Prof. Yu-Kun Lai

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Education

09/2006 – 07/2008, PhD in Computer Science, Tsinghua University, Beijing, China

09/2003 – 07/2006, Master in Computer Science, Tsinghua University, Beijing, China

09/1999 – 07/2003, Bachelor in Computer Science, Tsinghua University, Beijing, China

Academic Employment

2020 – present, Cardiff University, Wales, UK

Professor, School of Computer Science and Informatics

Responsibilities: Teaching and Research

Areas of Interest: Computer Graphics, Geometry Processing, Computer Vision

2018 – 2020, Cardiff University, Wales, UK

Reader, School of Computer Science and Informatics

2016 – 2018, Cardiff University, Wales, UK

Senior Lecturer, School of Computer Science and Informatics

2009 – 2016, Cardiff University, Wales, UK

Lecturer in Visual Computing, School of Computer Science and Informatics

2008 – 2009, Tsinghua University, Beijing, China

Research Fellow at Visual Media Research Center, Dept. of Computer Science and Technology

Academic Visit

10/2007 – 04/2008, Computer Science Department, Stony Brook University, Stony Brook, NY, USA

Teaching Activities

- 24/25, 23/24, 22/23, 21/22, 20/21, 19/20, 17/18, 16/17, 15/16 Spring CM1208 Maths for Computer Science
- 24/25, 23/24, 22/23, 21/22, 20/21, 19/20 CMT307 Applied Machine Learning (shared with Dr. Y. Qin/Dr. Y. Li)
- 24/25, 23/24, 22/23, 21/22, 20/21 CMT316 Applications of Machine Learning (shared with Dr. Y. Qin/Dr. Y. Li)
- 21/20 CMT219 Algorithms, Data Structures and Programming (shared with Dr. Y. Li/M. Morgan)
- 20/19, 17/18, 16/17, 15/16, 14/15, 13/14, 12/13 Spring CMT205 Object-Oriented Development with Java (shared with Dr. Y. Li/M. Morgan)
- 17/18, 16/17, 15/16 Spring CM2208 Scientific Computing (shared with Prof. A.D. Marshall)
- 17/18, 16/17, 15/16 Autumn CM2104 Computational Mathematics (shared with Prof. A. D. Marshall)

- 14/15, 13/14, 12/13, 11/12 Spring CM1203: Fundamentals of Computing with Java (shared with M. Morgan)
- 14/15, 13/14, 12/13, 11/12 Spring CM2202: Scientific Computing and Multimedia Applications (shared with Prof. A. D. Marshall and Dr. S. Schockaert)
- 11/12, 10/11, 09/10 Autumn & Spring CMT912: Programming (shared with Prof. R. R. Martin)
- 10/11 Autumn: CM0340: Multimedia
- 10/11, 09/10 Spring CM0268: Data audio graphics & image signal processing with MATLAB (shared with Prof. A. D. Marshall)
- 09/10 Spring CMT502: Data Structures and Algorithms (shared with Dr. X. Sun)

Research Projects

- Intelligent shape editing with robust feature analysis, EPSRC, 12/2010-7/2012, PI
- Using mosaicing for finite element meshing, 10/2010-10/2013, Airbus (PhD Studentship), CoI
- Small items of research equipment at Cardiff University, EPSRC, 11/2012-3/2013, CoI
- Intrinsic Voronoi/Delaunay structure on manifold mesh and its applications in visual computing. Royal Society Newton Advanced Fellowship, 3/2016-2/2020, UK lead.
- Data-driven realistic human motion reconstruction. Royal Society Newton Mobility Grant, 4/2016-3/2018, UK lead.
- Video scene analysis for virtual and augmented reality, Tencent, 2017-2026, PI.
- Realistic 3D face reconstruction and its applications, Kuaishou, 2021-2024, PI.
- Perceptual shape optimisation for 3D printing. Royal Society. 3/2018-3/2022, PI.
- Structural analysis of stereoscopic 360-degree video for mixed reality. Royal Society, 9/2018-8/2024, PI.
- Data driven geometric reconstruction from single images. Natural Science Foundation of China, 1/2019-12/2020, PI.
- Deep Representations for Analysis and Reconstruction of 3D Shapes with Complex Structure and Rich Details, Newton Advanced Fellowship, 12/2019-2/2024, UK lead.
- China-UK Workshop on Visual Signal Cognition and Understanding, British Council and NSF China, 1/2020-12/2021, PI.
- PHYDL: Physics-informed Differentiable Learning for Robotic Manipulation of Viscous and Granular Media, EPSRC, 10/2022-9/2024, CoI.
- Enable Cerebra to transform the current conventional marketing organisation to data analytics-driven strategic and digital marketing organisation, KTP, 2023-2025, CoI.
- Understanding the everyday visual experiences of young children with motor difficulties: The case of Down syndrome. James S. McDonnell Foundation, 10/2022-9/2026, CoI.
- EPSRC AI Hub in Generative Models, 2/2024-1/2029, CoI (Cardiff Lead).
- Eco-Efficient Prop Design: Generative AI for Rapid Texturing of Degradable 3D printed props for TV and film, Innovate UK, 8/2024-1/2025, CoI.

Publications
Edited Book

1. "RGB-D Image Analysis and Processing", editors P.L. Rosin, **Y.-K. Lai**, L. Shao, Y. Liu, Springer, ISBN 978-3-030-28603-3, 2019.

Journal Articles

1. F.-L. Liu, H. Fu, **Y.-K. Lai**, L. Gao, "SketchDream: sketch-based text-to-3D generation and editing", *ACM Transactions on Graphics*, to appear.

2. J.-M. Sun, J. Yang, K. Mo, **Y.-K. Lai**, L. Guibas, L. Gao, "HAISOR: Human-Aware Indoor Scene Optimization via Deep Reinforcement Learning", *ACM Transactions on Graphics*, vol. 32(2), pp. 15:1-17, 2024.

3. Y.-H. Huang, Y.-P. Cao, **Y.-K. Lai,** Y. Shan, L. Gao, "NeRF-Texture: Synthesizing neural radiance textures"*, IEEE Transactions on Pattern Analysis and Machine Intelligence,* to appear.

4. T.-J. Mu, M.-Y. Shen, **Y.-K. Lai**, S.-M. Hu, "Learning virtual view selection for 3D scene semantic segmentation", *IEEE Transactions on Image Processing*, to appear.

5. B. Li, X. Wei, B. Liu, Z. He, J. Cao, **Y.-K. Lai**, "Pose-aware 3D talking face synthesis using geometry-guided audio-vertices attention", *IEEE Transactions on Visualization and Computer Graphics*, to appear.

6. Z. Huang, Q. He, K. Maher, X. Deng, **Y.-K. Lai**, C. Ma, S.-F. Qin, Y.-J. Liu, H. Wang, "SpeechMirror: A multimodal visual analytics system for personalized reflection of online public speaking effectiveness", *IEEE Transactions on Visualization and Computer Graphics*, vol. 30(1), pp. 606-616, 2024.

7. Y. Zhai, G. Jia, **Y.-K. Lai**, J. Zhang, J. Yang, D. Tao, "Looking into gait for perceiving emotions via bilateral posture and movement graph convolutional networks", *IEEE Transactions on Affective Computing*, to appear.

8. J. Sun, J. Wu, Z. Ji, **Y.-K. Lai**, "A survey of object goal navigation", *IEEE Transactions on Automation Science and Engineering*, to appear.

9. X. Li, J. Zhang, **Y.-K. Lai**, J. Yang, K. Li, "High-quality animatable dynamic garment reconstruction from monocular videos", *IEEE Transactions on Circuits and Systems for Video Technology,* to appear.

10. J. Zhang, L. Gu, **Y.-K. Lai**, X. Wang, K. Li, "Towards grouping in large scenes with occlusion-aware spatio-temporal transformers", *IEEE Transactions on Circuits and Systems for Video Technology,* to appear.

11. Y.-F. Li, H.-B. Ji, W.-B. Zhang, **Y.-K. Lai**, "Learning discriminative motion models for multiple object tracking", *IEEE Transactions on Multimedia,* to appear.

12. B. Li, X. Lin, B. Liu, Z.-F. He, **Y.-K. Lai**, "Lightweight text-driven image editing with disentangled content and attributes", *IEEE Transactions on Multimedia*, to appear.

13. Z. Huang, C. Gao, H. Wang, X. Deng, **Y.-K. Lai**, C. Ma, S.-F. Qin, Y.-J. Liu, H. Wang, "SpeciFingers: finger identification and error correction on capacitive touchscreens", *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies,* vol. 8(1), pp. 8:1-28, 2024.

14. C.-P. Li, W. Dai, Y.-P. Xiao, M. Qi, L.-X. Zhang, L. Gao, F.-L. Zhang, **Y.-K. Lai,** C. Liu, J. Lu, F. Chen, D. Chen, S. Shi, S. Li, Q. Zeng, Y. Chen, "Two-stage deep neural network for diagnosing fungal keratitis via in vivo confocal microscopy images", *Scientific Reports*, to appear.

15. Y.-F. Li, H.-B. Ji, X. Chen, Y.-L. Yang, **Y.-K. Lai**, "Leaning key lines for multi-object

tracking", *Computer Vision and Image Understanding*, vol. 241, 103973, 2024.

16. J. Huo, M. Kong, W. Li, J. Wu, **Y.-K. Lai**, Y. Gao, "Towards efficient image and video style transfer via distillation and learnable feature transformation", *Computer Vision and Image Understanding,* vol. 241, 103947, 2024.

17. P. Herbert, J. Wu, Z. Ji, **Y.-K. Lai**, "Benchmarking visual SLAM methods in mirror environments", *Computational Visual Media*, vol. 10(2), pp. 215-241, 2024.

18. H. Zhao, L. Zhang, P.L. Rosin, **Y.-K. Lai**, Y. Wang, "HairManip: High quality hair manipulation via hair element disentangling", *Pattern Recognition,* vol. 147, 110132, 2024.

19. J. Zhang, **Y.-K. Lai,** J. Ma, K. Li, "Multi-scale information transport generative adversarial network for human pose transfer", *Displays*, 84, 102786, 2024.

20. H. Xuan, J. Zhang, **Y.-K. Lai**, K. Li, "MH-HMR: Human mesh recovery from monocular images via multi-hypothesis learning", *CAAI Transactions on Intelligence Technology*, to appear.

21. X. Jing, T. Yu, R. He, **Y.-K. Lai**, K. Li, "FRNeRF: Fusion and regularization fields for dynamic view synthesis", *Computational Visual Media*, to appear.

22. Y. Zhang, **Y.-K. Lai**, L. Nie, F.-L. Zhang, L. Xu, "RecStitchNet: Learning to stitch images with rectangular boundaries", *Computational Visual Media*, to appear.

23. Q. Wen, S. A. Tafrishi, Z. Ji, **Y.-K. Lai**¸"GLSkeleton: A geometric Laplacian-based skeletonization framework for object point clouds", *IEEE Robotics and Automation Letters*, to appear.

24. H.-H. Zhao, T.-L. Ji, P.L. Rosin, **Y.-K. Lai**, W.-L. Meng, Y.-N. Wang, "Cross-lingual font style transfer with full-domain convolutional attention", *Pattern Recognition*, vol. 155, 110709, 2024.

25. B. Li, X. Wei, B. Liu, W. Wang, Z.-F. He, **Y.-K. Lai**, "3D colored object reconstruction from a single view image through diffusion", *Expert Systems with Applications,* 252, p.124225, 2024.

26. X. Yang, J. Wu, **Y.-K. Lai,** Z. Ji, "GAM: General affordance-based manipulation for contact-rich object disentangling tasks", *Neurocomputing*, to appear.

27. L. Gao, F.-L. Liu, S.-Y. Chen, K. Jiang, C. Li, **Y.-K. Lai**, H. Fu, "SketchFaceNeRF: sketch-based facial generation and editing in neural radiance fields", *ACM Transactions on Graphics (ACM SIGGRAPH)*, 2023.

28. J. Yang, K. Mo, **Y.-K. Lai**, L. Guibas, L. Gao, "DSG-Net: Learning Disentangled Structure and Geometry for 3D Shape Generation", *ACM Transactions on Graphics*, vol. 42(1), pp. 1:1-17, 2023.

29. R. Yi, Y.-J. Liu, **Y.-K. Lai**, P. L. Rosin, "Quality metric guided portrait line drawing generation from unpaired training data", *IEEE Transactions on Pattern Analysis and Machine Intelligence,* vol. 45(1), pp. 905-918, 2023.

30. Y.-J. Yuan, Y.-T. Sun, **Y.-K. Lai,** Y. Ma, R. Jia, L. Kobbelt, L. Gao, "Interactive NeRF Geometry Editing with Shape Priors", *IEEE Transactions on Pattern Analysis and Machine Intelligence,* vol. 45(12), pp. 14821-14837, 2023.

31. T. Wu, L. Gao, L.-X. Zhang, **Y.-K. Lai**, H. Zhang, "STAR-TM: structure aware reconstruction of textured mesh from single image", *IEEE Transactions on Pattern Analysis and Machine Intelligence,* vol. 45(12), pp. 15680-15693, 2023.

32. Y.-J. Yuan, **Y.-K. Lai,** Y.-H. Huang, L. Kobbelt, L. Gao, "Neural radiance fields from sparse RGB-D images for high-quality view synthesis", *IEEE Transactions on Pattern Analysis and Machine Intelligence,* vol. 45(7), pp. 8713-8728, 2023.

33. J. Yang, J.-M. Sun, K. Mo, **Y.-K. Lai**, L. Guibas, L. Gao, "SceneHGN: hierarchical graph networks for 3D indoor scene generation with fine-grained geometry", *IEEE Transactions on Pattern Analysis and Machine Intelligence,* vol. 45(7), pp. 8902-8919, 2023.

34. Y.-T. Sun, Q.-C. Fu, Y.-R. Jiang, Z. Liu, **Y.-K. Lai**, H. Fu, L. Gao, "Human motion transfer with 3D constraints and detail enhancement", *IEEE Transactions on Pattern Analysis and Machine Intelligence,* vol. 45(4), pp. 4682-4693, 2023.

35. Y.-T. Sun, H.-Z. Huang, X. Wang, **Y.-K. Lai**, W. Liu, L. Gao, "Robust Pose Transfer with Dynamic Details using Neural Video Rendering", *IEEE Transactions on Pattern Analysis and Machine Intelligence,* vol. 45(2), pp. 2660-2666, 2023.

36. J. Yang, L. Gao, Q. Tan, Y.-H. Huang, S. Xia, **Y.-K. Lai,** "Multiscale mesh deformation component analysis with attention-based autoencoders", *IEEE Transactions on Visualization and Computer Graphics*, vol. 29(2), pp. 1301-1317, 2023.

37. X. Li, J. Huang, J. Zhang, X. Sun, H. Xuan, **Y.-K. Lai**, Y. Xie, J. Yang, K. Li, "Learning to infer inner-body under clothing from monocular video", *IEEE Transactions on Visualization and Computer Graphics*, vol. 29(12), pp. 5083-5096, 2023.

38. Z. Ye, M. Xia, Y. Sun, R. Yi, M. Yu, J. Zhang, **Y.-K. Lai**, Y.-J. Liu, "3D-CariGAN: an end-to-end solution to 3D caricature generation from normal face photos", *IEEE Transactions on Visualization and Computer Graphics*, vol. 29(4), pp. 2203-2210, 2023.

39. M. Shi, J.-Q. Zhang, S.-Y. Chen, L. Gao, **Y.-K. Lai**, F. Zhang, "Reference-based deep line art video colorization", *IEEE Transactions on Visualization and Computer Graphics*, vol. 29(6), pp. 2965-2979, 2023.

40. Y.-L. Qiao, L. Gao, S.-Z. Liu, L. Liu, **Y.-K. Lai**, X. Chen, "Learning-based intrinsic reflectional symmetry detection", *IEEE Transactions on Visualization and Computer Graphics*, vol. 29(9), pp. 3799-3808, 2023.

41. X. Yang, Z. Ji, J. Wu, **Y.-K. Lai**, "Recent advances of deep robotic affordance learning: a reinforcement learning perspective", *IEEE Transactions on Cognitive and Developmental Systems*, vol. 15(3), pp. 1139-1149, 2023.

42. R. Zuo, X. Deng, K. Chen, Z. Zhang, **Y.-K.** Lai, F. Liu, C. Ma, H. Wang, Y.-J. Liu, H. Wang, "Fine-grained video retrieval with scene sketches", *IEEE Transactions on Image Processing*, vol. 32, pp. 3136-3149, 2023.

43. K. Yuan, G. Schaefer, **Y.-K. Lai**, Y. Wang, X. Liu, L. Guan, H. Fang, "A multi-strategy contrastive learning framework for weakly supervised semantic segmentation", *Pattern Recognition*, vol. 137, 109298, 2023.

44. X. Hu, L.-X. Zhang, L. Gao, W. Dai, X. Han, **Y.-K. Lai**, Y. Chen, "GLIM-Net: chronic glaucoma forecast transformer for irregularly sampled sequential fundus images". *IEEE Transactions on Medical Imaging*, vol. 42(6), pp. 1875-1884, 2023.

45. S.-Y. Chen, **Y.-K. Lai**, S. Xia, P. L. Rosin, L. Gao, "3D face reconstruction and gaze tracking in the HMD for virtual interaction", *IEEE Transactions on Multimedia*, to vol. 25, pp. 3166-3179, 2023.

46. Z. Ye, M. Xia, R. Yi, J. Zhang, **Y.-K. Lai**, X. Huang, G.-X. Zhang, Y.-J. Liu, "Audio-

driven talking face video generation with dynamic convolution kernels", *IEEE Transactions on Multimedia*, vol. 25, pp. 2033-2046, 2023.

47. X. Du, X. Deng, H. Qin, Y. Shu, F. Liu, G. Zhao, **Y.-K. Lai**, C. Ma, Y.-J. Liu, H. Wang, "MMPosE: movie-induced multi-label positive emotion classification through EEG signals", *IEEE Transactions on Affective Computing*, vol. 14(4), pp. 2925-2938, 2023.

48. Y.-F. Li, H.-B. Ji, X. Chen, **Y.-K. Lai,** Y.-L. Yang, "Multi-object tracking with robust object regression and association", *Computer Vision and Image Understanding*, vol. 227, 103586, 2023.

49. L. Chen, L. Gao, J. Yang, S. Xu, J. Ye, X. Zhang, **Y.-K. Lai**, "Deep deformation detail synthesis for thin shell models", *Computer Graphics Forum* (Eurographics Symposium on Geometry Processing), vol. 42(5), e14903, pp. 1-13, 2023.

50. Z. Zhang, X. Deng, J. Li, **Y.-K. Lai**, C. Ma, Y.-J. Liu, H. Wang, "Stroke-based semantic segmentation for scene-level free-hand sketches", *The Visual Computer*, vol. 39, pp. 6309-6321, 2023.

51. R. Xu, Y. Jin, H. Zhang, Y. Zhang, **Y.-K. Lai**, Z. Zhe, F.-L. Zhang, "A variatonal approach for feature-aware B-spline curve design on surface meshes", The Visual Computer, vol. 39(8), pp. 3767-3781, 2023.

52. T.-X. Xu, Y.-C. Guo, Z. Li, G. Yu, **Y.-K. Lai**, S.-H. Zhang, "TransLoc3D: point cloud based large-scale place recognition using adaptive receptive fields", *Communications in Information and Systems*, vol. 23(1), article no. 3, 2023.

53. B Li, S.-H. Deng, B. Liu, Y. Li, Z.-F. He, **Y.-K. Lai**, C. Zhang, Z. Chen, "Controllable facial attribute editing via Gaussian mixture model disentanglement", *Digital Signal Processing*, vol. 134, 103916, 2023.

54. X. Jing, Q. Feng, **Y.-K. Lai**, J. Zhang, Y. Yu, K. Li, "STATE: Learning structure and texture representations for novel view synthesis", *Computational Visual Media,* vol. 9(4), pp. 767-786, 2023.

55. H. Lyu, P. L. Rosin, **Y.-K. Lai**, "WCGAN: Robust portrait watercolorization with adaptive hierarchical localized constraints", *Displays*, vol. 80, 102530, 2023.

56. F. Alhamazani, **Y.-K. Lai**, P. L. Rosin, "3DCascade-GAN: Shape completion from single-view depth images", *Computers & Graphics*, vol. 115, pp. 412-422, 2023.

57. F.-L. Liu, S.-Y. Chen, **Y.-K. Lai**, C. Li, Y.-R. Jiang, H. Fu, L. Gao, "DeepFaceVideoEditing: sketch-based deep editing of face videos", *ACM Transactions on Graphics*, vol. 41(4), pp. 167:1-16, 2022.

58. Q. Tan, L.-X. Zhang, J. Yang, **Y.-K. Lai**, L. Gao, "Variational autoencoders for localized deformation component analysis", *IEEE Transactions on Pattern Analysis and Machine Intelligence,* vol. 44(10), pp. 6297-6310, 2022.

59. J. Liu, B. Hui, K. Li, Y. Liu, **Y.-K. Lai**, Y. Zhang, Y. Liu, J. Yang, "Geometry-guided dense perspective network for speech-driven facial animation", *IEEE Transactions on Visualization and Computer Graphics*, vol. 28(12), pp. 4873-4886, 2022.

60. Y. He, Y.-T. Liu, Y.-H. Jin, S.-H. Zhang, **Y.-K. Lai**, S.-M. Hu, "Context-consistent generation of indoor virtual environments based on geometry constraints", *IEEE Transactions on Visualization and Computer Graphics*, vol. 28(12), pp. 3986-3999, 2022.

61. Y. Shu, R. Yi, M. Xia, Z. Ye, W. Zhao, Y. Chen, **Y.-K. Lai**, Y.-J. Liu, "GAN-based multi-style photo cartoonization", *IEEE Transactions on Visualization and Computer Graphics,*

vol. 28(10), pp. 3376-3390, 2022.

62. Y.-L. Qiao, **Y.-K. Lai**, H. Fu, L. Gao, "Synthesizing mesh deformation sequences with bidirectional LSTM", *IEEE Transactions on Visualization and Computer Graphics*, vol. 28(4), pp. 1906-1916, 2022.

63. Y.-L. Qiao, L. Gao, J. Yang, P. L. Rosin, **Y.-K. Lai**, X. Chen, "Learning on 3D meshes with Laplacian encoding and pooling", *IEEE Transactions on Visualization and Computer Graphics*, vol. 28(2), pp. 1317-1327, 2022.

64. K. Maher, Z. Huang, J. Song, X. Deng, **Y.-K. Lai**, C. Ma, H. Wang, Y.-J. Liu, H. Wang, "E-ffective: a visual analytic system for exploring the emotion and effectiveness of inspirational speeches", *IEEE Transactions on Visualization and Computer Graphics (VIS 2021)*, vol. 28(1), pp. 508-517, 2022.

65. F. Liu, X. Deng, C. Zou, **Y.-K. Lai**, K. Chen, R. Zuo, C. Ma, Y.-J. Liu, H. Wang, "SceneSketcher-v2: fine-grained scene-level sketch-based image retrieval using adaptive GCNs", *IEEE Transactions on Image Processing*, vol. 31, pp. 3737-3751, 2022.

66. X. Yang, Z. Ji, J. Wu, **Y.-K. Lai**, C. Wei, G. Liu, R. Setchi, "Hierarchical reinforcement learning with universal policies for multi-step robotic manipulation", *IEEE Transactions on Neural Networks and Learning Systems*, vol. 33(9), pp. 4727-4741, 2022.

67. X. Du, C. Ma, G. Zhang, J. Li, **Y.-K. Lai**, G. Zhao, X. Deng, Y.-J. Liu, H. Wang, "An efficient LSTM network for emotion recognition from multichannel EEG signals", *IEEE Transactions on Affective Computing*, vol. 13(3), pp. 1528-1540, 2022.

68. F. Liu, X. Deng, J. Song, **Y.-K. Lai,** Y.-J. Liu, H. Wang, C. Ma, S. Qin, H. Wang, "SketchMaker: sketch extraction and reuse for interactive scene sketch composition", *ACM Transactions on Interactive Intelligent Systems,* vol. 12(3), pp. 23:1-26, 2022.

69. Q. Bo, W. Ma, **Y.-K. Lai,** H. Zha, "All-higher-stages-in adaptive context aggregation for semantic edge detection", *IEEE Transactions on Circuits and Systems for Video Technology,* vol. 32(10), pp. 6778-6791, 2022.

70. D. Jiang, Y. Jin, F.-L. Zhang, **Y.-K. Lai**, R. Deng, R. Tong, "Reconstructing recognizable 3D face shapes based on 3D morphable models", *Computer Graphics Forum*, vol. 41(6), pp. 348-364, 2022.

71. P. L. Rosin, **Y.-K. Lai**, D. Mould, R. Yi, I. Berger, L. Doyle, S. Lee, C. Li, Y.-J. Liu, A. Semmo, A. Shamir, M. Son, H. Winnemöller, "NPRportrait 1.0: a three-level benchmark for non-photorealistic rendering of portraits", *Computational Visual Media*, vol. 8, pp. 445-465, 2022.

72. R. Yi, Y. Weng, M. Yu, **Y.-K. Lai**, Y.-J. Liu, "Lesion region segmentation via weakly supervised learning", *Quantitative biology,* vol. 10(3), pp. 239-252, 2022.

73. F. Zhou, **Y.-K. Lai**, P. L. Rosin, F. Zhang, Y. Hu, "Scale-aware network with modality-awareness for RGB-D indoor semantic segmentation", *Neurocomputing*, vol. 492, pp. 464-473, 2022.

74. Y. Tang, Y. Zhang, X. Han, F.-L. Zhang, **Y.-K. Lai**, R. Tong, "3D corrective nose reconstruction from a single image", *Computational Visual Media*, vol. 8(2), pp. 225-237, 2022.

75. D. George, X. Xie, **Y.-K. Lai**, G. K.L. Tam, "A deep learning driven active framework for segmentation of large 3D shape collections", *Computer-Aided Design*, vol. 144, 103179, 2022.

76. S.-Y. Chen, J.-Q. Zhang, Y.-Y. Zhao, P. L. Rosin, **Y.-K. Lai**, L. Gao, "A review of image and video colorization: from analogies to deep learning", *Visual Informatics*, vol. 6(3), pp. 51-68, 2022.

77. S.-Y. Chen, F.-L. Liu, **Y.-K. Lai**, P. L. Rosin, C. Li, H. Fu, L. Gao, "DeepFaceEditing: deep face generation and editing with disentangled geometry and appearance control", *ACM Transactions on Graphics (ACM SIGGRAPH)*, vol. 40(4), pp. 90:1-15, 2021.

78. Z. Liu, X. Han, Y. Zhang, X. Chen, **Y.-K. Lai**, E. L. Doubrovski, E. Whiting, C. C.L. Wang, "Knitting 4D garments with elasticity controlled for body motion", *ACM Transactions on Graphics (ACM SIGGRAPH)*, vol. 40(4), pp. 62:1-16, 2021.

79. L. Gao, T. Wu, Y.-J. Yuan, M.-X. Lin, **Y.-K. Lai**, H. Zhang, "TM-NET: deep generative networks for textured meshes", *ACM Transactions on Graphics (ACM SIGGRAPH Asia)*, vol. 40(6), pp. 263:1-15, 2021.

80. R. Yi, M. Xia, Y.-J. Liu, **Y.-K. Lai**, P. L. Rosin, "Line drawings for face portraits from photos using global and local structure based GANs", *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 43(10), pp. 3462-3475, 2021.

81. R. Yi, Z. Ye, W. Zhao, M. Yu, **Y.-K. Lai**, Y.-J. Liu, "Feature-aware uniform tessellations on video manifold for content-sensitive supervoxels", *IEEE Transactions on Pattern Analysis and Machine Intelligence,* vol. 43(9), pp. 3183-3195, 2021.

82. Q. Xie, **Y.-K. Lai**, J. Wu, Z. Wang, Y. Zhang, K. Xu, J. Wang, "Vote-based 3D Object Detection with Context Modeling and SOB-3DNMS", *International Journal of Computer Vision*, vol. 129(6), pp. 1857-1874, 2021.

83. X. Wu, J. Chang, **Y.-K. Lai**, J. Yang, Q. Tian, "BiSPL: bidirectional self-paced learning for recognition from web data", *IEEE Transactions on Image Processing*, vol. 30, pp. 6512-6527, 2021.

84. H. Hou, J. Huo, J. Wu, **Y.-K. Lai**, Y. Gao, "MW-GAN: multi-warping GAN for caricature generation with multi-style geometric exaggeration", *IEEE Transactions on Image Processing*, vol. 30, pp. 8644-8657, 2021.

85. K. Li, H. Wen, Y. Zhang, X. Li, J. Huang, C. Yuan, **Y.-K. Lai**, Y. Liu, "Image-guided human reconstruction via multi-scale graph transformation networks", *IEEE Transactions on Image Processing*, vol. 30, pp. 5239-5251, 2021.

86. X. Yao, S. Zhao, **Y.-K. Lai,** D. She, J. Liang, J. Yang, "APSE: attention-aware polarity sensitive embedding for emotion-based image retrieval", *IEEE Transactions on Multimedia*, vol. 23, pp. 4469-4482, 2021.

87. L. Gao, L.-X. Zhang, H.-Y. Meng, Y.-H. Ren, **Y.-K. Lai**, L. Kobbelt, "PRS-Net: planar reflective symmetry detection net for 3D models", *IEEE Transactions on Visualization and Computer Graphics*, vol. 27(6), pp. 3007-3018, 2021.

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25. Y.-H. Huang, Y.-P. Cao, **Y.-K. Lai**, Y. Shan, L. Gao, "NeRF-Texture: texture synthesis with neural radiance fields", ACM SIGGRAPH Conference Proceedings, 2023.

26. T. Wu, J.-M. Sun, **Y.-K. Lai**, L. Gao, "De-NeRF: decoupled neural radiance fields for view-consistent appearance editing and high-frequency environmental relighting", ACM SIGGRAPH Conference Proceedings, 2023.

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29. T. Xu, Y.-C. Guo, **Y.-K. Lai**, S.-H. Zhang, "MBPTrack: improving 3D point cloud tracking with memory networks and box priors", International Conference on Computer Vision, 2023.

30. S. Song, Y. Liang, J. Wu, **Y.-K. Lai,** Y. Qin, "Feature proliferation — the "cancer" in StyleGAN and its treatments", International Conference on Computer Vision, 2023.

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32. T.-X. Xu, Y.-C. Guo, **Y.-K. Lai**, S.-H. Zhang, "CXTrack: improving 3D point cloud tracking with contextual information", IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2023.

33. B. Li, K. Xue, B. Liu, **Y.-K. Lai,** "BBDM: image-to-image translation with Brownian bridge diffusion models", IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2023.

34. R. Yi, H. Tian, Z. Gu, **Y.-K. Lai,** P. L. Rosin, "Towards artistic image aesthetics assessment: a large-scale dataset and a new method", IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2023.

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37. T. Wang, J. Wu, Z. Ji, **Y.-K. Lai**, "RPS-Net: indoor scene point completion using RBF-point sparse convolution", Computer Graphics & Visual Computing (CGVC), 2023 (best student technical paper award).

38. F. Alhamazani, P. L. Rosin, **Y.-K. Lai,** "An image-based model for 3D shape quality measure", Computer Graphics & Visual Computing (CGVC), 2023.

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46. X. Yang, Z. Ji, J. Wu, **Y.-K. Lai**, "Abstract demonstrations and adaptive exploration for efficient and stable multi-step sparse reward reinforcement learning", International Conference on Automation and Computing (ICAC) 2022.

47. H. Cui, J. Yang, **Y.-K. Lai**, K. Li, "Monocular 3D face reconstruction with joint 2D and 3D constraints", CAAI International Conference on Artificial Intelligence (CACAI) 2022.

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53. D. She, **Y.-K. Lai,** G. Yi, K. Xu, "Hierarchical Layout-Aware Graph Convolutional Network for Unified Aesthetics Assessment", IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2021.

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59. Y.-J. Yuan, **Y.-K. Lai**, J. Yang, Q. Duan, H. Fu, L. Gao, "Mesh variational autoencoders with edge contraction pooling", CVPR Workshop, 2020.

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63. J. Huang, S. Yang, Z. Zhao, **Y.-K. Lai**, S.-M. Hu, "ClusterSLAM: a SLAM backend for simultaneous rigid body clustering and motion estimation", IEEE International Conference on Computer Vision (ICCV), 2019.

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70. R. M. Dyke, C. Stride, **Y.-K. Lai**, P. L. Rosin, et al. "SHREC'19: Shape Correspondence with Isometric and Non-Isometric Deformations", *Eurographics Workshop on 3D Object Retrieval,* 2019.

71. T. Wang, K. Vladimirov, S. Y. Goh, **Y.-K. Lai**, X. Xie, G. K.L. Tam, "Robust and flexible puzzle solving with corner-based cycle-consistent correspondences", Computer Graphics & Visual Computing (CGVC), 2019.

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73. J. Yang, D. She, **Y.-K. Lai,** P. L. Rosin, M.-H. Yang, "Weakly supervised coupled networks for visual sentiment analysis", IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2018 (spotlight).

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75. Y. Chen, **Y.-K. Lai**, Y.-J. Liu, "CartoonGAN: generative adversarial networks for photo cartoonization", IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2018.

76. Q. Tan, L. Gao, **Y.-K. Lai**, S. Xia, "Variational autoencoders for deforming 3D mesh models", IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2018.

77. Q. Wu, J. Zhang, **Y.-K. Lai**, J. Zheng, J. Cai, "Alive caricature from 2D to 3D", IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2018 (spotlight).

78. R. Yi, Y.-J. Liu, **Y.-K. Lai**, "Evaluation on the compactness of supervoxels", IEEE International Conference on Image Processing (ICIP), 2018.

79. Y. Han, B. Li, **Y.-K. Lai**, Y.-J. Liu, "CFD: a collaborative feature difference method for spontaneous micro-expression spotting", IEEE International Conference on Image Processing (ICIP), 2018.

80. Q. Tan, L. Gao, **Y.-K. Lai**, J. Yang, S. Xia, "Mesh-based autoencoders for localizd deformation component analysis", AAAI 2018 (spotlight).

81. J. Yang, D. She, **Y.-K. Lai**, M.-H. Yang, "Retrieving and classifying affective images via deep metric learning", AAAI 2018 (oral).

82. S.-Y. Chen, L. Gao, **Y.-K. Lai**, P. L. Rosin, S. Xia, "Real-time 3D face reconstruction and gaze tracking for virtual reality", *IEEE Conference on Virtual Reality and 3D User Interfaces*, 2018 (poster).

83. F. Langenfeld, et al. "SHREC 2018 – protein shape retrieval", *EG Workshop on 3D Object Retrieval,* 2018.

84. T. Wang, D. George, **Y.-K. Lai**, X. Xie, G. K.L. Tam, "Consistent segment-wise matching with multi-layer graphs", *Computer Graphics & Visual Computing*, 2018

(poster).

85. **Y.-K. Lai**, K. Rodriguez-Echavarria, R. Song, P. L. Rosin, "Digitisation and visual analysis of large scale monuments: the case of the Trajan column cast", *Visual Heritage (Eurographics Workshop on Graphics and Cultural Heritage)*, 2018 (short paper).

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88. Y. Chen, **Y.-K. Lai,** Y.-J. Liu, "Transforming Photos to Comics using Convolutional Neural Networks", ICIP 2017.

89. X. Liu, M.-M. Cheng, **Y.-K. Lai**, P. L. Rosin, "Depth-aware neural style transfer", *Expressive* 2017.

90. P. L. Rosin, D. Mould, I. Berger, J. Collomosse, **Y.-K. Lai**, C. Li, H. Li, A. Shamir, M. Wand, T. Wang, H. Winnemoeller, "Benchmarking non-photorealistic rendering of portraits", *Expressive* 2017.

91. K. Li, M. Wang, **Y.-K. Lai**, J. Yang, F. Wu, "3-D Motion Recovery via Low Rank Matrix Restoration on Articulation Graphs", *ICME* 2017.

92. D. Guo, K. Li, **Y.-K. Lai**, J. Yang, "Global alignment for deformable objects captured by a single RGB-D camera", *ICME* 2017.

93. P. L. Rosin, **Y.-K. Lai**, "Watercolour Rendering of Portraits", *PSIVT workshop on Vision meets Graphics*, 2017.

94. C. Liu, P. L. Rosin, **Y.-K. Lai**, G. R. Davis, D. Mills, C. Norton. "Recovering historical film footage by processing microtomographic images". In: *Proceedings of World Cultural Heritage Conference*, 2016.

95. M. Wang, K. Li, F. Wu, **Y.-K. Lai**, J. Yang, "3-D motion recovery via low rank matrix analysis". In: *Proceedings of Visual Communications and Image Processing,* 2016.

96. A. Abdulmunem, **Y.-K. Lai**, X. Sun, "3D GLOH Features for Human Action Recognition". In: *Proceedings of International Conference on Pattern Recognition*, 2016.

97. C. Liu, P. L. Rosin, **Y.-K. Lai**, W. Hu, "Robust segmentation of historical parchment XMT images for virtual unrolling". In: *Proceedings of International Congress on Digital Heritage*, 2015.

98. P. L. Rosin, **Y.-K. Lai**, "Non-photorealistic rendering of portraits". In: *Proceedings of Computational Aesthetics*, 2015.

99. F. M. Anuar, R. Setchi, **Y.-K. Lai**, "Trademark retrieval based on phonetic similarity". In: *Proceedings of IEEE International Conference on Systems, Man and Cybernetics*, 2014.

100. D. Mills, G.R. Davis, **Y.-K. Lai**, P. L. Rosin, "Apocalypto - Recovering lost text with XMT", Proc. SPIE 9212, Developments in X-Ray Tomography IX, 2014.

101. Y. Chen, **Y.-K. Lai**, Z.-Q. Cheng, R. R. Martin, S.-Y. Jin, "A data-driven approach to efficient character articulation". In: *Proceedings of CAD/Graphics,* pp. 32-37, 2013.

102. J. A. Quinn, F. C. Langbein, **Y.-K. Lai**, R. R. Martin, "Fast low-discrepancy sampling of parametric surfaces and meshes". In: *Proceedings of Mathematics of Surfaces XIV,* 2013.

103. P. L. Rosin, **Y.-K. Lai,** "Non-photorealistic rendering with spot colour". In: *Proceedings of Computational Aesthetics*, pp. 67-76, 2013.

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conceptual similarity", *Knowledge-based and Intelligent Information and Engineering Systems (KES), Procedia Computer Science*, vol. 22, pp. 450-459, 2013.

105. G.-X. Zhang, **Y.-K. Lai**, S.-M. Hu, "Efficient solid texture synthesis using gradient solids", In: *Proceedings of Computational Visual Media*, pp. 67-74, 2012 (Best Paper Award).

106. O. Samko, **Y.-K. Lai**, D. Marshall, P. L. Rosin, "Segmentation of parchment scrolls for virtual unrolling". In: *Proceedings of British Machine Vision Conference*, 2011.

107. P. L. Rosin, **Y.-K. Lai**, "Towards artistic minimal rendering". In: *Proceedings of ACM Symposium on Non-Photorealistic Animation and Rendering*, pp. 119-127, 2010.

108. **Y.-K. Lai**, S.-M. Hu and T. Fang, "Robust principal curvatures using feature adapted integral invariants". In: *Proceedings of SIAM/ACM Joint Conference on Geometric and Physical Modeling*, pp. 325-330, 2009.

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111. **Y.-K. Lai**, Y.-J. Liu, Y. Zang and S.-M. Hu, "Fairing wireframes in industrial surface design". In: *Proceedings of IEEE International Conference on Shape Modeling and Applications*, pp. 29-38, 2008.

112. Y. Zang, Y.-J. Liu and **Y.-K. Lai**, "Note on industrial applications of Hu's surface extension algorithm", *Geometric Modeling and Processing*, pp. 304-314, 2008.

113. W. Zeng, X. Yin, Y. Zeng, **Y.-K. Lai**, X. Gu, D. Samaras, "3D face matching and registration based on hyperbolic Ricci flow", *CVPR Workshop on 3D Face Processing*, pp.1-8, 2008.

114. Y.-J. Liu, **Y.-K. Lai** and S.-M. Hu, "Developable strip approximation of parametric surfaces with global error bounds", *Pacific Graphics*, pp.441-444, 2007.

115. **Y.-K. Lai**, S.-M. Hu and R. R. Martin, "Feature sensitive mesh segmentation". In: *Proceedings of ACM Symposium on Solid and Physical Modeling*, pp. 7-16, 2006.

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Book Chapters

1. **Y.-K. Lai**, P. L. Rosin, "Non-photorealistic rendering with reduced colour palettes". In: *Image and Video-based Artistic Stylisation*, *Computational Imaging and Vision* series, vol. 42(2), pp. 211-236, Springer, 2013.

2. R. Yi, Y.-J. Liu, **Y.-K. Lai**, P. L. Rosin, "Generating artistic portrait drawings from images", In: *Applications of Generative AI*, 2024.

Patents

1. Method and system for rapidly vectorizing image by gradient meshes based on parameterization, S. Hu and Y. Lai, US Patent No. 9,508,162 (Awarded 29/11/2016).

Honours and Awards
- Computers & Graphics Valuable Reviewer Award 2013-2014
- National Excellent Doctoral Dissertation of China Award, 2010.
- First-Class Excellent Doctoral Thesis, Tsinghua University, 2008
- Excellent PhD Graduate, Dept. of Computer Science and Technology, Tsinghua University, 2008.
- Microsoft Research Asia Fellowship, 2007.
- First-class Scholarship for Excellent Students in Tsinghua University (Morgan Stanley Scholarship), 2006.
- First-class Scholarship for Excellent Students in Tsinghua University (Sony Scholarship), 2002.
- Gold medal in National Olympiad in Informatics (NOI) of China, 1998.

Admin. Roles
- 2019-2022: Director of Research
- 2017-2019: Deputy Director of Research
- 2017-2018: Deputy Director of PGR Studies
- 2017-2018: School Seminar Co-ordinator
- 2009-2017: Year 2 Tutor

Other Activities
- Welsh Crucible 2015 participant

Professional Activities
Journal editorial board member
- IEEE Transactions on Visualization and Computer Graphics (since 2023)
- AI Communications (since 2023)
- Computer Graphics Forum (2019-2022)
- The Visual Computer (since Nov. 2012)

Conference Co-Chair
- Computational Visual Media 2016
- Eurographics Symposium on Geometry Processing 2014

Workshop Co-Chair:
- ACCV workshop on RGB-D sensing and understanding via combined colour and depth (2018)
- BMVA technical meeting on analysis and processing of RGBD data (2017)
- PSIVT workshop on Vision meets Graphics (2017)

Program Co-Chair
- 3D Object Retrieval Workshop (3DOR) 2021

Program committee member
- SIGGRAPH Asia Technical Papers (2024)

- IJCAI 2021 Senior PC member
- British Machine Vision Conference (BMVC) Reviewer (2015, 2016, 2017) Area Chair (2018, 2019, 2020, 2021, 2022, 2023, 2024)
- PC member/reviewer for CVPR, ICCV, ECCV, NeurIPS, ICML, etc.
- ACM Symposium on Solid and Physical Modeling, SIAM Conference on Geometric & Physical Modeling (SPM 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021)
- Eurographics Symposium on Geometry Processing (SGP 2014, 2015, 2017, 2018, 2019, 2020, 2021, 2024)
- Geometric Modeling and Processing (GMP 2012, 2014, 2015, 2016, 2017, 2018, 2024)
- Computer Graphics International (CGI 2018, 2019, 2020, 2021, 2022, 2023, 2024)
- Pacific Graphics (PG 2012, 2015, 2016, 2017, 2018, 2021, 2024)
- International Symposium on Visual Computing (ISVC 2018, 2019, 2020, 2021, 2022, 2023, 2024)
- MultiMedia Modeling (MMM 2020)
- SIGGRAPH Asia Briefs and Posters 2014, 2015, 2016
- Expressive 2014, 2015, 2016, 2018, 2019
- Computational Visual Media (CVM 2012, 2013, 2015, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025)
- IEEE Computer-Aided Design and Computer Graphics (CAD/Graphics 2011, 2013, 2015, 2017)
- Eurographics 2011 Short Papers
- Intl. Conf. on Computer Animation and Social Agents (CASA 2010)
- Computer Graphics & Visual Computing (CGVC 2014-2024)
- PSIVT Workshop on Vision meets Graphics (2015)

Member of EPSRC Peer Review College.
Reviewer for proposals for EPSRC, The Royal Society, Welsh government, Swiss NSF, Canadian research council.

Reviewer for major journals and conferences, including ACM Transactions on Graphics, IEEE Transactions on Pattern Analysis and Machine Intelligence, International Journal of Computer Vision (IJCV), IEEE Transactions on Image Processing, IEEE Transactions on Visualization and Computer Graphics, IEEE Transactions on Affective Computing, SIGGRAPH, SIGGRAPH Asia, Eurographics (EG), Pacific Graphics (PG), CVPR, ICCV, ECCV, NeurIPS, Artificial Intelligence Review, Neurocomputing, Computer-Aided Design, Computer Aided Geometric Design, Computer Graphics Forum, The Visual Computer, Computers & Graphics, Graphical Models, Journal of Computational and Applied Mathematics, IET Computer Vision, Multimedia Tools and Applications, etc.