

Victor Lempitsky

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Research interests: computer vision, biomedical imaging, pattern recognition, machine learning, image processing

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Education

- October 2007 **PhD (“kandidat nauk”)**. Thesis title: “Methods for 3D Reconstruction Based on Graph Cuts”. Supervisors: Prof. Yury Boykov (University of Western Ontario), Prof. A.V. Mikhalev (Moscow State University).
- 2004-2007 PhD student, Department of Mathematics and Mechanics, Moscow State University.
- June 2004 **Specialist (MS equivalent)** in Applied Mathematics (with honours), Department of Mathematics and Mechanics, Moscow State University. Supervisor: Dr. D. Ivanov (Moscow State University).
- 1999-2004 Student, Department of Mathematics and Mechanics, Moscow State University
- 1995-1999 High-school student, Moscow South-West Gymnasium (№1543).

Work Experience

- September 2012 – **Assistant professor** at **Skolkovo Institute of Science and Technology**.
- September 2011 – **Expert** in computer vision at **Yandex**. Duties: supervision of postgraduate students working on computer vision projects; prototyping computer vision and image search systems; lecturing at **Data Analysis School** (master program).
August 2011
- November 2009 – **Postdoc-researcher**, [Visual Geometry Group](#), Dept. of Engineering Science, **University of Oxford**, UK. Research in image classification, pattern recognition, automated object counting in biomedical images.
July 2011
- July 2009 – **Consultant** for **Microsoft Research** projects in Russia. Research projects: object detection, text detection in natural images, single-view reconstruction.
August 2011
- October 2007 – **Postdoc**, [Machine Learning and Perception](#), **Microsoft Research Cambridge**, UK. Research in discrete optimization, photo and medical image segmentation, object detection in images.
September 2009
- September 2006 – **Intern**, [Machine Learning and Perception](#), **Microsoft Research Cambridge**, UK. Research in graph-based optimization in computer vision problems.
December 2006
- January 2006 – **Visiting researcher**, [Vision Research Group](#), **University of Western Ontario**, London, Canada. Research in graph-based 3D reconstruction.
June 2006
- September 2000 – Student researcher, then junior researcher, Computer Graphics group, Department of Mathematics, **Moscow State University**. Research projects in computer graphics and image-based modeling.
December 2005

Publications – Top-tier conferences (ICCV, CVPR, ECCV, NIPS, MICCAI)

Note: in computer vision and biomedical image analysis, the proceedings of ICCV, CVPR, ECCV, NIPS, and MICCAI conferences represent the main pathway for the dissemination of new research results. All entries correspond to full papers.

1. Y. Chai, E. Rahtu, V. Lempitsky, L. Van Gool, A. Zisserman. **TriCoS: A Tri-level Class-Discriminative Co-Segmentation Method for Image Classification**. European Conference on Computer Vision (ECCV), Florence, Italy, 2012. (*Acceptance ratio = 27.4%*)
2. T. Novikova, O. Barinova, P. Kohli, V. Lempitsky. **Large-lexicon attribute-consistent text recognition in natural images**. European Conference on Computer Vision (ECCV), Florence, Italy, 2012. (*Acceptance ratio = 27.4%*)
3. C. Arteta, V. Lempitsky, A. Noble, A. Zisserman. **Learning Non-overlapping Stable Regions to Detect Cells**. Medical Image Computing and Computer Assisted Intervention (MICCAI'2012), Nice, France, 2012, (*Acceptance ratio = 32.0%*)
4. A. Babenko, V. Lempitsky. **The Inverted Multi-Index**. IEEE Computer Vision and Pattern Recognition (CVPR), pp. 3069 - 3076, Providence, RI, 2012. (*Acceptance ratio = 24.3%*)
5. V. Lempitsky, A. Vedaldi, and A. Zisserman. **Pylon Model for Semantic Segmentation**. Advances in Neural Information Processing Systems (NIPS), 9 pp., Granada, Spain, 2011. (*Acceptance ratio = 21.7%*)
6. Y. Chai, V. Lempitsky, and A. Zisserman. **BiCoS: A Bi-level Co-Segmentation Method for Image Classification**. International Conference on Computer Vision (ICCV), 8 pp., Barcelona, 2011, (*Acceptance ratio = 24.0%*)
7. V. Lempitsky, A. Zisserman. **Learning to Count Objects in Images**. Advances in Neural Information Processing Systems (NIPS), 9 pp., Vancouver, 2010. (*Spotlight presentation / acceptance ratio = 6.0%*)
8. O. Barinova, V. Lempitsky, P. Kohli. **On the Detection of Multiple Object Instances using Hough Transforms**. IEEE Computer Vision and Pattern Recognition (CVPR), pp. 1-8, San Francisco, 2010. (*Oral presentation / Acceptance ratio = 4.5%*)
9. V. Lempitsky. **Surface Extraction from Binary Volumes with Higher-Order Smoothness**. IEEE Computer Vision and Pattern Recognition (CVPR), pp. 1-8, San Francisco, 2010. (*Acceptance ratio = 26.8%*)
10. O. Barinova, V. Lempitsky, E. Tretyak, P. Kohli. **Geometric parsing in Man-Made Environments**. European Conference on Computer Vision (ECCV), Heraklion, Crete, 2010. (*Acceptance ratio = 27.4%*)
11. V. Lempitsky, P. Kohli, C. Rother, and T. Sharp. **Image Segmentation with A Bounding Box Prior**. IEEE International Conference on Computer Vision (ICCV), Kyoto, 2009. (*Oral presentation / Acceptance ratio = 3.1%*)
12. J. Gall and V. Lempitsky. **Class-specific Hough Forests for Object Detection**. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), pp. 1-8, Miami, 2009. (*Oral presentation / Acceptance ratio = 4.2%*)
13. V. Lempitsky, A. Blake, C. Rother. **Image Segmentation by Branch-and-Mincut**. In Proc. European Conference on Computer Vision (ECCV), vol. 4, pp. 15-29, Marseille, 2008. (*Oral presentation / Acceptance ratio = 4.6%*)
14. V. Lempitsky, S. Roth, C. Rother. **Fusion Flow: Discrete-Continuous Optimization for Optical Flow Estimation**. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), pp. 1-8, Anchorage, 2008. (*Acceptance ratio = 31.9%*)
15. V. Lempitsky, C. Rother, A. Blake. **LogCut – Efficient Graph Cut Optimization for Markov Random Fields**. IEEE International Conference on Computer Vision (ICCV), pp. 1-8, Rio de Janeiro, Brazil, 2007. (*Acceptance ratio = 23.5%*)
16. V. Lempitsky and Y. Boykov. **Global Optimization for Shape Fitting**. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), pp. 1-8, Minneapolis, 2007. (*Acceptance ratio = 28.2%*)

17. V. Lempitsky and D. Ivanov. **Seamless Mosaicing of Image-Based Texture Maps.** In Proc. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), pp. 1-6, Minneapolis, 2007. (*Acceptance ratio = 28.2%*)
18. C. Rother, V. Kolmogorov, V. Lempitsky, M. Szummer. **Optimizing binary MRFs via extended roof duality.** In Proc. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), pp. 1-8, Minneapolis, 2007. (*Oral presentation / Acceptance ratio = 4.8%*)
19. V. Lempitsky, Y. Boykov, D. Ivanov. **Oriented visibility for Multiview Reconstruction.** In Proc. European Conference on Computer Vision (ECCV), vol. 3, pp. 225-237, Graz, 2006. (*Acceptance ratio = 21.4%*)

Publications – Journals

20. O. Barinova, V. Lempitsky, P. Kohli. **On the Detection of Multiple Object Instances using Hough Transforms.** IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), vol. 34, No. 9, pp. 1773-1784, 2012. (*JCR 2010 impact-factor = 5.308, invited to the special issue for best papers of CVPR'2010*)
21. V. Lempitsky, A. Blake, C. Rother. **Branch-and-Mincut: Global Optimization for Image Segmentation with High-Level Priors.** Journal of Mathematical Imaging and Vision (JMIV), vol. 44, No. 3, pp. 315-329, 2012 (*JCR 2010 impact-factor = 1.285*)
22. E. Tretiak, O. Barinova, P. Kohli, V. Lempitsky. **Geometric Parsing in Man-Made Environments.** International Journal of Computer Vision (IJCV), vol. 97, No. 3, pp. 305-321, 2012. (*JCR 2010 impact-factor = 5.151*)
23. J. Gall, A. Yao, N. Razavi, L. Van Gool, V. Lempitsky. **Hough Forests for Object Detection, Tracking, and Action Recognition.** IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), vol. 33, No. 11, 2188-2202, 2011. (*JCR 2010 impact-factor = 5.308. Selected as a spotlight paper for the November 2011 issue*)
24. V. Lempitsky, C. Rother, S. Roth, A. Blake. **Fusion Move for Markov Random Field Optimization.** IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), vol. 32, no. 8, pp. 1392-1405, August, 2010. (*JCR 2010 impact-factor = 5.308*)
25. V.S. Lempitskii, **Minimal graph cuts on network subgraphs,** Uspekhi Matematicheskikh Nauk (Communications of Moscow Mathematical Society), **62:4(376)** (2007), 165–166. (*JCR 2010 impact-factor = 0.496*)
26. V. Zhislina, D. Ivanov, V. Kuriakin, V. Lempitsky, E. Martinova, K. Rodyushkin, T. Firsova, A. Khropov, A. Shokurov: **Creating and Animating Personalized Head Models from Digital Photographs and Video.** Programming and Computer Software 30(5): 242-257 (2004). (*JCR 2010 impact-factor = 0.145*)

Publications – Edited volume

27. Boykov, Y.; Kahl, F.; Lempitsky, V.; Schmidt, F.R. (Eds.) **Energy Minimization Methods in Computer Vision and Pattern Recognition (Proceedings of 8th International Conference, EMMCVPR 2011, St. Petersburg, Russia).** Series: Lecture Notes in Computer Science, Vol. 6819. Springer, 2011

Publications – Book chapters

28. J. Gall, V. Lempitsky, **Class-specific Hough Forests for Object Detection**. Invited chapter in “Decision Forests for Classification, Regression, Density Estimation, Manifold Learning and Semi-Supervised Learning”, A. Criminisi, J. Shotton, E. Konukoglu (eds.), Springer (*to appear*)
29. V. Lempitsky, A. Blake, C. Rother. **Exact optimization for Markov Random Fields with global parameters**. Invited chapter in “Advances in Markov Random Fields for Vision and Image Processing”, A.Blake, P.Kohli, C. Rother (eds.), MIT Press, 2011.
30. V. Lempitsky, C. Rother, S. Roth, A. Blake. **Fusion Move for Markov Random Field Optimization**. Invited chapter in “Advances in Markov Random Fields for Vision and Image Processing”, A.Blake, P.Kohli, C. Rother (eds.), MIT Press, 2011.

Publications – Biomedical imaging conferences

31. G. Flaccavento, V. Lempitsky, I. Pope, P. Barber, A. Zisserman, A. Noble, B. Vojnovic. **Learning to Count Cells: Applications to Lens-free Imaging of Large Fields**. Workshop on Microscopic Image Analysis with Applications in Biology (MIAAB), Heidelberg, Germany, 2011.
32. V. Lempitsky, M. Verhoek, A. Noble, A. Blake. **Random Forest Classification for Automatic Delineation of Myocardium in Real-time 3D Echocardiography**. In Proc. International Symposium on Functional Imaging and Modeling of the Heart (FIMH), Nice, France, 2009. (*Oral presentation / best paper award*).

Publications – Other refereed publications

33. V. Gulshan, V. Lempitsky, and A. Zisserman. **Humanising GrabCut: Learning to Segment humans Using the Kinect**. Workshop on Consumer Depth Cameras for Computer Vision, Barcelona, 2011
34. K. Chatfield, V. Lempitsky, A. Vedaldi, and A. Zisserman. **The Devil Is in the Details: an Evaluation of Recent Feature Encoding Methods**. British Machine Vision Conference (BMVC), Dundee, 2011 (*best poster honourable mention*)
35. P. Kohli, V. Lempitsky, and C. Rother. **Uncertainty Driven Multi-Scale Optimization**. in Proc. of the Annual Symposium German Association for Pattern Recognition (DAGM), 2010.
36. Roth, S., Lempitsky, V., and Rother, C. 2009. **Discrete-Continuous Optimization for Optical Flow Estimation**. In Proc. Statistical and Geometrical Approaches To Visual Motion Analysis: international Dagstuhl Seminar, 2008.
37. Y. Boykov and V. Lempitsky. **Form Photohulls to Photoflux Optimization**. In proc. British Machine Vision Conference (BMVC), vol.3, pp.1149-1158, Edinburgh, UK, September 2006.
38. D. Ivanov, Ye. Kuzmin, V. Lempitsky. **Modeling with Spatial Patches**. In Proc. IEEE International Conference on Shape Modeling and Applications (SMI), pp. 75-82, Banff, Canada, May 2002.
39. V. Lempitsky, D. Ivanov, and Ye. Kuzmin. **Texturing Calibrated Head Model from Images**. Short paper proc. of EuroGraphics, September 2002, pp. 281-288.
40. V.Lempitsky, D.Ivanov, A.Shokurov, Ye.Fedotov and Ye.Kuzmin. **ImagiCAD: Experimental Image Based Modeling System**. GraphiCon-2005 Proc., Novosibirsk, pp. 29-34
41. A. Khropov, A. Shokurov, V. Lempitsky, and D. Ivanov. **Reconstruction of projective and metric cameras for image triplets**. GraphiCon-2004 Proc., pp. 143-146.
42. D. Ivanov, V. Lempitsky, A. Shokurov, A. Khropov, and Ye. Kuzmin. **Creating Personalized Head Models from Image Series**. GraphiCon-2003 Proc., pp. 93-99, 2003.

- 43. V. Lempitsky, D. Ivanov and Ye. Kuzmin. **High-Quality Head Model Calibration Pipeline.** Graphicon-2002 Proc., September 2002.
- 44. V. Lempitsky, D. Ivanov, and Ye. Kuzmin. **Adaptive Ray Tracing on Spatial Patches.** GraphiCon-2001 Proc., 2001, pp. 47-53.

Patents

5 US patents: 20110164819, 20080310743, 20110007933, 20100322525, 20100128984

Publication Statistics

- Number of citations in [Google Scholar](#): **885** (870 since 2007), h-index = 15
Full statistics: <http://scholar.google.com/citations?user=gYYVokYAAAAJ>

Teaching Experience

- Fall 2011 - A course on **Structured Output Inference and Learning** at **Data Analysis School** (keywords: *graphical models, Markov networks, message passing in pairwise and higher-order models, graph cuts, dual decomposition, structured output max-margin and maximal conditional likelihood learning and their variations*). The course included 8 lectures (2 hours each) + 8 practicals (jointly with the TA) + 3 programming assignments (jointly with the TA) + 1 test (jointly with the TA). A webpage (restricted access) was maintained through the course.
- December 2011 – invited tutorial on **Structured Output Inference and Learning** at the **University of Oulu** (a shortened version of the above, 8 hours in three days).
- September 2011 – A mini-course on **Graph Algorithms in Computer Vision** at the Graphicon-2011 conference at **Moscow State University** (4 hours).
- May 2010 – A mini-course on **Graph Algorithms in Computer Vision** at **Computer Science Club** PDMI RAS, Saint-Petersburg (5 hours).
- August 2001 – Mini-course on computer graphics (**rendering**) for high school students at a multi-disciplinary summer school.

Student Supervision

Current:

- **Carlos Arteta** – 1st year PhD student at the University of Oxford working on biomedical image processing – *collaboration/joint supervision with profs. Andrew Zisserman and Alison Noble*.
- **Artem Babenko** – 2nd year master student at Moscow Institute of Physics and Technology working on large-scale multimedia retrieval systems.
- **Dmitry Maryin** – 1st year master student at Higher School of Economics, Faculty of Informatics, Moscow, working on fast image segmentation methods.
- **Renat Nasyrov** – 1st year master student at Higher School of Economics, Faculty of Informatics, Moscow, working on visual navigation of geo-referenced image collections.
- **Vladimir Tkachev** – 1st year master student at Higher School of Economics, Faculty of Informatics, Moscow, working on wide-baseline image matching.
- **Ilya Vorontsov** – 1st year master student at Moscow Institute of Physics and Technology, working on visual search.

Past:

- **Varun Gulshan** – a PhD student at the University of Oxford working on image and video segmentation – 2009-2011 – *collaboration/joint supervision with Prof. Andrew Zisserman.*
- **Yuning Chai** – a master intern (6 months) at the University of Oxford working on image-based flower species recognition – 2010-2011 – *joint supervision with Prof. Andrew Zisserman.*
- **Ben Mather** – a master student at the University of Oxford working on visual categorization – 2010-2011 – *joint supervision with Dr. Matthew Blaschko.*
- **Yaroslav Ganin** – a final-year undergraduate student at Moscow State University working on semantic image segmentation – 2010-2011.
- **Olga Barinova** – PhD intern (3 months) at Microsoft Research Cambridge working on object detection – 2009 – *joint supervision with Dr. Pushmeet Kohli.*
- **Vincent Vidal** – PhD intern (2 months) at Microsoft Research Cambridge working on geometric mesh processing – 2009 – *joint supervision with Dr. Pushmeet Kohli.*
- **Juergen Gall** – PhD intern (3 months) at Microsoft Research Cambridge working on object detection – 2008.
- **Anastassia Abrashitova** – a final-year undergraduate student at Moscow State University working on shape-from-points – 2007.
- **Nina Ivanova** – a final-year undergraduate student at Moscow State University working on shape-from-silhouettes – 2006.

Community Duties

- Area chair at the [ECCV 2012](#) conference
- Editor of the special issue of the International Journal of Computer Vision (IJCV) for the best papers of EMMCVPR conference.
- Co-organizer for Conference on Energy Minimization Methods in Computer Vision (EMMCVPR), Saint-Petersburg, July 2011
- Co-organizer of Microsoft Summer School in Computer Vision, Moscow, August 2011.
- Conference program committee member:
 - IEEE International Conference on Computer Vision (ICCV 2007, 2009, 2011)
 - IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2007, 2008, 2009, 2011, 2012)
 - European Conference on Computer Vision (ECCV 2008, 2010)
“Outstanding reviewer” award at ECCV 2010
 - Conference on Neural Information Processing Systems (NIPS 2010, 2011, 2012)
 - Conference on Energy Minimization Methods in Computer Vision (EMMCVPR 2009)
 - Graphicon (2008, 2009, 2010, 2011, 2012)
 - British Machine Vision Conference (BMVC 2009)
 - Indian Conference on Computer Vision, Graphics, Image Processing (ICVGIP 2010)
- Regularly reviewing for journals (several papers each year):
 - Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
 - International Journal on Computer Vision (IJCV)
- Has also reviewed manuscripts for:
 - SIAM Journal on Imaging Sciences (SIIMS)
 - Journal on Signal Image and Video Processing
 - Journal of Mathematical Imaging and Vision (JMIV)
 - Image and Vision Computing (IVC)
 - Journal of Visual Communication and Image Representation (JVIC)

- IEEE Transactions on Transactions on Geoscience and Remote Sensing

Talks, Presentations, Media

(excluding presentations at conferences and tutorials)

- Invited talk at “WebVision: The Workshop on Computer Vision for the Web”, ECCV 2012 workshop, Florence, Italy, 2012
- Talk on “Writing a Computer Vision Paper”, Computer Vision Summer School, Moscow, 2011
- Invited talk at Microsoft Research, Cambridge, UK, 2011
- Invited talk at the University of Bristol, UK, 2011
- Invited talk at IMT Lucca, Italy, 2011
- Invited talk at Computer Vision Colloquium, CMP Prague, 2010
- Invited talk in the series on “Information Retrieval and Data Analysis”, Yandex-Microsoft Research, Moscow, 2010
- Talk at Microsoft Research Cambridge, 2006
- Presentations at the reading groups, Oxford University, 2009-2011
- Research presentations at Microsoft Research Cambridge 2007-2009
- Talks at research seminars, Moscow State University, 2007, 2008, 2009, 2010
- «Science 2.0» TV-show at channel «Russia 24», 2010, 20-min. interview [video](#) (in Russian)

Extra info

Date of birth: August, 5th, 1982

Family: married, 1 child

Languages spoken: Russian (native), English (fluent), French (basic).

Programming languages/environments: MATLAB (+various toolboxes), C/C++ (+OpenCV).

Publishing/presentation tools: LaTeX/pdfLaTeX, Microsoft PowerPoint.

References available on request