Stamatios Lefkimmiatis

QBio Inc., Redwood City, United States
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Education

Nov. 2004– Dec. 2009
Ph.D. in Electrical & Computer Engineering, *National Technical University of Athens*, Greece.
Ph.D. Thesis: Statistical Signal and Image Processing Methods for Optimal Denoising and Detection with Applications to Satellite Data. (Ph.D. thesis successfully defended in December 2009, Ph.D. title awarded in April 2010)
Advisor: Prof. Petros Maragos

Sep. 1999– Jul. 2004
Diploma/M.Eng. in Computer Engineering & Informatics, *University of Patras*, Greece.
GPA: 8.62/10 (highest honors), ranked in top 5% of the class.
Diploma Thesis: Equalization for DMT-based (Discrete MultiTone) Systems
Advisor: Prof. Kostas Berberidis

Research Experience

Feb. 2019– present
Senior Research Scientist, *QBio Inc.*, Redwood City, United States.
Research in medical imaging, optimization and machine learning. Main research directions:

Neural networks and deep learning methods for non-linear problems in medical imaging.

Variational methods, regularization techniques and large-scale optimization strategies for parallel and quantitative MRI.

May 2016– March 2019
Assistant Professor, *Skolkovo Institute of Science and Technology*, Moscow, Russian Federation.
Director of the Computational Imaging Group (GIG) (cig.skoltech.ru). Research in image processing, machine learning and computer vision. Main research directions:

Deep neural networks for inverse problems in image processing and computer vision.

Variational and convex optimization methods for image reconstruction.

May 2014– April 2016
Postdoctoral Research Fellow, *University of California, Los Angeles*, United States.
Member of the Computational and Applied Mathematics Group (CAM)(www.math.ucla.edu), working with Prof. Stanley Osher. Research in image processing and computer vision. Main research directions:

Non-local variational methods for inverse problems in imaging.

Deep learning for image reconstruction.

Jul. 2010– April 2014
Postdoctoral Research Associate, *École polytechnique fédéral de Lausanne*, Switzerland.
Member of the Biomedical Imaging Group (BIG)(bigwww.epfl.ch), working with Prof. Michael Unser. Research in biomedical image processing and computer vision. Main projects:

Designing a novel regularization framework based on matrix-valued differential operators for reconstruction of biomedical data and natural images.

Development of efficient convex optimization techniques for large-scale inverse imaging problems.

Nov. 2004– May 2010	**Graduate Research Assistant**, *National Technical University of Athens*, Greece. Member of the *Computer Vision, Speech Communication & Signal Processing* (CVSP) group (cvsp.cs.ntua.gr). Participated in national and European research projects in the areas of image analysis and multisensor signal processing: ○ *ΠΕΝΕΔ-03 (Greek Secretariat for Research & Technology Project)*: Research in statistical signal processing and pattern recognition. Development of wavelet-domain signal and image denoising and detection techniques for digital analysis and processing. Applications to satellite astronomical data and multisensor problems. ○ *HIWIRE (European Union Research Project)*: Research in speech analysis and multisensor signal processing. Development of multisensor algorithms for speech enhancement and multisensor feature extraction front-ends for robust speech processing and recognition in adverse environments.
May-Jun. 2009	**Visiting researcher**, *Mullard Space Science Laboratory*, England. *Project*: Statistical methods for astronomical image analysis and processing. *Mentor*: Prof. Peter Muller.

Research Interests

Machine learning, computer vision, computational methods for inverse imaging problems, variational and PDE methods, large scale optimization techniques, Bayesian inference, statistical image modeling, multiscale image analysis.

Scholarships and Awards

2017	**IEEE Signal Processing Society**, 2017 SPS Best Paper Award.
May 2014– Oct. 2015	**Swiss National Science Foundation**, Advanced Postdoc Mobility Fellowship.
Sep. 2009	**National Technical University of Athens**, Thomaidio award for research excellence.
Jan. 2006– Dec. 2009	**Bodossaki Foundation**, PhD studies scholarship based on academic achievements.
Jan. 2005	**Technical Chamber of Greece**, Award to top ranking students in the School of Computer Engineering and Informatics.
Jan. 2004	**Greek State Scholarships Foundation**, Award to top ranking students in the School of Computer Engineering and Informatics for the academic year 2002-2003.

Research Funding

Feb. 2015	**NVIDIA Corporation**, Academic equipment grant (\$ 3,500). Image Recovery with Deep Learning Models.

Teaching Experience

Jan. – Mar. 2017 & 2018	**Signal and Image Processing Course**, *Skolkovo Institute of Science and Technology*. Lectures on fundamentals of signal and image processing.
Jun. – Aug. 2015	**REU Mentoring**, *University of California, Los Angeles, USA, Department of Mathematics*. Mentoring a group of undergraduate students within a research training program in image processing and computational applied mathematics.
Jul. 2010– April 2014	**Diploma Thesis Mentoring**, *École polytechnique fédéral de Lausanne, School of Engineering*. Mentoring diploma thesis students working on signal processing, image analysis and computer vision projects at BIG group.
Jul. 2010– April 2014	**Teaching Assistant**, *École polytechnique fédéral de Lausanne, School of Engineering*, Image Processing I & II (Master level). Serving as lab and teaching assistant. Contributing to student homework grading, development of new analytic and lab exercises, development of supplementary teaching material, lab and recitation classes, student tutoring, grading.

Sep. 2005– Dec. 2009	**Graduate Teaching Assistant**, *National Technical University of Athens, School of E.C.E.*, Signals and Systems (4th semester).
	Served as lab and teaching assistant. Contributed to student homework grading, development of new analytic and lab exercises, development of supplementary teaching material, lab and recitation classes, website maintenance, student tutoring.
Sep. 2007– Dec. 2009	**Graduate Teaching Assistant**, *National Technical University of Athens, School of E.C.E.*, Digital Signal Processing (6th semester).
	Served as lab and teaching assistant. Contributed to development of supplementary teaching material, development of new analytic exercises, lab classes, student tutoring.

Invited Talks and Presentations

2018   **Huawei's Professors Day, Russia, Moscow** , *Iterative Residual Networks for Burst Photography Applications*, Huawei Research Center, *Organizers*: A. Filippov.

2018   **Machines can See, Computer Vision and Deep Learning Summit, Russia, Moscow** , *Universal Denoising Networks : A Novel CNN Architecture for Image Denoising*, Vision Labs, *Organizers*: I. Laptev, V. Lempitsky, A. Konushin, D. Vetrov.

2017   **University of California, Los Angeles, USA**, *Non-local Color Image Denoising with Convolutional Neural Networks*, Level Set Collective, *Host*: Prof. S. Osher.

2017   **National Technical University of Athens, Greece**, *Non-local Image Restoration with Convolutional Neural Networks : A Deep Learning Approach*, CVSP group, *Host*: P. Maragos.

2016   **Los Alamos National Labs, New Mexico, USA**, *Convex Generalizations of Total Variation with Applications to Inverse Problems in Image Processing*, CNLS Seminar, *Host*: Dr. B. Wohlberg.

2015   **University of California, Los Angeles, USA**, *Vectorial Non-Local Total Variation for Calibration-Free Parallel MRI Reconstruction*, Keck Meeting, *Host*: Prof. P. Weiss.

2014   **University of California, Los Angeles, USA**, *Convex Regularization Strategies based on Matrix-valued Differential Operators for Inverse Imaging Problems*, Level Set Collective, *Host*: Prof. S. Osher.

2013   **University of California, Los Angeles, USA**, *Convex Generalizations of Total Variation based on Matrix-valued Differential Operators for Inverse Imaging Problems*, Applied Math Colloquium, *Host*: Prof. L. Vesse.

2011   **Schloss Dagstuhl, Germany**, *Image Restoration under Hessian Matrix-Norm Regularization*, Dagstuhl Seminar: Efficient Algorithms for Global Optimisation Problems in Computer Vision, *Organizers*: Andrés Bruhn, Thomas Pock, and Xue-Cheng Tai.

2010   **École polytechnique fédéral de Lausanne, Switzerland**, *Bayesian Multiscale Methods for Analyzing Poisson Processes with Applications to Photon Limited Imaging*, LCAV group, *Host*: Prof. M. Vetterli.

2009   **PENED Workshop, Greece**, *Photon-Limited Image Denoising with Bayesian Multiscale Methods*, PENED project Workshop: Novel Methods for Transmission, Reception and Analysis of Space Signals and Images.

2009   **Mullard Space Science Laboratory, England**, *Bayesian Multiscale Methods for Photon-Limited Image Intensity Estimation*, *Host*: Prof. Peter Muller.

2009   **University College London, England**, *Statistical Methods for Astronomical Image Analysis*, Astrophysics group, *Host*: Prof. Ofer Lahav.

2007   **HIWIRE Workshop, Greece**, *Multisensor Feature Extraction for Speech Recognition*, HIWIRE Research Project Workshop, Chania, Crete, May 10–11, 2007.

2006–2015   **Conference Presentations**,   *21 lecture and poster presentations at international conferences.*

Professional Activities

Journal paper reviewing

- **IEEE Transactions on Image Processing**.
- **IEEE Transactions on Computational Imaging**.
- **IEEE Signal Processing Letters**.
- **IEEE Transactions on Systems, Man, and Cybernetics–Part B: Cybernetics**.
- **SIAM Journal on Imaging Sciences**.

- **SPRINGER Journal of Mathematical Imaging and Vision**.
- **SPRINGER Journal of Scientific Computing**.
- **EURASIP Journal on Advances in Signal Processing**.
- **ELSEVIER Signal Processing**.
- **ELSEVIER Journal of Computational and Applied Mathematics**.
- **OSA Journal of Applied Optics**.

Conference Organization

ISBI 3D Deconvolution Microscopy Challenge (April 2013) [co-organized with Cedric Vonesch]. http://bigwww.epfl.ch/deconvolution/challenge/

ISBI Second International Challenge on 3D Deconvolution Microscopy (April 2014) [co-organized with Cedric Vonesch]. http://bigwww.epfl.ch/deconvolution/challenge/

MLSP Special Session on Machine Learning for Computational Imaging (Sep. 2017) [co-organized with S. Ravishankar, B. Wohlberg and J. Chul Ye]. http://mlsp2017.conwiz.dk/specialsessions.htm

Professional Memberships

2015–present	**Computational Imaging Special Interest Group**, www.signalprocessingsociety.org.
2008–present	**Institute of Electrical and Electronics Engineers (IEEE)**, www.ieee.org.
2008–present	**IEEE Signal Processing Society**, www.signalprocessingsociety.org.
2006–2008	**International Speech Communication Association (ISCA)**, www.isca-speech.org.
2005–present	**Technical Chamber of Greece**, www.e-tee.org.gr.

Computer Skills

Programming, Proficiency in Python, Matlab, working experience in C/C++, Java.

Other, System administration (Windows, Linux, Mac), document processing in LaTeX.

Languages

English, (Fluent, Michigan ESOL CPE (CEFR level C2)), **French** (Literate, One year courses), **Greek** (Native).

Publications List

Refereed Journal Articles

[11] F. Kokkinos and **S. Lefkimmiatis**, "Iterative Joint Image Demosaicking and Denoising using a Residual Denoising Network", *IEEE Trans. Image Process.*, vol. 28, no. 8, pp. 4177–4188, August 2019.

[10] A. Saucedo, **S. Lefkimmiatis**, N. Ragwala, and K. H. Sung, "Improved Computational Efficiency of Locally Low Rank MRI Reconstruction Using Iterative Random Patch Adjustments", in *IEEE Trans. Medical Image Process.*, vol. 36 , no. 6, pp. 1209–1220, Jan. 2017.

[9] **S. Lefkimmiatis** and S. Osher, "Non-local Structure Tensor Functionals for Image Regularization", *IEEE Trans. Computational Imaging*, vol. 1, no. 1, pp. 16–29, June 2015.

[8] **S. Lefkimmiatis**, A. Roussos, P. Maragos, and M. Unser, "Structure Tensor Total Variation", *SIAM J. Imaging Sci.*, vol. 8, no. 2, pp. 1090–1122, May 2015.

[7] E. Bostan, **S. Lefkimmiatis**, O. Vardoulis, N. Stergiopulos, and M. Unser, "Improved Variational Denoising of Flow Fields with Application to Phase-Contrast MRI Data," *IEEE Signal Process. Letters*, vol. 22, no. 6, pp. 762-766, June 2015.

[6] M. Nilchian, C. Vonesch, **S. Lefkimmiatis**, P. Modregger, M. Stampanoni, and M. Unser, "Constrained regularized reconstruction of X-ray-DPCI tomograms with weighted-norm", *Optics Express*, vol. 21, issue 26, pp. 32340-32348, December 2013.

[5] **S. Lefkimmiatis** and M. Unser, "Poisson Image Reconstruction with Hessian Schatten-Norm Regularization", *IEEE Trans. Image Process.*, vol. 22, no. 11, pp. 4314–4327, November 2013.

[4] **S. Lefkimmiatis**, J. P. Ward, and M. Unser, "Hessian Schatten-Norm Regularization for Linear Inverse Problems", *IEEE Trans. Image Process.*, vol. 22, no. 5, pp. 1873-1888, May 2013.

[3] **S. Lefkimmiatis**, A. Bourquard, and M. Unser, "Hessian-Based Norm Regularization for Image Restoration with Biomedical Applications", *IEEE Trans. Image Process.*, vol. 21, no. 3, pp. 983–995, March 2012. (**IEEE SPS 2017 Best Paper Award**)

[2] **S. Lefkimmiatis**, P. Maragos, and G. Papandreou, "Bayesian inference on multiscale models for Poisson intensity estimation: Applications to photon-limited image denoising", *IEEE Trans. Image Process.*, vol. 18, no. 8, pp. 1724–1741, August 2009.

[1] **S. Lefkimmiatis** and P. Maragos, "A generalized estimation approach for linear and nonlinear microphone array post-filters", *Speech Communication*, vol. 49, pp. 657–666, July 2007.

Refereed Conference Proceedings

[22] V. Pronina, F. Kokkinos, D. Dylov and **S. Lefkimmiatis**," Microscopy Image Restoration with Deep Wiener-Kolmogorov Filters", submitted.

[21] F. Kokkinos and **S. Lefkimmiatis**," Iterative Residual CNNs for Burst Photography Applications", In *Proc. IEEE Int. Conf. Computer Vision and Pattern (CVPR'19)*, Long Beach, CA, June 2019.

[20] F. Kokkinos and **S. Lefkimmiatis**,"Deep Image Demosaicking using a Cascade of Convolutional Residual Denoising Networks", In *European Conference on Computer Vision (ECCV'18)*, Munich, Germany, Sept. 2018.

[19] **S. Lefkimmiatis**,"Universal Denoising Networks : A Novel CNN Architecture for Image Denoising", In *Proc. IEEE Int. Conf. Computer Vision and Pattern (CVPR'18)*, Salt-Lake City, UT, June 2018.

[18] **S. Lefkimmiatis**,"Non-local color image denoising with convolutional neural networks", In *Proc. IEEE Int. Conf. Computer Vision and Pattern (CVPR'17)*, Honolulu, HI, July 2017.

[17] J. Lin, **S. Lefkimmiatis**, and S. Kyunghyun,"Deep network training based sparsity model for reconstruction", In *Proc. 25th ISMRM Meeting*, Hawaii, USA, April 2017.

[16] **S. Lefkimmiatis**, A. Saucedo, S. Osher, and S. Kyunghyun, "Vectorial non-local total variation regularization for calibration-free parallel MRI reconstruction", In *Proc. Int. Symp. Biomedical Imaging (ISBI'15)*, Brooklyn, NY, Apr. 2015.

[15] A. Saucedo, **S. Lefkimmiatis**, S. Osher, and S. Kyunghyun, "Novel non-local total variation regularization for constrained MR reconstruction", In *Proc. 23rd ISMRM Meeting*, Toronto, Canada, May 2015.

[14] S. Kromwijk, **S. Lefkimmiatis** and M. Unser, "High-performance 3D Deconvolution of Fluorescence Micrographs", In *Proc. Int. Conf. Image Processing (ICIP'14)*, Paris, France, Oct. 2014, pp. 3029–3032.

[13] E. Froustey, E. Bostan, **S. Lefkimmiatis**, and M. Unser, "Digital phase reconstruction via iterative solutions of transport-of-intensity equation", in *Proc. 13th IEEE Workshop on Information Optics (WIO'14)*, Neuchatel NE, Switzerland, July 2014, pp. 1–3.

[12] **S. Lefkimmiatis**, A. Roussos, M. Unser, and P. Maragos, "Convex Generalizations of Total Variation based on the Structure Tensor with Applications to Inverse Problems", In *Scale Space and Variational Methods in Computer Vision* , Springer Berlin Heidelberg, 2013, vol. 7893, pp. 48–60.

[11] **S. Lefkimmiatis** and M. Unser, "3D Poisson Microscopy Deconvolution with Hessian Schatten-Norm Regularization", In *Proc. Int. Symp. Biomedical Imaging (ISBI'13)*, San Francisco, CA, Apr. 2013, pp. 165–168.

[10] D. Sage, H. Kirshner, C. Vonech, **S. Lefkimmiatis**, and M. Unser, "Benchmarking Image-Processing Algorithms for Biomicroscopy: Reference Datasets and Perspectives", In *Proc. 21st European Signal Processing Conf. (EUSIPCO'13)*, Marrakech, Morocco, Sep. 2013.

[9] **S. Lefkimmiatis** and M. Unser, "A Projected Gradient Algorithm for Image Restoration under Hessian Matrix-Norm Regularization", In *Proc. Int. Conf. Image Processing (ICIP'12)*, Orlando, FL, Sep. 2012, pp. 3029–3032.

[8] **S. Lefkimmiatis**, A. Bourquard, and M. Unser, "Hessian-Based Regularization For 3-D Microscopy Image Restoration", In *Proc. Int. Symp. Biomedical Imaging (ISBI'12)*, Barcelona, Spain, May 2012, pp. 1731–1734.

[7] D. Zafer, **S. Lefkimmiatis**, A. Bourquard, and M. Unser, "A Second-order Extension of TV Regularization for Image Deblurring", In *Proc. Int. Conf. Image Processing (ICIP'11)*, Brussels, Belgium, Sep. 2011, pp. 713–716

[6] **S. Lefkimmiatis**, G. Papandreou, and P. Maragos, "Poisson-Haar transform: A nonlinear multiscale representation for photon-limited image denoising", In *Proc. IEEE Int. Conf. Image Processing (ICIP'09)*, Cairo, Egypt, Nov. 2009, pp. 3853–3856.

[5] **S. Lefkimmiatis**, G. Papandreou, and P. Maragos, "Photon-limited image denoising by inference on multiscale models," In *Proc. IEEE Int. Conf. Image Processing (ICIP'08)*, San Diego, CA, Oct. 2008, pp. 2332–2335.

[4] **S. Lefkimmiatis**, P. Maragos, and A. Katsamanis, "Multisensor multiband cross-energy tracking for feature extraction and recognition", In *Proc. IEEE Int. Conf. Acoustics, Speech, and Signal Processing (ICASSP'08)*, Las Vegas, NV, Apr. 2008, pp. 4741–4744.

[3] D. Dimitriadis, P. Maragos, and **S. Lefkimmiatis**, "Multiband, multisensor features for robust speech recognition", In *Proc. Int. Conf. Speech Technology and Communication (ICSTC'07)*, Antwerp, Belgium, Aug. 2007.

[2] **S. Lefkimmiatis** and P. Maragos, "Optimum Post-Filter Estimation for Noise Reduction in Multichannel Speech Processing", In *Proc. 14th European Signal Processing Conf. (EUSIPCO'06)*, Florence, Italy, Sep. 2006.

[1] **S. Lefkimmiatis**, D. Dimitriadis, and P. Maragos, "An Optimum Microphone Array Post-Filter for Speech Applications", In *Proc. Int. Conf. Spoken Language Processing (ICSLP'06)*, Pittsburgh, PA, Sep. 2006, pp 2142–2145.