

Lecture Bibliography (Alphabetical)

Contents

Biocompatibility, FDA, ISO 10993	1
Biosensors	2
Intro to Clinical Laboratory Medicine	3
Course Introduction	3
DNA Micro Total Analysis Systems	4
Drug Delivery	4
Lab-on-a-Chip Part 1	6
Lab-on-a-Chip Part 2	7
Microfluidics Part 1	8
Microfluidics Part 2	9
Micro- and Nanorobotics Part 1	9
Micro- and Nanorobotics Part 2	10
Microsensors	11
Nanotransducers - Quantum Dots & Nanoparticles	12
Organ-on-a-Chip	12
Packaging, Power, Data and RF Safety	14
Polymer Microfabrication	14
Protein Micro Total Analysis Systems	15

Biocompatibility, FDA, ISO 10993

Albert, D. E. "The important role of material and chemical characterization in device evaluation. Medical Device Technology, Octo Media Ltd, June 2004

Barkam, S., et al. Fabricated micro-nano devices for in vivo and in vitro biomedical applications. WIREs Nanomed Nanobiotechnol 2013, 5:544–568

Bryers, J., C. M. Giachelli, B. D. Ratner. Engineering biomaterials to integrate and heal: the biocompatibility paradigm shifts. Biotechnology and Bioengineering, 109(8) 2012.

Chen, H. et al. Biocompatible polymer materials: Role of protein–surface interactions. Progress in Polymer Science 33, pp 1059-1087 (2008).

Ratner, B. D., A. S. Hoffman, F.J. Schoen, J. E. Lemons, Biomaterials Science, Academic Press, New York (2013).

Biosensors

Adzhari R., Arshad K. M., Gopinath S. C. B., et al. High-performance integrated field-effect transistor-based sensors. *Analytica Chimica Acta*. 2016;917:1-18.

Ali, M. A.; Srivastava, S.; Solanki, P. R.; Reddy, V.; Agrawal, V. V.; Kim, C.; John, R.; Malhotra, B.D. Highly efficient bienzyme functionalized nanocomposite-based microfluidics biosensor platform for biomedical application. *Sci. Rep.* 2013, 3, 2661.

Bikiaris, D.; Vassiliou, A.; Chrissafis, K.; Paraskevopoulos, K. M.; Jannakoudakis, A.; Docoslis, A. Effect of Acid Treated Multi-Walled Carbon Nanotubes on the Mechanical, Permeability, Thermal Properties and Thermo-Oxidative Stability of Isotactic Polypropylene. *Polym. Degrad. Stab.* 2008, 93, 952–967.

Dixit, C. K.; Vashist, S. K.; MacCraith, B. D.; O’Kennedy, R. *Nat. Protoc.* 2011, 6, 439.

Eric Stern, James F. Klemic, David A. Routenberg, Pauline N. Wyrembak, Daniel B. Turner-Evans, Andrew D. Hamilton, David A. LaVan, Tarek M. Fahmy, and Mark A. Reed, *Nature*, 445, 519 (2007).

Golberg, A.; Linshiz, G.; Kravets, I.; Stawski, N.; Hillson, N.J.; Yarmush, M. L.; Marks, R.S.; Konry, T. Cloud-enabled microscopy and droplet microfluidic platform for specific detection of *Escherichia coli* in water. *PLoS ONE* 2014, 9, 4–12.

Gu, S.; Lu, Y.; Ding, Y.; Li, L.; Song, H.; Wang, J.; Wu, Q. A droplet-based microfluidic electrochemical sensor using platinum-black microelectrode and its application in high sensitive glucose sensing. *Biosens. Bioelectron.* 2014, 55, 106–112.

Kaisti M. Detection principles of biological and chemical FET sensors. *Biosensors & Bioelectronics*. 2017;98:437-448.

Kwon, O.S.; Park, S. J.; Hong, J.-Y.; Han, A.-R.; Lee, J.S.; Lee, J.S.; Oh, J.H.; Jang, J. Flexible FET-type VEGF aptasensor based on nitrogen-doped graphene converted from conducting polymer. *ACS Nano* 2012, 6, 1486–1493.

Luka G, Ahmadi A, Najjaran H, et al. Microfluidics Integrated Biosensors: A Leading Technology towards Lab-on-a-Chip and Sensing Applications. *Sensors*. 2015;15(12):30011-30031.

Nehra A, Singh K. P. Current trends in nanomaterial embedded field-effect transistor-based biosensor. *Biosensors & Bioelectronics*. 2015;74:731-743.

Park C. S., Lee C, Kwon O. S. Conducting Polymer Based Nanobiosensors. *Polymers*. 2016;8(7).

Schodek, D.; Ferreira, P.; Ashby, M. *Nanomaterials, Nanotechnologies and Design*; Butterworth-Heinemann: 2009.

Suvarnaphaet, P.; Pechprasarn, S. Graphene-Based Materials for Biosensors: A Review. *Sensors* 2017, 17, 2161.

Syu Y. C., Hsu W. E., Lin C. T. Review-Field-Effect Transistor Biosensing: Devices and Clinical Applications. *Ecs Journal of Solid-State Science and Technology*. 2018;7(7):Q3196-Q3207

Vashist S. K., Lam E, Hrapovic S, Male K. B., Luong J. H.T. Immobilization of Antibodies and Enzymes on 3-Aminopropyltriethoxysilane-Functionalized Bioanalytical Platforms for Biosensors and Diagnostics. *Chemical Reviews*. 2014;114(21):11083-11130.

Wongkaew N, Simsek M, Griesche C, Baeumner . Functional Nanomaterials and Nanostructures Enhancing Electrochemical Biosensors and Lab-on-a-Chip Performances: Recent Progress, Applications, and Future Perspective. *Chemical Reviews*. 2019;119(1):120-194

Clinical Laboratory Medicine, Intro to

Babaei M., Kashanian S., Harding F., et al. Proteomics techniques in protein biomarker discovery. *Quantitative biology*. 2024;12(1):53-69. doi:10.1002/qub2.35

Barnett, C. ELISA Application. *News Medical Life Sciences*. 2020 <https://www.news-medical.net/life-sciences/ELISA-Applications.aspx>

Cinquanta L., Fontana D. E., Bizzaro N. Chemiluminescent immunoassay technology: what does it change in autoantibody detection? *Auto Immun Highlights*. 2017;8(1):9-9.

Karolina Boguszezwska, Review: immunoassays in DNA damage and instability detection in Cellular and Molecular Life Sciences CMLS 76(1) · July 2019

Laposata M., Laboratory Medicine, Clinical Pathology in the Practice of Medicine, ASCP Press, Chicago (2002).

Course Introduction

Barkam, S., et al. Fabricated micro-nano devices for in vivo and in vitro biomedical applications. *WIREs Nanomed Nanobiotechnol* 2013, 5:544–568

Duffy D. C., McDonald JC, Schueller O. J. A., Whitesides G.M. Rapid prototyping of microfluidic systems in poly(dimethylsiloxane). *Analytical Chemistry*. 1998;70(23):4974-4984.

Gencoglu, A. and Adrienne R. Minerick . Electrochemical detection techniques in micro- and nanofluidic devices. *Microfluid Nanofluid* (2014) 17:781–807

Hildebrandt N., Spillmann C. M., Algar W. R., et al. Energy Transfer with Semiconductor Quantum Dot Bioconjugates: A Versatile Platform for Biosensing, Energy Harvesting, and Other Developing Applications. *Chemical Reviews*. 2017;117(2):536-711.

Hossan M. R., Dutta D., Islam N., Dutta P. Review: Electric field driven pumping in microfluidic device. *Electrophoresis*. 2018;39(5-6):702-731.

Huh, D. et al. Reconstituting organ- level lung functions on a chip. *Science* 328, 1662–1668 (2010).

Liu J., Hansen C., Quake S. R. 2003. Solving the “world-to-chip” interface problem with a microfluidic matrix. *Anal. Chem*. 75(18):4718–23

Maochun, Wan M. Biomedical micro- and nanorobots in disease treatment. Wiley-VCH; 2023. p. 14

Melin J., Quake S.R. Microfluidic large-scale integration: The evolution of design rules for biological automation. In: Annual Review of Biophysics and Biomolecular Structure. Vol 36.2007:213-231.

Naresh V., Lee N. A Review of Biosensors and Recent Development of Nanostructured Materials-Enabled Biosensors. Sensors. Feb 2021;21(4)1109. doi:10.3390/s21041109

Schutte J., Freudigmann C., Benz K., Bottger J., Gebhardt R. and Stelzle M. 2010 A method for patterned in situ biofunctionalization in injection-molded microfluidic devices Lab Chip 10 2551–8

Sutradhar K. B., Sumi C. D. Implantable microchip: the futuristic controlled drug delivery system. Drug Deliv. 2016;23(1):1-11.

Zhang B., Korolj A., Lai B. F. L., Radisic M. Advances in organ-on-a-chip engineering. Nature Reviews Materials. 2018;3(8):257-278.

Zhang, B. et al. Biodegradable scaffold with built- in vasculature for organ- on-a- chip engineering and direct surgical anastomosis. Nat. Mater. 15, 669–678 (2016).

DNA Micro Total Analysis Systems

Albert H. Titus, et al. CMOS Photodetectors in Photodiodes - World Activities in 2011. Ed. by Park, J. W. , pub. by InTech, 2011.

Carey, F. A., Advanced Organic Chemistry 5th Ed., 2002

Carter, M., Jennifer Shieh, in Guide to Research Techniques in Neuroscience (Second Edition), 2015

Hugle M., Dame G., Behrmann O., et al. A lab-on-a-chip for preconcentration of bacteria and nucleic acid extraction. Rsc Advances. 2018;8(36):20124-20130.

Norian, H. et al., An integrated CMOS qualitative-polymerase-chain-reaction lab-on-a-chip for point-of-care diagnostics Lab Chip, 2014, 14, 4076-4085

Petralia, S, et al., In-Check system: a highly integrated silicon lab-on-chip for sample preparation, PCR amplification and microarray detection of nucleic acids directly from biological samples. Sensors and Actuators B 187 (2013) 99-105.

Wang M. H., Yin H. S., Zhou Y. L., et al. Photoelectrochemical biosensor for microRNA detection based on a MoS₂/g-C₃N₄/black TiO₂ heterojunction with Histostar@AuNPs for signal amplification. Biosensors & Bioelectronics. 2019;128:137-143.

Drug Delivery

Adrus N., M. Ulbricht, Novel hydrogel pore-filled composite membranes with tunable and temperature-responsive size-selectivity, J. Mater. Chem. 22 (2012) 3088–3098.

Albanese A., Lam A. K., Sykes E. A., Rocheleau J. V., Chan W. C. W. Tumour-on-a-chip provides an optical window into nanoparticle tissue transport. Nature Communications. 2013;4.

Alhnan M. A., T. C. Okwuosa, M. Sadia, K. W. Wan, W. Ahmed, B. Arafat, Pharm. Res. 2016, 33, 1817.

Aram J. Chung, Donn Kim, and David Erickson. 2008. Electrokinetic microfluidic devices for rapid, low power drug delivery in autonomous microsystems. *Lab on a Chip - Miniaturization for Chemistry & Biology* 8, no. 2:330-338.

Capozzi M. E., DiMarchi R. D., Tschop M. H., Finan B, Campbell J. E. Targeting the Incretin/Glucagon System with Triagonists to Treat Diabetes. *Endocrine Reviews*. 2018;39(5):719-738.

Chen W., Tian R., Xu C., et al. Microneedle-array patches loaded with dual mineralized protein/peptide particles for type 2 diabetes therapy. *Nature Communications*. 2017;8

Chung A. J., Y. S. Huh, D. Erickson, *Biomed. Microdevices* 2009, 11, 861.

Cima M. J., Langer R. S., Santini J. T. Jr. Massachusetts Institute of Technology, assignee. (2000). Fabrication of microchip drug delivery device. US Patent US6123861, 26 Sept 2000.

Donnelly, R. F., Singh, T. R. R., Garland, M. J., Migalska, K., Majithiya, R., McCrudden, C. M., Kole, P. L., Mahmood, T. M. T., McCarthy, H. O., Woolfson, A.D., 2012. Hydrogel-forming microneedle arrays for enhanced transdermal drug delivery. *Adv. Funct. Mater.* 22 (23), 4879–4890.

Eljarrat-Binstock E., A. J. Domb, *J. Controlled Release* 2006, 110, 479.

Fenton O. S., Olafson K. N., Pillai P. S., Mitchell M. J., Langer R. *Advances in Biomaterials for Drug Delivery*. *Advanced Materials*. 2018;30(29).

Fong J., Z. M. Xiao, K. Takahata, Wireless implantable chip with integrated nitinol-based pump for radio-controlled local drug delivery, *Lab Chip* 15 (2015) 1050–1058

Geipel, A., et al. 2008. Design of an implantable active microport system for patient specific drug release. *Biomedical Microdevices* 10, no. 4:469-478.

Hsiao W. K., B. Lorber, H. Reitsamer, J. Khinast, 3D printing of oral drugs: a new reality or hype? *Expert Opin. Drug Deliv.* (2017) 1–4.

Khandan O., M. Y. Kahook, M. P. Rao, *Sens. Actuators, B* 2016, 223, 15.

Li P. Y., J. Shih, R. Lo, S. Saati, R. Agrawal, M. S. Humayun, Y. C. Tai, E. Meng, *Sens. Actuators, A* 2008, 143, 41.

Li, Tao et al. Compact, power-efficient architecture using microvalves and microsensors for intrathecal, insulin, and other drug delivery systems. *Advanced Drug Delivery Reviews* 64 (2012) 1639-1649

Lim S. H., S. M. Chia, L. Kang, K. Y. Yap, Three-dimensional printing of carbamazepine sustained-release scaffold, *J. Pharm. Sci.* 105 (2016) 2155–2163.

Lim , Kathuria H, Tan J. J. Y., Kang L. F. 3D printed drug delivery and testing systems - a passing fad or the future? *Advanced Drug Delivery Reviews*. 2018;132:139-168.

Lo J. R., K. Kuwahara, P. Y. , Li, R. Agrawal, M. S. Humayun, E. Meng, *Int. Conf. Microtechnol. Med. Biol. Okinawa, Japan* 2006, p. 74

Lo R. , P.-Y. Li, S. Saati, R. Agrawal, M. S. Humayun, E. Meng, *Lab Chip* 2008, 8, 1027.

- Lo R., P. Y. Li, S. Saati, R. N. Agrawal, M. S. Humayun, E. Meng, Biomed. Microdevices 2009, 11, 959.
- Molokhia S.A., H. Sant, J. Simonis, C. J. Bishop, R. M. Burr, B. K. Gale, B. K. Ambati, Vision Res. 2010, 50, 680.
- Patrascu, M., et al. Flexible, electrostatic microfluidic based on thin film fabrication. Sensors and Actuators A 186(2012) 249-256
- Pirmoradi F. N., et. al. 26th Int. Conf. Micro Electro Mech. Syst. (MEMS), Taipei, Taiwan 2013, p. 1.
- Rhee M., P. M. Valencia, M. I. Rodriguez, R. Langer, O. C. Farokhzad, R. Karnik, Synthesis of size-tunable polymeric nanoparticles enabled by 3D hydrodynamic flow focusing in single-layer microchannels, Adv. Mater. 23 (2011).
- Rowland M., Peck C., Tucker G. 2011. Physiologically based pharmacokinetics in drug development and regulatory science. Annu. Rev. Pharmacol. Toxicol. 51:45–73
- Saati S., R. Lo, P.-Y. Li, E. Meng, R. Varma, M. S. Humayun, Curr. Eye Res. 2010, 35, 192.
- Sutradhar K. B., Sumi C. D.. Implantable microchip: the futuristic controlled drug delivery system. Drug Deliv. 2016;23(1):1-11.
- Tsai, N. C. and C. Y. Sue. Review of MEMS-based drug delivery and dosing systems. Sensors and Actuators A 134 (2007) 555-564
- Zhuang Y., W. Hou, X. Zheng, Z. Wang, J. Zheng, X. Pi, J. Cui, Y. Jiang, S. Qian, C. Peng, A MEMS-based electronic capsule for time-controlled drug delivery in the alimentary canal, Sens. Actuators, A 169 (2011) 211–216.

Lab-on-a-Chip Part 1

- Barani A., Paktinat H., Janmaleki M., et al. Microfluidic integrated acoustic waving for manipulation of cells and molecules. Biosensors & Bioelectronics. 2016;85:714-725
- Cho, S. K., et al., “Creating, transporting, cutting and merging liquid droplets by electrowetting-based actuation for digital microfluidic circuits.” Journal of Microelectrochemical Systems 12(1) pp. 70-80 (2003)
- Ding, X., Lin, S.-C.S., Kiraly, B., Yue, H., Li, S., Chiang, I.-K., Shi, J., Benkovic, S. J., Huang, T.J., 2012a. PNAS 109 (28), 11105–11109.
- Eichler M., Nagel K., Hennecke P. and Klages C .2012 Area-selective microplasma treatment in microfluidic channels for novel fluid phase separators Plasma Process. Polym. 9 1160–7
- Franke, T., Braunmuller, S., Schmid, L., Wixforth, A., Weitz, D.A., 2010. Lab. Chip 10, 789–794.
- Gardner, J. W., V. K. Varadan and O. O. Awadelkarim, Microsensors, MEMS and Smart Devices. John Wiley & Sons, Ltd. W. Sussex (2001).
- Hildenhagen, J. et al. 2013. Simultaneous Micro Structuring and Functionalization of Surfaces with Pico-second Laser. International Conference on Optics in Precision Engineering and Nanotechnology (Icopen2013) 8769, 87691D.

Jubery, T. Z. and P. Dutta. A new design for efficient dielectrophoretic separation of cells in a microdevice . Electrophoresis 2013, 34, 643–650

Kitsara, Maria, and Jens Ducree. 2013. Integration of functional materials and surface modification for polymeric microfluidic systems. Journal of Micromechanics and Microengineering 23, no. 3:033001.

Lan, S. M. et al. "Surface modification of silicon and gold-patterned silicon surfaces for improved biocompatibility and cell patterning selectivity. Biosensors and Bioelectronics 20(9), pp. 1697-1708 (2005).

Lee, B. et al. A fully automated immunoassay from whole blood on a disc. Lab Chip, 2009, 9, 1548–1555

Mark, D., et al. 2012. Automated and miniaturized detection of biological threats with a centrifugal microfluidic system. Smart Biomedical and Physiological Sensor Technology Ix 8367, 83670E.

Odde, D. J. and M. J. Renn. Laser-guided direct writing for applications in biotechnology. Trends in Biotechnology 17(1), pp 385-389 (1999)

Ruecha, N., Lee, J., Chae, H., Cheong, H., Soum, V., Preechakasedkit, P., Chailapakul, O., Tanev, G., Madsen, J., Rodthongkum, N., 2017. Adv. Mater. Technol. 2 (3), 1600267.

Schutte J., Freudigmann C., Benz K., Bottger J., Gebhardt R. and Stelzle M. 2010 A method for patterned in situ biofunctionalization in injection-molded microfluidic devices Lab Chip 10 2551–8

Strohmeier O., Keller M., Schwemmer F., et al. Centrifugal microfluidic platforms: advanced unit operations and applications. Chemical Society Reviews. 2015;44(17):6187-6229.

Tran, S. B. Q., Marmottant, P., Thibault, P., 2012. Appl. Phys. Lett., 101.

van der Wijngaart, W. and et al. Handling of beads in microfluidic devices for biotech applications, Lab-on-a-chip: Miniaturized Systems for Biochemical Analysis and Synthesis, Edited by R. E. Oosterbroek and A. Van den Berg. Elsevier, The Netherlands (2003).

van der Wouden, E. J et al. / Procedia Engineering 25 (2011) 1465 – 1468

Wongkaew N., Simsek M., Griesche C., Baeumner A. J. Functional Nanomaterials and Nanostructures Enhancing Electrochemical Biosensors and Lab-on-a-Chip Performances: Recent Progress, Applications, and Future Perspective. Chemical Reviews. 2019;119(1):120-194.

Lab-on-a-Chip Part 2

Acimovic, S. S. LSPR Chip for Parallel, Rapid, and Sensitive Detection of Cancer Markers in Serum. Nano Lett. 2014, 14, 2636–2641

Caputo, D.; de Cesare, G.; Dolci, L. S.; Mirasoli, M.; Nascetti, A.; Roda, A.; Scipinotti, R. Microfluidic chip with integrated a-Si:H photodiodes for chemiluminescence-based bioassays. IEEE Sens. J. 2013, 13, 2595–2602.

Fan L., Zhao G., Shi H., Liu M., Li Z. (2013) A highly selective electrochemical impedance spectroscopy-based aptasensor for sensitive detection of acetamiprid. Biosens Bioelectron 43:12–18.
doi:10.1016/j.bios.2012.11.033

Gai, Hongwei, Yongjun Li, and Edward S. Yeung. 2011. Optical Detection Systems on Microfluidic Chips. *Microfluidics: Technologies and Applications* 304, 171-201.

Gencoglu, A. and Adrienne R. Minerick . Electrochemical detection techniques in micro- and nanofluidic devices. *Microfluid Nanofluid* (2014) 17:781–807

Guber A. E. et al., Microfluidic lab-on-a-chip systems based on polymers – fabrication and application.” *Chemical Engineering Journal* 101(1:3), pp 447-453 (2004).

Noda T., Takao H., Yoshioka K., Oku N., Ashiki M., Sawada K., Matsumoto K., Ishida M. (2006) *Sens Actuators B* 119:245–250

Shen, L.; Ratterman, M., Klotzkin, D.; Papautsky, I. A CMOS optical detection system for point-of-use luminescent oxygen sensing. *Sens. Actuators B Chem.* 2011, 155, 430–435.

Willems, Katherine A. and R. P. Van Duyne . Localized surface plasmon resonance spectroscopy and sensing *Annu. Rev. Phys. Chem.* 2007. 58:267–97

Wu, J. et al. Optical imaging techniques in microfluidics and their application. *Lab Chip*, 2012, 12, 3566–3575

Microfluidics Part 1

Duffy D. C., McDonald J. C., Schueller O. J., A. Whitesides. Rapid prototyping of microfluidic systems in poly(dimethylsiloxane). *Analytical Chemistry*. 1998;70(23):4974-4984.

Grover W. H., Ivester R. H. C., Jensen E. C., Mathies R. A.. 2006. Development and multiplexed control of latching pneumatic valves using microfluidic logical structures. *Lab Chip* 6(5):623–31

Hiraoka, M. et al. Miniaturized pumps and valves, based on conductive polymer actuators, for lab-on-a-chip application. *MEMS 2013*, Taipei, Taiwan, January 20 – 24, 2013

Hossan M. R., Dutta D., Islam N., Dutta P. Review: Electric field driven pumping in microfluidic device. *Electrophoresis*. 2018;39(5-6):702-731.

Kopeliovich, D. Stabilization of colloids, *SubsTech.com*, 2013

Lake, M. L. et al. Microfluidic device design, fabrication, and testing protocols University of Notre Dame, Notre Dame, IN 46556.

Li, D. *Electrokinetics in Microfluidics*, 1st ed., Vol. 2., Elsevier, Amsterdam (2004).

Liu J, Hansen C., Quake S. R. 2003. Solving the “world-to-chip” interface problem with a microfluidic matrix. *Anal. Chem.* 75(18):4718–23

Liu, R. H., et al., “A passive micromixer: three-dimensional serpentine microchannel.” *Proceedings of Transducer '99*, pp. 730-733 (1999).

Luka G., Ahmadi A., Najjaran H., et al. Microfluidics Integrated Biosensors: A Leading Technology towards Lab-on-a-Chip and Sensing Applications. *Sensors*. 2015;15(12):30011-30031.

Melin J., Quake S. R. Microfluidic large-scale integration: The evolution of design rules for biological automation. In: Annual Review of Biophysics and Biomolecular Structure. Vol 36.2007:213-231.

Nguyen, N. T. and S. T. Wereley, Fundamentals and Applications of Microfluidics, Artech House, Boston, MA (2002).

Unger M. A., Chou H. P., Thorsen T., Scherer A., Quake S. R. 2000. Monolithic microfabricated valves and pumps by multilayer soft lithography. Science 288:113–16

Microfluidics Part 2

Nguyen, N. T. and S. T. Wereley, Fundamentals and Applications of Microfluidics, Artech House, Boston, MA (2002).

Peterson, K. E. et al., “Toward next generation clinical diagnosis instruments: scaling and new processing paradigms.” Journal of Biomedical Microdevices 2(1), pp. 71-79 (1999).

Young, D. F., et al, A Brief Introduction to Fluid Mechanics, 2nd ed., Wiley, New York (2001).

Micro- and Nanorobotics Part 1

Benhal P. Micro/Nanorobotics in In Vitro Fertilization: A Paradigm Shift in Assisted Reproductive Technologies. Review. Micromachines. Apr 2024;15(4):20. 510. doi:10.3390/mi15040510, Fig. 1, p. 2.

Cai X. Q., Li Z. Y., Zhou W. J., et al. Single-atom-anchored microsweepers for *H. pylori* inhibition through dynamically navigated reciprocating locomotion. ChCom. May 2023;59(36):5455-5458. doi:10.1039/d3cc00933e. Fig. 1

Chen S., Wang J., Cao S., et al. Nanomotors driven by single-atom catalysts. Cell Reports Physical Science. 2024;5(4)doi:10.1016/j.xcrp.2024.101898. Fig 1.

In Benhal P. Micro/Nanorobotics in In Vitro Fertilization: A Paradigm Shift in Assisted Reproductive Technologies. Review. Micromachines. Apr 2024;15(4):20. 510. doi:10.3390/mi15040510, Fig. 3, p. 6.

Joshi G. Design and Control of Micro-Robots for Biomedical Applications. Neuroquantology. 2022;20(8):10524-10533. doi:10.48047/nq.2022.20.8.nq221075

Ju X. H., Pumera M. Single Atom Engineering for Nanorobotics. Review. ACS Nano. Jul 2024;18(31):19907-19911. doi:10.1021/acsnano.4c06880. Fig. 2

Ju X. H., Pumera M. Single Atom Engineering for Nanorobotics. Review. ACS Nano. Jul 2024;18(31):19907-19911. doi:10.1021/acsnano.4c06880. Fig. 2.

Khalil, I. S. M.; Tabak, A .F.; Hosney, A.; Mohamed, A.; Klingner, A.; Ghoneima, M.; Sitti, M. Sperm-shaped magnetic microrobots: Fabrication using electrospinning, modeling, and characterization. In Proceedings of the 2016 IEEE International Conference on Robotics and Automation (ICRA), Stockholm, Sweden, 16–21 May 2016; pp. 1939–1944.

Li et al. in Ma, Chun, Wan M. Biomedical micro- and nanorobots in disease treatment. Wiley-VCH; p. 17, 2023.

Liu M., Chen L., Zhao Z., et al. Enzyme-Based Mesoporous Nanomotors with Near-Infrared Optical Brakes. *J Am Chem Soc.* 2022;144(9):3892-3901. doi:10.1021/jacs.1c11749

Lu H. Untethered small-scale robots for biomedical applications. Academic Press, an imprint of Elsevier; 2023. p. 1

Mao, Chun, Wan M. Biomedical micro- and nanorobots in disease treatment. Wiley-VCH; 2023, Fig. 2.3 p 15.

Nauber, R.; Goudu, S. R.; Goeckenjan, M.; Bornhäuser, M.; Ribeiro, C.; Medina-Sánchez, M. Medical microrobots in reproductive medicine from the bench to the clinic. *Nat. Commun.* 2023, 14, 728.

Xing Y., Xiu J. D., Zhou M. Y., et al. Copper Single-Atom Jellyfish-like Nanomotors for Enhanced Tumor Penetration and Nanocatalytic Therapy. *ACS Nano.* Apr 2023;17(7):6789-6799. doi:10.1021/acsnano.3c00076

Zhang Y. L., Zhang Y. P., Han Y. Q., Gong X. Micro/Nanorobots for Medical Diagnosis and Disease Treatment. Review. *Micromachines.* May 2022;13(5):19. 648. doi:10.3390/mi13050648

Micro- and Nanorobotics Part 2

in Su H. Y., Li S. X., Yang G. Z., Qian K. Janus Micro/Nanorobots in Biomedical Applications. Review. *Adv Healthc Mater.* Jun 2023;12(16):21. doi:10.1002/adhm.202202391

Ju X. H., Pumera M. Single Atom Engineering for Nanorobotics. Review. *ACS Nano.* Jul 2024;18(31):19907-19911. doi:10.1021/acsnano.4c06880. Fig. 1

Lee J. G., Brooks A. M., Shelton W. A., Bishop K. J. M., Bharti B. Directed propulsion of spherical particles along three-dimensional helical trajectories. *Nature communications.* 2019;10(1):2575-2575. doi:10.1038/s41467-019-10579-1

Li Z., Xie Z., Lu H., Wang Y., Liu Y. Cargo Transportation and Methylene Blue Degradation by Using Fuel-Powered Micromotors. *ChemistryOpen (Weinheim).* 2021;10(9):861-866. doi:10.1002/open.202100064

Loukanov A. Light-triggered Janus nanomotor for targeting and photothermal lysis of pathogenic bacteria. *Microscopy research and technique.* 2021;84(5):967-975. doi:10.1002/jemt.23657

Zhang J., Grzybowski B. A., Granick S. Janus Particle Synthesis, Assembly, and Application. *Langmuir.* 2017;33(28):6964-6977. doi:10.1021/acs.langmuir.7b01123

Zhang L., Xiao Z., Chen X., Chen J., Wang W. Confined 1D Propulsion of Metallo dielectric Janus Micromotors on Microelectrodes under Alternating Current Electric Fields. *ACS Nano.* 2019;13(8):8842-8853. doi:10.1021/acsnano.9b02100

Zhang X., Fu Q., Duan H., Song J., Yang H. Janus Nanoparticles: From Fabrication to (Bio)Applications. *ACS Nano.* 2021;15(4):6147-6191. doi:10.1021/acsnano.1c01146

Microsensors

Dinh T., Phan H., Qamar A., et al. Environment-friendly wearable thermal flow sensors for noninvasive respiratory monitoring. Paper presented at: 2017 IEEE 30th International Conference on Micro Electro-mechanical Systems (MEMS); 22-26 Jan. 2017, 2017.

Gardner, J. W., V. K. Varadan and O. O. Awadelkarim, *Microsensors, MEMS and Smart Devices*. John Wiley & Sons Ltd. W. Sussex (2001).

Han C. J., Chiang H. P., Cheng Y. C. Using Micro-Molding and Stamping to Fabricate Conductive Polydimethylsiloxane-Based Flexible High-Sensitivity Strain Gauges. *Sensors*. 2018;18(2).

Karki, J. Texas Instruments: Signal Conditioning Wheatstone Resistive Bridge Sensors. Application Report, SLOA034, September 1999.

Kottapalli A. G. P., Shen Z., Asadnia M., et al. Polymer MEMS sensor for flow monitoring in biomedical device applications. 2017 IEEE 30th International Conference on Micro Electromechanical Systems (MEMS); 22-26 Jan. 2017, 2017.

Ma C., J. Du, Y. Liu, Y. Chu, Overview of micro-force sensing methods, in: K. M. Lee, P. Yarlagadda, Y.M. Lu (Eds.), *Progress in Mechatronics and Information Technology*, 2015, Pts 1 And 22,014, 25–31.

Motamed, M., J. Yan, A review of biological, biomimetic and miniature force sensing for microflight, in: *Intelligent Robots and Systems, (IROS 2005) IEEE/RSJ International Conference on 2005*, 2005, pp. 3939–3946.

Nadvi S., D. P. Butler, Z. Celik-Butler, I.E. Goenenli, Micromachined force sensors using thin film nickel-chromium piezoresistors, *J. Micromech. Microeng.* 22 (2012).

Qiaokang, L., Z. Dan, G. Coppola, W. Yaonan, W. Sun, G. Yunjian, Multi-dimensional mems/micro sensor for force and moment sensing: a review, *Sens. J. IEEE* 14 (2014) 2643–2657.

Rado J., Ducso C., Foldes P., et al. 3D force sensors for laparoscopic surgery tool. *Microsystem Technologies-Micro-and Nanosystems-Information Storage and Processing Systems*. 2018;24(1):519-525.

Shanbhag, Patil N. S. BioMEM systems: A novel approach for drug targeting in chronic diseases. *New Horizons in Translational Medicine*. 2017;3(6):265-271.

Silvestri, S. and E. Schena Micromachined Flow Sensors in Biomedical Applications. *Micromachines* 2012, 3, 225-243

Stefanescu D. M., M. A. Anghel, Electrical methods for force measurement - a brief survey, *Measurement* 46 (2013) 949–959.

Stefanescu, D. M., A. T. Farcasiu, A. Toader, Strain gauge force transducer and virtual instrumentation used in a measurement system for retention forces of palatal plates or removable dentures, *Sens. J. IEEE* 12 (2012) 2968–2973.

Tadigadapa, S., and K. Mateti. 2009. Piezoelectric MEMS sensors: state-of-the-art and perspectives. *Measurement Science & Technology* 20, no. 9:092001.

Wei Y. Z., Xu Q. S. An overview of micro-force sensing techniques. *Sensors and Actuators a-Physical*. 2015;234:359-374.

Yousef H. , M. Boukallel, K. Althoefer, Tactile sensing for dexterous in-hand manipulation in robotics—a review, *Sens. Actuators A: Phys.* 167 (2011) 171–187.

Zhang L., J. Dong, Design, fabrication, and testing of a SOI-MEMS-Based active microprobe for potential cellular force sensing applications, *Adv. Mech. Eng.* (2012).

Nanotransducers- Quantum Dots & Nanoparticles

Algar W. R., Susumu K, Delehanty J. B., Medintz I. L.. Semiconductor Quantum Dots in Bioanalysis: Crossing the Valley of Death. *Analytical Chemistry*. 2011;83(23):8826-8837.

Farka, Z. et al., Nanoparticle-based immunochemical biosensors and assays: Recent advances and challenges. *Chemical Reviews*, 2017;117(15) 9973-10042.

Hildebrandt N, Spillmann C. M., Algar W. R., et al. Energy Transfer with Semiconductor Quantum Dot Bioconjugates: A Versatile Platform for Biosensing, Energy Harvesting, and Other Developing Applications. *Chemical Reviews*. 2017;117(2):536-711.

Motaghi H, Mehrgardi M. A. Spectrofluorometric genotyping of single nucleotide polymorphisms using carbon dots as fluorophores. *Spectrochimica Acta Part a-Molecular and Biomolecular Spectroscopy*. 2019;206:154-159.

Petryayeva E, Algar W. R., Medintz I. L. Quantum Dots in Bioanalysis: A Review of Applications Across Various Platforms for Fluorescence Spectroscopy and Imaging. *Applied Spectroscopy*. 2013;67(3):215-252.

Shen, M.-Y., Li, B.-R., & Li, Y.-K. (2014). Silicon nanowire field-effect-transistor based biosensors: From sensitive to ultra-sensitive. *Biosensors and Bioelectronics*, 60, 101–111.
<https://doi.org/10.1016/j.bios.2014.03.057>.

Sposito A. J., Kurdekar A, Zhao J. Q., Hewlett I. Application of nanotechnology in biosensors for enhancing pathogen detection. *Wiley Interdisciplinary Reviews-Nanomedicine and Nanobiotechnology*. 2018;10(5).

Organ-on-a-Chip

Adriani, G., Ma, D., Pavesi, A., Kamm, R. D. & Goh, E. L. A. 3D neurovascular microfluidic model consisting of neurons, astrocytes and cerebral endothelial cells as a blood–brain barrier. *Lab. Chip* (2017).

Bian, W., Badie, N., Himel I. V., H. D. & Bursac, N Robust T- tubulation and maturation of cardiomyocytes using tissue- engineered epicardial mimetics. *Biomaterials* 35, 3819–3828 (2014).

Homan, K. A. et al. Bioprinting of 3D convoluted renal proximal tubules on perfusable chips. *Sci. Rep.* 6, 34845 (2016).

Huh, D. et al. Reconstituting organ- level lung functions on a chip. *Science* 328, 1662–1668 (2010).

Kim, J.-Y. et al. 3D spherical micro-tissues and microfluidic technology for multi- tissue experiments and analysis. *J. Biotechnol.* 205, 24–35 (2015).

Kimura H., Sakai Y., Fujii T. Organ/body-on-a-chip based on microfluidic technology for drug discovery. *Drug Metabolism and Pharmacokinetics*. 2018;33(1):43-48.

Kimura H, Yamamoto T, Sakai H, Sakai Y, Fujii T. An integrated microfluidic system for long-term perfusion culture and on-line monitoring of intestinal tissue models. *Lab a Chip* 2008;8(5):741e6

Lai, B. F. L. et al. InVADE: integrated vasculature for assessing dynamic events. *Adv. Funct. Mater.* <https://doi.org/10.1002/adfm.201703524> (2017).

Maoz, B. M. et al. Organs- on-Chips with combined multi- electrode array and transepithelial electrical resistance measurement capabilities. *Lab. Chip* 17, 2294–2302 (2017).

Maschmeyer, I. et al. *Lab. Chip* 15, 2688–2699 (2015).

Miller, P. G. & Shuler, M. L. *Biotechnol. Bioeng.* 113, 2213–2227(2016).

Nakao Y., Kimura H., Sakai Y., Fujii T. Bile canaliculi formation by aligning rat primary hepatocytes in a microfluidic device. *Biomicrofluidics* 2011;5(2):22212

Phan, D. T. et al. A vascularized and perfused organ- on-a- chip platform for large- scale drug screening applications. *Lab. Chip* 17, 511–520 (2017).

Powers M. J., Domansky K, Kaazempur-Mofrad M. R., Kalezi A, Capitano A, Upadhyaya A, et al. A micro-fabricated array bioreactor for perfused 3D liver culture. *Biotechnol Bioeng* 2002;78(3):257e69.

Prantil-Baun R., Novak R., Das D., Somayaji M. R., Przekwas A, Ingber D. E. Physiologically Based Pharmacokinetic and Pharmacodynamic Analysis Enabled by Microfluidically Linked Organs-on-Chips. In: Insel PA, ed. *Annual Review of Pharmacology and Toxicology*, Vol 58. Vol 58.2018:37-64.

Stoehr, A. et al. Spontaneous formation of extensive vessel- like structures in murine engineered heart tissue. *Tissue Eng. Part A* 22, 326–335 (2016).

Sun, X. & Nunes, S. S. Biowire platform for maturation of human pluripotent stem cell- derived cardiomyocytes *Methods* 101, 21–26 (2016).

Trietsch, S. J. et al. Membrane- free culture and real- time barrier integrity assessment of perfused intestinal epithelium tubes. *Nat. Commun.* 8, 262 (2017).

Verneti, L. et al. Functional coupling of human microphysiology systems: intestine, liver, kidney proximal tubule, blood- brain barrier and skeletal muscle. *Sci. Rep.* 7, 42296 (2017).

Weber, E. J. et al. Development of a microphysiological model of human kidney proximal tubule function. *Kidney Int.* 90, 627–637 (2016).

Zhang B., Korolj A., Lai B. F. L., Radisic M. Advances in organ-on-a-chip engineering. *Nature Reviews Materials*. 2018;3(8):257-278.

Zhang, Y. S. et al. Multisensor- integrated organs-on-chips platform for automated and continual in situ monitoring of organoid behaviors. *Proc. Natl Acad. Sci. USA* 114, E2293–E2302 (2017).

Packaging, Power, Data and RF Safety

Bock, D. C. et al. Batteries used to power implantable biomedical devices. *Electrochimica Acta* 84 (2012) 155– 164

Doherty et al. Transcutaneous powering of implantable micro-stimulators for functional restoration of impaired gastrointestinal motility. *Proceedings of the IEEE Engineering in Medicine and Biology Society* 17-21(2), pp. 1575-1578 (2003)

Hannan, M. A. et al. Energy harvesting for implantable biomedical devices: issues and challenges. *Bio-Medical Engineering OnLine* 2014, 13:79

Joung, Y. Development of implantable medical device: From an engineering perspective. *Int Neurourol J*, 2013;17:98-106

Lueke, J. and W. A. Moussa. MEMS based power generation techniques for implantable biosensing applications. *Sensors* 2011, 11, 1433-1460

Sauer C. et al. Power harvesting and telemetry in CMOS for implanted devices. 2004 IEEE

Polymer Microfabrication

Bertsch, A. et al., Microstereolithography using a liquid crystal display as dynamic generator. *Microsystem Technology* 3(2), pp. 42-47 (1997).

Ermis M., Antmen E., Hasirci V. Micro and Nanofabrication methods to control cell-substrate interactions and cell behavior: A review from the tissue engineering perspective. *Bioactive Materials*. Sep 2018;3(3):355-369. doi:10.1016/j.bioactmat.2018.05.005

Ermis M., Antmen E., Hasirci V. Micro and Nanofabrication methods to control cell-substrate interactions and cell behavior: A review from the tissue engineering perspective. *Bioactive Materials*. Sep 2018;3(3):355-369. doi:10.1016/j.bioactmat.2018.05.005

Gattazzo F., Urciuolo A., Bonaldo P. Extracellular matrix: a dynamic microenvironment for stem cell niche. *Research Support, Non-U.S. Gov't*

Gattazzo F., Urciuolo A., Bonaldo P. Extracellular matrix: a dynamic microenvironment for stem cell niche. *Research Support, Non-U.S. Gov't*

Hecke, M. and W. K. Schomburg, Review on micro molding of thermoplastic polymers. *Journal of Micromechanics and Microengineering* 14(3), pp. 1-14 (2004).

Luttge R. *Nano- and Microfabrication for Industrial and Biomedical Applications*, 2nd Edition. 2016.

Marco, C. D. et al. Surface properties of femtosecond laser ablated PMMA, *AC Appl. Mater. Interfaces* 2(8) (2010) 2377-2384

Nguyen, N. T. and S. T. Wereley, *Fundamentals and Applications of Microfluidics*, Artech House, Boston, MA (2002).

Oosterbroek, R. E. and A. van den Berg, *Lab-on-a-Chip: Miniaturized Systems for (Bio)Chemical Analysis and Synthesis*, 1st ed. Amsterdam, Elsevier (2003).

Ozdil D., Aydin H. M. Polymers for medical and tissue engineering applications.(Report). 2014;89(12):1793.

Review. Biochim Biophys Acta. Aug 2014;1840(8):2506-19.
doi:<https://dx.doi.org/10.1016/j.bbagen.2014.01.010>

Slaughter B. V., Khurshid S. S., Fisher O. Z., Khademhosseini A, Peppas N. A. Hydrogels in Regenerative Medicine. Advanced Materials. 2009;21(32-33):3307-3329.

Suzumori, K. and et al., Microfabrication of integrated FMAs using stereolithography. Proceedings of IEEE MEMS, pp. 136-141 (1994)

Protein Micro Total Analysis Systems

Abel, L. et al. Autoimmune profiling with protein microarrays in clinic applications. Biochimica et Biophysica Acta 1844 (2014) 977–987

Carey, F. A., Advanced Organic Chemistry 5th Ed., 2002

Casado-Vela, J. Screening of protein-protein and protein-DNA inter-actions using microarrays: applications in biomedicine. Advances in Protein Chemistry and Structural Biology, Volume 95, 2014

Cretich, M. et al. Protein microarray technology: how far off are routine diagnostics? Analyst, 2014, 139, 528.

Graves, P. R. and T. A .J. Haystead, Handbook of Proteomic Methods (2003)

Pardanani, A. et al., Mayo Clinic Proceedings 77(11), 2002

Romanov, V. et al. A critical comparison of protein microarray fabrication technologies. Analyst, 2014, 139, 1303-1326.

Sposito A. J., Kurdekar A, Zhao J. Q., Hewlett I. Application of nanotechnology in biosensors for enhancing pathogen detection. Wiley Interdisciplinary Reviews-Nanomedicine and Nanobiotechnology. 2018;10(5).

Sun, Hongyan, et al. Recent advances in microarray technologies for proteomics. Chemistry & Biology 20, May 23, 2013

Vander, A. J., et al., Human Physiology: The Mechanism of Body Function, 8th Ed., 2001