



THIERRY BLU

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RESEARCH INTERESTS

Signal processing	Real, complex wavelets and multiresolution analysis; Filter banks; Nonseparable multidimensional cases
Approximation theory	Uniform, nonuniform splines; Interpolation, approximation error; Variational approximation problems; Sparse approximation, finite rate of innovation
Statistics	Detection and estimation; Signal/Image denoising, Stein's Unbiased Risk Estimate; Generalized stochastic processes, fractional Brownian motions (fBm)
Modelling	Auditory system, psychoacoustics
Physics	Wave propagation, optics, holography
Applications	Functional Magnetic Resonance Imaging (fMRI); Electro-Encephalography (EEG); Biomedical imaging; Optical Coherence Tomography (OCT); TeraHertz imaging

EDUCATION

1986	“Diplôme d'ingénieur ¹ ” from <i>École Polytechnique</i> ² –Palaiseau, France: strong emphasis on mathematical analysis (integration, distribution theory and statistics) and theoretical physics (quantum mechanics, wave propagation, statistical physics)
1988	“Diplôme d'ingénieur” from <i>École Nationale Supérieure des Télécommunications (ENST)</i> –Paris, France: emphasis on electrical engineering and communications
1996	PhD in electrical engineering from ENST (with highest honours): <i>Fractional Octave Band Iterated Filter Banks—Application to Audio Sound Processing</i> advised by Prof. Pierre DUHAMEL

POSITIONS

2008–present	<i>The Chinese University of Hong Kong</i> : Professor (tenured 2011) in the department of <i>Electronic Engineering</i>
1998–2007	<i>Swiss Federal Institute of Technology in Lausanne (EPFL)</i> : Project leader, then “Scientific Adjunct” in the <i>Biomedical imaging Laboratory</i> headed by Prof. Michael UNSER; responsible for the mathematical aspects of Image Processing
1988–present	“Ingénieur des Télécoms/Mines” then “Ingénieur en Chef des Télécoms/Mines ³ ” (since 1997) in the French Telecommunication administration, on sabbatical leave since 1998
1994–1998	<i>France Telecom Research & Development</i> –Paris: researcher in audio and image processing within the <i>Groupware and Videotelephony</i> department
1988–1993	<i>France Telecom Research & Development</i> –Paris: researcher in wave propagation (1988–1990) then in signal processing (wavelets, filterbanks) within the <i>Centre de Recherche en Physique de l'Environnement Terrestre et Planétaire</i> ⁴

¹Equivalent to a Master of Science Degree

²The most prestigious higher education institution in France (see <http://en.wikipedia.org/wiki/Polytechnique>)

³Chief Telecommunication/Mining Engineer

⁴Research Center in Physics of the Environment of the Earth and the Planets

PROFESSIONAL ACTIVITIES

Editor in Chief	<i>Sampling Theory in Signal and Image Processing</i> (2009–)
Associate Editor	<i>IEEE Transactions on Image Processing</i> (2002–2006) <i>IEEE Transactions on Signal Processing</i> (2006–2010) <i>Elsevier Signal Processing</i> (2008–2011) <i>EURASIP Journal on Image and Video Processing</i> (2009–)
Guest Editor	<i>Elsevier Signal Processing</i> Special Issue on Advances in Multirate Filter Bank Structures and Multiscale Representations
Chair	Program Committee for <i>WavE 2006</i> (Lausanne) General Co-Chair of <i>SAMPTA 2011</i> (Singapore) Asia liaison for <i>ISBI 2012</i> (Barcelona)
Member	IEEE Signal Processing Society <i>Signal Processing Theory and Methods</i> Technical Committee (2008–) Program Committee for <i>EUSIPCO 2004</i> (Vienna), <i>SPIE Wavelet X, BioMed 2006–2008</i> (Innsbrück), <i>ICSP 2008</i> (Beijing), <i>APSIPA 2009–2010</i> . <i>ICIP 2006</i> special session organizer “signal/image reconstruction from sparse measurements” (with P.L. Dragotti and M. Vetterli)
Session Chair	<i>SPIE Wavelet VII and X</i> , <i>Pacific Rim Conference on Mathematics</i> 2001 (Taipeh), <i>International Conference on Superresolution Imaging</i> 2005 (Hong Kong), <i>International Conference on Image Processing</i> 2010 (Hong Kong)
Reviewer	Various <i>IEEE Transactions</i> , <i>IEEE conferences</i> , <i>SIAM</i> publications, <i>Nature Methods</i> , <i>JOSA</i> , books, conferences and research grant proposals
Jury	Chairman/Member of PhD and award committees

AWARDS

IEEE Signal Processing Society’s 2003 **Best Paper Award** for the article entitled *Wavelets, fractals, and radial basis functions* (with M. Unser) [49, journals]

IEEE Signal Processing Society’s 2006 **Best Paper Award** for the article entitled *Sampling signals with finite rate of innovation* (with M. Vetterli and P. Marziliano) [44, journals]

IEEE Signal Processing Society’s 2009 **Young Author Best Paper Award** for the article entitled *A new SURE approach to image denoising: Interscale orthonormal wavelet thresholding* (First author: F. Luisier) [20, journals]

ICIP’05 **Best Student Paper Award** for the article entitled *Beyond interpolation: Optimal reconstruction by quasi-interpolation* (First author: L. Condat) [41, conferences]

TEACHING

1997–1999	Courses on wavelets for undergraduates at ENIC (New School for Communication Engineers in Lille, France)
1998–	Supervision of undergraduate, Master and PhD students
2003–2007	<i>Signals and Systems</i> to Microengineering students and Life-Science students at EPFL
2008–	ELEG4430 (<i>Digital Image Processing</i>), ELEG3310 (<i>Basic Electromagnetic Theory</i>), ENGG3910 (<i>Methodology of Research</i>), ENGG2011 (<i>Advanced Engineering Mathematics—Syllabus A</i>) and BMEG3320 (<i>Biomedical Imaging</i>) to engineering undergraduate students at CUHK; participation to the MSc course BMEG5830 (<i>Medical Imaging</i>)

GRADUATE STUDENTS

2011–	Cheuk Man Fong, “Brain-Computer Interface” (PhD–CUHK)
2011–	Hiu Fung Lee, “Edge basis functions” (MPhil–CUHK)
2010–	Hanjie Pan, “Algorithms for Sparse Image Restoration” (MPhil–CUHK)
2009–	Feng Xue, “Deconvolution/Denoising of Microscopy Fluorescence Images” (PhD–CUHK)
2008–2011	Djano Kandaswamy, “Analytic Sensing of Electro-EncephaloGrams” (PhD–EPFL)
2008–2011	Matthew Ka Lim Ma, “Denoising of Computer Tomography Images” (MPhil–CUHK)
2005–2009	Florian Luisier, “The SURE-LET Approach to Image Denoising” (PhD–EPFL)
2000–2004	Michael Liebling, “On Fresnelets, Interference Fringes, and Digital Holography” (PhD–EPFL)
1999–2003	Mathews Jacob, “Parametric Shape Processing in Biomedical Imaging” (PhD–EPFL)
1998–2002	Arrate Muñoz-Barrutia, “Nondyadic and Nonlinear Multiresolution Image Approximations” (PhD–EPFL)
1998–2002	Manuela Feilner, “Statistical Wavelet Analysis of Functional Images of the Brain” (PhD–EPFL)

ADMINISTRATION

Feb. 2008–	Member of various committees of the EE Dept: <i>Computer Committee</i> (Chairman), <i>Research Committee</i> (Chairman), <i>Curriculum Committee</i> , <i>Teaching & Learning Committee</i> (Vice-chairman), <i>Teaching Lab</i> , <i>Non-Teaching Staff Review Panel</i> , <i>Scholarship</i> , <i>Student Activities</i> , <i>Library Coordinator</i> ; and of the Faculty of Engineering: <i>Engineering Panel</i> , <i>Engineering Mathematics Subject Panel</i> , <i>Outstanding Thesis Award Selection Panel</i> .
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FUNDING

Feb. 2008–Feb. 2010	“Poisson noise reduction using an unbiased risk estimate: Application to biological image denoising”, PI, Direct Grant for Research ID# 2050420, HK\$ 150’000, February 2008–August 2009
Apr. 2008–Apr. 2011	“Analytic sensing: A new technique for EEG source imaging”, Co-I, SNF (Switzerland) doctoral grant #200021-119812/1, CHF 165’240 (HK\$ 1’137’204)
2009–2010	Sino-Swiss Grant with matching grant from the MS-CU-Joint Lab (CHF 4’500 + HK\$ 30’000) to finance three one-month visits to CUHK of Djano Kandaswamy (Oct. 2009, April 2010, Nov. 2010)
Sept. 2009–Sept. 2011	“Terahertz Probe for in Vivo Imaging”, PI (initial PI was Prof. E. McPherson), SHIAE #BME-p4-09, HK\$ 666’000
Jan. 2010–Jan. 2013	“Non-Redundant Complex Wavelet Transform: Definition, Design and Implementation”, PI, RGC #CUHK410209, HK\$ 724’500
Jan. 2011–Jan. 2014	“Improved Algorithms for Finite Rate of Innovation Signals”, PI (with P.-L. Dragotti and M. Vetterli), RGC #CUHK410110, HK\$ 1’083’300

PERSONAL DATA

French citizen, married, born 18/04/1964

PUBLICATIONS⁵

Tutorial & Plenary Talks

- [1] T. Blu and F. Luisier. Image denoising and the SURE-LET methodology. *Tutorial Presentation at the Seventeenth International Conference on Image Processing (ICIP'2010)*, Hong Kong, China, September 26–29, 2010.
- [2] T. Blu. Sparsity through annihilation: Algorithms and applications. *Keynote Presentation at the Tenth IEEE International Conference on Signal Processing (ICSP'10)*, Beijing, China, October 24–28, 2010.
- [3] T. Blu. Image denoising and the SURE-LET methodology. *Tutorial Presentation at APSIPA Annual Summit and Conference 2010*, Singapore, December 14–17, 2010.
- [4] M. Vetterli, P. Marziliano, T. Blu, and P.-L. Dragotti. Sparse sampling: Theory, algorithms and applications. *Tutorial Presentation at the Thirty-Fourth IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'09)*, Taipei, Taiwan, April 19–24, 2009.
- [5] M. Vetterli, P. Marziliano, T. Blu, and P.-L. Dragotti. Sparse sampling of structured data. *Tutorial Presentation at the Seventeenth European Signal Processing Conference (EUSIPCO'09)*, Glasgow, Scotland UK, August 24–28, 2009.
- [6] T. Blu. The SURE-LET methodology — A prior-free approach to signal and image denoising. *Plenary Presentation at the Eighth International Workshop on Sampling Theory and Applications (SampTA'09)*, Marseille, France, May 18–22, 2009.

Patents

- [1] Qualcomm Inc., T. Blu, M. Vetterli, and L. Coulot. Sparse sampling of signal innovations. International patent WO/2009/096995, August 2009.
- [2] T. Blu, M. Unser, P. Thévenaz, and M. Sühling. Interpolation method and apparatus. International Patent WO2003021474, 2003.
- [3] M. Vetterli, P. Marziliano, and T. Blu. Sampling methods, reconstruction methods and devices for sampling and/or reconstructing signals. International Patent WO200278197, 2002. This technology was transferred to Qualcomm Inc. in 2007.

Book Chapters

- [1] T. Blu and J. Lebrun. Linear time-frequency analysis II: wavelet-type representations. In F. Hlawatsch and F. Auger, editors, *Time-Frequency Analysis - Concepts and Methods*, chapter 4, pages 93–130. Wiley-ISTE, London UK, 2008.
- [2] T. Blu and J. Lebrun. Analyse temps-fréquence linéaire II: représentations de type ondelettes. In F. Hlawatsch and F. Auger, editors, *Temps-fréquence, concepts et outils*, Traitement du Signal et de l'Image, chapter 4, pages 101–138. Hermès, Paris, France, 2005.
- [3] P. Thévenaz, T. Blu, and M. Unser. Image interpolation and resampling. In I.N. Bankman, editor, *Handbook of Medical Imaging, Processing and Analysis*, chapter 25, pages 393–420. Academic Press, San Diego CA, USA, 2000.

PhD Thesis

- [1] T. Blu. *Bancs de filtres itérés en fraction d'octave — Application au codage de son (Iterated Rational Filter Banks with an Application to Audio Coding)*. PhD thesis, ENST Paris, Nr. 96 E 009, 1996. in French.

Journal Papers

- [1] E.P.J. Parrott, S.M.Y. Sy, T. Blu, V.P. Wallace, and E. Pickwell-MacPherson. Terahertz pulsed imaging in vivo: measurements and processing methods. *Journal of Biomedical Optics*, 16(10):106010 1–8, October 2011.

⁵Most papers are freely available at <http://www.ee.cuhk.edu.hk/~tblu/>

- [2] F. Luisier, T. Blu, and M. Unser. Image denoising in mixed Poisson-Gaussian noise. *IEEE Transactions on Image Processing*, 20(3):696–708, March 2011.
- [3] D. Van De Ville, B. Forster-Heinlein, M. Unser, and T. Blu. Analytical footprints: Compact representation of elementary singularities in wavelet bases. *IEEE Transactions on Signal Processing*, 58(12):6105–6118, December 2010.
- [4] A.F. Stalder, T. Melchior, M. Müller, D. Sage, T. Blu, and M. Unser. Low-bond axisymmetric drop shape analysis for surface tension and contact angle measurements of sessile drops. *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 364(1–3):72–81, July 2010.
- [5] F. Luisier, C. Vonesch, T. Blu, and M. Unser. Fast interscale wavelet denoising of Poisson-corrupted images. *Signal Processing*, 90(2):415–427, February 2010.
- [6] F. Luisier, T. Blu, and M. Unser. SURE-LET for orthonormal wavelet-domain video denoising. *IEEE Transactions on Circuits and Systems for Video Technology*, 20(6):913–919, June 2010.
- [7] J.P. Lie, T. Blu, and C.M.S. See. Single antenna power measurements based direction finding. *IEEE Transactions on Signal Processing*, 58(11):5682–5692, November 2010.
- [8] J. Berent, P.L. Dragotti, and T. Blu. Sampling piecewise sinusoidal signals with finite rate of innovation methods. *IEEE Transactions on Signal Processing*, 58(2):613–625, February 2010.
- [9] J.-M. Mari, T. Blu, O. Bou Matar, M. Unser, and C. Cachard. A bulk modulus dependent linear model for acoustical imaging. *Journal of the Acoustical Society of America*, 125(4):2413–2419, April 2009.
- [10] D. Kandaswamy, T. Blu, and D. Van De Ville. Analytic sensing: Noniterative retrieval of point sources from boundary measurements. *SIAM Journal on Scientific Computing*, 31(4):3179–3194, 2009.
- [11] S. Ramani, D. Van De Ville, T. Blu, and M. Unser. Nonideal sampling and regularization theory. *IEEE Transactions on Signal Processing*, 56(3):1055–1070, March 2008.
- [12] S. Ramani, T. Blu, and M. Unser. Monte-Carlo SURE: A black-box optimization of regularization parameters for general denoising algorithms. *IEEE Transactions on Image Processing*, 17(9):1540–1554, September 2008.
- [13] F. Luisier and T. Blu. SURE-LET multichannel image denoising: Interscale orthonormal wavelet thresholding. *IEEE Transactions on Image Processing*, 17(4):482–492, April 2008.
- [14] B. Forster, T. Blu, D. Van De Ville, and M. Unser. Shift-invariant spaces from rotation-covariant functions. *Applied and Computational Harmonic Analysis*, 25(2):240–265, September 2008.
- [15] T. Blu, P.-L. Dragotti, M. Vetterli, P. Marziliano, and L. Coulot. Sparse sampling of signal innovations. *IEEE Signal Processing Magazine*, 25(2):31–40, March 2008.
- [16] Y. Barbotin, D. Van De Ville, T. Blu, and M. Unser. Fast computation of polyharmonic B-Spline autocorrelation filters. *IEEE Signal Processing Letters*, 15:773–776, 2008.
- [17] C. Vonesch, T. Blu, and M. Unser. Generalized Daubechies wavelet families. *IEEE Transactions on Signal Processing*, 55(9):4415–4429, September 2007.
- [18] D. Van De Ville, M.L. Seghier, F. Lazeyras, T. Blu, and M. Unser. WSPM: Wavelet-based statistical parametric mapping. *NeuroImage*, 37(4):1205–1217, October 1, 2007.
- [19] M. Unser and T. Blu. Self-similarity: Part I—Splines and operators. *IEEE Transactions on Signal Processing*, 55(4):1352–1363, April 2007.
- [20] F. Luisier, T. Blu, and M. Unser. A new SURE approach to image denoising: Interscale orthonormal wavelet thresholding. *IEEE Transactions on Image Processing*, 16(3):593–606, March 2007. **IEEE Signal Processing Society’s 2009 Young Author Best Paper Award.**
- [21] P.L. Dragotti, M. Vetterli, and T. Blu. Sampling moments and reconstructing signals of finite rate of innovation: Shannon meets Strang-Fix. *IEEE Transactions on Signal Processing*, 55(5):1741–1757, May 2007. Part 1.
- [22] T. Blu and M. Unser. Self-similarity: Part II—Optimal estimation of fractal processes. *IEEE Transactions on Signal Processing*, 55(4):1364–1378, April 2007.

- [23] T. Blu and F. Luisier. The SURE-LET approach to image denoising. *IEEE Transactions on Image Processing*, 16(11):2778–2786, November 2007.
- [24] B. Bathellier, D. Van De Ville, T. Blu, M. Unser, and A. Carleton. Wavelet-based multi-resolution statistics for optical imaging signals: Application to automated detection of odour activated glomeruli in the mouse olfactory bulb. *NeuroImage*, 34(3):1020–1035, February 1, 2007.
- [25] D. Van De Ville, T. Blu, and M. Unser. Surfing the brain—An overview of wavelet-based techniques for fMRI data analysis. *IEEE Engineering in Medicine and Biology Magazine*, 25(2):65–78, March–April 2006.
- [26] P. Marziliano, M. Vetterli, and T. Blu. Sampling and exact reconstruction of bandlimited signals with additive shot noise. *IEEE Transactions on Information Theory*, 52(5):2230–2233, May 2006.
- [27] M. Jacob, T. Blu, C. Vaillant, J.H. Maddocks, and M. Unser. 3-D shape estimation of DNA molecules from stereo cryo-electron micro-graphs using a projection-steerable snake. *IEEE Transactions on Image Processing*, 15(1):214–227, January 2006.
- [28] B. Forster, T. Blu, and M. Unser. Complex B-Splines. *Applied and Computational Harmonic Analysis*, 20(2):261–282, March 2006.
- [29] D. Van De Ville, T. Blu, and M. Unser. On the multidimensional extension of the quincunx sub-sampling matrix. *IEEE Signal Processing Letters*, 12(2):112–115, February 2005.
- [30] D. Van De Ville, T. Blu, and M. Unser. Isotropic polyharmonic B-Splines: Scaling functions and wavelets. *IEEE Transactions on Image Processing*, 14(11):1798–1813, November 2005.
- [31] M. Unser and T. Blu. Generalized smoothing splines and the optimal discretization of the Wiener filter. *IEEE Transactions on Signal Processing*, 53(6):2146–2159, June 2005.
- [32] M. Unser and T. Blu. Cardinal exponential splines: Part I—Theory and filtering algorithms. *IEEE Transactions on Signal Processing*, 53(4):1425–1438, April 2005.
- [33] F. Precioso, M. Barlaud, T. Blu, and M. Unser. Robust real-time segmentation of images and videos using a smooth-spline snake-based algorithm. *IEEE Transactions on Image Processing*, 14(7):910–924, July 2005.
- [34] D. Van De Ville, T. Blu, M. Unser, W. Philips, I. Lemahieu, and R. Van de Walle. Hex-splines: A novel spline family for hexagonal lattices. *IEEE Transactions on Image Processing*, 13(6):758–772, June 2004.
- [35] D. Van De Ville, T. Blu, and M. Unser. Integrated wavelet processing and spatial statistical testing of fMRI data. *NeuroImage*, 23(4):1472–1485, December 2004.
- [36] M. Liebling, T. Blu, and M. Unser. Complex-wave retrieval from a single off-axis hologram. *Journal of the Optical Society of America A*, 21(3):367–377, March 2004.
- [37] M. Jacob, T. Blu, and M. Unser. Efficient energies and algorithms for parametric snakes. *IEEE Transactions on Image Processing*, 13(9):1231–1244, September 2004.
- [38] T. Blu, P. Thévenaz, and M. Unser. Linear interpolation revitalized. *IEEE Transactions on Image Processing*, 13(5):710–719, May 2004.
- [39] M. Unser and T. Blu. Wavelet theory demystified. *IEEE Transactions on Signal Processing*, 51(2):470–483, February 2003.
- [40] M. Unser and T. Blu. Mathematical properties of the JPEG2000 wavelet filters. *IEEE Transactions on Image Processing*, 12(9):1080–1090, September 2003.
- [41] M. Liebling, T. Blu, and M. Unser. Fresnelets: New multiresolution wavelet bases for digital holography. *IEEE Transactions on Image Processing*, 12(1):29–43, January 2003.
- [42] K. Ichige, T. Blu, and M. Unser. A study on spline functions and their applications to digital signal and image processing. *The Telecommunications Advancement Foundation*, 18(7(1)):358–365, January 2003.
- [43] T. Blu, P. Thévenaz, and M. Unser. Complete parameterization of piecewise-polynomial interpolation kernels. *IEEE Transactions on Image Processing*, 12(11):1297–1309, November 2003.

- [44] M. Vetterli, P. Marziliano, and T. Blu. Sampling signals with finite rate of innovation. *IEEE Transactions on Signal Processing*, 50(6):1417–1428, June 2002. IEEE Signal Processing Society’s 2006 **Best Paper Award**.
- [45] A. Muñoz Barrutia, T. Blu, and M. Unser. ℓ_p -Multiresolution analysis: How to reduce ringing and sparsify the error. *IEEE Transactions on Image Processing*, 11(6):656–669, June 2002.
- [46] J. Kybic, T. Blu, and M. Unser. Generalized sampling: A variational approach—Part II: Applications. *IEEE Transactions on Signal Processing*, 50(8):1977–1985, August 2002.
- [47] J. Kybic, T. Blu, and M. Unser. Generalized sampling: A variational approach—Part I: Theory. *IEEE Transactions on Signal Processing*, 50(8):1965–1976, August 2002.
- [48] M. Jacob, T. Blu, and M. Unser. Sampling of periodic signals: A quantitative error analysis. *IEEE Transactions on Signal Processing*, 50(5):1153–1159, May 2002.
- [49] T. Blu and M. Unser. Wavelets, fractals, and radial basis functions. *IEEE Transactions on Signal Processing*, 50(3):543–553, March 2002. IEEE Signal Processing Society’s 2003 **Best Paper Award**.
- [50] A. Muñoz Barrutia, T. Blu, and M. Unser. Least-squares image resizing using finite differences. *IEEE Transactions on Image Processing*, 10(9):1365–1378, September 2001.
- [51] M. Jacob, T. Blu, and M. Unser. An exact method for computing the area moments of wavelet and spline curves. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 23(6):633–642, June 2001.
- [52] T. Blu, P. Thévenaz, and M. Unser. MOMS: Maximal-order interpolation of minimal support. *IEEE Transactions on Image Processing*, 10(7):1069–1080, July 2001.
- [53] M. Unser and T. Blu. Fractional splines and wavelets. *SIAM Review*, 42(1):43–67, March 2000.
- [54] P. Thévenaz, T. Blu, and M. Unser. Interpolation revisited. *IEEE Transactions on Medical Imaging*, 19(7):739–758, July 2000.
- [55] T. Blu and M. Unser. Quantitative Fourier analysis of approximation techniques: Part II—Wavelets. *IEEE Transactions on Signal Processing*, 47(10):2796–2806, October 1999.
- [56] T. Blu and M. Unser. Quantitative Fourier analysis of approximation techniques: Part I—Interpolators and projectors. *IEEE Transactions on Signal Processing*, 47(10):2783–2795, October 1999.
- [57] T. Blu and M. Unser. Approximation error for quasi-interpolators and (multi-) wavelet expansions. *Applied and Computational Harmonic Analysis*, 6(2):219–251, March 1999.
- [58] T. Blu. A new design algorithm for two-band orthonormal rational filter banks and orthonormal rational wavelets. *IEEE Transactions on Signal Processing*, 46(6):1494–1504, June 1998.
- [59] P. Blanc, T. Blu, T. Ranchin, L. Wald, and R. Aloisi. Using iterated rational filter banks within the ARSIS concept for producing 10 m Landsat multispectral images. *International Journal of Remote Sensing*, 19(12):2331–2343, August 1998.
- [60] T. Blu. Iterated filter banks with rational rate changes connection with discrete wavelet transforms. *IEEE Transactions on Signal Processing*, 41(12):3232–3244, December 1993.

Conferences Papers & Abstracts

- [1] J.A. Urigüen, P.-L. Dragotti, and T. Blu. On the exponential reproducing kernels for sampling signals with finite rate of innovation. In *Proceedings of the Ninth International Workshop on Sampling Theory and Applications (SampTA’11)*, Singapore, May 2–6, 2011.
- [2] H. Pan, T. Blu, and P.-L. Dragotti. Sampling curves with finite rate of innovation. In *Proceedings of the Ninth International Workshop on Sampling Theory and Applications (SampTA’11)*, Singapore, May 2–6, 2011.
- [3] H. Pan and T. Blu. Sparse image restoration using iterated linear expansion of thresholds. In *Proceedings of the 2011 IEEE International Conference on Image Processing (ICIP’11)*, pages 1905–1908, Brussels, Belgium, 11–14 September 2011.
- [4] J.P. Lie, T. Blu, and C.M.S. See. Azimuth-elevation direction finding using power measurements from single antenna. In *Proceedings of the Thirty-sixth IEEE International Conference on Acoustics*,

Speech, and Signal Processing (ICASSP'11), pages 2608–2611, Prague, Czech Republic, May 22–May 27 2011.

- [5] H. Lakshman, H. Schwartz, T. Blu, and T. Wiegand. Generalized interpolation for motion compensated prediction. In *Proceedings of the 2011 IEEE International Conference on Image Processing (ICIP'11)*, pages 1213–1216, Brussels, Belgium, 11–14 September 2011.
- [6] D. Kandaswamy, T. Blu, L. Spinelli, C. Michel, and D. Van De Ville. Local multilayer analytic sensing for EEG source localization: Performance bounds and experimental results. In *Proceedings of the Eighth IEEE International Symposium on Biomedical Imaging: From Nano to Macro (ISBI'11)*, pages 479–483, Chicago, IL, March 30–April 2, 2011.
- [7] N. Zheng, X. Li, T. Blu, and T. Lee. SURE-MSE speech enhancement for robust speech recognition. In *Proceedings of the 2010 International Symposium on Chinese Spoken Language Processing (ISCSLP'10)*, pages 271–274, Tainan, Taiwan, November 29–December 3 2010.
- [8] M. Wang and T. Blu. Generalized YUV interpolation of CFA images. In *Proceedings of the 2010 IEEE International Conference on Image Processing (ICIP'10)*, pages 1909–1912, Hong Kong, SAR of China, 26–29 September 2010.
- [9] F. Luisier, T. Blu, and M. Unser. Undecimated Haar thresholding for Poisson intensity estimation. In *Proceedings of the 2010 IEEE International Conference on Image Processing (ICIP'10)*, pages 1697–1700, Hong Kong, SAR of China, 26–29 September 2010.
- [10] F. Luisier, C. Vonesch, T. Blu, and M. Unser. Fast haar-wavelet denoising of multidimensional fluorescence microscopy data. In *Proceedings of the Sixth IEEE International Symposium on Biomedical Imaging: From Nano to Macro (ISBI'09)*, Boston, MA, USA, June 28–July 1, 2009.
- [11] T. Blu. The generalized annihilation property — a tool for solving finite rate of innovation problems. In *Proceedings of the Eighth International Workshop on Sampling Theory and Applications (SampTA'09)*, Marseille, France, May 18–22, 2009.
- [12] S. Bergner, D. Van De Ville, T. Blu, and T. Möller. On sampling lattices with similarity scaling relationships. In *Proceedings of the Eighth International Workshop on Sampling Theory and Applications (SampTA'09)*, Marseille, France, May 18–22, 2009.
- [13] P. Thévenaz, T. Blu, and M. Unser. Short basis functions for constant-variance interpolation. In J.M. Reinhardt and J.P.W. Pluim, editors, *Proceedings of the SPIE International Symposium on Medical Imaging: Image Processing (MI'08)*, volume 6914, pages 69142L–1–69142L–8, San Diego CA, USA, February 16–21, 2008.
- [14] S. Ramani, T. Blu, and M. Unser. Blind optimization of algorithm parameters for signal denoising by Monte-Carlo SURE. In *Proceedings of the Thirty-Third IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'08)*, pages 905–908, Las Vegas NV, USA, March 30–April 4, 2008.
- [15] F. Luisier and T. Blu. SURE-LET multichannel image denoising: Undecimated wavelet thresholding. In *Proceedings of the Thirty-Third IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'08)*, pages 769–772, Las Vegas NV, USA, March 30–April 4, 2008.
- [16] D. Kandaswamy, T. Blu, L. Spinelli, C. Michel, and D. Van De Ville. EEG source localization by multi-planar analytic sensing. In *Proceedings of the Fifth IEEE International Symposium on Biomedical Imaging: From Nano to Macro (ISBI'08)*, pages 1075–1078, Paris, France, May 14–17, 2008.
- [17] S. Delpretti, F. Luisier, S. Ramani, T. Blu, and M. Unser. Multiframe SURE-LET denoising of timelapse fluorescence microscopy images. In *Proceedings of the Fifth IEEE International Symposium on Biomedical Imaging: From Nano to Macro (ISBI'08)*, pages 149–152, Paris, France, May 14–17, 2008.
- [18] D. Van De Ville, M. Seghier, F. Lazeyras, T. Blu, and M. Unser. Wavelet-based statistical analysis of fMRI data with high spatial resolution. In *CHUV Research Day (CHUV'07)*, page 185, Lausanne VD, Switzerland, February 1, 2007.
- [19] D. Van De Ville, M. Seghier, F. Lazeyras, T. Blu, and M. Unser. Empirical sensitivity, specificity, and bias of wavelet-based statistical parametric mapping (WSPM). In *Thirteenth Annual Meeting of the Organization for Human Brain Mapping (HBM'07)*, Chicago IL, USA, June 10–14, 2007. CD-ROM paper no. 336 TH PM.

- [20] D. Van De Ville, B. Bathellier, A. Carleton, T. Blu, and M. Unser. Wavelet-based statistical analysis for optical imaging in mouse olfactory bulb. In *Proceedings of the Fourth IEEE International Symposium on Biomedical Imaging: From Nano to Macro (ISBI'07)*, pages 448–451, Arlington VA, USA, April 12-15, 2007.
- [21] S.C. Sekhar, H. Nazkani, T. Blu, and M. Unser. A new technique for high-resolution frequency domain optical coherence tomography. In *Proceedings of the Thirty-Second IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'07)*, pages I-425–I-428, Honolulu HI, USA, April 15-20, 2007.
- [22] S.C. Sekhar, R.A. Leitgeb, M.L. Villiger, A.H. Bachmann, T. Blu, and M. Unser. Non-iterative exact signal recovery in frequency domain optical coherence tomography. In *Proceedings of the Fourth IEEE International Symposium on Biomedical Imaging: From Nano to Macro (ISBI'07)*, pages 808–811, Arlington VA, USA, April 12-15, 2007.
- [23] F. Luisier and T. Blu. SURE-LET interscale-intercolor wavelet thresholding for color image denoising. In *Proceedings of the SPIE Conference on Mathematical Imaging: Wavelet XII*, volume 6701, pages 67011H–1–67011H–10, San Diego CA, USA, August 26-29, 2007.
- [24] F. Luisier and T. Blu. Image denoising by pointwise thresholding of the undecimated wavelet coefficients: A global SURE optimum. In *Proceedings of the Thirty-Second IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'07)*, pages I-593–I-596, Honolulu HI, USA, April 15-20, 2007.
- [25] I. Khalidov, D. Van De Ville, T. Blu, and M. Unser. Construction of wavelet bases that mimic the behaviour of some given operator. In *Proceedings of the SPIE Conference on Mathematical Imaging: Wavelet XII*, volume 6701, pages 67010S–1–67010S–7, San Diego CA, USA, August 26-29, 2007.
- [26] D. Kandaswamy, T. Blu, and D. Van De Ville. Analytic sensing: Direct recovery of point sources from planar Cauchy boundary measurements. In *Proceedings of the SPIE Conference on Mathematical Imaging: Wavelet XII*, volume 6701, pages 67011Y–1–67011Y–6, San Diego CA, USA, August 26-29, 2007.
- [27] D. Van De Ville, M. Seghier, F. Lazeyras, M. Pelizzone, T. Blu, and M. Unser. SPM versus WSPM: Sensitivity and specificity for multi-session fMRI data. In *Twelfth Annual Meeting of the Organization for Human Brain Mapping (HBM'06)*, page S94, Florence, Italy, June 11-15, 2006. Invited talk.
- [28] D. Van De Ville, T. Blu, and M. Unser. WSPM or how to obtain statistical parametric maps using shift-invariant wavelet processing. In *Proceedings of the IEEE Thirty-First International Conference on Acoustics, Speech, and Signal Processing (ICASSP'06)*, pages V-1101–V-1104, Toulouse, France, May 14-19, 2006.
- [29] D. Van De Ville, T. Blu, B. Forster, and M. Unser. Polyharmonic B-Spline wavelets: From isotropy to directionality. In *Advanced Concepts for Intelligent Vision Systems (ACIVS'06)*, Antwerp, Belgium, September 18-21, 2006. Invited talk.
- [30] D. Van De Ville, B. Bathellier, R. Accolla, A. Carleton, T. Blu, and M. Unser. Wavelet-based detection of stimulus responses in time-lapse microscopy. In *Proceedings of the Thirty-First IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'06)*, pages V-1161–V-1164, Toulouse, France, May 14-19, 2006.
- [31] F. Luisier, T. Blu, and M. Unser. SURE-based wavelet thresholding integrating inter-scale dependencies. In *Proceedings of the 2006 IEEE International Conference on Image Processing (ICIP'06)*, pages 1457–1460, Atlanta GA, USA, October 8-11, 2006.
- [32] T. Blu and M. Unser. Optimal interpolation of fractional Brownian motion given its noisy samples. In *Proceedings of the Thirty-First IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'06)*, pages III-860–III-863, Toulouse, France, May 14-19, 2006.
- [33] C. Vonesch, T. Blu, and M. Unser. Generalized daubechies wavelets. In *Proceedings of the Thirtieth IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'05)*, volume IV, pages 593–596, Philadelphia PA, USA, March 18-23, 2005.
- [34] C. Vonesch, T. Blu, and M. Unser. Generalized biorthogonal Daubechies wavelets. In *Proceedings of the SPIE Conference on Mathematical Imaging: Wavelet XI*, volume 5914, pages 59141X–1–59141X–6, San Diego CA, USA, July 31-August 3, 2005.

- [35] D. Van De Ville, T. Blu, and M. Unser. WSPM: A new approach for wavelet-based statistical analysis of fMRI data. In *Eleventh Annual Meeting of the Organization for Human Brain Mapping (HBM'05)*, page S17, Toronto ON, Canada, June 12-16, 2005.
- [36] D. Van De Ville, T. Blu, B. Forster, and M. Unser. Semi-orthogonal wavelets that behave like fractional differentiators. In *Proceedings of the SPIE Conference on Mathematical Imaging: Wavelet XI*, volume 5914, pages 59140C-1-59140C-8, San Diego CA, USA, July 31-August 3, 2005.
- [37] F. Luisier, T. Blu, B. Forster, and M. Unser. Which wavelet bases are the best for image denoising? In *Proceedings of the SPIE Conference on Mathematical Imaging: Wavelet XI*, volume 5914, pages 59140E-1-59140E-12, San Diego CA, USA, July 31-August 3, 2005.
- [38] I. Khalidov, T. Blu, and M. Unser. Generalized l-spline wavelet bases. In *Proceedings of the SPIE Conference on Mathematical Imaging: Wavelet XI*, volume 5914, pages 59140F-1-59140F-8, San Diego CA, USA, July 31-August 3, 2005.
- [39] Y. Hao, P. Marziliano, M. Vetterli, and T. Blu. Compression of ECG as a signal with finite rate of innovation. In *Proceedings of the Twenty-Seventh Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS'05)*, pages 7564-7567, Shanghai, China, September 1-4, 2005.
- [40] L. Condat, D. Van De Ville, and T. Blu. Hexagonal versus orthogonal lattices: A new comparison using approximation theory. In *Proceedings of the 2005 IEEE International Conference on Image Processing (ICIP'05)*, volume III, pages 1116-1119, Genova, Italy, September 11-14, 2005.
- [41] L. Condat, T. Blu, and M. Unser. Beyond interpolation: Optimal reconstruction by quasi-interpolation. In *Proceedings of the 2005 IEEE International Conference on Image Processing (ICIP'05)*, volume I, pages 33-36, Genova, Italy, September 11-14, 2005. Best student paper award.
- [42] D. Van De Ville, T. Blu, and M. Unser. WSPM: Wavelet processing and the analysis of fMRI using statistical parametric maps. In *Second International Conference on Computational Harmonic Analysis, Nineteenth Annual Shanks Lecture (CHA'04)*, Nashville TN, USA, May 24-30, 2004. Invited talk.
- [43] D. Van De Ville, T. Blu, and M. Unser. Wavelet-based fMRI statistical analysis and spatial interpretation: A unifying approach. In *Proceedings of the Second IEEE International Symposium on Biomedical Imaging: From Nano to Macro (ISBI'04)*, pages 1167-1170, Arlington VA, USA, April 15-18, 2004.
- [44] D. Van De Ville, T. Blu, B. Forster, and M. Unser. Isotropic-polyharmonic B-Splines and wavelets. In *Proceedings of the 2004 IEEE International Conference on Image Processing (ICIP'04)*, pages 661-664, Singapore, Singapore, October 24-27, 2004.
- [45] M. Unser and T. Blu. A unifying spline formulation for stochastic signal processing [Or how Schoenberg meets Wiener, with the help of Tikhonov]. In *Second International Conference on Computational Harmonic Analysis, Nineteenth Annual Shanks Lecture (CHA'04)*, Nashville TN, USA, May 24-30, 2004. Plenary talk.
- [46] R.V.V.L. Langoju, T. Blu, and M. Unser. Resolution enhancement in optical coherence tomography. In *2004 Annual Meeting of the Swiss Society of Biomedical Engineering (SSBE'04)*, Zürich ZH, Switzerland, September 2-3, 2004. poster 9.
- [47] M. Jacob, T. Blu, and M. Unser. Shape estimation of 3-D DNA molecules from stereo cryo-electron micro-graphs. In *Proceedings of the 2004 IEEE International Conference on Image Processing (ICIP'04)*, pages 1883-1886, Singapore, Singapore, October 24-27, 2004.
- [48] B. Forster, T. Blu, and M. Unser. Complex B-Splines and wavelets. In *Second International Conference on Computational Harmonic Analysis, Nineteenth Annual Shanks Lecture (CHA'04)*, Nashville TN, USA, May 24-30, 2004.
- [49] T. Blu and M. Unser. Quantitative L^2 approximation error of a probability density estimate given by it samples. In *Proceedings of the Twenty-Ninth IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'04)*, volume III, pages 952-955, Montréal QC, CA, May 17-21, 2004.
- [50] T. Blu, P. Thévenaz, and M. Unser. High-quality causal interpolation for online unidimensional signal processing. In *Proceedings of the Twelfth European Signal Processing Conference (EUSIPCO'04)*, pages 1417-1420, Wien, Austria, September 6-10, 2004.

- [51] R. van Spaendonck, T. Blu, R. Baraniuk, and M. Vetterli. Orthogonal Hilbert transform filter banks and wavelets. In *Proceedings of the Twenty-Eighth IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'03)*, volume VI, pages 505–508, Hong Kong SAR, People's Republic of China, April 6-10, 2003.
- [52] D. Van De Ville, T. Blu, and M. Unser. Wavelets versus resels in the context of fMRI: Establishing the link with SPM. In *Proceedings of the SPIE Conference on Mathematical Imaging: Wavelet Applications in Signal and Image Processing X*, volume 5207, pages 417–425, San Diego CA, USA, August 3-8, 2003. Part I.
- [53] D. Van De Ville, T. Blu, and M. Unser. Recursive filtering for splines on hexagonal lattices. In *Proceedings of the Twenty-Eighth IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'03)*, volume III, pages 301–304, Hong Kong SAR, People's Republic of China, April 6-10, 2003.
- [54] D. Van De Ville, T. Blu, and M. Unser. On the approximation power of splines: Orthogonal versus hexagonal lattices. In *Proceedings of the Fifth International Workshop on Sampling Theory and Applications (SampTA'03)*, pages 109–111, Strobl, Austria, May 26-30, 2003.
- [55] M. Unser and T. Blu. The spline foundation of wavelet theory. In *International Conference on Wavelets and Splines (EIMI-WS'03)*, pages 98–99, Saint Petersburg, Russia, July 3-8, 2003. Petersburg Department of Steklov Institute of Mathematics, Euler International Mathematical Institute.
- [56] M. Unser and T. Blu. Fractional wavelets, derivatives, and Besov spaces. In *Proceedings of the SPIE Conference on Mathematical Imaging: Wavelet Applications in Signal and Image Processing X*, volume 5207, pages 147–152, San Diego CA, USA, August 3-8, 2003. Part I.
- [57] F. Precioso, M. Barlaud, T. Blu, and M. Unser. Smoothing B-Spline active contour for fast and robust image and video segmentation. In *Proceedings of the 2003 IEEE International Conference on Image Processing (ICIP'03)*, volume I, pages 137–140, Barcelona, Spain, September 14-17, 2003.
- [58] M. Liebling, T. Blu, and M. Unser. Non-linear Fresnelet approximation for interference term suppression in digital holography. In *Proceedings of the SPIE Conference on Mathematical Imaging: Wavelet Applications in Signal and Image Processing X*, volume 5207, pages 553–559, San Diego CA, USA, August 3-8, 2003. Part II.
- [59] M. Liebling, T. Blu, É. Cuche, P. Marquet, C.D. Depeursinge, and M. Unser. Local amplitude and phase retrieval method for digital holography applied to microscopy. In A.-M. Boccara, editor, *Proceedings of the SPIE European Conference on Biomedical Optics: Novel Optical Instrumentation for Biomedical Applications (ECBO'03)*, volume 5143, pages 210–214, München, Germany, June 22-25, 2003.
- [60] K. Ichige, T. Blu, and M. Unser. Multiwavelet-like bases for high quality image interpolation. In *Proceedings of the SPIE Conference on Mathematical Imaging: Wavelet Applications in Signal and Image Processing X*, volume 5207, pages 153–161, San Diego CA, USA, August 3-8, 2003. Part I.
- [61] K. Ichige, T. Blu, and M. Unser. Interpolation of signals by generalized piecewise-linear multiple generators. In *Proceedings of the Twenty-Eighth IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'03)*, volume VI, pages 261–264, Hong Kong SAR, People's Republic of China, April 6-10, 2003.
- [62] B. Forster, T. Blu, and M. Unser. A new family of complex rotation-covariant multiresolution bases in 2D. In *Proceedings of the SPIE Conference on Mathematical Imaging: Wavelet Applications in Signal and Image Processing X*, volume 5207, pages 475–479, San Diego CA, USA, August 3-8, 2003. Part I.
- [63] C. Depeursinge, É. Cuche, T. Colomb, P. Massatch, A. Marian, F. Montfort, M. Liebling, T. Blu, M. Unser, P. Marquet, and P.J. Magistretti. Digital holography applied to microscopy: A new imaging modality in the sub-wavelength range. In *Hundertvierte Jahrestagung der Deutschen Gesellschaft für angewandte Optik (DGaO)*, Münster (Westfalen), Germany, June 10-14, 2003.
- [64] T. Blu and M. Unser. Harmonic spline series representation of scaling functions. In *Proceedings of the SPIE Conference on Mathematical Imaging: Wavelet Applications in Signal and Image Processing X*, volume 5207, pages 120–124, San Diego CA, USA, August 3-8, 2003. Part I.
- [65] T. Blu and M. Unser. A complete family of scaling functions: The (α, τ) -fractional splines. In *Proceedings of the Twenty-Eighth IEEE International Conference on Acoustics, Speech, and Signal*

- Processing (ICASSP'03)*, volume VI, pages 421–424, Hong Kong SAR, People's Republic of China, April 6-10, 2003.
- [66] M. Unser and T. Blu. Fractional wavelets: Properties and applications. In *Proceedings of the First 2002 SIAM Conference on Imaging Science (SIAG-IS'02)*, volume MS1, page 33, Boston MA, USA, March 4-6, 2002.
- [67] M. Liebling, T. Blu, É. Cuche, P. Marquet, C. Depeursinge, and M. Unser. A novel non-diffractive reconstruction method for digital holographic microscopy. In *Proceedings of the First IEEE International Symposium on Biomedical Imaging: Macro to Nano (ISBI'02)*, volume II, pages 625–628, Washington DC, USA, July 7-10, 2002.
- [68] M. Jacob, T. Blu, and M. Unser. 3-D reconstruction of DNA filaments from stereo cryo-electron micrographs. In *Proceedings of the First IEEE International Symposium on Biomedical Imaging: Macro to Nano (ISBI'02)*, volume II, pages 597–600, Washington DC, USA, July 7-10, 2002.
- [69] T. Blu, M. Unser, and P. Thévenaz. Optimizing basis functions for best approximation. In *Fifth International Conference on Curves and Surfaces (ICCS'02)*, Saint Malo, France, June 27-July 3, 2002.
- [70] T. Blu, P. Thévenaz, and M. Unser. How a simple shift can significantly improve the performance of linear interpolation. In *Proceedings of the 2002 IEEE International Conference on Image Processing (ICIP'02)*, volume III, pages 377–380, Rochester NY, USA, September 22-25, 2002.
- [71] T. Blu, H. Bay, and M. Unser. A new high-resolution processing method for the deconvolution of optical coherence tomography signals. In *Proceedings of the First IEEE International Symposium on Biomedical Imaging: Macro to Nano (ISBI'02)*, volume III, pages 777–780, Washington DC, USA, July 7-10, 2002.
- [72] M. Vetterli, P. Marziliano, and T. Blu. A sampling theorem for periodic piecewise polynomial signals. In *Proceedings of the Twenty-Sixth IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'01)*, volume 6, pages 3893–3896, Salt Lake City UT, USA, May 7-11, 2001.
- [73] M. Vetterli, P. Marziliano, and T. Blu. Sampling discrete-time piecewise bandlimited signals. In *Proceedings of the Fourth International Conference on Sampling Theory and Applications (SampTA'01)*, pages 97–102, Orlando FL, USA, May 13-17, 2001.
- [74] M. Unser and T. Blu. Why restrict ourselves to compactly supported basis functions? In *Proceedings of the SPIE Conference on Mathematical Imaging: Wavelet Applications in Signal and Image Processing IX*, volume 4478, pages 311–314, San Diego CA, USA, July 29-August 1, 2001.
- [75] M. Unser and T. Blu. Fractional splines and wavelets: From theory to applications. In *Joint IDR-IMA Workshop: Ideal Data Representation*, Minneapolis MN, USA, April 9-13, 2001.
- [76] M. Liebling, T. Blu, and M. Unser. Fresnelets—A new wavelet basis for digital holography. In *Proceedings of the SPIE Conference on Mathematical Imaging: Wavelet Applications in Signal and Image Processing IX*, volume 4478, pages 347–352, San Diego CA, USA, July 29-August 1, 2001.
- [77] J. Kybic, T. Blu, and M. Unser. Variational approach to tomographic reconstruction. In M. Sonka and K.M. Hanson, editors, *Progress in Biomedical Optics and Imaging, vol. 2, no. 27*, volume 4322 of *Proceedings of the SPIE International Symposium on Medical Imaging: Image Processing (MI'01)*, pages 30–39, San Diego CA, USA, February 19-22, 2001. Part I.
- [78] J. Kybic, T. Blu, and M. Unser. Generalized sampling: A variational approach. In *Proceedings of the Fourth International Conference on Sampling Theory and Applications (SampTA'01)*, pages 151–154, Orlando FL, USA, May 13-17, 2001.
- [79] M. Jacob, T. Blu, and M. Unser. A unifying approach and interface for spline-based snakes. In M. Sonka and K.M. Hanson, editors, *Progress in Biomedical Optics and Imaging, vol. 2, no. 27*, volume 4322 of *Proceedings of the SPIE International Symposium on Medical Imaging: Image Processing (MI'01)*, pages 340–347, San Diego CA, USA, February 19-22, 2001. Part I.
- [80] M. Jacob, T. Blu, and M. Unser. An error analysis for the sampling of periodic signals. In *Proceedings of the Fourth International Conference on Sampling Theory and Applications (SampTA'01)*, pages 45–48, Orlando FL, USA, May 13-17, 2001.

- [81] T. Blu, M. Sühling, P. Thévenaz, and M. Unser. Approximation order: Why the asymptotic constant matters. In *Second Pacific Rim Conference on Mathematics (PRCM'01)*, pages II.3–II.4, Taipei, Taiwan ROC, January 4–8, 2001.
- [82] M. Unser, S. Horbelt, and T. Blu. Fractional derivatives, splines and tomography. In *Proceedings of the Tenth European Signal Processing Conference (EUSIPCO'00)*, volume IV, pages 2017–2020, Tampere, Finland, September 4–8, 2000.
- [83] M. Unser and T. Blu. Wavelets and radial basis functions: A unifying perspective. In *Proceedings of the SPIE Conference on Mathematical Imaging: Wavelet Applications in Signal and Image Processing VIII*, volume 4119, pages 487–493, San Diego CA, USA, July 31–August 4, 2000.
- [84] P. Thévenaz, T. Blu, and M. Unser. Complete parametrization of piecewise-polynomial interpolators according to degree, support, regularity, and order. In *Proceedings of the 2000 IEEE International Conference on Image Processing (ICIP'00)*, volume II, pages 335–338, Vancouver BC, Canada, September 10–13, 2000.
- [85] A. Muñoz Barrutia, T. Blu, and M. Unser. Non-uniform to uniform grid conversion using least-squares splines. In *Proceedings of the Tenth European Signal Processing Conference (EUSIPCO'00)*, volume IV, pages 1997–2000, Tampere, Finland, September 4–8, 2000.
- [86] A. Muñoz Barrutia, T. Blu, and M. Unser. Non-Euclidean pyramids. In *Proceedings of the SPIE Conference on Mathematical Imaging: Wavelet Applications in Signal and Image Processing VIII*, volume 4119, pages 710–720, San Diego CA, USA, July 31–August 4, 2000.
- [87] M. Jacob, T. Blu, and M. Unser. Exact computation of area moments for spline and wavelet curves. In *Proceedings of the Fifteenth International Conference on Pattern Recognition (ICPR'00)*, volume III, pages 131–134, Barcelona, Spain, September 3–8, 2000.
- [88] S. Horbelt, A. Muñoz Barrutia, T. Blu, and M. Unser. Spline kernels for continuous-space image processing. In *Proceedings of the Twenty-Fifth IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'00)*, volume IV, pages 2191–2194, Istanbul, Turkey, June 5–9, 2000.
- [89] M. Feilner, T. Blu, and M. Unser. Optimizing wavelets for the analysis of fMRI data. In *Proceedings of the SPIE Conference on Mathematical Imaging: Wavelet Applications in Signal and Image Processing VIII*, volume 4119, pages 626–637, San Diego CA, USA, July 31–August 4, 2000.
- [90] M. Feilner, T. Blu, and M. Unser. Analysis of fMRI data using spline wavelets. In *Proceedings of the Tenth European Signal Processing Conference (EUSIPCO'00)*, volume IV, pages 2013–2016, Tampere, Finland, September 4–8, 2000.
- [91] T. Blu and M. Unser. The fractional spline wavelet transform: Definition and implementation. In *Proceedings of the Twenty-Fifth IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'00)*, volume I, pages 512–515, Istanbul, Turkey, June 5–9, 2000.
- [92] M. Unser and T. Blu. Construction of fractional spline wavelet bases. In *Proceedings of the SPIE Conference on Mathematical Imaging: Wavelet Applications in Signal and Image Processing VII*, volume 3813, pages 422–431, Denver CO, USA, July 19–23, 1999.
- [93] A. Muñoz Barrutia, T. Blu, and M. Unser. Efficient image resizing using finite differences. In *Proceedings of the 1999 IEEE International Conference on Image Processing (ICIP'99)*, volume III, pages 662–666, Kobe, Japan, October 25–28, 1999.
- [94] M. Feilner, T. Blu, and M. Unser. Statistical analysis of fMRI data using orthogonal filterbanks. In *Proceedings of the SPIE Conference on Mathematical Imaging: Wavelet Applications in Signal and Image Processing VII*, volume 3813, pages 551–560, Denver CO, USA, July 19–23, 1999.
- [95] T. Blu and M. Unser. A theoretical analysis of the projection error onto discrete wavelet subspaces. In *Proceedings of the SPIE Conference on Mathematical Imaging: Wavelet Applications in Signal and Image Processing VII*, volume 3813, pages 273–281, Denver CO, USA, July 19–23, 1999.
- [96] T. Blu, P. Thévenaz, and M. Unser. Generalized interpolation: Higher quality at no additional cost. In *Proceedings of the 1999 IEEE International Conference on Image Processing (ICIP'99)*, volume III, pages 667–671, Kobe, Japan, October 25–28, 1999.
- [97] M. Unser and T. Blu. Spline wavelets with fractional order of approximation. In *Wavelet Applications Workshop*, Monte Verità TI, Switzerland, September 28–October 2, 1998.

- [98] M. Unser and T. Blu. Comparison of wavelets from the point of view of their approximation error. In *Proceedings of the SPIE Conference on Mathematical Imaging: Wavelet Applications in Signal and Image Processing VI*, volume 3458, pages 14–21, San Diego CA, USA, July 19-24, 1998.
- [99] L. Peyronny, O. Soligon, C. Roux, O. Avaro, and T. Blu. How to construct an MPEG4 API: A videoconference application example. In *Proceedings of the International Conference on Image and Multidimensional Digital Signal Processing (IMDSP'98)*, pages 111–114, Alpbach, Austria, July 16, 1998.
- [100] S. Matusiak, M. Daoudi, T. Blu, and O. Avaro. Sketch-based images database retrieval. In *Proceedings of the Fourth International Workshop on Advances in Multimedia Information Systems (MIS'98)*, pages 185–191, Istanbul, Turkey, September 24-26, 1998.
- [101] T. Blu and M. Unser. A quantitative Fourier analysis of the linear approximation error by wavelets. In *Wavelet Applications Workshop*, Monte Verità TI, Switzerland, September 28-October 2, 1998.
- [102] T. Blu, P. Thévenaz, and M. Unser. Minimum support interpolators with optimum approximation properties. In *Proceedings of the 1998 IEEE International Conference on Image Processing (ICIP'98)*, volume III, pages 242–245, Chicago IL, USA, October 4-7, 1998.
- [103] T. Blu and M. Unser. Quantitative L^2 error analysis for interpolation methods and wavelet expansions. In *Proceedings of the 1997 IEEE International Conference on Image Processing (ICIP'97)*, volume I, pages 663–666, Santa Barbara CA, USA, October 26-29, 1997.
- [104] T. Blu. Shift error in iterated rational filter banks. In *Proceedings of the Eighth European Signal Processing Conference (EUSIPCO'96)*, volume II, pages 1199–1202, Trieste, Italy, September 10-13, 1996.
- [105] T. Blu. An iterated rational filter bank for audio coding. In *Proceedings of the Third IEEE Signal Processing Society International Symposium on Time-Frequency and Time-Scale Analysis (IEEE-SP'96)*, pages 81–84, Paris, France, June 18-21, 1996.
- [106] T. Blu and O. Rioul. Wavelet regularity of iterated filter banks with rational sampling changes. In *Proceedings of the Eighteenth IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'93)*, volume III, pages 213–216, Minneapolis MN, USA, April 27-30, 1993.
- [107] T. Blu. Iterated rational filter banks—Underlying limit functions. In *Proceedings of the IEEE Signal Processing Society Digital Signal Processing Workshop*, pages 1.8.1–1.8.2, Utica IL, USA, September 13-16, 1992.
- [108] S. Mayrargue and T. Blu. Relationship between high-resolution methods and discrete Fourier transform. In *Proceedings of the Sixteenth IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'91)*, volume V, pages 3321–3324, Toronto ON, Canada, May 14-17, 1991.