

TAKANORI FUJIWARA

University of California, Davis
Department of Computer Science
2136 Kemper Hall, One Shields Avenue, Davis, CA 95616

Phone: (530) 304-3219
E-Mail: tfujiwara@ucdavis.edu
<https://takanori-fujiwara.github.io/>

EDUCATION

- 2015 - Present **PH.D. IN COMPUTER SCIENCE, UNIVERSITY OF CALIFORNIA, DAVIS** California
- Dissertation title: "Advancing Visual Analytics Using Dimensionality Reduction"
 - Advisor: Dr. Kwan-Liu Ma
- 2009 - 2011 **MASTER OF SCIENCE IN ENVIRONMENTAL STUDIES, UNIVERISTY OF TOKYO** Tokyo
- 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** Tokyo
- Thesis title: "A Study on the Uneven Distribution and Propagation of Knowledge in Organizations"
 - Advisor: Dr. Hiroshi Okuda

FIELDS OF INTEREST

Data Visualization
Network Science
Data Mining
Machine Learning

PROFESSIONAL EXPERIENCE

- 2016.1 - Present **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
- 2019.6 - 2019.9 **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
- 2016.6 - 2016.8 **RESEARCH INTERN, ARGONNE NATIONAL LABORATORY** Illinois
- Developed a visual analytics system for optimizing communications within 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 company in Japan)
- 2014.6 - 2015.8 **ASSISTANT MANAGER IN ARCHITECTURAL CONSTRUCTION MANAGEMENT DEP., TOKYO BRANCH** Tokyo
- 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 - 2014.6 **ASSISTANT MANAGER IN MANAGEMENT DEP., CHUBU NAGOYA** Nagoya
- Worked on business analysis, project management for developing IT systems (including inspection systems, etc.), deployment of IT systems to construction sites.
- 2011.4 - 2013.3 **ASSISTANT MANAGER IN IT SOLUTIONS DEP., THE HEADQUARTERS** Tokyo
- Constructed IT networks and infrastructures for H.Q., branches, and construction sites in Japan and overseas.

AWARDS AND HONORS

- 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 GRANTS UNDER REVIEW

- 2020 "Development of Innovative Informatics Methods and Algorithms for Cancer Research and Management." Agency: National Institutes of Health (R21). No.: RFA-CA-20-007. Principal Investigator: S.-P Tu, UC Davis. Co-Principal Investigator: K.-L. Ma, UC Davis.
- Assisted the entire proposal writing. Wrote the majority of the content for innovation and research approach, where we will develop machine learning based network analysis techniques to investigate effective healthcare professionals' communications over electronic health record systems for cancer patients
- 2020 "Targeting Src Homology Phosphatase 2 in Alcohol-Associated Liver Disease." Agency: National Institute on Alcohol Abuse and Alcoholism (R21). No.: R21AA029189. Principal Investigator: F. Haj, UC Davis. Co-Principal Investigator: K.-L. Ma, UC Davis.
- Provided the content for research approach related to visual analytics, where we will develop a new network layout algorithm and interactive interface to analyze functional relationships among enzymes, substrates, and subcellular localizations that relate to the alcohol-associated liver disease.

CONTRIBUTION TO FUNDED GRANTS

- 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 submitted to IEEE PacificVis 2021. <https://drive.google.com/file/d/1i3NlptxfLhD2TYkYgUsIDRvMzMOFOi1/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

- 2020 T. Fujiwara* and T.-P. Liu* (*equally contributed). "Contrastive Multiple Correspondence Analysis (cMCA): Using Contrastive Learning to Identify Latent Subgroups in Political Parties." *arXiv:2007.04540* (manuscript submitted for *Political Analysis*).
<https://arxiv.org/abs/2007.04540>

- 2020 T. Fujiwara, J. Zhao, F. Chen, Y. Yu, and K.-L. Ma. "Interpretable Contrastive Learning for Networks." *arXiv:2005.12419* (manuscript submitted for *ACM Transactions on Intelligent Systems and Technology*).
<https://arxiv.org/abs/2005.12419>
- 2020 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." Manuscript submitted for *IEEE PacificVis 2021* and conditionally accepted.
- 2020 Shilpika, T. Fujiwara, N. Sakamoto, J. Nonaka, and K.-L. Ma. "A Visual Analytics Approach to Monitor Time-Series Data with Incremental and Progressive Functional Data Analysis." *arXiv: 2011.13079*.
<https://arxiv.org/abs/2011.13079>
- 2020 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." *arXiv:2005.12419* (manuscript submitted for *IEEE Transactions on Visualization and Computer Graphics*).
<https://arxiv.org/abs/2010.07047>

JOURNAL

- 2020 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)*), early access.
<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* (also *proc. 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* (also *proc. 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. Crnovrsanin, 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>

REFERREED FULL-LENGTH CONFERENCE PAPERS

- 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-5iSIV99GhdyJxMXViCeURbxs4nk7
- 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 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. the 113th APSA Annual Meeting*.
<https://drive.google.com/open?id=0B59ss1whXM4kLXIUSTlvQTVwbGs>
- 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/0B59ss1whXM4kZWFIQk82Y1FNZ0k/view>
- 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/view>

REFERREED SHORT-LENGTH CONFERENCE PAPERS

- 2018 K. Dasu, T. Fujiwara, and K.-L. Ma. "An Organic Visual Metaphor for Public Understanding of Conditional Co-occurrences." In *Proc. of 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/0B59ss1whXM4kMEJtQXpsdVixMm8/view>

OTHERS

- 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), 2020, Virtual Conference.
- 2010 T. Fujiwara, M. Tange, S. Someya, and K. Okamoto. "A Dimensional Reduction Visualization Method Using Fractal Shapes for Time-Varying Volume Data." *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." *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 *Proc. Computational Mechanics Conference*, Vol. 22, No.1805, 2009.

TALKS

INVITED TALKS

- 2019 "Visual Analytics Methods for Multidimensional Data in Network Applications." *FX Palo Alto Laboratory*, Palo Alto, California

- 2018 “An Incremental Dimensionality Reduction Method for Visualizing Streaming Multidimensional Data.” *BayVAST: Bay Area Visual Analytics Symposium*, Sunnyvale, California
- 2018 “A Visual Analytics System for Optimizing the Performance of Large-Scale Networks in Supercomputing Systems.” *Summer of CODES Workshop*, Lemont, Illinois
- 2018 “Network Visualization.” *STEM for Girls*, University California, Davis.

CONFERENCE PRESENTATIONS

- 2020 “A Visual Analytics Framework for Reviewing Multivariate Time-Series Data with Dimensionality Reduction.” *IEEE VIS*, Virtual Conference.
- 2020 “A Visual Analytics Framework for Contrastive Network Analysis.” *IEEE VIS*, Virtual Conference.
- 2019 “Supporting Analysis of Dimensionality Reduction Results with Contrastive Learning.” *IEEE VIS*, Vancouver, BC.
- 2019 “An Incremental Dimensionality Reduction Method for Visualizing Streaming Multidimensional Data.” *IEEE VIS*, Vancouver, BC.
- 2018 “A Visual Analytics System for Optimizing the Performance of Large-scale Networks in Supercomputing Systems.” *PacificVAST*, Kobe, Japan.
- 2017 “A Visual Analytics System for Optimizing Communications in Massively Parallel Applications.” *IEEE VIS*, Phoenix, AZ.
- 2017 “A Visual Analytics System for Brain Functional Connectivity Comparison across Individuals, Groups, and Time Points.” *IEEE PacificVis*, Seoul, Korea.
- 2010 “Fractal Map: Fractal-Based 2D Expansion Method for Multi-Scale High-Dimensional Data Visualization.” *ISVC*, Las Vegas, NV.
- 2010 “A Dimensional Reduction Visualization Method Using Fractal Shapes for Time-Varying Volume Data.” *Visualization Society of Japan*, Tokyo, Japan.
- 2009 “A 2D Expansion Method Using Fractal Shapes for High Dimensional Data.” *Visualization Society of Japan*, Yamagata, Japan.

PATENTS

- 2020 T. Fujiwara, J. Zhao, and F. Chen. “System and Method for Contrastive Network Analysis and Visualization.” Filed in 2020 (US).
- 2011 T. Fujiwara, M. Iwamaru, and K. Okamoto. “A High-Dimensional Data Visualization Apparatus, Method, and Program.” Patent Application Publication 2011-86065 (Japan).
<https://www.j-platpat.inpit.go.jp/c1800/PU/JP-2011-086065/4884842630B7900E81243CB9D2E98649B34AEB830F32532B68B9C00E3E318905/11/en>

ACADEMIC SERVICES

ORGANIZING COMMITTEES

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

INVITED CONFERENCE REVIEWER

- IEEE Big Data: 2017, 2018, 2019, 2020
- IEEE VIS (VAST, InfoVis, Short Papers): 2019, 2020
- EG/VGTC EuroVis: 2020
- IEEE PacificVis: 2021
- ACM CHI: 2021

INVITED JOURNAL REVIEWER

- ACM Transactions on Graphics
- ACM Transactions on Interactive Intelligent Systems
- Elsevier Computers & Graphics

TEACHING EXPERIENCES

- 2020 **TEACHING ASSISTANT, UNIVERSITY OF CALIFORNIA, DAVIS** California
- ECS 289H Visual Analytics (graduate course, Fall 2020).
Co-lectured with Dr. Kwan-Liu Ma (responsible for 50% of the lectures), designed course materials, evaluated course assignments, and held office hours.
- 2009 - 2011 **TEACHING ASSISTANT, UNIVERSITY OF TOKYO** Tokyo
- Teaching assistant for three undergraduate courses (Scientific Computer Graphics, Advanced Project for Simulation, Mathematical and Information Sciences).
 - Lectured scientific visualization techniques, methods to visualize information data on the web, and the state-of-the-art technologies.
 - Supported students to implement programs and understand general computer science and simulation concepts.

STUDENT SUPERVISION

MENTORING

- 2020.9-Present Xinhai Wei, Undergraduate Student, University of Waterloo, Canada
- 2020.5-Present Shiplika, Ph. D. Student, University of California, Davis, USA
- 2020.1-Present Xiaoyu Zhang, Ph. D. Student, University of California, Davis, USA
- 2019.12-Present Yun-Hsin Kuo, Ph. D. Student, University of California, Davis, USA
- 2019.6-2020.3 Rongchen Guo, Undergraduate Student, Beihang University, Beijing, China
(now MS Student at University of Texas at Austin)
- 2019.4-Present Yiran Li, Ph. D. Student, University of California, Davis, USA
- 2019.1-2020.1 Suraj P. Kesavan, Ph. D. Student, University of California, Davis, USA
- 2017.11-2018.4 Keshav Dasu, Ph. D. Student, University of California, Davis, USA
- 2017.11-2018.4 Sandra Bae, Master Student, University of California, Davis, USA
(now Ph. D. Student at University of Colorado Boulder)
- 2010.4 - 2011.3 Ryo Matsushita, Master Student, University of Tokyo, Japan
(now 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 C++, Python, JavaScript, R, Common Lisp, HTML, OpenGL, WebGL, D3, Qt, Unix/Linux
- Languages English (fluent), Japanese (native)

GRADUATE COURSEWORK

COMPUTER SCIENCE, UNIVERSITY OF CALIFORNIA, DAVIS

Machine Learning, Network Theory, Analysis of Algorithms, Software Engineering,
Information Visualization, Advanced Visualization