

# TAKANORI FUJIWARA

Linköping University  
Department of Science & Technology  
Kopparhammaren 2, Room 3030, 602 33 Norrköping, Sweden

E-Mail: [takanori.fujiwara@liu.se](mailto:takanori.fujiwara@liu.se)  
<https://takanori-fujiwara.github.io/>

## EDUCATION

---

- 2015 - 2021     **PH.D. IN COMPUTER SCIENCE, UNIVERSITY OF CALIFORNIA, DAVIS**     California
- Dissertation title: "Advancing Visual Analytics Using Dimensionality Reduction"  
<https://escholarship.org/uc/item/3hj4183c>
  - Advisor: Dr. Kwan-Liu Ma
- 2009 - 2011     **MASTER OF ENVIRONMENTAL STUDIES, UNIVERSITY OF TOKYO**     Japan
- Thesis title: "Dimensional Transformation Visualization Method Using Self-Similar Objects for Multi-scale Multi-dimensional Data" <http://hdl.handle.net/2261/48988>
  - Advisor: Dr. Koji Okamoto
- 2005 - 2009     **BACHELOR OF ENGINEERING IN SYSTEMS INNOVATION, UNIVERSITY OF TOKYO**     Japan
- Thesis title: "A Study on the Uneven Distribution and Propagation of Knowledge in Organizations"
  - Advisor: Dr. Hiroshi Okuda

## FIELDS OF INTEREST

---

Data Visualization  
Data Science  
Machine Learning  
Network Science

## PROFESSIONAL EXPERIENCE

---

- 2022.01 - Present     **POSTDOCTORAL RESEARCHER, LINKÖPING UNIVERSITY**     Sweden
- Researching visual analytics of high-dimensional and network data, using machine learning. Working for the division for Media and Information Technology and the Information Visualization Group.
  - Division head: Dr. Anders Ynnerman. Group chair: Dr. Andreas Kerren
- 2016.01 - 2021.12     **RESEARCH ASSISTANT, UNIVERSITY OF CALIFORNIA, DAVIS**     California
- Designed new dimensionality reduction, contrastive learning methods to aid visual analytics. Developed visual analytics systems for various application fields, including biomedical, healthcare, neurobiology, network, and computer sciences.
  - Advisor: Dr. Kwan-Liu Ma
- 2019.06 - 2019.09     **RESEARCH INTERN, FX PALO ALTO LABORATORY**     California
- Developed a visual analytics method for identifying unique characteristics in one network when compared with another network.
  - Mentors: Dr. Jian Zhao and Dr. Francine Chen
- 2016.06 - 2016.08     **RESEARCH INTERN, ARGONNE NATIONAL LABORATORY**     Illinois
- Developed a visual analytics system for optimizing communications in supercomputers.
  - Mentors: Dr. Preeti Malakar and Dr. Khairi Reda
- 2011.4 - 2015.8     **ASSISTANT MANAGER, KAJIMA CORPORATION**     Japan  
(Kajima Corporation is one of the largest construction companies in Japan)
- 2014.6 - 2015.8     Assistant Manager in Architectural Construction Management Dep., Tokyo Branch
- Worked on business analysis, project management for developing IT systems (including resource assignment optimization system, communication infrastructure, etc.), deployment of IT systems to construction sites, construction management.
- 2013.4 -     Assistant Manager in Management Dep., Chubu Branch

- 2014.6 - Worked on business analysis, project management for developing IT systems (including inspection systems, etc.), deployment of IT systems to construction sites.
- 2011.4 - Assistant Manager in IT Solutions Dep., the Headquarters
- 2013.3 - Constructed IT networks and infrastructures for H.Q., branches, and construction sites in Japan and overseas.

## AWARDS AND HONORS

---

- 2023 Best Paper Honorable Mention on IEEE VIS 2023.  
S. S. Bae, T. Fujiwara, A. Ynnerman, E. Y.-L. Do, M. L. Rivera, and D. A. Szafir. "A Computational Design Pipeline to Fabricate Sensing Network Physicalizations." *IEEE Transactions on Visualization and Computer Graphics*, forthcoming. <https://arxiv.org/abs/2308.04714>
- 2022 Best Paper Honorable Mention on IEEE PacificVis 2022.  
Shilpika, T. Fujiwara, N. Sakamoto, J. Nonaka, and K.-L. Ma. "A Visual Analytics Approach for Hardware System Monitoring with Streaming Functional Data Analysis." *IEEE Transactions on Visualization and Computer Graphics*, vol. 28, no. 6, pp. 2338-2349, 2022. <https://arxiv.org/abs/2011.13079>
- 2020 Best Graduate Researcher Award from Graduate Group in Computer Science, University of California, Davis.
- 2019 Best Paper Honorable Mention on IEEE VIS 2019 (VAST).  
T. Fujiwara, O.-H. Kwon, and K.-L. Ma. "Supporting Analysis of Dimensionality Reduction Results with Contrastive Learning." *IEEE Transactions on Visualization and Computer Graphics*, Vol. 26, No. 1, pp. 45-55, 2020. <https://arxiv.org/abs/1905.03911>
- 2018 Honorable Mention on IEEE PacificVis 2018 Visual Storytelling Contest.  
K. Dasu, S. Bae, T. Fujiwara, and K.-L. Ma. "Learning About Disease Associations in Taiwan." <https://k-dasu.github.io>
- 2014 Award for Streamlining Business Operations from Kajima Corporation

## FUNDING

---

### CONTRIBUTION TO FUNDED GRANTS

- 2022 "SMART Cancer Care Teams: Enhancing EHR Communication to Improve Interprofessional Teamwork." Agency: National Institutes of Health (R01). No: 1R01CA273058. Principal Investigator: S.-P. Tu, UC Davis.  
- Wrote one of the three aims, including the background, preliminary study, and research plan, where we will develop machine-learning-assisted visual analytics tools to characterize multi-team systems of healthcare professionals and predict patients with HER communication structures associated with poor quality outcomes.  
<https://health.ucdavis.edu/news/headlines/improving-electronic-health-communication/2022/09>
- 2022 "SMART EHR Data Analytics to Enhance Cancer Care Multiteam Systems." Agency: National Science Foundation/National Institutes of Health (SCH). No.: 1R01CA270454. Principal Investigator: K.-L. Ma, UC Davis. Co-Principal Investigator: S.-P Tu, UC Davis.  
- Wrote the majority of the research plan, where we will develop graph neural network-based machine learning techniques and design an interactive visual analytics tool that supports what-if and predictive analyses to optimize communication among healthcare professionals.  
<https://cs.ucdavis.edu/news/can-medical-records-help-teams-doctors-treat-patients-better>
- 2022 "The National Center for Interventional Biophotonic Technologies (NCIBT)." Agency: National Institute of Biomedical Imaging and Bioengineering, National Institutes of Health (P41). No.: 1P41EB032840. Principal Investigator: L. Marcu, UC Davis, Co-Principal Investigator: G. R. Harsh, UC Davis.  
- Wrote half of an aim for one of the three R&D directions—"Intelligent Visual Analytics towards Better Critical Care Monitoring" as a part of "TRD3: Data Analytics and Intelligent Systems" (Sub-project ID: 7222)—where we plan to develop post-hoc and real-time monitoring and annotation tools to help investigate multiple signal data with machine learning techniques. <https://ncibt.ucdavis.edu/>

- 2021 “NSF Convergence Accelerator—Track D: Data-driven disease control and prevention in veterinary health (Phase 2).” Agency: National Science Foundation. No.: 2134901. Principal Investigator: B. M. Lopez, UC Davis. Co-Principal Investigator: X. Liu, UC Davis; M. Clavijo, ISU; K. Zhang, CMU.  
- Wrote a part of the research plan related to visual analytics.
- 2019 “A Visual Analytics Framework for Analysis, Presentation, and Prognostics of Machine Maintenance Logs.” Agency: National Institute of Standards and Technology. No.: 2019-NIST-MSE-01. Principal Investigator: K.-L. Ma, UC Davis.  
- Assisted to describe the detailed development plan. The project result was published in *Proc. IEEE PacificVis 2021*. <https://drive.google.com/file/d/1i3NIptxfILhD2TYKqUsIDRvMzMzMOFOi1/view?usp=sharing>

### FELLOWSHIPS, SCHOLARSHIPS

- 2015 Department fellowship from University of California, Davis
- 2011 Grants-in-Aid for scientific research from Japan Society for the Promotion of Science  
- Research on “Urban Reformation Program for Realization of Bright Low Carbon Society”, a national project of FY2011 Strategic Funds for the Promotion of Science Technology
- 2009 - 2011 Exempted payment by good academic performance from Japan Students Services Organizations for interest-free student loan

### PUBLICATIONS

---

#### PREPRINT, UNDER REVIEW

- 2023 H.-Y. Lu, T. Fujiwara, M.-Y. Chang, Y.-c. Fu, A. Ynnerman, and K.-L. Ma. “Visual Analytics of Multivariate Networks with Representation Learning and Composite Variable Construction.” *arXiv preprint*, 2023. <https://arxiv.org/abs/2303.09590>

#### JOURNAL

- 2023 S. S. Bae, T. Fujiwara, A. Ynnerman, E. Y.-L. Do, M. L. Rivera, and D. A. Szafir. “A Computational Design Pipeline to Fabricate Sensing Network Physicalizations.” *IEEE Transactions on Visualization and Computer Graphics* (also *proc. IEEE VIS 2023*), early access. **[Best Paper Honorable Mention]**. <https://arxiv.org/abs/2308.04714>
- 2023 T. Fujiwara and T.-P. Liu (equally contributed). “Contrastive Multiple Correspondence Analysis (cMCA): Using Contrastive Learning to Identify Latent Subgroups in Political Parties.” *PLOS ONE*, vol. 18, no.7, e0287180 (20 pages), 2023. <https://doi.org/10.1371/journal.pone.0287180>
- 2023 T. Fujiwara. “Visualizations Using Neural Networks.” *Journal of The Japan Society for Simulation Technology*. Invited article (in Japanese), vol. 42, no. 2, pp. 83-88, 2023.
- 2023 Y. Li, J. Wang, T. Fujiwara, and K.-L. Ma. “Visual Analytics of Neuron Vulnerability to Adversarial Attacks on Convolutional Neural Networks.” *ACM Transactions on Interactive Intelligent Systems*, Early Access. <https://arxiv.org/abs/2303.02814>
- 2023 C. Xu, T. Neuroth, T. Fujiwara, R. Liang, and K.-L. Ma. “A Predictive Visual Analytics System for Studying Neurodegenerative Disease based on DTI Fiber Tracts.” *IEEE Transactions on Visualization and Computer Graphics*, vol. 29, no. 4, pp. 2020-2035, 2023. <https://arxiv.org/abs/2010.07047>
- 2022 T. Fujiwara, J. Zhao, F. Chen, Y. Yu, and K.-L. Ma. “Network Comparison with Interpretable Contrastive Network Representation Learning.” *Journal of Data Science, Statistics, and Visualisation*, vol. 2, no. 5, 2022. <https://doi.org/10.52933/jdssv.v2i5.56>
- 2022 K. Fujita, N. Sakamoto, T. Fujiwara, T. Tsukamoto, and J. Nonaka. “A Visual Analytics Method for Time-Series Log Data Using Multiple Dimensionality Reduction.” *Journal of Advanced Simulation in Science and Engineering*, vol. 9, no. 2, pp. 206-219, 2022. <https://doi.org/10.15748/jasse.9.206>
- 2022 Shilpika, T. Fujiwara, N. Sakamoto, J. Nonaka, and K.-L. Ma. “A Visual Analytics Approach for Hardware System Monitoring with Streaming Functional Data Analysis.” *IEEE Transactions on Visualization and Computer Graphics* (also *proc. IEEE PacificVis 2022*), vol. 28, no. 6, pp. 2338-2349, 2022. **[Best Paper Honorable Mention]**. <https://arxiv.org/abs/2011.13079>
- 2022 T. Fujiwara, X. Wei, J. Zhao, and K.-L. Ma. “Interactive Dimensionality Reduction for Comparative Analysis.” *IEEE Transactions on Visualization and Computer Graphics* (also *proc. IEEE VIS 2021*), Vol. 28, No. 1, pp. 758-768, 2022. <https://arxiv.org/abs/2106.15481>

- 2021 T. Fujiwara, Shilpika, N. Sakamoto, J. Nonaka, K. Yamamoto, and K.-L. Ma. "A Visual Analytics Framework for Reviewing Multivariate Time-Series Data with Dimensionality Reduction." *IEEE Transactions on Visualization and Computer Graphics* (also proc. *IEEE VIS 2020 (VAST)*), Vol. 27, No. 2, pp. 1601-1611, 2021. <https://arxiv.org/abs/2008.01645>
- 2020 Y. Li, T. Fujiwara, Y. K. Choi, K. K. Kim, and K.-L. Ma. "A Visual Analytics System for Multi-model Comparison on Clinical Data Predictions." *Journal of Visual Informatics* (presented at *PacificVis 2020 Visualization Meets AI Workshop*), Vol. 4, No.2, pp. 122-131, 2020. <https://arxiv.org/abs/2002.10998>
- 2020 R. Guo, T. Fujiwara, Y. Li, K. M. Lima, S. Sen, N. K. Tran, and K.-L. Ma. "Comparative Visual Analytics for Assessing Medical Records with Sequence Embedding." *Journal of Visual Informatics* (presented at *PacificVis 2020 Visualization Meets AI Workshop*), Vol. 4, No. 2, pp. 72- 85, 2020. <https://arxiv.org/abs/2002.08356>
- 2020 T. Fujiwara, O.-H. Kwon, and K.-L. Ma. "Supporting Analysis of Dimensionality Reduction Results with Contrastive Learning." *IEEE Transactions on Visualization and Computer Graphics* (also proc. *IEEE VIS 2019 (VAST)*), Vol. 26, No. 1, pp. 45-55, 2020. **[Best Paper Honorable Mention]**. <https://arxiv.org/abs/1905.03911>
- 2020 T. Fujiwara, J.-K. Chou, Shilpika, P. Xu, L. Ren, and K.-L. Ma. "An Incremental Dimensionality Reduction Method for Visualizing Streaming Multidimensional Data." *IEEE Transactions on Visualization and Computer Graphics* (also proc. *IEEE VIS 2019 (InfoVis)*), Vol. 26, No.1, pp. 418-428, 2020. <https://arxiv.org/abs/1905.04000>
- 2018 T. Fujiwara, T. Cnovrsanin, and K.-L. Ma. "Concise Provenance of Interactive Network Analysis." *Journal of Visual Informatics*, Vol.2, No. 4, pp. 213-224, 2018. <https://doi.org/10.1016/j.visinf.2018.12.002>
- 2018 T. Fujiwara, J. K. Li, M. Mubarak, C. Ross, C. D. Carothers, R. B. Ross, and K.-L. Ma. "A Visual Analytics System for Optimizing the Performance of Large-scale Networks in Supercomputing Systems." *Journal of Visual Informatics* (also proc. *PacificVAST*), Vol. 2, No.1, pp. 98-110, 2018. <https://doi.org/10.1016/j.visinf.2018.04.010>
- 2015 G. Hashimoto, T. Fujiwara, M. Suzuki, H. Okuda, J. Ise, and M. Sioya. "Multi-Agent-Based Simulation of Knowledge Propagation in Organizations." *Electronics and Communications in Japan*, Vol. 98, No.7, pp. 22–33, 2015. <http://onlinelibrary.wiley.com/doi/10.1002/ecj.11685/abstract>
- 2011 T. Fujiwara, M. Iwamaru, M. Tange, S. Someya, and K. Okamoto. "A Fractal-Based 2D Expansion Method for Multi-scale Volume Data Visualization." *Journal of Visualization*, Vol.14, No. 2, pp.171-190, 2011. <https://drive.google.com/file/d/0B59ss1whXM4kR21WbDMtYTdOc28/view>

## REFEREED FULL-LENGTH CONFERENCE PAPERS

- 2023 J. Nonaka, K. Fujita, T. Fujiwara, N. Sakamoto, K. Yamamoto, M. Terai, T. Tsukamoto, and F. Shoji. "Reflections on the Developments of Visual Analytics Systems for the K Computer System Log Data." In *Proc. VisGap*, pp. 11-18, 2023. <https://diqlib.eq.org/handle/10.2312/visgap20231116>
- 2023 T. Fujiwara, Y.-H. Kuo, A. Ynnerman, and K.-L. Ma. "Feature Learning for Nonlinear Dimensionality Reduction toward Maximal Extraction of Hidden Patterns." In *Proc. PacificVis*, pp. 122-131, 2023. <https://arxiv.org/abs/2206.13891>
- 2022 Y.-H. Kuo, T. Fujiwara, C. C.-K. Chou, C.-h. Chen, and K.-L. Ma. "A Machine-Learning-Aided Visual Analysis Workflow for Investigating Air Pollution Data." In *Proc. PacificVis*, pp. 91-100, 2022. <https://arxiv.org/abs/2202.05413>
- 2021 K. Fujita, N. Sakamoto, T. Fujiwara, J. Nonaka, and T. Tsukamoto. "A Visual Analytics Method for Time-Series Log Data Using Multiple Dimensionality Reduction." In *Proc. AsiaSim (also Communications in Computer and Information Science*, Vol. 1636), 2021. <https://drive.google.com/file/d/1dHSxSlAiHoHxev95Ue74YndcSZsVTV6x>
- 2021 X. Zhang, T. Fujiwara, S. Chandrasegaran, M. P. Brundage, T. Sexton, A. Dima, and K.-L. Ma. "A Visual Analytics Approach for the Diagnosis of Heterogeneous and Multidimensional Machine Maintenance Data." In *Proc. IEEE PacificVis*, pp. 186-195, 2021. <https://drive.google.com/file/d/1i3NlptxfiLhD2TYkYqUsIDRvMzMOfO1>
- 2020 T. Fujiwara, J. Zhao, F. Chen, and K.-L. Ma. "A Visual Analytics Framework for Contrastive Network Analysis." In *Proc. IEEE VAST*, pp. 48-59, 2020. <https://arxiv.org/abs/2008.00151>
- 2020 S. P. Kesavan, T. Fujiwara, J. K. Li, C. Ross, M. Mubarak, C. D. Carothers, R. B. Ross, and K.-L. Ma. "A Visual Analytics Framework for Reviewing Streaming Performance Data." In *Proc. IEEE PacificVis*, pp. 206-215, 2020. <https://arxiv.org/abs/2001.09399>

- 2019 J. K. Li, T. Fujiwara, S. P. Kesavan, C. Ross, M. Mubarak, C. D. Carothers, R. B. Ross, and K.-L. Ma. "A Visual Analytics Framework for Analyzing Parallel and Distributed Computing Applications." In *Proc. VDS*, 2019. [https://drive.google.com/open?id=1\\_pv-5lSIV99GhdyJxMXViCeURbxs4nk7](https://drive.google.com/open?id=1_pv-5lSIV99GhdyJxMXViCeURbxs4nk7)
- 2017 T. Fujiwara, P. Malakar, K. Reda, V. Vishwanath, M. E. Papka, and K.-L. Ma. "A Visual Analytics System for Optimizing Communications in Massively Parallel Applications." In *Proc. IEEE VAST*, pp. 59-70, 2017. <https://drive.google.com/open?id=0B59ss1whXM4kNIF0Y25wMEZMckk>
- 2017 T. Fujiwara, J.-K. Chou, A. M. McCullough, C. Ranganath, and K.-L. Ma. "A Visual Analytics System for Brain Functional Connectivity Comparison across Individuals, Groups, and Time Points." In *Proc. IEEE PacificVis*, pp. 250-259, 2017. <https://drive.google.com/file/d/0B59ss1whXM4kZWFI0k82Y1FNZ0k>
- 2010 T. Fujiwara, R. Matsushita, M. Iwamaru, M. Tange, S. Someya, and K. Okamoto. "Fractal Map: Fractal-Based 2D Expansion Method for Multi-Scale High-Dimensional Data Visualization." In *Proc. ISVC*, Vol. 1, pp. 306-315, 2010. <https://drive.google.com/file/d/0B59ss1whXM4kZm90T1FIZTJVNIIE>

### REFEREED SHORT-LENGTH CONFERENCE PAPERS

- 2021 Y. Li, E. Musabandesu, T. Fujiwara, F. J. Loge, and K.-L. Ma. "A Visual Analytics System for Water Distribution System Optimization." In *Proc. IEEE VIS—Short Papers*, pp. 126-130, 2021. <https://arxiv.org/abs/2108.12540>
- 2018 K. Dasu, T. Fujiwara, and K.-L. Ma. "An Organic Visual Metaphor for Public Understanding of Conditional Co-occurrences." In *Proc. IEEE SciVis*, pp. 1-5, 2018. <https://drive.google.com/open?id=1n1lgnzjuVEGMRT4Q8496WhHtoGa7THmp>
- 2017 Y.-J. Huang, T. Fujiwara, Y.-X. Lin, W.-C. Lin, and K.-L. Ma. "A Gesture System for Graph Visualization in Virtual Reality Environments." In *Proc. PacificVis*, pp. 41-45, 2017. <https://drive.google.com/file/d/0B59ss1whXM4kMEJtQXpsdVlxMm8>

### OTHERS

- 2023 N. Okami, N. Sakamoto, T. Fujiwara, T. Tsukamoto, and J. Nonaka. "Visual Comparative Analysis for Multidimensional Time Series Data Using Tensor Decomposition—Application to Supercomputer Log Data—" (in Japanese). *Journal of the Visualization Society of Japan*, 2023.
- 2022 K. Fujita, N. Sakamoto, T. Fujiwara, J. Nonaka, and T. Tsukamoto. "Visual Analytics of Tensor Data with Dimensionality Reduction Techniques" (in Japanese). In *IPSJ SIG Technical Report (Human-Computer Interaction)*, Otaru, Japan, 2022.
- 2022 T. Liu and T. Fujiwara. "Contrastive Multiple Correspondence Analysis (cMCA): Using Contrastive Learning to Identify Latent Subgroups in Political Parties." In *Proc. MPSA (Paper Session, selected based on the abstract)*, Chicago, 2022.
- 2021 K. Fujita, N. Sakamoto, T. Fujiwara, J. Nonaka, and T. Tsukamoto. "A Visual Analytics Method for Time-series Log Data Using Multiple Dimensionality Reduction" (in Japanese). *Journal of the Visualization Society of Japan*, 2021.
- 2020 T. Liu and T. Fujiwara. "Contrastive Multiple Component Analysis (cMCA): Applying the Contrastive Learning Method to Identify Political Subgroups." In *Proc. PolMeth (Poster Session, selected based on the abstract)*, 2020, Virtual Conference.
- 2017 G. Kato, T. Fujiwara, C. Collet, T. Kobayashi, and T. Suzuki. "Threatening Event, National Identity and Network Dynamics of Motivated Information Processing: Exploring Japanese Twitter during the Rise of Territorial Disputes, April through October 2012." In *Proc. APSA Annual Meeting (selected based on the abstract)*. <https://drive.google.com/open?id=0B59ss1whXM4kLXIUSTlvQTVwbGs>
- 2010 T. Fujiwara, M. Tange, S. Someya, and K. Okamoto. "A Dimensional Reduction Visualization Method Using Fractal Shapes for Time-Varying Volume Data" (in Japanese). *Journal of the Visualization Society of Japan*, Vol. 30, Suppl. 1, pp.283-284, 2010.
- 2009 T. Fujiwara, M. Tange, S. Someya, and K. Okamoto. "A 2D Expansion Method Using Fractal Shapes for High Dimensional Data" (in Japanese). *Journal of the Visualization Society of Japan*, Vol. 29, Suppl. 2, pp.319-320, 2009.
- 2009 M. Suzuki, T. Fujiwara, and H. Okuda. "Agent-Based Modeling of Knowledge Propagation in Organizations" (in Japanese). In *Proc. Computational Mechanics Conference*, Vol. 22, No.1805, 2009.

## TALKS

---

### INVITED TALKS

- 2023.06.07 "A Cosmic View of Life on Earth." Seminar for the Bioinformatics Working Group at the American Museum of Natural History, New York, NY (provided 20% of the presentation remotely).
- 2023.04.17 "Interactive Visual Comparison Using Representation Learning." *SNU CSE Seminar* (<https://cse.snu.ac.kr/en/seminars>) at Dep. Computer Science and Engineering, Seoul National University, South Korea.
- 2022.07.28 "Comparative Analysis with Intelligent Visual Interfaces." *VCS: Visual Computing Seminar* (<https://fi.ics.keio.ac.jp/vcs>) at Keio University, Yokohama, Japan.
- 2022.07.15 "Comparison! Comparison of Research Environments and Research on Comparison." Seminar for a visualization laboratory led by Dr. Naohisa Sakamoto at Kobe University, Kobe, Japan.
- 2021.08.27 "Comparative Analysis with Intelligent Visual Interfaces." Seminar for the Division for Media and Information Technology, Dep. Science and Technology at Linköping University (virtual).
- 2021.07.08 "High-dimensional Data Comparison with Intelligent Visual Interfaces." *DSSV-ECDA*, Rotterdam, the Netherlands (virtual). [https://www.youtube.com/watch?v=uopQqTmz\\_g](https://www.youtube.com/watch?v=uopQqTmz_g)
- 2021.05.05 "Comparative Analysis with Intelligent Visual Interfaces." *The Department of Management Sciences Seminar Series*, the Faculty of Engineering at University of Waterloo (virtual).
- 2021.04.22 "A Visual Analytics Framework for Contrastive Network Analysis." Pacific Northwest National Laboratory, Richland, Washington (virtual).
- 2021.02.09 "A Visual Analytics Framework for Multi-aspect Network Comparison." The Institute of Social Sciences of the Academia Sinica, Taipei, Taiwan (virtual).
- 2019.09.11 "Brain Network comparison." The Orientation for *AvenueE* Students, University of California, Davis.
- 2019.04.05 "Visual Analytics Methods for Multidimensional Data in Network Applications." FX Palo Alto Laboratory, Palo Alto, California.
- 2018.10.05 "An Incremental Dimensionality Reduction Method for Visualizing Streaming Multidimensional Data." *BayVAST: Bay Area Visual Analytics Symposium*, Sunnyvale, California.
- 2018.07.17 "A Visual Analytics System for Optimizing the Performance of Large-Scale Networks in Supercomputing Systems." *Summer of CODES Workshop*, Lemont, Illinois.
- 2018.05.05 "Network Visualization." *STEM for Girls*, University of California, Davis.
- 2009.10.21 "2D-3D Interaction Visualization Using Fractal Shape." *Swedish Visualization Delegation to Japan*, University of Tokyo Kashiwa Campus (hosted by Embassy of Sweden in Tokyo).
- 2009.08.06 "2D and 3D Interface Using Fractal Shape." Nintendo Headquarters, Kyoto, Japan.

### CONFERENCE PRESENTATIONS

- 2023.04.20 "Feature Learning for Nonlinear Dimensionality Reduction toward Maximal Extraction of Hidden Patterns." *IEEE PacificVis*, Seoul, South Korea.
- 2021.10.27 "Interactive Dimensionality Reduction for Comparative Analysis." *IEEE VIS*, Virtual Conference. <https://youtu.be/12u1vDQOpE>
- 2021.10.25 "Approaches and Challenges in Visual Analytics of Streaming High-dimensional Data." *IEEE LDAV Early Career Researcher Lightning Talks*, Virtual Conference. <https://drive.google.com/drive/folders/1qLYa3W6LxwsRdfBEbjc1p8m3QxPoCrRW>
- 2020.10.29 "A Visual Analytics Framework for Contrastive Network Analysis." *IEEE VIS*, Virtual Conference. <https://youtu.be/hLHMiQpFFbw>
- 2020.10.28 "A Visual Analytics Framework for Reviewing Multivariate Time-Series Data with Dimensionality Reduction." *IEEE VIS*, Virtual Conference. <https://youtu.be/zV4gChjroY0>
- 2019.10.23 "An Incremental Dimensionality Reduction Method for Visualizing Streaming Multidimensional Data." *IEEE VIS*, Vancouver, BC. <https://vimeo.com/371267332>
- 2019.10.22 "Supporting Analysis of Dimensionality Reduction Results with Contrastive Learning." *IEEE VIS*, Vancouver, BC. <https://vimeo.com/368441312>
- 2018.04.10 "A Visual Analytics System for Optimizing the Performance of Large-scale Networks in Supercomputing Systems." *PacificVAST*, Kobe, Japan.

- 2017.10.05 "A Visual Analytics System for Optimizing Communications in Massively Parallel Applications." *IEEE VIS*, Phoenix, AZ. <https://vimeo.com/238502779>
- 2017.04.21 "A Visual Analytics System for Brain Functional Connectivity Comparison across Individuals, Groups, and Time Points." *IEEE PacificVis*, Seoul, Korea.
- 2010.11.29 "Fractal Map: Fractal-Based 2D Expansion Method for Multi-Scale High-Dimensional Data Visualization." *ISVC*, Las Vegas, NV.
- 2010.07.21 "A Dimensional Reduction Visualization Method Using Fractal Shapes for Time-Varying Volume Data." *Visualization Society of Japan*, Tokyo, Japan.
- 2009.10.25 "A 2D Expansion Method Using Fractal Shapes for High Dimensional Data." *Visualization Society of Japan*, Yamagata, Japan.

## PATENTS

---

- 2023 S. S. Bae, T. Fujiwara, M. L. Rivera, D. A. Szafir, E. Y.-L. Do. "Systems and Methods for Touching Sensing Based on Resistor-Capacitor Delays." US Patent Application 63497594 (pending nonprovisional patent application).
- 2022 T. Fujiwara, J. Zhao, and F. Chen. "System and Method for Contrastive Network Analysis and Visualization." US 11538552 B2 (also JP 2021117966 and CN 113176917).  
<https://patentimages.storage.googleapis.com/7c/c2/fc/9acc50da337aa7/US11538552.pdf>
- 2011 T. Fujiwara, M. Iwamaru, and K. Okamoto. "A High-Dimensional Data Visualization Apparatus, Method, and Program." JP 2011-86065 A (Japan).  
<https://www.j-platpat.inpit.go.jp/c1800/PU/JP-2011-086065/4884842630B7900E81243CB9D2E98649B34AEB830F32532B68B9C00E3E318905/11/en>

## SELECTED MEDIA COVERAGE

---

- 2023.06 CNC Kitchen (YouTube), "3D Printing Resistors, Fibers & Coffee - Utility Research Lab." Showcases of sensing networks from "A Computational Design Process for Sensing Network Physicalizations." (presented by S. S. Bae). [https://youtu.be/Oeqvo2c28\\_c](https://youtu.be/Oeqvo2c28_c)
- 2021.11 T.-M. Rhyne and G. Hattab, "A Snapshot of IEEE VIS 2021." *ACM SIGGRAPH Blog*. Noteworthy Highlights: "Interactive Dimensionality Reduction for Comparative Analysis."  
<https://blog.siggraph.org/2021/11/a-snapshot-view-of-ieee-vis-2021.html/>
- 2021.07 D. Gutierrez. "Best of arXiv.org for AI, Machine Learning, and Deep Learning—June 2021." *insideBIGDATA*. Compelling subjects relating to machine learning: "Interactive Dimensionality Reduction for Comparative Analysis."  
<https://insidebigdata.com/2021/07/19/best-of-arxiv-org-for-ai-machine-learning-and-deep-learning-june-2021/>
- 2020.06 G. Li, et al. "Big Data Visualization and Analytics: Future Research Challenges and Emerging Applications—Part 2." *ACM SIGMOD Blog*. Visualization toward interpretable machine: "Supporting Analysis of Dimensionality Reduction."  
<https://wp.sigmod.org/?p=3123>

## ACADEMIC SERVICES

---

### ORGANIZING COMMITTEES

- **Co-Chair:** PacificVis Workshop on Visualization Meets AI: 2021-2024 (Present)

### PROGRAM COMMITTEE PARTICIPATION

- SC Workshop ProTools: 2022-2023 (Present)
- IEEE LDAV: 2022-2023
- IEEE VIS Short Papers Track: 2021-2022

### SESSION CHAIR

- IEEE PacificVis 2022

## INVITED CONFERENCE REVIEWER

- ACM CHI: 2021, 2024
- ACM CSCW: 2022
- EG/VGTC EuroVis: 2020, 2023
- GD: 2023
- IEEE Big Data: 2017–2021
- IEEE VIS (VAST, InfoVis, Short Papers): 2019–2023
- IEEE PacificVis: 2021–2024
- SIBGRAPI (C&G Track): 2022

## INVITED JOURNAL REVIEWER

- ACM Transactions on Graphics
- ACM Transactions on Interactive Intelligent Systems
- ACM Transactions on Intelligent Systems and Technology
- Computers & Graphics
- Computer Graphics Forum
- Expert Systems with Applications
- Frontiers of Computer Science
- Geocarto International
- Geo-spatial Information Science
- Human-centric Computing and Information Sciences
- IEEE Computer Graphics and Applications
- IEEE Transactions on Visualization and Computer Graphics
- Information Sciences
- Infrared Physics and Technology
- International Journal of Digital Earth
- International Journal of Data Science and Analytics
- Journal of Computational and Graphical Statistics
- Journal of Visualization
- Knowledge-Based Systems
- Neural Networks
- Neurocomputing
- Pattern Recognition
- Patterns
- SoftwareX
- The Visual Computer

## TEACHING EXPERIENCES

---

### GUEST LECTURES

- |            |  |
|------------|--|
| 2023.04.14 | "Dimensionality Reduction." Linköping University.<br>TNM098 Advanced Visual Data Analysis (graduate course), taught by Dr. Katerina Vrotsou.   |
| 2022.04.27 | "Dimensionality Reduction." Linköping University.<br>TNM098 Advanced Visual Data Analysis (graduate course), taught by Dr. Katerina Vrotsou.   |
| 2021.02.11 | "Visual Analytics of High Dimensional Data." University of California, Davis.<br>ECS 272 Information Visualization (graduate course), taught by Dr. Kwan-Liu Ma.   |
| 2021.02.11 | "Visual Analytics of High Dimensional Data." University of California, Davis.<br>ECS 163 Information Interface (undergraduate course), taught by Dr. Kwan-Liu Ma.  |
| 2010.04.19 | "Using Fractal Shapes to Project 3D Objects onto 2D Space." University of Tokyo Komaba Campus.<br>Mathematical and Information Sciences (undergraduate course on visualization), taught by Dr. Koji Okamoto.   |
| 2020       | <b>LECTURES/TEACHING ASSISTANTSHIPS, UNIVERSITY OF CALIFORNIA, DAVIS</b> California <ul style="list-style-type: none"><li>- ECS 289H Visual Analytics (graduate course).<br/>Co-lectured with Dr. Kwan-Liu Ma (responsible for 50% of the lectures; lecture topics include visual analytics pipeline, interaction design, visual analytics of high-dimensional data, geospatial data, and time-series data), designed course materials, evaluated course assignments, and held office hours.</li></ul> |



- 2009 - 2011      **LECTURES/TEACHING ASSISTANTSHIPS, UNIVERSITY OF TOKYO**      Tokyo
- Teaching assistant for two undergraduate courses (Scientific Computer Graphics and Advanced Project for Simulation).
  - Co-lectured with Dr. Koji Okamoto (The lecture topics include methods for information visualization of web data and state-of-the-art visualization technologies).
  - Supported students to implement programs and understand general computer science and simulation concepts.

## STUDENT SUPERVISION

---

### MENTORING

- 2022.05-Present    Meerahshvin Shanmuganathan, Master's Student, University of Yamanashi, Japan  
(As a part of my volunteer mentorship for students in underrepresented countries in terms of visualization research. Refer to <https://takanori-fujiwara.github.io/mentorship.html>)
- 2021.11-2023.04    Hsiao-Ying Lu, Ph. D. Student, University of California, Davis, USA (co-advised with Dr. Kwan-Liu Ma)
- 2021.01-2021.04    Shidi Yu, Master's Student, University of California, Davis, USA (co-advised with Dr. Kwan-Liu Ma):  
now software engineer at Pinterest
- 2020.09-2021.03    Xinhai Wei, Undergraduate Student, University of Waterloo, Canada (co-advised with Dr. Jian Zhao):  
now software engineer at Wish
- 2020.01-2021.01    Xiaoyu Zhang, Ph. D. Student, University of California, Davis, USA (co-advised with Dr. Kwan-Liu Ma and  
Dr. Senthil Chandrasegaran)
- 2019.12-2022.03    Yun-Hsin Kuo, Ph. D. Student, University of California, Davis, USA (co-advised with Dr. Kwan-Liu Ma)
- 2019.06-2020.03    Rongchen Guo, Undergraduate Student, Beihang University, Beijing, China:  
now Master's Student at both University of Ottawa and University of Texas, Austin
- 2019.04-2022.01    Yiran Li, Ph. D. Student, University of California, Davis, USA (co-advised with Dr. Kwan-Liu Ma)
- 2019.01-2020.01    Suraj P. Kesavan, Ph. D. Student, University of California, Davis, USA (co-advised with Dr. Kwan-Liu Ma)
- 2017.11-2018.07    Keshav Dasu, Ph. D. Student, University of California, Davis, USA (co-advised with Dr. Kwan-Liu Ma)
- 2017.11-2018.04    Sandra Bae, Master's Student, University of California, Davis, USA (co-advised with Dr. Kwan-Liu Ma):  
now Ph. D. Student at University of Colorado Boulder
- 2010.04-2011.03    Ryo Matsushita, Master's Student, University of Tokyo, Japan (co-advised with Dr. Koji Okamoto):  
now project manager at Mitsui & Co.

## CERTIFICATIONS IN JAPAN

---

- 2012      Information Security Specialist  
(Skill Level 4 (highest) in Japan Information-Technology Engineers Examination)
- 2011      Associate Professional Engineer in Information Engineering
- 2009      Applied Information Technology Engineer

## SKILLS

---

- Computer      Python, JavaScript, C++, R, Common Lisp, HTML, OpenGL, WebGL, D3, Qt, Unix/Linux
- Languages      English (fluent), Japanese (native)