Algebraic Days of Gabon
6th Edition

École Normale Supérieure

Libreville, Gabon

March 16-27, 2026

Coordinators

Tony Ezome †, École Normale Supérieure de Libreville, Gabon
Christian Maire, University Marie and Louis Pasteur, France
Maurice Saint Clair Obame Nguema, École Normale Supérieure de Libreville, Gabon
Winnie Ossete, Université Marien Ngouabi, Brazzaville, Republic of Congo

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website of the event

In tribute to

our dear friend Tony

The Algebraic Days of Gabon, 6th Edition will take place in École Normale Supérieure (ENS) in Libreville, Gabon, from March 16 to 27, 2026. It will consist of three main activities:

- **CIMPA Collaborative workshop and advanced course**. The program will consist of one course on *Arithmetic Groups* by Aurel Page, INRIA and University of Bordeaux, France [second week]. During the first week, there will be *advanced preparatory lectures* for this course. These lectures will be accompanied by preparation sessions (first week) and exercise sessions (second week). This Advanced Course is part of a CIMPA Collaborative Workshop.
- **Research and advanced lectures.** Lectures given by Researchers, and by master and PhD students.
- **A series of events to promote mathematics.**
  - Outreach activities about the gender gap in science in the framework of the International Women's Day 2026, jointly organized with the *Association des femmes mathématiciennes du Gabon* which is the local branch of the African Women in Mathematics Association,
  - A round table led by Cécile Armana, University of Lille, on *Open Science and access to mathematical resources*.
  - Activities for popularizing mathematics in the framework in the International Day of Mathematics, but also the Mathematics Olympiad of the ENS Libreville.

This event has received special support from the CIMPA, France.

The afternoon of Monday, March 23, will be dedicated to the memory of Tony. We are planning three research talks given by his most recent PhD students. The afternoon will conclude with a discussion on the future of ANAGA.

	9-9:45	10-11	11:15-12:15	2:00-3:00	3:15-4:15	4:30-5:30
March 16		opening	opening			
March 17	preparation					
March 18	preparation					
March 19	preparation					
March 20	preparation					Open Science
March 21	preparation	Women Day'26	Women Day'26			
March 23				Tributes to	Tony	ANAGA
March 24						
March 25	exercises					
March 26	exercises					
March 27	exercises				olymp. awards	closing

Advanced Course

This course is intended for master and PhD students, and future teachers in mathematics, as part of their initial training and to help them gain sufficient perspective into the field they will be teaching.
This course is given by Aurel Page, INRIA and University of Bordeaux, France. It is supported by https://www.cimpa.info/ in the form of a CIMPA Collaborative Workshop.

Abstract

Aurel PAGE

Arithmetic Groups

Advanced preparatory lectures

A series of talks is planned in preparation for Aurel Page' course.
They will be accompanied by preparation sessions (first week) and exercise sessions (second week).
These talks will be given by PhD students and postdocs. They were supervised by experienced researchers.
The talks were divided into three themes.

A **- Algebraic Groups**
Coordinators: Demba Barry and Hermann Soré.
Participants (8): Ibraim Nonkane, Brice Miyaoka, Roslan Ibara, Derille Kouemo, Copernic Boungouendji, Eric Bapack, Graciel Essono, Cédric Midianga.

B **- Global fields**
Coordinators: Cécile Armana, Anne Hanwa and Abdoulaye Maiga
Participants (8): Euloge Tchammou, Joseph Fomekong, Karim Sankara, Deborah Amani, Geordann Igouwe, Pierre Ebayi, Fermi Adrien Memiaghe, Gylain Ovono Allogo.

C **- Idèles, Adèles and Approximation**
Coordinators: Moustapha Camara, Vincent Kouakou and Christian Maire
Participants (8): Johanathan Djella, Bénédicte Nzi, Aldo Lokossa, Josepha Nguema, Ephraim Poncho-Kotey, Beni Ibara, Jean-Baptiste Mebale Engohang, Seguy Mihindou.

These talks will be based on the following books:

J.W.S. Cassels, A. Fröhlich, Algebraic Number Theory, Academic Press, London, 1967

V. Platonov, A. Rapinchuk, Algebric Groups and Number Theory, English translation, Academic Press, 1994.

P. Samuel, Théorie algébrique des nombres, Hermann Paris, 1967.

J.-P. Serre, Cours d'arithmétique, GTM 7, Springer, 1973.

T.A. Springer, Linear Algebraic Groups, MBC, Birkhäuser Boston, 1998.

Monday, March 16

2:00-3:00	Copernic Bougouendji - *Rappels sur les variétés affines*
3:15-4:15	Beni Ibara - *Valuation, completion and Ostrowski Theorem*

Tuesday, March 17

10-11	Roslan Ibara - *Groupes algébriques*
11:15-12:15	Gylain Ovono Allogo - *Corps de nombres, anneau des entiers, discriminant*
2:00-3:00	Bénédicte Nzi - *Hensel Lemma, applications*
3:15-4:15	Brice Miayoka - *Exemples de groupes algébriques*
4:30-5:30	Eric Bapack - *Quelques résultats de base*

Wednesday, March 18

10-11	Derille Kouemo - *G-Spaces*
11:15-12:15	Joseph Fomekong - *Anneaux de Dedekind, factorisation des idéaux*
2:00-3:00	Ephraim Poncho-Kotey - *Hasse-Minkowski Theorem*
3:15-4:15	Euloge Tchammou - *Idéaux fractionnaires, groupe des classes d'idéaux*
4:30-5:30	Fermi Adrien Memiaghe - *Décomposition d'un idéal premier dans une extension*

Thursday, March 19

10-11	Ibrahim Nonkane - *Restriction des scalaires, espaces tangents*
11:15-12:15	Josepha Nguema - *Some consequences of Hasse-Minkowski Theorem*
2:00-3:00	Déborah Amani - *Cas des corps quadratiques*
3:15-4:15	Jean-Baptiste Mebale - *The Hilbert symbol*
4:30-5:30	Geordann Igouwe - *Discriminant et ramification*

Friday, March 20

10-11	Aldo Lokossa - $\mathbb{Q}_p$ *and its extensions*
11:15-12:15	Pierre Ebayi - *Plongement canonique et finitude du groupe des classes*
2:00-3:00	Johnathan Djella, Seguy Mihindou - *Adèles, Idèles, and Approximation*
3:15-4:15	Karim Sankara - *Théorème des unités de Dirichlet*

Monday, March 23

9-9:45 Demba Barry - *Algèbre de Lie d'un groupe algébrique*

Tuesday, March 24

9-9:45 Hermann Soré - *Groupes diagonalisable et tores*

Promotion of Mathematics

We schedule a series of events to promote mathematics:

- Activities for popularizing mathematics in the framework in the International Day of Mathematics (on March 14),
- A round table led by Cécile Armana, University of Lille, on *Open Science and access to mathematical resources* (On March 20).
- Outreach activities about the gender gap in science in the framework of the International Women's Day 2026, jointly organized with the *Association des femmes mathématiciennes du Gabon* which is the local branch of the African Women in Mathematics Association (On March 21),
- We are organizing the Mathematics Olympiad of the ENS Libreville Department on Saturday, March 14, from 9 AM to 10 AM. This competition is open to final-year science students specializing in mathematics from high schools in Libreville. The top 10 students will receive awards (On March 27).

Friday, March 14 - Pi Day

Under construction

Friday, March 20 - Open Science and access to mathematical resources

Under construction

Saturday, March 21 - International Women's Day 2026

Under construction

Friday, March 27

3:00-5:00 Olympiad Awards - Closing ceremony

Research lectures

Monday, March 23

2:00-2:25 Johnathan Djella
2:30-2:55 Ephraim Poncho-Kotey
3:15-3:40 Brice Miyaoka

Tuesday, March 24

2:00-2:25 Jules Tindzogho
2:30-2:55 Anne Hanwa
3:15-3:40 Abdoulaye Maiga
3:45-4:10 Euloge Tchammou
4:30-4:55 Aldo Lokossa
5:00-5:25 Copernic Boungouendji

Wednesday, March 25

2:00-2:25 Vincent Kouakou
2:30-2:55 Moustapha Camara
3:15-3:40 Karim Sankara
3:45-4:10 Abdoulaye Boumanga Ba
4:30-4:55 Déborah Amani
5:00-5:25 Pierre Ebayi

Tuesday, March 26

2:00-2:25 Hermann Soré
2:30-2:55 Ibrahim Nonkane
3:15-3:40 Geordann Igouwe
3:45-4:10 Joseph Fomekong
4:30-4:55 Graciel Abaga
5:00-5:25 Cédric Midianga

Friday, March 27

2:00-2:25 Demba Barry
2:30-2:55 Christian Maire

Abstracts of the research lectures

BARRY Demba, University of Bamako, Mali

Trialitarian triples

Trialitarian triples are triples of central simple algebras of degree 8 *with orthogonal involution that provide the groundwork for the study of algebraic groups of trialitarian type* $D4$*. A cohomological approach in the Book of Involutions reveals the existence (non-explicit) of an operator of order* 3 *that induces a cyclic operation on trialitarianc triples. In this talk, we propose an explicit (cohomology-free) approach based on the compositions of quadratic spaces. This allows to elucidate the trialitarian isomorphisms between* $D4$ *algebraic groups. Joint work with J.-P. Tignol.*

BOUMANGA BA Abdoulaye, ArchiSec-IT, Gabon

Mathématiques des PKI et Souveraineté Numérique

Les infrastructures à clé publique (PKI) reposent sur des problèmes fondamentaux en théorie des nombres et en géométrie algébrique, tels que la factorisation entière et le logarithme discret sur courbes elliptiques. Cet exposé examine leur structure mathématique et montre en quoi la maîtrise de ces primitives conditionne la souveraineté numérique d'un État, notamment dans le contexte de la transition post-quantique.

KOUAKOU Vincent, Université Nangui Abrogoua, Côte d'Ivoire

Rank Lifting From Rank-Zero Elliptic Curves Via Quadratic Twists

We prove that rank-zero elliptic curves $E_p : y^2 = x^3 - p^2x$ *over* $\mathbb{Q}$ *generate infinite families of positive rank elliptic curves* $E_N : y^2 = x^3 - N^2x$ *through unit circle, via quadratic twisted models* $E_{p/q} : y^2 = x^3 - \left(\frac{p}{q}\right)^2 x$*. This construction demonstrates rank evolution from finite to infinite rational points, complementing high-rank families. All rank-zero status and positive-rank emergence rigorously verified computationally.*

MAIRE Christian, Univerité Marie et Louis Pasteur, France

Indivisibility of Ray Class Groups of Real Quadratic Fields

In this talk, we will discuss the Cohen-Lenstra heuristics for ray class groups in real quadratic extensions.
This is joint work with Emmanuel Lecouturier, Westlake University, China.

NONKANE Ibrahim, Université Thomas Sankara, Burkina Faso

A kind of Howe duality between a wreath product and algebra of invariant differential operators

In this talk, we investigate a kind of Howe duality between generalized symmetric group and algebra of invariant differential operators. In this vein, we study polynomial rings as modules over a ring of invariant differential operators by elaborating its irreducible submodules. We prove that the irreducible D-submodules of the direct image are in one-to-one correspondence with irreducible representations of G. We study the decomposition structure for G equal to a wreath product.

PONCHO KOTEY Ephraim, University of Ghana, Ghana

Computing Discrete Logarithms From Intersection Theory on Surfaces

Discrete logarithms algorithms has been developed over the years by a lot of mathematicians because of its link with cryptography. In this talk we will talk about intersection theory, some sieving algorithms and some introduction to curves and surfaces. We will also investigate how those concepts helps in the computation of discrete logarithms.

SANKARA Karim, Nazi Boni University, Burkina Faso

On the inverse Galois problem for Hilbert p-class field and S-p-class field tower

In this talk, we simultaneously address the inverse Galois problem for the Hilbert p-class field tower and S-p-class field tower. The goal is to show that, given a p-group G, a normal subgroup H of G, a number field K with trivial p-class group, and a finite nonempty set S of places of K, there exists an extension F/K, S-split, such that the unramified Hilbert p-class field tower of F has Galois group G, and the S-Hilbert p-class field tower of F has Galois group G/H. This extends the results of Ozaki, of Hajir-Maire-Ramakrishna, and Maire-Sankara.

TCHAMMOU Euloge, IMSP, Bénin

On the Diophantine equation $\sum_{j=1}^{m} jF_{k,j}^2 = F_{k,n}^q$

In this presentation, we find all the solutions of the Diophantine equation $F_{k,1}^2 + 2F_{k,2}^2 + \cdots + mF_{k,m}^2 = F_{k,n}^q$ in positive integer variables (m, n), where $q \in \{1, 2\}$, k a positive integer and $F_{k,i}$ is the i^{th} term of the k^{th} Fibonacci sequence defined by

$$F_{k,0} = 0,\ F_{k,1} = 1 \text{ and } F_{k,n} = kF_{k,n-1} + F_{k,n-2}, \quad \text{for} \quad n \geq 2.$$

TINDZOGHO NTSIRI Jules, Universté des Sciences et Techniques de Masuku, Gabon

Lie rings in model theory

In this talk, we discuss the study of Lie rings in model theory that are equipped with a dimension called the Morley rank*, which gives them interesting properties similar to those of Lie K-algebras. In an article published with Adrien Deloro, where we show, for example, that simple Lie rings up to dimension 4 are Lie K-algebras, a list of open*

research questions is outlined. This will also be an opportunity for us to present these interesting questions and discuss current research on them.

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– AFRIMath, Afrique France Réseau International de Mathématiques, CNRS, France
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– Association Top Sciences, Gabon
– Archisec-IT, Libreville, Gabon

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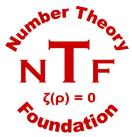
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