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Scientific Report
AHA 2015: A conference on abstract harmonic analysis
Dalhousie University, Halifax, Nova Scotia
August 17-21, 2015

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Many of the leading researchers in the area of abstract harmonic analysis gathered in Halifax from August 17 to August 21 for a scientific conference and workshop.

There were 42 participants in the conference, distributed as follows: Canada (17), USA (2), UK (4), Germany (4), Spain (2), Sweden (2), France (1), Switzerland (1), Austria (2), Finland (1), Tunisia (1), Hong Kong (1), New Zealand (1), South Korea (1), South Africa (1), Poland (1). Of the 17 Canadian participants, 10 were students or post-docs. Thus it was very much an international conference. A participant list is attached.

The scientific program was structured around 32 invited lectures with time set aside on Wednesday and Friday afternoons for small group discussions to foster collaborations. An excursion at 4:30 on Wednesday afternoon was followed by a conference dinner.

The Schedule: The scientific committee of the conference consisted of Eberhard Kaniuth (Paderborn), Zhong-Jin Ruan (Illinois), Anthony Lau (Alberta) and Keith Taylor (Dalhousie). We structured the schedule, as much as was feasible, into morning or afternoon groupings of cognate presentations. The schedule is attached. One consideration on Monday was to have speakers who had not travelled great distances in the previous couple of days.

As reflects the importance of the Fourier $A(G)$ and Fourier-Stieltjes algebra $B(G)$ of a locally compact group G and the many significant advances in understanding these algebras in recent years three of the eight sessions had a focus relating to these particular algebras. Monday, Wednesday and Friday morning sessions consisted of talks on $A(G)$, $B(G)$ or closely related Banach algebras.

Other sessions contained contributions to a variety of tools of harmonic analysis such as cohomology, Beurling algebras, Sidon sets, multiplier algebras, hypergroups, representation theory of Lie groups, group C*-algebras, quantum groups, spectral theory, and compactifications.

In arranging the schedule, we also strove to intermix mature researchers with recent entrants into the field. It was gratifying that eight of the lectures were presented by current or recent doctoral students.

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Scientific highlights: One of the highlights of the Fourier algebra sessions was Nico Spronk's announcement that the cohomological question of weak amenability of $A(G)$ was now completely answered for Lie groups. ($A(G)$ is weakly amenable if and only if the connected component of the identity in G is abelian.) This was joint work of Spronk with Lee, Ludwig and Samei (all of whom were at the conference) and built on recent breakthrough results of Choi and Ghandehari.

Another highlight concerned the Herz-Figa-Talamanca algebras $A_p(G), 1 < p < \infty$ (note $A_2(G) = A(G)$). Antoine Derighetti presented a brilliant and delicate construction giving an explicit extension of an element in $A_p(H)$ to $A_p(G)$ in the case where H is a closed amenable subgroup of G. This construction is new, and difficult, even when $G = \mathbb{R}$ and $H = \mathbb{Z}$. The existence of such extensions will be very useful in establishing hereditary or inductive properties of Fourier algebras.

Arguably, one of the most exciting results presented at the conference was Jean Ludwig's talk on the group C*-algebra of a nilpotent Lie group. He and his co-authors have achieved an explicit description of $C^*(G)$, when G is connected and simply connected, as particular sections of a C*-bundle over $\widehat{G}$. The existence of such an explicit description has been sought since 1973 when Ian Brown showed that the Kirillov map from the topological space of coadjoint orbits in the dual of the Lie algebra of G onto $\widehat{G}$ is a homeomorphism. The greatest difficulties involve the behaviour at the singular point which is the constant 1 representation.

Summary: AHA 2015 was a scientific success with virtually all talks having good content and several presenting substantial and significant recent advances; but perhaps the greatest benefit of a conference such as this, which brings together the very active researchers in a relatively specialized area with graduate students and post-docs, is the wealth of new connections made, both mathematical and personal. In the evenings and during gaps in the program, many discussions take place, often stimulated by a talk. A number of new collaborations started during this week and we can look forward to continued vitality in the field. All of this was facilitated by the highly professional conference services of Dalhousie University and funding provided by the Atlantic Association for Research in the Mathematical Sciences (AARMS), the Fields Institute for Research in the Mathematical sciences (Fields) and the Department of Mathematics & Statistics at Dalhousie. We sincerely thank Dalhousie, AARMS and Fields for their support.

TABLE 1: Registered participants	
Atlantic Canada	
Bassemah Alhulaimi	Dalhousie University
Emma Carline	Dalhousie University
Raja Milad	Dalhousie University
Tom Potter	Dalhousie University
Keith Taylor	Dalhousie University
Rest of Canada	
Anthony Lau	University of Alberta
Ebrahim Samei	University of Saskatchewan
Monica Ilie	Lakehead University
Mahmoud Alaghmandan	University of Waterloo
Mehdi Monfared	University of Windsor
Nico Spronk	University of Waterloo
Elcim Elgun	Lakehead University
Kathryn E. Hare	University of Waterloo
Safoura Jafar Zadeh	University of Manitoba
Zsolt Tanko	University of Alberta
Matthew Wiersma	University of Waterloo
Baris Ugurcan	Western University
International	
Bert Schreiber	Wayne State University
Yemon Choi	Lancaster University
Jean Ludwig	University of Metz
Lyudmyla Turowska	Chalmers University
Aase Fahlander	Chalmers University
Mahmoud Filali	University of Oulu
Antoine Derighetti	Lausanne
Ivan Todorov	Queens University Belfast
Eberhard Kaniuth	University of Paderborn
Jerónimo Alaminos	University of Granada
Armando Villena	University of Granada
Gero Fendler	Vienna
Michael Leinert	University of Heidelberg
Rupert Lasser	T. University of Munich
Ying-Fen Lin	Queens University Belfast
Adam Skalski	University of Warsaw
Jared White	University of Lancaster
Gerhard Racher	Salzburg University
Abdelrhman Elkasapy	Max Planck, Leipzig
Ali Baklouti	University of Sfax
Chi Wai Leung	Chinese U. of Hong Kong
Hung Le Pham	Victoria U. of Wellington
Hun Hee Lee	Seoul National University
Oluwatosin Mewomo	University of KwaZulu-Natal

TABLE 2: Itemized Budget	
Expenses	$ CAD
Catering (breakfast, lunch, health breaks for 41)	3,955.65
HST on catering	593.38
Meeting space and audio-visual	570.00
Accommodations for 10 participants	3,884.04
Travel - Jean Ludwig (Metz)	1,370.04
Travel - Baris Ugurcan (Western)	678.78
Travel - Safoura Zadeh (Manitoba)	398.10
Wednesday excursion and dinner for 47	4,009.87
Total expenses	**$15,459.86**
Income	
Registrations (23 @ $173.92)	4,000.16
Paying guests for excursion and dinner (7 @ $80)	560.00
AARMS	7,500.00
Fields	3,000
Department of Mathematics & Statistics	399.70
Total income	**$15,459.86**

Notes:

- The registration fee was designed to cover the cost of breakfast and lunch each day of the conference plus the cost of the Wednesday excursion and conference dinner. This worked out to $169 per participant. We selected the registration fee based on initial estimates of these costs and had to charge HST to those who paid their registration fee themselves. At $173.92 as a registration fee, the HST brought it to an even $200 per person. This was extremely convenient.

- Seven of the conference participants were accompanied by a spouse and they were welcomed on the Wednesday evening excursion and dinner but had to pay $80 each to cover their additional cost for a total of $560.

- Allocation of the income from AARMS and Fields followed the guidelines provided with those awards and are detailed in Tables 3 and 4.

TABLE 3: Allocation of AARMS funds	
Expenses	$ CAD
Registration fee Alhulaimi	173.92
Registration fee Carline	173.92
Registration fee Fendler	173.92
Registration fee Filali	173.92
Registration fee Leinert	173.92
Registration fee Ludwig	173.92
Registration fee Mewomo	173.92
Registration fee Milad	173.92
Registration fee Pham	173.92
Registration fee Potter	173.92
Registration fee Racher	173.92
Registration fee Tanko	173.92
Registration fee White	173.92
Accommodations Fendler	298.48
Accommodations Filali	295.75
Accommodations Ludwig	1,130.87
Accommodations Mewomo	435.44
Accommodations Tanko	298.50
Accommodations Taylor	268.50
Travel - Jean Ludwig (Metz)	1,370.04
Meeting room and audio-visual	570.00
Morning and afternoon health breaks	923.50
Provided by Department of Math & Stats, Dalhousie	-352.04
Total allocated to AARMS fund	**$7,500.00**

TABLE 4: Allocation of Fields funds	
Expenses	$ CAD
Registration Alaghmandan (PDF Waterloo)	173.92
Registration Elgun (PDF Lakehead)	173.92
Registration Jafar-Zadeh (Student Manitoba)	173.92
Registration Ugurcan (PDF Western)	173.92
Registration Wiersma (Student Waterloo)	173.92
Accommodations Elgun (PDF Lakehead)	268.50
Accommodations Jafar-Zadeh (Student Manitoba)	351.00
Accommodations Ugurcan (PDF Western)	268.50
Accommodations Wiersma (Student Waterloo)	268.50
Travel - Baris Ugurcan (Western)	678.78
Travel - Safoura Zadeh (Manitoba)	398.10
Provided by the department and general registrations	-102.98
Total allocated to Fields fund	**$3,000**

Abstract Harmonic Analysis 2015

Schedule

All talks take place in Room 1016, Kenneth C. Rowe Management Building

Monday, August 17:

Time	Speaker	Title
9:00-9:40	Tony Lau	*Characterizations of the Fourier algebra in a class of Banach algebras*
9:50-10:30	Monica Ilie	*p-completely contractive algebra homomorphisms of $A_p(G)$*
10:30-11:00	Refreshments	
11:00-11:40	Matthew Wiersma	*L^p-Fourier and Fourier-Stieltjes algebras*
11:50-12:30	Nico Spronk	*Weak amenability of Fourier algebras*
12:30-2:00	Lunch	
2:00-2:40	Ebrahim Samei	*Reflexivity and hyperreflexivity of bounded n-cocycle spaces and application to convolution operators*
2:50-3:30	Safoura Jafar-Zadeh	*Bipositive isomorphisms between Beurling algebras and between their second dual algebras*
3:30-4:00	Refreshments	
4:00-4:40	Oluwatosin Mewomo	*On character amenability of Beurling and second dual algebras*
4:50-5:30	Baris Ugurcan	*Harmonic analysis of discrete Laplacians: Whitney extension on fractals and sandpile models*

Tuesday, August 18:

Time	Speaker	Title
9:00-9:40	Kathryn Hare	*Sidon and other interpolation sets*
9:50-10:30	Ying-Fen Lin	*Positive extensions of Schur multipliers and positive definite functions*
10:30-11:00	Refreshments	
11:00-11:40	Gerhard Racher	*Absolutely summing multipliers on $L^\infty(G)$*
11:50-12:30	Lyudmyla Turowska	*Herz-Schur multipliers of dynamical systems*
12:30-2:00	Lunch	
2:00-2:40	Rupert Lasser	*Character spaces of commutative hypergroups*
2:50-3:30	Gero Fendler	*Convolution Dominated Operators. Discrete groups versus continuous*
3:30-4:00	Refreshments	
4:00-4:40	Mehdi Monfared	*Relative boundaries for normed spaces*
4:50-5:30	Ali Baklouti	*On the L^p-Fourier transform norm for certain Lie groups*

Wednesday, August 19:

Time	Speaker	Title
9:00-9:40	Eberhard Kaniuth	*The Rajchman Algebra $B_0(G)$ of a locally compact group G*
9:50-10:30	Mahmood Alaghmandan	*Amenability properties of central Fourier algebras of locally compact groups*
10:30-11:00	Refreshments	
11:00-11:40	Hung Le Pham	*Subalgebras of the Fourier-Stieltjes algebra*
11:50-12:30	Armando Villena	*Orthogonally additive holomorphic functions on Fourier algebras*
12:30-2:00	Lunch	

Thursday, August 20:

Time	Speaker	Title
9:00-9:40	Jean Ludwig	*The C*-algebra of a nilpotent Lie group*
9:50-10:30	Jared White	*Maximal ideals in group algebras*
10:30-11:00	Refreshments	
11:00-11:40	Michael Leinert	*Some spectral subalgebras of noncommutative tori*
11:50-12:30	Jerónimo Alaminos-Prats	*Orthogonality on some Banach Algebras associated to a locally compact group*
12:30-2:00	Lunch	
2:00-2:40	Chi-Wai Leung	*The Berkovich spectrum of a completely continuous operator on a non-Archimedean Banach space*
2:50-3:30	Adam Skalski	*Open and closed quantum subgroups of quantum groups*
3:30-4:00	Refreshments	
4:00-4:40	Mahmoud Filali	*Algebraic structure of semigroup compactifications: Pym's and Veech's theorems*
4:50-5:30	Abdelrhman Elkasapy	*Surjectivity of word maps on SU(n)*

Friday, August 21:

Time	Speaker	Title
9:00-9:40	Antoine Derighetti	*The extension property concerning the algebra A_p for general amenable subgroups*
9:50-10:30	Hun Hee Lee	*Spectra of weighted Fourier algebras on non-compact Lie groups: the case of the Heisenberg group*
10:30-11:00	Refreshments	
11:00-11:40	Ivan Todorov	*Ideals of the Fourier algebra, supports and harmonic operators*
11:50-12:30	Yemon Choi	*The cb-version of the AMNM property for Fourier algebras*
12:30-2:00	Lunch	