Natsumi Komatsu

Burroughs Wellcome Fund CASI Postdoctoral Fellow
University of California, Berkeley
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Professional Experience

Postdoc	**University of California, Berkeley** Burroughs Wellcome Fund CASI Postdoctoral Fellow Advisor: Dr. Markita Landry	2023 – present
Postdoc	**University of California, Los Angeles** Schmidt Science Postdoctoral Fellow Advisor: Dr. Clarice Aiello	2022 – 2023
PhD	**Rice University** Funai Foundation Graduate Fellow Advisor: Dr. Junichiro Kono	2017 – 2022

Education

PhD	**Rice University** Ph.D. in Electrical and Computer Engineering	2022
BEng	**Keio University** (Japan) BEng in Applied Physics and Physico-Informatics	2017

Fellowships

Career Awards at the Scientific Interface (CASI), Burroughs Wellcome Fund (About) 2024 – 2029
Postdoc-to-Faculty Transition Fellowship
Awarded $560,000 over fiver years
One of 12 recipients nationwide

Schmidt Science Fellows, Schmidt Futures (About) 2022 – 2024
Postdoctoral Fellowship
Awarded $200,000 over two years
One of 29 recipients worldwide

Funai Overseas Scholarship, Funai Foundation for Information Technology (About) 2017 – 2019
Graduate Fellowship
Awarded $100,000 over two years
One of 10 recipients nationwide (Japan)

Honors and Awards

Rising Stars in Electrical Engineering and Computer Science, MIT (About) 2024

Future Leaders in Bioengineering, Rice University (About) 2024

Senior Fellows Catalyst Grant, Schmidt Futures (About) 2024

Rising Stars in Chemical Engineering, MIT (About) 2023

Cornell Future Faculty Symposium, Cornell University (About) 2023

Texas Instruments Distinguished Fellowship, Texas Instruments 2017-2022

Platinum SCI Oral Presentation Award, Rice University (About) 2020

President Prize, Rice University 2017

Research Experience

University of California, Berkeley 2023 – present

Advisor: Dr. Markita Landry

Research area: Chemical Engineering, Neuroscience

Developed a synthetic fluorescent nanosensor for neuropeptide oxytocin based on carbon nanotubes functionalized with single-stranded DNA.

Performed real-time imaging of oxytocin using nanosensors in the brain of mice and prairie voles (Adams, **Komatsu** et al., 2024).

Imaged oxytocin kinetics in transgenic prairie voles lacking oxytocin receptors and demonstrated an altered oxytocin regulation, providing molecular insights into oxytocin release dynamics in socially selective animals for the first time (**Komatsu***, Black*, et al. in prep).

Rice University 2017 – 2022

Advisor: Dr. Junichiro Kono

Research area: Nanomaterials, Flexible Devices, Optics

Purified carbon nanotube chirality by gel chromatography to provide deeper understanding of optical processes (Dal Forno, **Komatsu** et al., 2022).

Engineered ordered assembly of carbon nanotubes with vacuum filtration method (**Komatsu** et al., 2020)

Developed flexible devices and photonic devices based on aligned carbon nanotube structures (**Komatsu** et al., 2021, Matano, **Komatsu** et al., 2023).

Nanofabricated electronic devices for quantum transport measurements (**Komatsu***, Yu*, et al. in prep).

Publications

24. Adams, J., **Komatsu, N,** *et al.* Near Infrared Fluorescent Nanosensors for High Spatiotemporal Oxytocin Imaging. ***bioRxiv***, 593556 (2024). (Link)

23. **Komatsu, N,** *et al.* Macroscopic Weavable Fibers of Carbon Nanotubes with Giant Thermoelectric Power Factor. ***Nature Communications***, 12, 4931 (2021). (Link)

22. **Komatsu, N,** *et al.* Groove-Assisted Global Spontaneous Alignment of Carbon Nanotubes in Vacuum Filtration. ***Nano Letters****,* 20, 2332 (2020). (Link)

21. **Komatsu, N,** *et al.* Modulation-Doped Multiple Quantum Wells of Aligned Single-Wall Carbon Nanotubes. ***Advanced Functional Materials***, 27, 1606022 (2017). (Link)

20. Klinger, M., Miller, R., **Komatsu, N,** *et al.* Optical Fibers Functionalized with Single-Walled Carbon Nanotubes for Flexible Fluorescent Catecholamine Detection. ***bioRxiv****,* 602792 (2024). (Link)

19. Saju, S., Puthirath, A., Wang, S., Tsafack, T., Beagle, L., Baydin, A., Nithya Chakingal, N. **Komatsu, N**, *et al.* Thermochromic polymer blends. ***Joule*** (2024). (Link)

18. Zacheo, A., Matano, S., Shimura, Y., Yu, S., Doumani, J., **Komatsu, N**, *et al.* Efficient Emission of Highly polarized Thermal Radiation from a Suspended Aligned Carbon Nanotube Film. ***ACS Nano***, 18, 15769 (2024). (Link)

17. Matano, S., **Komatsu, N,** *et al.* High-Speed Modulation of Polarized Thermal Radiation from an On-Chip Aligned Carbon Nanotube Film. ***Nano Letters****,* 23, 9817 (2023). (Link)

16. Zhu, S., Li, W., Yu, S., **Komatsu, N**, *et al.* Extreme Polarization Anisotropy in Resonant Third-Harmonic Generation from Aligned Carbon Nanotube Films. ***Advanced Materials****,* 2304082 (2023). (Link)

15. Wais, F., Bagsican, F., **Komatsu, N**, *et al.* Transition from Diffusive to Superdiffusive Transport in Carbon Nanotube Networks via Nematic Order Control. ***Nano Letters***, 23, 4448 (2023). (Link)

14. Imtiaz, T., Doumani, J., Tay, F., **Komatsu, N**, *et al.* Facile alignment estimation in carbon nanotube films using image processing. ***Signal Processing***, 202, 108751 (2022). (Link)

13. Matano, S., Takahashi, H., **Komatsu, N**, *et al.* Electrical Generation of Polarized Broadband Radiation from an On-Chip Aligned Carbon Nanotube Film. ***ACS Materials Letters****,* 4, 626 (2022). (Link)

12. Lee, D., Kim, S. G., Hong, S., Madrona, C., Oh, Y., Park, M., **Komatsu, N**, *et al.* Ultrahigh strength, modulus, and conductivity of graphitic fibers by macromolecular coalescence. ***Science Advances***, 8, 16 (2022). (Link)

11. Yomogida, Y., Horiuchi, K., Okada, R., Kawai, H., Ichinose, Y., Nishidome, H., Ueji, K., **Komatsu, N,** *et al.* Hall Effect in Gated Single-Wall Carbon Nanotube Films. ***Scientific reports***, 12, 1 (2022). (Link)

10. Dal Forno, S., **Komatsu, N**, *et al.* Origin of the Background Absorption in Carbon Nanotubes: Phonon-Assisted Excitonic Continuum. ***Carbon***, 186, 765 (2022). (Link)

9. Baydin, A., **Komatsu, N**, *et al.* Giant Terahertz Polarization Rotation in Ultrathin Films of Aligned Carbon Nanotubes. ***Optica***, 8, 760 (2021). (Link)

8. Taylor, L. W., Dewey, O. S., Headrick, R. J., **Komatsu, N**, *et al.* Improved Properties, Increased Production, and the Path to Broad Adoption of Carbon Nanotube Fibers. ***Carbon***, 171, 689 (2021). (Link)

7. Wei, N., Tian, Y., Liao, Y., **Komatsu, N**, *et al*. Colors of Single-Wall Carbon Nanotubes. ***Advanced Materials***, 33, 2006395 (2020). (Link)

6. (Invited Review Article) Gao, W., **Komatsu, N**, *et al.* Macroscopically Aligned Carbon Nanotubes for Flexible and High-Temperature Electronics, Optoelectronics, and Thermoelectrics. ***Journal of Physics D: Applied Physics***, 53, 63001 (2020) (Link)

5. Bagsican, F.R.G., Wais, M., **Komatsu, N**, *et al.* Terahertz Excitonics in Carbon Nanotubes: Exciton Autoionization and Multiplication. ***Nano Letters***, 20, 3098 (2020). (Link)

4. Yamaguchi, S., Tsunekawa, I., **Komatsu, N**, *et al.* One-directional thermal transport in densely aligned single-wall carbon nanotube films. ***Applied Physics Letters***, 115, 233104 (2019). (Link)

3. Ichinose, Y., Yoshida, A., Horiuchi, K., Fukuhara, K., **Komatsu, N**, et al. Solving the Thermoelectric Trade-Off Problem with Metallic Carbon Nanotubes. ***Nano Letters***, 19, 7370 (2019). (Link)

2. Fukuhara, K., Ichinose, Y., Nishidome, H., Yomogida, Y., Katsutani, F., **Komatsu, N**, *et al.* Isotropic Seebeck Coefficient of Aligned Single-Wall Carbon Nanotube Films. ***Applied Physics Letters***, 113, 243105 (2018). (Link)

1. (Invited Review Article) Katsutani, F., **Komatsu, N**, *et al.* New Developments in Optoelectronic Studies and Applications of Carbon Nanomaterials. ***Oyo Buturi***, 87, 814 (2018).

Invited Talks

6. **2024 MBIB Annual Meeting**, Illuminating Neuromodulators with Non-Genetically Encoded Nanosensors, Berkeley, CA (April 2024)
5. **Society of Brain Mapping and Therapeutics 2024**, Imaging Neurochemical Signaling in Acute Brain Slices with Non-Genetically Encoded Near-Infrared Nanosensors, Los Angeles, CA (March 2024).
4. **The 64th Fullerenes-Nanotubes-Graphene General Symposium**, Thermoelectric and Electronic Transport Studies of Ultrahigh-Conductivity Carbon Nanotube Fibers, Nagoya, Japan (March 2023).
3. **8th Workshop on Nanotube Optics and Nanospectroscopy**, Novel Optical Processes in Chirality-Enriched and Aligned Carbon Nanotube Films, Madison, WI (July 2022).
2. **Electronic Materials and Applications 2022**, Electronic transport in ultrahigh-conductivity aligned carbon nanotube assemblies, online (January 2022).
1. **The 82nd JSAP Autumn Meeting conference**, Novel Optical Processes in Globally Aligned Carbon Nanotube Films, online (September 2021).

Conference Oral Presentations

13. **2024 American Institute of Chemical Engineers (AIChE) Annual Meeting**, Imaging Oxytocin Signaling in Socially Selective Prairie Voles with Non-Genetically Encoded Fluorescent Nanosensors, San Diego, CA (October 2024).
12. **2024 AIChE Annual Meeting**, Imaging Dopamine Signaling Aberrations in Cocaine Sensitized Animals with Near-Infrared Fluorescent Nanosensors, San Diego, CA (October 2024).
11. **245th Electrochemical Society (ECS) Meeting**, Imaging Oxytocin Signaling in Socially Selective Prairie Voles with Non-Genetically Encoded Fluorescent Nanosensors, San Fransisco, CA (May 2024).
10. **2023 AIChE Annual Meeting**, Imaging Dopamine Modulation in Brain Acute Slices for Cocaine Addiction Study with Non-Genetically Encoded Nanosensors, Orlando, FL (November 2023).
9. **2023 AIChE Annual Meeting**, Macroscopic Weavable Fibers of Carbon Nanotubes with Giant Thermoelectric Power Factor, Orlando, FL (November 2023).
8. **241st ECS Meeting**, Thermoelectric and Electronic Transport Studies of Ultrahigh-Conductivity Aligned Carbon Nanotube Assemblies, Vancouver, Canada (April 2022).
7. **2022 American Physics Society (APS) March Meeting**, Electronic Transport in Ultrahigh-Conductivity Aligned Carbon Nanotube, Chicago, IL (March 2022).
6. **2021 APS March Meeting**, Ultrahigh Conductivity Carbon Nanotube Fibers with Ultrahigh Thermoelectric Power Factors, online (March 2021)
5. **2020 Material Research Society Fall Meeting**, Ultrahigh Thermoelectric Power Factors of Ultrahigh Conductivity Carbon Nanotube Fibers, online (October 2020).
4. **81st JSAP Autumn Meeting**, Optical and Thermoelectric Properties of Ultrahigh-Conductivity Double-Wall Carbon Nanotube Films and Fibers, online (September 2020).
3. **6th Annual Transdisciplinary Symposium**, Ultrahigh Thermoelectric Power Factors of Ultrahigh Conductivity Carbon Nanotube Fibers, online (August 2020).
2. **5th Annual Transdisciplinary Symposium**, Groove-Assisted Global Spontaneous Alignment of Carbon Nanotubes in Vacuum Filtration, Houston, TX (February 2020).
1. **3rd Annual Transdisciplinary Symposium**, Toward Single Crystals of Single-Chirality Single-Wall

Carbon Nanotubes, Houston, TX (August 2018).

Service and Outreach

TOMODACHI-STEM Women's Leadership and Research Program 2018 – 2022

Student Assistant, Mentor

- Mentored 35 undergraduate students over four years during a 5-week long research internship.
- Organized guest lectures, career talks, and panel discussions.
- Initiated and organized an online information session about the program (> 80 attendees).
- Assisted graduate school applications of alumni, admitted to Stanford University, Caltech, Rockefeller University, and Rice University.

Graduate STRIVE: Students Transforming Rice Into a Violence-Free Environment 2020 – 2022

Graduate Student Liaison

- Worked with Title IX office and served as a liaison for survivors.
- Organized panel discussions and documentary screening on topics related to gender discriminations, such as Sexism in Academia, and Redefining Masculinity.

Rice University Graduate Student Ambassador 2020 – 2022

Ambassador

- Involved in prospective students' recruitment to Rice University.
- Organized online information sessions and virtual coffee chats.
- Filmed and edited YouTube videos introducing graduate school at Rice University.

XPLANE 2020 – 2022

Volunteer

- Assisted graduate school applications focusing on revising statement of purpose.
- Organized online sessions to discuss women's' careers and health abroad.