Personal information form for Fellow members of EAMBES

Personal Info

Name: Sabine Van Huffel

Gender: Female

Date and place of birth: September 26, 1958, Menen, Belgium

Present affiliations and functions:

Full professor biomedical data processing,

KU Leuven, Department of Electrical Engineering-ESAT, SCD-SISTA, and IBBT Future Health Department

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Short CV

1. **Date and university for MSc and PhD degree(s)**
   July 1981: Master of Science in Computer Science Engineering, KU Leuven, Univ. of Leuven, Belgium.
   September 1981: Licensed teacher in Higher Secondary Education, KU Leuven, Univ. of Leuven, BE.
   July 1985: Postgraduate degree in Biomedical Engineering, KU Leuven, University of Leuven, Belgium.
   June 1987: Ph.D. in Electrical Engineering, Dept. of Electrical Engineering, KU Leuven Summa cum laude.

2. **Different professional affiliations with applicable periods:**
   2002-present: Full professor, Department of Electrical Engineering (ESAT), KU Leuven, Belgium, and head of biomedical data processing research group (including 15 PhD students and 7 postdocs),
   1998-2002: professor (part-time till Oct.1,2000), Dept. of Electrical Engineering (ESAT), KU Leuven, BE
   1999 –2000: research director Research Foundation Flanders (F.W.O.), BE
   1995-1998: part-time associate professor, Department of Electrical Engineering (ESAT), KU Leuven, BE
   1991-1999: research associate Research Foundation Flanders (F.W.O.), BE
   1993-1995: part-time assistant professor, Department of Electrical Engineering (ESAT), KU Leuven, BE
   1987-1991: postdoctoral researcher Research Foundation Belgium (F.W.O.), BE
   1983- 1987: PhD student, Department of Electrical Engineering (ESAT), KU Leuven, Belgium.
   1981-1983: scientific researcher, Faculty of Medicine, KU Leuven, BE
   Oct.-Nov. 2000: Guest professor, Dept. Computer Sciences, Stanford University, CA (host: Gene Golub)

May-June 2004: Guest professor, Dept. Systems and Control, Uppsala University, Sweden (host: P. Stoica)
June-August 1992: visiting fellow, ARHPRC, Univ. of Minnesota, Minneapolis, U.S.A. (host: Haesun Park)
April-May 1993: Visiting scientist, Computer Science Dept., University of Minnesota, Minneapolis, U.S.A.

3. **Major activities at the national and international level**
   2000-present: **head BIOMED** (Biomedical data processing) research group, ESAT (7 postdocs &15 PhD)
   2005-2009: **Rectorial advisor for equal opportunities and Diversity**. In this capacity she has taken various initiatives a.o. for attracting more female students to engineering.
   Chair (since 2011) & Panel member (since 06) Commission Informatics & Knowledge Technology FWO
   Member **Householder Prize Committee** (2002-2011): selects 3-yearly best PhD in numerical linear algebra
   Member Barco and IBM Prize committees (annual selection best master thesis and best PhD thesis)
   Cofounder and treasurer IEEE-EMBS Benelux Chapter (2005-present)
   President (2011) and steering committee member (since 2006) of ISOTT
   Member **National Committee on Biomedical Engineering**, IEEE, ISMRM, ESMRMB, EURASIP, SIAM
   Chair Numerics-in-Control NICONET International Society & editor NICONET reports (1998-2005)
   Member Editorial board of EURASIP J. Signal Process. and Bioinformatics (since 2005), Springer J. Signal, Image and Video Process. (since 2006), Numer. Lin. Alg. with Appl. (since 2004), EURASIP J. on Signal Process. (2003 -2005), Numer. Algor. (since 1995), SIAM J. Matrix Anal. and Appl. (1996-2005).

4. **Major scientific interests**

   Research – fundamental/theoretical as well as application oriented- is performed in the domain of (multi)linear algebra, (non)linear signal analysis, classification and system identification with special focus to the development of numerically reliable and robust algorithms for improving medical diagnostics. Topics:
   - **Total Least Squares (TLS) fitting** combines effectively statistical and numerical methodologies for dealing with errors in linear parameter estimation problems; Her contributions involve numerical issues, computational efficiency, statistical value, and valuable, creative applications mainly in biomedicine. Her book (The Total Least Squares Problem, SIAM, 1991, 300 pages, 1067 citations) with J. Vandewalle became the **standard book for TLS** and received excellent reviews. She organized 4 workshops on TLS and errors-in-variables modeling, attracting 70 scientists from diverse disciplines to Leuven, Belgium (1991, 1996, 2001, 2006), which resulted in 2 edited books (SIAM,1997) and (Kluwer, 2002) and 2 special issues (Signal Processing 2007, Computational Statistics & Data Analysis 2007).
   - **Numerical tensor algorithms** and applications in biomedical multimodal and multichannel data processing including EEG-fMRI and MRSI-MRI integration.
   - **Computational Biomedical Signal Processing** involves advanced methods of applied mathematics in numerous areas such as EEG-based epilepsy monitoring and neonatal brain monitoring, Magnetic Resonance Spectroscopic (MRS) and MRS Imaging (MRSI), cardiovascular dynamics and heart-rate variability analysis, event-related potential (ERP) analysis, stress monitoring . In particular, the widely used AMARES software is nowadays a standard technique for long echo-time MRS quantification.

- **Pattern recognition & machine learning** involves neural networks and LS support vector machines with significant contributions   to medical diagnostics, like **ovarian and brain cancer diagnosis**.

5. When applicable **the number of journal publications** (full articles), total citations, Hirsch Factor and number of patents

Publications

Two monographs, about 304 articles in refereed international journals, about 257 articles in international peer-reviewed conferences, 4 edited books, 7 edited journal special issues, 21 book chapters, all receiving in Jan. 2012   9212   scholar-google citations (according to Publish or Perish), 3729 citations (without self-citations 3098)   on ISI's Web of Science, h-index= 42 (Publish or Perish) and 28 (WoS). For a complete list of publications (online available), see http://www.esat.kuleuven.be/scd/.

PhD supervision and postdocs
(Co)supervisor of 35 finished PhDs and 15 ongoing PhDs: mostly all interdisciplinary in cosupervision with medical colleagues. Postdocs give support through daily supervision. In addition, she mentored 22 postdocs since 1994. Graduates include research lab/faculty members in respectable institutions (Univ. Georgia Tech, Univ. Southhampton, Univ. Kiev, Univ. of Sydney, Univ. Picardie, Univ. Wales, Univ. Jakarta, Univ. of Oldenburg, IMEC, CNR Bari, Sony, Philips Medical Systems, Alcatel).

6. When applicable, **maximal 4 references to papers** you find most important and relevant

L. Vanhamme, A. Van Den Boogaart, S. Van Huffel, Improved method for accurate and efficient quantification of MRS data with use of prior knowledge. *J. Magn. Resonance*, vol.129, no.1, p.35-43, 1997.   IF= 2.333, 693 scholar-google & 537 WoS citations

- Timmerman D., Testa A.C., Bourne T., Ferrazzi E., Ameye L., Konstantinovic M.L., Van Calster B., Collins W.P., Vergote I., Van Huffel S., Valentin L., Logistic regression model to distinguish between the benign and malignant adnexal mass before surgery: a multicenter study by the International Ovarian Tumor Analysis Group, *Journal of Clinical Oncology*, vol. 23, no. 34, Dec. 2005, pp. 8794-8801. IF=18.979, 97 scholar-google & 93 WoS citations

- W. De Clercq, A. Vergult, B. Vanrumste, W. Van Paesschen , S. Van Huffel, Canonical Correlation Analysis applied to remove muscle artifacts from the electroencephalogram, *IEEE Transactions Biomedical Engineering*, Vol. 53, No.12, p.2583-2587, 2006. IF=1.790, 53 scholar-google & 31 WoS citations

- K. Vanderperren, M. De Vos, J. Ramautar, N. Novitskiy, M. Mennes, S. Assecondi, B. Mijovic, B. Vanrumste, P. Stiers, B. Van Den Bergh, J. Wagemans, L. Lagae, S. Sunaert, S. Van Huffel. Removal of BCG artifacts from EEG recordings inside the MR scanner: a comparison of methodological and validation-related aspects. *NeuroImage*, Volume 50, Issue 3, 15 April 2010, pp. 920-934. IF=5.937, 11 scholar-google & 7 WoS citations

Recognitions: *Please indicate honorary recognitions, prices, fellowships etc.*

IEEE Fellow ``for contributions to total LS fitting & computational biosignal processing'' since Jan. 2009

EAMBS Fellow, European Alliance for Medical and Biological Engineering & Science, since Jan. 2012

Martin Black award: best 2010 paper in Physiological Measurements for M. Mendez, J. Corthout, S. Van Huffel, M. Matteucci, T. Penzel, S. Cerutti, A.Bianchi. `Automatic screening of obstructive sleep apnea from the ECG based on empirical mode decomposition and wavelet analysis'. Vol. 31, pp. 273-289

Award winner Belgian Industrial Research & Development (BiR&D) Interdisciplinary M.Sc. Thesis program-Call 2010 for `Smart Care' (supervisors winning team: A. Cuyt, A. De Schepper, S. Van Huffel)