

TOSHIO ANDO

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Toshio ANDO is a Full Professor in Physics and Biophysics, and the Director of Bio-AFM Frontier Research Center at the Kanazawa University. Toshio was born in Tokyo and received his B.E. in applied physics and his D.S. in physics from Waseda University. After receiving the doctorate, he worked at UC San Francisco as a postdoctoral fellow and then an Assistant Research Biophysicist from 1980 to 1986, where he worked on the development of fluorescence techniques as well as the elucidation of muscle contraction mechanism. After that, he returned to Japan to establish a Biophysics Laboratory at the Department of Physics, Kanazawa University. Toshio is a biophysicist specializing in the development and use of measurement techniques for understanding the functional mechanism of proteins. In the last two decades he has been developing high-speed atomic force microscopy (HS-AFM) techniques to directly visualize protein molecules in action at high spatiotemporal resolution. This microscopy is now highly advanced for practical applications and being disseminated in the world. The exquisite dynamic images filmed in his recent studies have been continuously demonstrating that this new microscopy is a powerful tool capable of revealing the dynamic processes and structure dynamics of biological molecules in stunning detail, which are currently not possible with other techniques. For example, he successfully visualized myosin V walking on an actin filament and thereby obtained a new insight into the energy usage and chemo-mechanical coupling in this molecular motor. As such, Toshio ANDO opened a new avenue to studying in detail how proteins function, making a great contribution to the field of scanning probe microscopy and biomedical sciences. For these achievements, he has been awarded 15 prizes.

Education

1980 D.Sc. Waseda University (Japan), Physics
1977 M.Sc. Waseda University (Japan), Physics
1974 B.Sc. Waseda University (Japan), Applied Physics

Positions held

2010-Now Director of Bio-AFM Frontier Research Center, Kanazawa University
1996-Now Kanazawa University (Department of Physics), Professor
1992-1996 Kanazawa University (Department of Physics), Associate Professor
1986-1992 Kanazawa University (Department of Physics), Lecturer
1983-1986 University of California, San Francisco (Cardiovascular Research Institute),
Assistant Research Biophysicist
1980-1983 University of California, San Francisco (Cardiovascular Research Institute),
Postdoctoral Fellow

Professional Memberships and Committees

2013-Now Advisor, Nanoprobe Technology 167th Committee in Japan Society for the
Promotion of Science
2012-Now Committee of Biophysics Society of Japan
2010-2012 Expert Committee of SPM in Biophysical Society of Japan
2008-Now Member, American Physical Society
2008-Now Member, Surface Science Society of Japan
2008-Now Member, Japanese Society of Microscopy
2007-2010 Committee of Biophysics Society of Japan
2007-Now Member, Japan Society of Applied Physics
2006-Now Microbeam Analysis 114th Committee in Japan Society for the Promotion of
Science
2006-2012 Nanoprobe Technology 167th Committee in Japan Society for the Promotion of
Science
2005-2007 JSPS Peer Review Committee: Micro- & Nano-Science
1983-Now Member, Biophysical Society
1973-Now Member, Biophysical Society of Japan

Awards

2014 Shimadzu Prize
2013 Distinguished Contribution Award for Research and Education, Kanazawa University
2013 Chairman's prize of the Japanese Association of Invention
2013 Science & Technology Award of the Minister of Education, Culture, Sports, Science and
Technology of Japan
2012 University of Pennsylvania NBIC Award for Research Excellence in Nanotechnology
2012 Kanazawa City Culture Prize
2011 Award of the Japanese Society of Microscopy
2011 Human Frontier Science Program Grant Award
2010 Yamazaki-Teiichi Prize of the Foundation for Promotion of Material Science and
Technology of Japan
2010 Award of the Surface Science Society of Japan
2008 Sakaki Prize of the Japan Society for the Promotion of Science

- 2007 Best Paper Award of the Japan Society of Applied Physics
- 2007 Distinguished Service Award of the President of Science Council of Japan
- 2005 Hokkoku Culture Prize of the Hokkoku Newspaper
- 2004 Nanoprobe Technology Prize of the Japan Society for the Promotion of Science
- 2003 Nikkei BP Technology Prize

Publications (original papers and Reviews)

1. S. Ishino, T. Yamagami, M. Kitamura, N. Kodera, T. Mori, T. Ando, N. Goda, H. Hiroaki, and Y. Ishino, "Multiple interactions of the intrinsically disordered region between the N-terminal helicase and C-terminal nuclease domains of the archaeal Hef protein", *J. Biol. Chem.* (accepted).
2. J. Preiner, N. Kodera, J. Tang, A. Ebner, M. Brameshuber, D. Blaas, N. Gelbmann, H. Gruber, T. Ando, and P. Hinterdorfer, "IgGs are made for walking on bacterial and viral surfaces", *Nature Communications* **5**, 4394 (2014)
3. T. Ando, "High-speed AFM imaging", *Curr. Opin. Struct. Biol.* (in press). DOI: 10.1016/j.sbi.2014.07.011.
4. N. Kodera and T. Ando, "The path to visualization of walking myosin V by high-speed atomic force microscopy", *Biophys. Rev.* (published online). DOI:10.1007/s12551-014-0141-7.
5. Y. Shibafuji, A. Nakamura, T. Uchihashi, N. Sugimoto, S. Fukuda, H. Watanabe, M. Samejima, T. Ando, H. Noji, A. Koivula, K. Igarashi, and R. Iino, "Single-molecule imaging analysis of elementary reaction steps of Trichoderma Reesei cellobiohydrolase I (Cel7A) hydrolyzing crystalline cell", *J. Biol. Chem.* **289**, 14056-14065 (2014).
6. T. Ando, T. Uchihashi, and S. Scheuring, "Filming biomolecular processes by high-speed atomic force microscopy", *Chem. Rev.* **114**, 3120-3188 (2014). Selected to be featured in ACS Editors' Choice.
7. A. Nakamura, H. Watanabe, T. Ishida, T. Uchihashi, M. Wada, T. Ando, K. Igarashi, and M. Samejima, "Trade-off between processivity and hydrolytic velocity of cellobiohydrolases at the surface of crystalline cellulose", *J. Am. Chem. Soc.* **136**, 4584-4592 (2014).
8. K. Igarashi, T. Uchihashi, T. Uchiyama, H. Sugimoto, M. Wada, K. Suzuki, S. Sakuda, T. Ando, T. Watanabe, and M. Samejima, "Two-way traffic of glycoside hydrolase family 18 processive chitinases on crystalline chitin", *Nature Communications* **5**, 3975 (2014).
9. K. Noi, D. Yamamoto, S. Nishikori, K. Arita-Morioka, T. Ando and T. Ogura, "High-Speed Atomic Force Microscopic Observation of ATP-Dependent Rotation of the AAA+ Chaperone p97", *Structure* **21**, 1992-2002 (2013).
10. H. Yamashita, K. Inoue, M. Shibata, T. Uchihashi, J. Sasaki, H. Kandori, and T. Ando, "Role of trimer-trimer interaction of bacteriorhodopsin studied by optical spectroscopy and high-speed atomic force microscopy", *J. Struct. Biol.* **184**, 2-11 (2013).
11. S. Fukuda, T. Uchihashi, R. Iino, Y. Okazaki, M. Yoshida, K. Igarashi, and T. Ando, "High-speed atomic force microscope combined with single-molecule fluorescence microscope", *Rev. Sci. Instrum.* **84**, 073706 (8 pp) (2013).
12. H. Watanabe, T. Uchihashi, T. Kobashi, M. Shibata, J. Nishiyama, R. Yasuda, and T. Ando, "Wide-area scanner for high-speed atomic force microscopy", *Rev. Sci. Instrum.* **84**, 053702 (10 pp) (2013).

13. N. Yilmaz, T. Yamada, P. Greimel, T. Uchihashi, T. Ando and T. Kobayashi, "Real-Time Visualization of Assembling of a Sphingomyelin-Specific Toxin", *Biophys. J.* **105**, 1397-1405 (2013).
14. T. Ando, T. Uchihashi, and N. Kodera, "High-speed AFM and applications to biomolecular systems", *Annu. Rev. Biophys.* **42**, 393-414(2013).
15. T. Ando, "Molecular Machines directly observed by high-speed atomic force microscopy", *FEBS Lett.* **587**, 997-1007 (2013).
16. T. Ando, "High-speed atomic force microscopy", *Microscopy* **62**, 81-93 (2013).
17. M. Hashimoto, N. Kodera, Y. Tsunaka, M. Oda, M. Tanimoto, T. Ando, K. Morikawa, and S. Tate, "Phosphorylation-Coupled Intramolecular Dynamics of Unstructured Regions in Chromatin Remodeler FACT", *Biophys. J.* **104**, 2222-2234 (2013).
18. T. Ando, T. Uchihashi, and N. Kodera, "High-speed atomic force microscopy", *Jpn. J. Appl. Phys.* **51**, 08KA02 (15 pp) (2012).
19. H. Yamashita, A. Taoka, T. Uchihashi, T. Asano, T. Ando, and Y. Fukumori, "Single molecule imaging on living bacterial cell surface by high-speed AFM", *J. Mol. Biol.* **422**, 300-309 (2012).
20. T. Uchihashi, N. Kodera, and T. Ando, "Guide to video recording of structure dynamics and dynamic processes of proteins by high-speed atomic force microscopy", *Nature Protoc.* **7**, 1193-1206 (2012).
21. T. Ando, "High-speed atomic force microscopy coming of age", *Nanotechnology* **23**, 062001 (27 pp) (2012).
22. T. Ando and N. Kodera, "Visualization of mobility by atomic force microscopy", *Methods Mol. Biol.* **896**, 57-69 (2012).
23. K. Igarashi, T. Uchihashi, A. Koivula, M. Wada, S. Kimura, M. Penttilä, T. Ando, and M. Samejima, "Visualization of cellobiohydrolase I from *Trichoderma reesei* moving on crystalline cellulose using high-speed atomic force microscopy", *Methods Enzymol.* **510**, 169-182 (2012).
24. T. Uchihashi and T. Ando, "High-speed atomic force microscopy and biomolecular processes", *Methods Mol. Biol.* **736**, 285-300 (2011).
25. A. Laisne, M. Ewald, T. Ando, E. Lesniewska, and D. Pompon, "Self-assembly properties and dynamic of synthetic proteo-nucleic building blocks in solution and on surfaces", *Bioconjugate Chem.* **22**, 1824-1834 (2011).
26. K. Igarashi, T. Uchihashi, A. Koivula, M. Wada, S. Kimura, T. Okamoto, M. Penttilä, T. Ando, and M. Samejima, "Traffic jams reduce hydrolytic efficiency of cellulase on cellulose surface", *Science* **333**, 1279-1282 (2011).
27. T. Uchihashi, R. Iino, T. Ando, and H. Noji, "High-speed atomic force microscopy reveals rotary catalysis of rotor-less F₁-ATPase", *Science* **333**, 755-758 (2011).
28. A. Miyagi, T. Ando and Y. L. Lyubchenko, "Dynamics of nucleosomes assessed with time-lapse high speed atomic force microscopy", *Biochemistry* **50**, 7901-7908 (2011).
29. Y. L. Lyubchenko, L. S. Shlyakhtenko, and T. Ando, "Imaging of nucleic acids with atomic force microscopy", *Methods* **54**, 274-283 (2011).
30. M. Shibata, T. Uchihashi, H. Yamashita, H. Kandori, and T. Ando, "Structural changes in bacteriorhodopsin in response to alternate illumination observed by high-speed atomic force microscopy", *Angew. Chem. Int. Ed.* **50**, 4410-4413 (2011).

31. S. Inoue, T. Uchihashi, D. Yamamoto, and T. Ando, "Direct observation of surfactant aggregate behavior on a mica surface using high-speed atomic force microscopy", *Chem. Commun.* **47**, 4974–4976 (2011).
32. N. Kodera, D. Yamamoto, R. Ishikawa, and T. Ando, "Video imaging of walking myosin V by high-speed atomic force microscopy", *Nature* **468**, 72–76 (2010).
33. M. Shibata, H. Yamashita, T. Uchihashi, H. Kandori, and T. Ando, "High-speed atomic force microscopy visualization shows dynamic molecular processes in photo-activated bacteriorhodopsin", *Nature Nanotechnol.* **5**, 208–212 (2010).
34. P.-E. Milhiet, D. Yamamoto, O. Berthoumieu, P. Dosset, Ch. Le Grimmellec, J.-M. Verdier, S. Marchal, and T. Ando, "Deciphering the structure, growth and assembly of amyloid-like fibrils using high-speed atomic force microscopy", *PLoS One* **5**, e13240 (8 pp) (2010).
35. D. Yamamoto, T. Uchihashi, N. Kodera, H. Yamashita, S. Nishikori, T. Ogura, M. Shibata, and T. Ando, "High-speed atomic force microscopy techniques for observing dynamic biomolecular processes", *Methods Enzymol.* **475**, 541–564 (2010).
36. D. Yamamoto, A. Taoka, T. Uchihashi, H. Sasaki, H. Watanabe, T. Ando, and Y. Fukumori, "Visualization and structural analysis of the bacterial magnetic organelle magnetosome using atomic force microscopy", *Proc. Natl. Acad. Sci. USA* **107**, 9382–9387 (2010).
37. M.-C. Giocondi, D. Yamamoto, E. Lesniewska, P.-E. Milhiet, T. Ando, and C. Le Grimmellec, "Surface topography of membrane domains", *Biochim. Biophys. Acta - Biomembranes* **1798**, 703–718 (2010).
38. S. Sugimoto, K. Yamanaka, S. Nishikori, A. Miyagi, T. Ando, and T. Ogura, "AAA⁺ chaperone ClpX regulates dynamics of prokaryotic cytoskeletal protein FtsZ", *J. Biol. Chem.* **285**, 6648–6657 (2010).
39. I. Casuso, N. Kodera, C. Le Grimmellec, T. Ando, and S. Scheuring, "Contact mode high-resolution high-speed atomic force microscopy movies of the purple membrane", *Biophys. J.* **97**, 1354–1361 (2009).
40. D. Yamamoto, N. Nagura, S. Omote, M. Taniguchi, and T. Ando, "Streptavidin 2D crystal substrates for visualizing biomolecular processes by atomic force microscopy", *Biophys. J.* **97**, 2358–2367 (2009).
41. H. Yamashita, K. Voitchovsky, T. Uchihashi, S. Antoranz Contera, J. F. Ryan, and T. Ando, "Dynamics of bacteriorhodopsin 2D crystal observed by high-speed atomic force microscopy", *J. Struct. Biol.* **167**, 153–158 (2009).
42. K. Shinohara, N. Kodera, and T. Ando, "Single-molecule imaging of a micro-Brownian motion of a chiral helical π -conjugated polymer as a molecular spring driven by thermal fluctuations", *Chem. Lett.* **38**, 690–691 (2009).
43. T. Ando, T. Uchihashi, and T. Fukuma, "High-speed atomic force microscopy for nano-visualization of dynamic biomolecular processes", *Prog. Surf. Sci.* **83**, 337–437 (2008).
44. D. Yamamoto, T. Uchihashi, N. Kodera, and T. Ando, "Anisotropic diffusion of point defects in two-dimensional crystal of streptavidin observed by high-speed atomic force microscopy", *Nanotechnology* **19**, 384009 (9 pp) (2008).
45. A. Miyagi, Y. Tsunaka, T. Uchihashi, K. Mayanagi, S. Hirose, K. Morikawa, and T. Ando, "Visualization of intrinsically disordered regions of proteins by high-speed atomic force microscopy", *Chem. Phys. Chem.* **9**, 1859–1866 (2008).
46. T. Fukuma, Y. Okazaki, N. Kodera, T. Uchihashi, and T. Ando, "High resonance frequency force microscope scanner using inertia balance support", *Appl. Phys. Lett.* **92**, 243119 (3 pp) (2008).

47. T. Ando, T. Uchihashi, N. Kodera, D. Yamamoto, M. Taniguchi, A. Miyagi, and H. Yamashita, "High-speed AFM and nano-visualization of biomolecular processes", *Pflügers Archiv -Eur. J. Physiol.* **456**, 211-225 (2008).
48. H. Iwase, H. Choi, M. Akabori, T. Suzuki, S. Yamada, D. Yamamoto and T. Ando, "Fabrication of 3D micro-cantilevers based on MBE-grown strained semiconductor layers", *Physica E: Low-dimensional Systems and Nanostructures* **40**, 2210-2213 (2008).
49. T. Ando, T. Uchihashi, N. Kodera, D. Yamamoto, M. Taniguchi, A. Miyagi, and H. Yamashita, "High-speed atomic force microscopy for observing dynamic biomolecular processes", *J. Mol. Recognit.* **20**, 448-458 (2007).
50. H. Yamashita, T. Uchihashi, N. Kodera, A. Miyagi, D. Yamamoto, T. Ando, "Tip-sample distance control using photo-thermal actuation of a small cantilever for high-speed atomic force microscopy", *Rev. Sci. Instrum.* **78**, 083702 (5 pp) (2007).
51. K. Shinohara, N. Kodera, and T. Ando, "Single molecular imaging of a micro-Brownian motion and a bond scission of a supramolecular chiral π -conjugated", *Chem. Lett.* **36**, 1378-1379 (2007).
52. S. Morita, H. Yamada, and T. Ando, "Japan AFM roadmap 2006", *Nanotechnology* **18**, 08401 (10 pp) (2007).
53. T. Uchihashi, H. Yamashita, and T. Ando, "Fast phase imaging in liquids using a rapid scan atomic force microscope", *Appl. Phys. Lett.* **89**, 213112 (3 pp) (2006).
54. N. Kodera, M. Sakashita, and T. Ando, "Dynamic proportional-integral-differential controller for high-speed atomic force microscopy", *Rev. Sci. Instrum.* **77**, 083704 (7 pp) (2006).
55. H. Koide, T. Kinoshita, Y. Tanaka, S. Tanaka, N. Nagura, G. Meyer zu Hörste, A. Miyagi, and T. Ando, "Identification of the specific IQ motif of myosin V from which calmodulin dissociates in the presence of Ca^{2+} ", *Biochemistry* **45**, 11598-11604 (2006).
56. M. Yokokawa, C. Wada, T. Ando, N. Sakai, A. Yagi, S.H. Yoshimura, and K. Takeyasu, "Fast-scanning atomic force microscopy reveals the ATP/ADP-dependent conformational changes of GroEL", *EMBO J.* **25**, 4567-4576 (2006).
57. M. Yokokawa, S.H. Yoshimura, Y. Naito, T. Ando, A. Yagi, N. Sakai, and K. Takeyasu, "Fast-scanning atomic force microscopy reveals the molecular mechanism of DNA cleavage by ApaI endonuclease", *IEE Proc Nanobiotechnol.* **153**, 60-66 (2006).
58. T. Ando, T. Uchihashi, N. Kodera, A. Miyagi, R. Nakakita, H. Yamashita, and M. Sakashita, "High-speed atomic force microscopy for studying the dynamic behavior of protein molecules at work", *Jpn. J. Appl. Phys.* **45**, 1897-1903 (2006).
59. T. Uchihashi, N. Kodera, H. Itoh, H. Yamashita, and T. Ando, "Feed-forward control for high-speed AFM imaging of biomolecules", *Jpn. J. Appl. Phys.* **45**, 1904-1908 (2006).
60. T. Ando, T. Uchihashi, N. Kodera, A. Miyagi, R. Nakakita, H. Yamashita, and K. Matada, "High-speed AFM for studying the dynamic behavior of protein molecules at work", *e-J. Surf. Sci. Nanotechnol.* **3**, 384-392 (2005).
61. N. Kodera, H. Yamashita, and T. Ando, "Active damping of the scanner for high-speed atomic force microscopy", *Rev. Sci. Instrum.* **76**, 053708 (5 pp) (2005).
62. N. Kodera, T. Kinoshita, T. Ito, and T. Ando, "High-resolution imaging of myosin motor in action by a high-speed atomic force microscope", *Adv. Exp. Med. Biol.* **538**, 119-127 (2003).
63. R. Ishikawa, T. Sakamoto, T. Ando, S. Higashi-Fujime, and K. Kohama, "Polarized actin bundles formed by human fascin-1: Their sliding and disassembly on myosin II and myosin V in vitro", *J. Neurochem.* **87**, 676-685 (2003).

64. T. Ando, N. Kodera, Y. Naito, T. Kinoshita, K. Furuta, and Y.Y. Toyoshima, "A high-speed atomic force microscope for studying biological macromolecules in action", *Chem. Phys. Chem.* **4**, 1196-1202 (2003).
65. T. Ando, N. Kodera, D. Maruyama, E. Takai, K. Saito, and A. Toda, "A High-speed atomic force microscope for studying biological macromolecules in action", *Jpn. J. Appl. Phys.* **41**, 4851-4856 (2002).
66. T. Ando, N. Kodera, E. Takai, D. Maruyama, K. Saito, and A. Toda, "A High-speed atomic force microscope for studying biological macromolecules", *Proc. Natl. Acad. Sci. USA* **98**, 12468-12472 (2001).
67. I. Amitani, T. Sakamoto, and T. Ando, "Link between the enzymatic and mechanical behavior in an actomyosin motor", *Biophys. J.* **80**, 379-397 (2001).
68. T. Sakamoto, I. Amitani, E. Yokota, and T. Ando, "Direct observation of processive movement by individual myosin V molecules", *Biochem. Biophys. Res. Commun.* **272**, 586-590 (2000).
69. K. Adachi, Kinoshita, K. Jr., and T. Ando, "Single-fluorophore imaging with an unmodified epifluorescence and conventional video camera", *J. Microscopy* **195**, 125-132 (1999).
70. H. Nakajima, Y. Kunioka, K. Nakano, K. Shimizu, M. Seto, and T. Ando, "Scanning force microscopy of the interaction events between a single molecule of heavy meromyosin and actin", *Biochem. Biophys. Res. Commun.* **234**, 178-182 (1997).
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78. T. Ando and D. Scales, "Skeletal muscle myosin subfragment-1 induces bundle formation by actin filaments", *J. Biol. Chem.* **260**, 2321-2327 (1985).
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80. T. P. Burghardt, T. Ando, and J. Borejdo, "Evidence for cross-bridge order in contraction of glycerinated skeletal muscle", *Proc. Natl. Acad. Sci. USA* **80**, 7515-7519 (1983).
81. T. Ando and J. A. Duke, "The process in which nucleotide is buried into the active site of heavy meromyosin", *Biochem. Biophys. Res. Commun.* **115**, 312-316 (1983).
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87. T. Ando and H. Asai, "Conformational change in actin filament induced by the interaction with heavy meromyosin: Effects of pH, tropomyosin and deoxy-ATP", *J. Mol. Biol.* **129**, 265-278 (1979).
88. T. Ando and H. Asai, "The effects of solvent viscosity on the kinetic parameters of myosin and heavy meromyosin ATPase", *J. Bioenerg.* **9**, 283-288 (1977).
89. H. Asai and T. Ando, "Fluorescence correlation spectroscopy illuminated by standing exciting light waves", *J. Phys. Soc. Jpn.* **40**, 1527-1528 (1976).
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Book Chapters

1. T. Ando, T. Uchihashi, "High-speed AFM and Imaging of Biomolecular Processes", pp. 713-742 in *Nanoscale Liquid Interfaces: Wetting, Patterning, and Force Microscopy at the Molecular Scale*, Thierry Ondarçuhu and Jean-Pierre Aimé, Eds., Pan Stanford Publishing (2013).
2. T. Uchihashi, N. Kodera, T. Ando, "Nanovisualization of proteins in action using high-speed AFM", pp 119-147, in *Single-molecule Studies of Proteins. Biophysics for the Life Sciences Vol 2*, Andres Oberhauser, Ed., Springer (2013).
3. T. Ando, N. Kodera, "Visualization of mobility of atomic force microscopy", pp. 57-69 in "*Springer series Methods in Molecular Biology*, vol. 897, part 1 "*Experimental Tools for the Intrinsically Disordered Protein Analysis*", Vladimir N. Uversky and A. Keith Dunker, Eds., Springer (2012).
4. T. Ando, "Techniques for developing high-speed AFM" in "*Control Technologies for Emerging Micro and Nanoscale Systems*" (*Lecture Notes in Control and Information Sciences*, Vol. 413), Eleftheriou Evangelos and S.O. Reza Moheimani, Eds., Springer, (2011).
5. T. Ando, T. Uchihashi, N. Kodera, M. Shibata, D. Yamamoto, H. Yamashita, "High-speed AFM for observing dynamic processes in liquid" in "*Atomic force microscopy in liquid*", pp. 189-210, Arturo M Baró and Donald Refenberger, Eds., Wiley-VCH Verlag GmbH (2011).
6. T. Uchihashi, T. Ando, "High-speed atomic force microscopy for dynamic biological imaging", pp. 163-184 in "*Life at the Nanoscale - Atomic force microscopy of live cells*", Yves Dufréne Ed., Pan Stanford Publishing Pte. (2011).

7. T. Uchihashi, T. Ando, "High-speed Atomic Force Microscopy and Biomolecular Processes", pp. 285-300 in *"Atomic force microscopy in biomedical research: Methods and Protocols"*, Pier C. Braga and Davide Ricci, Eds., Humana Press (2011).
8. T. Ando, T. Uchihashi, "High-speed atomic force microscopy", pp. 487-523 in *"Handbook of Single-Molecule Biophysics"*, Peter Hinterdorfer and Antoine van Oijen, Eds., Springer-Verlag (2009).
9. T. Ando, T. Uchihashi, N. Kodera, D. Yamamoto, M. Taniguchi, A. Miyagi, H. Yamashita, "High-speed atomic force microscopy for nano-visualization of biomolecular processes", pp. 277-296 in *"Single Molecule Dynamics in Life Science"*, T. Yanagida and Yoshiharu Ishii, Eds., Wiley-VCH (2008).
10. T. Ando, "High-speed SPM", pp. 109-116 in *Roadmap of Scanning Probe Microscopy*, Seizo Morita, Ed., Springer-Verlag (2006).

Invited Talks (International & Oversea Meetings)

1. T. Ando, Plenary talk "High-speed atomic force microscopy for nano-visualization of dynamic processes", Satellite Symposium of NC-AFM 2014 on Nano Mechanics for Green Innovation and Life Sciences (Tsukuba International Congress Center, August 4, 2014).
2. T. Ando, "Filming biomolecules in action by high-speed AFM", Gordon Research Conference 2014 - Single molecule approaches to biology - (Renaissance Tuscany Il Ciocco Resort Lucca (Barga), Italy, July 13-18, 2014).
3. T. Ando, "High-speed atomic force microscopy", NanoKorea 2014 (Coex, Seoul, Korea, July 2-4).
4. T. Ando, "High-speed AFM - Its current state and prospects", ISPM 2014 (Sogang University, Seoul, Korea, June 30-July 3).
5. T. Ando, Plenary talk "Mechanism of energy conversion in walking myosin V revealed by high-speed AFM imaging", "From solid state to Biophysics" VII International Conference (Cavtat, Croatia, June 8-13, 2014).
6. T. Ando, "Filming dynamic molecular and cellular processes by high-speed atomic force microscopy", UCSF/Mission Bay Seminar (San Francisco, USA, April 24, 2014).
7. T. Ando, "High-speed atomic force microscopy for observing nano-scale dynamic events in liquids", 2014 MRS Spring Meeting: Advances in scanning probe microscopy for material properties (San Francisco, USA, April 21-25, 2014).
8. T. Ando, "The development of high-speed AFM: A curious journey of a scientist", Campus seminar at the Max Planck Institute for Biophysical Chemistry in Göttingen" (Göttingen, Germany, March 19, 2014).
9. T. Ando, "Filming biomolecular and cellular processes by high-speed AFM", Euro AFM Forum 2014 (Göttingen, Germany, March 17-19, 2014).
10. T. Ando, "High-speed atomic force microscopy that captures dynamic molecular and cellular processes on video", Kitasato Joint Meeting 2014 "Molecular Control of Cellular Function: Seeing, Thinking, and Believing" (Kitasato University School of Pharmacy, Tokyo, Feb. 21, 2014).
11. T. Ando, "High-speed AFM for filming biomolecular and cellular processes", 2014 RNBI Winter School (Hula Valley, Israel, Feb. 9-14, 2014).

12. T. Ando, "High-speed AFM: Technical progress and application to myosin V", XVI. Linz Winter Workshop (Linz, Austria, Jan. 30-Feb.3, 2014).
13. T. Ando, T. Uchihashi, and N. Kodera, Plenary Lecture "High-speed atomic force microscopy filming dynamic biomolecular processes", ACSIN12 & ICSPM21 (Tsukuba International Congress Center, Tsukuba, Japan, Nov. 5-8, 2013).
14. T. Ando, "High-speed atomic force microscopy that captures dynamic molecular and cellular processes on video", Univ. of Basel, Center for Molecular Life Sciences Seminar (Basel, Switzerland, Oct. 15, 2013).
15. T. Ando, "Video imaging of molecular and cellular processes by high-speed atomic force microscopy", Karolinska Institute CMB/LICR Seminar (JSPS-KVA Program) (Stockholm, Sweden, Oct. 10, 2013).
16. T. Ando, "The development of high-speed atomic force microscopy", KTH Royal Institute of Technology Applied Physics Seminar (JSPS-KVA Program) (Stockholm, Sweden, Oct. 10, 2013).
17. T. Ando, "High-speed atomic force microscopy", Symposium on "Nanoscale 3D tomography, time-resolved imaging and dynamic characterization of nanostructured materials and devices" at 2013 JSAP-MRS Joint Symposia (Doshisha Univ. Shintanabe campus, Sept. 16-20, 2013).
18. T. Ando, "High-speed AFM for filming dynamic biological processes", Archie Howie Symposium at EMAG-2013 (Univ. of York, UK, Sept. 4-6, 2013).
19. T. Ando, "Video imaging of dynamic molecule and cellular processes by high-speed AFM", Zhejiang University School of Medicine Seminar (Hangzhou, China, Aug. 24, 2013).
20. T. Ando, "Video imaging of dynamic molecular and cellular processes by high-speed atomic force microscopy", Cold Spring Harbor Asia Conference on "New Advances in Optical Imaging of Live Cells and Organisms" (Suzhou, China, Aug. 20-23, 2013).
21. T. Ando, Keynote speech "Applications of high-speed atomic force microscopy", XX International Summer School "Nicolas Cabrera", Biomolecules and Single Molecule Techniques (Residencia "La Cristalera", Miraflores de la Sierra, Madrid, Spain, July 21-26, 2013).
22. T. Ando, Keynote speech "Development of high-speed atomic force microscopy", XX International Summer School "Nicolas Cabrera", Biomolecules and Single Molecule Techniques (Residencia "La Cristalera", Miraflores de la Sierra, Madrid, Spain, July 21-26, 2013).
23. T. Ando, "High-speed atomic force microscopy for biology", ISPM 2013 (Dijon, France, July 1-4, 2013).
24. T. Ando, Plenary talk "Filming dynamic processes by high-speed AFM", UK-SPM 2013 (Leeds, UK, June 26-27, 2013).
25. T. Ando, "Progress of high-speed AFM technology", 5th AFM BioMed Conference (Shanghai, China, May 7-11, 2013).
26. T. Ando, "Protein molecules in action filmed by high-speed atomic force microscopy", 38th Lorne Conference on Protein Structure and Function (Lorne, Victoria, Australia, Feb. 10-14, 2013).
27. T. Ando, "Filming dynamic processes of proteins by high-speed AFM", 57th Annual Meeting of Biophysical Society: Workshop-4 Time-resolved AFM of Biological Systems (Philadelphia, USA, Feb. 2-6, 2013).
28. T. Ando, Keynote lecture "High-speed atomic force microscopy filming protein molecules in

- action", 1st Bioscience and Biotechnology International Symposium on "Biomolecular Assemblies from Nano to Micro"(Suzake Hall, Suzukakedai campus, Tokyo Institute of Technology, Jan. 30, 2013).
29. T. Ando "Dissecting dynamic IDP structure by high-speed AFM imaging", 2nd International Symposium on Intrinsically Disordered Proteins (RIKEN Yokohama Institute, Jan. 23-24, 2013).
 30. T. Ando "High-speed atomic force microscopy capable of filming dynamic processes in biomolecule self-assembly", 2012 MRS Fall Meeting Symposium "Fundamentals of self-assembly of biomolecular and biomimetic systems (Boston, Nov. 26-30, 2012).
 31. M. Shibata, T. Uchihashi, J. Nishiyama, T. Ando, and R. Yasuda, "Development of high-speed atomic force microscopy for imaging of cultured hippocampal neurons", 3rd Kanazawa Bio-AFM Workshop (Kanazawa, Nov.5-8, 2012).
 32. T. Ando, "High-speed atomic force microscopy: Nanoscale visualization of dynamic biomolecular processes", Keynote speech for NanoDay@Penn (Univ. of Pennsylvania, Philadelphia, USA, Oct. 24, 2012).
 33. T. Ando & N. Kodera, "High-speed AFM and mechanochemical coupling in walking myosin V", UK-Japan symposium for mechanochemical cell biology (Scarman House, Univ. of Warwick, Aug. 23-34, 2012).
 34. T. Ando, "High-speed atomic force microscopy for recording dynamics of biomolecules", International Conference of Nanoscience + Technology (Sorbonne, Paris, France, July 23-27, 2012).
 35. T. Ando, Keynote Lecture "High-speed atomic force microscopy for filming biological dynamics", Seeing at the nanoscale conference 2012 (University of Bristol, UK, July 9-11, 2012).
 36. T. Ando, T. Uchihashi, and N. Kodera, "High-speed atomic force microscopy for biology", International Scanning Probe Microscopy Conference (Toronto, Canada, June 15-18, 2012).
 37. T. Ando, "High-speed atomic force microscopy coming of age", NUANCE-BRUKER International Symposium on Scanning Probe Microscopy for Energy Application and Quantitative Nano-Biomechanics (Northwestern University, Evanston, USA, Apr. 5, 2012).
 38. T. Ando, "Nanoscale video imaging of proteins in action by high-speed AFM", ABRF 2012 (Orland, Florida, USA, March 17-20, 2012).
 39. T. Ando, "Current state of high-speed AFM: its advantages & limitations", 6th international conference on Structural Analysis of Supramolecular Assemblies by Hybrid Methods (Lake Tahoe, CA, USA, March 14-18, 2012).
 40. T. Ando, N. Kodera, T. Uchihashi, "High-speed Atomic Force Microscopy coming of age", 19th International Colloquium of Scanning Probe Microscopy (Lake Toya, Hokkaido, Japan, Dec. 19-21, 2011).
 41. T. Ando, "High-speed atomic force microscopy for filming biomolecular processes", AVS 58th Annual International Symposium, Applied Surface Science Div., Advances in Scanning Probe Microscopy (Nashville, TN, USA, Oct. 30 - Nov. 4, 2011).
 42. T. Ando, "High-speed bio-AFM coming of age", 4th AFM BioMed Conference (Institut Curie, Paris, 23-27 Aug., 2011).
 43. T. Ando, "Direct observation of molecular machines by high-speed atomic force microscopy", 25th Anniversary Symposium of Protein Society, Molecular machines (Boston, MA, USA, 23-27 July 2011).

44. T. Ando, "Motor proteins in action filmed by high-speed AFM", Gordon Research Conference on Muscle and Molecular Motors (New London, NH, USA, 10-15 July 2011).
45. T. Ando, "Direct and dynamic visualization of protein molecules in action by high-speed AFM", European Science Foundation Research Conference on Biological Surfaces And Interfaces (Sant Feliu de Guixols, Spain, 26 June - 1 July 2011).
46. T. Ando, "Dynamic imaging of protein molecules in action by high-speed atomic force microscopy", 5th IUMAS & ALC'11 Conference (Olympic Parktel, Seoul, Korea, May 23-27, 2011).
47. T. Ando, "Direct visualization of walking myosin V molecules by high-speed atomic force microscopy", Motility Subgroup Symposium at Biophysical Society 55th Annual Meeting (Baltimore, Maryland, March 5, 2011).
48. T. Ando, T. Uchihashi, and N. Kodeara, "Dynamic processes of proteins filmed by high-speed AFM", XIII Linz Winter Workshop (Linz, Austria, Feb. 4-7, 2011)
49. T. Ando, Plenary talk "Video imaging of biomolecular processes by high-speed AFM", IEEE MEMS2011 Conference: The 24th International Conference on Micro Electro Mechanical Systems (Cancun, Mexico, Jan. 23-27, 2011).
50. T. Ando, "High-speed atomic force microscopy and nano-visualization of dynamic processes and structural changes of proteins", 3rd International Symposium on Atomically Controlled Fabrication Technology (Osaka Univ. Nakanoshima Center, Nov. 25-26, 2010).
51. Toshio Ando, "Direct imaging of dynamic biomolecular processes by high-speed AFM", International Symposium on Protein structure and dynamics; from molecules to assembly (Nagoya Univ., Nov. 23-24, 2010).
52. T. Ando, "Dynamic imaging of biomolecular processes by high-speed AFM", Recent Advances and Future Prospects for Visualizing Macromolecular Complexes and Cellular Structures (NIH, Bethesda, USA, Oct. 12-13, 2010).
53. T. Ando, "High-speed AFM imaging of intrinsically disordered proteins", IRB Barcelona BioMed Conference" on "Intrinsically Disordered Proteins in Biomedicine" (Barcelona, Spain, Oct. 4-6, 2010).
54. Toshio Ando, "Visualization of intrinsically disordered regions of proteins by high-speed atomic force microscopy", Gordon Research Conference "Intrinsically Disordered Proteins" (Davidson College, Charlotte, North Carolina, USA, July 11-15, 2010).
55. T. Ando, "Dynamic visualization of protein molecules in action by high-speed AFM", Seminar at the London Center for Nanotechnology (LCN, University College London, July 2, 2010).
56. T. Ando, Plenary Lecture "Dynamic visualization of protein molecules in action by high-speed AFM", UK-SPM 2010 (ExCel, London, June 30-July 1, 2010).
57. T. Ando, "High-speed AFM and visualization of biomolecular processes", From Solid-state Physics to Biophysics V (Cavtat, Croatia, June 12-19, 2010).
58. Toshio Ando, "Walking mechanism of myosin V revealed by high-speed AFM imaging", XII Linz Winter Workshop (Linz, Austria, Feb. 5-8, 2010).
59. Toshio Ando, "Instrumentation of high-speed AFM and dynamic imaging of motor protein myosin V", University of Nebraska Medical Center Seminar (Omaha, USA, Jan. 8, 2010).
60. T. Ando, Keynote Speech "High-speed AFM for dynamic visualization of biomolecular processes", Workshop on dynamics and control of micro and nanoscale systems (IBM Research Institute, Zurich, Rüschlikon, Switzerland, Dec. 10-11, 2009).

61. T. Ando, "High-speed AFM for dynamic visualization of biomolecular processes", The American Society for Cell Biology 49th Annual Meeting Symposium "Breaking Diffraction Barrier" (San Diego, Dec. 9, 2009).
62. T. Ando, "High-speed AFM instrumentation and study on the walking mechanism of myosin V", Three Seminars in France (Univ. of Montpellier, Sep. 21; Univ. of Bourgogne, Sep. 25; Institute Curie, Sep. 28, 2009).
63. T. Ando, "High-speed atomic force microscopy for visualizing dynamic biomolecular processes", Symposium in the International Congress of Physiological Sciences, "Challenges in the Integration of Multiscale Biomechanical Systems" (Kyoto, Japan, July 30, 2009).
64. T. Ando, "High-speed atomic force microscopy and direct visualization of biomolecular processes", 5th International Symposium on Scanning Probe Spectroscopy and Related Methods (Poznan (Wasowo), Poland, July 19-22, 2009).
65. T. Ando, "Direct visualization of biomolecular processes by high-speed atomic force microscopy", 4th Asian and Pacific Rim Symposium on Biophotonics (Jeju, South Korea, May 27-29, 2009).
66. T. Ando, Keynote Speech "High-speed atomic force microscopy and direct visualization of biomolecular processes", 24th New Zealand Conference on Microscopy (Rotorua, New Zealand, Feb. 10-13, 2009).
67. T. Ando, "Dynamics in bacteriorhodopsin captured by high-speed AFM", XIth Linz Winter Workshop (Linz, Austria, Feb. 6-9, 2009).
68. T. Ando, "Visualization of biomolecular processes by high-speed atomic force microscopy", 2nd International Seminar on Nanosciences and Nanotechnologies (Havana, Cuba, Nov. 13-17, 2008).
69. T. Ando, T. Uchihashi, D. Yamamoto, and N. Kodera, "High-speed AFM and nano-visualization of dynamic biomolecular processes", 4th Vacuum and Surface Sciences Conference of Asia and Australia (VASSCAA-4) (Matsue, Japan, Oct. 29-31, 2008).
70. T. Ando, "Nano-visualization of dynamic biomolecular processes by high-speed atomic force microscopy", Gordon Research Conference on Single Molecule Approaches to Biology (Colby-Sawyer College, New Hampshire, Aug. 17-22, 2008).
71. T. Ando, Keynote speech "Dynamic biomolecular processes revealed by high-speed AFM", Seeing at the Nanoscale VI (Berlin, July 9-11, 2008).
72. T. Ando, T. Uchihashi, N. Kodera, H. Yamashita, and N. Takahashi, "Control techniques in high-speed atomic force microscopy", American Control Conference (Seattle, June 11-13, 2008).
73. T. Ando, Plenary talk "High-speed AFM and video shooting of dynamic biomolecular processes", Focus on Microscopy 2008 (Osaka-Awajishima, Apr. 13-16, 2008).
74. T. Ando, "High-speed AFM for studying dynamic biomolecular processes", American Physics March Meeting: Symposium on High Bandwidth Dynamic Atomic Force Microscopy (New Orleans, March 10-14, 2008).
75. T. Ando, "Visualization of dynamic biomolecular processes by high-speed AFM", Xth Linz Winter Workshop (Linz, Austria, Feb. 15-18, 2008).
76. T. Ando, "High-speed atomic force microscopy for visualizing biomolecular processes", 9th International Conference on Atomically Controlled Surfaces, Interfaces and Nanostructures (Tokyo, Japan, Nov. 11-15, 2007).
77. T. Ando, "Dynamic Biomolecular processes dissected by high-speed AFM", Atomic Level Characterization '07 International Conference (Kanazawa, Japan, October 28-Nov. 2, 2007).

78. T. Ando, "High-speed AFM for visualizing biomolecular processes", 6th International Workshop on Scanning Probe Microscopy in Life Sciences (Berlin, Germany, Oct. 9, 2007).
79. T. Ando, "Development of high-speed atomic force microscope for studying biological macromolecule", 13th International Conference on Surface Science (ICSS-13), International Conference on Nanoscience and Technology 2007 (ICN+T 2007) (Stockholm, Sweden, July 2-6, 2007).
80. T. Ando, "High-speed atomic force microscopy for visualizing dynamic biomolecular processes", International Scanning Probe Microscopy Conference (Jeju, Korea, June 11-14, 2007).
81. T. Ando, "Dynamic behaviors of proteins at work captured by high-speed atomic force microscopy", AFM BioMed Conference 2007 (Barcelona, Spain, Apr. 19-21, 2007).
82. T. Ando, "Protein dynamics captured by high-speed AFM", IXth Linz Winter Workshop (Linz, Austria, Feb. 3-5, 2007).
83. T. Ando, "Instrumentation of high-speed AFM and observation of protein dynamics", 1st Kanazawa Workshop on Atomic Force Microscopy (Kanazawa, Jan. 16-18, 2007).
84. T. Ando, "Rapid scan atomic force microscopy", 9th International Conference on Non-contact Atomic Force Microscopy (Kobe, July 16-20, 2006).
85. T. Ando, "High-speed AFM and its potential to explore nano-biology", Symposium "Single Molecule Biology" at the 20th IUBMB International Congress of Biochemistry and Molecular Biology (Kyoto, June 19, 2006).
86. T. Ando, "High-speed AFM", SPM 2006 Conference (Scanning Probe Microscopy, Sensors & Nanostructures) (Montpellier-La Grande Motte, France, June 3-6, 2006).
87. T. Ando, "Rapid scan atomic force microscopy", Okinawa Institute Science & Technology International Workshop on "Single Molecule Analysis" (Bankoku Shinryokan, Okinawa, Japan, Apr. 16-22, 2006).
88. T. Ando, "High-speed AFM for studying the dynamic behavior of protein at work", International Symposium of Surface Science and Nanotechnology 4 (the Omiya Sonic Center, Omiya, Japan, Nov. 14-17, 2005).
89. T. Ando, "High-speed AFM and its potential to explore nano-biology", International Conference "Seeing at the Nanoscale III" (UC Santa Barbara, Aug. 13-16, 2005).
90. T. Ando, Plenary talk "High-speed AFM for studying the dynamic behavior of protein molecules at work", STM '05 (13th International Conference on Scanning Tunneling Microscopy/Spectroscopy and Related Techniques (Sapporo, Japan, July, 2005).
91. T. Ando, "Dynamic behavior of myosin V and reconstructed HMM studied by single molecule assay and high-speed AFM", Symposium "Muscle Contraction and Cell Movement" (University of Colima, Colima, Manzanillo, Mexico, Jan. 20-26, 2005).
92. T. Ando, "High-speed atomic force microscopy", Oxford-Kobe Seminar: UK-Japan Collaborations in Bionanotechnology (Kobe Institute, Kobe, July 1-3, 2004).
93. T. Ando, "High-speed atomic force microscopy for viewing protein molecules at work", MIT Seminar (Mechanical/Biological Engineering) (Boston, Feb. 20, 2004).
94. T. Ando, Nanometer-scale dynamic behavior of motor proteins revealed by high-speed AFM", 19th International Symposium in Conjunction with Award of the International Prize for Biology (Nara, Japan, Dece. 3-4, 2003).
95. T. Ando, "Motor proteins at work imaged by high-speed atomic force microscopy", World Congress on Medical Physics and Biomedical Engineering (Sydney, Aug. 28, 2003).

96. T. Ando, "A high-speed atomic force microscope for studying biological macromolecules in action", Vth Annual Linz Winter Workshop on Single Molecule Techniques in Biophysics and Drug Discovery (Linz, Feb. 21, 2003).
97. T. Ando, Plenary talk "High-speed atomic force microscope for studying biological macromolecules in action", European Medical & Biological Engineering Conference (Vienna, Dec., 2002).
98. T. Ando and N. Kodera, "A high-speed atomic force microscope for studying biological macromolecules in action", Fujiwara Seminar (Hakone, Oct. 26-30, 2002).
99. T. Ando, "A high-speed atomic force microscope for studying biological macromolecules in action", Kazusa DNA Institute International Symposium (Chiba, Japan, Feb. 18-19, 2002).
100. T. Ando, "A High-speed atomic force microscope for studying biological macromolecules in action", International Workshop on Genetic Materials as a Target of Nanotechnology (Osaka, Dec. 21, 2001).
101. T. Ando, "A high-speed atomic force microscope for studying biological macromolecules in action", The 9th International Colloquium on Scanning Probe Microscopy (Atagawa, Japan, Dec. 6-8, 2001).