# Tatsunori TANIAI

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## Professional Employment

Apr 2017 – present: **Special Postdoctoral Researcher**, **RIKEN AIP**, JAPAN (April 2017)

Apr 2014 – Mar 2017: **JSPS Young Research Fellow**, **The University of Tokyo**, JAPAN
(also employed as research interns at Microsoft in 2012, 2015 and 2016)

## Education

**The University of Tokyo**, JAPAN (Apr 2009 – March 2017)

March 2017: **Ph.D. degree** in Information Science and Technology
Advisor: Yoichi Sato

March 2014: **Master of Science** in Information Science and Technology
Advisor: Takeshi Naemura

March 2012: **Bachelor of Engineering** in Information and Communication Engineering
Advisor: Takeshi Naemura

**National Institute of Technology, Tokyo College (a.k.a. Tokyo Kosen)**, JAPAN (2003-2009)

Mar 2009: **Associate of Engineering** in Information Engineering
Advisor: Tetsuya Kojima

## Research Interests

Include low and mid-level computer vision, particularly,

- **3D reconstruction** in both geometric and photometric approaches.
- **Image segmentation** especially, jointly with stereo, optical flow, etc.
- **MRF optimization** for higher-order energies or a large label space.
- **Deep learning** for computer vision applications.

## AWARDS & HONORS

March 2017: **Dean's Award for Best Doctoral Thesis** from the Graduate School of Information Science and Technology, the University of Tokyo.

October 2015: **Microsoft Research Asia Ph.D. Fellowship** from Microsoft Research Asia with research fund of 10,000 USD. One of 13 winners among 100 applicants from Asia.

2014 - 2017: **JSPS Young Research Fellowship (DC1)** from the Japan Society for the Promotion of Science with research fund of approximately 10,000 USD / year for three years. Acceptance rate: 23%.

March 2014: **Dean's Award for Best Master Thesis** from the Graduate School of Information Science and Technology, the University of Tokyo.

March 2012: **Dean's Award for Best Bachelor Thesis** from the Faculty of Engineering, the University of Tokyo.

## PUBLICATIONS

♦ **Journals**

[1] Tatsunori Taniai, Yasuyuki Matsushia, Yoichi Sato, and Takeshi Naemura: "Continuous 3D Label Stereo Matching using Local Expansion Moves", In *IEEE Transactions on Pattern Analysis and Machine Intelligence* (**TPAMI**), vol. 40, no. 11, pp. 2725–2739 (Nov. 2018). (an extended version of [8])

[2] Tatsunori Taniai, Viet-Quoc Pham, Keita Takahashi, and Takeshi Naemura: "Image Segmentation using Simultaneous Matching of Foreground-Background Color Distributions", *IEICE Transactions on Information and Systems (Japanese edition)*, vol. J96-D, no. 8, pp. 1764–1777 (Aug. 2013).

♦ **International Conference Papers**

[3] Tatsunori Taniai and Takanori Maehara: "Neural Inverse Rendering for General Reflectance Photometric Stereo", In *Proc. of the 35th International Conference on Machine Learning* (**ICML 2018**), pp. 4864–4873, Stockholm, Sweden (Jul. 2018). (acceptance rate: 618/2473 = 25.0%)

[4] Daniel Scharstein, Tatsunori Taniai, Sudipta N. Sinha. "Semi-Global Stereo Matching with Surface Orientation Priors". In *Proc. of the 5th International Conference on 3D Vision* (**3DV 2017**), pp. 215–224, Qingdao, China, 2017. (spotlight presentation)

[5] Tatsunori Taniai, Sudipta Sinha, and Yoichi Sato: "Fast Multi-frame Stereo Scene Flow with Motion Segmentation", In *Proc. of IEEE Conference on Computer Vision and Pattern Recognition* (**CVPR 2017**), pp. 6891–6900, Honolulu, Hawaii, USA (Jul. 2017). (acceptance rate: 783/2620 = 29.9%)

[6] Tatsunori Taniai, Sudipta Sinha, and Yoichi Sato: "Joint Recovery of Dense Correspondence and

Cosegmentation in Two Images", In *Proc. of IEEE Conference on Computer Vision and Pattern Recognition* (**CVPR 2016**), pp. 4246–4255, Las Vegas, NV, USA (Jun. 2016). (acceptance rate: 643/2145 = 29.9%)

[7] Tatsunori Taniai, Yasuyuki Matsushia, and Takeshi Naemura: "Superdifferential Cuts for Binary Energies", In *Proc. of IEEE Conference on Computer Vision and Pattern Recognition* (**CVPR 2015**), pp. 2030–2038, Boston, MA, USA (Jun. 2015). (acceptance rate: 602/2123 = 28.4%)

[8] Tatsunori Taniai, Yasuyuki Matsushia, and Takeshi Naemura: "Graph Cut based Continuous Stereo Matching using Locally Shared Labels", In *Proc. of IEEE Conference on Computer Vision and Pattern Recognition* (**CVPR 2014**), pp. 1613–1620, Columbus, OH, USA (Jun. 2014). (acceptance rate: 540/1807 = 29.8%)

[9] Tatsunori Taniai, Viet-Quoc Pham, Keita Takahashi, and Takeshi Naemura: "Image Segmentation using Dual Distribution Matching", In *Proc. of British Machine Vision Conference* (**BMVC 2012**), pp. 74.1–74.11, Surrey, UK (Sep. 2012). (oral presentation. acceptance rate: 32/414 = 8%)

♦ **Technical Reports**

♦ **Invited Talks**

[10] Tatsunori Taniai†, Sudipta N. Sinha, and Yoichi Sato: "Fast Multi-frame Stereo Scene Flow with Motion Segmentation (CVPR 2017)", In *The 20th Meeting on Image Recognition and Understanding (MIRU 2017)*, IT-16, at International Conference Center Hiroshima in Hiroshima, Japan (Aug. 10th, 2017).

[11] Tatsunori Taniai†: "Joint Recovery of Dense Correspondence and Cosegmentation in Two Images", In *The Workshop on Vision, Learning, and Cognition in Microsoft Research Asia Ph.D. Forum 2016*, Microsoft office, Beijing, China (Sep. 20th, 2016).

[12] Tatsunori Taniai, Sudipta N. Sinha, and Yoichi Sato†: "Joint Recovery of Dense Correspondence and Cosegmentation in Two Images (CVPR 2016)", In *The 19th Meeting on Image Recognition and Understanding (MIRU 2016)*, IS2-15, at Actcity Hamamatsu in Shizuoka, Japan (Aug. 4th, 2016).

[13] Tatsunori Taniai†: "Solving Segmentation and Dense Correspondence Problems using Graph Cuts", In *The 1st CREST Symposium on Random Fields and Deep Learning*, at Waseda University in Tokyo, Japan (Jan. 13th, 2016). (Organizers: Prof. Hiroshi Ishikawa & Prof. Takayuki Okatani)

[14] Tatsunori Taniai†: "Joint Co-segmentation and Dense Correspondence", In *The final interview of Microsoft Research Asia Ph.D. fellowships*, at Microsoft Research Asia in Beijing, China (Sep. 11th, 2015).

[15] Tatsunori Taniai, Yasuyuki Matsushia†, and Takeshi Naemura: "Superdifferential Cuts for Binary Energies (CVPR 2015)", In *The 18th Meeting on Image Recognition and Understanding (MIRU 2015)*, IS1-10, at Hotel Hankyu Expo Park in Osaka, Japan (Jul. 28th, 2015).

[16] Tatsunori Taniai†, Yasuyuki Matsushia, and Takeshi Naemura: "Graph Cut based Continuous Stereo Matching using Locally Shared Labels (CVPR 2014)", In *The 17th Meeting on Image*

*Recognition and Understanding (MIRU 2014)*, IT1-1, at Okayama Convention Center in Okayama, Japan (Jul. 29th, 2014).

Names with † are the presenters.

♦ **Domestic Conference Papers** (in Japanese)

Two papers including one refereed paper.

## EXPERIENCES

**Conference Reviewer**: 3DV 2014, '17, '18, ICCV 2017, CVPR 2018 (outstanding reviewer)

**Journal Reviewer**: IEEE TIP 2015, '18, IMAVIS 2016, IEICE TIS 2016, CVIU 2017

**Research Internship at Microsoft Research** (May 23th – Aug 26th, 2016 in Redmond, USA)

**S**upervisor: Dr. Sudipta Sinha

Part of the internship achievements has been published as a CVPR 2017 paper [5].

**Visiting Research at Microsoft Research Asia** (Jan 26th – Apr 25th, 2016 in Beijing, China)

**S**upervisor: Dr. David Wipf

**Research Internship at Microsoft Research** (June 1st – Sep 4th, 2015 in Redmond, USA)

**S**upervisor: Dr. Sudipta Sinha

Part of the internship achievements has been published as a CVPR 2016 paper [6].

**Research Internship at Microsoft Research Asia** (Dec 11th, 2012 – Apr 17th, 2013 in Beijing, China)

**S**upervisor: Dr. Yasuyuki Matsushita

Part of the internship achievements has been published as a CVPR 2014 paper [8].

## SKILLS

- 10+ years of programming experiences in **C++** (primary use), **C#**, **Java**, and **Python**
- Learner of **modern C++** (not mastering level yet!)
- Visual computing using **OpenCV** (primary use) and ~~**MATLAB**~~ **Python + numpy**
- GPGPU programming skills using **OpenCL** and **CUDA** (basic level)
- SIMD code optimization using **SSE** and **AVX** (basic level)
- Academic literacy & conversation skills in **English** (TOEIC 930 of 990 in May 2011)