010-2011
Awarded in association with African Institute for Mathematical Sciences (AIMS - SA)
Essay title: *Finite fields, p -adic fields and their extensions*
- MSc in Pure Mathematics, Maseno University, 2008-2010
Thesis title: *Block quivers and their mutations*
- BEd (Science), Maseno University, 2003-2007
- KCSE, Masaba High School, Keroka, 1998-2001
- KCPE, Ojwando Primary School, Oyugis, 1990-1997

RESEARCH EXPERIENCE

My research interests are in the broad areas of combinatorics, graph theory and number theory.

On-going researches:

1. Enumeration of k -plane and k -noncrossing trees (Joint work with Prof. Stephan Wagner, Uppsala University, Sweden): We aim to find various statistics of these structures with given set of parameters.
2. Combinatorics of tree-like structures: We aim to enumerate plane Husimi graphs and d -ary Husimi graphs as well as their cacti and oriented cacti by various statistics.
3. Generalization of Fibonacci, Pell and Lucas sequences (Joint work with Fidel Oduol): We aim to derive various generalizations of these sequences as well as their properties.

Supervision:

1. Albert Nyariaro, MSc in Pure Mathematics, Maseno University, To graduate 2020
Thesis title: *Enumeration of trees by degree sequences and reachability of vertices*
2. Donnie Munyao, PhD in Pure Mathematics, Maseno University, To graduate 2020
Thesis title: *Regular prime graphs of selected classes of nonabelian finite groups*
3. Meshack Agwang, MSc in Pure Mathematics, Maseno University, Graduated 2019
Thesis title: *Groups of composition operators on Dirichlet spaces of the upper half plane*
4. Omondi Eric Gori, MSc in Pure Mathematics, Maseno University, Graduated 2019
Thesis title: *Duality properties of non-reflexive Bergman space of the upper half-plane*
5. Mose Samuel Bagasa, MSc in Pure Mathematics, Maseno University, Graduated 2019

Thesis title: *Spectral properties of semigroups of weighted composition operators on the Bloch space*

6. Fidel Oduol, MSc in Pure Mathematics, Maseno University, Final thesis draft
Thesis title: *On Shifted Fibonacci numbers and their polynomials*
7. Christopher Musoga, PhD in Pure Mathematics, Maseno University, Problem solving
Thesis title: *Enumeration of subgroups of unit groups of classes of finite rings*
8. Kenneth Lumumba, MSc in Pure Mathematics, Maseno University, Initial stage
9. Nicholas Ogoalah, Msc in Pure Mathematics, Maseno University, Initial stage
10. Vincent Kirui, MSc in Pure Mathematics, Maseno University, Initial stage

TEACHING EXPERIENCE

- March 2015 - Date: Lecturer of Mathematics, Maseno University
- December 2010 - February 2015: Tutorial Fellow, Maseno University
- April 2008 - December 2010: Graduate Assistant, Maseno University
- August 2007 - March 2008: Graduate teacher, Got Rateng' Secondary School, Kadongo

Courses already handled

- Undergraduate: Basic Mathematics, Differential Calculus, Integral Calculus, Analytical Geometry, Foundations of Pure Mathematics, Linear Algebra II, Discrete Structures I and II, Graph Theory, Number Theory, Algebraic Structures and Group Theory
- Postgraduate: Combinatorics, Complex Analysis, General Topology

HONORS AND AWARDS

- February 2015: Awarded a PhD Incentive bursary by Faculty of Science, Stellenbosch University, for having finished my PhD in less than three years.
- 31 October 2013: Awarded a Second Prize in the "Best talk by a PhD student" category at the Annual Congress of South African Mathematical Society in Pietermaritzburg, University of KwaZulu Natal.
- July 2012 - June 2015: Awarded a scholarship by German Academic Exchange Service (DAAD) to undertake a PhD at Stellenbosch University, South Africa.
- December 2010 - March 2015: Awarded Tutorial Fellowship at Maseno University
- August 2010 - June 2011: Awarded a scholarship by AIMS to undertake a postgraduate diploma in Mathematical Sciences, Cape Town, South Africa.
- April 2008 - December 2010: Awarded Graduate Assistantship at Maseno University.
- November 2007: Awarded a First Class Honours Degree at Maseno University.

SKILLS AND TRAINING

Professional training: I am a trained teacher of Mathematics and Chemistry.

Computing skills: Typing and typesetting in LATEX. Programming in Python and R

LEADERSHIP EXPERIENCE

Academic Leadership

- May 2019 – Date: Chairman, Department of Pure and Applied Mathematics, Maseno University
- September 2016 - May 2019: Chairman, School of Mathematics, Statistics and Actuarial Science Postgraduate Studies Committee, Maseno University

Community Service

- February 2019 - Date: Vice Chairman, Board of Management, St. Anne's Secondary School – Ojwando, Oyugis, Kenya

CONFERENCES AND WORKSHOPS

- August 2019: Presented a paper at Strathmore International Mathematics Conference, Strathmore University, Nairobi, Kenya.
- 13-17 August 2018: Presented two papers at the MARMS workshop "Around Algebra, Combinatorics and Number Theory" at the University of Malawi, Chancellor College, Zomba, Malawi.
- August 2015: Presented a paper at Strathmore International Mathematics Conference, Strathmore University, Nairobi, Kenya.
- July 2015: Conducted an Experimental Pure Mathematics Workshop at Makerere University, Kampala, Uganda.
- October 2013: Presented a paper at the Annual Congress of South African Mathematical Society in Pietermaritzburg, University of KwaZulu Natal, South Africa.
- October 2012: Presented a paper at the Annual Congress of South African Mathematical Society in Matieland, University of Stellenbosch, South Africa.
- August 2011: Presented a paper at Strathmore International Mathematics Conference, Strathmore University, Nairobi, Kenya.

PUBLICATIONS

1. I. O. Okoth and S. Wagner, Locally oriented noncrossing trees. *The Electronic Journal of Combinatorics* **22**(3), 2015.
2. I. O. Okoth, Refined enumeration of 2-noncrossing trees. Submitted.
3. I. O. Okoth, Enumeration of k -noncrossing trees and forests. Submitted.
4. I. O. Okoth and A. O. Nyariaro, Reachability of vertices in t -ary trees. Submitted.
5. A. O. Nyariaro and I. O. Okoth, Reachability of vertices in labelled plane trees. Submitted.
6. I. O. Okoth and S. Wagner, Refined enumeration of k -plane and k -noncrossing trees. Preprint.
7. I. O. Okoth, On plane and d -ary Husimi graphs, Under preparation.