References

[1] H. J. Kim, Y. Kim, S. J. Park, C. Kwon, and H. Noh, "Development of Colorimetric Paper Sensor for Pesticide Detection Using Competitive-inhibiting Reaction," *BioChip J.*, vol. 12, no. 4, pp. 326–331, Dec. 2018, doi: 10.1007/s13206-018-2404-z.

[2] A. Charbaji, H. Heidari-Bafroui, C. Anagnostopoulos, and M. Faghri, "A New Paper-Based Microfluidic Device for Improved Detection of Nitrate in Water," *Sensors*, vol. 21, no. 1, p. 102, Dec. 2020, doi: 10.3390/s21010102.

[3] M. D. Fernández-Ramos, A. L. Ogunneye, N. A. A. Babarinde, M. M. Erenas, and L. F. Capitán-Vallvey, "Bioactive microfluidic paper device for pesticide determination in waters," *Talanta*, vol. 218, p. 121108, Oct. 2020, doi: 10.1016/j.talanta.2020.121108.

[4] J. Qi *et al.*, "Three-dimensional paper-based microfluidic chip device for multiplexed fluorescence detection of Cu2+ and Hg2+ ions based on ion imprinting technology," *Sensors Actuators B Chem.*, vol. 251, pp. 224–233, Nov. 2017, doi: 10.1016/j.snb.2017.05.052.

[5] S. Kasetsirikul, M. Umer, N. Soda, K. R. Sreejith, M. J. A. Shiddiky, and N.-T. Nguyen, "Detection of the SARS-CoV-2 humanized antibody with paper-based ELISA," *Analyst*, vol. 145, no. 23, pp. 7680–7686, 2020, doi: 10.1039/D0AN01609H.

[6] P. A. Owusu, S. A. Sarkodie, and P. A. Pedersen, "Relationship between mortality and health care expenditure: Sustainable assessment of health care system," *PLoS One*, vol. 16, no. 2, p. e0247413, Feb. 2021, doi: 10.1371/journal.pone.0247413.

[7] R. Masoodi and K. M. Pillai, "Darcy's law-based model for wicking in paper-like swelling porous media," *AIChE J.*, vol. 56, no. 9, pp. 2257–2267, Sep. 2010, doi: 10.1002/aic.12163.

[8] R. Masoodi and K. M. Pillai, Eds., *Wicking in Porous Materials*. CRC Press, 2012. doi: 10.1201/b12972.

[9] J. Van der Westhuizen and J. Prieur Du Plessis, "An attempt to quantify fibre bed permeability utilizing the phase average Navier-Stokes equation," *Compos. Part A Appl. Sci. Manuf.*, vol. 27, no. 4, pp. 263–269, Jan. 1996, doi: 10.1016/1359-835X(95)00039-5.

[10] A. Nabovati, E. W. Llewellin, and A. C. M. Sousa, "A general model for the

permeability of fibrous porous media based on fluid flow simulations using the lattice Boltzmann method," *Compos. Part A Appl. Sci. Manuf.*, vol. 40, no. 6–7, pp. 860–869, Jul. 2009, doi: 10.1016/j.compositesa.2009.04.009.

[11] J. R. Choi *et al.*, "Polydimethylsiloxane-Paper Hybrid Lateral Flow Assay for Highly Sensitive Point-of-Care Nucleic Acid Testing," *Anal. Chem.*, vol. 88, no. 12, pp. 6254–6264, Jun. 2016, doi: 10.1021/acs.analchem.6b00195.

[12] A. W. Martinez, S. T. Phillips, M. J. Butte, and G. M. Whitesides, "Patterned Paper as a Platform for Inexpensive, Low-Volume, Portable Bioassays," *Angew. Chemie*, vol. 119, no. 8, pp. 1340–1342, Feb. 2007, doi: 10.1002/ange.200603817.

[13] D. A. Bruzewicz, M. Reches, and G. M. Whitesides, "Low-Cost Printing of Poly(dimethylsiloxane) Barriers To Define Microchannels in Paper," *Anal. Chem.*, vol. 80, no. 9, pp. 3387–3392, May 2008, doi: 10.1021/ac702605a.

[14] A. W. Martinez, S. T. Phillips, and G. M. Whitesides, "Three-dimensional microfluidic devices fabricated in layered paper and tape," *Proc. Natl. Acad. Sci.*, vol. 105, no. 50, pp. 19606–19611, Dec. 2008, doi: 10.1073/pnas.0810903105.

[15] T. Zhu *et al.*, "Continuous-flow ferrohydrodynamic sorting of particles and cells in microfluidic devices," *Microfluid. Nanofluidics*, vol. 13, no. 4, pp. 645–654, Oct. 2012, doi: 10.1007/s10404-012-1004-9.

[16] U. Sen, S. Chatterjee, R. Ganguly, R. Dodge, L. Yu, and C. M. Megaridis, "Scaling Laws in Directional Spreading of Droplets on Wettability-Confined Diverging Tracks," *Langmuir*, vol. 34, no. 5, pp. 1899–1907, Feb. 2018, doi: 10.1021/acs.langmuir.7b03896.

[17] S. Chatterjee *et al.*, "Precise Liquid Transport on and through Thin Porous Materials," *Langmuir*, vol. 34, no. 8, pp. 2865–2875, Feb. 2018, doi: 10.1021/acs.langmuir.7b04093.

[18] A. W. Martinez, S. T. Phillips, G. M. Whitesides, and E. Carrilho, "Diagnostics for the Developing World: Microfluidic Paper-Based Analytical Devices," *Anal. Chem.*, vol. 82, no. 1, pp. 3–10, Jan. 2010, doi: 10.1021/ac9013989.

[19] A. W. Martinez, S. T. Phillips, E. Carrilho, S. W. Thomas, H. Sindi, and G. M. Whitesides, "Simple Telemedicine for Developing Regions: Camera Phones and Paper-

Based Microfluidic Devices for Real-Time, Off-Site Diagnosis,” *Anal. Chem.*, vol. 80, no. 10, pp. 3699–3707, May 2008, doi: 10.1021/ac800112r.

[20] A. W. Martinez, S. T. Phillips, B. J. Wiley, M. Gupta, and G. M. Whitesides, “FLASH: A rapid method for prototyping paper-based microfluidic devices,” *Lab Chip*, vol. 8, no. 12, p. 2146, 2008, doi: 10.1039/b811135a.

[21] W. Dungchai, O. Chailapakul, and C. S. Henry, “Electrochemical Detection for Paper-Based Microfluidics,” *Anal. Chem.*, vol. 81, no. 14, pp. 5821–5826, Jul. 2009, doi: 10.1021/ac9007573.

[22] M. M. Thuo *et al.*, “Fabrication of Low-Cost Paper-Based Microfluidic Devices by Embossing or Cut-and-Stack Methods,” *Chem. Mater.*, vol. 26, no. 14, pp. 4230–4237, Jul. 2014, doi: 10.1021/cm501596s.

[23] K. Abe, K. Suzuki, and D. Citterio, “Inkjet-Printed Microfluidic Multianalyte Chemical Sensing Paper,” *Anal. Chem.*, vol. 80, no. 18, pp. 6928–6934, Sep. 2008, doi: 10.1021/ac800604v.

[24] X. Li, J. Tian, G. Garnier, and W. Shen, “Fabrication of paper-based microfluidic sensors by printing,” *Colloids Surfaces B Biointerfaces*, vol. 76, no. 2, pp. 564–570, Apr. 2010, doi: 10.1016/j.colsurfb.2009.12.023.

[25] J. L. Delaney, C. F. Hogan, J. Tian, and W. Shen, “Electrogenerated Chemiluminescence Detection in Paper-Based Microfluidic Sensors,” *Anal. Chem.*, vol. 83, no. 4, pp. 1300–1306, Feb. 2011, doi: 10.1021/ac102392t.

[26] X. Li, J. Tian, T. Nguyen, and W. Shen, “Paper-Based Microfluidic Devices by Plasma Treatment,” *Anal. Chem.*, vol. 80, no. 23, pp. 9131–9134, Dec. 2008, doi: 10.1021/ac801729t.

[27] E. Carrilho, A. W. Martinez, and G. M. Whitesides, “Understanding Wax Printing: A Simple Micropatterning Process for Paper-Based Microfluidics,” *Anal. Chem.*, vol. 81, no. 16, pp. 7091–7095, Aug. 2009, doi: 10.1021/ac901071p.

[28] Y. Lu, W. Shi, L. Jiang, J. Qin, and B. Lin, “Rapid prototyping of paper-based microfluidics with wax for low-cost, portable bioassay,” *Electrophoresis*, vol. 30, no. 9, pp. 1497–1500, May 2009, doi: 10.1002/elps.200800563.

[29] Y. Lu, W. Shi, J. Qin, and B. Lin, “Fabrication and Characterization of Paper-Based

Microfluidics Prepared in Nitrocellulose Membrane By Wax Printing," *Anal. Chem.*, vol. 82, no. 1, pp. 329–335, Jan. 2010, doi: 10.1021/ac9020193.

[30] G. Chitnis, Z. Ding, C.-L. Chang, C. A. Savran, and B. Ziaie, "Laser-treated hydrophobic paper: an inexpensive microfluidic platform," *Lab Chip*, vol. 11, no. 6, p. 1161, 2011, doi: 10.1039/c0lc00512f.

[31] Y. Zhang, J. Liu, H. Wang, and Y. Fan, "Laser-induced selective wax reflow for paper-based microfluidics," *RSC Adv.*, vol. 9, no. 20, pp. 11460–11464, 2019, doi: 10.1039/C9RA00610A.

[32] J. Wang, J. X. H. Wong, H. Kwok, X. Li, and H.-Z. Yu, "Facile Preparation of Nanostructured, Superhydrophobic Filter Paper for Efficient Water/Oil Separation," *PLoS One*, vol. 11, no. 3, p. e0151439, Mar. 2016, doi: 10.1371/journal.pone.0151439.

[33] A. Baidya *et al.*, "Organic Solvent-Free Fabrication of Durable and Multifunctional Superhydrophobic Paper from Waterborne Fluorinated Cellulose Nanofiber Building Blocks," *ACS Nano*, vol. 11, no. 11, pp. 11091–11099, Nov. 2017, doi: 10.1021/acsnano.7b05170.

[34] T. Lam, J. P. Devadhasan, R. Howse, and J. Kim, "A Chemically Patterned Microfluidic Paper-based Analytical Device (C-µPAD) for Point-of-Care Diagnostics," *Sci. Rep.*, vol. 7, no. 1, p. 1188, Apr. 2017, doi: 10.1038/s41598-017-01343-w.

[35] P. Kwong and M. Gupta, "Vapor Phase Deposition of Functional Polymers onto Paper-Based Microfluidic Devices for Advanced Unit Operations," *Anal. Chem.*, vol. 84, no. 22, pp. 10129–10135, Nov. 2012, doi: 10.1021/ac302861v.

[36] M. Pascual, M. Kerdraon, Q. Rezard, M.-C. Jullien, and L. Champougny, "Wettability patterning in microfluidic devices using thermally-enhanced hydrophobic recovery of PDMS," *Soft Matter*, vol. 15, no. 45, pp. 9253–9260, 2019, doi: 10.1039/C9SM01792E.

[37] N. N. Hamidon, Y. Hong, G. I. Salentijn, and E. Verpoorte, "Water-based alkyl ketene dimer ink for user-friendly patterning in paper microfluidics," *Anal. Chim. Acta*, vol. 1000, pp. 180–190, Feb. 2018, doi: 10.1016/j.aca.2017.10.040.

[38] T. L. Mako and M. Levine, "Design, Implementation, and Evaluation of Paper-Based Devices for the Detection of Acetaminophen and Phenacetin in an Advanced Undergraduate Laboratory," *J. Chem. Educ.*, vol. 96, no. 8, pp. 1719–1726, Aug. 2019,

doi: 10.1021/acs.jchemed.9b00028.

[39] N. K. Mani, A. Prabhu, S. K. Biswas, and S. Chakraborty, "Fabricating Paper Based Devices Using Correction Pens," *Sci. Rep.*, vol. 9, no. 1, p. 1752, Feb. 2019, doi: 10.1038/s41598-018-38308-6.

[40] R. Ghosh, S. Gopalakrishnan, R. Savitha, T. Renganathan, and S. Pushpavanam, "Fabrication of laser printed microfluidic paper-based analytical devices (LP-µPADs) for point-of-care applications," *Sci. Rep.*, vol. 9, no. 1, p. 7896, May 2019, doi: 10.1038/s41598-019-44455-1.

[41] E. M. Fenton, M. R. Mascarenas, G. P. López, and S. S. Sibbett, "Multiplex Lateral-Flow Test Strips Fabricated by Two-Dimensional Shaping," *ACS Appl. Mater. Interfaces*, vol. 1, no. 1, pp. 124–129, Jan. 2009, doi: 10.1021/am800043z.

[42] E. Evans, E. F. M. Gabriel, W. K. T. Coltro, and C. D. Garcia, "Rational selection of substrates to improve color intensity and uniformity on microfluidic paper-based analytical devices," *Analyst*, vol. 139, no. 9, pp. 2127–2132, 2014, doi: 10.1039/C4AN00230J.

[43] H. A. Silva-Neto *et al.*, "Recent advances on paper-based microfluidic devices for bioanalysis," *TrAC Trends Anal. Chem.*, vol. 158, p. 116893, Jan. 2023, doi: 10.1016/j.trac.2022.116893.

[44] T. M. G. Cardoso, R. B. Channon, J. A. Adkins, M. Talhavini, W. K. T. Coltro, and C. S. Henry, "A paper-based colorimetric spot test for the identification of adulterated whiskeys," *Chem. Commun.*, vol. 53, no. 56, pp. 7957–7960, 2017, doi: 10.1039/C7CC02271A.

[45] C. Duangdeewong, J. Sitanurak, P. Wilairat, D. Nacapricha, and S. Teerasong, "Microfluidic paper-based analytical device for convenient use in measurement of iodate in table salt and irrigation water," *Microchem. J.*, vol. 152, p. 104447, Jan. 2020, doi: 10.1016/j.microc.2019.104447.

[46] V. Ortone, L. Matino, F. Santoro, and S. Cinti, "Merging office/filter paper-based tools for pre-concentring and detecting heavy metals in drinking water," *Chem. Commun.*, vol. 57, no. 58, pp. 7100–7103, 2021, doi: 10.1039/D1CC02481G.

[47] Q. Wang *et al.*, "Double quantum dots-nanoporphyrin fluorescence-visualized paper-

based sensors for detecting organophosphorus pesticides," *Talanta*, vol. 199, pp. 46–53, Jul. 2019, doi: 10.1016/j.talanta.2019.02.023.

[48] K. Yamada, H. Shibata, K. Suzuki, and D. Citterio, "Toward practical application of paper-based microfluidics for medical diagnostics: state-of-the-art and challenges," *Lab Chip*, vol. 17, no. 7, pp. 1206–1249, 2017, doi: 10.1039/C6LC01577H.

[49] C.-T. Kung, C.-Y. Hou, Y.-N. Wang, and L.-M. Fu, "Microfluidic paper-based analytical devices for environmental analysis of soil, air, ecology and river water," *Sensors Actuators B Chem.*, vol. 301, p. 126855, Dec. 2019, doi: 10.1016/j.snb.2019.126855.

[50] E. W. Nery and L. T. Kubota, "Sensing approaches on paper-based devices: a review," *Anal. Bioanal. Chem.*, vol. 405, no. 24, pp. 7573–7595, Sep. 2013, doi: 10.1007/s00216-013-6911-4.

[51] J. M. Morrissette, P. S. Mahapatra, A. Ghosh, R. Ganguly, and C. M. Megaridis, "Rapid, Self-driven Liquid Mixing on Open-Surface Microfluidic Platforms," *Sci. Rep.*, vol. 7, no. 1, p. 1800, May 2017, doi: 10.1038/s41598-017-01725-0.

[52] C. F. Nascimento, P. M. Santos, E. R. Pereira-Filho, and F. R. P. Rocha, "Recent advances on determination of milk adulterants," *Food Chem.*, vol. 221, pp. 1232–1244, Apr. 2017, doi: 10.1016/j.foodchem.2016.11.034.

[53] A. Nilghaz, S. M. Mousavi, M. Li, J. Tian, R. Cao, and X. Wang, "Paper-based microfluidics for food safety and quality analysis," *Trends Food Sci. Technol.*, vol. 118, pp. 273–284, Dec. 2021, doi: 10.1016/j.tifs.2021.08.029.

[54] E. F. O'Connor, S. Paterson, and R. de la Rica, "Naked-eye detection as a universal approach to lower the limit of detection of enzyme-linked immunoassays," *Anal. Bioanal. Chem.*, vol. 408, no. 13, pp. 3389–3393, May 2016, doi: 10.1007/s00216-016-9453-8.

[55] T. R. L. C. Paixão and M. Bertotti, "Fabrication of disposable voltammetric electronic tongues by using Prussian Blue films electrodeposited onto CD-R gold surfaces and recognition of milk adulteration," *Sensors Actuators B Chem.*, vol. 137, no. 1, pp. 266–273, Mar. 2009, doi: 10.1016/j.snb.2008.10.045.

[56] B. Asci Erkocyigit, O. Ozufuklar, A. Yardim, E. Guler Celik, and S. Timur, "Biomarker

Detection in Early Diagnosis of Cancer: Recent Achievements in Point-of-Care Devices Based on Paper Microfluidics," *Biosensors*, vol. 13, no. 3, p. 387, Mar. 2023, doi: 10.3390/bios13030387.

[57] L. Magro *et al.*, "Paper microfluidics for nucleic acid amplification testing (NAAT) of infectious diseases," *Lab Chip*, vol. 17, no. 14, pp. 2347–2371, 2017, doi: 10.1039/C7LC00013H.

[58] X. Weng and S. Neethirajan, "Ensuring food safety: Quality monitoring using microfluidics," *Trends Food Sci. Technol.*, vol. 65, pp. 10–22, Jul. 2017, doi: 10.1016/j.tifs.2017.04.015.

[59] M. I. G. S. Almeida, B. M. Jayawardane, S. D. Kolev, and I. D. McKelvie, "Developments of microfluidic paper-based analytical devices (μPADs) for water analysis: A review," *Talanta*, vol. 177, pp. 176–190, Jan. 2018, doi: 10.1016/j.talanta.2017.08.072.

[60] A. T. Jafry, H. Lim, S. Il Kang, J. W. Suk, and J. Lee, "A comparative study of paper-based microfluidic devices with respect to channel geometry," *Colloids Surfaces A Physicochem. Eng. Asp.*, vol. 492, pp. 190–198, Mar. 2016, doi: 10.1016/j.colsurfa.2015.12.033.

[61] D. Rath, N. Sathishkumar, and B. J. Toley, "Experimental Measurement of Parameters Governing Flow Rates and Partial Saturation in Paper-Based Microfluidic Devices," *Langmuir*, vol. 34, no. 30, pp. 8758–8766, Jul. 2018, doi: 10.1021/acs.langmuir.8b01345.

[62] S. Modha, C. Castro, and H. Tsutsui, "Recent developments in flow modeling and fluid control for paper-based microfluidic biosensors," *Biosens. Bioelectron.*, vol. 178, p. 113026, Apr. 2021, doi: 10.1016/j.bios.2021.113026.

[63] R. B. Channon, M. P. Nguyen, C. S. Henry, and D. S. Dandy, "Multilayered Microfluidic Paper-Based Devices: Characterization, Modeling, and Perspectives," *Anal. Chem.*, vol. 91, no. 14, pp. 8966–8972, Jul. 2019, doi: 10.1021/acs.analchem.9b01112.

[64] H. Asadi, M. Pourjafar-Chelikdani, N. P. Khabazi, and K. Sadeghy, "Quasi-steady imbibition of physiological liquids in paper-based microfluidic kits: Effect of shear-

thinning," *Phys. Fluids*, vol. 34, no. 12, Dec. 2022, doi: 10.1063/5.0131335.

[65] G. S. Gerlero, A. R. Valdez, R. Urteaga, and P. A. Kler, "Validity of Capillary Imbibition Models in Paper-Based Microfluidic Applications," *Transp. Porous Media*, vol. 141, no. 2, pp. 359–378, Jan. 2022, doi: 10.1007/s11242-021-01724-w.

[66] C. Castro, C. Rosillo, and H. Tsutsui, "Characterizing effects of humidity and channel size on imbibition in paper-based microfluidic channels," *Microfluid. Nanofluidics*, vol. 21, no. 2, p. 21, Feb. 2017, doi: 10.1007/s10404-017-1860-4.

[67] Y. Wang *et al.*, "Spontaneous Imbibition in Paper-Based Microfluidic Devices: Experiments and Numerical Simulations," *Langmuir*, vol. 38, no. 8, pp. 2677–2685, Mar. 2022, doi: 10.1021/acs.langmuir.1c03403.

[68] M. Boodaghi and A. Shamloo, "Effects of wax boundaries in combination with evaporation on dynamics of fluid flow in paper-based devices," *Surfaces and Interfaces*, vol. 21, p. 100684, Dec. 2020, doi: 10.1016/j.surfin.2020.100684.

[69] Anushka, A. Bandopadhyay, and P. K. Das, "Paper based microfluidic devices: a review of fabrication techniques and applications," *Eur. Phys. J. Spec. Top.*, vol. 232, no. 6, pp. 781–815, Jun. 2023, doi: 10.1140/epjs/s11734-022-00727-y.

[70] I. I. Gringorten, "Envelopes for ordered observations applied to meteorological extremes," *J. Geophys. Res.*, vol. 68, no. 3, pp. 815–826, Feb. 1963, doi: 10.1029/JZ068i003p00815.

[71] J. Park, J. Shin, and J.-K. Park, "Experimental Analysis of Porosity and Permeability in Pressed Paper," *Micromachines*, vol. 7, no. 3, p. 48, Mar. 2016, doi: 10.3390/mi7030048.

[72] J. Harkness, "The viscosity of human blood plasma; its measurement in health and disease.," *Biorheology*, vol. 8, no. 3, pp. 171–193, 1971, doi: 10.3233/BIR-1971-83-408.

[73] M. E. Pickup, J. S. Dixon, C. Hallett, H. A. Bird, and V. Wright, "Plasma viscosity - A new appraisal of its use as an index of disease activity in rheumatoid arthritis," *Ann. Rheum. Dis.*, vol. 40, no. 3, pp. 272–275, 1981, doi: 10.1136/ard.40.3.272.

[74] R. Junker *et al.*, "Relationship between plasma viscosity and the severity of coronary heart disease," *Arterioscler. Thromb. Vasc. Biol.*, vol. 18, no. 6, pp. 870–875, 1998, doi:

10.1161/01.ATV.18.6.870.

[75] G. G. Ranade, R. R. Puniyani, N. G. Huilgol, and M. M. Khan, “Application of plasma viscosity to assess the status of cancer patients,” *Clin. Hemorheol. Microcirc.*, vol. 15, no. 5, pp. 755–761, 1995, doi: 10.3233/CH-1995-15507.

[76] G. Késmárky, P. Kenyeres, M. Rábai, and K. Tóth, “Plasma viscosity: A forgotten variable,” *Clin. Hemorheol. Microcirc.*, vol. 39, no. 1–4, pp. 243–246, 2008, doi: 10.3233/CH-2008-1088.

[77] T. Somer, “4 Rheology of paraproteinaemias and the plasma hyperviscosity syndrome,” *Baillieres. Clin. Haematol.*, vol. 1, no. 3, pp. 695–723, 1987, doi: 10.1016/S0950-3536(87)80021-5.

[78] T. Somer and H. J. Meiselman, “Disorders of blood viscosity,” *Ann. Med.*, vol. 25, no. 1, pp. 31–39, 1993, doi: 10.3109/07853899309147854.

[79] M. J. Stone and S. A. Bogen, “Evidence-based focused review of management of hyperviscosity syndrome,” *Blood*, vol. 119, no. 10, pp. 2205–2208, 2012, doi: 10.1182/blood-2011-04-347690.

[80] R. Rosencranz and S. A. Bogen, “Clinical laboratory measurement of serum, plasma, and blood viscosity.,” *Am. J. Clin. Pathol.*, vol. 125 Suppl, 2006, doi: 10.1309/fff7u8rrpk26vapy.

[81] D. H. Lee, J. M. Jung, S. Y. Kim, K. T. Kim, and Y. I. Cho, “Comparison tests for plasma viscosity measurements,” *Int. Commun. Heat Mass Transf.*, vol. 39, no. 10, pp. 1474–1477, Dec. 2012, doi: 10.1016/j.icheatmasstransfer.2012.10.018.

[82] T.-A. Lee, W.-H. Liao, Y.-F. Wu, Y.-L. Chen, and Y.-C. Tung, “Electrofluidic Circuit-Based Microfluidic Viscometer for Analysis of Newtonian and Non-Newtonian Liquids under Different Temperatures,” *Anal. Chem.*, vol. 90, no. 3, pp. 2317–2325, Feb. 2018, doi: 10.1021/acs.analchem.7b04779.

[83] N. Srivastava, R. D. Davenport, and M. A. Burns, “Nanoliter Viscometer for Analyzing Blood Plasma and Other Liquid Samples,” *Anal. Chem.*, vol. 77, no. 2, pp. 383–392, Jan. 2005, doi: 10.1021/ac0494681.

[84] Z. Han, X. Tang, and B. Zheng, “A PDMS viscometer for microliter Newtonian fluid,” *J. Micromechanics Microengineering*, vol. 17, no. 9, pp. 1828–1834, Sep. 2007, doi:

10.1088/0960-1317/17/9/011.

[85] Y. Jun Kang, J. Ryu, and S.-J. Lee, "Label-free viscosity measurement of complex fluids using reversal flow switching manipulation in a microfluidic channel," *Biomicrofluidics*, vol. 7, no. 4, p. 044106, Jul. 2013, doi: 10.1063/1.4816713.

[86] M. F. Khan *et al.*, "Online measurement of mass density and viscosity of pL fluid samples with suspended microchannel resonator," *Sensors Actuators, B Chem.*, vol. 185, pp. 456–461, 2013, doi: 10.1016/j.snb.2013.04.095.

[87] W. J. Lan, S. W. Li, J. H. Xu, and G. S. Luo, "Rapid measurement of fluid viscosity using co-flowing in a co-axial microfluidic device," *Microfluid. Nanofluidics*, vol. 8, no. 5, pp. 687–693, 2010, doi: 10.1007/s10404-009-0540-4.

[88] Y. J. Kang, S. Y. Yoon, K.-H. Lee, and S. Yang, "A Highly Accurate and Consistent Microfluidic Viscometer for Continuous Blood Viscosity Measurement," *Artif. Organs*, vol. 34, no. 11, pp. 944–949, Nov. 2010, doi: 10.1111/j.1525-1594.2010.01078.x.

[89] P. Arosio, K. Hu, F. A. Aprile, T. Müller, and T. P. J. Knowles, "Microfluidic Diffusion Viscometer for Rapid Analysis of Complex Solutions," *Anal. Chem.*, vol. 88, no. 7, pp. 3488–3493, 2016, doi: 10.1021/acs.analchem.5b02930.

[90] T. V. Nguyen, M. D. Nguyen, H. Takahashi, K. Matsumoto, and I. Shimoyama, "Viscosity measurement based on the tapping-induced free vibration of sessile droplets using MEMS-based piezoresistive cantilevers," *Lab Chip*, vol. 15, no. 18, pp. 3670–3676, 2015, doi: 10.1039/c5lc00661a.

[91] I. Puchades and L. F. Fuller, "A thermally actuated microelectromechanical (MEMS) device for measuring viscosity," *J. Microelectromechanical Syst.*, vol. 20, no. 3, pp. 601–608, 2011, doi: 10.1109/JMEMS.2011.2127447.

[92] S. Kuenzi, E. Meurville, E. Grandjean, S. Straessler, and P. Ryser, "Contactless rotational concentric microviscometer," *Sensors Actuators, A Phys.*, vol. 167, no. 2, pp. 194–203, 2011, doi: 10.1016/j.sna.2011.02.005.

[93] A. W. Martinez, S. T. Phillips, M. J. Butte, and G. M. Whitesides, "Patterned Paper as a Platform for Inexpensive, Low-Volume, Portable Bioassays," *Angew. Chemie*, vol. 119, no. 8, pp. 1340–1342, 2007, doi: 10.1002/ange.200603817.

[94] Y. Yang, E. Noviana, M. P. Nguyen, B. J. Geiss, D. S. Dandy, and C. S. Henry, "Paper-

Based Microfluidic Devices: Emerging Themes and Applications," *Anal. Chem.*, vol. 89, no. 1, pp. 71–91, 2017, doi: 10.1021/acs.analchem.6b04581.

[95] S. Chang, J. Seo, S. Hong, D. G. Lee, and W. Kim, "Dynamics of liquid imbibition through paper with intra-fibre pores," *J. Fluid Mech.*, vol. 845, pp. 36–50, 2018, doi: 10.1017/jfm.2018.235.

[96] S. Hong, R. Kwak, and W. Kim, "Paper-Based Flow Fractionation System Applicable to Preconcentration and Field-Flow Separation," *Anal. Chem.*, vol. 88, no. 3, pp. 1682–1687, 2016, doi: 10.1021/acs.analchem.5b03682.

[97] X. Wei *et al.*, "Microfluidic Distance Readout Sweet Hydrogel Integrated Paper-Based Analytical Device (μDiSH-PAD) for Visual Quantitative Point-of-Care Testing," *Anal. Chem.*, vol. 88, no. 4, pp. 2345–2352, 2016, doi: 10.1021/acs.analchem.5b04294.

[98] M. S. Akram, R. Daly, F. da Cruz Vasconcellos, A. K. Yetisen, I. Hutchings, and E. A. H. Hall, "Applications of Paper-Based Diagnostics," in *Lab-on-a-Chip Devices and Micro-Total Analysis Systems*, Cham: Springer International Publishing, 2015, pp. 161–195. doi: 10.1007/978-3-319-08687-3_7.

[99] Z. Liu *et al.*, "Facile method for the hydrophobic modification of filter paper for applications in water-oil separation," *Surf. Coatings Technol.*, vol. 352, pp. 313–319, 2018, doi: 10.1016/j.surfcoat.2018.08.026.

[100] S. M. Partridge, "Filter-paper partition chromatography of sugars," *Biochem. J.*, vol. 42, no. 2, pp. 251–253, 1948, doi: 10.1042/bj0420251.

[101] L. S. A. Busa, S. Mohammadi, M. Maeki, A. Ishida, H. Tani, and M. Tokeshi, "Advances in microfluidic paper-based analytical devices for food and water analysis," *Micromachines*, vol. 7, no. 5, 2016, doi: 10.3390/mi7050086.

[102] S. A. Klasner, A. K. Price, K. W. Hoeman, R. S. Wilson, K. J. Bell, and C. T. Culbertson, "Paper-based microfluidic devices for analysis of clinically relevant analytes present in urine and saliva," *Anal. Bioanal. Chem.*, vol. 397, no. 5, pp. 1821–1829, 2010, doi: 10.1007/s00216-010-3718-4.

[103] D. Das, T. Singh, I. Ahmed, M. Masetty, and A. Priye, "Effects of Relative Humidity and Paper Geometry on the Imbibition Dynamics and Reactions in Lateral Flow Assays," *Langmuir*, vol. 38, no. 32, pp. 9863–9873, 2022, doi:

10.1021/acs.langmuir.2c01017.

[104] Y. Xu *et al.*, “Paper-based wearable electronics,” *iScience*, vol. 24, no. 7, p. 102736, Jul. 2021, doi: 10.1016/j.isci.2021.102736.

[105] A. W. Martinez, S. T. Phillips, M. J. Butte, and G. M. Whitesides, “Patterned Paper as a Platform for Inexpensive, Low-Volume, Portable Bioassays,” *Angew. Chemie*, vol. 119, no. 8, pp. 1340–1342, Feb. 2007, doi: 10.1002/ange.200603817.

[106] B. Li, L. Yu, J. Qi, L. Fu, P. Zhang, and L. Chen, “Controlling Capillary-Driven Fluid Transport in Paper-Based Microfluidic Devices Using a Movable Valve,” *Anal. Chem.*, vol. 89, no. 11, pp. 5707–5712, Jun. 2017, doi: 10.1021/acs.analchem.7b00726.

[107] T. Songjaroen, W. Dungchai, O. Chailapakul, C. S. Henry, and W. Laiwattanapaisal, “Blood separation on microfluidic paper-based analytical devices,” *Lab Chip*, vol. 12, no. 18, pp. 3392–3398, 2012, doi: 10.1039/c2lc21299d.

[108] J. Yan, M. Yan, L. Ge, S. Ge, and J. Yu, “An origami electrochemiluminescence immunosensor based on gold/graphene for specific, sensitive point-of-care testing of carcinoembryonic antigen,” *Sensors Actuators, B Chem.*, vol. 193, pp. 247–254, 2014, doi: 10.1016/j.snb.2013.11.107.

[109] J. R. Choi *et al.*, “An integrated paper-based sample-to-answer biosensor for nucleic acid testing at the point of care,” *Lab Chip*, vol. 16, no. 3, pp. 611–621, 2016, doi: 10.1039/c5lc01388g.

[110] D. M. Cate, W. Dungchai, J. C. Cunningham, J. Volckens, and C. S. Henry, “Simple, distance-based measurement for paper analytical devices,” *Lab Chip*, vol. 13, no. 12, pp. 2397–2404, 2013, doi: 10.1039/c3lc50072a.

[111] N. R. Pollock *et al.*, “A paper-based multiplexed transaminase test for low-cost, point-of-care liver function testing,” *Sci. Transl. Med.*, vol. 4, no. 152, 2012, doi: 10.1126/scitranslmed.3003981.

[112] H. Li, D. Han, G. M. Pauletti, and A. J. Steckl, “Blood coagulation screening using a paper-based microfluidic lateral flow device,” *Lab Chip*, vol. 14, no. 20, pp. 4035–4041, 2014, doi: 10.1039/C4LC00716F.

[113] E. Elizalde, R. Urteaga, and C. L. A. Berli, “Precise capillary flow for paper-based viscometry,” *Microfluid. Nanofluidics*, vol. 20, no. 10, p. 135, Oct. 2016, doi:

10.1007/s10404-016-1800-8.

[114] A. Rayaprolu, S. K. Srivastava, K. Anand, L. Bhati, A. Asthana, and C. M. Rao, “Fabrication of cost-effective and efficient paper-based device for viscosity measurement,” *Anal. Chim. Acta*, vol. 1044, pp. 86–92, Dec. 2018, doi: 10.1016/j.aca.2018.05.036.

[115] E. W. Washburn, “The dynamics of capillary flow,” *Phys. Rev.*, vol. 17, no. 3, pp. 273–283, 1921, doi: 10.1103/PhysRev.17.273.

[116] I. Jang, K. E. Berg, and C. S. Henry, “Viscosity measurements utilizing a fast-flow microfluidic paper-based device,” *Sensors Actuators B Chem.*, vol. 319, p. 128240, Sep. 2020, doi: 10.1016/j.snb.2020.128240.

[117] Y. Xia, J. Si, and Z. Li, “Fabrication techniques for microfluidic paper-based analytical devices and their applications for biological testing: A review,” *Biosens. Bioelectron.*, vol. 77, pp. 774–789, 2016, doi: 10.1016/j.bios.2015.10.032.

[118] S. Chattopadhyay, R. Ram, A. Sarkar, and S. Chakraborty, “Smartphone-based automated estimation of plasma creatinine from finger-pricked blood on a paper strip via single-user step sample-to-result integration,” *Meas. J. Int. Meas. Confed.*, vol. 199, 2022, doi: 10.1016/j.measurement.2022.111492.

[119] Y. Wang *et al.*, “Spontaneous Imbibition in Paper-Based Microfluidic Devices: Experiments and Numerical Simulations,” *Langmuir*, vol. 38, no. 8, pp. 2677–2685, 2022, doi: 10.1021/acs.langmuir.1c03403.

[120] A. T. Jafry, H. Lim, S. Il Kang, J. W. Suk, and J. Lee, “A comparative study of paper-based microfluidic devices with respect to channel geometry,” *Colloids Surfaces A Physicochem. Eng. Asp.*, vol. 492, pp. 190–198, 2016, doi: 10.1016/j.colsurfa.2015.12.033.

[121] J. Saidykhan, L. Selevic, S. Cinti, J. E. May, and A. J. Killard, “Paper-Based Lateral Flow Device for the Sustainable Measurement of Human Plasma Fibrinogen in Low-Resource Settings,” *Anal. Chem.*, vol. 93, no. 41, pp. 14007–14013, 2021, doi: 10.1021/acs.analchem.1c03665.

[122] M. Stange, M. E. Dreyer, and H. J. Rath, “Capillary driven flow in circular cylindrical tubes,” *Phys. Fluids*, vol. 15, no. 9, pp. 2587–2601, Sep. 2003, doi: 10.1063/1.1596913.

[123] J. Cai, T. Jin, J. Kou, S. Zou, J. Xiao, and Q. Meng, “Lucas–Washburn Equation-Based Modeling of Capillary-Driven Flow in Porous Systems,” *Langmuir*, vol. 37, no. 5, pp. 1623–1636, Feb. 2021, doi: 10.1021/acs.langmuir.0c03134.

[124] V. Srinivasan, V. K. Pamula, and R. B. Fair, “An integrated digital microfluidic lab-on-a-chip for clinical diagnostics on human physiological fluidsThe Science and Application of Droplets in Microfluidic Devices.Electronic supplementary information (ESI) available: five video clips showing: high-spe,” *Lab Chip*, vol. 4, no. 4, p. 310, 2004, doi: 10.1039/b403341h.

[125] P. Sahatiya, A. Kadu, H. Gupta, P. Thanga Gomathi, and S. Badhulika, “Flexible, Disposable Cellulose-Paper-Based MoS 2 /Cu 2 S Hybrid for Wireless Environmental Monitoring and Multifunctional Sensing of Chemical Stimuli,” *ACS Appl. Mater. Interfaces*, vol. 10, no. 10, pp. 9048–9059, Mar. 2018, doi: 10.1021/acsami.8b00245.

[126] R. Ram, N. Gautam, P. Paik, S. Kumar, and A. Sarkar, “A novel and low-cost smartphone integrated paper-based sensor for measuring starch adulteration in milk,” *Microfluid. Nanofluidics*, vol. 26, no. 12, p. 103, Dec. 2022, doi: 10.1007/s10404-022-02607-2.

[127] S. Shariati and G. Khayatian, “Microfluidic paper-based analytical device,” pp. 18662–18667, 2020, doi: 10.1039/d0nj03986a.

[128] T. Songjaroen, W. Dungchai, O. Chailapakul, and W. Laiwattanapaisal, “Novel, simple and low-cost alternative method for fabrication of paper-based microfluidics by wax dipping,” *Talanta*, vol. 85, no. 5, pp. 2587–2593, 2011, doi: 10.1016/j.talanta.2011.08.024.

[129] S. Boonkaew, P. Teengam, S. Jampasa, S. Rengpipat, W. Siangproh, and O. Chailapakul, “Cost-effective paper-based electrochemical immunosensor using a label-free assay for sensitive detection of ferritin,” *Analyst*, vol. 145, no. 14, pp. 5019–5026, 2020, doi: 10.1039/d0an00564a.

[130] G. Chitnis, Z. Ding, C.-L. Chang, C. A. Savran, and B. Ziaie, “Laser-treated hydrophobic paper: an inexpensive microfluidic platform,” *Lab Chip*, vol. 11, no. 6, p. 1161, 2011, doi: 10.1039/c0lc00512f.

[131] J. Noiphung, T. Songjaroen, W. Dungchai, C. S. Henry, O. Chailapakul, and W.

Laiwattanapaisal, “Electrochemical detection of glucose from whole blood using paper-based microfluidic devices,” *Anal. Chim. Acta*, vol. 788, pp. 39–45, Jul. 2013, doi: 10.1016/j.aca.2013.06.021.

[132] J. Olkkonen, K. Lehtinen, and T. Erho, “Flexographically Printed Fluidic Structures in Paper,” *Anal. Chem.*, vol. 82, no. 24, pp. 10246–10250, Dec. 2010, doi: 10.1021/ac1027066.

[133] H. Kang, I. Jang, S. Song, and S. C. Bae, “Development of a Paper-Based Viscometer for Blood Plasma Using Colorimetric Analysis,” *Anal. Chem.*, vol. 91, no. 7, pp. 4868–4875, 2019, doi: 10.1021/acs.analchem.9b00624.

[134] N. Gautam, R. Verma, R. Ram, J. Singh, and A. Sarkar, “Development of a biodegradable microfluidic paper-based device for blood-plasma separation integrated with non-enzymatic electrochemical detection of ascorbic acid,” *Talanta*, vol. 266, p. 125019, Jan. 2024, doi: 10.1016/j.talanta.2023.125019.

[135] S. Kainth, B. Maity, and S. Basu, “Label-free detection of creatinine using nitrogen-passivated fluorescent carbon dots,” *RSC Adv.*, vol. 10, no. 60, pp. 36253–36264, 2020, doi: 10.1039/D0RA06512A.

[136] N. Gautam, R. Ram, V. Bishnoi, and A. Sarkar, “A low-cost and disposable capillary-based paper sensor for measuring blood-plasma viscosity using a smartphone app,” *Microfluid. Nanofluidics*, vol. 27, no. 6, p. 41, Jun. 2023, doi: 10.1007/s10404-023-02653-4.

[137] J. Coresh *et al.*, “Prevalence of Chronic Kidney Disease in the United States,” *JAMA*, vol. 298, no. 17, p. 2038, Nov. 2007, doi: 10.1001/jama.298.17.2038.

[138] M. Tadele, L. Karamchand, N. R. Hendricks, and J. M. Blackburn, “Analytica Chimica Acta Citrate-capped silver nanoparticles as a probe for sensitive and selective colorimetric and spectrophotometric sensing of creatinine in human urine,” *Anal. Chim. Acta*, vol. 1007, pp. 40–49, 2018, doi: 10.1016/j.aca.2017.12.016.

[139] A. Apilux, W. Dungchai, W. Siangproh, N. Praphairaksit, C. S. Henry, and O. Chailapakul, “Lab-on-Paper with Dual Electrochemical/Colorimetric Detection for Simultaneous Determination of Gold and Iron,” *Anal. Chem.*, vol. 82, no. 5, pp. 1727–1732, Mar. 2010, doi: 10.1021/ac9022555.

[140] E. P. Randviir and C. E. Banks, “Sensors and Actuators B : Chemical Analytical methods for quantifying creatinine within biological media,” *Sensors Actuators B. Chem.*, vol. 183, pp. 239–252, 2013, doi: 10.1016/j.snb.2013.03.103.

[141] C. De Lelis and M. De Morais, “Analytical Methods Determination and analytical validation of creatinine content in serum using image analysis by,” pp. 6904–6910, 2015, doi: 10.1039/c5ay01369k.

[142] K. Talalak, J. Noiphung, T. Songjaroen, O. Chailapakul, and W. Laiwattanapaisal, “A facile low-cost enzymatic paper-based assay for the determination of urine creatinine,” *Talanta*, vol. 144, pp. 915–921, Nov. 2015, doi: 10.1016/j.talanta.2015.07.040.

[143] C. Tseng, “Micro fl uidic paper-based platform for whole blood creatinine detection,” vol. 348, no. February, pp. 117–124, 2018.

[144] I. Lewińska, M. Speichert, M. Granica, and Ł. Tymecki, “Colorimetric point-of-care paper-based sensors for urinary creatinine with smartphone readout,” *Sensors Actuators B Chem.*, vol. 340, p. 129915, Aug. 2021, doi: 10.1016/j.snb.2021.129915.

[145] C.-C. Tseng, R.-J. Yang, W.-J. Ju, and L.-M. Fu, “Microfluidic paper-based platform for whole blood creatinine detection,” *Chem. Eng. J.*, vol. 348, pp. 117–124, Sep. 2018, doi: 10.1016/j.cej.2018.04.191.

[146] E. L. Rossini, M. I. Milani, E. Carrilho, L. Pezza, and H. R. Pezza, “Simultaneous determination of renal function biomarkers in urine using a validated paper-based microfluidic analytical device,” *Anal. Chim. Acta*, vol. 997, pp. 16–23, Jan. 2018, doi: 10.1016/j.aca.2017.10.018.

[147] A. Mathaweesansurn, S. Thongrod, P. Khongkaew, C. M. Phechkrajang, P. Wilairat, and N. Choengchan, “Simple and fast fabrication of microfluidic paper-based analytical device by contact stamping for multiple-point standard addition assay: Application to direct analysis of urinary creatinine,” *Talanta*, vol. 210, p. 120675, Apr. 2020, doi: 10.1016/j.talanta.2019.120675.

[148] V. VanDelinder and A. Groisman, “Separation of Plasma from Whole Human Blood in a Continuous Cross-Flow in a Molded Microfluidic Device,” *Anal. Chem.*, vol. 78, no. 11, pp. 3765–3771, Jun. 2006, doi: 10.1021/ac060042r.

[149] A. W. Martinez, S. T. Phillips, M. J. Butte, and G. M. Whitesides, “Patterned Paper as

a Platform for Inexpensive, Low-Volume, Portable Bioassays," *Angew. Chemie Int. Ed.*, vol. 46, no. 8, pp. 1318–1320, Feb. 2007, doi: 10.1002/anie.200603817.

[150] W. Dungchai, O. Chailapakul, and C. S. Henry, "A low-cost, simple, and rapid fabrication method for paper-based microfluidics using wax screen-printing," *Analyst*, vol. 136, no. 1, pp. 77–82, 2011, doi: 10.1039/C0AN00406E.

[151] T. Songjaroen, W. Dungchai, O. Chailapakul, and W. Laiwattanapaisal, "Novel, simple and low-cost alternative method for fabrication of paper-based microfluidics by wax dipping," *Talanta*, vol. 85, no. 5, pp. 2587–2593, Oct. 2011, doi: 10.1016/j.talanta.2011.08.024.

[152] S. A. Klasner, A. K. Price, K. W. Hoeman, R. S. Wilson, K. J. Bell, and C. T. Culbertson, "Paper-based microfluidic devices for analysis of clinically relevant analytes present in urine and saliva," *Anal. Bioanal. Chem.*, vol. 397, no. 5, pp. 1821–1829, Jul. 2010, doi: 10.1007/s00216-010-3718-4.

[153] Z. Nie *et al.*, "Electrochemical sensing in paper-based microfluidic devices," *Lab Chip*, vol. 10, no. 4, pp. 477–483, 2010, doi: 10.1039/B917150A.

[154] F. Mollarasouli, E. Zor, G. Ozcelikay, and S. A. Ozkan, "Magnetic nanoparticles in developing electrochemical sensors for pharmaceutical and biomedical applications," *Talanta*, vol. 226, p. 122108, May 2021, doi: 10.1016/j.talanta.2021.122108.

[155] K. Yamanaka, M. Vestergaard, and E. Tamiya, "Printable Electrochemical Biosensors: A Focus on Screen-Printed Electrodes and Their Application," *Sensors*, vol. 16, no. 10, p. 1761, Oct. 2016, doi: 10.3390/s16101761.

[156] J. P. Hart and S. A. Wring, "Recent developments in the design and application of screen-printed electrochemical sensors for biomedical, environmental and industrial analyses," *TrAC Trends Anal. Chem.*, vol. 16, no. 2, pp. 89–103, Feb. 1997, doi: 10.1016/S0165-9936(96)00097-0.

[157] R. Raho *et al.*, "Reusable flexible dry electrodes for biomedical wearable devices," *Sensors Actuators A Phys.*, vol. 333, p. 113157, Jan. 2022, doi: 10.1016/j.sna.2021.113157.

[158] A. U. Sardesai, V. N. Dhamu, A. Paul, S. Muthukumar, and S. Prasad, "Design and Electrochemical Characterization of Spiral Electrochemical Notification Coupled

Electrode (SENCE) Platform for Biosensing Application," *Micromachines*, vol. 11, no. 3, p. 333, Mar. 2020, doi: 10.3390/mi11030333.

[159] M. Sajid, "Nanomaterials: types, properties, recent advances, and toxicity concerns," *Curr. Opin. Environ. Sci. Heal.*, vol. 25, p. 100319, Feb. 2022, doi: 10.1016/j.coesh.2021.100319.

[160] A. B. Asha and R. Narain, "Nanomaterials properties," in *Polymer Science and Nanotechnology*, Elsevier, 2020, pp. 343–359. doi: 10.1016/B978-0-12-816806-6.00015-7.

[161] J. Baranwal, B. Barse, G. Gatto, G. Broncova, and A. Kumar, "Electrochemical Sensors and Their Applications: A Review," *Chemosensors*, vol. 10, no. 9, p. 363, Sep. 2022, doi: 10.3390/chemosensors10090363.

[162] G. E. Uwaya and O. E. Fayemi, "Electrochemical Detection of Ascorbic acid in Orange on Iron(III) Oxide Nanoparticles Modified Screen Printed Carbon Electrode," *J. Clust. Sci.*, vol. 33, no. 3, pp. 1035–1043, May 2022, doi: 10.1007/s10876-021-02030-7.

[163] J. Ping, J. Wu, Y. Wang, and Y. Ying, "Simultaneous determination of ascorbic acid, dopamine and uric acid using high-performance screen-printed graphene electrode," *Biosens. Bioelectron.*, vol. 34, no. 1, pp. 70–76, Apr. 2012, doi: 10.1016/j.bios.2012.01.016.

[164] W. Kit-Anan *et al.*, "Disposable paper-based electrochemical sensor utilizing inkjet-printed Polyaniline modified screen-printed carbon electrode for Ascorbic acid detection," *J. Electroanal. Chem.*, vol. 685, pp. 72–78, Oct. 2012, doi: 10.1016/j.jelechem.2012.08.039.

[165] Q. Wang *et al.*, "MnO 2 nanoparticle mediated colorimetric turn-off determination of ascorbic acid," *New J. Chem.*, vol. 44, no. 2, pp. 381–386, 2020, doi: 10.1039/C9NJ05751J.

[166] J. Kaźmierczak-Barańska, K. Boguszewska, A. Adamus-Grabicka, and B. T. Karwowski, "Two Faces of Vitamin C—Antioxidative and Pro-Oxidative Agent," *Nutrients*, vol. 12, no. 5, p. 1501, May 2020, doi: 10.3390/nu12051501.

[167] J. M. Mohan, K. Amreen, A. Javed, S. K. Dubey, and S. Goel, "Miniaturized electrochemical platform with ink-jetted electrodes for multiplexed and interference

mitigated biochemical sensing," *Appl. Nanosci.*, vol. 10, no. 10, pp. 3745–3755, Oct. 2020, doi: 10.1007/s13204-020-01480-1.

[168] X. Liu *et al.*, "Sensitive colorimetric detection of ascorbic acid using Pt/CeO2 nanocomposites as peroxidase mimics," *Appl. Surf. Sci.*, vol. 479, pp. 532–539, Jun. 2019, doi: 10.1016/j.apsusc.2019.02.135.

[169] E. O. Díaz, J. E. Galgani, C. A. Aguirre, I. J. Atwater, and R. Burrows, "Effect of glycemic index on whole-body substrate oxidation in obese women," *Int. J. Obes.*, vol. 29, no. 1, pp. 108–114, Jan. 2005, doi: 10.1038/sj.ijo.0802592.

[170] M. A. Alonso-Lomillo, O. Domínguez-Renedo, A. Saldaña-Botín, and M. J. Arcos-Martínez, "Determination of ascorbic acid in serum samples by screen-printed carbon electrodes modified with gold nanoparticles," *Talanta*, vol. 174, no. May, pp. 733–737, 2017, doi: 10.1016/j.talanta.2017.07.015.

[171] D. Ji *et al.*, "Smartphone-based integrated voltammetry system for simultaneous detection of ascorbic acid, dopamine, and uric acid with graphene and gold nanoparticles modified screen-printed electrodes," *Biosens. Bioelectron.*, vol. 119, pp. 55–62, Nov. 2018, doi: 10.1016/j.bios.2018.07.074.

[172] K. Kunpatee, S. Traipop, O. Chailapakul, and S. Chuanuwatanakul, "Simultaneous determination of ascorbic acid, dopamine, and uric acid using graphene quantum dots/ionic liquid modified screen-printed carbon electrode," *Sensors Actuators B Chem.*, vol. 314, p. 128059, Jul. 2020, doi: 10.1016/j.snb.2020.128059.

[173] A. Ambrosi, A. Morrin, M. R. Smyth, and A. J. Killard, "The application of conducting polymer nanoparticle electrodes to the sensing of ascorbic acid," *Anal. Chim. Acta*, vol. 609, no. 1, pp. 37–43, Feb. 2008, doi: 10.1016/j.aca.2007.12.017.

[174] T. N. Pham, T. Q. Huy, and A.-T. Le, "Spinel ferrite (AFe 2 O 4)-based heterostructured designs for lithium-ion battery, environmental monitoring, and biomedical applications," *RSC Adv.*, vol. 10, no. 52, pp. 31622–31661, 2020, doi: 10.1039/D0RA05133K.

[175] S. Kalia, A. Kumar, S. Sharma, and N. Prasad, "Properties, applications, and synthesis of first transition series substituted cobalt ferrite: a mini review," *J. Phys. Conf. Ser.*, vol. 2267, no. 1, p. 012133, May 2022, doi: 10.1088/1742-6596/2267/1/012133.

[176] P. B. Koli, K. H. Kapadnis, and U. G. Deshpande, “Nanocrystalline-modified nickel ferrite films: an effective sensor for industrial and environmental gas pollutant detection,” *J. Nanostructure Chem.*, vol. 9, no. 2, pp. 95–110, Jun. 2019, doi: 10.1007/s40097-019-0300-2.

[177] M. J. Uddin and Y.-K. Jeong, “Application of magnesium ferrite nanomaterials for adsorptive removal of arsenic from water: Effects of Mg and Fe ratio,” *Chemosphere*, vol. 307, p. 135817, Nov. 2022, doi: 10.1016/j.chemosphere.2022.135817.

[178] J. Mettakoonpitak *et al.*, “Electrochemistry on Paper-based Analytical Devices: A Review,” *Electroanalysis*, vol. 28, no. 7, pp. 1420–1436, Jul. 2016, doi: 10.1002/elan.201501143.

[179] L. Cao, G.-C. Han, H. Xiao, Z. Chen, and C. Fang, “A novel 3D paper-based microfluidic electrochemical glucose biosensor based on rGO-TEPA/PB sensitive film,” *Anal. Chim. Acta*, vol. 1096, pp. 34–43, Feb. 2020, doi: 10.1016/j.aca.2019.10.049.

[180] S. Cinti, D. Talarico, G. Palleschi, D. Moscone, and F. Arduini, “Novel reagentless paper-based screen-printed electrochemical sensor to detect phosphate,” *Anal. Chim. Acta*, vol. 919, pp. 78–84, May 2016, doi: 10.1016/j.aca.2016.03.011.

[181] A. Ivanets *et al.*, “Effect of magnesium ferrite doping with lanthanide ions on dark-, visible- and UV-driven methylene blue degradation on heterogeneous Fenton-like catalysts,” *Ceram. Int.*, vol. 47, no. 21, pp. 29786–29794, Nov. 2021, doi: 10.1016/j.ceramint.2021.07.150.

[182] A. Pradeep, P. Priyadharsini, and G. Chandrasekaran, “Sol–gel route of synthesis of nanoparticles of MgFe2O4 and XRD, FTIR and VSM study,” *J. Magn. Magn. Mater.*, vol. 320, no. 21, pp. 2774–2779, Nov. 2008, doi: 10.1016/j.jmmm.2008.06.012.

[183] S. Maensiri, M. Sangmanee, and A. Wiengmoon, “Magnesium Ferrite (MgFe2O4) Nanostructures Fabricated by Electrospinning,” *Nanoscale Res. Lett.*, vol. 4, no. 3, p. 221, Mar. 2009, doi: 10.1007/s11671-008-9229-y.

[184] R. J. Forster, “Microelectrodes: new dimensions in electrochemistry,” *Chem. Soc. Rev.*, vol. 23, no. 4, p. 289, 1994, doi: 10.1039/cs9942300289.

[185] E. Laviron, “General expression of the linear potential sweep voltammogram in the case of diffusionless electrochemical systems,” *J. Electroanal. Chem. Interfacial*

Electrochem., vol. 101, no. 1, pp. 19–28, Jul. 1979, doi: 10.1016/S0022-0728(79)80075-3.

[186] A. P. Brown and F. C. Anson, “Cyclic and differential pulse voltammetric behavior of reactants confined to the electrode surface,” *Anal. Chem.*, vol. 49, no. 11, pp. 1589–1595, Sep. 1977, doi: 10.1021/ac50019a033.

List of paper based on thesis

1) **Gautam, Neha,** Rahul Verma, Rishi Ram, Jay Singh, and Arnab Sarkar. "Development of a biodegradable microfluidic paper-based device for blood-plasma separation integrated with non-enzymatic electrochemical detection of ascorbic acid." *Talanta* 266 (2024): 125019.
2) **Gautam, Neha,** Rishi Ram, Vikas Bishnoi, and Arnab Sarkar. "A low-cost and disposable capillary-based paper sensor for measuring blood-plasma viscosity using a smartphone app." *Microfluidics and Nanofluidics* 27, no. 6 (2023): 41.
3) **Gautam, Neha,** Sudip Chattopadhyay, Shantimoy Kar, and Arnab Sarkar. "Real-time detection of plasma ferritin by electrochemical biosensor developed for biomedical analysis." *Journal of Pharmaceutical and Biomedical Analysis* 235 (2023): 115579.
4) Ram, Rishi, **Neha Gautam,** Pradip Paik, Santosh Kumar, and Arnab Sarkar. "A novel and low-cost smartphone integrated paper-based sensor for measuring starch adulteration in milk." *Microfluidics and Nanofluidics* 26, no. 12 (2022): 103.
5) **Gautam, Neha,** Ranjana Verma, Priya Ranjan Mudli, Shantimoy Kar, and Arnab Sarkar. "Single Step Quantification of Creatinine from Whole Blood using RGB Sensor." (2024): Analyst. (IF: 5, Under review)
6) **Gautam, Neha,** Shantimoy Kar, and Arnab Sarkar. "How Flow Characteristics on Paper-based Devices is Dependent of Fabrication Methods?" (2024): (Under preparation)
7) **Gautam, Neha,** Avinash Pandey, and Arnab Sarkar. “Development of a Low Cost Paper-based Sensor for Simultaneous Detection of Hematocrit, Hemoglobin, and ESR." (Under preparation)