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Kyohei Terao, *Ph.D.*

PERSONAL DETAILS

Job title: Associate Professor
Affiliation: Faculty of Engineering and Design, Kagawa University
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Date of Birth: December 24 1979
Nationality: Japan

EDUCATION

March 2007 Ph.D. **The University of Tokyo**
March 2005 M.E. **The University of Tokyo**
March 2002 B.E. **Kyoto University**

RESEARCH FIELD

Single Cell Analysis, Single Molecule Analysis, MicroTAS, Microfabrication, Organ on a Chip

PROFESSIONAL EXPERIENCE

Sept 2018 – Mar 2019 **Visiting Scientist**
Physicochemistry Curie Laboratory, Institute Curie
“Development of Microvascular In Vitro Constriction Model for Analyzing Cancer Cell deformation and Recovery”

Oct 2015 – present **Vice Director**
Nano-Micro Structure Device Integrated Research Center, Kagawa University
“Cell Sensors for Health Sciences”

Oct 2014 – Mar 2018 **PRESTO Researcher**
Japan Science and Technology Agency

Project: “Nano-blade Array for Spatial Dissection of Single Cells and Tissues”

May 2013 - present **Associate Professor (PI)**
Department of Intelligent Mechanical Systems Engineering, Kagawa University
Project: “On-Site Molecular Processing”, “Development of Microfluidic Device for Single Cell Analysis”, “Development of MEMS-based Surface Biosensor”

Apr 2009 - Apr 2013 **Assistant Professor**
Department of Intelligent Mechanical Systems Engineering, Kagawa University
Project: “On-Site Genome Manipulation”, “Development of Microfluidic Device for Single Cell Analysis”, “Development of MEMS-based Surface Biosensor”

Apr 2007 - Mar 2009 **Postdoctoral Researcher**
Department of Micro-Engineering, Kyoto University
Advisor: Professor Hidetoshi Kotera
Project: “Development of Microfluidic device for Single Cell Analysis”

AWARDS

[1] **The Young Scientists’ Prize, The Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology**
K. Terao:
The Minister of Education, Culture, Sports, Science and Technology (MEXT, Japan), April 2018

[2] **IEEJ Distinguished Paper Awards**
T. Suzuki, K. Terao, H. Suzuki, Y. Nitta, H. Takao, F. Shimokawa, F. Oohira, D. Hiramaru, H. Kotera:
“Development of a High-Throughput DNA Fiber Analysis Device Using MEMS Technology”
The Institutes of Electrical Engineering Japan, May 2013

[3] **Best Paper Award**
T. Suzuki, K. Terao, H. Suzuki, Y. Nitta, H. Takao, F. Shimokawa, F. Oohira, D. Hiramaru, H. Kotera:

"Development of a High-Throughput DNA Fiber Analysis Device Using MEMS Technology"
28th Sensor Symposium, October 2012

[4] **Young Investigator Award**
K. Terao:
"Micro-nanotechnology for Manipulating single DNA molecule"
Funai Foundation for Information Technology, April 2010

[5] **Best Poster Award**
T. Nakano, O. Sasaki, K. Terao, T. Suzuki, F. Oohira:
"Low cost polymer MEMS mirrors fabricated by photolithography and wet etching processes"
26th Sensor Symposium, October 2009

[6] **Paper selected as Hot Articles 2008 in *Lab on a Chip***
K. Terao, M. Washizu, H. Oana:
"On-Site Manipulation of Single Chromosomal DNA Molecules by using Optically Driven Microstructures"
Lab on a Chip, 8(8), 1280-4 (2008), January 2009

[7] **Best Paper Award**
K. Terao, H. Kabata, H. Oana. M. Washizu
"Complete Extension of Chromosomal DNA and its Manipulation using Optically-Driven Microstructures"
IEEE International Symposium on Micro-Nanomechatronics and Human Science 2006 (MHS2006), November 2006

PUBLICATION LIST

(*Corresponding author)

[1] K. Hamamoto, K. Terao, F. Shimokawa, H. Takao*: "A highly sensitive MEMS silicon-hair device reproducing the function of hair follicle", IEEJ Transactions on Sensors and Micromachines, 139(7), pp.180-185 (2019)

[2] Y. Yano, A. Ono, K. Terao, T. Suzuki, H. Takao, T Kobayashi, I Kataoka, F. Shimokawa*: "Phloem-sap-dynamics sensor device for monitoring photosynthates transportation in plant shoots", Japanese Journal of Applied Physics, 57(6), 067001 (2018)

[3] A. Ono, A. Yoneda, H. Ishizuka, K. Terao, H. Takao, N. Takahashi, T. Kobayashi, I. Kataoka, and F. Shimokawa*: "Pure photosynthates extraction

sensor device with highly precise phloem/xylem position identification", IEEE Sensors Journal, 18(4), 1739-1746 (2018)

[4] H. Takao*, H. Mori, Y. Maeda, K. Watatani, K. Terao, F. Shimokawa, K. Maeda, and R. Kozai: "Cell-like Sensor" Devices Directed to Ultra Low Invasive Implementation", The IEICE transactions on electronics (Japanese edition), 101C(1), 9-17 (2018).

[5] Y. Tao, K. Fukuda, H. Takao, F. Shimokawa, and K. Terao*: "Development of microfluidic device for imaging paracrine communication", *IEEJ Transactions on Sensors and Micromachines*, 137(5), 128-133(2017)

[6] J. Suzuki, K. Terao, H. Takao, F. Shimokawa, F. Oohira, H. Miyagawa and T. Suzuki*: "Development of Magnetically Driven Microvalve Using Photosensitive SU-8/Fe Composite", *International Journal of Applied Electromagnetics and Mechanics*, 52(3-4),1585-1590(2016)

[7] H. Ueno, S. Komai, K. Terao, H. Takao, F. Shimokawa, H. Kotera, and T. Suzuki*: "Development of a local light stimulation device integrated with micro electrode array", *Mechanical Engineering Journal*, 3, ID:15-00570(2016)

[8] J. Suzuki, Y. Onishi, K. Terao, H. Takao, F. Shimokawa, F. Oohira, H. Miyagawa, T. Namazu, and T. Suzuki*: "Development of a two-dimensional scanning micro-mirror utilizing magnetic polymer composite", *Japanese Journal of Applied Physics*, 55, ID:06GP01(2016)

[9] M. Ochi, Y. Yano, K. Terao, T. Suzuki, H. Takao, T. Kobayashi, I. Kataoka, F. Shimokawa*: "Micro-scale sap flow sensor fabricated using MEMS technology", *Japanese Journal of Ecology*, 66, 465 - 475（2016）

[10] Y. Maeda, K. Terao, F. Shimokawa, H. Takao*: "A MEMS hardness sensor with reduced contact force dependence based on the reference plane concept aimed for medical applications", *Japanese Journal of Applied Physics*, 55, 04EF11 (2016)

[11] K. Terao*, C. Masuda, R. Inukai, M. Gel, H. Oana, M. Washizu, T. Suzuki, H. Takao, F. Shimokawa, F. Oohira: "Characterization of optically-driven microstructures for manipulating single DNA molecules under a fluorescence microscope", *IET Nanobiotechnology*, 10(3), 124-128(2016)

[12] J. Suzuki, K. Terao, H. Takao, F. Shimokawa, F. Oohira, T. Suzuki*: "Development of magnetically driven micro valve using SU-8/Fe composite", *Journal of the Japan Society of Applied Electromagnetics and Mechanics*, 23(2), 407-413(2015)

[13] K. Terao*, S. Hiramatsu, T. Suzuki, H. Takao, F. Shimokawa, F. Oohira: “Fast protein detection from raw blood by size-exclusion SPR sensing”, *Analytical Methods*, 7, 6483-6488 (2015)
[14] H. Tamai, K. Maruo, H. Ueno, K. Terao, H. Kotera, T. Suzuki* “Development of low-fluorescence thick photoresist for high-aspect-ratio microstructure in bio-application”, *Biomicrofluidics*, 9, 022405 (2015)
[15] Y. Ueda, T. Nakahara, K. Terao, H. Takao, F. Shimokawa, F. Oohira, H. Kotera, T. Suzuki*: “Development of an electromagnetic micropump with photosensitive magnetic nanocomposite”, *Journal of the Japan Society of Applied Electromagnetics and Mechanics*, 22(2), 202-207 (2014)
[16] K. Terao*, M. Gel, A. Okonogi, A. Fuke, T. Okitsu, T. Tada, T. Suzuki, S. Nagamatsu, M. Washizu, H. Kotera: “Subcellular Glucose Exposure Biases the Spatial Distribution of Insulin Granules in Single Pancreatic Beta Cells”, *Scientific Reports*, 4, 4123 1-6 (2014)
[17] Y. Maeda, K. Terao, T. Suzuki, F. Simokawa, H. Takao*: “A Post-CMOS Formation Process of High Adhesion SU-8 Structures for Reliable Fabrication of Integrated MEMS Microsensors”, *Japanese Journal of Applied Physics*, 52, 06GL18 (2013)
[18] T. Suzuki*, K. Terao, H. Suzuki, Y. Nitta, H. Takao, F. Shimokawa, F. Oohira, D. Hiramaru, H. Kotera: “Development of a High-Throughput DNA Fiber Analysis Device Using MEMS Technology”, *IEEJ Transactions on Sensors and Micromachines*, 133(5), 139-146 (2013)
[19] M. Akamatsu, K. Terao, H. Takao, F. Shimokawa, F. Oohira, T. Suzuki*: “Development of High Accuracy Spray Coating Method using Multi-layer Coat”, *IEEJ Transactions on Sensors and Micromachines*, 133(5), 170-176 (2013)
[20] N. Nagase, K. Terao*, N. Miyanishi, N. Tamai, N. Uchiyama, T. Suzuki, H. Takao, F. Shimokawa, F. Oohira: “Signal Enhancement of Protein Binding by Electrodeposited Gold Nanostructures for Application in Kretschmann-Type SPR Sensor”, *Analyst*, 137(21), 5034-5040 (2012)
[21] M. Inoue, A. Okonogi, K. Terao, H. Takao, F. Shimokawa, F. Oohira, H. Kotera, and T. Suzuki*: “Cell Culture on MEMS Materials in Micro-Environment Limited by a Physical Condition”, *Micro & Nano Letters*, 7(8), 725-728 (2012)
[22] R. Yokokawa*, Y. Kitazawa, K. Terao, A. Okonogi, I. Kanno H. Kotera: “A Perfusable microfluidic device with on-chip total internal reflection

fluorescence microscopy (TIRFM) for in situ and real-time monitoring of live cells", *Biomedical Microdevices*, 14(4), 791-797 (2012)

[23] K. Oda, H. Takao*, K. Terao, T. Suzuki, F. Shimokawa, I. Ishimaru, F. Oohira: "Vertical Comb-Drive MEMS Mirror with Sensing Function for Phase-Shift Device", *Sensors and Actuators A: Physical*, 181, 61-69 (2012)

[24] K. Terao*, K. Shimizu, N. Miyanishi, S. Shimamoto, T. Suzuki, H. Takao, F. Oohira: "Size-Exclusion SPR Sensor Chip: Application to Detection of Aggregation and Disaggregation of Biological Particles", *Analyst*, 137(9), 2192-2198 (2012)

[25] K. Terao*, C. Kakita, N. Nagase, N. Miyanishi, T. Suzuki, H. Takao, F. Shimokawa, F. Oohira: "Evaluation of Electrodeposited Gold Nanostructures for Applications in QCM Sensing", *Analytical Sciences*, 28(3), 291-294 (2012)

[26] K. Terao*, A. Okonogi, A. Fuke, T. Okitsu, T. Suzuki, M. Washizu, H. Kotera: "Localized substance delivery to single cell and 4D imaging of its uptake using a flow channel with a lateral aperture", *Microfluidics and Nanofluidics*, 12(1), 423-429 (2012)

[27] K. Terao*, Y. Kitazawa, R. Yokokawa, A. Okonogi, H. Kotera: "Open-Access and Multi-Directional Electroosmotic Flow Chip for Positioning Heterotypic Cells", *Lab on a Chip*, 11(8), 1507-1512(2011)

[28] K. Okada, H. Watanabe, F. Oohira*, K. Terao, Y. Mihara, T. Suzuki, K. Ogawa: "Fabrication of AWG for the CWDM by the Casting Method using a Micro Die (2nd Report) -Improvement of Fabrication Process of Arrayed Waveguide Grating and Characteristic Evaluation-", *Journal of the Japan Society of Precision Engineering*, 77(2), 213-217 (2011)

[29] H. Morii, F. Oohira*, T. Suzuki, K. Terao, M. Sasaki, T. Ochi, A. Yuzuriha, K. Wani: "Proposal of high-density packaging construction and conductive pattern forming method on vertical wall using spray coating technology", *IEEJ Transactions on Sensors and Micromachines*, 131(1), 40-44 (2011)

[30] H. Mukai, S. Kawakami, Y. Kamiya, F. Ma, H. Takahashi, K. Satake, K. Terao, H. Kotera, F. Yamashita, M. Hashida*: "Pressure-Mediated Transfection of Murine Spleen and Liver.", *Human Gene Therapy*, 20(10), 1-11 (2009)

[31] K. Terao*, M. Washizu, H. Oana: "On-Site Manipulation of Single Chromosomal DNA Molecules by using Optically Driven Microstructures", *Lab on a Chip*, 8(8), 1280-4 (2008), *selected as Hot Articles 2008.*

[32] K. Terao, H. Kabata, M. Washizu*:
“Extending chromosomal DNA in microstructures using electro-osmotic flow”
Journal of Physics: Condensed Matter, 18(18), S653-63 (2006)