Call for Papers

Computed Tomography and Fourier Analysis

Special issue of the International Journal of Biomedical Imaging

X-ray CT (computed tomography) has been the leading technique for medical imaging and an important research field for the past four decades. Fourier analysis is the theoretical foundation of computed tomography, including formulism, algorithms, and programs. Historically, most people considered Radon's formula as the starting point of CT theory and, recently, some researchers treated Tuy's formula as an alternate mother formula. These dialect formulas make CT an isolated research field and CT research is limited within a small group. In fact, Radon's formula and Tuy's formula are two representations of inverse Fourier transform in the spherical (or polar) coordinate system. Fourier analysis provides us a straightforward, complete, and unified scheme for 2D and 3D, parallel beam, and divergent beam computed tomography.

The aim of this Special Issue is to invite more mathematicians, physicists, engineers, and programmers with expertise in Fourier analysis to participate in CT research and advance this technology. Its focus is the relationship between computed tomography and Fourier analysis, such as the applications of Fourier analysis in CT, and the contribution of recent CT results to Fourier analysis. Both intuitive review papers from various viewpoints and original research papers of high quality are welcome. Mathematical papers (such as on Fourier analysis) are acceptable but the authors should mention the potential relation with medical imaging in the introduction. Potential topics include, but are not limited to:

- Fourier transform, Fourier series, discrete Fourier transform in CT
- Theoretical foundation, scheme, and central formula of CT
- 2D and 3D, parallel, and divergent beam reconstruction and their relationships
- The influence of recent CT results on classical Fourier analysis
- Radon theory, Tuy-related framework, Orlov's theorem, Gel'fand inversion formula
- Data consistent condition, identity, Fourier slice theorem, odd-even extension, etc.
- Generalized function, filtering theory, weight function, and motion of the frequency plane
- Compressive sensing, wavelets, common waveform analysis, advance in Fourier analysis
- Integral geometry, differential geometry, topology, number theory, group theory, etc.
- None X-ray CT, new ideas and methodology for medical imaging

Before submission, authors should carefully read over the journal's Author Guidelines which are located at http://www.hindawi.com/journals/ijbi/guidelines/. Prospective authors should submit an electronic copy of their complete manuscript through the journal's Manuscript Tracking System at http://mts.hindawi.com/ according to the following timetable:

Manuscript Due	Friday, March 29, 2013
First Round of Reviews	Friday, June 21, 2013
Publication Date	Friday, August 16, 2013

Lead Guest Editor
Yuchuan Wei**,** ywei.ijbi@gmail.com
Guest Editors
Alexander Katsevich, Gengsheng Zeng, Victor P. Palamodov, Yannick Boursier, Hans G. Feichtinger