

## Plans for the MORLET Chair Sept. - Dec. 2014, Marseille

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# Overview over my presentation

- Personal background and story
- Why to call came at a good moment
- General Scientific Plans
- Existing Cooperations
- Concrete Plans for the Semester
- Benefits for the Marseille area
- Long-term impact
- Summary and Conclusion



# Brief Academic CV of Hans G. Feichtinger

- teacher student in mathematics and physics, Univ. Vienna;
- habilitation (lecturership) in 1979;
- most of my career took place in Vienna, with [guest professorships](#) in Heidelberg, College Park (1989/90), Edinburgh (2008) and Christchurch (2010) (NZ);
- since 1992 I have built up the internationally highly visible [NuHAG](#) group ([www.nuhag.eu](http://www.nuhag.eu)) in Vienna
- see myself also as a dedicated teacher and educator (25 PhD students according to Mathem. Genealogy).
- since 2000 Chief Editor to Journ. Fourier Anal. Appl.;
- a large number of pure and applied projects.



# Hans G. Feichtinger as academic teacher

Aside from the creation of **NuHAG** in Vienna, which together with John Benedetto's Norbert Wiener Center NWC in College Park in the US are highly visible centers for application oriented Harmonic Analysis I am most proud of having contributed to the launching of academic careers of my coworkers and students over the years:

- Charly Gröchenig (I sent him to Yves Meyer, Jan. 1987);
- Thomas Strohmer (full prof., UC Davis/CA);
- Massimo Fornasier (full prof., TU Muenich, ERC jun.);
- Holger Rauhut (RWTH Muenich, ERC jun.);
- Franz Luef (Berkeley/Trondheim);
- Monika Dörfler (Vienna, Mathematics and Music);
- Peter Balazs (ARI director, START prize);



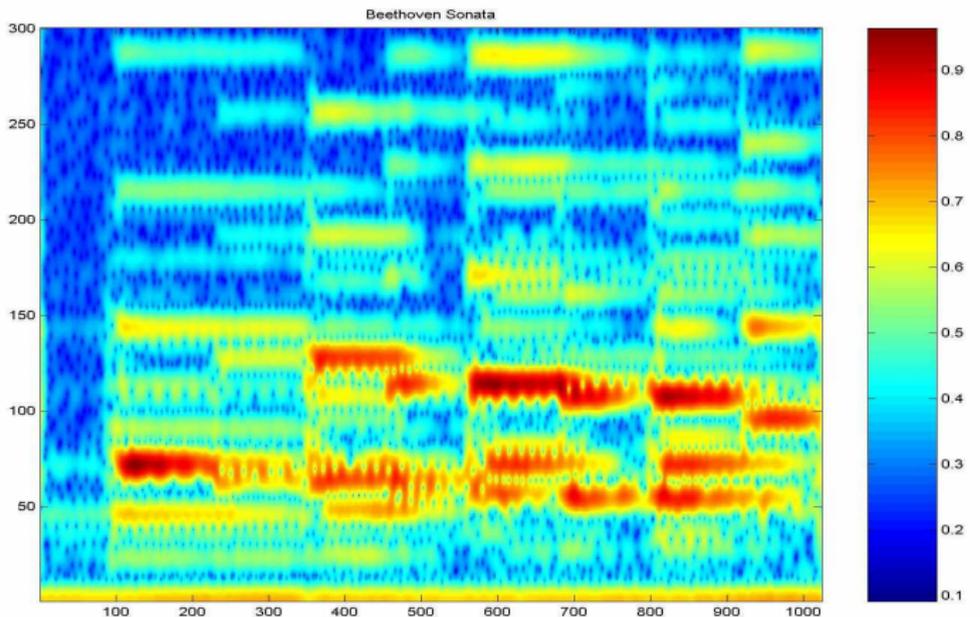
# HGFei: Short Research Profile

In order to introduce myself in a conversation I typically call myself an **application oriented mathematicians**, with a great interest in the mathematical foundations of digital signal processing (as it is part of our daily life, think of MP3, JPEG, etc.).

Within the mathematical community I rather call myself a **application oriented computational harmonic analyst** who however is not only interested in efficient algorithms but also in the mathematical foundations, in questions concerning the transition from the finite-discrete setting to the continuous setting, and (distributional) modelling of real-life scenarios, such as *mobile communication channels through slowly varying channels*.



# Gabor Analysis: Beethoven Piano Sonata



# ACADEMIC CV : Topics of Work

I did most of my academic career at the University of Vienna

- Starting as a teacher student (mathematics + physics);
- Phd and habilitation (1979) in **Abstract Harmonic Analysis** (H. Reiter, tradition of A. Weil);
- turning to function spaces, interpolatoin theory (H. Triebel, J. Peetre, E. Stein and G. Weiss, P. Butzer);
- turning towards applications and computational harmonic analysis from 1989 on;
- visiting positions in various places (e.g. College Park 1989/90; with J. Benedetto; Heidelberg, Edinburgh (2008), Christchurch (NZ, 2010));
- $\geq 1992$ : building **NuHAG!!** (with K. Gröchenig and T. Strohmer) the **Numerical Harmonic Analysis Group**



# NuHAG History

**NuHAG** has been built up over the last  $\geq 20$  years and has become a highly visible player in Harmonic Analysis (alongside with the Norbert Wiener Center NWC in College Park, Maryland).

Especially in the last ten years NuHAG has been

- location for the [Marie Curie Excellence Grant](#) (EU-funded) EUCETIFA (A European Center for Time-Frequency Analysis);
- I have hosted at NuHAG [Intra-7 European Marie Curie Individual Fellows](#) and supported two outgoing MC Fellows;
- we have organized *workshops and international conferences*;
- pure and applied projects (EU, FWF, WWTF, ESO funded);
- YESTERDAY Martin Ehler confirmed that he will come to Vienna for a 1.5 Mill. EURO WWTF project;
- regularly foreign PhDs, PostDocs, Sabbatical visitors.



# NuHAG Spirit

**NuHAG**, the **Numerical Harmonic Analysis Group** is located at the Faculty of Mathematics, University Vienna, with web-page [www.nuhag.eu](http://www.nuhag.eu) providing lots of information!

I would be happy to bring the *NuHAG Spirit* to Luminy:

- Good *cooperative spirit* which encourages interaction between different communities (from pure math. to applied sciences);
- Provide an *excellent research infra-structure* (BIBTEX database, MATLAB modules, Tools for cooperative research and production of technical notes);
- Develop efficient algorithms, with math. foundations;
- Cover the full spectrum of **Conceptual Harmonic Analysis** also sometimes called *Postmodern Analysis*;



# Research and Teaching

Personal comments about academic research and teaching: I have been involved in both for more than 35 years and realize that aside from a strong research attitude (like most of my active colleagues) I feel very positively about the following things:

- develop solid and long lasting **concepts** and research topics (e.g. modulation spaces, Wiener amalgam spaces, Banach Gelfand triples, the Segal algebra  $\mathbf{S}_0(G)$ , standard spaces);
- **interact with scientists** from different disciplines;
- carry out **MATLAB experiments** in order to gain insight, and share the experiences obtained in this way with others, especially younger ones (PostDocs, PhDs);
- communicate the *larger view* in articles, books, etc. ...



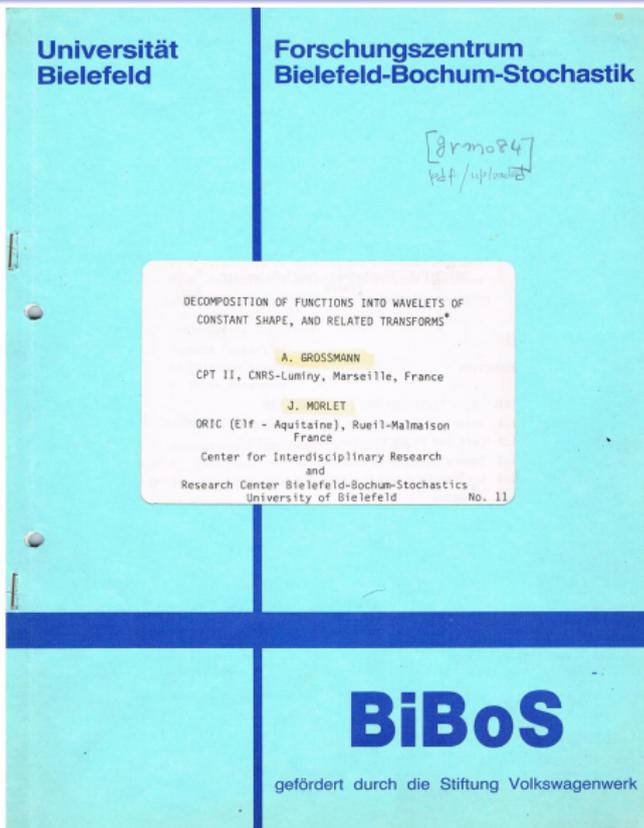
# Morlet, Wavelets and Time-Frequency Analysis

Next let me comment on the connections between my own goals, the ambitions of the Morlet Chair and how I see the overlap, from a scientific and from a personal point of view.

- As the librarian (at that time) to the institute I was lucky to identify as early as April 1985 the BiBoS preprint by A. Grossmann and J. Morlet as a highly interesting topic (theory of *voice transforms*, the admissibility condition, “**wavelets**”).
- In Feb. 1986 I was visiting Yves Meyer in Paris.
- Early 1987 I came to Marseille to visit A. Grossmann.
- In 1990 I attended the first “Wavelet Conf.” in Lowell.
- In May 1992 I was in Luminy for the “Wavelet Semester”.
- May 2013 I was honoured as Wavelet Pioneer (SPIE).



# Recalling early contacts



# Function Spaces, Wavelets, Calderon-Zygmund Operators

I think it is fair to say that one of the strong arguments for wavelets, immediately recognized by Yves Meyer in his first preprint entitled **De la recherche petroliere a la geometrie des espaces de Banach en passant par les paraproduite. in Seminaire sur les Aequations aux derivees partielles, 1985-1986, Exp. No. I, Ecole Polytech (1986) p.11,** was the fact that they were perfectly suited to explain the good properties of Calderon-Zygmund operators on the classical function spaces, because it was possible to completely describe the spaces by the size of their (good) wavelet coefficients, and CZ-operators have diagonally concentrated matrix representations.



# Function Spaces, Wavelets, Modulation Spaces

I was excited about the wavelet characterization of classical function spaces (keeping the spirit of Paley-Littlewood Theory), because I myself had tried to extend the concept of smoothness in the spirit of Besov- and Triebel- Lizorkin spaces to general LCA groups, where dilations are often absent.

In order to do so I suggested to replace the dyadic partitions of unity (used e.g. by Frazier-Jawerth) by *uniform ones* (I like to call them BUPUs) and HAD already in 1983 my first long manuscript about [Modulation Spaces over LCA groups](#).

The content of this manuscript was not appreciated by two different (high level) journals, so the paper was only published in 2003, long after modulation spaces had been recognized as "*the relevant function spaces*" in the context of TF analysis.



# Wavelets, Modulation and Coorbit Spaces

The *analogy between the continuous wavelet transform and the so-called Gabor transform or Short-time Fourier transform* used in my context was of course striking, and suggested immediately to try to check whether maybe a common approach, unifying these two examples, could be possible.

Certainly inspired by the work of A. Grossmann and J. Morlet, using already group representation methods, I came up at the end of the 80-th and was able to develop the so-called **coorbit theory**, together with Karlheinz Gröchenig, in a series of four papers. Using the terminology of **voice transforms** we were able to create a theory of atomic decompositions for families of function (resp. distribution) spaces, defined by the global behaviour of that voice transform over some locally compact group.



# Coorbit Spaces: Old and New

While originally created as a **unifying concept**, with various families of analytic functions as further early examples (either Fock-spaces, or Moebius invariant function spaces on the open unit disk), the last few years have shown that this concept has far-reaching and yet to be explored aspects.

As two more recent examples let me mention the work of Margit Pap (Marie Curie Fellow at NuHAG, 2010-2012) on function spaces using the Blaschke group, or the whole movement of **shearlets**, where the shearlet group allows to generate **Banach frames for a family of Banach spaces of distributions** on  $\mathbb{R}^d$ , well suited for the description e.g. of wave-front sets (microlocal analysis). They also have corresponding atomic decompositions, duality theory, independence of the analyzing window or atom, etc. (work of G. Kutyniok, D. Labate, S. Dahlke, ).



# Coorbit Spaces: The Future

- develop further concrete cases, especially with respect to connections to complex analysis (e.g. *polyanalytic functions*, *Fock spaces*, *sampling and interpolation*, etc.);
- continue to develop the **flexible theory** where only *locally* group actions and atoms are fixed, but are allowed to change globally (Quilted frames (Dörfler), Surgery on Frames (J.L. Romero), Hamiltonian flows (M. DeGosson));
- connect to the theory of “generalized coorbit spaces” as developed by Stefan Dahlke and coauthors;
- start to seriously work on **computational coorbit theory**, based on the rich collection of MATLAB code available at NuHAG (including LTFAT).
- prepare **consumer reports** for applied scientists.



# Scientific Long Term Goals

My long term scientific and publication goals, which I plan to pursue in the coming years, hence also as part of the Semester at Luminy:

- Book Projects (concepts are mostly ready, material is now tested)
  - A new distributional approach to Harmonic Analysis
  - Banach Gelfand Triples and Time-Frequency Analysis
  - From Linear Algebra to Time-Frequency Analysis
- Flexible Gabor Analysis (e.g. Musical Gabor Analysis), with warped lattices and time-variant atoms ( $>$  Hamiltonian Flows);
- prepare MATLAB toolboxes on the basis of LTFAT:
- Survey Articles (for AMS Notices, SIAM Review);



# Some of NuHAG's infra-structure:

The screenshot shows the NuHAG BibTeX collection of Publications website. At the top, there is a navigation bar with links for 'LOCAL', 'Meistbesucht', 'Erste Schritte', 'Moodle Universität Wie...', 'IEEE Xplore Digital Libr...', and 'VPN Anleitung'. Below this is a search bar with the following options: 'SEARCH: <normal> <extended> <last> <queries>', 'ADD: <formular> <formular-JS> <BibTeX>', 'GOTO: < >', and 'COLLECTION: show X'. The main content area features a welcome message: 'Welcome to the NuHAG-BibTeX database' with a timestamp '2013-05-19 21:12' and '13257 entries'. A search form is present with fields for 'author:' and 'title:', a 'search default' button, and a 'search in all fields' checkbox. Below the search form, there are links for 'search within:' (tex\_id, author, editor, title, booktitle, edition, series, journal, volume, pages, note, publisher, address, language, abstract, comment, keywords, zbl, mr) and 'sort by: year'. A 'Quick-search for NuHAG-members:' section includes a dropdown menu and a 'go' button. The 'NuHAG Publications:' section displays a list of years from 2013 to 2000, along with '<1999' and 'all NuHAG Publications'. There are also links for 'featured publication >', 'top authors >', and 'PDF-wish >'. The footer of the page shows the URL 'nhgbib.bib' and a link to 'build new version of NHGBIB.BIB >'. Below this, there are two entries: 'nhgbib.bib [2013.05.18 20:17 :: 4212573] use this BIB-file for including into your TeX-file!' and 'nhgbib\_SCP.bib [2013.05.14 11:31 :: 4209625] (last stable version)'.





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.....	Feichtinger	2012-08-07 15:22:15	[ ]
ACT	.....schwab	2007-07-24 11:48:23	[temp]
ADJCOMM	.....Feichtinger	2012-10-22 20:11:44	[ ]
ADJLAT	.....Feichtinger	2010-07-28 08:08:32	[temp]
ADJLAT	.....import	2007-04-23 11:00:01	[temp]
ADJLAT	.....import	2007-04-23 10:57:16	[temp]
ADJLAT3	.....import	2007-04-23 11:00:01	[temp]
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# Some of NuHAG's infra-structure:

## LTFAT HOMEPAGE (created by Peter Soendergaard, ARI, OEAW)

**LTFAT** The Large Time-Frequency Analysis Toolbox  
*- All your frame are belong to us -*

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### Introduction

The Large Time/Frequency Analysis Toolbox (LTFAT) is a Matlab/Octave toolbox for working with time-frequency analysis and synthesis. It is intended both as an educational and a computational tool. The toolbox provides a large number of linear transforms including Gabor and wavelet transforms along with routines for constructing windows (filter prototypes) and routines for manipulating coefficients

LTFAT is developed at [CAHR](#), Technical University of Denmark, [ARI](#), Austrian Academy of Sciences and [LATP](#), Université de Provence.

### Features

- Fast TF-transforms with a linear time-frequency scale: Gabor (STFT), Wilson and windowed MDCT
- Wavelet transforms: dyadic and general trees, decimated/undecimated and wavelet packet transforms
- Filterbanks
- Non-stationary (time-evolving) Gabor systems
- An object oriented framework for describing algorithms that work on frames in general
- Basic Fourier and TF-analysis (unitary DFT, involution, twisted conv., symplectic Fourier transformation)
- All transforms have methods for generating perfect reconstruction systems
- Operators: Frame multipliers and spreading representation
- A [GUI](#) in Matlab to modify signals in the time-frequency domain
- Sparse regression in the Gabor and WMDCT domain
- Windows and filter prototypes: Gauss, Hanning etc. Canonical dual and tight windows and many different types of wavelets
- Spectrogram and reassigned spectrogram plots, and plotting routines for each transform
- Simple tools for working with coefficients (thresholding, N-term approx.)
- Demos demonstrating the use of the toolbox
- Works in Matlab/Octave with a backend in C for greater speed
- The toolbox is [Free](#) software, released under the GNU General Public License (GPLv3)



## Existing Cooperations of NuHAG to Marseille

Currently LAPT (Torresani) and NuHAG (Feichtinger) are members of an EU-consortium named **UnlocX** (for Uncertainty and Localization), as part of the FET programme [on Future and Emerging Technologies] of the European Commission (with industrial partners in France, Germany and Israel), 2009-2013. Genesis, a company in Aix-en-Provence, is specialized in sound design and analysis, and prepares currently a sound database.

The partnership goes back to the **HASSIP network** (2002-2006, created by B. Torresani, J.P. Antoine and myself in the aftermath of a review panel to a German priority program). It was extremely efficient, both for the participating institutions and the PostDoc fellows (several of them holding now good academic positions, e.g. M. Fornasier, TUM Muenich, or H. Rauhut, now RWTH Aachen, Brigitte Forster-Heinlein, Univ. Passau).



# Existing Cooperations of NuHAG to Marseille II

**Peter Balazs** (Director of ARI):

- HASSIP: 10 months at LATP (Bruno) and LMA, CNRS (Richard Kronland-Martinet).
- WTZ-Project with LMA (2006-2007);
- WTZ-Project with IRCAM Paris (2013-2014);
- regularly students from Paris (2 at the moment);
- 2 Dissertationen: Necciari (Marseille, co-advisor, Jury-member) und Liuni (Paris, reviewer, Jury-member)

**Monika Dörfler**, Coorganizer of “Math. + Musik, 1999”.

- more then 6 months PostDoc in Marseille (HASSIP)
- close cooperation with Bruno Torresani (several joint papers) and Richard Kronland-Martinet;
- she has just finished the AUDIO-Miner project (jointly with Artificial Intelligence Department, Univie).



# Existing Cooperations of NuHAG to Marseille III

Other forms of existing cooperations:

- As Erasmus coordinator to the faculty of mathematics (UniVie) I have contributed recently (based on the existing good contacts) to establish a student exchange between Marseille and Vienna (which of course can anytime intensified, of mutually agreed);
- Already a little while ago Clothilde Melot has invited Jose Luis Romero, a NuHAG PostDoc, to present a talkt in Marseille;
- The big Music-conference by Kronland-Martinet organized in Marseille in October is certainly intersting for myself or Monika Dörfler;
- I will meet B. Torresani this summer in Argentina, and in September for the final UnlocX meeting in Bremen.



# Plans for Activities in Marseille

In principle the idea is to use the **time in Marseille for an intensified realization of long-term research and publication goals**, based on the rich network of cooperations (and co-authors) and the general NuHAG infra-structure which can be used over the internet. The organization will be *comparable to a special semester* (as I have organized it at ESI, the Erwin Schrödinger Institute in Vienna already in 2005 and 2012), and following the rules given by CIRM.

In fact, it would be the plan to **divert the continuous flow of incoming visitors to NuHAG mostly towards Marseille** during the period of Sept. to December 2014, and attract a couple of NuHAG coworkers and partners to spend some time here.



## Activities in Marseille: related NuHAG activities

During the *Special semester on Time-Frequency Methods* at the ESI (Vienna), Sept. to December 2012, we had these workshop:

- Applied Coorbit Theory
- Phase Retrieval
- Phase space methods for pseudo-differential operators
- Wavelet methods in scientific computing
- Operator algebras and time-frequency methods
- Time-frequency methods for the applied sciences

For January 2014 we plan a [follow-up workshop at ESI](#), which will be coordinated with the Morlet Chair activities.

Next Strobl-conference: [Progress in TF-analysis \(June 2014\)](#).

Final plans for the events in Luminy are realized in parallel with the preparation of these events in Austria (Jan/June 14).



# Activities in Marseille: FUNCTION SPACE conference

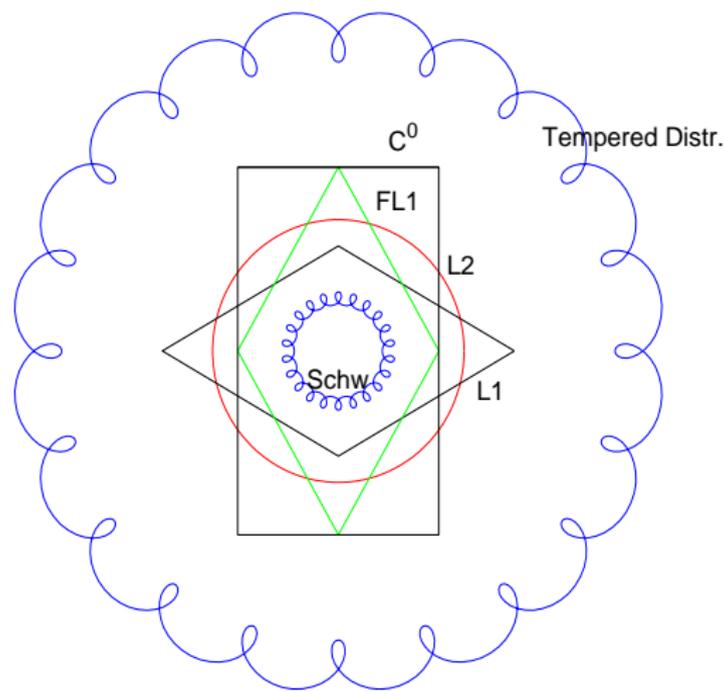
The main conference for the planned semester should be an international conference on [Function Spaces](#).

*While function spaces play an important role in many places, e.g. Sobolev spaces in order to describe elliptic PDEs, or the real Hardy space for Calderon-Zygmund operators, all of which are well characterized by wavelet expansions, the literature contains very little information about the choice of function spaces, depending on the applications, in the spirit of a **consumer report**.*

The planned conference should bring together experts which can give a perspective to the usefulness of different types of expansions for different purposes, with arguments why some of them are specifically relevant for certain applications. Rigged Hilbert spaces, Banach frames, RKH (Learning Theory), atomic compositions, **Frames and Bases** will play a role.

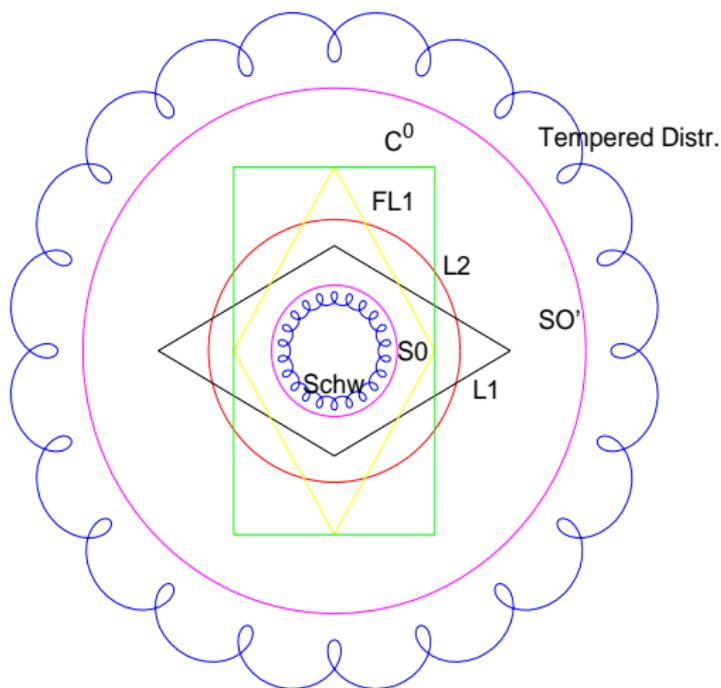


# The Schwartz-Gelfand Triple



# The $S_0$ -Banach Gelfand Triple

Using the Banach space  $M_0^{1,1}(\mathbb{R}^d) = \mathbf{S}_0(\mathbb{R}^d)$ :



# Activities in Marseille: Toeplitz Operators

During the preparation for this presentation I realized that there is also number of partners that I have in common especially with Hassan Youssfi and Alexander Borichev.

I have attended conferences in Bordeaux (Sept. 2010 Journées d'Analyse a Bordeaux), which has been a part of the FRAB network (frames and bases, with nodes in Marseille, Bordeaux, Lille, Toulouse,...), I have been twice in Oslo during the last academic year due to cooperation between NuHAG and Yura Lyubarskii and Kristian Seip [Postdoc in Marseille in ca. 1991!]) in Trondheim (Franz Luef is moving to this place in August 2013).

I have also been in Barcelona in Dec. 2011 for the ICREA Conference at CRM Barcelona Approximation Theory and Fourier Analysis (G. Ascensi, J. Bruna, S. Tikhonov).



## Plans for Activities in Marseille II

In addition to the planned main workshop on [Function Spaces I](#) definitely propose to have a workshop on [Computational Harmonic Analysis](#), to be realized jointly with Peter Soendergaard (now ARI, the creator of the LTFAT toolbox), in the spirit of the MACHA11-workshop in Marburg (Gabor + wavelet theory, foundations and instructions to carry out MATLAB experiences).

Given the fact that more and more application oriented projects require the realization of numerical algorithms (e.g. related to digital sound or image processing) applied students (e.g. in engineering) or PhD students and PostDocs, able to perform easily their own numerical experiments or rapid prototyping using MATLAB are very welcome and have good chances on the job market. We plan corresponding lecture notes (tutorial style).



## Plans for Activities in Marseille III

I wouldn't have applied if there were not many natural connections between the work in my group and activities in the Marseille area. The close cooperation between LAPT (Torresani) and LMA (Kronland-Martinet) have been already mentioned.

Given the development at the border between harmonic and complex analysis in the last years (e.g. through D. Abreu, M. Pap, G. Ascensi) or within the HCAA ESF network (2007-2011) I see large potential for close cooperation with El Hassan Youssefi and Alexander Borichev.

I will also certainly be open to interaction with member of the LAPT team, specifically Clothilde Melot, Sandrine Anthoine, Caroline Chaux, Frederic Richard, Marie-Christine Roubaud. Also an intensive exchange of experiences with GENESIS (in Aix-en-Provence, with St. Mollat) will be highly interesting.



## Plans for Activities in Marseille IV

There is a variety of options concerning **Research in Pairs** or small groups on concrete projects. I have listed a number of partners both from circle of scientist associated with and from the outside. Once more concrete plans can be made named scientist will agree to come, but of course it is a matter of availability and of optimal use of resources to make co concrete plans. Definitely I would hope that at least two of my long-time coauthors would be able to come for extended periods:

- 1 Georg Zimmermann (book project: new introduction to distribution theory, using Feichtinger's algebra  $\mathbf{S}_0(\mathbb{R}^d)$ );
- 2 Franz Luef (Berkeley/Trondheim, expert in the connections to non-commutative geometry, GPOTS2013 organizer);
- 3 Maurice de Gosson (symplectic geom., metaplectic group)



## Talks and Teaching in the region

I am certainly used to provide talks different types of audiences, without too much extra effort, using a large collection of already given talks at many different places in the last decade (see the NuHAG Talk-Server).

- talks popularizing applied analysis;
- digital audio and images and mathematics;
- mathematics in our daily life (even high-schools);
- the Fourier transform without pain (for engineers);
- from linear algebra to TF-analysis;
- technical talks on concrete topics;
- a simple approach to abstract harmonic analysis;
- all kinds of seminar talks in the region;



## Talks and Teaching: New Media

The **work with MATLAB** had (in the last 20 years) an increasing impact on my teaching and on my talks, which are nowadays full of illustrations, pictures, or life-demonstrations. The ability of communicating (sometimes also deep) mathematical facts in this way is changing the format of my presentations, and I think **sharing experiences in this direction will be also of some value.**

On the one hand this concerns the setup for [reproducible research](#), the setup of MATLAB toolboxes or even just the sharing of conventions and illustrative code can stimulate independence and curiosity of young researchers.

On the other hand is it becoming more and more realistic to properly simulate complex problems (say the inversion of a pseudo-differential operator) using MATLAB.



# Sharing Experiences on Applied Projects

I have been running a considerable number of interdisciplinary projects in the last 20 years, and am of course also willing to share those experiences. The project where with

- image and audio signal processing (in particular processing of music!);
- geophysicists, petrol industry software;
- astronomy (ESO: 2009-2012);
- medicine (defibrillator);
- bridge tension analysis (BWIM);
- mobile communication (2 patents);
- participant resp. coordinator in Austrian as well as European priority programs/networks



## Some hints to the literature

In the years 1998 and 2003 I have been able to edit jointly with Thomas Strohmer (UC Davis/CA) two books describing the foundations of Gabor Analysis, from application to theory and up to numerical issues. In 2001 Charly Gröchenig published his (mathematical) “Foundations of Time-Frequency Analysis” which nowadays is the basic reference in the field.

For the coming two years another compilation is due, most likely to be called [Progress in Gabor Analysis](#) and the final compilation might of such a book volume (including dedications) could be carried out at the Morlet Chair.

However, I also see the need for exploratory and introductory material, e.g. in the form of lecture notes, accompanying courses or workshops as those planned at CIRM.



# Long Term Impact

Aside from the collaboration with various partners in the Marseille area I would expect that a 5-month stay at the Morlet Chair would positively influence the following aspects:

- intensified international contacts
- exchange of best practice for algorithm development
- sharing of MATLAB code and tutorials
- common development platforms
- I might be able to help improve the WIKI presence of Jean Morlet by studying some of his work
- also the connection to coherent states (John Klauder's domain) could be further explored.



# SUMMARY

- the call for the Morlet chair came at the right moment (for me and my family);
- I feel that much of my own work is grounded on Morlet's (and D. Gabor's) intuition;
- there is a broad basis for lasting cooperation;
- representing NuHAG and not just myself ensures a long term impact and high visibility



# THANKS and Captatio Benevolentiae

J'aimerais vous remercier pour l'attention que vous avez port à ma présentation ; je l'ai faite en anglais, qui est ma langue habituelle de communication en mathématiques (il y a bien longtemps que je n'ai pas fait une présentation en français...)

Je voudrais être capable de mieux communiquer dans cette langue étant donné notre intention de séjourner à Marseille; ma fille (now 17) et mon fils (now 14) ont néanmoins étudié le français à l'école, et vont certainement se perfectionner!

J'ai déjà été à Marseille en 1987 pour visiter Professor Grossmann et j'y suis retourné à plusieurs reprises ces dernières années. Je serais très heureux de pouvoir y séjourner à nouveau en automne 2014, d'autant plus que Marseille est une capitale culturelle de l'Europe en 2013! J'ai hâte d'être Marseill en 2014 !



# THANK YOU

Thanks for your Attention!  
Merci Beaucoup!

