

## Themelis Konstantinos

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Current position	Postdoctoral research associate, CosmoStat lab., CEA Saclay	
Contact information	CEA Saclay, Service d'Astrophysique Orme des Merisiers, Building 709 91191 Gif-sur-Yvette, France	Phone: +33 68 16 39 268 email: k.e.themelis@gmail.com web: <a href="https://themelis.github.io/">https://themelis.github.io/</a>
Date of birth	23 December 1981	
Nationality	Greek	
Languages	Greek (native), English (fluently), French (intermediate), German (beginner)	
Education	<b>National Observatory of Athens and University of Athens</b> <b>10.2005 - 01.2012</b> <b>Ph.D.</b> in statistical signal processing <i>"Bayesian signal processing techniques for hyperspectral image unmixing"</i> Supervisors: Athanasios A. Rontogiannis, Research Director NOA, Sergios Theodoridis, Professor, UOA  <b>University of Patras</b> <b>09.2000 - 09.2005</b> Diploma degree in Computer Engineering and Informatics Thematic area: "Decision feedback equalization of MIMO channels" GPA: 8.49/10	
Phd thesis	K. E. Themelis, <i>"Bayesian signal processing techniques for hyperspectral image unmixing"</i> , Department of Informatics and Telecommunications, University of Athens, Jan. 2012. <a href="http://goo.gl/mkbswl">http://goo.gl/mkbswl</a>	
Research interests	Statistical signal processing with emphasis on Bayesian modelling and approximate inference methods. Stochastic variational inference for big data. Probabilistic machine learning with application to image processing and astrophysics. Proximal-based optimization for inverse problems	
Awards	<b>10.2003 - 09.2004</b> Hellenic State Scholarship Foundation Honorary Distinction Award for academic excellence	
Fellowships	<b>08.2017 - 12.2018</b> Participant of the <i>Enhanced Eurotalents Marie Skłodowska-Curie Actions</i> Program co-funded by the European Commission and managed by the French Atomic Energy and Alternative Energies Commission (CEA) with the research proposal "PRobabilistic cOMponent separaTion tEchniqUes with application to aStrophysical data analysis - PROTEUS".	

Programming skills	<b>Probabilistic programming:</b> Tensorflow, Keras <b>Scientific computing:</b> C / C++, Python, Matlab, R <b>Programming:</b> PHP, Java, Javascript, MySQL <b>Systems:</b> High Performance Computing (HPC) Unix cluster developer
Participation in research projects	<b><i>Greek funded projects</i></b> <div> <div>THALES: "Secure wireless nonlinear communications at the physical layer." Nov. 2012 - 2015</div> <div>11.2012</div> </div> <div> <div>ARISTEIA: "Advancing Hyperspectral Image Processing for Planetary Mineral Exploration and Thematic Mapping: the Case of Planet Mars." Sep. 2012 - 2015.</div> <div>09.2012</div> </div> <b>EU funded projects</b> <div> <div>EIS: European Ionosode and Neutron Monitor Service, Jan. 2014-2015.</div> <div>01.2014</div> </div> <div> <div>A-Effort: Athens Effective Solar Flare Forecasting, Sep. 2014-2015.</div> <div>09.2014</div> </div> <div> <div>PHySIS: Sparse signal processing technologies for hyperspectral imaging systems, Oct. 2015-2017.</div> <div>10.2015</div> </div> <div> <div>DEDALE: Data Learning on Manifolds and Future Challenges, Apr. 2017-2018.</div> <div>03.2017</div> </div> <div> <div>EUCLID: ESA mission to map the geometry of the dark Universe.</div> <div>10.2018</div> </div>
Peer reviewing	<b>Journals</b> IEEE Transactions on Image Processing IEEE Transactions on Neural Networks and Learning Systems IEEE Transactions on Signal Processing IEEE Transactions on Geoscience and Remote Sensing IEEE Signal Processing Letters IEEE Journal of Selected Topics in Signal processing IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing Elsevier Signal Processing Journal  <b>Conferences</b> MLSP, IEEE Workshop on Machine Learning and Signal Processing SSP, IEEE Workshop on Statistical Signal Processing EUSIPCO, European Signal Processing Conference ICASSP, IEEE International Conference on Acoustics, Speech, and Signal Processing DSP, IEEE International Conference on Digital Signal Processing
Attended conferences and workshops	EUSIPCO Rome, 2018, (poster) DEDALE workshop, Nice, 2017 (tutorial on Approximate Bayesian Computation) EUSIPCO Nice, 2016, (poster) WHISPERS Tokyo, 2015 (lecture) SUSTAIN workshop Bristol, 2014 (poster) ICASSP Florence, 2014 (lecture) WHISPERS Florida, 2013 (lecture) EPSC Rome, 2012, (lecture) EUSIPCO Lausanne, 2008 (poster)

Memberships	Member of the European Association for Signal Processing (EURASIP) Member of the Technical Chamber of Greece
Teaching experience	<b>University of Athens</b> <b>09.2009 - 02.2010</b> "Introduction to Matlab", self-paced introduction to Matlab, supporting the course "Digital signal processing" by Prof. S. Theodoridis  <b>CentraleSupélec &amp; ESSEC Business School</b> <b>01.2020 - 03.2020</b> "Information Processing Tools for Data Science", M1 level, Master program in Data Sciences & Business Analytics, Introduction to linear algebra, statistical signal processing and information theory.
Working experience	<b>University of Piraeus</b> <b>11.2005 - 12.2006</b> Web developer, linux system administrator  <b>National Observatory of Athens</b> <b>01.2007 - 12.2010</b> High-Performance Computing Cluster development  <b>National Observatory of Athens</b> <b>05.2013 - 09.2014</b> Linux system administrator, Java / OpenSSO developer  <b>Academy of Athens</b> <b>09.2014 - 03.2015</b> Linux system administrator, Java / OpenSSO developer
Referees	Athanasios A. Rontogiannis, Research Director NOA, email: <a href="mailto:tronto@noa.gr">tronto@noa.gr</a> Sergios Theodoridis, Professor UOA, email: <a href="mailto:stheodor@di.uoa.gr">stheodor@di.uoa.gr</a> Konstantinos K. Koutroumbas, Research Director, NOA, email: <a href="mailto:koutroum@noa.gr">koutroum@noa.gr</a> Jean-Luc Starck, head of Cosmostat lab, CEA, Saclay, email: <a href="mailto:jean-luc.starck@cea.fr">jean-luc.starck@cea.fr</a>
Publication metrics (scholar)	<b>citations:</b> 339 <b>h-index:</b> 7 <b>i10-index:</b> 6
List of publications	<b>Journals</b> <ol style="list-style-type: none"> <li>1. K. E. Themelis, F. Lanusse, N. Jeffrey, A. Peel, J.-L. Starck, "Weak lensing mass reconstruction using sparsity and a Gaussian random field", Astronomy &amp; Astrophysics, (under preparation)</li> <li>2. P. V. Giampouras, A. A. Rontogiannis, K. E. Themelis, K. D. Koutroumbas, "Online sparse and low-rank subspace learning from incomplete data: A Bayesian view", Signal Processing, vol. 137, pp. 199-212, Aug. 2017.</li> <li>3. P. V. Giampouras, K. E. Themelis, A. A. Rontogiannis, K. D. Koutroumbas, "Simultaneously sparse and low-rank abundance matrix estimation for hyperspectral image unmixing", IEEE Transactions on Geoscience and Remote Sensing, vol. 54, no. 8, pp. 4775-4789, Aug. 2016</li> <li>4. K. E. Themelis, A. A. Rontogiannis, K. D. Koutroumbas, "Variational Bayes group sparse time-adaptive parameter estimation with either known or</li> </ol>

- unknown sparsity pattern", *IEEE Transactions on Signal Processing*, vol.64, no.12, pp.3194-3206, June 2016.
5. A. Belehaki, I. Tsagouri, I. Kutiev, P. Marinov, B. Zolesi, M. Pietrella, K. E. Themelis, P. Elias, K. Tziotziou, "The European Ionosonde Service: nowcasting and forecasting ionospheric conditions over Europe for the ESA Space Situational Awareness services", *Journal of Space Weather and Space Climate*, 5 A25, 2015.
  6. K. E. Themelis, A. A. Rontogiannis, K. D. Koutroumbas, "A variational Bayes framework for sparse adaptive estimation", *IEEE Transactions on Signal Processing*, 62(18), 4723-4736, Sept. 2014.
  7. K.E. Themelis, A.A. Rontogiannis, K.D. Koutroumbas, "A Novel Hierarchical Bayesian Approach for Sparse Semi-Supervised Hyperspectral Unmixing", *IEEE Transactions on Signal Processing*, 60(2), 585-599, Feb. 2011.
  8. K.E. Themelis, F. Schmidt, O. Sykioti, A.A. Rontogiannis, K.D. Koutroumbas, I.A. Daglis, "On the Unmixing of MEX/OMEGA Hyperspectral Data", *Planetary and Space Science*, 68, 34-41, 2012.

### **Book chapters**

1. P.V Giampouras, K.E. Themelis, A.A. Rontogiannis, K.D. Koutroumbas, "Structured Abundance Matrix Estimation for Land Cover Hyperspectral Image Unmixing", Chapter in book: *Compressive Sensing of Earth Observations*, C.H. Chen (Editor), CRC Press Signal and Image Processing of Earth Observations Book Series, 2017.

### **Conferences (peer reviewed)**

1. K. E. Themelis, F. Lanusse, N. Jeffrey, A. Peel, J.-L. Starck, and F. B. Abdalla, "Modelling Data with Both Sparsity and a Gaussian Random Field: Application to Dark Matter Mass Mapping in Cosmology," in *Proceedings of the 26th European Signal Processing Conference (EUSIPCO)*, Rome, Italy, September 3-7, 2018.
2. K. E. Themelis, A. A. Rontogiannis, and K. D. Koutroumbas, "Online Bayesian group sparse parameter estimation using a Generalized Inverse Gaussian Markov chain", in *Proceedings of the 23th European Signal Processing Conference (EUSIPCO)*, Nice, France, Sep. 2015.
3. P. V. Giampouras, A. A. Rontogiannis, K. E. Themelis and K. D. Koutroumbas, "Online Bayesian Low-Rank Subspace Learning from Partial Observations", in *Proceedings of the 23th European Signal Processing Conference (EUSIPCO)*, Nice, France, Sep. 2015
4. P. V. Giampouras, A. A. Rontogiannis, K. D. Koutroumbas and K. E. Themelis, "A sparse reduced-rank regression approach for hyperspectral image unmixing", in *Proceedings of the 3rd International Workshop on Compressed Sensing Theory and its Application to Radar, Sonar and Remote Sensing (CoSeRa)*, Pisa, Italy, June 2015.
5. P. V. Giampouras, K. E. Themelis, A. A. Rontogiannis and K. D. Koutroumbas, "Hyperspectral image unmixing via simultaneously sparse and low rank abundance matrix estimation", in *Proceedings of the 7th Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing (IEEE WHISPERS)*, Tokyo, June 2015.
6. G. Papageorgiou, P. Bouboulis, S. Theodoridis, K.E. Themelis, "Robust Linear Regression Analysis - The Greedy Way", In *Proceedings of the 22th European Signal Processing Conference (EUSIPCO)*, Lisbon, Portugal, Sep. 2014.
7. K.E. Themelis, A.A. Rontogiannis, and K.D. Koutroumbas, "Group-sparse

- adaptive variational Bayes estimation”, In Proceedings of the 22th European Signal Processing Conference (EUSIPCO), Lisbon, Portugal, Sep. 2014.
8. P.V. Giampouras, K.E. Themelis, A.A. Rontogiannis, and K.D. Koutroumbas, “A variational Bayes algorithm for joint-sparse abundance estimation”, In Proceedings of the 6th Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing (IEEE WHISPERS), Lausanne, June 2014.
  9. K.E. Themelis, A.A. Rontogiannis, and K.D. Koutroumbas, “Adaptive variational sparse Bayesian estimation,” Acoustics, Speech and Signal Processing (ICASSP), IEEE International Conference on, May 2014.
  10. K.E. Themelis, A.A. Rontogiannis, and K.D. Koutroumbas, “Variational Bayesian sparse adaptive filtering using a Gauss-Seidel recursive approach,” In Proceedings of the 21th European Signal Processing Conference (EUSIPCO), Marocco, Sep. 2013.
  11. A.A. Rontogiannis, K.E. Themelis, O. Sykioti and K.D. Koutroumbas, “A fast variational Bayes algorithm for sparse semi-supervised unmixing of OMEGA/Mars data”, In Proceedings of the 5th Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing (IEEE WHISPERS), Florida, June 2013.
  12. A.A. Rontogiannis, K.E. Themelis, K.D. Koutroumbas, “A Fast Algorithm for the Bayesian Adaptive Lasso”, In Proceedings of the 20th European Signal Processing Conference (EUSIPCO), Bucharest, Aug. 2012.
  13. K.E. Themelis, A.A. Rontogiannis, K.D. Koutroumbas, “Sparse Semi-Supervised Hyperspectral Unmixing Using a Novel Iterative Bayesian Inference Algorithm”, In Proceedings of the 19th European Signal Processing Conference (EUSIPCO), Barcelona, Sept. 2011.
  14. K.E. Themelis, A.A. Rontogiannis, O. Sykioti, K.D. Koutroumbas, I.A. Daglis, F. Schmidt, “On the Unmixing of MEx/OMEGA Hyperspectral Data”, In Proceeding of the European Planetary Science Congress (EPSC) , Rome, Sept. 2010.
  15. K.E. Themelis, A.A. Rontogiannis, O. Sykioti, K.D. Koutroumbas, I.A. Daglis, F. Schmidt, “On the unmixing of MEx/OMEGA hyperspectral data using a MAP Estimator”, Geophysical Research Abstracts, 12, PS7.1 Spectroscopy and radiative transfer in Planetary atmospheres, EGU General Assembly, Vienna, April 2010.
  16. K.E. Themelis, A.A. Rontogiannis, K.D. Koutroumbas, “Semi-Supervised Hyperspectral Unmixing via the Weighted Lasso”, In Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), Dallas, TX, March 2010.
  17. K.E. Themelis, A.A. Rontogiannis, “A Soft Constrained MAP Estimator for Supervised Hyperspectral Signal Unmixing”, In Proceedings of the 16th European Signal Processing Conference (EUSIPCO), Lausanne, Aug. 2008.
  18. Anogianakis G., Kapritsos E., Makris C., Mpaltas N., Themelis A., Perdikuri K., Tsakalidis A., "Idenitification of protein patterns in nucleic acid sequences and exploration of synonymous codons in tissue differentiation", Computational Biology and Genome Information Conference, 2005.

Hobbies & interests

Chess puzzles solver, amateur photographer, individual sports.