Yuliya Tarabalka, PhD - Curriculum Vitae

Last name : **TARABALKA**   *First name :* **Yuliya**
French citizen, born on 14/11/1984 in Ternopil, Ukraine
One child (Born in 2015)
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Education

2017	Habilitation **HdR**	ED STIC, *Inria, University Côte d'Azur*, France
	Awarded: 24/11/2017, *Dissertation:* "Learning Approaches for Remote Sensing Image Classification"	
2010	**PhD** *with European label*	Signal and Image Processing, *Grenoble Institute of Technology (INPG), France*
	PhD *joint degree with INPG*	Electrical and Computer Engineering, *University of Iceland, Iceland*
	Awarded: 14/06/2010, *Dissertation:* "Classification of Hyperspectral Data Using Spectral-Spatial Approaches"	
2007	**MS** *with highest honors*	Signal, Image, Speech Processing and Telecommunications, *INPG, France*
2006	Engineer *with highest honors*	Information & Computer Systems, *Ternopil State Technical University, Ukraine*
2005	BS *with highest honors*	Computer Sciences, *Ternopil State Technical University, Ukraine*

Research experience

2012-pres.	**Research scientist, Inria Sophia Antipolis**, France (TITANE project team)
2012	**Post-doctoral researcher at Inria Sophia Antipolis and French Space Agency**, France
2010-2011	**Post-doctoral researcher at NASA Goddard Space Flight Center**, Greenbelt, MD, USA
2007-2010	**Researcher in the Marie Curie project "HYPER-I-NET"**. Norwegian Defence Research Establishment, Norway (6 months). University of Iceland, Iceland (2 years). INPG, France (6 months)
2007-2008	**Scientist at Norwegian Defence Research Establishment**, Kjeller, Norway (6 months)
2007	**Master Sc. project**, GIPSA laboratory, Grenoble, France (5 months)
2003-2006	**Research intern during engineering studies**, Ternopil State Technical University, Ukraine

Supervised students

Andrew Khalel	**Ms** student (pansharpening of satellite images), 2018
Nicolas Girard	**PhD** student (how to structure satellite data), 2017-pres
Onur Tasar	**PhD** student (using deep learning approaches to devise an efficient representation for large-scale satellite images), 2017-pres
Lionel Matteo	**PhD** student (from Pleiades images to very high resolution topography in complex zones), 2017-pres
Emmanuel Maggiori	**PhD** student (classification of large-scale remote sensing data), 2015-2017
Onur Tasar	**MS** student (deep learning for large-scale remote sensing image classification), 2017
Lionel Matteo	**MS** student (building multi-stereo Pleiades image-based DEMs), 2017
Armand Zamprieri	**MS** student (aligning large-scale remote sensing images with neural networks), 2017
Chunlin Xiao	**MS** student (hierarchical segmentation of large-scale satellite images), 2016
Seong-Gyun Jeong	**PhD** student (curvilinear structure modeling), 2012-2015
Emmanuel Maggiori	**MS** student (optimizing partition trees for multi-object segmentation), 2014
Aakanksha Rana	**MS** student (graph-cut-based model for classification of hyperspectral images), 2016
Claudio Price Gonzalez	**MS** student (multitemporal segmentation of sea ice floes from satellite data), 2016
Kevin Bernard	**MS** student (stochastic MSF approach for classification of hyperspectral data), 2016

Teaching experience (> 600 hours)

2017-pres.	"Discrete Inference and Learning," MVA, ENS Paris-Saclay and Centrale Supelec, France
2017-pres.	"Discrete Optimization," Ecole Centrale Supelec, France
2016-pres.	"Mathematical Methods," Ecole Centrale Supelec, France
2015-pres.	"Advanced Algorithms," IUT Nice Côte d'Azur, France
2012-2015	"Digital Imaging," University of Nice Sophia-Antipolis, France
2013	"Spaceborn Sensors and their Applications," Ecole Nationale des Sciences Géographiques, France
2012	"Techniques for Statistical Data Analysis," Ecole Polytech Nice Sophia, France
2012	"Computer Vision," Ternopil National Technical University, Ukraine
2008-2010	"Image Processing," Grenoble Institute of Technology (INPG), France
2010	"Matlab for Image Processing," Grenoble Institute of Technology (INPG), France
2009	"Pattern Recognition," University of Iceland, Iceland
2009	"Mathematical Morphology," E-learning course, University of Iceland, Iceland
2002-2003	"Programming," "Web-Design," "CorelDraw," "Fundamentals of Computer Science," Regional Computer School, Ukraine

Main distinctions

- The top of the class in all study levels; graduated from the high school with the Gold Medal
- Prime d'encadrement doctoral et de recherche, awarded in 2016
- Best reviewer award of IEEE Transactions on Geoscience and Remote Sensing (best impact factor in RS), 2011
- Winner of the HYPER-I-NET summer school team contest "Evaluation of an unknown hyperspectral data set and information extraction" (team leader), 2009.
- Second rank in the best oral talk contest at the EARSeL conference, Israel, 2009
- Winner of the Ukrainian Cup-tie "KROKS" (national intellectual and sports contest), 2002
- Winner of the Regional student contests in computer science, Ukraine, 2000-2001.

Funding

- 2017-2021 - PI of the ANR JCJC project "EPITOME: Efficient representation to structure large-scale satellite images"
- 2017-2021 - Co-I of the ANR project "FAULTS_R_GEMS: Modeling & analysis of sismic faults"
- 2015-2017 - PI of the CNES R&T project "Hierarchical approaches for object-oriented classification of multi-source images"
- 2012 - CNES Research Fellowship
- 2011 - Co-I of the NASA ROSES 2011-AIST project "An advanced learning framework for high dimensional multi-sensor remote sensing data," selected for funding in 2012-2014 (PI: M. Crawford, Purdue University, USA)
- 2010-2012 - NASA Postdoctoral Fellowship. PI of the project "Advanced Remote Sensing Image Analysis Combining Segmentation and Classification Approaches"
- 2007-2010 - Marie Curie Research Fellowship
- 2006-2007 - Scholarship of the French Government
- 2004-2005 - Scholarship of the President of Ukraine and the Ukrainian Parliament

Professional service

- **Thesis committees:** Committee member for PhD thesis of A. Bohi, University of Toulon (2017)
- **Expert committees:** Member of the expert panel for the FWO funding programme (2016-present), expert evaluator for Kazakhstan national research funding foundation (2017-pres), evaluator for the AFIA prize (2013)
- **Member of the editorial board** for the journal Remote Sensing (2017-pres)
- **Associate editor** for the Springer journal Sensing and Imaging and the International Journal of Computing (2017-pres).
- **Co-Editor** of special issues for the journals Remote Sensing (2013-2014) and Sensing and Imaging (2015-2017)
- Member of **program committees** for internat. conf.: ACIVS 2018, ACIVS 2016, OSA Imaging Systems and Applications 2013, 2014, ISPRS 2012, ICPRAM 2012, SPIE 2011, IEEE WHISPERS 2009

- Member of the **organizing committee** for IEEE WHISPERS 2009, 2010
- Member of the **Scientific Advisory Committee** of the 2nd International Electronic Conference on Remote Sensing (ECRS), 2018.
- Member of the **scientific committee** of the Academy 3 of the University Cote d'Azur, 2017-pres
- Member of the Center Committee of Inria Sophia-Antipolis, 2017-pres
- Member of the Commission de Dveloppement Technologique, Inria Sophia-Antipolis, 2015-pres
- Member of the "HYPER-I-NET" project management board, 2008-2010
- Reviewer for international scientific journals (IEEE PAMI, IEEE Trans. Image Processing, IEEE Trans. Systems, Man, Cyb., IEEE TGRS, IEEE GRSL, Pattern Recogn., ...) and conferences (IEEE ICIP, ICASSP, IGARSS, GRETSI, ...)

Publications (64 articles, 3195 citations, h-index = 18)

Peer-reviewed international journals (18)

1. E. Maggiori, <u>Y. Tarabalka</u>, G. Charpiat, and P. Alliez, "High-resolution aerial image labeling with convolutional neural networks," *IEEE Trans. Geosc. Remote Sens.*, vol. 55, no. 12, Dec. 2017.
2. E. Maggiori, G. Charpiat, <u>Y. Tarabalka</u>, and P. Alliez, "Recurrent neural networks to correct satellite image classification maps," *IEEE Trans. Geosc. Remote Sens.*, vol. 55, no. 9, Sep. 2017. **2 citations**
3. E. Maggiori, <u>Y. Tarabalka</u>, G. Charpiat, and P. Alliez, "Convolutional neural networks for large-scale remote sensing image classification," *IEEE Trans. Geosc. Remote Sens.*, vol. 55, no. 2, 2017. **51 citations**
4. H. Aghighi, J. Trinder, S. Lim and <u>Y. Tarabalka</u>, "Fully spatially adaptive smoothing parameter estimation for Markov random field super-resolution mapping of remotely sensed images," *International Journal of Remote Sensing*, vol. 36, no. 11, pp. 2851-2879, 2015. **4 citations**
5. B. B. Damodaran, R. R. Nidamanuri and <u>Y. Tarabalka</u>, "Dynamic ensemble selection approach for hyperspectral image classification with joint spectral and spatial information," *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, vol. 8, no. 6, pp. 2405-2417, 2015. **14 citations**
6. <u>Y. Tarabalka</u>, G. Charpiat, L. Brucker and B. H. Menze, "Spatio-temporal video segmentation with shape growth or shrinkage constraint," *IEEE Transactions on Image Processing*, vol. 23, no. 9, pp. 3829-3840, 2014. **16 citations**
7. H. Aghighi, J. Trinder, <u>Y. Tarabalka</u>, and S. Lim, "Dynamic block-based parameter estimation for MRF classification of high-resolution images," *IEEE GRSL*, vol. 11, no. 10, pp. 1687-1691, 2014. **14 citations**
8. M. Fauvel, <u>Y. Tarabalka</u>, J. A. Benediktsson, J. Chanussot, and J. C. Tilton, "Advances in spectral-spatial classification of hyperspectral images," *Proceedings of the IEEE*, vol. 101, no. 3, pp. 652-675, March 2013. **566 citations**
9. J. C. Tilton, <u>Y. Tarabalka</u>, P. M. Montesano, and E. Gofman, "Best merge region growing with integrated region object classification," *IEEE Trans. Geosc. Remote Sens.*, vol. 50, no. 11, pp. 4454-4467, Nov. 2012. **92 citations**
10. K. Bernard, <u>Y. Tarabalka</u>, J. Angulo, J. Chanussot, and J. A. Benediktsson, "Spectral-spatial classification of hyperspectral data based on a stochastic minimum spanning forest approach," *IEEE Trans. on Image Processing*, vol. 21, no. 4, pp. 2008-2021, April 2012. **96 citations**
11. <u>Y. Tarabalka</u>, J. C. Tilton, J. A. Benediktsson, and J. Chanussot, "A marker-based approach for the automated selection of a single segmentation from a hierarchical set of image segmentations," *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, vol. 5, no. 1, pp. 262-272, Feb. 2012. **71 citations**
12. <u>Y. Tarabalka</u>, J. A. Benediktsson, J. Chanussot, and J. C. Tilton, "Multiple spectral-spatial classification approach for hyperspectral data," *Trans. Geosc. Remote Sens.*, vol. 48, no. 11, pp. 4122-4132, Nov. 2010. **215 citations**
13. <u>Y. Tarabalka</u>, M. Fauvel, J. Chanussot, J. A. Benediktsson, "SVM and MRF-based method for accurate classification of hyperspectral images," *IEEE GRSL*, vol. 7, no. 4, pp. 736-740, Oct. 2010. **412 citations**
14. <u>Y. Tarabalka</u>, J. Chanussot, and J. A. Benediktsson, "Segmentation and classification of hyperspectral images using Minimum Spanning Forest grown from automatically selected markers," *IEEE Trans. on Systems, Man, and Cybernetics, Part B: Cybernetics*, vol. 40, no. 5, pp. 1267-1279, Oct. 2010. **188 citations**
15. <u>Y. Tarabalka</u>, J. Chanussot, and J. A. Benediktsson, "Segmentation and classification of hyperspectral images using watershed transformation," *Pattern Recognition*, vol. 43, no. 7, pp. 2367-2379, July 2010. **368 citations**
16. P. Badin, <u>Y. Tarabalka</u>, F. Elisei, G. Bailly, "Can you 'read' tongue movements? Evaluation of the contribution of tongue display to speech understanding," *Speech Communication*, no. 52, pp. 493-503, 2010. **69 citations**
17. <u>Y. Tarabalka</u>, J. A. Benediktsson, and J. Chanussot, "Spectral-spatial classification of hyperspectral imagery based on partitional clustering techniques," *IEEE Trans. Geosc. Remote Sens.*, vol. 47, no. 8, pp. 2973-2987, 2009. **510 citations**
18. <u>Y. Tarabalka</u>, T. V. Haavardsholm, I. Kåsen, and T. Skauli, "Real-time anomaly detection in hyperspectral images using multivariate normal mixture models and GPU processing," *Journal of Real-Time Image Processing*, vol. 4, no. 3, pp. 287-300, Aug. 2009. **108 citations**

Book chapters (3)

1. E. Maggiori, A. Plaza and <u>Y. Tarabalka</u>, "Models for hyperspectral image analysis: from unmixing to object-based classification," *Mathematical Models for Remote Sensing Image Processing* (edit. by G. Moser and J. Zerubia), in print.

2. J. Tilton, S. Aksoy and <u>Y. Tarabalka</u>, "Image segmentation algorithms for land categorization," *Remote Sensing Handbook* (edited by P. S. Thenkabail), Taylor and Francis, 2015.

3. <u>Y. Tarabalka</u>, J. Chanussot, and J. A. Benediktsson, "Spectral-spatial classification of hyperspectral images using segmentation-derived adaptive neighborhoods," *Multivariate Image Processing* (edited by C. Collet, J. Chanussot, and K. Chehdi), John Wiley & Sons, 2009, pp. 341-374.

International conferences (36)

1. E. Maggiori, <u>Y. Tarabalka</u>, G. Charpiat and P. Alliez, "Can semantic labeling methods generalize to any city? The Inria aerial image labeling benchmark," *IGARSS'17*, Fort Worth, Texas, USA, 2017.

2. E. Maggiori, <u>Y. Tarabalka</u>, G. Charpiat and P. Alliez, "High-resolution image classification with convolutional networks," *IGARSS'17*, Fort Worth, Texas, USA, 2017.

3. E. Maggiori, <u>Y. Tarabalka</u>, G. Charpiat and P. Alliez, "Fully convolutional neural networks for remote sensing image classification," *IGARSS'16*, Beijing, China, 2016.

4. E. Maggiori, <u>Y. Tarabalka</u> and G. Charpiat, "Optimizing partition trees for multi-object segmentation with shape prior," *BMVC'2015*, Swansea, UK, 2015.

5. S-G. Jeong, <u>Y. Tarabalka</u> and J. Zerubia, "Stochastic model for curvilinear structure reconstruction using morphological profiles," *IEEE ICIP'15*, Quebec City, Canada, 2015.

6. E. Maggiori, <u>Y. Tarabalka</u> and G. Charpiat, "Improved partition trees for multi-class segmentation of remote sensing images," *IGARSS'15*, Milan, Italy, 2015.

7. S-G. Jeong, <u>Y. Tarabalka</u> and J. Zerubia, "Marked point process model for curvilinear structures extraction," *EMM-CVPR'15*, Hong Kong, 2015.

8. S-G. Jeong, <u>Y. Tarabalka</u> and J. Zerubia, "Marked point process model for facial wrinkle detection," *IEEE ICIP'14*, Paris, France, 2014.

9. <u>Y. Tarabalka</u> and A. Rana, "Graph-cut-based model for spectral-spatial classification of hyperspectral images," *IGARSS'14*, Quebec City, Canada, 2014.

10. H. Aghighi, J. Trinder, K. Wang, <u>Y. Tarabalka</u> and S. Lim, "Smoothing parameter estimation for Markov random field classification of non-Gaussian distribution image," *ISPRS TC VII Symposium*, Istanbul, Turkey, 2014.

11. <u>Y. Tarabalka</u>, G. Charpiat, L. Brucker and B. H. Menze, "Enforcing monotonous shape growth or shrinkage in video segmentation," *BMVC'2013*, Bristol, UK, 2013.

12. C. Price, <u>Y. Tarabalka</u> and L. Brucker, "Graph-based method for multitemporal segmentation of sea ice floes from satellite data," *LARS'13*, Santiago, Chile, 2013.

13. <u>Y. Tarabalka</u> and G. Charpiat, "A graph-cut-based method for spatio-temporal segmentation of fire from satellite observations," *IGARSS'13*, Melbourne, Australia, 2013.

14. <u>Y. Tarabalka</u>, "Overview of hierarchical models for hyperspectral image classification," *UkrOBRAZ* - Signal/Image Processing and Pattern Recognition Conference, Kyiv, Ukraine, 2012.

15. <u>Y. Tarabalka</u>, L. Brucker, A. Ivanoff and J. C. Tilton, "Shape-constrained segmentation approach for Arctic multiyear sea ice floe analysis," *IGARSS'12*, Munich, Germany, 2012.

16. <u>Y. Tarabalka</u> and J. Tilton, "Improved hierarchical optimization-based classification of hyperspectral images using shape analysis," *IGARSS'12*, Munich, Germany, 2012.

17. <u>Y. Tarabalka</u> and J. C. Tilton, "Spectral-spatial classification of hyperspectral images using hierarchical optimization," *WHISPERS'11*, Lisbon, Portugal, 2011.

18. <u>Y. Tarabalka</u>, J. C. Tilton, J. A. Benediktsson and J. Chanussot, "Marker-based hierarchical segmentation and classification approach for hyperspectral imagery", *ICASSP'11*, Czech Republic, 2011.

19. K. Bernard, <u>Y. Tarabalka</u>, J. Angulo, J. Chanussot, and J. A. Benediktsson, "A stochastic minimum spanning forest approach for spectral-spatial classification of hyperspectral images," *ICIP'11*, Brussels, Belgium, 2011.

20. <u>Y. Tarabalka</u> and J. C. Tilton, "Best merge region growing with integrated probabilistic classification for hyperspectral imagery," *IGARSS'11*, Vancouver, Canada, 2011.

21. <u>Y. Tarabalka</u>, J. A. Benediktsson, J. Chanussot and J. C. Tilton, "A multiple classifier approach for spectral-spatial classification of hyperspectral data," in Proc. of *IGARSS'10*, Honolulu, Hawaii, USA, 2010, pp. 1410-1413.

22. J. Chanussot, J. A. Benediktsson, M. Fauvel, <u>Y. Tarabalka</u>, "Spectral-spatial analysis in hyperspectral remote sensing: from morphological profiles to classified segmentation," in Proc of *SPIE*, Vol. 7477, 2009.

23. <u>Y. Tarabalka</u>, J. Chanussot, J. A. Benediktsson, "Classification of hyperspectral images using automatic marker selection and Minimum Spanning Forest," in Proc. of *IEEE WHISPERS'09*, Grenoble, France, 2009, pp. 1-4.

24. <u>Y. Tarabalka</u>, J. Chanussot, J. A. Benediktsson, "Classification based marker selection for watershed transform of hyperspectral images," in Proc. of *IGARSS'09*, Cape Town, South Africa, 2009, pp. III-105-III-108.

25. G. Bailly, P. Badin, F. Elisei, O. Govokhina, C. Savariaux, and <u>Y. Tarabalka</u>, "Cloning speakers' articulation, shape and appearance," In Facial Analysis and Animation, Edinburgh, UK, 2009, 2 p.

26. <u>Y. Tarabalka</u>, J. A. Benediktsson, and J. Chanussot, "Classification of hyperspectral data using Support Vector Machines and adaptive neighborhoods," in Proc. of *the 6th EARSeL SIG IS workshop*, Tel Aviv, Israel, 2009, pp. 1-6.

27. <u>Y. Tarabalka</u>, J. Chanussot, J. A. Benediktsson, J. Angulo, and M. Fauvel, "Segmentation and classification of hyperspectral data using watershed," in Proc. of *IGARSS'08*, Boston, USA, 2008, pp. III-652-III-655.

28. T. Skauli, I. Kåsen, T. Haavardsholm, A. Kavara, <u>Y. Tarabalka</u>, and Ø. Farsund, "Status of the norwegian hyperspectral technology demonstrator," in Proc. of *NATO SET-130 "NATO Military sensing symposium"*, Orlando, Florida, USA, 2008, pp. F5-1-F5-6.

29. <u>Y. Tarabalka</u>, T. V. Haavardsholm, I. Kåsen, and T. Skauli, "Parallel processing for normal mixture models of hyperspectral data using a graphics processor," in Proc. of *IGARSS'08*, Boston, USA, 2008, pp. II-990-II-993.

30. P. Badin, F. Elisei, G. Bailly, and <u>Y. Tarabalka</u>, "An audiovisual talking head for augmented speech generation: models and animations based on a real speaker's articulatory data," In *Vth Conference on Articulated Motion and Deformable Objects* (F.J. Perales & R.B. Fisher, Eds.), Berlin, Heidelberg, Germany : Springer Verlag, 2008, pp. 132-143.

31. P. Badin, <u>Y. Tarabalka</u>, F. Elisei, and G. Bailly, "Can you "read tongue movements"?," in Proc. of *Interspeech 2008*, Brisbane , Australia , 2008, pp. 2635-2638.

32. P. Badin, F. Elisei, L. Huang, <u>Y. Tarabalka</u>, and G. Bailly, "Vision of tongue in augmented speech: contribution to speech comprehension and visual tracking strategies," in *Speech and Face-to-Face communication - A workshop / Summer School dedicated to the Memory of Christian Benoît*, Grenoble, France, 2008, pp. 97.

33. <u>Y. Tarabalka</u>, P. Badin, F. Elisei, and G. Bailly, "Can you "read tongue movements"? Evaluation of the contribution of tongue display to speech understanding," in Proc. of *ASSISTH'2007*, Toulouse, France, 2007, pp. 187-193.

34. <u>Y. Tarabalka</u>, "Information system for audio-visual speech reproduction and perception," in Proc. of *the International technological conference "Information systems and technologies - IST-2007"*, Nizhnyy Novgorod, NSTU, Russia, 2007.

35. <u>Y. Tarabalka</u>, "Properties of the use of automatic speech recognition for the design of biotechnical systems," in Proc. of *the International technological conference "Information systems and technologies - IST-2006"*, Nizhnyy Novgorod, NSTU, Russia, 2006, p. 152-153.

36. <u>Y. Tarabalka</u>, "Histogram analysis of the aggregate Internet-traffic by using non-linear transformations," in Proc. of *the International scientific conference for students and young researchers "Polit-2006"*, NAU, Kyiv, Ukraine, 2006.