Preface

The chapters in this Vol. 5 have at least one author who spoke at the February Fourier Talks during the period 2014–2016. Volumes 1–4 cover the February Fourier Talks during the period 2002–2013.

The February Fourier Talks (FFT)

The *FFT*s were initiated in 2002 and 2003 as small meetings on harmonic analysis and applications, held at the University of Maryland, College Park. There were no *FFT*s in 2004 and 2005. The Norbert Wiener Center (NWC) for Harmonic Analysis and Applications was founded in 2004 in the Department of Mathematics at the university, and, since 2006, the *FFT* has been organized by the NWC. The *FFT* has developed into a major annual conference that brings together applied and pure harmonic analysts along with scientists and engineers from universities, industry, and government for an intense and enriching 2-day meeting.

The goals of the *FFT* are the following:

- To offer a forum for applied and pure harmonic analysts to present their latest cutting-edge research to scientists working not only in the academic community but also in industry and government agencies;
- To give harmonic analysts the opportunity to hear from government and industry scientists about the latest problems in need of mathematical formulation and solution;
- To provide government and industry scientists with exposure to the latest research in harmonic analysis;
- To introduce young mathematicians and scientists to applied and pure harmonic analysis;
- To build bridges between pure harmonic analysis and applications thereof.

These goals stem from our belief that many of the problems arising in engineering today are directly related to the process of making pure mathematics applicable. The Norbert Wiener Center sees the *FFT* as the ideal venue to enhance this process in a constructive and creative way. Furthermore, we believe that our vision is shared by the scientific community, as shown by the steady growth of the *FFT* over the years.

The *FFT* is formatted as a 2-day single-track meeting consisting of 30-minute talks as well as the following:

- Norbert Wiener Distinguished Lecturer Series;
- General Interest Keynote Address;
- Norbert Wiener Colloquium;
- Graduate and Postdoctoral Poster Session.

The talks are given by experts in applied and pure harmonic analysis, including academic researchers and invited scientists from industry and government agencies.

The Norbert Wiener Distinguished Lecture caps the technical talks of the first day. It is given by a senior harmonic analyst, whose vision and depth through the years have had profound impact on our field. In contrast to the highly technical day sessions, the Keynote Address is aimed at a general public audience and highlights the role of mathematics, in general, and harmonic analysis, in particular. Furthermore, this address can be seen as an opportunity for practitioners in a specific area to present mathematical problems that they encounter in their work. The concluding lecture of each *FFT*, our Norbert Wiener Colloquium, features a mathematical talk by a renowned applied or pure harmonic analyst. The objective of the Norbert Wiener Colloquium is to give an overview of a particular problem or a new challenge in the field. We include here a list of speakers for these three lectures.

Distinguished	Keynote	Colloquium
• Robert Calderbank	• Peter Carr	• Richard Baraniuk
• Ronald Coifman	• Barry Cipra	• Rama Chellappa
• Ingrid Daubechies	• James Coddington	• Margaret Cheney
• Ronald DeVore	• Nathan Crone	• Charles Fefferman
• Richard Kadison	• Ali Hirsa	• Robert Fefferman
• Peter Lax	• Mario Livio	• Gerald Folland
• Elias Stein	• William Noel	• Christopher Heil
• Gilbert Strang	• Steven Schiff	• Peter Jones
	• Mark Stopfer	• Thomas Strohmer
	• Frederick Williams	• Victor Wickerhauser

In 2013, the February Fourier Talks was followed by a workshop on phaseless reconstruction, also hosted by the Norbert Wiener Center and intellectually in the spirit of the *FFT*.

The Norbert Wiener Center

The Norbert Wiener Center for Harmonic Analysis and Applications provides a national focus for the broad area of applied harmonic analysis. Its theoretical underpinnings form the technological basis for many applications. Further, the applications themselves impel the study of fundamental harmonic analysis issues in topics such as signal and image processing, machine learning, data mining, waveform design, and dimension reduction.

The Norbert Wiener Center reflects the importance of integrating new mathematical technologies and algorithms in the context of current industrial and academic needs and problems.

The Norbert Wiener Center has three goals:

- Research activities in harmonic analysis and applications;
- Education–undergraduate to postdoctoral;
- Interaction within the international harmonic analysis community.

We believe that educating the next generation of harmonic analysts, with a strong understanding of the foundations of the field and a grasp of the problems arising in applications, is important for a high-level and productive industrial, government, and academic workforce.

The Norbert Wiener Center website: www.norbertwiener.umd.edu

The Structure of the Volumes

To some extent, the four parts for each of these volumes are artificial placeholders for all the diverse chapters. It is an organizational convenience that reflects major areas in harmonic analysis and its applications, and it is also a means to highlight significant modern thrusts in harmonic analysis. Each part includes an introduction that describes the chapters therein.

Volume 1	Volume 2
I Sampling Theory	V Measure Theory
II Remote Sensing	VI Filtering
III Mathematics of Data Processing	VII Operator Theory
IV Applications of Data Processing	VIII Biomathematics

Volume 3

IX Special Topics in Harmonic Analysis
X Applications and Algorithms in the Physical Sciences
XI Gabor Theory
XII RADAR and Communications: Design, Theory, and Applications

Volume 4

XIII Theoretical Harmonic Analysis
XIV Sparsity
XV Signal Processing and Sampling
XVI Spectral Analysis and Correlation

Volume 5

XVII Theoretical Harmonic Analysis
XVIII Image and Signal Processing
XIX Quantization
XX Algorithms and Representations

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