Curriculum vitæ — Jan KYBIC

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Born on 18^{th} January 1974 in Prague, Czech Republic. Male.

Work experience

since 2003 Senior researcher at CMP, FEE, Czech Technical University, Prague.

2001–2003 Post-doc position at *INRIA*, France, working on inverse problems in MEG and EEG.

1992–1998 several part-time and summer jobs in software development and system administration.

Education

1998–2001 PhD in biomedical image processing at *Ecole Polytechnique Fédérale de Lausanne (EPFL)*, Switzerland, with thesis *Biomedical Image Registration by Elastic Warping*.

1994–1998 Master (Engineer) in control engineering from *Czech Technical University (CTU)*, with honors, with thesis *Kalman Filtering and Speech Enhancement*

Research interests

Signal and image processing for biomedical applications, image registration, segmentation, splines and wavelets, speech processing and enhancement, computer vision, numerical methods, inverse problems, algorithm theory, parallel algorithms, control theory.

Language skills

Mother tongue Czech, fluent English, French, and Spanish, conversational knowledge of German and Italian, intermediate Russian, basic Portuguese.

Professional activities

Associated Editor for *IEEE Transactions on Medical Imaging*. Article reviews for *IEEE Transactions on Medical Imaging*, *IEEE Transactions on Image Processing*, *IEEE Transactions on Biomedical Engineering*, *Medical Image Analysis* and various other journals and conferences. Member of *IEEE*, *Czech TEX Users Group*, *Czech Linux Users Group*. Organized the *CVAMIA* workshop at the *ECCV* conference in 2004, Prague; *Local ACM Programming Contest* at *CTU* in 1996–1999. Reviewer of PhD and Master theses. Collaborated on six projects funded by Czech grant agencies and in one European training network.

Pedagogical activities

Teaching a *Digital Image Processing* and *Medical Imaging* courses. Lectures about medical and microscopy image processing. Two PhD students and seven Master students have successfully defended; currently advising four and co-advising one PhD student.

Publications

Journal articles:

[1] Martin Barva, Marián Uherčík, Jean-Martial Mari, Jan Kybic, Jean-René Duhamel, Hervé Liebgott, Václav Hlaváč, and Christian Cachard, "Parallel integral projection transform for straight electrode localization in 3-d ultrasound images," *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control (UFFC)*, vol. 55, no. 7, pp. 1559–1569, July 2008.

[2] Elisabeth Brusseau, Jan Kybic, Jean-François Déprez, and Olivier Basset, "2-D locally regularized tissue strain estimation from radio-frequency ultrasound images: Theoretical developments and results on experimental data," *IEEE Transactions on Medical Imaging*, vol. 27, no. 2, pp. 145–160, Feb. 2008.

[3] Maureen Clerc and Jan Kybic, "Cortical mapping by Laplace-Cauchy transmission using a boundary element method.," *Journal on Inverse Problems*, vol. 23, pp. 2589–2601, Nov. 2007.

[4] Jan Petr, Jan Kybic, Michael Bock, Sven Müller, and Václav Hlaváč, "Parallel image reconstruction using B-spline approximation (PROBER)," *Magnetic Resonance in Medicine*, vol. 58, no. 9, pp. 582–591, September 2007.

[5] Jan Kybic, Maureen Clerc, Olivier Faugeras, Renaud Keriven, and Théo Papadopoulo, "Generalized head models for MEG/EEG: BEM beyond nested volumes," *Physics in Medicine and Biology*, vol. 51, no. 5, pp. 1333–1346, Feb. 2006, doi:10.1088/0031-9155/51/5/021.

[6] Jan Kybic, Maureen Clerc, Olivier Faugeras, Renaud Keriven, and Théo Papadopoulo, "Fast multipole acceleration of the MEG/EEG boundary element method," *Physics in Medicine and Biology*, vol. 50, no. 19, pp. 4695–4710, October 2005.

[7] Olivier Faugeras, Geoffray Adde, Guillaume Charpiat, Christophe Chefd'Hotel, Maureen Clerc, Thomas Deneux, Rachide Deriche, Gerardo Hermosillo, Renaud Keriven, Pierre Kornprobst, Jan Kybic, Christophe Lenglet, Lucero Lopez-Perez, Théo Papadopoulo, Jean-Philippe Pons, Florent Segonne, Bertrand Thirion, David Tschumperle, Thierry Vieville, and Nicolas Wotawa, "Variational, geometric, and statistical methods for modeling brain anatomy and function," *Neuroimage*, vol. 23S1, pp. S46–S55, 2004, Special issue: Mathematics in Brain Imaging.

[8] Jan Kybic, Maureen Clerc, Touffic Abboud, Olivier Faugeras, Renaud Keriven, and Théo Papadopoulo, "A common formalism for the integral

formulations of the forward EEG problem," *IEEE Transactions on Medical Imaging*, vol. 24, no. 1, pp. 12–28, Jan. 2005.

[9] María Jesús Ledesma-Carbayo, Jan Kybic, Manuel Desco, Andrés Santos, Michael Sühling, Patrick Hunziker, and Michael Unser, "Spatio-temporal non-rigid registration for ultrasound cardiac motion estimation," *IEEE Transactions on Medical Imaging*, vol. 24, no. 9, pp. 1113–1126, Sept. 2005.

[10] Jan Kybic and Michael Unser, "Fast parametric elastic image registration," *IEEE Transactions on Image Processing*, vol. 12, no. 11, pp. 1427–1442, November 2003.

[11] Jan Kybic, Thierry Blu, and Michael Unser, "Generalized sampling: A variational approach. Part I — Theory," *IEEE Transactions on Signal Processing*, vol. 50, no. 8, pp. 1965–1976, August 2002.

[12] Jan Kybic, Thierry Blu, and Michael Unser, "Generalized sampling: A variational approach. Part II — Applications," *IEEE Transactions on Signal Processing*, vol. 50, no. 8, pp. 1977–1985, August 2002.

[13] Jan Kybic, Philippe Thévenaz, Arto Nirkko, and Michael Unser, "Unwarping of unidirectionally distorted EPI images," *IEEE Transactions on Medical Imaging*, vol. 19, no. 2, pp. 80–93, February 2000.

[14] Stanislav Tůma, Jiří Neuwirth, E. Čumlivská, J. Mališ, Jan Kybic, J. Šanda, M. Fricová-Poulová, T. Adla, and M. Polovinčák, "Nízkodávková technika spirální CT plic v diagnostice metastatických ložiskových nálezů u dětí a v dorostovém věku," *Česko-slovenská pediatrie*, vol. 61, no. 4, pp. 179–185, Mar. 2006.

Books and book chapters:

[1] Tomáš Svoboda, Jan Kybic, and Hlaváč Václav, *Image Processing, Analysis and Machine Vision — A MATLAB Companion*, Thomson, Toronto, Canada, 1 edition, September 2007.

[2] Jan Kybic and Michael Unser, *Handbook of Biomedical Image Analysis: Registration Models*, vol. 3 of *Topics in Biomedical Engineering*, chapter Elastic Registration for Biomedical Applications, pp. 339–393, Kluwer Academic / Plenum Publishers, New York, USA, 2005.

[3] Milan Šonka, A. Ioannis Kakadiaris, and Jan Kybic, Eds., *Computer Vision and Mathematical Methods in Medical and Biomedical Image Analysis (CVAMIA+MMBIA)*, number 3117 in Lecture Notes in Computer Science, Heidelberg, May 2004. Springer.

[4] Václav Hlaváč and Jan Kybic, *Zdravotnická informatika*, chapter Zpracování obrazu počítačem v medicíně, pp. 105–114, Karolinum, Univerzita Karlova v Praze, Ovocný trh 3–5, Praha 1, Sept. 2007, in Czech.

Conference articles:

[1] Jef Vandemeulebroucke, Patrick Clarysse, Jan Kybic, and David Sarrut, "Estimating respiratory motion from cone-beam projections," in *Proceedings of the First International Workshop on Pulmonary Image Analysis*, Matthew Brown, Marleen de Bruijne, Bram van Ginneken, Atilla Kiraly, Jan-Martin Kuhnigk, Cristian Lorenz, Kensaku Mori, and Joseph Reinhardt, Eds., MorrisVille, USA, September 2008, pp. 83–92, Lulu.com.

[2] S. Tůma, J. Kybic, M. Dolejší, J. Polovinčák, J. Neuwirth, T. Adla, and E. Čumlivská, "Přesnost počítačem asistované CT diagnostiky plicních uzlů ve srovnání s klasickými postupy hodnocení," in *Čes.-slov. Pediatr.*, Jihlava, Czech Republic, Sept. 2008, vol. 63, pp. 52–31, Česká lékařská společnost J. E. Purkyně.

[3] T. Kazmar and J. Kybic, "Opacity quantification in cardiac angiogram sequences," in *BIOSIGNAL: Analysis of Biomedical Signals and Images*, Jiří Jan, Jiří Kozumplík, and Ivo Provazník, Eds., Brno, Czech Republic, June 2008, p. 66, VUTIUM Press, CDROM proceedings.

[4] Marián Uherčík, Jan Kybic, Hervé Liebgott, and Christian Cachard, "Multi-resolution parallel integral projection for fast localization of a straight electro de in 3d ultrasound images," in *Proceedings of 2008 IEEE International Symposium on Biomedical Imaging: From Nano to Macro*, New York, US, May 2008, IEEE International Symposium on Biomedical Imaging (ISBI), pp. 33–36, IEEE Press.

[5] Jan Kybic, "Fast no ground truth image registration accuracy evaluation: Comparison of bootstrap and Hessian approaches," in *Proceedings of 2008 IEEE International Symposium on Biomedical Imaging: From Nano to Macro*, New York, US, May 2008, pp. 792–795, IEEE Press.

[6] Martin Dolejší, Jan Kybic, Michal Polovinčák, and Stanislav Tůma, "Reducing false positive responses in lung nodule detector system by Asymmetric AdaBoost," in *Proceedings of 2008 IEEE International Symposium on Biomedical Imaging: From Nano to Macro*, 3 Park Ave., 17th Floor, New York, NY 10016-5997, USA, May 2008, pp. 656–659, IEEE.

[7] Juan D. García-Arteaga and Jan Kybic, "Regional image similarity criteria based on the Kozachenko-Leonenko entropy estimator," in *CVPRW: Computer Vision and Pattern Recognition Workshops*, 445 Hoes Lane, Piscataway, NJ, U.S.A., June 2008, pp. 1–8, IEEE.

[8] Jakub Krátký and Jan Kybic, "Three-dimensional segmentation of bones from CT and MRI using fast level sets," in *SPIE MI 2008: Proceedings of the SPIE Medical Imaging 2008 Conference*, Joseph M. Reinhardt and Josien P. W. Pluim, Eds., Bellingham, Washington, USA, February 2008, SPIE, vol. 6914 of *Medical Imaging 2008: Image Processing*, p. 10, SPIE, CD-ROM.

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[17] Jan Kybic and Daniel Smutek, "Image registration accuracy estimation without ground truth using bootstrap," in *CVAMIA: Computer Vision Approaches to Medical Image Analysis*, R. Beichel and M. Sonka, Eds. May 2006, number 3117 in Lecture Notes in Computer Science, pp. 61–72, Springer.

[18] Ignacio Arganda-Carreras, Carlos O. S. Sorzano, Roberto Marabini, Jose M. Carazo, Carlos Ortiz de Solorzano, and Jan Kybic, "Consistent and elastic registration of histological sections," in *CVAMIA: Computer Vision Approaches to Medical Image Analysis*, R. Beichel and M. Sonka, Eds., Heidelberg, Germany, May 2006, number 3117 in Lecture Notes in Computer Science, pp. 85–95, Springer, http://dx.doi.org/10.1007/11889762_8.

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[25] María-Jesús Ledesma-Carbayo, Andrés Santos, Patricia Mahia, Miguel-Angel Garcia-Fernandez, Jan Kybic, Malpica Norberto, Perez-David E., and Desco Manuel, "Longitudinal and radial regional strain obtained from gray-scale conventional echocardiography," in *Journal of the American College of Cardiology*, B. Lerman, Ed., Bethesda, USA, Mar. 2005, vol. 45, p. A255, Elsevier, supplement 1.

[26] Leila Muresan, Bettina Heise, Jan Kybic, and Erich Peter Klement, "Quantitative analysis of microarrays," in *Proceedings of ICIP*, 445 Hoes Lane, Piscataway, USA, September 2005, pp. 1274–1277, IEEE.

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[29] Maureen Clerc, Geoffray Adde, Jan Kybic, Théo Papadopoulo, and Jean-Michel Badier, "In vivo conductivity estimation with symmetric boundary elements," in *NFSI2005: 5th International Conference on Bioelectromagnetism and 5th International Symposium on Noninvasive Functional Source Imaging*. May 2005, vol. 7, International Society for Bioelectromagnetism.

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Gerbeau, Eds., 17, avenue du Hoggar, France, July–September 2004, vol. 14 of *ESAIM: Proceedings*, pp. 63–71, EDP Sciences, http://www.edpsciences.org/articles/proc/abs/2005/01/contents/contents.html.

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Supervised Master and PhD theses:

[1] Martin Barva, *Localization of Surgical Instruments in 3D Ultrasound Images*, PhD Thesis CTU–CMP–2007–12, Center for Machine Perception, K13133 FEE Czech Technical University, Prague, Czech Republic, June 2007.

[2] Jan Petr, *Parallel Magnetic Resonance Imaging Reconstruction*, Ph.D. thesis, Czech Technical University in Prague, Prague, Czech Republic, October 2007.

[3] Helena Jansová, "Reconstruction of 3D surface from colonoscopic video," M.S. thesis, Center for Machine Perception, K13133 FEE Czech Technical University, Prague, Czech Republic, May 2008.

[4] Jiří Mazanec, "Program pro prohlížení a segmentaci 3D MRI dat," M.S. thesis, Center for Machine Perception, K13133 FEE Czech Technical University, Prague, Czech Republic, May 2008.

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