Shoichi Nishitani, Ph.D.

Department of Chemical and Biomolecular Engineering, University of California, Berkeley
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EDUCATION

The University of Tokyo — Tokyo, Japan
Ph.D. in Materials Engineering — Sept. 2020
Thesis: Design and development of nanofilter biointerface for potentiometric small-biomolecule recognition
Advisor: Prof. Toshiya Sakata

The University of Tokyo — Tokyo, Japan
M.S. in Materials Engineering — Sept. 2017
B.S. in Materials Engineering — Sept. 2015

PROFESSIONAL APPOINTMENTS

University of California, Berkeley — Berkeley, CA
Postdoctoral Researcher — June 2021 – Present
Department of Chemical and Biomolecular Engineering
Helen Wills Neuroscience Institute
Advisor: Prof. Markita Landry

The University of Tokyo — Tokyo, Japan
Postdoctoral Researcher — Sept. 2020 – May 2021
Graduate Research Associate — Oct. 2015 – Sept. 2020
Department of Materials Engineering
Advisor: Prof. Toshiya Sakata

RESEARCH FUNDING

Stanford Diabetes Research Center (SDRC) Pilot and Feasibility Grant — **Feb. 2025**
Role: Lead-PI (NIH/NIDDK-funded, $80,000)
Project: In vivo glucose monitoring using near-infrared fluorescent glucose nanosensors

Molecular Therapeutics Initiative (MTI) Parkinson's Therapeutic Program — **Jan. 2026**
Role: Co-PI ($180,000 total over two years)
Project: Parkinson's therapeutics discovery using nanosensor platforms

AWARDS & FELLOWSHIPS

JSPS Overseas Research Fellowship (Postdoc) — **2021 – 2023**
Highly competitive postdoctoral fellowship awarded by the Japan Society for the Promotion of Science (Total: approx. $140,000)

JSPS Research Fellowship (DC1) — **2018 – 2021**
Full Ph.D. funding including monthly stipend and annual research grant

JSPS Overseas Challenge Program for Young Researchers — **2020**
Travel grant for research at the University of Cambridge ($10,000)

Young Researchers Award, *Science and Technology for Advanced Materials (STAM)* — **2018**

Young Researchers Award, *Intl. Conf. on Solid State Devices and Materials (SSDM)* — **2016**

SELECTED RESEARCH ACCOMPLISHMENTS

1. Systematic Design of Near-Infrared Nanosensors for Biochemical Imaging

Developed a novel dye–carbon nanotube energy transfer scheme (analogous to single-molecule FRET) and enzyme-nanotube conjugation chemistry. This work overcomes longstanding challenges in the rational design of selective chemical nanosensors, enabling continuous metabolite monitoring without enzymatic turnover.

- **S. Nishitani**, et al., ***PNAS***, 2025.
- **S. Nishitani**, et al., ***Angew. Chem. Int. Ed.***, 2024 (**VIP**, **Frontispiece Cover**). *Impact: Altmetric score of 96; featured in 13 news outlets; 28 citations since Jan. 2024.*
- F. Ledesma, **S. Nishitani**, et al., ***Adv. Funct. Mater.***, 2024 (Covalent enzyme conjugation).

2. Molecular Precision Engineering: From Ensembles to Single-Molecule Control

Established a theoretical and experimental framework for stochastic DNA-guided monovalent modification of carbon nanotubes. Validated by **single-molecule TIRF counting** (collaboration with Prof. Ke Xu), achieving high-purity synthesis of single-site functionalized nanomaterials for single-photon emitters and specific cell targeting.

- **S. Nishitani (Corresponding Author)**, et al., ***Angew. Chem. Int. Ed.***, (Accepted).
- **Mentorship & Placement:** Supervised 3 undergraduates; the co-leading author student has been accepted to Ph.D. programs at **MIT, Stanford, and UC Berkeley**.

3. Neurotechnology: Visualizing Neurochemistry in Parkinson's Disease (PD) Models

Developing optical platforms to characterize dopaminergic axonal growth and signaling in Parkinson's disease circuits (collaboration with Prof. Stephan Lammel). Integrated this with all-infrared two-photon microscopy for deep-brain tissue imaging, enabling long-term monitoring of therapeutic effects.

- P. Mocellin, **S. Nishitani**, et al., **Manuscript in preparation** (PD therapeutics focus).
- M. Safaee*, **S. Nishitani***, et al., ***Adv. Funct. Mater.***, 2024 (Two-photon microscopy).
- **Grant Support:** Awarded **MTI Parkinson's Therapeutic Program** ($180k) as **Co-PI**.

4. Nanostructured Bio-Interfaces for Ultra-Selective Biosensing

Engineered nanoscale "molecular sieves" and densified diazonium-based organic thin films for signal-to-noise ratio enhancement in potentiometric sensors. This doctoral research established precise control over bioelectrical interfaces for sensitive biomarker detection.

- **S. Nishitani**, et al., ***ACS Appl. Mater. Interfaces***, 2020 & 2019.
- **S. Nishitani**, et al., ***Langmuir***, 2021 (Thin-film densification).
- **S. Nishitani**, et al., ***Adv. Mater. Interfaces***, 2022 (Nanostructure engineering).

MENTORSHIP & TEACHING

Research Mentorship

Mentored over 30 students across diverse disciplines and backgrounds. Committed to inclusive mentoring practices, including the support of neurodivergent students (e.g., ADHD), fostering an environment where all researchers can excel.

University of California, Berkeley June 2021 – Present

Ph.D. Student Mentorship (4 students: ChemE, Neuroscience, Bioengineering)

Undergraduate Student Mentorship (19 students)

- **High-Impact Placement:** One mentee (co-first author on *Angew. Chem.*) was accepted to **MIT, Stanford, UC Berkeley, Princeton, and Northwestern** for Chemical Engineering Ph.D. programs (2026).
- **Inclusive Mentoring:** Tailored research projects and communication strategies for **neurodivergent students (ADHD)**, ensuring their successful integration and contribution to the lab's mission.
- **Thesis Supervision:** Supervised 4 undergraduate Honors Theses.

The University of Tokyo 2015 – 2020

Ph.D. Student Mentorship (3 students)

Master's & Undergraduate Mentorship (12 students)

- Co-authored 11 publications with student mentees, including 5 as lead authors.

Mentee Placements (Alumni)

My mentees have consistently secured positions at world-class institutions and programs:

- **Ph.D. Programs:** MIT (Chemistry & MSE, 2025; ChemE, 2026), Stanford (ChemE, 2026), Princeton (Neuroscience, 2025), UC Berkeley (ChemE, 2026), Univ. of Michigan (Chemistry, 2024).
- **Professional Schools:** Two M.D. candidates at top-tier medical schools.

Teaching Experience

The University of Tokyo 2017 – 2020

Graduate Teaching Assistant

- Delivered weekly lectures for courses: *Thermodynamics, Transport Phenomena, Electrochemistry, Biosensing Materials, Biomaterials, and Polymer Materials*.

Professional Instructor (Cram School), Japan 2010 – 2018

Pedagogical Leadership: Designed customized curricula for class sizes of >30 students in STEM subjects, leading to high admission rates to top national universities.

PUBLICATION LIST

Refereed Journal Articles

Impact Factors (IF) are from Clarivate JCR 2024; citation counts are from Google Scholar (as of Feb. 2026).
*(*Equal contributions; ‡Corresponding author.)*

[1] **Nishitani S.*‡**, Liang Z.*, Tabo A., Zhang W., Smith D., Xu K., Landry M., High-purity monovalent functionalization of carbon nanotubes. ***Angew. Chem. Int. Ed.***, Accepted.

[2] **Nishitani S.**, Ao K., Jalil A., Arias-Soto O.I., Moudi A., Chen F., Biyani A., Muppirala P.N., Landry M.P.‡, Redox dye-mediated fluorescence energy transfer of carbon nanotube-based nanosensors. ***Proc. Natl. Acad. Sci. (PNAS)***, **2025**, *122* (12), e2419666122.
IF: 9.1; Citations: 8.

[3] **Nishitani S.**, Tran T., Puglise A., Yang S., Landry M.P.‡, Engineered glucose oxidase-carbon nanotube conjugates for tissue-translatable glucose nanosensors. ***Angew. Chem. Int. Ed.***, **2024**, *63* (8), e202311476.
Featured Frontispiece Cover & Very Important Paper (VIP)* *IF: 16.9; Citations: 28.*

[4] Safaee M.*, **Nishitani S.***, McFarlane I.R., Yang S.J., Sun E., Medina S.M., Squire H., Landry M.P.‡, Dual infrared 2-photon microscopy achieves minimal background deep tissue imaging in brain and plant tissues. ***Adv. Funct. Mater.***, **2024**, 2404709.
**Equal contributions. IF: 19.0; Citations: 14.*

[5] Ledesma F., **Nishitani S.**, Cunningham F.J., Hubbard J.D., Yim D., Lui A., Chio L., Murali A., Landry M.P.‡, Covalent attachment of horseradish peroxidase to single-walled carbon nanotubes for hydrogen peroxide detection. ***Adv. Funct. Mater.***, **2024**, *34* (32), 2316028.
IF: 19.0; Citations: 19.

[6] Rosenberg D., Cunningham F., Hubbard J., Goh N., Wang J., **Nishitani S.**, Hayman E., Hura G., Landry M., Pinals R.‡, Mapping the morphology of DNA on carbon nanotubes in solution using X-ray scattering interferometry. ***J. Am. Chem. Soc. (JACS)***, **2024**, *146* (1), 386–398.
IF: 15.6; Citations: 10.

[7] Kishi R., **Nishitani S.**, Kudo H., Sakata T.‡, Charging and discharging of poly(m-aminophenylboronic acid) doped with phytic acid for enzyme-free real-time monitoring of human sweat lactate. ***ACS Omega***, **2024**, *9* (50), 49368–49376.
IF: 4.3

[8] Man Y., **Nishitani S.**, Sawada K., Sakata T.‡, Electrical monitoring of human-serum-albumin-templated molecularly imprinted polymer nanoparticles with high affinity based on molecular charges and their visualization. ***Chem. Commun.***, **2024**, *60* (72), 9769–9772.
IF: 4.2; Citations: 2.

[9] Man Y., **Nishitani S.**, Sakata T.‡, Fundamental characteristics of molecularly imprinted polymer nanoparticles with high affinity for human serum albumin. ***Sensors Mater.***, **2024**, *36* (9), 4077–4087.
Citations: 1.

[10] Noguchi T., **Nishitani S.**, Sakata T.‡, Anti-biofouling effect of nanoporous gold electrodes on nonspecific signal reduction for electrochemical biosensors. ***J. Electrochem. Soc.***, **2024**, *171* (7), 077507.
IF: 3.3; Citations: 1.

[11] Sakata T.‡, Shiratori R., **Nishitani S.**, Aptamer-based glycated albumin sensor for capacitive spectroscopy. ***Anal. Chem.***, **2023**, *95* (2), 1480–1489.
IF: 6.7; Citations: 12.

[12] **Nishitani S.**, Man Y., Noguchi T., Sakata T.‡, Polyaniline-based nanostructure interface for signal-to-noise ratio enhancement in potentiometric enzyme-free biosensors. ***Adv. Mater. Interfaces***, **2022**, 2201029.
IF: 4.4; Citations: 7.

[13] Ishino K., **Nishitani S.**, Man Y., Saito A., Sakata T.‡, Surface characteristics and formation of polyserotonin thin films for bioelectrical and biocompatible interfaces. ***Langmuir***, **2022**, *38*, 8633–8642.
IF: 3.9; Citations: 13.

[14] Sakata T.‡, **Nishitani S.**, Yasuoka Y., Himori S., Homma K., Masuda T., Akimoto A.M., Sawada K., Yoshida R., Self-oscillating chemoelectrical interface of solution-gated ion-sensitive field-effect transistor based on Belousov-Zhabotinsky reaction. ***Sci. Rep.***, **2022**, *12*, 2949.
IF: 3.9; Citations: 8.

[15] **Nishitani S.**, Fukuma T., Himori S., Man Y., Shiratori R., Sakata T.‡, Densification of diazonium-based organic thin film as bioelectrical interface. ***Langmuir***, **2021**, *37*, 14369–14379.
IF: 3.9; Citations: 6.

[16] Sakata T.‡, **Nishitani S.**, Saito A., Fukasawa Y., Solution-gated ultrathin channel indium tin oxide-based field-effect transistor fabricated by a one-step procedure that enables high-performance ion sensing and biosensing. ***ACS Appl. Mater. Interfaces***, **2021**, *13*, 38569–38578.
IF: 8.2; Citations: 27.

[17] Fujita A., Masuda T., **Nishitani S.**, Akimoto A.M., Yoshida R., Sakata T.‡, Slow phase-transition behavior of thermoresponsive polymer brushes constrained at substrate observed by in situ electrical monitoring using poly(N-isopropylacrylamide)-grafted field-effect transistor. ***Chem. Lett.***, **2021**, *50*, 1852–1855.
IF: 1.2; Citations: 1.

[18] Himori S., **Nishitani S.**, Sakata T.‡, Aptamer-based nanofilter interface for small-biomarker detection with potentiometric biosensor. ***Electrochim. Acta***, **2021**, *368*, 137631.
IF: 5.6; Citations: 24.

[19] **Nishitani S.**, Sakata T.‡, Enhancement of signal-to-noise ratio for serotonin detection with well-designed nanofilter-coated potentiometric electrochemical biosensor. ***ACS Appl. Mater. Interfaces***, **2020**, *12* (13), 14761–14769. *IF: 8.2; Citations: 56.*

[20] Sakata T.‡, **Nishitani S.**, Kajisa T., Molecularly imprinted polymer-based bioelectrical interfaces with intrinsic molecular charges. ***RSC Adv.***, **2020**, *10* (29), 16999–17013.
IF: 4.6; Citations: 40.

[21] **Nishitani S.**, Sakata T.‡, Polymeric nanofilter biointerface for potentiometric small-biomolecule recognition. ***ACS Appl. Mater. Interfaces***, **2019**, *11* (5), 5561–5569. *IF: 8.2; Citations: 32.*

[22] Himori S., **Nishitani S.**, Sakata T.‡, Control of potential response to small biomolecules with electrochemically grafted aryl-based monolayer in field-effect transistor-based sensors. ***Langmuir***, **2019**, *35* (10), 3701–3709.
IF: 3.9; Citations: 23.

[23] **Nishitani S.**, Maekawa Y., Sakata T.‡, Understanding the molecular structure of the sialic acid-phenylboronic acid complex by using a combined NMR spectroscopy and DFT study: toward sialic acid detection at cell membranes. ***Chem. Open***, **2018**, *7* (7), 513–519.
IF: 3.1; Citations: 16.

[24] Yang H., **Nishitani S.**, Sakata T.‡, Potentiometric Langmuir isotherm analysis of histamine-selective molecularly imprinted polymer-based field-effect transistor. ***ECS J. Solid State Sci. Technol.***, **2018**, *7* (7), Q3079–Q3082.
Citations: 14.

[25] **Nishitani S.**, Sakata T.‡, Potentiometric adsorption isotherm analysis of a molecularly imprinted polymer interface for small-biomolecule recognition. ***ACS Omega***, **2018**, *3* (5), 5382–5389.
IF: 4.3; Citations: 43.

[26] **Nishitani S.**, Kajisa T., Sakata T.‡, Development of a molecularly imprinted polymer-based field-effect transistor for sugar chain sensing. ***Jpn. J. Appl. Phys.***, **2017**, *56* (4S), 04CM02.

IF: 4.3; Citations: 8.

Books

[27] **Nishitani S.**, Adams J., Mun J., Klinger M., Landry M., Komatsu N.‡, *Unraveling Neurochemistry*. **American Chemical Society**, Washington, DC, USA, 2025.

PATENTS

[1] T. Sakata, R. Shiratori, **S. Nishitani**, *Thin Film, Biosensor, and Manufacturing Method*. **2022**, Patent No. US20240094161 (United States).
[2] T. Sakata, T. Noguchi, **S. Nishitani**, *Biosensor and Electrode Manufacturing Method*. **2022**, Patent No. JP2024027660 (Japan).
[3] T. Sakata, **S. Nishitani**, R. Shiratori, K. Sekimizu, N. Ito, *Method and Device for Detecting Biomolecules*. **2022**, Patent No. WO2023002892 (International).
[4] T. Sakata, A. Saito, **S. Nishitani**, *Biosensor and Field-Effect Transistor Manufacturing Method*. **2022**, Patent No. WO2022102759 (International).
[5] T. Sakata, **S. Nishitani**, *Biosensor*. **2020**, Patent No. JP2022024633A (Japan).
[6] T. Sakata, **S. Nishitani**, *Biosensor with Field-Effect Transistor*. **2017**, Patent No. JP2019045417A (Japan).

PUBLIC & PROFESSIONAL SERVICES

Grant Reviewer

UK Research and Innovation (UKRI) 2023

Conference Leadership

- **Session Chair**, 2025 AIChE Annual Meeting (Session 449) Nov. 2025
- **Session Chair**, 246th ECS Meeting (Session B02) May 2025
- **Poster Session Judge**, 2024 AIChE Annual Meeting Oct. 2024
- **Session Chair**, 245th ECS Meeting (Session B02) May 2024

Manuscript Reviewer

Advanced Materials, *Angewandte Chemie*, *Advanced Sensor Research*, *Micromachines*, *PeerJ*

PROFESSIONAL PRESENTATIONS

Invited Talks

- *2025 AIChE Annual Meeting*, Boston, MA. Nov. 2025
- *Departmental Seminar*, The University of Tokyo, Japan May 2025
- *Riken Seminar*, Riken, Japan May 2025
- *Kyushu University Seminar*, Japan May 2025
- *Osaka University Seminar*, Japan May 2025
- *Bioenergetics Seminar*, UC Berkeley April 2025
- *OPERA RA Seminar Series*, Japan Dec. 2020

Contributed Conference Talks (Selected)

Over 15 oral presentations at international conferences including:

- *AIChE Annual Meeting* (2025, 2024)
- *MRS Fall Meeting* (2024)
- *ECS Meeting* (2024, 2023, 2018)
- *ACS National Meeting* (2019, 2018, 2017)