Teng-Yok Lee

Research Scientist
Mitsubishi Electric Research Laboratories
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Research Interests

- Computer Graphics
- Scientific/Information Visualization/Visual Analytics
- Computer Vision/Image Processing
- High Performance Computing
- GPGPU
- Cloud computing

Education

PhD., Computer Science & Engineering — Sep., 2005 – Dec., 2011
The Ohio State University — Columbus, OH

Thesis: Data Triage and Visual Analytics for Scientific Visualization
Advisor: Prof. Han-Wei Shen

M.S., Computer Science & Information Engineering — Sep., 2000 – Jun., 2002
National Chiao Tung University — Hsinchu, Taiwan

B.S., Computer Science & Information Engineering — Sep., 1996 – Jun., 2000
National Chiao Tung University — Hsinchu, Taiwan

Experience

Research Scientist — Jun. 2015 – Present
Mitsubishi Electric Research Laboratories — Cambridge, MA

Software Development Engineer — Mar., 2013 – May, 2015
Amazon Web Services — Seattle, WA

- Developed distributed software for HPC applications, especially scientific simulations, on GPU instances of AWS cloud computing environment.

Post Doctoral Researcher (with Prof. Han-Wei Shen) — Jan., 2012 – Feb. 2013
The Ohio State University — Columbus, OH

Research Aide (with Dr. Tom Peterka) — Jun. - Aug., 2011
Argonne National Laboratory — Argonne, IL

- Extend CFD simulation packages (NEK5000 and FLASH) with in situ analysis features on supercomputers at Argonne Leadership Computing Facility of Department of Energy.

Summer Graduate Intern (with Dr. Fatih Porikli) — Jun. – Aug., 2008
Mitsubishi Electric Research Laboratories — Cambridge, MA

- Developed real time phase estimation and visualization system for respiration-gated radiation therapy (1 US patent for the visualization system and 1 PacificVis paper for the visualization algorithm).

Summer Graduate Intern (with Dr. Fatih Porikli) — Jun. – Sep.,, 2007
Mitsubishi Electric Research Laboratories — Cambridge, MA

- Accelerated image/video processing algorithms on GPUs with nVidia CUDA.

Graduate Research Associate (with Prof. Han-Wei Shen) — Jan., 2006 – Dec., 2011
The Ohio State University — Columbus, OH

Engineer — Nov., 2004 – Aug., 2005
Compal Electronics, Inc. — Taipei City, Taiwan

- Image/video processing: Developed application-layer video streaming software on Sony/Ericsson platform.

Refereed Publications

1. **Space-Time Slicing: Visualizing Object Detector Performance in Driving Video Sequences.**
T.-Y. Lee, and K. Wittenburg.
In *PacificVis '19: Proceedings of IEEE Pacific Visualization Symposium*, Bangkok, Thailand, 2019
(acceptance rate: 12/19 = 63.2%).
2. **Localization-Aware Active Learning for Object Detection.**
C.-C. Kao, **T.-Y. Lee,** P. Sen, and M.-Y. Liu.
In *ACCV '18: Proceedings of Asian Conference on Computer Vision,* Perth*,* Australia, 2018
(acceptance rate: 274/979 = 28.0%).
3. **Recurrent Multi-frame Single Shot Detector for Video Object Detection.**
A. Broad, M. Jones, and **T.-Y. Lee.**
In *BMVC '18: Proceedings of British Machine Vision Conference*, New Castle, UK, 2018
(acceptance rate: 255/862 = 29.5%).
4. **VLASE: Vehicle Localization by Aggregating Semantic Edges.**
X. Yu, S. Chaturvedi, C. Feng, Y. Taguchi, **T.-Y. Lee**, C. Fernandes, and S. Ramalingam.
In *IROS '18: Proceedings of International Conference on Intelligent Robots*, Madrid*,* Spain, 2018
(acceptance rate: 1257/2693 = 46.9%).
5. **Barcode: Global Binary Patterns for Fast Visual Inference.**
T.-Y. Lee, S. Patil, S. Ramalingam, Y. Taguchi, and B. Benes.
In *3DV '17: Proceedings of the International Conference on 3D Vision*, Qingdao, China, 2017
(acceptance rate: 73/146 = 50%).
6. **Deep Active Learning for Civil Infrastructure Defect Detection and Classification.**
C. Feng, M.-Y. Liu, C.-C. Kao, and **T.-Y. Lee**
In *IWCCE '17: International Workshop on Computing for Civil Engineering*, Seattle, WA, 2017.
7. **Exploring Flow Fields Using Space-filling Analysis of Streamlines**
A Chaudhuri, **T.-Y. Lee**, H.-W. Shen, and R. Wenger.
IEEE Transactions on Visualization and Computer Graphics, 20(10): 1392-1404, Oct., 2014.
8. **Efficient Range Distribution Query for Visualizing Scientific Data.**
A Chaudhuri, T.-H. Wei, **T.-Y. Lee**, H.-W. Shen, and T. Peterka.
In *PacificVis '14: Proceedings of the IEEE Pacific Visualization Symposium*, pp. 201-208, Yokohama, Japan, 2014
(acceptance rate: 29/99 = 29%).
9. **Efficient Local Statistical Analysis via Integral Histograms with Discrete Wavelet Transform.**
T.-Y. Lee and H.-W. Shen.
IEEE Transactions on Visualization and Computer Graphics (Special Issue for *IEEE SciVis '13*, acceptance rate: 31/126 = 24%), 19(12):2693-2701, Dec., 2013.

10. **Feature Tracking and Visualization of Madden-Julian Oscillation in Climate Simulation**.
T.-Y. Lee, X. Tong, H.-W. Shen, P. C. Wong, S. Hagos, and L. Leung.
IEEE Computer Graphics and Applications (*Theme Issue on Big Data Visualization*), 33(4): 29-37, 2013.
11. **Evaluating Isosurfaces with Level-set-based Information Maps.**
T.-H. Wei, **T.-Y. Lee**, and H.-W. Shen.
Computer Graphics Forum (Special Issue for *EuroVis 2013*, acceptance rate: 49/177 = 28%), 30(3):1-10, 2013.
12. **Exploring Vector Fields with Distribution-based Streamline Analysis.**
K. Lu, A. Chaudhuri, **T.-Y. Lee**, H.-W. Shen, and P. C. Wong.
In *PacificVis '13: Proceedings of the IEEE Pacific Visualization Symposium*, pp.257 - 264, Sydney, Australia, 2013 (acceptance rate: 34/118 = 29%).
13. **Parallel Particle Advection and FTLE Computation for Time-Varying Flow Fields.**
B. Nouanesengsy, **T.-Y. Lee**, K. Lu, H.-W. Shen, and T. Peterka.
In *SC '12: Proceedings of the ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis*. Salt Lake City, UT, Nov., 2012 (acceptance rate: 100/472 = 21%).
14. **Salient Time Steps Selection from Large Scale Time-Varying Data Sets with Dynamic Time Warping.**
X. Tong, **T.-Y. Lee**, and H.-W. Shen.
In *LDAV '12: Proceedings of the IEEE Symposium on Large-Scale Data Analysis and Visualization*, pp. 49 - 56, Seattle, WA, Oct., 2012 (acceptance rate: 18/34 = 53%).
15. **Flow-guided File Layout for Out-of-core Pathline Computation.**
C.-M. Chen, B. Nouanesengsy, **T.-Y. Lee**, and H.-W. Shen.
In *LDAV '12: Proceedings of the IEEE Symposium on Large-Scale Data Analysis and Visualization*, pp. 109 - 112, Seattle, WA, Oct., 2012 (acceptance rate: 18/34 = 53%).
16. **Scalable Computation of Distributions from Large Scale Data Sets.**
A. Chaudhuri, **T.-Y. Lee**, B. Zhou, C. Wang, T. Xu, H.-W. Shen, T. Peterka and Y.-J. Chiang.
In *LDAV '12: Proceedings of the IEEE Symposium on Large-Scale Data Analysis and Visualization*, pp. 113 - 120, Seattle, WA, Oct., 2012 (acceptance rate: 18/34 = 53%).
17. **Flow-Guided File Layout for Out-Of-Core Streamline Computation.**
C.-M. Chen, L. Xu, **T.-Y. Lee**, and H.-W. Shen.
In *PacificVis '12: Proceedings of the IEEE Pacific Visualization Symposium*, pp. 145 - 152, Songdo, Korea, March, 2012 (acceptance rate: 30/89 = 34%).
18. **Load-Balanced Parallel Streamline Generation on Large Scale Vector Fields.**
B. Nouanesengsy, **T.-Y. Lee**, and H.-W. Shen.
IEEE Transactions on Visualization and Computer Graphics (Special Issue for *IEEE Visualization 2011*, acceptance rate: 49/194 = 25%), 17(12):1785-1794, 2011.
19. **View Point Evaluation and Streamline Filtering for Flow Visualization.**
T.-Y. Lee, O. Mishchenko, H.-W. Shen, and R. A. Crawfis.
In *PacificVis '11: Proceedings of the IEEE Pacific Visualization Symposium*, pp. 83–90, Hong Kong, China, 2011 (acceptance rate: 27/81 = 33%).
20. **An Information-Theoretic Framework for Flow Visualization.**
L. Xu, **T.-Y. Lee**, and H.-W. Shen.
IEEE Transaction on Visualization and Computer Graphics (Special issue for *IEEE Visualization '10,* acceptance rate: 45/185 = 26%), 16(6):1216–1224, 2010.
21. **CycleStack: Inferring Periodic Behavior via Temporal Sequence Visualization in Ultrasound Video.**
T.-Y. Lee, A. Chaudhuri, F. Porikli, and H.-W. Shen.
In *PacificVis '10: Proceedings of the IEEE Pacific Visualization Symposium*, pp. 89–96, Taipei, Taiwan, 2010 (acceptance rate: 27/84 = 32%).
22. **Visualization and Exploration of Temporal Trend Relationships in Multivariate Time-Varying Data.**
T.-Y. Lee, and H.-W. Shen.
IEEE Transaction on Visualization and Computer Graphics (Special Issue for *IEEE Visualization '09*, acceptance rate: 54/202 = 27%), 15(6): 1369–1366, 2009.
23. **Visualizing Time-Varying Features with TAC-based Distance Fields.**
T.-Y. Lee, and H.-W. Shen.

In *PacificVis '09: Proceedings of the IEEE Pacific Visualization Symposium*, pp. 1–8, Beijing, China, 2009 (acceptance rate: 26/66 = 40%).

24. **An Image-Based Modelling Approach To GPU-based Unstructured Grid Volume Rendering.**
N. Shareef, **T.-Y. Lee**, H.-W. Shen, and K. Mueller.
In *VG '06: Proceedings of the International Workshop on Volume Graphics*, pp. 31–38, Boston, MA, USA, 2006 (acceptance rate: 13/38 = 34%).

Posters/Other Publications (see my Google Scholar page for the complete list)

1. **Analysis of the contribution and temporal dependency of LSTM layers for reinforcement learning tasks.**
T.-Y. Lee, J. van Baar, K. B. Wittenburg, and A. Sullivan.
In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR) Explanable AI Workshop,* Long Beach, CA, 2019
2. **Fault Detection and Classification of Time Series Using Localized Matrix Profiles.**
J. Zhang, D. N. Nikovski, **T.-Y. Lee**, and T. Fujino
In *PHM '19: Proceedings of IEEE International Conference on Prognostics and Health Management*, San Francisco, CA, 2019.
3. **Equal-height Treemaps for Multivariate Data.**
K. Wittenburg, and **T.-Y. Lee**.
A poster in *AVI '18: International Conference on Advanced Visual Interfaces*.
4. **Visual Analytics of Large-Scale Climate Model Data.**
P. C. Wong, H.-W. Shen, R. Leung, S. Hagos, **T.-Y. Lee,** X. Tong, and K. Lu
In *LDAV '14: Proceedings of the IEEE Symposium on Large Data Analysis and Visualization 2014*, Paris, France, November 2014 (acceptance rate: 12/43 = 28%).
5. **Efficient Range Distribution Query in Large-scale Scientific Data.**
A. Chaudhuri, **T.-Y. Lee**, H.-W. Shen, and T. Peterka
A poster in *LDAV '13: IEEE Symposium on Large Data Analysis and Visualization 2013*, Atlanta, Georgia, October 2013 (**Best Poster**).
6. **Exploring Flow Fields Using Fractal Analysis of Field Lines.**
A. Chaudhuri, **T.-Y. Lee**, H.-W. Shen, M. khoury and R. Wenger
A poster in *VisWeek '12: IEEE Visualization*, Seattle, WA, Oct 2012 (**Best Poster**).
7. **Exploring Vector Fields with Distribution-based Streamline Analysis.**
K. Lu, A. Chaudhuri, **T.-Y. Lee**, A. G. Suttmiller, H.-W. Shen, and P. C. Wong
A poster in *Vis '12: IEEE Visualization*, Seattle, WA, 2012.
8. **Interactive Word Cloud Rendering with Semantic Zooming.**
X. Liu, **T.-Y. Lee**, and H.-W. Shen
A poster in *InfoVis '12: IEEE Information Visualization*, Seattle, WA, 2012.
9. **Exploring Large Scale Scientific Data Using Information Theory**
A. Chaudhuri, **T.-Y. Lee**, H.-W. Shen, T. Peterka, C. Wang, T. Xu, B. Zhou, and Y.-J. Chiang
A poster in *CoDA '12: DoE Conference on Data Analysis*, Santa Fe, New Mexico, Feb., 2012.
10. **Scalable Parallel Building Blocks for Custom Data Analysis.**
T. Peterka, R. Ross, W. Kendall, A. Gyulassy, V. Pascucci, H.-W. Shen, **T.-Y. Lee**, and A. Chaudhuri.
In *LDAV '11: Proceedings of the IEEE Symposium on Large Data Analysis and Visualization*, pp. 105–112, Providence, Rhode Island, Oct. 2011.
11. **A Flow-Guided File Layout for Out-Of-Core Streamline Computation.**
C.-M. Chen, L. Xu, **T.-Y. Lee**, and H.-W. Shen.
A poster in *LDAV '11: IEEE Symposium on Large-Scale Data Analysis and Visualization*, Providence, Rhode Island, Oct. 2011.
12. **Visual Analytics for Enabling Extreme Scale Scientific Discovery**
H.-W. Shen, **T.-Y. Lee**, A. Chaudhuri, and B. Nouanesengsey.
In *SciDAC 2011*, Denver, Colorado, July, 2011.

13. **A Study of Parallel Particle Tracing for Steady-State and Time-Varying Flow Fields.**
T. Peterka, R. Ross, B. Nouanesengsey, **T.-Y. Lee**, H.-W. Shen, W. Kendall, and J. Huang.
In *IPDPS '11: Proceedings of the IEEE International Parallel & Distributed Processing Symposium*, pp. 580–591, Anchorage, Alaska, May 2011 (acceptance rate: 112/571 = 20%).
14. **Method for estimating pattern of change of patient.**
F. Porikli, and **T.-Y. Lee**.
Japan Patent Application JP2010240400A, October, 2010.
15. **Enhanced Visualizations for Ultrasound Videos.**
F. Porikli, and **T.-Y. Lee**.
United States Patent Application 20100246914, Sep., 2010.
16. **Visualizing Time-Varying Features with TAC-based Distance Fields.**
T.-Y. Lee, and H.-W. Shen.
OSU-CISRC-10/08-TR53.
17. **Visual Discovery of Box Office and Oscars in Movie Data.**
Y. Tu, and **T.-Y. Lee.**
Submitted to *IEEE InfoVis Contest*, 2007.

Presentations

1. **Scene Understanding with Deep Learning and Active Learning.**
In Dept. of Computer Science, National Chiao-Tung University, Taiwan, Apr., 2018.
2. **Information Theory for Visualization and Data Analysis.**
In *CScADS Summer 2011 Workshop 2: Scientific Data and Analytics for Extreme Scale Computing*, Jul., 2011.
3. **Visualizing Time-Varying Features with TAC-based Distance Fields.**
In *Grad Research Poster Exhibit*, Department of Computer Science & Engineering, The Ohio State University, Apr., 2009.
4. **Visualizing Time-Varying Features with TAC-based Distance Fields,**
In *Demonstrations at Ohio State University in IEEE VisWeek 2008*, Oct. 22, 2008.

Awards

Best Visualization Note Award — Apr. 2019, Bangkok, Thailand
T.-Y. Lee, and K. Wittenburg. Space-Time Slicing: .Visualizing Object Detector Performance in Driving Video Sequences. In *PacificVis '19: Proceedings of IEEE Pacific Visualization Symposium*.

Best Poster Award — Oct. 2013, Atlanta, GA
A. Chaudhuri, **T.-Y. Lee**, H.-W. Shen, T. Peterka. Efficient Range Distribution Query in Large-scale Scientific Data. In *LDAV 2013: IEEE Symposium on Large-Scale Data Analysis and Visualization*.

Best Poster Award — Oct. 2012, Seattle, WA
A. Chaudhuri, **T.-Y. Lee**, H.-W. Shen, M. khoury and R. Wenger. Exploring Flow Fields Using Fractal Analysis of Field Lines. In *VisWeek 2012: IEEE Visualization*.

Honorable Mention Award — Oct. 2012, Seattle, WA
C.-M. Chen, B. Nouanesengsy, **T.-Y. Lee**, and H.-W. Shen. Flow-guided File Layout for Out-of-core Pathline Computation. In *LDAV '12: Proceedings of the IEEE Symposium on Large-Scale Data Analysis and Visualization*.

Mike Liu Graduate Fellowship Award — May 2011, Columbus, OH
Department of Computer Science Engineering, The Ohio State University.
One or more partial &/or full fellowship for full-time graduate students. Fellowship winners are chosen primarily for their academic merit and research achievements.

Academic Activities/Services

IEEE Computer Society Member since 2014.
IEEE Member since 2006.

IEEE Large Data Analysis and Visualization (LDAV): Poster Co-Chair of 2015.

IEEE Pacific Visualization Symposium: Committee Member for Visualization Notes of 2015, 2016, 2017, 2018 & 2019.

ACM SIGGRAPH: Reviewer of 2013.
Asia Conference on Computer Vision: Reviewer of 2018.
Eurographics/IEEE Symposium on Visualization (EuroVis): Reviewer of 2010, 2012, 2013, 2016, & 2018.
IEEE/RSJ International Conference on Intelligent Robots (IROS): Reviewer of 2018.
IEEE Computer Graphics & Applications: Reviewer.
IEEE Computer Vision & Pattern Recognition: Reviewer of 2018.
IEEE Pacific Visualization Symposium: Reviewer of 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2018 & 2019.
IEEE Transaction on Visualization and Computer Graphics: Reviewer.
IEEE Visualization: Reviewer of 2009, 2010, 2011, 2012, 2014, 2015, & 2018.
SPIE Journal of Electronic Imaging: Reviewer.

IEEE Visualization: Student Volunteer of 2008, 2010, & 2011.