Reza Sameni, PhD
(Extended Curriculum Vitae)

Associate Professor, IEEE Senior Member

Visiting Researcher
GIPSA-lab, Universitè Grenoble Alpes, CNRS, Grenoble INP
38400 Saint-Martin-d'Hères, France
Phone: +33 (0)6 27 39 77 21
Email: reza.sameni@gipsa-lab.grenoble-inp.fr (rsameni@shirazu.ac.ir)

Department of Computer Science & Engineering
School of Electrical & Computer Engineering
Shiraz University, Shiraz, Iran
Web: www.sameni.info
LinkedIn: https://www.linkedin.com/in/reza-sameni-8a191229
ResearchGate: https://www.researchgate.net/profile/Reza_Sameni
Google Scholar: https://scholar.google.com/citations?user=MkoXtWwAAAAJ&hl=en

Contents

1 Current Status

- Visiting Researcher, GIPSA-lab, Université Grenoble Alpes, CNRS, Grenoble INP, Grenoble, France *September 2018– present*

- Senior Algorithm Developer and Consultant, MindChild Medical Inc., USA   *September 2018– present*

- Tenure Associate Professor, School of Electrical & Computer Engineering, Shiraz University, Shiraz, Iran *September 2008–present*

2 Personal Information

Birth: September 21st, 1977, Shiraz, Iran
Citizenship: Iranian
Marital status: Married to Maryam Shariat
Children: Two daughters; Baran and Bahar
Languages: Persian (maternal), English (fluent), French (good), Arabic (basic)

3 Education

- **PhD in Electrical Engineering, Sharif University of Technology (SUT), Tehran, Iran** *2003–2008*

- **PhD in Signal Processing and Telecommunications, GIPSA-lab, INPG, Grenoble, France** *2005–2008*

  Pursued a joint PhD degree (*co-tutelle*) from Sharif University of Technology and Institut National Polytechnique de Grenoble (INPG); graduated with Honor.

  Major: Statistical Signal Processing & Bioelectrical Engineering

  Thesis: Non-invasive extraction and processing of fetal cardiac signals from an array of maternal abdominal sensors

  ✎ I started the PhD program of SUT in the field of Biolectrical Engineering, in 2003. After passing the courses and the comprehensive exam, as part of a *co-tutelle* agreement between SUT and INPG, I moved to France and enrolled in the PhD program of INPG in the field of Signal, Speech, Image and Telecommunications (abbreviated as SIPT in French), in 2005. The PhD thesis was jointly supervised by Prof. Mohammad-Bagher Shamsollahi and Prof. Christian Jutten.

- **MSc in Electrical Engineering, Sharif University of Technology, Tehran, Iran**   *2000–2003*

Major: Bioelectrical Engineering

Thesis: Classification of EEG signals for brain-computer interface (BCI) applications

- **BSc in Electrical Engineering, Shiraz University, Shiraz, Iran** *1996–2000*
  Major: Electronics

  Final Project: Designing a Training Board for the 8x51 Microcontroller Series

- **High School, Exceptional Talents High School (NODET), Shiraz, Iran** *1992–1996*
  Major: Mathematics & Physics

4 Honors and Awards

- Distinguished Academic Faculty of Electrical & Computer Engineering (yearly award), Shiraz University, Iran, 2012
  ✎ This is a yearly prize awarded to faculty members, which obtain the highest scores of teaching quality, in official student polls and evaluations carried-out by the Dean's office.

- PhD thesis award of INPG (Prix de Thèse de Grenoble INP), in Signal Processing and Telecommunications, Grenoble, France, 2010
  ✎ This is a highly-selective award of INPG, granted to PhD graduates with distinguished performance and achievements during their PhD.

- First Place Award in Electrical Engineering, Dr. Mojtahedi Innovation Award, Sharif University of Technology Association (SUTA), Tehran, Iran, 2010
  ✎ This is a yearly award of SUTA granted to distinguished PhD thesis of each department.

- Gold medal of Best Young Inventor from the World Intellectual Property Organization (WIPO) on the occasion of the 23rd Khwarizmi International contest, Tehran, Iran, 2010
  ✎ This medal was awarded by WIPO for my research in the field of fetal cardiac signal processing.

- Young Scientist Award from the Academy of Sciences for the Developing World (TWAS), Tehran, Iran, 2010
  ✎ This prize was awarded by TWAS for the achievements of my PhD thesis.

- Second Place Award of Innovation, 23rd Khwarizmi International Award (KIA), Tehran, Iran, 2010
  ✎ This award was due to my research in the field of fetal cardiac signal analysis and its industrialization.

- Rhône-Alpes region scholarship, Grenoble, France, 2008
  ✎ A regional scholarship in France.

- Eiffel PhD Scholarship of Excellence from the French government, Grenoble, France, 2007
  ✎ A selective national scholarship in France.

- PhD scholarship from the French government (BGF), 2005
  ✎ A selective scholarship of the French government granted to international students.

- Research assistant scholarship from Sharif University of Technology, Tehran, Iran, 2004
  ✎ A yearly RA for a selection of PhD candidates.

- PhD scholarship and post-doctoral faculty position from Shiraz University, Shiraz, Iran, 2003
  ✎ Shiraz University is well-known for its high standards, discipline and very narrow selection of faculty members. I had the chance to be awarded this position from the beginning of my PhD.

5 Academic Activities

5.1 Teaching

✎ I have taught various courses during the past years in Sharif University of Technology (during the first two years of my PhD) and Shiraz University, since 2008. Several of these courses have been developed from scratch; a few others have been redesigned and updated with new contents based on my personal research and engineering experiences.

- Estimation Theory & Optimal Filtering (Graduate course/two semesters)

- Reconfigurable Architectures (Graduate course/three semesters)

- Biological System Modeling (Graduate course/nine semesters)

- Signal Processing in Time, Frequency, and Space (Graduate course/six semesters)

- Digital Signal Processing (Graduate course/two semesters)

- Signals & Systems (BSc course/seven semesters)

- Signal Processing Lab (BSc course/two semesters)
  ✎ Lab developed for Shiraz University for the first time

- Electrical Circuit Theory (BSc course/five semesters)

- Electrical Circuit Lab (BSc course/four semesters)

- Linear Control Systems (BSc course/three semesters)

- Technical Communication (BSc course/two semesters)

- Digital System Design (BSc course/seven semesters)
  ✎ Designed and presented in Shiraz University for the first time; course fully customized for industrial needs.

- Digital System Design Lab (BSc course/four semester)
  ✎ Lab developed for Shiraz University for the first time and accompanied by a fully customized FPGA board designed and manufactured in our group.

- Principles of Electrical Engineering (BSc course/two semesters)
  ✎ Taught during my PhD in SUT

6 Research Activities

6.1 Research Profile

H-index: 19 with more than 2100 Google Scholar Citations by March 2019

6.2 Research Interests

Statistical signal and data processing (especially for biomedical applications), system and data modeling, digital system design, software defined radio systems.

✎ My current research at GIPSA-lab is focused on:

- *The integration of blind source separation techniques and optimal filtering schemes (such as the Kalman filter), especially for biomedical applications:* We have coined this technique "dynamic source separation", as it consists of a unified source separation framework for dynamic systems. We have developed interesting algorithms for source separation, using presumed dynamics for the sources.

- *Fusion and selection in multichannel and multimodal data, with applications for biomedical signals:* Our major question is when and how to select or fuse between multichannel or multimodal recordings. Some recent theoretical results have shown that for noisy data, channel or modality "selection" is in cases better than their "fusion". In other words, adding channels, modalities, or dimensions is not necessarily harmless and is not necessarily compensable by dimension reduction. I am currently focused on extending these findings, with applications for multichannel and multimodal cardiac signals using a novel simultaneous electrocardiogram and phonocardiogram dataset acquired by our research group.

✎ In addition, some of the recent topics that my graduate students and I have been working on include:

- *Electroencephalogram (EEG) phase analysis:* The EEG phase has emerged as a rich complement for the EEG spectra. Important phenomena such as phase coupling and phase resetting have been built on this property. We have theoretically proved that the common method used for EEG phase calculation in the literature is highly susceptible to noise and the smallest variations in algorithmic parameters. Based on this finding, we proposed a robust Monte Carlo algorithm for EEG phase calculation and, as proof of concept, successfully used it for brain computer interface applications. The proposed algorithm will soon be added as an official plugin to the popular EEGLAB toolbox.

- *Statistical performance bounds on electrocardiogram (ECG) parameter estimation:* We may argue that ECG parameter extraction is always explicitly or implicitly "model-based" (even the parameters visually extracted by expert annotators). On the other hand, we have the beatwise variations of the ECG, measurement noises, inter-rater and intra-rater variabilities of annotations. Based on these factors, we have formulated the problem of ECG parameter extraction as a classical estimation problem and derived Cramér-Rao lower bounds (CRLB) for the most popular ECG parameters and models.

- *Advances in fetal electrocardiography:* This topic has been my personal interest for many years. Some of our recent advances in this area include: a) online fetal ECG (fECG) extraction using online source separation algorithms; b) using the fECG for estimating and tracking fetal motions/rotations with respect to the maternal body coordinates; c) noninvasive fECG extraction from low-rank (as few as a single-channel) and time-varying mixtures; d) a novel semi-blind source separation algorithm for fECG extraction in presence of nonstationary noise and irregular maternal beats.

- *Simultaneous phonocardiogram (PCG) and ECG analysis:* In our research lab, in collaboration with a local startup company, we have invested on studying the electro-mechanical coupling of the heart. We have built our own device for the simultaneous acquisition of adult/fetal ECG and PCG and we have recorded a primary adult ECG-PCG database using this device, which is being used in our research team and will be soon published online.

- *Biomedical devices and software development:* We have also manufactured different biomedical devices and applications, including: a three to six channel Holter monitor, a digital infrared vein finder, an FPGA digital data acquisition and signal processing board and an ECG analysis software engine.

6.3 Publications

6.3.1 Theses

T1 Reza Sameni. *Extraction of Fetal Cardiac Signals from an Array of Maternal Abdominal Recordings*. PhD thesis, Sharif University of Technology – Institut National Polytechnique de Grenoble, July 2008. URL http://www.sameni.info/Publications/Thesis/PhDThesis.pdf

T2 R. Sameni. Discrimination of EEG Signals during the Performance of Different Mental Tasks. Master's thesis, Sharif University of Technology, 2003

T3 Reza Sameni and Sharifoddin Mansouri. Designing a Training Board for the 8x51 Microcontroller Series. Bachlor's final project, Shiraz University, September 2000

6.3.2 Patents

P1 R. Sameni, C. Jutten, M.B. Shamsollahi, and G.D. Clifford. Extraction of Fetal Cardiac Signals, June 2010b. Licensed to MindChild Medical Inc

6.3.3 Journal Papers

J1 Selene Tomassini, Agnese Sbrollini, Annachiara Strazza, Reza Sameni, Ilaria Marcantoni, Micaela Morettini, and Laura Burattini. AdvFPCG-delineator: Advanced delineator for fetal phonocardiography. *Biomedical Signal Processing and Control*, 61:102021, Aug 2020. doi: $10.1016/\mathrm{j.bspc.}2020.102021$

J2 F. Jamshidian-Tehrani, R. Sameni, and C. Jutten. Temporally nonstationary component analysis; application to noninvasive fetal electrocardiogram extraction. *IEEE Transactions on Biomedical Engineering*, 2019:1–10, 2019. ISSN 0018-9294. URL http://dx.doi.org/10.1109/TBME.2019.2936943. In Press

J3 Amin Zollanvari, Alex Pappachen James, and Reza Sameni. A theoretical analysis of the peaking phenomenon in classification. *Journal of Classification*, Jul 2019. ISSN 1432-1343. doi: $10.1007/\mathrm{s}00357$-019-09327-3. URL https://doi.org/10.1007/s00357-019-09327-3

J4 Fahimeh Jamshidian-Tehrani and Reza Sameni. Fetal ECG extraction from time-varying and low-rank noninvasive maternal abdominal recordings. *Physiological Measurement*, Nov 2018. URL http://dx.doi.org/10.1088/1361-6579/aaef5d

J5 F. Karimzadeh, R. Boostani, E. Seraj, and R. Sameni. A distributed classification procedure for automatic sleep stage scoring based on instantaneous electroencephalogram phase and envelope features. *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, 26(2):362–370, Feb 2018. ISSN 1534-4320. URL https://doi.org/10.1109/TNSRE.2017.2775058

J6 Reza Sameni and Esmaeil Seraj. A robust statistical framework for instantaneous electroencephalogram phase and frequency estimation and analysis. *Physiological Measurement*, 38(12):2141–2163, 2017. URL http://dx.doi.org/10.1088/1361-6579/aa93a1

J7 Marzieh Fatemi and Reza Sameni. An Online Subspace Denoising Algorithm for Maternal ECG Removal from Fetal ECG Signals. *Iranian Journal of Science and Technology, Transactions of Electrical Engineering*, 2017:1–15, April 2017. URL http://dx.doi.org/10.1007/s40998-017-0018-4

J8 Hamed Hassani Saadi, Reza Sameni, and Amin Zollanvari. Interpretive time-frequency analysis of genomic sequences. *BMC Bioinformatics*, 18(4):154, 2017. ISSN 1471-2105. URL http://dx.doi.org/10.1186/s12859-017-1524-0

J9   Esmaeil Seraj and Reza Sameni. Robust electroencephalogram phase estimation with applications in brain-computer interface systems. *Physiological Measurement*, 38(3):501, 2017. URL https://doi.org/10.1088/1361-6579/aa5bba

J10 Reza Sameni. Online filtering using piecewise smoothness priors: Application to normal and abnormal electrocardiogram denoising. *Signal Processing*, 133(4):52 – 63, April 2017. ISSN 0165-1684. URL https://doi.org/10.1016/j.sigpro.2016.10.019

J11 Chengyu Liu, David Springer, Qiao Li, Benjamin Moody, Ricardo Abad Juan, Francisco J Chorro, Francisco Castells, José Millet Roig, Ikaro Silva, Alistair E W Johnson, Zeeshan Syed, Samuel E Schmidt, Chrysa D Papadaniil, Leontios Hadjileontiadis, Hosein Naseri, Ali Moukadem, Alain Dieterlen, Christian Brandt, Hong Tang, Maryam Samieinasab, Mohammad Reza Samieinasab, Reza Sameni, Roger G Mark, and Gari D Clifford. An open access database for the evaluation of heart sound algorithms. *Physiological Measurement*, 37(12):2181–2213, 2016. URL https://doi.org/10.1088/0967-3334/37/12/2181

J12 Joachim Behar, Tingting Zhu, Julien Oster, Alisa Niksch, Douglas Y Mah, Terrence Chun, James Greenberg, Cassandre Tanner, Jessica Harrop, Reza Sameni, Jay Ward, Adam J Wolfberg, and Gari D Clifford. Evaluation of the fetal QT interval using non-invasive fetal ECG technology. *Physiological Measurement*, 37(9):1392–1403, September 2016. URL https://doi.org/10.1088/0967-3334/37/9/1392

J13 Hadis Biglari and Reza Sameni. Fetal motion estimation from noninvasive cardiac signal recordings. *Physiological Measurement*, 37(11):2003–2023, November 2016. URL https://doi.org/10.1088/0967-3334/37/11/2003

J14 Eesa Nikahd, Payman Behnam, and Reza Sameni. High-speed hardware implementation of fixed and runtime variable window length 1-d median filters. *IEEE Transactions on Circuits and Systems II: Express Briefs*, 63(5):478–482, 2016. URL https://doi.org/10.1109/TCSII.2015.2504945

J15 Fatemeh Razavipour and Reza Sameni. A Study of Event Related Potential Frequency Domain Coherencyusing Multichannel Electroencephalogram Subspace Analysis. *Journal of Neuroscience Methods*, 249:22–28, July 2015. URL http://dx.doi.org/10.1016/j.jneumeth.2015.03.037

J16 Reza Sameni and Cedric Gouy-Pailler. An Iterative Subspace Denoising Algorithm for Removing Electroencephalogram Ocular Artifacts. *Journal of Neuroscience Methods*, 225(3):97–105, March 2014. URL http://dx.doi.org/10.1016/j.jneumeth.2014.01.024

J17 Ebadollah Kheirati Roonizi and Reza Sameni. Morphological modeling of cardiac signals based on signal decomposition. *Computers in Biology and Medicine*, 43(10):1453–1461, October 2013. ISSN 0010-4825. URL http://dx.doi.org/10.1016/j.compbiomed.2013.06.017

J18 Fatemeh Razavipour and Reza Sameni. A General Framework for Extracting Fetal Magnetoencephalogram and Audio-Evoked Responses. *Journal of Neuroscience Methods*, 212(2):283–296, January 2013. URL http://dx.doi.org/10.1016/j.jneumeth.2012.10.021

J19 Liviu Moraru, Reza Sameni, Uwe Schneider, Jens Haueisen, Ekkehard Schleußner, and Dirk Hoyer. Validation of fetal auditory evoked cortical responses to enhance the assessment of early brain development using fetal MEG measurements. *Physiological Measurements*, 32(11):1847–1868, October 2011. URL http://dx.doi.org/10.1088/0967-3334/32/11/002

J20 Gari Clifford, Reza Sameni, Jay Ward, Julian Robinson, and Adam John Wolfberg. Clinically accurate fetal ECG parameters acquired from maternal abdominal sensors. *American Journal of Obstetrics and Gynecology*, 205(1):47.e1–47.e5, July 2011. URL https://doi.org/10.1016/j.ajog.2011.02.066

J21 Reza Sameni and Gari D. Clifford. A Review of Fetal ECG Signal Processing; Issues and Promising Directions. *The Open Pacing, Electrophysiology & Therapy Journal (TOPETJ)*, 3:4–20, November 2010. URL 10.2174/1876536X01003010004

J22 G.D. Clifford, S. Nemati, and R. Sameni. An Artificial Vector Model for Generating Abnormal Electrocardiographic Rhythms. *Physiological Measurements*, 31(5):595–609, May 2010. URL https://dx.doi.org/10.1088/0967-3334/31/5/001

J23 R. Sameni, C. Jutten, and M. B. Shamsollahi. A Deflation Procedure for Subspace Decomposition. *IEEE Transactions on Signal Processing*, 58(4):2363–2374, April 2010a. URL https://doi.org/10.1109/TSP.2009.2037353

J24 Thato Tsalaile, Reza Sameni, Saeid Sanei, Christian Jutten, and Jonathon Chambers. Sequential Blind Source Extraction For Quasi-Periodic Signals With Time-Varying Period. *Biomedical Engineering, IEEE Transactions on*, 56(3):646–655, March 2009. URL https://doi.org/10.1109/TBME.2008.2002141

J25 R. Sameni, C. Jutten, and M. B. Shamsollahi. Multichannel Electrocardiogram Decomposition using Periodic Component Analysis. *Biomedical Engineering, IEEE Transactions on*, 55(8):1935–1940, Aug 2008a. URL https://doi.org/10.1109/TBME.2008.919714

J26 R. Sameni, M. B. Shamsollahi, and C. Jutten. Model-based Bayesian filtering of cardiac contaminants from biomedical recordings. *Physiological Measurement*, 29(5):595–613, May 2008b. URL https://doi.org/10.1088/0967-3334/29/5/006

J27 R. Sameni, M. B. Shamsollahi, C. Jutten, and G. D. Clifford. A nonlinear bayesian filtering framework for ECG denoising. *Biomedical Engineering, IEEE Transactions on*, 54(12):2172–2185, December 2007b. URL https://doi.org/10.1109/TBME.2007.897817

J28 R Sameni, G. D. Clifford, C. Jutten, and M. B. Shamsollahi. Multichannel ECG and Noise Modeling: Application to Maternal and Fetal ECG Signals. *EURASIP Journal on Advances in Signal Processing*, 2007:Article ID 43407, 14 pages, 2007a. URL https://doi.org/10.1155/2007/43407

6.3.4 Conference Papers

C1 H. Narimani and R. Sameni. Electrocardiogram denoising using h-infinity filters. In *Electrical Engineering (ICEE), 2015 23rd Iranian Conference on*, May 2015. In Persian

C2 M. Samieinasab and R. Sameni. Fetal phonocardiogram extraction using single channel blind source separation. In *Electrical Engineering (ICEE), 2015 23rd Iranian Conference on*, May 2015. URL https://doi.org/10.1109/IranianCEE.2015.7146186

C3 Masoumeh Haghpanahi, Reza Sameni, and David A Borkholder. Scoring consensus of multiple ECG annotators by optimal sequence alignment. In *Engineering in Medicine and Biology Society (EMBC), 2014 36th Annual International Conference of the IEEE*, pages 1855–1859. IEEE, 2014. URL https://doi.org/10.1109/EMBC.2014.6943971

C4 Joachim Behar, Adam Wolfberg, Tingting Zhu, Julian Oster, Alisa Niksch, Douglas Mah, Terrence Chun, James Greenberg, Cassandre Tanner, Jessica Harrop, Alexander Van Esbroeck, Amy Alexander, Michele McCarroll, Timothy Drake, Angela Silber, Reza Sameni, Jay Ward, and Gari Clifford. Evaluation of the fetal QT interval using non-invasive fetal ECG technology. In *American Journal of Obstetrics and Gynecology*, volume 210, pages S283–S284, New Orleans, LA, February 2014. Society for Maternal-Fetal Medicine. URL https://doi.org/10.1016/j.ajog.2013.10.609

C5   Marzieh Fatemi, Mohammad Niknazar, and Reza Sameni. A Robust Framework for Noninvasive Extraction of Fetal Electrocardiogram Signals. In *Proceedings of the 40th Annual International Conference on Computers in Cardiology*, pages 201–204, Zaragoza, Spain, September 22-25 2013

C6   Fatemeh Razavipour, Masoumeh Haghpanahi, and Reza Sameni. Fetal QRS Complex Detection using Semi-Blind Source Separation Framework. In *Proceedings of the 40th Annual International Conference on Computers in Cardiology*, pages 181–184, Zaragoza, Spain, September 22-25 2013

C7   Ikaro Silva, Joachim Behar, Reza Sameni, Tingting Zhu, Julien Oster, Gari D. Clifford, and George B. Moody. Noninvasive Fetal ECG: The PhysioNet/Computing in Cardiology Challenge 2013. In *Proceedings of the 40th Annual International Conference on Computers in Cardiology*, pages 149–152, Zaragoza, Spain, September 22-25 2013

C8   M. Fatemi and R. Sameni. Application of second and higher order subspace tracking in multichannel data analysis. In *Biomedical Engineering (ICBME), 2013 20th Iranian Conference on*, pages 161–165, Dec 2013. URL http://dx.doi.org/10.1109/ICBME.2013.6782211

C9   Reza Sameni. A Linear Kalman Notch Filter for Power-Line Interference Cancellation. In *Proceedings of the 16th CSI International Symposium on Artificial Intelligence and Signal Processing (AISP)*, pages 604–610, Shiraz, Iran, 2-3 May 2012 2012. URL https://doi.org/10.1109/AISP.2012.6313817

C10 Hamed Hassani Saadi and Reza Sameni. Using matched filters for similarity search in genomic data. In *Proceedings of the 16th CSI International Symposium on Artificial Intelligence and Signal Processing (AISP)*, pages 469–472, Shiraz, Iran, 2-3 May 2012 2012. URL https://doi.org/10.1109/AISP.2012.6313793

C11 Bahman Vahabzadeh and Reza Sameni. The Notion of Cardiac Phase and its Applications in Electrophysiological Studies. In *Biomedical Engineering (BioMed 2012)*, Innsbruck, Austria, February 15–17 2012. URL http://dx.doi.org/10.2316/P.2012.764-127

C12 Caitlin McDonnell, Gari Clifford, Reza Sameni, Jay Ward, Jim Robertson, and Adam Wolfberg. Comparison of abdominal sensors to a fetal scalp electrode for fetal ST analysis during labor. In *American Journal of Obstetrics and Gynecology*, volume 204, pages S256–S256. Society for Maternal-Fetal Medicine, January 2011. URL http://dx.doi.org/10.1016/j.ajog.2010.10.669

C13 Reza Sameni, Gari D. Clifford, Jay Ward, Jim Robertson, Courtenay Pettigrew, and Adam J. Wolfberg. Accuracy of fetal heart rate acquired from sensors on the maternal abdomen compared to a fetal scalp electrode. In *American Journal of Obstetrics and Gynecology*, volume 201, pages S241–S241, Chicago, IL, December 2009. Society for Maternal-Fetal Medicine. URL http://dx.doi.org/10.1016/j.ajog.2009.10.529

C14 Gari D. Clifford, Reza Sameni, Jay Ward, Jim Robertson, Courtenay Pettigrew, and Adam J. Wolfberg. Comparing the fetal ST-segment acquired using a FSE and abdominal sensors. In *American Journal of Obstetrics and Gynecology*, volume 201, pages S242–S242, Chicago, IL, December 2009. Society for Maternal-Fetal Medicine. URL http://dx.doi.org/10.1016/j.ajog.2009.10.535

C15 C. Gouy-Pailler, R. Sameni, M. Congedo, and C. Jutten. Iterative Subspace Decomposition for Ocular Artifact Removal from EEG Recordings. In *Proc. of the 8th Intl. Conf. on Independent Component (ICA 2009)*, pages 419–426, Paraty, Brazil, 2009. URL https://link.springer.com/chapter/10.1007/978-3-642-00599-2_53

C16 L. Moraru, R. Sameni, U. Schneider, C. Jutten, J. Haueisen, and D. Hoyer. Identification of fetal auditory evoked cortical responses using a denoising method based on periodic component analysis. In *Proceedings of the 4th European Conference of the International Federation for Medical and Biological Engineering*

(*ECIFMBE 2008*), pages 1390–1393, Antwerp, Belgium, 2008. URL https://link.springer.com/chapter/10.1007/978-3-540-89208-3_329

C17 M. Congedo, C. Jutten, R. Sameni, and C. Gouy-Pailler. A new General Weighted Least-Squares Algorithm for Approximate Joint Diagonalization. In *Proceedings of the 4th International BCI Workshop*, Graz, Austria, 2008

C18 G.D. Clifford, S. Nemati, and R. Sameni. An Artificial Multi-Channel Model for Generating Abnormal Electrocardiographic Rhythms. In *Computers in Cardiology, 2008*, pages 773–776, Bologna, Italy, September 14–17 2008

C19 L. Amini, R. Sameni, C. Jutten, G.A. Hossein-Zadeh, and H. Soltanian-Zadeh. MR Artifact Reduction in the Simultaneous Acquisition of EEG and fMRI of Epileptic Patients. In *EUSIPCO2008 - 16th European Signal Processing Conf.*, Lausanne, Switzerland, August 25-29 2008

C20 O. Sayadi, R. Sameni, and M.B. Shamsollahi. ECG Denoising Using Parameters of ECG Dynamical Model as the States of an Extended Kalman Filter. In *Engineering in Medicine and Biology Society, 2007. EMBS 2007. 29th Annual International Conference of the IEEE*, pages 2548–2551, Aug. 2007. doi: 10.1109/IEMBS.2007.4352848. URL https://doi.org/10.1109/IEMBS.2007.4352848

C21 R. Sameni, M.B Shamsollahi, and C. Jutten. Multi-Channel Electrocardiogram Denoising Using a Bayesian Filtering Framework. In *Proc. of the 33rd Annual International Conference on Computers in Cardiology*, pages 185–188, Valencia, Spain, September 17-20 2006b. URL http://cinc.mit.edu/archives/2006/

C22 C. Jutten, R. Sameni, and H. Hauksdóttir. On the Relevance of Independent Components. In *Proc. of the ICA Research Network International Workshop (ICArn 2006)*, pages 1–8, Liverpool, UK, September 18-19 2006

C23 R. Sameni, C. Jutten, and M. B. Shamsollahi. What ICA Provides for ECG Processing: Application to Noninvasive Fetal ECG Extraction. In *Proc. of the International Symposium on Signal Processing and Information Technology (ISSPIT'06)*, pages 656–661, Vancouver, Canada, August 2006a. URL https://doi.org/10.1109/ISSPIT.2006.270882

C24 R. Sameni, F. Vrins, F. Parmentier, C. Hérail, V. Vigneron, M. Verleysen, C. Jutten, and M.B Shamsollahi. Electrode Selection for Noninvasive Fetal Electrocardiogram Extraction using Mutual Information Criteria. In *Proc. of the 26th International Workshop on Bayesian Inference and Maximum Entropy Methods in Science and Engineering (MaxEnt 2006)*, volume 872, pages 97–104, CNRS, Paris, France, July 8-13 2006c. URL http://hdl.handle.net/2078.1/90753

C25 R. Sameni, M. B. Shamsollahi, C. Jutten, and M. Babaie-Zadeh. Filtering Noisy ECG Signals Using the Extended Kalman Filter Based on a Modified Dynamic ECG Model. In *Proceedings of the 32nd Annual International Conference on Computers in Cardiology*, pages 1017–1020, Lyon, France, September 25-28 2005b

C26 R. Sameni, M. B. Shamsollahi, and C. Jutten. Filtering Electrocardiogram Signals Using the Extended Kalman Filter. In *Proceedings of the 27th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS)*, pages 5639–5642, Shanghai, China, September 1-4 2005a. URL https://doi.org/10.1109/IEMBS.2005.1615765

C27 R. Sameni, M.B Shamsollahi, and L. Senhadji. Processing Polysomnographic Signals, using Independent Component Analysis. In *Proc. Of the International Conference on Biomedical Engineering (BIOMED 2004)*, pages 193–196, Innsbruck, Austria, February 2004

C28 R. Sameni and M.B Shamsollahi. Discrimination of EEG Signals during the Performance of Different Mental Tasks. In *Proc. of the World Congress on Medical Physics and Biomedical Engineering*, Sydney, Australia, August 24-29 2003. [CD-ROM] ISBN 1877040142, Poster Paper No. 4251

6.3.5 Unpublished & Working Papers

U1 Reza Sameni. Spatio-Temporal Source Separation using Temporal Priors with Parameterized Uncertainties. working paper or preprint, October 2016. URL https://hal.archives-ouvertes.fr/hal-01382035

U2 Reza Sameni. Towards Distributed Component Analysis. working paper or preprint, October 2015. URL https://hal.archives-ouvertes.fr/hal-01382076

U3 R. Sameni. Multipole Expansion of Body Surface Potentials: An ICA Oriented Formulation (Part I). Technical Report, November 2007

U4 R. Sameni. Analysis of Iterative Approaches of Interpolation-Distortion Compensation. DSPII course term paper, Sharif University of Technology, March 2004a

U5 Reza Sameni. Writing Efficient Matlab Codes. Technical report, Lecture Notes, Sharif University of Technology, 2006b

U6 R. Sameni. Removing ECG Artifacts from EEG Recordings. Technical report, GIPSA-LAB, INP-Grenoble, May 2006a. Technical Report

U7 Reza Sameni. Discrimination of EEG Patterns during the Performance of Different Mental Activities. Technical report, Research Project Report, Sharif University of Technology, 2004b

U8 Reza Sameni. Design and Implementation of a Portable Hotwire Anemometer. Technical report, IROST, November 2001

6.4 Supervised Thesis

6.4.1 PhD

S1 Fahimeh Jamshidian-Tehrani. *Online Noninvasive Fetal Cardiac Signal Extraction*. PhD thesis, Artificial Intelligence, School of Electrical & Computer Engineering, Shiraz University, September 2019. Supervised by: Dr. Reza Sameni

S2 Davood Fattahi. *A Statistical Framework for Cardiac Parameter Estimation*. PhD thesis, Biomedical Engineering, School of Electrical & Computer Engineering, Shiraz University, In Progress, due: 2019. Supervised by: Dr. Reza Sameni

6.4.2 Master's

S1 Najmeh Kheram. Modeling and Denoising of Phonocardiogram Signals. Master's thesis, Biomedical Engineering, School of Electrical & Computer Engineering, Shiraz University, September 2019. Supervised by: Dr. Reza Sameni

S2 Arsalan Kazemnejad. Analysis of Synchronous Electrocardiogram and Phonocardiogram Parameters Extracted from Normal Subjects. Master's thesis, Biomedical Engineering, School of Electrical & Computer Engineering, Shiraz University, September 2018. Supervised by: Dr. Reza Sameni

S3 Niloofar Firoozi. A Hardware Architecture for Efficient Implementation of Elementary Functions. Master's thesis, Computer Architecture, School of Electrical & Computer Engineering, Shiraz University, September 2018. Supervised by: Dr. Reza Sameni

S4 Saeed Keshavarzi. Designing a Hardware Architecture for the Implementation of Online Subspace Tracking Algorithms. Master's thesis, Computer Architecture, School of Electrical & Computer Engineering, Shiraz University, September 2018. Supervised by: Dr. Reza Sameni

S5 Mohammad-Ali Abbasi. Design and Implementation of Parametric RTL Tools for Linear Algebraic Calculations. Master's thesis, Computer Architecture, School of Electrical & Computer Engineering, Shiraz University, February 2018. Supervised by: Dr. Reza Sameni

S6 Pejman Torabi. Implementation of Artificial Neural Networks on FPGA with Scalable and parametric Design. Master's thesis, Computer Architecture, School of Electrical & Computer Engineering, Shiraz University, February 2018. Supervised by: Dr. Reza Sameni

S7 Laleh Akbari. Random Circuit Generation for Evaluation of Different Levels of Synthesis and Implementation of Reconfigurable Circuits. Master's thesis, Computer Architecture, School of Electrical & Computer Engineering, Shiraz University, September 2017. Supervised by: Dr. Reza Sameni

S8 Mahdi Rahbaralam. Evaluation of Instantaneous Frequency Estimation Techniques with Application in Electroencephalogram Analysis. Master's thesis, Biomedical Engineering, School of Electrical & Computer Engineering, Shiraz University, May 2017. Supervised by: Dr. Reza Sameni

S9 Roohollah Mohammadzadeh. Implementation of Blind Source Separation and Frequency Scrambling Algorithms on FPGA Soft-Cores Using Mixed-Design. Master's thesis, Computer Architecture, School of Electrical & Computer Engineering, Shiraz University, September 2016. Supervised by: Dr. Reza Sameni

S10 Esmaeil Seraj. A Comparison of Cerebral Signal Phase Extraction and Analysis Methods. Master's thesis, Biomedical Engineering, School of Electrical & Computer Engineering, Shiraz University, September 2016. Supervised by: Dr. Reza Sameni

S11 Saman Doostkam. Design and Implementation of a Portable Assistive System for Visually Impared People. Master's thesis, Biomedical Engineering, School of Electrical & Computer Engineering, Shiraz University, September 2016. Supervised by: Dr. Reza Sameni

S12 Hadis Biglari. Fetal Motion Tracking from Non-Invasive Cardiac Signal Recordings. Master's thesis, Biomedical Engineering, School of Electrical & Computer Engineering, Shiraz University, 2015. Supervised by: Dr. Reza Sameni

S13 Zahra Sadeghian. Analysis and Prediction of Economic Indexes using Signal Processing Techniques. Master's thesis, Artificial Intelligence, School of Electrical & Computer Engineering, Shiraz University, October 2015. Supervised by: Dr. Reza Sameni

S14 Maryam Samieinasab. Modeling and Filtering of Fetal Phonocardiogram Signals. Master's thesis, Biomedical Engineering, School of Electrical & Computer Engineering, Shiraz University, February 2015. Supervised by: Dr. Reza Sameni

S15 Hadi Narimani. Application of Kalman and H-∞ filters in Electrocardiogram Denoising. Master's thesis, Biomedical Engineering, School of Electrical & Computer Engineering, Shiraz University, September 2014. Supervised by: Dr. Reza Sameni

S16 Behnam Tavakol-Shoorjeh. Distributed Component Analysis and its Applications in Biosignal Processing. Master's thesis, Biomedical Engineering, School of Electrical & Computer Engineering, Shiraz University, September 2014. Supervised by: Dr. Reza Sameni

S17 Zahra Kheradpisheh. Comparison of Linear and Nonlinear Electrocardiogram Processing Techniques. Master's thesis, Biomedical Engineering, School of Electrical & Computer Engineering, Shiraz University, February 2014. Supervised by: Dr. Reza Sameni

S18 Marzieh Fatemi. Application of Subspace Tracking Techniques for Fetal Cardiac Signal Extraction. Master's thesis, Biomedical Engineering, School of Electrical & Computer Engineering, Shiraz University, March 2013. Supervised by: Dr. Reza Sameni

S19 Hamed Hassani-Saadi. Application of Signal Processing Algorithms for Non-numeric Data. Master's thesis, Artificial Intelligence, School of Electrical & Computer Engineering, Shiraz University, March 2013. Supervised by: Dr. Reza Sameni

S20 Fatemeh Razavipour. Fetal Magnetoencephalogram Extraction and Phase Analysis of the Electroencephalogram. Master's thesis, Artificial Intelligence, School of Electrical & Computer Engineering, Shiraz University, March 2012. Supervised by: Dr. Reza Sameni

S21 Bahman Vahabzadeh. Study of Heart Rate Calculation Techniques and the Notion of Cardiac Signal Phase. Master's thesis, Biomedical Engineering, School of Electrical & Computer Engineering, Shiraz University, February 2012. Supervised by: Dr. Reza Sameni

S22 Sajad Niknam. Multichannel Cardiac Signal Processing & Sensor Selection Techniques. Master's thesis, Biomedical Engineering, School of Electrical & Computer Engineering, Shiraz University, January 2012. Supervised by: Dr. Reza Sameni

S23 Ebadollah Kheirati-Roonizi. Morphological Modeling of Cardiac Signals. Master's thesis, Biomedical Engineering, School of Electrical & Computer Engineering, Shiraz University, June 2011. Supervised by: Dr. Reza Sameni

S24 Shahrzad Kharabian. Fetal R-Wave Detection from Non-Invasive Magnetocardiogram Recordings. Master's thesis, Biomedical Engineering, School of Electrical & Computer Engineering, Sharif University of Technology, September 2009. Jointly Supervised by: Dr. Mohammad-Bagher Shamsollahi and Dr. Reza Sameni

6.5 Reviews

- Reviewer of several national and international journals and conferences. An incomplete list is available at: https://publons.com/a/1554991/

- I have been awarded the Outstanding Reviewer Award of Physiological Measurement in 2018

- Referee of nation-wide projects of Iran's National Cognitive Sciences and Technologies Council, and Iran's National Elites Foundation (Fars branch)

6.6 Open-Source Projects

The Open-Source Electrophysiological Toolbox (OSET), URL: www.oset.ir. GitLab Repository: https://gitlab.com/rsameni/OSET/.
✎ OSET is an open-source project that I launched in November 2006. It is a collection of electrophysiological data and open-source codes for biosignal generation, modeling, processing, and filtering. The toolbox is distributed under the GNU General Public License and may be freely used or modified under the specified

terms of use. The source codes have been mainly developed in Matlab and partially in C++. The toolbox has been used by many researchers (with several thousands of downloads since 2006) and events such as the Computers in Cardiology (CinC) Conference Challenge 2013, in which the data and source codes were used to generate sample fetal ECG data for the challenge (www.physionet.org/challenge/2013/), and the Physionet Challenge 2016 on heart sound evaluation (www.physionet.org/challenge/2016/). Starting from Version 3.14 released on June 2018, OSET is accessible and will be updated on the above noted public Git repository.

6.7 Invited Talsk and Workshops

1. *A Nonlinear Bayesian Filtering Framework for the Filtering of Noisy ECG Signals*, UCL, Louvain-la-Neuve, Belgium, April 21, 2006

2. *Workshop on Blind Source Separation and Independent Component Analysis: Theory, Applications and Perspectives*, 15th Iranian Conference on Electrical Engineering (ICEE 2007), Iran Telecom Research Center (ITRC), May 13, 2007

3. *A Biomedical Signal Processing Project from Research to Production*, Shiraz University, January 13, 2009

4. *Introduction to Biomedical Engineering*, Iranian Telecommunication Manufacturing Company (ITMC), December 8, 2010

5. *Cardiac Signal Processing*, Interdisciplinary Summer School, Shiraz University, July 16, 2012

6. *Advances in electrocardiogram signal processing and analysis*, International Workshop on Signal Processing (IWSP 2017), Tehran, Iran, May 10, 2017

7. *Introduction to Blind Source Separation*, 20th Workshop on Applied Stochastic Processes, Shiraz, Iran, April 2018

8. *Fetal Cardiac Signal Processing Techniques*, Invited Lecturer in the International Summer School on Technologies and Signal Processing, Pula, Sardinia, Italy, July 2–6, 2018

7 Industrial Activities & Engineering Experience

✎ I started working in industry during my Master's studies in part time and continued this collaboration ever since (during and after graduation from the university). Details of my industrial activities during the past eighteen years are listed below.

7.1 Companies and Research Centers

- Signal Processing Center (SPC), School of Electrical & Computer Engineering, Shiraz University, Shiraz, Iran   *2010–2015*
  ✎ I am the founder and director of SPC in Shiraz University
  ✎ SPC is a co-operative (co-op) research center, for helping students and fresh graduates get involved in real-world projects outsourced by worldwide industries. The major interest of the team is the design and implementation of high-performance digital signal processing systems on hardware, firmware, and software platforms. Having a close collaboration with our industrial partners, SPC members find a chance to experience the full production cycle from research to industrial prototyping; plus the social, financial and management requirements of real-world projects. Since the foundation of the center in

2010, the design and implementation of many subsystems have been outsourced to SPC; all of which have been successfully delivered to our customers. After three years of successful collaboration with worldwide industries, in 2013, SPC has made a jump towards further productivity, by marketing some of its R&D products. The center is open to internships for students and industrial trainees.

- Software Defined Radio Center (SDRC), School of Electrical & Computer Engineering, Shiraz University, Shiraz, Iran   *2013–present*
  ✎ SDRC is a specialized research center, founded in Shiraz University by a group of faculty members, for digital telecommunication systems research and design in collaboration with industrial partners. I have been a major co-founder and currently a member of the management board of SDRC.

- MindChild Medical, Inc., North Andover, MA, USA   *2008–present*
  Technology adviser and algorithm designer for fetal ECG monitoring systems
  ✎ MindChild Medical, Inc. is a start-up company based in the US, specialized in maternal and fetal healthcare systems. The company holds the license to our 2010 patent on fetal ECG extraction algorithm and we have had very close collaborations since its foundation. I have worked with MindChild, as technology adviser and algorithm designer of fetal ECG monitoring systems. The first product based on our technology has been approved by FDA and is currently commercialized in the US. Please refer to `www.mindchild.com` for further details.

- Vala-Andishe Paya (VAP) Ltd., Shiraz, Iran   *2017–present*
  ✎ This is a start-up company where we produce healthcare systems, including vein finders, Holter monitors, and cardiac monitoring and analysis software.

- Basamad Negar Ltd., Tehran, Iran   *2001–2005*
  ✎ This is how I earned my living during the MSc and the first two year of my PhD; I owe much of my industrial experience to this job. I started my work as an engineer and finished as a senior project manager before moving to France in 2005.

- Iranian Research Organization for Science & Technology (IROST), Tehran, Iran   *2000–2001*
  ✎ This was my first industrial job; where I was first convinced that university was useful! I worked on the design and implementation of a portable digital Hotwire anemometry system.

7.2 Engineering Skills

✎ I have served as electronics engineer, software programmer, algorithm developer, digital hardware architecture designer, and project manager of more than ten successful industrial projects. With eighteen years of part-time engineering experience, parallel to my academic and research activities, I currently give consultancies to companies in the following fields:

- Solution providing for digital signal processing systems (from design to implementation).

- Digital electronics and hardware architecture design for FPGA platforms, including the entire cycle from solution providing, hardware selection or design, and back-end software/firmware implementation.

7.3 Programming Languages

C, C++, Matlab/Octave, Verilog (HDL).

8 Administration & Services

- Chair of the Department of Computer Science & Engineering & IT, School of Electrical & Computer Engineering, Shiraz University, 2016–2018.

- Shiraz University's International Office Representative for collaboration with universities of France, 2017.

- Member of the course planning committee of Shiraz University, 2016–2018.

- Member of Fars Province Science and Technology Park Consulting Committee and Evaluation Board, 2016–2017.

- Vice Provost of Student Affairs, School of Electrical & Computer Engineering, Shiraz University, 2009–2015.

- Co-founder of the MSc and PhD programs of Bioelectrical Engineering in Shiraz University

- Co-founder of the MSc program of Computer Architecture in Shiraz University

9 Memberships

- Senior Member of the Institute of Electrical and Electronics Engineering (IEEE), (Student Member 2001, Member 2008, Senior Member 2015)

- Member of Iran's National Elites Foundation, Since 2010

- Member of Iran's National Cognitive Sciences and Technologies Council, Since 2014

Last Revised on February 2020