CIMPA School: Final Report

Title of the school: Enumerative Combinatorics with Applications to Computer Science

Dates: 6-17 January 2025

Location: Stellenbosch, South Africa

I. Summary

During the two-week long summer school, 8 lecturers from international institutions gave courses on enumerative combinatorics to a total of 35 participants from 15 different African countries. During the second week, time was allocated towards group projects, where students engaged with recent research and solved problems together.

One of the issues faced was that the background of the students varied greatly – some students had a strong background in enumerative combinatorics and had already produced first publications in combinatorics, while others had little-to-no combinatorial background. Therefore it was difficult to do the projects on a research-level as we had hoped. However, by the end of the school all students had dipped their toe into combinatorial problem-solving, and in some cases research.

Strong links were formed between South Africa, Kenya, and Uganda in terms of combinatorics research. Many participants were from (or located in) these countries, and there are plans to submit a proposal to initiate collaboration between Austria, Kenya, and Uganda. We will also initiate an online African Enumerative Combinatorics Seminar to keep participants of the school in touch with each other and current research trends.

II. Scientific Content

There were 8 lectures as outlined in the original plan and listed below:

- Dimbinaina Ralaivaosaona (Stellenbosch University, South Africa): Enumeration methods
- Frederique Bassino (Sorbonne University, France): Introduction to Analytic Combinatorics
- Darlison Nyirenda (University of the Witwatersrand, South Africa): Partitions and q-series
- Stephan Wagner (Uppsala University, Sweden, and Graz University of Technology, Austria): Tree enumeration and tree parameters
- Olivia Nabawanda (Mbarara University of Science & Technology, Uganda): Permutation statistics
- Amalia Duch-Brown (Universitat Politècnica de Catalunya, Spain): Analysis of algorithms
- Sarah Selkirk (University of Warwick, UK): Using SageMath to generate combinatorial objects and do experimental combinatorics
- Clemens Heuberger (University of Klagenfurt, Austria): Packages for guessing generating functions and performing asymptotic expansions

In addition, each lecturer supervised a group project of 3-6 students on a topic of the lecturer's choice. In some cases, this involved reading a scientific paper, in others, it involved working on a set list of problems. At the end of the week, groups presented what they had done to the other participants of the school.

III. Participants

	Students		Gender	Country of Origin	Country of Residence	Career level
1	Dennis	Gikunda	M	Kenya	South Africa	PhD
2	Nzaganya		M	Tanzania	South Africa	PostDoc
3	Jamiu	Aliyu	M	Nigeria	South Africa	Master
4	Guy	Konan	M	Ivory Coast	South Africa	PhD
5	Hosana		F	Madagascar	South Africa	Postdoc
6	Audace Amen V.	Dossou-Olory	M	Benin	Benin	Faculty
7	Kenny Lalatiana	ANDRIANTIAVINTSOA	F	Madagascar	Madagascar	Master
8	Yvonne Wakuthii	Kariuki	F	Kenya	Kenya	PhD
9	Notahinjanahary Ange	ADIMANANA	M	Madagascar	Madagascar	Master
10	ANDRIANANTENAINA	Zo Lalaina Andrianina	F	Madagascar	Madagascar	Master
11	Kyomugisha	Racheal	F	Uganda	Uganda	Master
12	ALBERT	NYARIARO	M	Kenya	Kenya	PhD
13	FIDEL	ODUOL	M	Kenya	Kenya	Master
14	Ignatius	Boadi	M	Ghana	Senegal	Master
15	Josaphat Wenceslas Vincent	Baolahy	M	Madagascar	Madagascar	PhD
16	Mpirirwe	Charity	F	Uganda	Uganda	PhD
17	Zeinab	Mohamed	F	Egypt	Egypt	PhD
18	RASATAHARISOA	Lucky	M	Madagascar	Madagascar	Master
19	Betelhem	Dejen	F	Ethiopia	Ethiopia	Faculty
20	Abdou Majeed	Alidou	M	Benin	Rwanda	PhD
21	Roy	Ferguson	M	South Africa	South Africa	PhD
22	Andry Nirina	Rabenantoandro	M	Madagascar	South Africa	PostDoc
23	Kansiime	Zaituni	F	Uganda	Uganda	Master
24	Wegulo	Mariam	F	Uganda	Uganda	Master
25	Tumelo	Ranoto	M	South Africa	South Africa	Master
26	Ayanda	Bangani	F	South Africa	South Africa	Master
27	Sam	Parle	F	South Africa	South Africa	PhD
28	Calisto Blessmore	Marime	M	Zimbabwe	South Africa	Master
29	Sinetemba	Funani	M	South Africa	South Africa	Master

30	Fabian Norman	Palmer	M	South Africa	South Africa	Master
31	Kanda Patrick	Tshinu	M	DRC	South Africa	Master
32	Anelisa	Hewu	F	South Africa	South Africa	Master
33	Joseph	Atalaye	M	Cameroon	South Africa	PhD
34	Richarlotte Valérà	Razafindravola	F	Madagascar	South Africa	PostDoc
35	Taboka	Chalebgwa	M	Botswana	South Africa	Faculty

IV. Financial Report

EXPENSES

CIMPA SCHOOL			Cost Centre & Amount:	
ORDER	DESCRIPTION	SUPPLIER	R4172	26136
US10000150045	Accommodation	De Laer	R115,020.00	
US10000154360	Accommodation	Factory 209	R174,160.00	
US10000159152	School Dinner	Alluvia	R30,335.00	
US10000159207	Lunch	The Chalk board	R82,500.00	
US10000159742	Flight Blessmore	Neelsie	R13,680.40	
US10000159754	Flight Ranoto	Neelsie		R5,779.76
US10000159763	Flight Rabenantoandro	Neelsie		R5,779.76
US10000159789	Flight Funani	Neelsie		R5,409.46
US10000159791	Flight Bangani	Neelsie		R5,409.46
US10000159811	Flight Palmer	Neelsie		R7,450.14
US10000160838	Flights Parle/Hewu	Neelsie	R17,152.55	
US10000161055	Accommodation	Factory 209	R21,496.00	
US10000162086	Food Lunch Vouchers	Innovus	R7,600.00	
US10000163171	Lecturer dinner	De Volkskombuis	R5,400.00	
US10000163175	Accommodation	Neelsie Travel	R2,714.00	
US10000164251	Shuttle	CL Heynes	R12,450.00	
US10000164270	Shuttle	CL Heynes	R8,650.00	
SUN-E-HR	Payment assistance 2x students		R6,000.00	
EXP000076648010	Petrol Claim		R279.48	
EXP000076620761	Naina Own Pocket Expenses	Water and others	R2,347.45	
US10000169741	Wagner Expenses	coffee break	R8,663.70	
US10000232477	Selkirk Expenses	Lecturer Accommodation deposit	R28,600.00	
US10000229707	CECO	Lecturer Accommodation	R28,600.00	

			remaining		
	SU Vehicle booking	Transportation Arrival+ Week 1	R10,218.00		
	ICRR	Overhead costs total	R63,311.02		
	TOTAL		**R639,177.60**	**R29,828.58**	

INCOME RECEIVED

INVOICES:	DESCRIPTION	Debtor	Cost Centre & Amount R4172	Received in (Rand)	ICCR Overhead	CoE Cost Centre 26136
INV995768	CoE-MaSS 2025 028 NUM Cimpa School	University of Witwatersrand				R75,000.00
INV1004528	Conference Funding	University of Edinburgh	£8000	R147,783.04	R36,945.76	
Electronic Transfer	Grant MA-2425-03	London Mathematical Society	£500	R11,424.35	R-	
Electronic Transfer	Grant	IMU-CDC	€3000	R45,461.04	R11,365.26	
NITheCS	Grant	University of Stellenbosch	R100,000.00	R100,000.00	R-	
NGA Pretoria	Grant	University of Pretoria	R75,000.00	R60,000.00	R15,000.00	
Mathematics	Grant	University of Stellenbosch	R25,000.00	R25,000.00	R-	
				R389,668.43	**R63,311.02**	**R75,000.00**

SUMMARY

		Comments
Total expenses	-R669,006.18	
Total Income	R464,668.43	
Expected ICCR Reverasal	R63,311.02	
Expected Income London Math Soc	R11,424.35	£500.00
Expected Grant European Math Soc	R18,000.00	€ 1,000.00
Current Shortfall	**-R111,602.38**	

The shortfall will be made up from the remaining grant of the ICMS (University of Edinburgh).

CIMPA funded all flights of participants from developing countries of our school, and thus these costs are not included in this expense report.

We are incredibly grateful to CIMPA for their financial and administrative support to make this school possible.

V. Pictures