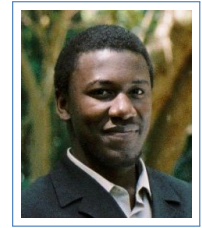# Dr. BAMUNOBA ALEX SAMUEL

Lecturer of Mathematics

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PERSONAL INFORMATION

Family Name	Bamunoba.
Other Names	Alex Samuel.
Date of Birth	October 10, 1986.
Place of Birth	Nakasongola, Uganda.
Nationality	Ugandan.
Marital Status	Married.

EDUCATION

2012 – 2014	**PhD in Mathematics**, University of Stellenbosch, South Africa.
Thesis Title	Arithmetic of Carlitz polynomials.
Abstract	We extended the list of similarities between the classical and Carlitz cyclotomic polynomials. In particular, we proved an analogue of Suzuki's theorem for coefficients of cyclotomic polynomials, an analogue of Bang-Zsigmondy theorem, and numerous results on Wieferich primes, all in the Carlitz module context.
Promoter	Doctor Arnold Keet.

2010 – 2011	**MSc. in Mathematics**, University of Stellenbosch, South Africa.
Thesis Title	Cyclotomic polynomials (*in the parallel worlds of Number Theory*).
Abstract	At the most accessible level, the rings $\mathbb{Z}$ and $\mathbb{F}_q[T]$ have many similarities of arithmetic interest. For example, both are integral domains, principal ideal domains with finitely many units and infinitely many prime elements. It is these similarities that make their multiplicative structures almost identical, even-though their additive structures are totally different. These similarities also extend to finite extension of the fraction fields of the two rings, i.e., $\mathbb{Q}$ and $\mathbb{F}_q(T)$. At a deeper level, we replaced the multiplicative group scheme $\mathbb{G}_m$ of $\mathbb{C}$ by the additive group scheme $\mathbb{G}_a$ of $\mathbb{C}_\infty$ and studied the Carlitz module analogue of cyclotomic polynomials, number fields and their applications.
Promoter	Professor Florian Breuer.

2009 – 2010	**PGD in Mathematical Sciences**, AIMS-South Africa, (African Institute for Mathematical Sciences).

Essay Title	Cyclotomic polynomials (*over the rational numbers*).
Supervisor	Professor Florian Breuer.
2005 – 2008	**BSc.(Hons) with Education**, Makerere University, Uganda.
Mentor	Doctor John Kitayimbwa.

Scholarships

2015 – 2016	AIMS Alumni Small Research Grants Award (AASRG), Stellenbosch University.
2013 – 2014	DAAD In Country + PG Merit Bursary Scheme, Stellenbosch University.
2010 – 2011	Joint AIMS - Stellenbosch University Scholarship.
2009 – 2010	AIMS - South Africa Scholarships.
2005 – 2008	Undergraduate Sponsorship - Government of Uganda, Makerere University.
2003 – 2004	Best Students' Bursary, Katikamu S.S., Wobulenzi, Uganda.

Conferences and Workshops

2018	New Developments in the Theory of Modular Forms over Function Fields, Centro di Ricerca Matematica Ennio De Giorgi, Pisa, Italy.
2017	Arithmetic of Function Fields Conference, University of Münster.
2017	AIMS-Stellenbosch Number Theory Conference, Stellenbosch University.
2016	EAUMP-Conference, Makerere University.
2015	EAUMP-Experimental Pure Mathematics Workshop, Makerere University.
2015	Characters of Representations and Modular Forms, 2015, University of Cologne.
2015	Arithmetic Geometry and Number Theory Conference, 2015, AIMS-Muizenberg and Stellenbosch University, South Africa.
2014	Building Bridges: 2nd EU/US Summer School + Workshop on Automorphic Forms and Related Topics, 2014, University of Bristol, United Kingdom.
2014	Workshop on Function Field Arithmetic, 2014, Sirince, Turkey.
2013	SAMSA Conference, 2013, Stellenbosch University, South Africa.
2013	Arithmetic Geometry Conference, 2013, Stellenbosch University, South Africa.
2012	Local Analytic Geometry, 2012, Lahore, Pakistan.
2011	SAMS-AMS Congress (*Mathematics for tomorrow*), NMMU, Port Elizabeth.
2011	Workshop in Computation Algebra, AIMS-Cape Town, South Africa.
2011	Geometric Representation Theory Conference, 2011, ITB - Bandung, Indonesia.
2011	Conference in Number Theory, Carleton University, 2011, Ottawa - Canada.
2011	Some aspects of Mahler measure, Graduate seminar, Stellenbosch University.
2011	Cyclotomic polynomials, Arithmetic Geometry, 2011, Stellenbosch University.
2010	HPC School & CHPC National Conference, Cape Town, South Africa.

2010	Parallel worlds of Number Theory, Algebra workshop, Stellenbosch University.

Scientific Interests

I am interested in Arithmetic Geometry and Number Theory, more especially with the adjectives elementary, algebraic, analytic and computational. I am also interested in problems from Diophantine Geometry and Complex Analysis.

Publications

Journal Articles and Conference Proceedings

2013 – 2016	A note on order one cyclotomic polynomials, *Quaest. Math.*
2013 – 2014	On some properties of cyclotomic polynomials, *J. of Number Theory.*
2014 – 2015	On coefficients of Carlitz cyclotomic polynomials, *Finite Fields and Their Appl.*
2014 – 2015	A note on Lerch's formula for Euler quotients, *Integers.*
2014 – 2017	A note on Carlitz Wieferich primes, *J. of Number Theory.*
2016 – 2017	A note on values of Carlitz cyclotomic polynomials, (*The third EAUMP Conference proceedings*).
2015 – 2017	On the integral divisors of Carlitz's analogue of $a^n - b^n$, (*Acta Arith.*).
2017 – to DATE	A note on Carlitz Wieferich primes II, (*in preparation*).
2016 – to DATE	A note on Wieferich and Mirimanoff's primes, (*in preparation*).

Selected Presentations

2017	On the Bang-Zigmondy Theorem.
2016	Values of cyclotomic polynomials.
2015	A note on Carlitz Wieferich primes.
2016	An invitation to number theory (or why was Prof. A. Wiles given \$700,000?).
2015	On the existence or non-existence of odd perfect numbers (*known results*).
2014	Carlitz analogue of Suzuki's Theorem (*coefficients of cyclotomic polynomials*).
2014	An invitation to modular forms.
2014	Reciprocity theorems in $\mathbb{F}_q[T]$.
2014	Lerch like formulas in global fields.
2013	A note on order one cyclotomic polynomials.
2013	Fermat pseudoprimes, Zsigmondy primes and Wieferich primes.
2012	Mahler measures of order one cyclotomic polynomials.

Professional Experience and Responsibilities

Teaching

2017 – to DATE	Lecturer (*Probability Theory, Foundations of Mathematics, Abstract Algebra I, Commutative Algebra*), Makerere University.
2016 –2017	Lecturer (*Complex Analysis, Number Theory, Rings & Modules, Engineering Mathematics I*), Makerere University.
2015 – 2015	Lecturer (*Topics in Number Theory*), AIMS-Tanzania.
2015 – 2016	Lecturer (*Functional Analysis*), Makerere University.
2013 – 2014	Teaching Assistant (*Analysis & Linear Algebra*), Stellenbosch University.
	Teaching Assistant (*Mathematics for Biologists*), Stellenbosch University.
	Assistant Lecturer (*Financial Mathematics*), Stellenbosch University.
	Assistant Lecturer (*Engineering Mathematics*), Stellenbosch University.
2012 – 2013	Teaching Assistant (*Mathematics & Physics*), AIMS South Africa.
2012 – 2013	Volunteer teacher at the Center of Science and Technology COSAT, Khayelitsha.
2012 – 2012	Teaching Assistant (*Calculus & Analysis*), Stellenbosch University.
2010 – 2011	Mathematics Tutor, (*Calculus, Ordinary Differential Equations, Real Analysis*) Stellenbosch University, South Africa.
2008 – 2009	Teacher (Mathematics & Physics), Katikamu S. S., Wobulenzi.
2005 – 2009	Teacher (Mathematics & Physics), Kirojo College, Nakasongola.

Responsibilities

2016 – to DATE	Organiser: Algebra, Geometry, Number Theory Seminar, Makerere University.
2015 – to DATE	IMO Trainer (Algebra & Number Theory), Uganda Mathematics Society.
2015 – to DATE	Secretary: Finance and Planning Committee, Department of Mathematics, Makerere University.
2015 – to DATE	Assistant Graduate Students Co-ordinator, Makerere University.
2011 – 2013	Wiskus organiser, Mathematics Department, Stellenbosch University.
2008 – 2009	Head of Science Department, Kirojo College, Nakasongola.
2008 – 2009	Participated in National Assessment and Progress in Education (NAPE).
2008 – 2009	Organiser of (local) Mathematics Seminars and Olympiads, Nakasongola.

Programming Languages

Procedural	Python-Scipy.
Scientific	SAGE, SINGULAR, MAPLE, GAP, MAGMA, PARI-GP, LaTeX.

Languages

Luganda, Luruli	Fluent (vernacular).

English	Good: (second language and language of instruction).
French	Fair comprehension.

PERSONAL ATTRIBUTES

Attributes	I am a hard and devoted worker.

REFEREES

These persons are familiar with my professional qualifications and character:

Professor Florian Breuer,
School of Mathematical and Physical Sciences,
University of Newcastle, Australia,   Email : *fbreuer@sun.ac.za,*
Room V131, Mathematics Building.   Email : *florian.breuer@newcastle.edu.au*

Doctor Arnold Keet,
Department of Mathematics,
Universiteit van Stellenbosch,   Phone : +2772–611–4404,
7602 Stellenbosch, South Africa.   Email : *keetap@sun.ac.za*

Professor Lenny Taelman,
KdVI-Universiteit van Amsterdam,
P.O. Box 94248, Amsterdam,   Phone : +3120–525–5714,
1090 GE Amsterdam, the Netherlands.   Email : *l.d.j.taelman@uva.nl*

Doctor Saul Hannington Nsubuga
Senior Lecturer, Department of Mathematics,
Makerere University,   Phone : +256–782–301666
P.O. Box 7062, Kampala, Uganda   Email : *nsubuga@cns.mak.ac.ug*

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UPDATED

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