

I. Curriculum Vitae

Metin Sitti

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Objective

Desire a tenure-track faculty position in the field of Mechanical Engineering, specializing in micro/nano-mechatronics.

Research Interests

Micro/nano-mechatronics with focus on micro/nanomanipulation, biomimetic micro/nano-robotic system design, analysis, manufacturing and control, medicine microrobots, micro/nano-electromechanical systems, nanotribology, and bio-nanotechnology.

Education

- **University of Tokyo**, Tokyo, Japan, **Ph.D./Dr.Eng.** in Electrical Engineering, September 1999.
Supervisor: Prof. Hideki Hashimoto
Thesis Title: Teleoperated 2-D Micro/Nanomanipulation Using Atomic Force Microscope.
Thesis Committee: Hideki Hashimoto, Fumio Harashima, Hiroyuki Fujita, Yasuhiko Arakawa, Yoichi Hori, and Katsushi Ikeuchi.
Keywords: Micro/Nanorobotics, Scanning Probe Microscopy, Tele-Robotics, Virtual Reality User Interfaces, Haptic Devices, Precision Positioning and Design, MEMS Microprobes.
- **Bogazici University**, Istanbul, Turkey, **M.Sc.** in Electrical and Electronics Engineering, September 1994.
Supervisor: Prof. Isil Bozma and Prof. Ahmet Denker
Thesis Title: Visual Tracking: An Integration of Control and Vision
Keywords: Visual Servoing, Robot Control, Computer Vision.
- **Bogazici University**, Istanbul, Turkey, **B.Sc.** in Electrical and Electronics Engineering, July 1992.
- **Bogazici University**, Istanbul, Turkey, **B.Sc.** in Physics, July 1992.

Professional Experience

- 1999- present: **Visiting Scientist** at the University of California at Berkeley, Department of Electrical Engineering and Computer Science, Robotics Laboratory, Berkeley, CA.
- 1996-1999: **Research Assistant** at the University of Tokyo, Institute of Industrial Science, Intelligent Mechatronics Laboratory, Tokyo, Japan.
- 1994-1996: **Research Engineer** at TUBITAK (Turkish Scientific and Technical Research Council) Marmara Research Center, CAD/CAM Robotics Department, Gebze, Kocaeli, Turkey.
- 1992-1994: **Teaching Assistant** at the Bogazici University, Physics Dept., Istanbul, Turkey.

Honors and Awards

- 2001: Best Student Paper Nomination in the IEEE Robotics and Automation Conference (ICRA'01) for the research paper entitled, "Development of a Scaled Teleoperation System for Nano Scale Interaction and Manipulation" (Six papers are nominated out of around submitted 1200 papers).
- 2000: Best Paper Nomination in the IEEE Robotics and Automation Conference (ICRA'00) for the research paper entitled, "Wing Transmission for a Micromechanical Flying Insect" (Five papers are nominated out of around submitted 1100 papers).
- 1998: Nakamura Best Outstanding Paper Award in the IEEE/RSJ Intelligent Robot Systems Conference (IROS'98) for the research paper entitled, "Tele-Nanorobotics using Atomic Force Microscope".
- 1998: Japanese Science Promotion Society (JSPS) Fellowship as a visiting researcher to CNRS, France, for excellent academic achievement.
- 1998: Monbusho (Japanese Ministry of Education) Outstanding Research Grant for excellent research achievement (around \$500,000).
- 1996-1999: Monbusho Research Fellowship during all Ph.D. education from the Japanese government.
- 1989-1994: Education Fellowship from TELETAS Inc. for excellent academic achievement.
- 1987: Ranked 99th from around 1,000,000 students at the National University Entrance Exam in Turkey.

Research Grants

- February 1998: *Visiting Researcher* in CNRS, Institute of Microsystems, University of France-Comte, Besancon, France.
- July 1998: Conference attendance grant from C&C, NEC Co., for the IEEE ISIE'98 conference.
- April 1998: Conference attendance grant from the Engineering Faculty of Univ. of Tokyo, for the IEEE-SMC conference.
- July 1995: Conference attendance grant from TUBITAK for IEEE ISIE'95 conference.

Scientific Activities

- **Program Committee Member** at the IEEE Conference on Nanotechnology, Oct. 2001, International Conference on Industrial Electronics, Technology & Automation, Dec. 2001.
- **Invited Talks** in IEEE ICRA'01 conference related to bio-nanotechnology, and MHS'99 related to nanomanipulation.
- **Organizer, chair and presenter** of the IEEE/ASME Advanced Intelligent Mechatronics Conference, *Micro/Nano Manipulation* Invited Session, Atlanta, USA, 21 Sept. 1999.
- **Organizer, chair and presenter** of the IEEE Conference on Nanotechnology, *Nanorobotics and Nanomanipulation* Special Session, Maui, Hawaii, USA, Oct. 2001.
- **Organizer, chair and presenter** of the IEEE/ASME Advanced Intelligent Mechatronics Conference, *Micro/Nano Mechatronics for Nanotechnology* Tutorial, Atlanta, 9 Sept. 1999.
- **Reviewer** for the *IEEE/ASME Trans. on Mechatronics* and *Journal of Micromechatronics* journals.
- **Conference Presentations:** ICRA'99-'00-'01, IROS'98-'99, STM'99, AIM'99, MHS'98-'99, etc.

Society Memberships

- Institute of Electrical and Electronics Engineers (IEEE)
- Robotics Society of Japan (RSJ)
- American Association for the Advancement of Science (AAAS)

Software Knowledge

Programming Languages: C, OpenGL, X11, Parallel C, Pascal, Fortran.
Operating Systems: UNIX, Windows, Windows NT, Linux, DOS, Inventor.
Symbolic Programming: Mathematica, Matlab 5.0, Reduce.
Packages: Matlab/Simulink, Solid Works (CAD Design), Light Year 3D Lithography Machine Software, Explorer, Image Lib, etc.

Experienced Devices

Atomic Force Microscope: JEOL Co., Molecular Imaging Inc., and self-made Atomic Force Microscopes.
3D Laser Lithography Machine: SLA-500, 3D rapid prototyping machine using polymer material, 3D Systems Inc.
Rapid Prototyping Machine: 3D rapid prototyping machine using inkjet vax, 3D Systems Inc.
Laser Micromachining Device: 2D microcutting machine, New Wave Quiklaze Inc.
MEMS Fabrication Devices: University of California, Berkeley Sensors and Actuators Center (BSAC) Microlab utility devices for MEMS fabrication.
Industrial Robot Manipulator: 6 DOF, anthropomorphic industrial robot, Manutec, Siemens Inc.
Haptic Devices: 3 DOF Phantom haptic device, self-made haptic devices, Sensor Glove, Sensor Arm, etc.
Image Processing Hardware: Matrox frame grabber, TMS320C40 DSP, etc.

Languages

English (fluent), Japanese (fluent), German (poor).

II. References

1. Prof. Ronald S. Fearing (Present host professor)
Address: University of California at Berkeley, Department of EE&CS, 265M Cory Hall, Berkeley, CA 94720-1770, USA
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2. Prof. Hideki Hashimoto (PhD supervisor)
Address: Institute of Industrial Science, University of Tokyo, 3rd Dept., 4-6-1 Komaba, Meguro-ku, Tokyo 153-8505, Japan
Tel: +81-3-3479-2766
Fax: +81-3-3423-1484
E-Mail: hashimoto@iis.u-tokyo.ac.jp
3. Prof. Hiroyuki Fujita (My PhD thesis committee member and project collaborator related to MEMS and micromechatronics)
Address: CIRMM, Institute of Industrial Science, The University of Tokyo, 4-6-1 Komaba, Meguro-ku, Tokyo 153-8505, Japan
Tel/Fax: +81-3-5452-6248
E-Mail: h.fujita@ieee.org (fujita@iis.u-tokyo.ac.jp)
4. Prof. Toshio Fukuda (Previous IEEE Robotics and Automation Society president, from IEEE conferences and collaboration related to micro/nano-mechatronics)
Address: Center for Cooperative Research in Advanced Science and Technology, Nagoya University, Furo-cho, Chikusa-ku, Nagoya 464-8603, Japan
Tel: +81-52-789-4478
Fax: +81-52-789-3115
E-Mail: fukuda@mein.nagoya-u.ac.jp
5. Prof. Paolo Dario (Current IEEE Robotics and Automation Society president, from IEEE conferences and collaboration related to micro/nano-mechatronics)
Address: ARTS Lab/MiTech Lab, Scuola Superiore Sant'Anna, 56127 Pisa, Italy, Via Carducci, 40
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6. Prof. Michael H. Dickinson (Project collaborator in Micromechanical Flying Insect project)
Address: University of California at Berkeley, Department of Integrative Biology, 3060 Valley Life Sciences Building #3140, Berkeley, CA 94720-3140, USA
Tel: +1-510-643-2579
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E-Mail: flymanmd@socrates.berkeley.edu
7. Prof. Timothy D. Sands (Project Collaborator in Micromechanical Flying Insect project)
Address: University of California at Berkeley, Department of Materials Science & Engineering, 59 Evans Hall, Berkeley CA 94720-1760, USA
Tel: +1-510-642-2347
E-Mail: sands@uclink4.berkeley.edu
8. Prof. Isil H. Bozma (M.Sc. Supervisor)
Address: Bogazici University, Department of Electrical and Electronics Engineering, Bebek, 80815 Istanbul, Turkey
Tel: +90-212-263-1540 ext. 1414
E-Mail: bozma@boun.edu.tr

III. Attended Projects

1999-...: Micromechanical Flying Insect Project

- **Aim:** Using biomimetic insect flight mechanism principles to design, fabricate and control the flying micromechanical insect robot with exceptional flight performance, and real fly size.
- **Project Team:** Robotics Laboratory (Prof. Ronald S. Fearing and Prof. Shankar Sastry), MEMS Laboratory (Prof. Kris Pister), Material Science and Engineering Department (Prof. Timothy D. Sands), Integrative Biology Department (Prof. Michael H. Dickinson), and Department of Mechanical Engineering (Prof. Dorian Liepmann) at the University of California, Berkeley.
- **Keywords:** Biomimetic Robotics, Insect Aerodynamics, Micromechatronics, Laser Micro-machining, MEMS, Smart Sensors, Actuators and Control, Rapid Prototyping, Microassembly, Distributed Intelligent Systems, Hybrid System Control, Virtual Simulator.
- **My Contribution:** Design, analysis, fabrication, characterization and control of the micromechanical wing mechanisms and PZT-5H and PZN-PT based unimorph actuators.
- **Milestone Publication:**
Michael H. Dickinson, Fritz-Olaf Lehmann, and Sanjay P. Sane, "Wing Rotation and the Aerodynamic Basis of Insect Flight", *Science*, vol. 284, no. 5422, pp. 1956-1960, 18 June 1999.

2000-...: Gecko Foot-Hair Project

- **Aim:** Understanding the mechanism of the gecko foot-hair sticking to surfaces for fabricating novel adhesives, and constructing wall-climbing robots in all environments.
- **Project Team:** Robotics Laboratory (Prof. Ronald S. Fearing) and Integrative Biology Department (Prof. Robert J. Full) at the University of California at Berkeley, Mechanical Engineering Department (Prof. Tom Kenny) at the Stanford University, and Department of Biology (Prof. Keller Autumn) at Lewis and Clark College.
- **Keywords:** Biomimetic Robotics, Nanotechnology, Polymer Nanofabrication, Bio-MEMS, Smart Sensors, Actuators and Control, Scanning Probe Microscopy.
- **My Contribution:** Design, analysis and characterization of the gecko foot-hair sticking using nano scale force modeling and Atomic Force Microscopy, and fabrication of the artificial gecko hairs using the polymer nanofabrication techniques such as nano-imprinting.
- **Milestone Publication:**
K. Autumn, Y. Liang, T. Hsieh, W. Zesch, W.-P. Chan, T. Kenny, R. Fearing, and R.J. Full, "Adhesive force of a single gecko foot-hair," *Nature*, vol. 405, pp. 681-685, June 8, 2000.

1998-2000: Tele-Nanorobotics Project

- **Aim:** Development of the Atomic Force Microscopy, tele-robotics, and advanced human-machine user interface technologies for micro/nano-robotic applications, i.e. micro/nano manipulation, observation, and fabrication of 2D micro/nano objects and materials for micro/nanotechnology, material science, and bioengineering applications.
- **Project Team:** JEOL Co., Intelligent Mechatronics Laboratory (Prof. Fumio Harashima and Prof. Hideki Hashimoto), and Laboratory for Integrated Micro-Mechatronic Systems (LIMMS, Dr. Moussa Hoummady, Prof. Hiroaki Fujita and Prof. Yasuhiko Arakawa) at the Institute of Industrial Science, University of Tokyo, Japan.
- **Keywords:** Micro/Nanorobotics, Scanning Probe Microscopy, Tele-Robotics, Virtual Reality User Interfaces, Haptic Devices, Precision Positioning and Design, MEMS Microprobes.

- **My Contribution:** Project proposal, budget applications, and all research work as my Ph.D. thesis.
- **Milestone Publication:**
M. Sitti and H. Hashimoto, "Tele-Nanorobotics Using Atomic Force Microscope as a Robot and Sensor," *Advanced Robotics Journal*, vol. 13, no. 4, pp. 417-436, 1999.

1997-1999: **Intelligent Space Project: Multimodal Human-Machine User Interfaces and Intelligent ATMs (Industrial Project)**

- **Aim:** Using visual face and body motion recognition, and sound information for understanding the human behavior status for intelligent ATM user interfaces.
- **Project Team:** OMRON Inc., and Intelligent Mechatronics Laboratory (Prof. Hideki Hashimoto) at the Institute of Industrial Science, University of Tokyo.
- **Keywords:** Advanced Human-Machine Interfaces, Computer Vision, Sound Recognition, Computer Networks.
- **My Contribution:** Color image processing for segmenting the human face region at real-time.

1996: **Chaotic Control of Mechanisms**

- **Aim:** Controlling chaotic systems (robot dynamics) using OGY Method for enabling minimum power consumption oscillating systems.
- **Project Team:** Department of Electrical and Electronics Engineering (Prof. Yagmur Denizhan), Bogazici University, Turkey.
- **Keywords:** Chaos, Nonlinear Dynamics, Chaos Control.
- **Main Contribution:** Developing oscillation control algorithms for robotic mechanisms and chaotic maps.

1995-1996: **Automatic Quality Detection of Textile Fabrics (Industrial Project)**

- **Aim:** Automizing the textile fabric quality control process using real-time computer vision.
- **Project Team:** CAD/CAM Robotics Department at the TUBITAK Marmara Research Center, and many textile companies in Turkey.
- **Keywords:** Computer Vision, Parallel Algorithms, Real-Time Image Processing, Object Recognition.
- **My Contribution:** Image processing for segmenting and recognizing the textile fabric defects using Neural Networks at real-time.

1994-1996: **Robot Vision Project**

- **Aim:** Automatic recognition and picking of unknown multiple moving objects on the assembly lines by robotic manipulators utilizing visual feedback.
- **Project Team:** CAD/CAM Robotics Department at the TUBITAK Marmara Research Center.
- **Keywords:** Robot Vision, Robot Control, Intelligent Control, Object Recognition, Robot Grasping, Flexible Manufacturing.
- **My Contribution:** Whole research as my M.Sc. thesis work while leading four research engineers for developing image processing software and robot control schemes for the automatic recognition and picking of unknown multiple objects moving on the assembly lines.

1994-1995: **Automatic Quality Detection of Painted Surfaces (Industrial Project)**

- **Aim:** Real-time defect detection on the painted metallic surfaces using real-time computer vision.

- **Project Team:** Arcelik Inc., and CAD/CAM Robotics Department at the TUBITAK Marmara Research Center.
- **Keywords:** Computer Vision, Digital Signal Processors, Statistical Image Processing.
- **My Contribution:** Implementing and developing the real-time parallel DSP software and hardware for detecting the color changes on the metallic surfaces by stochastic image processing techniques.

IV. Publication List

A. Thesis:

1. M. Sitti, "Teleoperated 2-D Micro/Nanomanipulation Using Atomic Force Microscope," Department of Electrical Engineering, University of Tokyo, Tokyo, Sept. 1999.
2. M. Sitti, "Visual Tracking: An Integration of Control and Vision," *M.Sc. Thesis*, Department of Electrical and Electronics Engineering, Bogazici University, Bebek, Istanbul, Sept. 1994.
3. M. Sitti, "An Obstacle Avoidance Approach for Mobile Robots Based on the Artificial Potential Field Approach and Least Squares Method," *B.Sc. Engineering Thesis*, Department of Electrical and Electronics Engineering, Bogazici University, Bebek, Istanbul, July 1992.

B. Book Articles:

1. R.S. Fearing, S. Avadhanula, D. Campolo, M. Sitti, J. Yan and R. Wood, "A Micromechanical Flying Insect Thorax," *Neurotechnology for Biomimetic Robots*, MIT Press, 2000 (to appear).
2. M. Sitti and H. Hashimoto, "Teleoperated Nano Scale Object Manipulation," *Recent Advances in Mechatronics*, pp. 322-335, edited by O. Kaynak, S. Tosunoglu, and M.J. Ang, Springer Verlag Pub., 1999.
3. M. Sitti, M. Hoummady, and H. Hashimoto, "Trends on Mechatronics for Micro/Nano Telemanipulation: Survey and Requirements," *IFAC Information Control in Manufacturing*, edited by G. Morel and F. B. Vernadat, Elsevier Science Pub., UK, pp. 235-240, 1999.

C. Journal Papers (Published):

1. **M. Sitti** and H. Hashimoto, "Controlled Pushing of Nanoparticles: Modeling and Experiments," *IEEE/ASME Trans. on Mechatronics*, vol. 5, no. 2, pp. 199-211, June 2000.
2. **M. Sitti** and H. Hashimoto, "Two-Dimensional Fine Particle Positioning Under Optical Microscope Using a Piezoresistive Cantilever as a Manipulator," *Journal of Micromechatronics*, vol. 1, no. 1, pp. 25-48, 2000.
3. **M. Sitti** and H. Hashimoto, "Macro to Nano Tele-Manipulation Towards Nanoelectromechanical Systems," *Journal of Robotics and Mechatronics*, pp. 209-217, vol. 12, no. 3, June 2000.
4. **M. Sitti** and H. Hashimoto, "Tele-Nanorobotics Using Atomic Force Microscope as a Robot and Sensor," *Advanced Robotics Journal*, vol. 13, no. 4, pp. 417-436, 1999.
5. S. Horiguchi, **M. Sitti**, and H. Hashimoto, "Investigation of Virtual Reality Interface for AFM-Based Nano Manipulation," *IEEJ Trans. on Electronics, Information and Systems (C)*, pp. 1948-1956, Dec. 2000 (in Japanese).
6. **M. Sitti** and H. Hashimoto, "Micro/Nano Manipulation Using Atomic Force Microscope," *Seisan Kenkyu (Journal of Industrial Science Research)*, University of Tokyo, vol. 51, no. 8, pp. 31-33, 1999.
7. **M. Sitti** and H. Hashimoto, "Virtual Reality-Based Teleoperation in the Micro/Nano World," *Seisan Kenkyu (Journal of Industrial Science Research)*, University of Tokyo, vol. 51, no. 8, pp. 34-36, 1999.

D. Journal Papers (Submitted/On Submission):

8. K. Autumn, Y. A. Liang, **M. Sitti**, A. Peattie, W. Hansen, S. Sponberg, T. Kenny, R. Fearing, J. Israelachvili & R. J. Full, "Molecular mechanism of adhesion in geckos", *Nature*, 2001.

9. **M. Sitti** and H. Hashimoto, "Tele-Touch Feedback of Surfaces at the Nano Scale: Modeling and Experiments," *IEEE/ASME Trans. on Mechatronics*, Focused Section on Nanotechnology, June 2001.
10. **M. Sitti**, "PZT Actuated Four-Bar Mechanism with Two Flexible Links for Micromechanical Flying Insect Thorax," *IEEE/ASME Trans. on Mechatronics*, 2001.
11. D. Campolo, **M. Sitti** and R.S. Fearing, "Efficient Charge Recovery Method for Driving Piezoelectric Actuators in Low Power Applications," *Smart Materials and Structures*, 2001.

E. Invited Talks and Seminars:

1. M. Sitti, "Robotics at the Micro/Nano Scale: Tele-Nanorobotics using Nanoprobes, and Biologically Inspired Micromechanical Flying Insects," Swiss Federal Institute of Technology at Zurich, *ETHZ*, Switzerland, 6 June 2001.
2. M. Sitti, "Issues in Bio-Nanotechnology Education and Research," *IEEE Robotics and Automation Conference*, Korea, 24 May 2001.
3. M. Sitti, "Robotics at the Micro/Nano Scale: Tele-Nanorobotics using Nanoprobes, and Biologically Inspired Micromechanical Flying Insects," *Robotics Institute, Carnegie Mellon University*, Pittsburgh, 4 May 2001.
4. H. Hashimoto and M. Sitti, "Challenge to Micro/Nanomanipulation Using Atomic Force Microscope," *IEEE Micromechatronics and Human Systems Conf.*, Nagoya, Japan, pp. 35-42, November 1999.

F. Tutorials:

5. M. Sitti, "Micro/Nano Mechatronics for Nanotechnology," *IEEE/ASME Advanced Intelligent Mechatronics Conference*, Atlanta, USA, 19 September 1999.

G. Conference Papers:

1. M. Sitti, "Nanotribological Characterization System by AFM Based Controlled Pushing," *IEEE-Nanotechnology Conf.*, Maui, USA, Nov. 2001 (submitted).
2. M. Sitti, "Survey on Nanomanipulation Systems," *IEEE-Nanotechnology Conf.*, Maui, USA, Nov. 2001 (submitted).
3. B. Aruk, M. Sitti and H. Hashimoto, "Human-Machine Interface for Nanomanipulation with AFM Probe," *IEEE-Nanotechnology Conf.*, Maui, USA, Nov. 2001 (submitted).
4. M. Sitti, "PZT Actuated Four-Bar Mechanism with Two Flexible Links for Micromechanical Flying Insect Thorax," *Proc. of the IEEE Robotics and Automation Conf.*, pp. 3893-3900, Korea, May 2001.
5. M. Sitti, T. Su, R.S. Fearing, D. Campolo, J. Yan, D. Taylor, T. Sands, "Development of PZT/PZN-PT Unimorph Actuators for Micromechanical Flapping Mechanisms," *Proc. of the IEEE Robotics and Automation Conf.*, pp. 3839-3846, Korea, May 2001.
6. M. Sitti, B. Aruk, K. Shintani, and H. Hashimoto, "Development of a Scaled Teleoperation System for Nano Scale Interaction and Manipulation," *Proc. of the IEEE Robotics and Automation Conf.*, pp. 860-867, Korea, May 2001 (**Best Student Paper Nomination**).
7. J. Yan, R. Wood, S. Avandhanula, D. Campolo, M. Sitti, R. Fearing, "Towards Flapping Wing Control for a Micromechanical Flying Insect," *Proc. of the IEEE Robotics and Automation Conf.*, pp. 3901-3908, Korea, May 2001.
8. B. Aruk, H. Shintani, H. Hashimoto and M. Sitti, "Man-Machine Interface for Micro/Nano Manipulation," *Int. Symp. on Robotics*, Korea, April 2001 (to appear).
9. R. S. Fearing, K. Chiang, M. Dickinson, D. Pick, M. Sitti and J. Yan, "Wing Transmission for a

- Micromechanical Flying Insect," *Proc. of the IEEE Robotics and Automation Conf.*, pp. 1509-15, San Francisco, USA, Apr. 2000 (**Best Paper Nomination**).
10. M. Sitti, S. Horiguchi, and H. Hashimoto, "Tele-Touch Feedback of Elastically Deformable Surfaces at the Micro/Nano Scale: Modeling and Experiments," *Proc. of the IEEE/RSJ Intelligent Robots and Systems Conf.*, pp. 882-888, IROS'99, Korea, Nov. 1999.
 11. H. Shintani, M. Sitti, K. Hirahara, and H. Hashimoto, "Force Display Method for Teleoperation Using Scanning Probe Microscope," *Human Machine Symposium*, Osaka, Japan, Oct. 1999 (in Japanese).
 12. M. Sitti and H. Hashimoto, "Force-Controlled Pushing of Nano Particles: Modeling and Experiments," *IEEE/ASME Advanced Intelligent Mechatronics Conf.*, pp. 19-26, Atlanta, USA, Sept. 1999.
 13. M. Sitti, S. Horiguchi, and H. Hashimoto, "Tele-Nanorobotics 2-D Manipulation of Micro/Nano Particles Using Atomic Force Microscope," *Video Proceedings of IEEE/ASME Advanced Intelligent Mechatronics Conf.*, Atlanta, USA, Sept. 1999.
 14. M. Sitti and H. Hashimoto, "Pushing Micro/Nano Scale Particles on Substrates Using Atomic Force Microscope Probe Towards Tribological Characterization of Particle-Substrate Interfaces," *STM'99 Conference*, Korea, July 1999.
 15. S. Horiguchi, M. Sitti, and H. Hashimoto, "Visualization Interface for AFM-based Nano Manipulation," *Proc. of the IEEE Int. Symp. on Industrial Electronics*, Slovenia, pp. 310-315, July 1999.
 16. M. Sitti and H. Hashimoto, "Two-Dimensional Fine Particle Positioning Using a Piezoresistive Cantilever as a Micro/Nano-Manipulator," *Proc. of the IEEE Robotics and Automation Conf.*, Detroit, USA, pp. 2729-2735, May 1999.
 17. M. Sitti and H. Hashimoto, "Teleoperated Micro/Nano Particle Manipulation using Atomic Force Microscope," *RSJ Robotics and Mechatronics Conf.*, Tokyo, June 1999.
 18. S. Horiguchi, M. Sitti, and H. Hashimoto, "3-D Nano Scale Tactile Feedback Interface," *RSJ Robotics and Mechatronics Conf.*, Tokyo, June 1999.
 19. M. Sitti, T. Ohashi, S. Horiguchi, and H. Hashimoto, "Virtual Reality Simulator for Nano Scale Contact Feedback," *RSJ Robotics and Mechatronics Conf.*, Tokyo, June 1999 (in Japanese).
 20. M. Sitti, K. Hirahara, and H. Hashimoto, "2-D Micro Particle Assembly using Atomic Force Microscope," *Proc. of the IEEE Micromechatronics and Human Systems Conf.*, pp. 143-148, Nagoya, Japan, Nov. 1998.
 21. M. Sitti and H. Hashimoto, "Manipulation of the Micro/Nano Particles at the Interface of Micro and Nano Worlds," *France-Japan Workshop on Nano to Macroscale Science and Technology through Microsystems*, Toulouse, France, p. 90, Nov. 1998.
 22. M. Sitti and H. Hashimoto, "Tele-Nanorobotics Using Atomic Force Microscope," *Proc. of the IEEE/RSJ Int. Conf. on Intelligent Robots and Systems*, IROS'98, pp. 1739-1746, Victoria, Canada, Oct. 1998 (**Best Paper Award**).
 23. M. Sitti and H. Hashimoto, "Macro to Nano Tele-Manipulation through Nanoelectromechanical Systems," *Proc. of the IEEE Ind. Electronics Conf.*, pp. 98-103, Aachen, Germany, Sept. 1998.
 24. S. Horiguchi, M. Sitti, and H. Hashimoto, "Virtual Reality User Interface for Teleoperated Nanometer Scale Object Manipulation", *Proc. of 7th IEEE Int. Workshop on Robot and Human Communication*, Takamatsu, Japan, pp.142-147, Sept. 1998.
 25. S. Horiguchi, Metin Sitti, and H. Hashimoto, "Human Interface for Teleoperated Nano Scale Object Manipulation ", *RSJ Robotics Conf*, pp. 237-238, Sapporo, Japan, Sept. 1998 (in Japanese).
 26. M. Sitti and H. Hashimoto, "Teleoperation Control for Nano Scale Object Manipulation", *RSJ Robotics Conf.*, pp. 1325-1326, Sapporo, Japan, Sept. 1998.
 27. M. Sitti, S. Horiguchi and H. Hashimoto, "Nano Tele-Manipulation Using Virtual Reality Interface," *Proc. of the IEEE Int. Symp. on Industrial Electronics*, pp. 171-176, Pretoria, S.

Africa, July 1998.

28. M. Sitti, S. Horiguchi, and H. Hashimoto, "Atomic Force Microscope-Based Tele-Manipulation System", *RSJ Robotics and Mechatronics Conf.*, pp. 1BIV1-5 (1)-(2), Sendagi, June 1998.
29. S. Horiguchi, M. Sitti, and H. Hashimoto, "Virtual Reality Graphics Interface for Nano Tele-Manipulation", *RSJ Robotics and Mechatronics Conf*, pp. 1BIV1-6 (1)-(2), Sendagi, June 1998 (in Japanese).
30. M. Sitti, M. Hoummady, and H. Hashimoto, "Macro to Micro/Nano Manipulation Systems Through the Integration of Macro and Micro/Nano Mechatronics," *IEEE-SMC Computational Eng. In Systems Applications*, pp. 105-110, Tunisia, April 1998.
31. H. Hashimoto and M. Sitti, "Human-Machine Interfaces and Telerobotics," *France-Japan Workshop on Nano to Macroscale Science and Technology through Microsystems*, pp. 38, Tokyo, May 1997.
32. M. Sitti, I. Bozma, and A. Denker, "Visual Tracking For Moving Multiple Objects: An Integration of Vision and Control," *IEEE Int. Symp. on Industrial Electronics, ISIE'95*, Athens, pp. 535-540, July 1995.
33. M. Sitti, M. Ertugrul, and A. Denker, "Coordination of Two Robots Using Visual Feedback," *Int. Conf. on Recent Advances on Mechatronics*, pp. 615-620, Istanbul, Turkey, Aug. 1995.
34. M. Sitti, I. Bozma, and A. Denker, "Visual Tracking," *2nd Int. Symp. on Mechatronics*, Ankara, Turkey, Nov. 1995.
35. F. Bagciogullari, C. Taskiran, M. Sitti, and M. Ertugrul, "Recognition of Geometric Objects Moving on a Conveyor Belt, Grasping the Objects with a Robot Manipulator in Real-Time," *2nd Int. Symp. on Mechatronics*, Ankara, Turkey, Nov. 1995.
36. M. Sitti, "Detecting Fabric Defects Using Computer Vision," *3rd Conf. on Signal Processing and Applications*, Antalya, Turkey, Apr. 1996 (in Turkish).
37. E. Gul, M. Sitti, A. Ercil, and B. Ozuyilmaz, "A Parallel System Design For Quality Control of Painted Metallic Surfaces," *2nd Conf. on Signal Processing and Applications*, pp. 141-146, Nevsehir, Turkey, Apr. 1995 (in Turkish).
38. M. Sitti, I. Bozma, and A. Denker, "Picking Objects Moving on a Conveyor Belt Using Artificial Vision," *2nd Conf. on Signal Processing and Applications*, pp. 63-68, Nevsehir, Turkey, Apr. 1995 (in Turkish).
39. M. Sitti, M. Ertugrul, and A. Denker, "Coordination of Two Robots Using Visual Feedback," *National Symp. on Industrial Automation*, Istanbul, Apr. 1995 (in Turkish).

H. Technical Reports

1. M. Sitti and M. Hoummady, "Micro/Nano Manipulation," Annual Report of Laboratory for Integrated Micro-Mechanical Systems, pg. 72, April 1997.
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