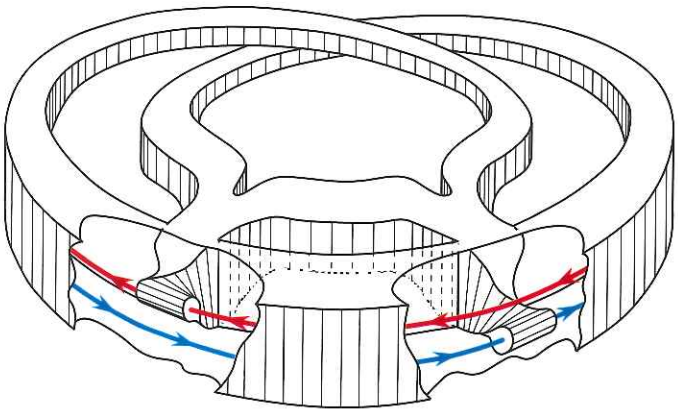
UNIVERSITY OF LEICESTER

Department of Mathematics

31st Summer Conference on Topology and its Applications

Tuesday 2 – Friday 5 August 2016



Invited Speakers

Will Brian, Baylor University
Anna Giordano Bruno, University of Udine
Steven Frankel, Yale University
Paul Gartside, University of Pitsburgh
Jean Goubault-Larrecq, Ecole Normal Sup'erieure de Cachan
Mike Hill, UCLA
John Hunton, Durham University
Steve Hurder, University of Illinois at Chicago
Ieke Moerdijk, Utrecht University and University of Sheffield
Jimme Lawson, Louisana State University
Ulrike Tillmann, University of Oxford
Boaz Tsaban, Bar-Ilan University

Scientific Advisory Committee

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Topological Methods in Algebra and Analysis

Tuesday *Rattray Lecture Theatre*

1:30	Lopez-Pellicer
2:00	Kakol

4:00	Hernandez
4:30	Krupski
5:00	Marciszewski

Wednesday *Rattray Lecture Theatre*

2:00	Clementino
2:30	Illiadis
3:00	Lukacs

4:00	Dahmen
4:30	Tarrega

Thursday ** *Attenborough Basement Lecture Theatre 1* **

1:45	Bugajewski
2:15	Lopez-Alfonso
2:45	Moll
3:15	Unver

4:00	Gairola
4:30	Olgun
5:00	Rashid

Friday *Rattray Lecture Theatre*

2:00	Dolecki
2:30	Keimel
3:00	Zlatos

4:00	Kunzi
4:30	Pennig

(B) In each of the following classes of spaces there are elements which are continuously containing spaces for the subclass of all elements being topological groups (in all cases, by dimension we mean small (transfinite) inductive dimension):

(1) *the class of all completely regular n-dimensional spaces of weight $\leq \tau$, $n \in \omega$;*

(2) *the class of all completely regular countable-dimensional spaces of weight $\leq \tau$;*

(3) *the class of all completely regular strongly countable-dimensional spaces of weight $\leq \tau$;*

(4) *the class of all completely regular locally finite-dimensional spaces of weight $\leq \tau$ (the elements of this class, which are topological groups, are finite dimensional);*

(5) *The class of all completely regular spaces of weight $\leq \tau$ with dimension ind equal to an infinite ordinal $\alpha \in \tau^+$.* $\square$

In the connection to these results we put some problems on universal topological groups.

[1] S. Iliadis, *On embeddings of topological groups*, Fundamental and Applied Mathematics, Vol 20, No.2, 2015, pp. 105-112 (Russian).

On the separable quotient problem for Banach spaces and spaces C(X)

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Coauthors: Manuel Lopez-Pellicer

One of the famous unsolved problems of functional analysis asks (Mazur's problem (1932)) if every (infinite-dimensional) Banach space E has an (infinite-dimensional) separable quotient.

Many Banach spaces are known to have separable quotient, for example, reflexive Banach spaces, or even weakly compactly generated Banach spaces. Rosenthal (independently Lacey) proved that any Banach space $C(X)$ has separable quotient. On the other hand, Eidelheit showed that every non-normable Fréchet space (i.e. a metrizable complete locally convex space) has a quotient isomorphic to $\mathbb{K}^\omega$ where $\mathbb{K}$ denotes the field of real or complex scalars, and so it has separable quotient. A general result of Saxon and Wilansky states that a Banach space E has separable quotient iff E contains a dense non-barrelled subspace. Later on, Saxon and Narayanaswami showed that every (LF)-space possesses separable quotient.

In the first part we gather a few other problems from Banach space theory which are equivalent to the separable quotient problem.

We show new results for Banach spaces and dual Banach spaces and recent results due to Kakol, Saxon and Todd concerning the same problem but posed for spaces $C_p(X)$ and $C_k(X)$. Moreover, results of Kakol, Saxon and Todd about concrete (first in literature) examples of locally convex spaces (non-metrizable) E which do not admit separable quotients will be presented.

On Elliott's topological enrichment of the Cuntz semigroup of a C*-algebra

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With the aim to introduce a powerful invariant for C*-algebras, Coward, Elliott and Ivanescu have enriched the Cuntz semigroup with a topological ingredient. This topological information is coded in a relation ¡¡ that expresses an abstract notion of *relative compactness* and an approximation of elements by their relatively compact approximants. Under the name of *Domain Theory* these notions have served for about forty years in denotational semantics for interpreting logical calculi and programming languages. But historically, the origins also grew out of mathematical questions. It was a surprise to discover that recently these ideas have become a tool in connection to C*-algebras.

In the talk, the bridge to (abstract) Cuntz semigroups will be established and a theorem unifying results in a paper by Elliott, Robert and Santiago on lower semicontinuous traces and quasi-traces on C*-algebras will be presented.