

# Stéphane Derrode

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## Full professor

École Centrale de Lyon, France  
& LIRIS Lab (CNRS UMR 5205)

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## Short Curriculum

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- Sept. 20→** **Head** of the [Imagine team](#), which includes 21 members: 8 full professors, and 13 assistant professors (previously deputy team leader, from 2015 to 2020).
- Sept. 14→** **Full Professor** [École Centrale de Lyon](#)  
Teacher in the Mathematics and Computer Sciences Dpt and researcher at [LIRIS](#) laboratory.
- 2015→2020** Elected to the **Scientific Council** of LIRIS Lab.
- 2008** **Habilitation à Diriger des Recherches** Aix-Marseilles University.  
TITLE [Contributions in statistical segmentation and 2D pattern recognition.](#)  
DATE April 29, 2008
- 01→** **Associate professor** at [École Centrale Marseille](#)  
Teacher and researcher in Computer Sciences, Signal and Image Processing at [Institut Fresnel](#), Marseilles, France.
- 99→01** **Post-doct** at ENST BRETAGNE, France. Involved in projects  
SIR [Radar image classification using Markovian models.](#)  
MOSS [Multi-scale segmentation of oil spills.](#)
- 1999** **PhD** from Rennes University (France), *ITI* department from ENST-BRETAGNE, under supervision of Prof. F. Ghorbel.  
TITLE [Plane shape description using different approximations of analytical Fourier-Mellin transform for image database indexing.](#)  
DATE December 15, 1999

## Research activities

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Book chapters	3
Paper in international journal	27 (+4 in French journals)
International patents	2
Communications in int. conf.	34

All preprints for journal papers are available to download from [my own web pages](#).

### ➤ Thesis supervision (in progress or already defended)

- ↔ Mr **Liqun Liu**. Grant China Scholarship Council (CSC), defence planned for autumn 2021. Rate: 25%. Co-supervisors: R. Vuillemot
- ↔ Mr **Haoyu Li**. Grant China Scholarship Council (CSC), defended December 4, 2019. Rate: 50%. Co-supervisors: W. Pieczynski et L. Benyoussef
- ↔ Mrs **Qinjie Ju**. Grant China Scholarship Council (CSC), defended April 9, 2019. Rate: 50%. Co-supervisor: R. Chalon. Position: ATER at INSA / Lyon.
- ↔ Mrs **Fei Zheng**. Grant China Scholarship Council (CSC), defended December 18, 2017. Rate: 70%. Co-supervisor: W. Pieczynski. Position: post-doct at INRIA / Grenoble.
- ↔ Mr **Valérian Nêmesin**. Grant DGA/CNRS, defended September 30, 2014. Rate: 100%. Position: iResearch engineer.
- ↔ Mr **William Ketchantang**. Grant Cifre (ST MicroElectronics), 29/01/2008. Rate: 50%. Position: Research engineer at Morpho, Groupe Safran.
- ↔ Mr **Cyril Carincotte**. Grant Ministérielle, 14/11/2005. Rate: 50%. Position: Research engineer at MultiTel (Belgique).
- ↔ Mrs **Rim Mezhoud-Khouaja**. Ensi, Lab. Cristal (Grift, Tunisie), 2/11/2005. Rate: 50%. Position: assistant-professor at Tunis, Tunisia.

### ➤ Thesis examiner

- ↔ Mr **Mathieu Adam**, March 25, 2010 at TÉLÉCOM PARISTECH, France.
- ↔ Mrs **Noura Dridi**, June 25, 2012 at TÉLÉCOM LILLE, France.
- ↔ Mr **Mohamed El Yazid Boudaren**, January 11, 2014 at l'ÉCOLE POLYTECH. D'ALGER, Algeria.
- ↔ Mr **Quoc Thong Nguyen**, May 18, 2015 at TÉLÉCOM LILLE, France.
- ↔ Mrs **Atizez Hadrich**, December 2, 2015 at l'UNIVERSITÉ DES SCIENCES DE SFAX, Tunisia.
- ↔ Mr **Faïcel Chamroukhi**, December 7, 2015 at l'UNIVERSITÉ DE TOULON, France.
- ↔ Mrs **Mouna Zitouni**, May 23, 2017 at UNIVERSITÉ DES SCIENCES DE SFAX, Tunisia.
- ↔ Mrs **Meriem Yahiaoui**, July 11, 2017 at l'TÉLÉCOM SUDPARIS, France.
- ↔ Mrs **Sawsen Rezig**, July 13, 2017 at l'ENISE, Saint-Étienne, France.
- ↔ Mr **Tahar Nabil**, January 9, 2018 at TÉLÉCOM PARISTECH, France.
- ↔ Mr **Yassin Lehiani**, March 1, 2018 at ENIS, TUNIS, Tunisia.
- ↔ Mr **Bassel Marhaban**, Nov. 21, 2018 at Côte d'Opale University, France.
- ↔ Mme **Ines Sakly**, Nov. 29, 2018 at ENSI, Tunisia.
- ↔ Mr **Thomas Deregnaucourt**, December 16, 2019 at UNIVERSITÉ CLERMONT AUVERGNE, France.
- ↔ Mr **Marwene Kechiche**, Nov. 19, 2020, at l'ENISE, Saint-Étienne, France.
- ↔ Mr **Emmanuel Monfrini**, Oct. 27, 2020 at Télécom-SudParis, France.

## Publication list

### ► Book chapters

- [1] G. Mercier, **S. Derrode**, E. Trouvé, and L. Bombrun. *Multivariate Image Processing: Methods and Applications*, chapter [Change Detection in Remote Sensing Observation](#). Digital Signal and Image Processing Series, ISBN-10: 1848211392, ISBN-13: 978-1848211391. J. Chanussot, Ch. Collet and K. Chehdi Editors, ISTE Ltd and John Wiley et Sons Inc, 2009.
- [2] L. Benyoussef and **S. Derrode**. *Imaging for Culturage Heritage*, chapter [Analysis of ancient mosaic images for dedicated applications](#). Digital Imaging and Computer Vision Book Series. Filippo Stanco, Sebastiano Battiato and Giovanni Gallo Editors, CRC Press / Taylor & Francis, 2011.
- [3] **S. Derrode** and W. Pieczynski. *Avancées Récentes en Reconnaissance Statistique de Formes*, chapter [Modèles de mélange à copules : simulation, restauration et sélection](#). F. Ghorbel, S. Derrode et O. Alata, 2012.

### ► Papers in peer-reviewed journals

- [4] **S. Derrode** and F. Ghorbel. [Robust and efficient Fourier-Mellin transform approximations for invariant grey-level image description and reconstruction](#). *Computer Vision and Image Understanding*, 83(1):57–78, July 2001. **SJR: Q1**.
- [5] **S. Derrode** and F. Ghorbel. [Shape analysis and symmetry detection in gray-level objects using the Fourier-Mellin representation](#). *Signal Processing*, 84(1):25–39, January 2004. **SJR: Q1**.
- [6] **S. Derrode** and W. Pieczynski. [Unsupervised signal and image segmentation using pairwise Markov chains](#). *IEEE Trans. on Signal Processing*, 52(9):2477–2489, September 2004. **SJR: Q1**.
- [7] C. Carincotte, **S. Derrode**, and S. Bourennane. [Unsupervised change detection on SAR images using fuzzy hidden Markov chains](#). *IEEE Trans. on Geosci. and Rem. Sens.*, 44(2):432–441, 2006. **SJR: Q1**.
- [8] F. Ghorbel, **S. Derrode**, R. Mezhoud, T. Bannour, and S. Dhahbi. [Image reconstruction from a complete set of similarity invariants extracted from complex moments](#). *Pattern Recognition Letters*, 27:1361–1369, September 2006. **SJR: Q1**.
- [9] **S. Derrode** and G. Mercier. [Multiscale oil slick segmentation from SAR images using a vector HMC model](#). *Pattern Recognition*, 40(3):1135–1147, March 2007. **SJR: Q1**.
- [10] W. Ketchantang, **S. Derrode**, L. Martin, and S. Bourennane. [Pearson-based mixture model for color object tracking](#). *Machine Vision and Applications, Special issue on video surveillance research in industry and academia*, 19(5-6), October 2008. **SJR: Q2**.
- [11] L. Benyoussef, C. Carincotte, and **S. Derrode**. [Extension of higher-order HMC modeling with application to image segmentation](#). *Digital Signal Processing*, 18(5):849–860, 2008. **SJR: Q2**.
- [12] M.-A. Chermi, **S. Derrode**, and F. Ghorbel. [Fourier-based geometric shape prior for snakes](#). *Pattern Recognition Letters*, 29(7):897–904, May 2008. **SJR: Q1**.
- [13] Z. Bouyahia, L. Benyoussef, and **S. Derrode**. [Change detection in SAR images with a sliding hidden Markov chain model](#). *J. of Applied Remote Sensing*, 2(1):023526, 2008. **SJR: Q2**.
- [14] L. Benyoussef and **S. Derrode**. [Tessella-oriented segmentation and guidelines estimation of ancient mosaic images](#). *J. of Electronic Imaging*, 17(4), October 2008. **SJR: Q3**.
- [15] **S. Derrode**, L. Benyoussef, and W. Pieczynski. [Subsampling-based HMC parameters estimation with application to large data sets classification](#). *Signal, Image and Video Processing Journal*, May 2012. doi:10.1007/s11760-012-0324-2, **SJR: Q2**.
- [16] **S. Derrode** and W. Pieczynski. [Unsupervised parameters estimation in generalized pairwise Markov chain with automatic copulas selection](#). *Computational Statistics & Data Analysis*, 63:81–98, July 2013. doi:10.1016/j.csda.2013.01.027, **SJR: Q1**.
- [17] V. Nèmesin and **S. Derrode**. [Robust blind pairwise Kalman algorithms using QR decompositions](#). *IEEE Trans. on Signal Processing*, 61(1):5–9, 2013. **SJR: Q1**.
- [18] **S. Derrode** and W. Pieczynski. [Exact fast computation of optimal filter in Gaussian switching linear systems](#). *IEEE Signal Processing Letters*, 20(7):701–704, July 2013. **SJR: Q2**.
- [19] N. Abassi, D. Benboudjema, **S. Derrode**, and W. Pieczynski. [Optimal filter approximations in conditionally Gaussian pairwise Markov switching models](#). *IEEE Trans. on Automatic Control*, 60(4):1104–1109, April 2015. **SJR: Q1**.

- [20] V. Nèmesin and **S. Derrode**. Robust partial-learning in linear Gaussian systems. *IEEE Trans. on Automatic Control*, 60(9):2518–2523, 2015. **SJR: Q1**.
- [21] V. Nèmesin and **S. Derrode**. Quality-driven real-time iris recognition from close-up eye videos. *Signal, Image and Video Processing Journal*, 10(1):153–160, 2016. **SJR: Q2**.
- [22] **S. Derrode** and W. Pieczynski. Unsupervised classification using hidden Markov chain with unknown noise copulas and margins. *Signal Processing*, 128:8–17, November 2016. **SJR: Q1**.
- [23] I. Gorynin, **S. Derrode**, E. Monfrini, and W. Pieczynski. Fast Filtering in Switching Approximations of Nonlinear Markov Systems With Applications to Stochastic Volatility. *IEEE Trans. on Automatic Control*, 62(2):853–862, February 2017. **SJR: Q1**.
- [24] I. Gorynin, **S. Derrode**, E. Monfrini, and W. Pieczynski. Fast smoothing in switching approximations of non-linear and non-Gaussian models. *Computational Statistics and Data Analysis*, 114:38–46, 2017. doi: <https://doi.org/10.1016/j.csda.2017.04.007>, **SJR: Q1**.
- [25] F. Zheng, **S. Derrode**, and W. Pieczynski. Parameter Estimation in Switching Markov Systems and Unsupervised Smoothing. *IEEE Trans. on Automatic Control*, 64(4):1761–1767, April 2019. **SJR: Q1**.
- [26] Q. Ju, R. Chalon, and **S. Derrode**. Assisted Music Score Reading Using Fixed-Gaze Head Movement: Empirical Experiment and Design Implications. *PACM on Human-Computer Interaction Journal*, 3(EICS):3:1–3:29, 2019. **SJR: trop récent**.
- [27] H. Li, **S. Derrode**, and W. Pieczynski. Lower limb locomotion activity recognition of healthy individuals using semi-Markov model and single wearable inertial sensor. *Sensors*, 19:4242–1, September 2019. doi: [10.3390/s19194242](https://doi.org/10.3390/s19194242), **SJR: Q2**.
- [28] H. Li, **S. Derrode**, and W. Pieczynski. An adaptive and on-line IMU-based locomotion activity classification method using a triplet Markov model. *Neurocomputing*, (362):94 – 105, October 2019. doi: [10.1016/j.neucom.2019.06.081](https://doi.org/10.1016/j.neucom.2019.06.081), **SJR: Q1**.
- [29] F. Zheng, **S. Derrode**, and W. Pieczynski. Semi-supervised optimal recursive filtering and smoothing in non-Gaussian Markov switching models. *Signal Processing*, 171:107511–1:107511–10, June 2020. doi: [10.1016/j.sigpro.2020.107511](https://doi.org/10.1016/j.sigpro.2020.107511), **SJR: Q1**.
- [30] Z. Bouyahia, **S. Derrode**, and W. Pieczynski. Filtering in Gaussian linear systems with fuzzy switches. *IEEE Trans. Fuzzy Syst.*, 28(8):1760–1770, 2020. doi: [10.1109/TFUZZ.2019.2921944](https://doi.org/10.1109/TFUZZ.2019.2921944), **SJR: Q1**.

## ► International conferences

- [31] **S. Derrode** and W. Pieczynski. SAR image segmentation using generalized pairwise Markov chains. In *SPIEs Int. Symp. on Remote Sensing (SPIE-RS'02)*, Crete (Greece), 22-27 September 2002.
- [32] **S. Derrode** and F. Ghorbel. Shape distance for rotation estimation and rotational symmetry detection in gray-level images. In *Proc. of the XIème European Signal Processing Conf. (EUSIPCO'02)*, Toulouse (France), 3-6 September 2002.
- [33] **S. Derrode**, G. Mercier, and W. Pieczynski. Unsupervised multicomponent image segmentation combining a vectorial HMC model and ICA. In *Proc. of the IEEE Int. Conf. on Image Processing (ICIP)*, Barcelona (Spain), 14-17 September 2003.
- [34] G. Mercier, **S. Derrode**, and M. Lennon. Hyperspectral image segmentation with Markov chain model. In *Proc. of the IEEE IGARSS'03*, Toulouse (France), 21-25 July 2003.
- [35] G. Mercier, **S. Derrode**, W. Pieczynski, J.-M. Lecaillec, and R. Garello. Multiscale oil slick segmentation with Markov chain model. In *Proc. of the IEEE Int. Conf. IGARSS'03*, Toulouse (France), 21-25 July 2003.
- [36] **S. Derrode**, G. Mercier, and W. Pieczynski. Unsupervised change detection in SAR images using a multicomponent HMC model. In *Proc. of the 2nd Int. MultiTemp Workshop*, Ispra (Italy), 16-18 July 2003.
- [37] C. Carincotte, **S. Derrode**, G. Sicot, and J.-M. Boucher. Unsupervised image segmentation based on a new fuzzy HMC model. In *Proc. of the IEEE Int. Conf. ICASSP'04*, Montreal (Canada), 17-21 May 2004.
- [38] **S. Derrode**, C. Carincotte, and S. Bourennane. Unsupervised image segmentation based on high-order hidden Markov chains. In *Proc. of the IEEE Int. Conf. ICASSP'04*, Montreal (Canada), 17-21 May 2004.
- [39] G. Mercier and **S. Derrode**. SAR image change detection using distance between distributions of classes. In *Proc. of the IEEE Int. Conf. IGARSS'04*, Anchorage (Alaska, USA), 20-24 September 2004.
- [40] N. Brunel, W. Pieczynski, and **S. Derrode**. Copulas in vectorial hidden Markov chains for multicomponent image segmentation. In *Proc. of the IEEE Int. Conf. ICASSP'05*, Philadelphia (USA), 19-23 March 2005.
- [41] C. Carincotte, **S. Derrode**, and S. Bourennane. Multivariate fuzzy hidden Markov chains model applied to unsupervised multiscale SAR image segmentation. In *Proc. of the IEEE Int. Conf. FUZZ'05*, Reno (Nevada, USA), 22-25 May 2005.
- [42] W. Ketchantang, **S. Derrode**, S. Bourennane, and L. Martin. Video pupil tracking for iris based identification. In *Proc. of the Advanced Concepts for Intelligent Vision Systems (ACIVS'05)*, Antwerp (Belgium), 20-23 September 2005.

- [43] F. Ghorbel, **S. Derrode**, S. Dhahbi, and R. Mezhoud. [Reconstructing with geometric moments](#). In *Proc. of the Int. Conf. on Machine Intelligence (ACIDCA-ICMI'05)*, Tozeur (Tunisia), 5-7 November 2005.
- [44] **S. Derrode**, M. A. Chermi, and F. Ghorbel. [Fourier-based invariant shape prior for snakes](#). In *Proc. of the IEEE Int. Conf. ICASSP'06*, Toulouse (France), 14-19 May 2006.
- [45] **S. Derrode**, L. Benyoussef, and W. Pieczynski. [Contextual estimation of hidden Markov chains with application to image segmentation](#). In *Proc. of the IEEE Int. Conf. ICASSP'06*, Toulouse (France), 14-19 May 2006.
- [46] M. A. Chermi, **S. Derrode**, and F. Ghorbel. [Euclidean invariant snake for joint stereo segmentation](#). In *Proc. of the IEEE Int. Conf. ICTTA'06*, Damascus (Syria), 24-28 April 2006.
- [47] G. Mercier, **S. Derrode**, W. Pieczynski, J.-M. Nicolas, A. Joannic-Chardin, and J. Inglada. [Copula-based stochastic kernels for abrupt change detection](#). In *Proc. of the IEEE Int. Conf. IGARSS'06*, Denver (Colorado, USA), July 31-August 4 2006.
- [48] Z. Bouyahia, L. Benyoussef, and **S. Derrode**. [Unsupervised SAR images change detection with hidden Markov chains on a sliding window](#). In *Proc. of the SPIE-RS'07 - Image and Signal Processing for Remote Sensing*, Florence (Italy), 17 - 21 September 2007.
- [49] M.-A. Chermi, F. Ghorbel, and **S. Derrode**. [Using Fourier-based shape alignment to add geometric prior to snakes](#). In *Proc. of the IEEE Int. Conf. ICASSP'09*, Taipei (Taiwan), 19 - 24 April 2009.
- [50] W. Sawaya, **S. Derrode**, M. Oould-Barikalla, and J. Rivaillier. [Detection and iterative decoding of a 2D alphabetic barcode](#). In *Proc. of the IEEE Int. Conf. MLSP'09*, Genoble (France), September 2-4 2009.
- [51] N. Benletaief, A. Benazza, and **S. Derrode**. [Pupil localization and tracking for vide-based iris biometrics](#). In *Proc. of the Int. Conf. ISSPA'10*, Kuala Lumpur (Malaysia), May 10-13 2010.
- [52] M. A. Chermi, M. A. Mezghich, S. M'Hiri, **S. Derrode**, and F. Ghorbel. [Geometric shape prior to region-based active contour using Fourier-based shape alignment](#). In *Proc. of the IEEE Int. Conf. IST'10*, Thessaloniki (Greece), July 1-2 2010.
- [53] **S. Derrode** and W. Pieczynski. [Unsupervised restoration in Gaussian pairwise mixture model](#). In *Proc. of the Int. Conf. EUSIPCO'11*, Barcelona (Spain), August 29 - September 2 2011.
- [54] S. Yousfi, **S. Derrode**, and R. Robbana. [Watermarking in e-voting for large scale election](#). In *Proc. of the Int. Conf. ARES'11*, Vienna (Austria), August 22-26 2011.
- [55] **S. Derrode** and W. Pieczynski. [Copulas selection in pairwise Markov chain](#). In *Proc. of the 20th Int. Conf. on Computational Statistics (COMPSTAT'12)*, Limassol (Cyprus), August 27-31 2012.
- [56] V. Nemesin, **S. Derrode**, and A. Benazza. [Gradual iris code construction from close-up eye video](#). In *Proc. of the Int. Conf. Advanced Concepts for Intelligent Vision Systems (ACIVS'12)*, Brno (Czech Republic), September 4-7 2012.
- [57] V. Nemesin and **S. Derrode**. [Inferring segmental pairwise Kalman filter with application to pupil tracking](#). In *Traitement et Analyse de l'Information - Méthodes et Applications (TAIMA)*, Hammamet (Tunisie), 8-13 Mai 2013.
- [58] W. Pieczynski, **S. Derrode**, N. Abassi, Y. Petitin, and F. Desbouvries. [Exact optimal filtering in an approximating switching system](#). In *Traitement et Analyse de l'Information - Méthodes et Applications (TAIMA)*, Hammamet (Tunisie), 8-13 Mai 2013.
- [59] **S. Derrode** and W. Pieczynski. [Fast filter in nonlinear systems with application to stochastic volatility model](#). In *Proc. of the Int. Conf. EUSIPCO'14*, Lisbonne (Portugal), 1-5 September 2014.
- [60] I. Gorynin, **S. Derrode**, E. Monfrini, and W. Pieczynski. [Exact fast smoothing in switching models with application to stochastic volatility](#). In *Proc. of the Int. Conf. EUSIPCO'15*, Nice, France, August 2015.
- [61] F. Zheng, **S. Derrode**, and W. Pieczynski. [Parameter estimation in conditionally Gaussian pairwise Markov switching models and unsupervised smoothing](#). In *Machine Learning for Signal Processing (MLSP'16)*, Salerno, Italy, September 2016.
- [62] F. Zheng, **S. Derrode**, and W. Pieczynski. [Fast Exact Filtering in Generalized Conditionally Observed Markov Switching Models with Copulas](#). In *Traitement et Analyse de l'Information - Méthodes et Applications (TAIMA)*, Hammamet (Tunisia), April 30 - May 5 2018.
- [63] H. Li, **S. Derrode**, L. Benyoussef, and W. Pieczynski. [Unsupervised Pedestrian Trajectory Reconstruction from IMU Sensors](#). In *Traitement et Analyse de l'Information - Méthodes et Applications (TAIMA)*, Hammamet (Tunisia), April 30 - May 5 2018.
- [64] H. Li, **S. Derrode**, L. Benyoussef, and W. Pieczynski. [Free walking 3D pedestrian large trajectory reconstruction from IMU Sensors](#). In *Proc. of the Int. Conf. EUSIPCO'18*, pp. 657-661, Roma (Italy), 2018.