

Yuki Uematsu, updated December 5, 2022,

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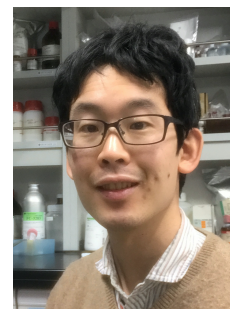
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Affiliation: Department of Physics and Information Technology, Kyushu Institute of Technology

Married, a daughter in 2017 and a son in 2021



I. EDUCATION

- April 2007 – March 2011, Bachelor course in Department of Physics, Kyoto University, Japan.
- April 2011 – March 2013, Master course in Department of Physics, Kyoto University, Japan. Master thesis “Electro-osmotic flow of polyelectrolyte solutions” under supervision of Prof. Takeaki Araki.
- April 2013 – March 2016, Ph. D. course in Department of Physics, Kyoto University, Japan. Ph. D. thesis “Electro-osmosis of polymer solutions: Linear and nonlinear behavior” under supervision of Prof. Takeaki Araki.

II. EMPLOYMENT

- April 2013 – March 2016, Ph. D. student at Kyoto University (Host: Prof. Takeaki Araki) supported by Japan Society for the Promotion of Science Research Fellowship (DC1).
- April 2016 – January 2019, Post-doctoral researcher at Kyushu University (Host: Prof. Ryo Akiyama) supported by Japan Society for the Promotion of Science Research Fellowship (PD).
 - May 2016 – October 2017, Visiting researcher at Freie Universität Berlin (Host: Prof. Roland R. Netz)
- February 2019 – December 2019, Post-doctoral researcher at Ecole Normale Supérieure (Host: Prof. Lyderic Bocquet) supported by Japan Society for the Promotion of Science Overseas Fellowships.
- October 2019 – March 2022, Assistant professor at Department of Physics, Kyushu University
- April 2022 – present, Associate professor (tenure-track) at Department of Physics and Information Technology, Kyushu Institute of Technology

III. RESEARCH INTEREST

I am interested in physics and chemistry of electrolyte solutions and other charge-related phenomena. By using theoretical and experimental methods, I want to clarify simple physico-chemical mechanism of fascinating phenomena and compare the theory with experiments directly. Specially, interfacial effects such as surface tension, slippage, and electrokinetics are my main targets so far.

IV. PUBLICATIONS

1. Sota Inoue, Yasuyuki Kimura, and Yuki Uematsu, Ostwald ripening of aqueous microbubble solutions, submitted (2022).
2. Yuki Uematsu, Analytic theory of nonlinearly coupled electrokinetics in nanochannels, accepted in Physics of Fluids (2022).
3. Yuki Uematsu and Hiroyuki Ohshima, Electrophoretic mobility of a water-in-oil droplet separately affected by the net charge and surface charge density, Langmuir **38**, 4213-4221 (2022). (9 pages, regular article) doi:10.1021/acs.langmuir.1c03145
4. Yuki Uematsu, Electrification of water interface, J. Phys. Condens. Matter **33**, 423001 (2021).

(21 pages, Topical review, invited) doi:10.1088/1361-648X/ac15d5

5. Majid Rezaei, Bernhard Mitterwallner, Philip Loche, Yuki Uematsu, Roland R. Netz, and Douwe Jan Bonthuis, Interfacial, electroviscous, and nonlinear dielectric effects on electrokinetics at highly charged surfaces, *J. Phys. Chem. B* **125**, 4767-4778 (2021). (12 pages, regular article) doi:10.1021/acs.jpcc.0c11280.
6. Alexandre dos Santos, Yuki Uematsu, Alexander Rathert, Philip Loche, and Roland Netz, Consistent description of ion-specificity in bulk and at interfaces by solvent implicit simulations and mean-field theory, *J. Chem. Phys.* **153**, 034103 (2020). (14 pages, regular article) doi:10.1063/5.001610
7. Yuki Uematsu, Douwe Jan Bonthuis, and Roland R. Netz, Nanomolar surface-active charged impurities account for the zeta potential of hydrophobic surfaces, *Langmuir* **36**, 3645-3658 (2020). (14 pages, regular article) doi:10.1021/acs.langmuir.9b03795
8. Philip Loche, Cihan Ayaz, Alexander Schlaich, Yuki Uematsu, and Roland R. Netz, Giant Axial Dielectric Response in Water-Filled Nanotubes and Effective Electrostatic Ion-Ion Interactions from a Tensorial Dielectric Model, *J. Phys. Chem. B*, **123**, 10850-10857, (2019). (8 pages, article) doi:10.1021/acs.jpcc.9b09269
9. Yuki Uematsu, Douwe J. Bonthuis, and Roland R. Netz, Impurity Effects at Hydrophobic Surfaces Current Opinion in Electrochemistry **13**, 166-173 (2019). (8 pages) doi:10.1016/j.coelec.2018.09.003
10. Yuki Uematsu, Kengo Chida, and Hiroki Matsubara, Intentionally Added Ionic Surfactants Induce Jones-Ray Effect at Air-Water Interface, *Colloid and Interfacial Science Communications* **27**, 45-48 (2018). (4 pages) doi:10.1016/j.colcom.2018.10.003
11. Ram M. Adar, Yuki Uematsu, Shigeyuki Komura, and David Andelman, Linear Response Functions of an Electrolyte Solution in a Uniform Flow, *Phys. Rev. E* **98**, 032604 (2018). (10 pages) doi:10.1103/PhysRevE.98.032604
12. Yuki Uematsu, Roland R. Netz, and Douwe J. Bonthuis, Analytical interfacial layer model for the capacitance and electrokinetics of charged aqueous interfaces, *Langmuir* **34**, 9097-9113 (2018). (17 pages) doi:10.1021/acs.langmuir.7b04171
13. Yuki Uematsu, Roland R. Netz, Lydéric Bocquet, and Douwe J. Bonthuis, Cross-over of the power law exponent for carbon nanotube conductivity as a function of salinity, *J. Phys. Chem. B* **122**, 2992-2997 (2018). (6 pages) doi:10.1021/acs.jpcc.8b01975
14. Yuki Uematsu, Roland R. Netz, and Douwe J. Bonthuis, The effects of ion adsorption on the potential of zero charge and the differential capacitance of charged aqueous interfaces, *J. Phys. Condens. Matter* **30**, 064002 (2018). (7 pages) doi:10.1088/1361-648X/aaa4d4
15. Yuki Uematsu, Douwe J. Bonthuis, and Roland R. Netz, Charged Surface-Active Impurities At Nanomolar Concentration Induce Jones-Ray Effect, *J. Phys. Chem. Lett.* **9**, 189-193 (2018). (5 pages) doi:10.1021/acs.jpcclett.7b02960
16. Yuki Uematsu, Roland R. Netz, and Douwe J. Bonthuis, Power-law electrokinetic behavior as a direct probe of effective surface viscosity, *Chem. Phys. Lett.* **670**, 11-15 (2017). (5 pages) doi:10.1016/j.cplett.2016.12.056
17. Douwe J. Bonthuis, Yuki Uematsu, and Roland R. Netz, Interfacial Layer Effects on Surface Capacitances and Electro-osmosis in Electrolytes, *Phil. Trans. R. Soc. A* **374**, 20150033 (2016). (9 pages) doi:10.1098/rsta.2015.0033
18. Yuki Uematsu, Nonlinear Electro-Osmosis of Dilute Non-Adsorbing Polymer Solutions with Low Ionic Strength, *Soft Matter* **11**, 7402-7411 (2015). (10 pages), doi:10.1039/C5SM01507C
19. Yuki Uematsu, Electrophoresis of Electrically Neutral Porous Spheres Induced by Selective Affinity of Ions, *Phys. Rev. E* **91**, 022303 (2015). (10 pages), doi:10.1103/PhysRevE.91.022303
20. Yuki Uematsu and Takeaki Araki, Electro-Osmotic Flow of Semidilute Polyelectrolyte Solutions, *J. Chem. Phys.* **139**, 094901 (2013). (8 pages), doi:10.1063/1.4820236
21. Yuki Uematsu and Takeaki Araki, Effects of Strongly Selective Additives on Volume Phase Transition in Gels, *J. Chem. Phys.* **137**, 024902 (2012). (8 pages), doi:10.1063/1.4732857

V. AWARD

- March 2023, 17th Young Scientist Award of the Physical Society of Japan
- January 2021, 5th Fukui Kenichi Award
- September 2016, Best Presentation Award for Young Researchers at the 67th Divisional Meeting on Colloid and Interface Chemistry of the Chemical Society of Japan
- May 2016, Springer Theses Award

VI. FUNDING

- April 2022 - March 2025, Grant-in-Aid for Scientific Research C, “Unveiling cooperative effects of hydrogen bonding on the interfacial tension of dilute electrolyte liquids” (PI: Hayato Shiba), 22K03546, Total 1,000,000 JPY
- **(PI)** October 2021 - March 2025, JST Presto “Ionic hydrodynamics in micro- and nano-interfaces” JPMJPR21O2, Total 49,000,000 JPY
- **(PI)** October 2021 - September 2022 Kurita Water and Environment Foundation “Effect of surfactants on the radii dynamics of microbubble solutions” 21E006, Total 500,000 JPY
- **(PI)** April 2021 - March 2022 Kyushu University QR program, “Research on the stability of bubbles by measuring radii dynamics in microbubble solutions”, R3-01302, Total 1,400,000 JPY
- **(PI)** April 2021 - February 2022 The Sasakawa Scientific Research Grant, “Search of non-equilibrium phase separation in ternary systems of water/alcohol/electrolytes under steady electric currents”, 2021-3001, Total 700,000 JPY
- June 2020 – March 2022, Fund for the Promotion of Joint International Research (Fostering Joint International Research (B)), Total 2,000,000 JPY.
- **(PI)** April 2020 – March 2022, Grant-in-Aid for Early-Career Scientists “Revealing the origin of surface charge of hydrophobic interface based on charged impurities”, Total 3,200,000 JPY.
- **(PI)** February 2019 – December 2019, JSPS Fellowship for Research Abroad, “Comprehensive study on fluidic transport of confined electrolytes in nanotubes by theory and experiment”, Total 5,600,000 JPY as maintenance allowance
- **(PI)** April 2016 – March 2019, Grant-in-Aid for JSPS Research Fellows “Study on electrokinetics of electrolyte solutions in nanotubes”, Total 3,400,000 JPY as Grant and 12,308,000 JPY as Salary.
- **(PI)** April 2013 – March 2016, Grant-in-Aid for JSPS Research Fellows “Study on hydrodynamics and electrostatics of polymer gels with ion and interfacial effects”, Total 2,700,000 JPY as Grant and 7,200,000 JPY as Salary.

VII. TEACHING Experience

- Experimental Training Class “Physics Experiments” (BZ reaction and Brownian motion, 2019, 2020, 2021).
- Undergraduate Class “Exercises in Electromagnetism” (2020, 2021)
- Undergraduate Class “Statistical Mechanics” (2022)
- Undergraduate Class “Thermodynamics” (2022)
- Experimental Training Class “Seminar of Physics and Information Technology” (Colloid physics and chemistry, 2022)

VIII. Supervising Experience

- Bachelor thesis: Sota Inoue (2021), Kenichiro Ide (2022), Haruto Iwasaki (2022), Riku Miyazaki (2022), Keigo Shimizu (2023), Yuto Fujihara (2023), Ryota Shioya (2023)
- Master thesis: Sota Inoue (2023),