Yimin Wang

Contact Information

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Current Affiliation

Southeast University, China

- Adjunct Professor, Institute of Brain and Intelligence — March 2018 to present
  Team Leader for software tools.

Shanghai University, China

- School of Computer Engineering and Science — June 2013 to present

Research Interests

- ◇ Bioimage visualization and analytics
- ◇ Computer graphics
- ◇ Computational neuroscience
- ◇ Artificial intelligence
- ◇ Mixed reality
- ◇ Human computer interaction
- ◇ Image processing
- ◇ Geometric modeling

Education

Nanyang Technological University, Singapore

Ph.D., School of Computer Science and Engineering — 2004 to 2009

- Thesis Topic: Free-form surface representation and approximation using T-splines
- Advisor: Professor Jianmin Zheng

Fudan University, Shanghai, China

B.S., School of Computer Science — 1999 to 2003

- Thesis Topic: Ontology based semi-automated information extraction

Past Professional Experience

Allen Institute for Brain Science, Seattle, United States

- Visiting Scientist, worked with Hanchuan Peng Group on neuron morphology reconstruction and analysis — April 2016 to July 2016

IBM Research - China

- Staff Researcher, Virtual World and 3D Internet — October 2009 to June 2013

Nanyang Technological University, Singapore

- Research Fellow, School of Computer Science and Engineering — April 2009 to October 2009

Grants

Research Grants

- Reconstruction and analysis of full neuronal morphology based on mixed reality and artificial intelligence. National Science Foundation of China, PI, 2021-2024.
- Visualization and computation of whole-brain microscopic imaging data, Natural Science Foundation of Shanghai, PI, 2020-2023.
- Free-form surface representation using T-splines: investigation on the theory and the application in surface reconstruction. National Science Foundation of China, PI, 2015-2017.

- On the theory and methods of constructing feature-sensitive T-spline surfaces. Natural Science Foundation of Shanghai, PI, 2014-2017.
- Essential problems on T-spline surface fitting. Open Project Program of the State Key Lab of CAD&CG, PI, 2015-2016.
- Theory and algorithms for T-spline surfaces. Start up grant for young scholars in Shanghai, PI, 2014-2016.
- Novel film-making-suitable techniques in geometric modeling. Shanghai University filmology summit research grant, PI, 2015.

PUBLICATIONS

[1] Shengdian Jiang, **Yimin Wang** (*co-first, co-corresponding*), Lijuan Liu, Sujun Zhao, Mengya Chen, Xuan Zhao, Peng Xie, Liya Ding, Zongcai Ruan, Hong-Wei Dong, Giorgio A. Ascoli, Michael Hawrylycz, Hongkui Zeng, and Hanchuan Peng. Petabyte-Scale Multi-Morphometry of Single Neurons for Whole Brains. *bioRxiv*, January 2021 (submitted to *Nature Biotechnology*).

[2] Lei Qu, Yuanyuan Li, Peng Xie, Lijuan Liu, **Yimin Wang**, Jun Wu, Yu Liu, Tao Wang, Longfei Li, Kaixuan Guo, Wan Wan, Lei Ouyang, Feng Xiong, Anna C. Kolstad, Zhuhao Wu, Fang Xu, Yefeng Zheng, Hui Gong, Qingming Luo, Guoqiang Bi, Hongwei Dong, Michael Hawrylycz, Hongkui Zeng, and Hanchuan Peng. Cross-modal coherent registration of whole mouse brains. ***Nature Methods***, December 2021.

[3] BRAIN Initiative Cell Census Network (**BICCN**). A multimodal cell census and atlas of the mammalian primary motor cortex. ***Nature***, 598(7879):86–102, October 2021.

[4] Rodrigo Muñoz-Castañeda, ..., **Yimin Wang**, ..., and Hong-Wei Dong. Cellular anatomy of the mouse primary motor cortex. ***Nature***, 598(7879):159–166, October 2021.

[5] Hanchuan Peng, Peng Xie, Lijuan Liu, Xiuli Kuang, **Yimin Wang**, ..., and Hongkui Zeng. Morphological diversity of single neurons in molecularly defined cell types. ***Nature***, 598(7879):174–181, October 2021.

[6] Jack A. Supple, Daniel Pinto-Benito, Christopher Khoo, Trevor J. Wardill, Samuel T. Fabian, Molly Liu, Siddhant Pusdekar, Daniel Galeano, Jintao Pan, Shengdian Jiang, **Yimin Wang**, Lijuan Liu, Hanchuan Peng, Robert M. Olberg, and Paloma T. Gonzalez-Bellido. Binocular Encoding in the Damselfly Pre-motor Target Tracking System. *Current Biology*, 30(4):645–656.e4, February 2020 (**selected as the cover article**).

[7] **Yimin Wang**, Qi Li, Lijuan Liu, Zhi Zhou, Zongcai Ruan, Lingsheng Kong, Yaoyao Li, Yun Wang, Ning Zhong, Renjie Chai, Xiangfeng Luo, Yike Guo, Michael Hawrylycz, Qingming Luo, Zhongze Gu, Wei Xie, Hongkui Zeng, and Hanchuan Peng. TeraVR empowers precise reconstruction of complete 3-D neuronal morphology in the whole brain. ***Nature Communications***, 10(1):3474, August 2019 (**also highlighted in Nature Methods, 16, 957**).

[8] **Yimin Wang**, Lingsheng Kong, Zhenxing Qian, Guorui Feng, Xinpeng Zhang, and Jianmin Zheng. Breaking Permutation-Based Mesh Steganography and Security Improvement. *IEEE Access*, 7:183300–183310, 2019.

[9] **Yimin Wang**, Qi Li, Lijuan Liu, Zhi Zhou, Yun Wang, Lingsheng Kong, and Hanchuan Peng. Immersive visualization is a key enabler for precise whole-brain scale reconstruction of neurons. abstract in Neuroscience 2019, 2019.

[10] **Yimin Wang** and Hanchuan Peng. A virtual reality platform for visualization, exploration, and annotation of brain-wide neuronal images. abstract in Neuroscience 2018 (**selected as SfN 2018 Hot Topic, 1%**), 2018.

[11] **Yimin Wang**, Zhi Zhou, Xiaoxiao Liu, Alessandro Bria, Yike Guo, and Hanchuan Peng. Disseminating vaa3d and its high-performance, open-source, cross-platform neuron image toolbox. abstract in Neuroscience 2016, 2016.

[12] Zhenxing Qian, Xinpeng Zhang, Weiming Zhang, and **Yimin Wang**. Reversible contrast enhancement. In *International Conference on Cloud Computing and Security*, pages 18–27. Springer, 2016.

[13] **Yimin Wang** and Jianmin Zheng. Curvature-guided adaptive T-spline surface fitting. *Computer-Aided Design*, 45(8–9):1095–1107, August 2013.

[14] **Yimin Wang**, Jian Wang, Lijun Mei, and Qicheng Li. A virtual-learning service platform and its API based programming learning and design refinement. In *SOLI*, 2012.

[15] Jianmin Zheng and **Yimin Wang**. Periodic T-splines and tubular surface fitting. In *Curves and Surfaces*, number 6920 in Lecture Notes in Computer Science, pages 731–746. Springer Berlin Heidelberg, January 2012.

[16] Lijun Mei, **Yimin Wang**, Qicheng Li, Jian Wang, and Ziyu Zhu. A service-oriented framework for hybrid immersive web applications. In *International Conference on Web Services*, 2011.

[17] **Yimin Wang**, Lijun Mei, Qi Cheng Li, Jian Wang, and Zi Yu Zhu. 3D virtual client center and its service oriented modeling. In *International Joint Conference on Service Sciences*, 2011.

[18] **Yimin Wang** and Jianmin Zheng. Tubular triangular mesh parameterization and applications. *Computer Animation and Virtual Worlds*, 21(2):91–102, 2010.

[19] **Yimin Wang** and Jianmin Zheng. Using periodic T-spline surfaces for virtual reality applications. In *International Conf. of ISAGA*, 2009.

[20] **Yimin Wang** and Jianmin Zheng. Edge based parameterization for tubular meshes. In *VRCAI '08: Proceedings of The 7th ACM SIGGRAPH International Conference on Virtual-Reality Continuum and Its Applications in Industry*, pages 1–6, New York, NY, USA, 2008. ACM.

[21] **Yimin Wang** and Jianmin Zheng. Adaptive T-spline surface approximation of triangular meshes. In *Information, Communications & Signal Processing, 2007 6th International Conference on*, pages 1–5, 2007.

[22] **Yimin Wang** and Jianmin Zheng. Control point removal algorithm for T-Spline surfaces. *Lecture Notes in Computer Science (Geometric Modeling and Processing (GMP) 2006)*, pages 385–396, 2006.

[23] Jianmin Zheng, **Yimin Wang**, and Hock Soon Seah. Adaptive T-spline surface fitting to z-map models. In *GRAPHITE 2005*, pages 405–411. ACM, 2005.

[24] **Yimin Wang**, Jianmin Zheng, and Hock Soon Seah. Conversion between T-Splines and hierarchical B-Splines. In *Computer Graphics and Imaging*, pages 8–13, 2005.

U.S. Patents

[1] Managing software performance tests based on a distributed virtual machine system. US 10,248,539 B2. 2019.

[2] Auto Focus Device And Method For Liquid Crystal Display. US 9,835,930 B2. 2017.

[3] Producing Sounds In A Virtual World And Related Sound Card. US 9,564,115 B2. 2017.

[4] Managing software performance tests based on a distributed virtual machine system. US 9,529,693 B2. 2016.

[5] Creation of Rhythmic Password and Authentication Based on Rhythmic Password. US 9,454,655 B2. 2016.

[6] Method and apparatus for processing three-dimensional model data. US 9,135,749 B2. 2015.

[7] Scheduling discrete event simulation. US 9,053,263 B2. 2015.

[8] Building Controllable Clairvoyance Device In Virtual World. US 8,970,586 B2. 2015.

[9] Method And Apparatus For Search In Virtual World. US 8,933,939 B2. 2015.

[10] Method And System For Providing Images Of A Virtual World Scene And Method And System For Processing The Same. US 8,854,391 B2. 2014.

[11] Generating three-dimensional virtual scene (US 2013/0135304 A1)

[12] Human-Computer Interaction Device And An Apparatus And Method For Applying The Device Into A Virtual World (US 2012/0133581 A1)

[13] Method And System For Creating Model Data (US 2012/0078590 A1)

[14] Method And System For Protecting Model Data (US 2012/0054873 A1)

[15] Workpiece Detecting Method and System, 2012, patent approval pending.

Talks and Presentations

"Towards the construction of a large-scale dataset for complete neuronal morphology". **15th International Conference on Photonics and Imaging in Biology and Medicine (PIBM 2021), invited talk**, Haikou, China, December 2021.

"Methods and tools that support mass production of neuron morphology from whole brains". **The 10th China Intelligence Industry Summit (2020), Forum on Novel Methods and Technologies for Brain Sciences, invited talk**, Jiaxing, China, November 2020.

"Several research problems in single-cell level whole-brain microscopic image visualization and computing". **NWPU Frontiers in Brain-inspired Computing, invited talk**, Xi'an, China, September 2020.

"Boosting Large Multidimensional Bioimage Visualization and Analysis: Vaa3D and Applications". **A MICCAI 2019 tutorial**, **organizer and speaker**, Shenzhen, China, October 2019.

"Efficient and precise neuron reconstruction facilitated by virtual reality". **NeuroFrontiers'2019 - Reconstruction and Applications, invited talk**, Nanjing, China, September 2019.

"Reconstructing full neuron morphology from terabyte-scale images using Vaa3D-VR". **International Workshop of Neuron Reconstruction and Applications 2018, invited talk**, Nanjing, China, September 2018.

"Towards the High-Throughput Generation of Full Neuron Morphometry from Peta-Scale Images". **Medical Image Computing Seminar (MICS) 2018, invited talk**, Nanjing, China, July 2018.

"Periodic T-spline surface representation and approximation for virtual reality applications". ISAGA 2009, Singapore, June 2009.

"Edge based mesh parameterization". VRCAI 2008, Singapore, December 2008.

"Adaptive T-spline surface approximation for triangular meshes". ICICS 2007, Singapore, December 2007.

"Control points removal for T-splines". GMP 2006, Pittsburgh, PA, United States, July 2006.

Academic Experience

Teaching

- Computer Graphics 2016 - 2019
- C++ Programming 2016 - 2017
- Software Project Management 2014 - 2016

Reviewer Experience

- IEEE Transactions on Medical Imaging
- Brain Informatics
- Frontiers In Computational Neuroscience
- Frontiers in Neural Circuits
- Neuroinformatics
- BMC Bioinformatics
- IEEE Transactions on Information Forensics and Security
- Journal of Visual Communication and Image Representation
- Journal of Computational and Applied Mathematics
- Applied Numerical Mathematics
- Journal of Medical Imaging and Health Informatics
- Virtual-Reality Continuum and its Applications in Industry 2008
- Geometric Modeling and Processing 2008
- Computer Graphics International 2011
- Computer Graphics International 2012
- IEEE International Conference on Service Operations and Logistics, and Informatics 2012
- Computational Visual Media 2012
- Pacific Graphics 2016

Honors and Awards

- IBM 4th Invention Plateau, 2012
- IBM 3rd Invention Plateau, 2011
- IBM 2nd Invention Plateau, 2011
- IBM 1st Invention Plateau, 2010
- IBM Tier 2 Award, 2010
- Postgraduate Student Fellowship, Nanyang Technological University
- Teaching Assistant Grant, Nanyang Technological University, 2007 & 2008
- The People's Scholarship, Fudan University, 2000 & 2001
- Scholarship of Exceptional Freshman, Fudan University, 1999
- China Biology Olympiad, Second Prize, 1998
- Shanghai High School Biology Competition, First Prize, 1998 & 1999

Computer Skills	☐ Programming: C, C++, Java, Pascal, C#, Assembly Language, and others
	☐ Toolkits and Libraries: OpenGL, GLUT, GLUI, Qt, FLTK, CGAL, OpenMesh, and others
	☐ Operating Systems: Microsoft Windows, Linux, and other UNIX variants
	☐ Applications: LaTeX, Microsoft Office, Mathematica, Maple, Autodesk Maya, Autodesk 3ds Max, Rhinoceros 3D, and other common softwares
Language Skills	☐ English: fluent
	☐ Mandarin: native
Mathematical Expertise	☐ Mathematical analysis
	☐ Linear algebra
	☐ Abstract algebra
	☐ Graph theory
	☐ Probability, Random variables, and Stochastic processes
	☐ Differential geometry
References	Available upon request.

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