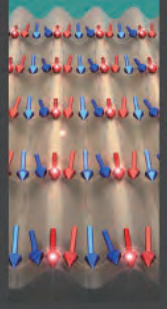



Frontiers of Nanomechanical Systems
(FNS)

June 3-6, 2025

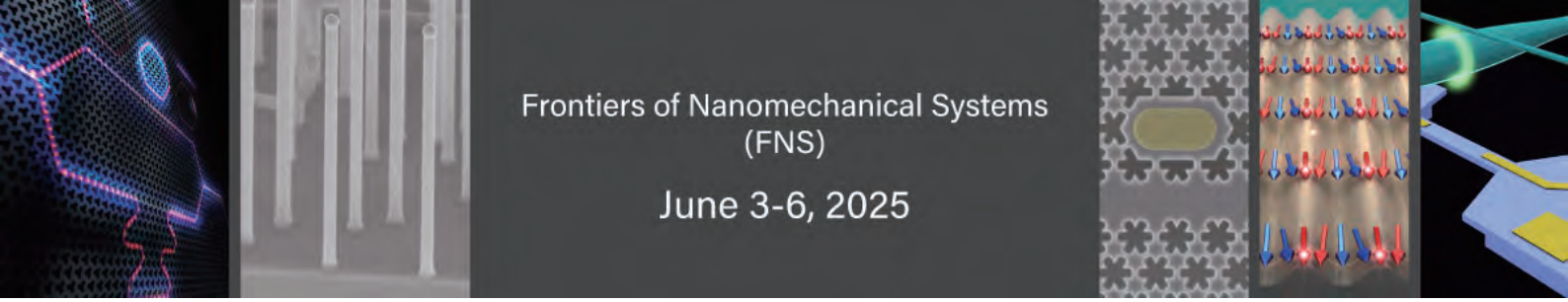

General Information

FNS2025

FRONTIERS OF NANOMECHANICAL SYSTEMS

June 3-6, 2025

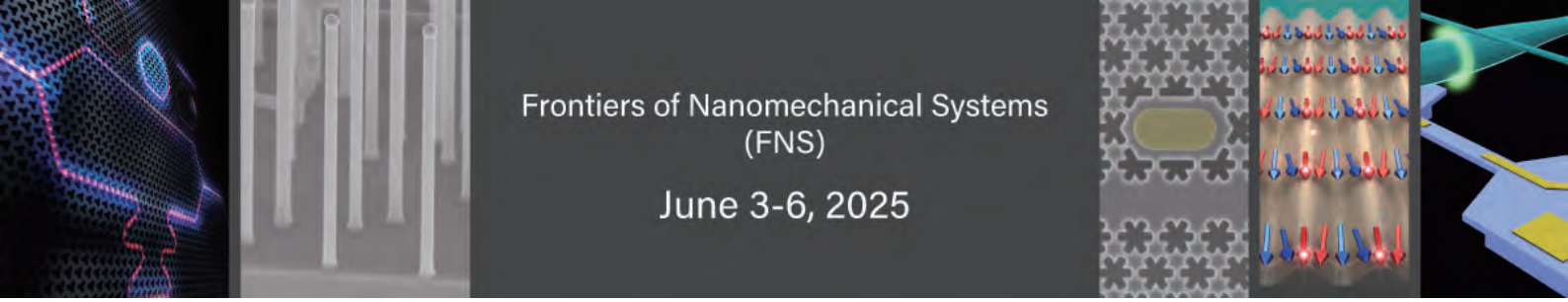
NTT Atsugi R&D center, Japan



Message from workshop chairs

Frontiers of Nanomechanical Systems (FNS) is a workshop series with the purpose to bring together the international community engaged in fundamental research on vibrations of nano- and micro- electromechanical systems (NEMS & MEMS). The workshop intends to promote the cross-fertilization of ideas and stimulate international interactions in this rapidly growing area.

After four successful FNS series in 2017 in the Italian Alpes, 2019 in Palm Springs California, 2021 online event organized by ICFO, and the 2023 in Delft, the 5th FNS workshop will be held at the NTT Atsugi R&D center in Kanagawa prefecture, Japan, from June 3-6, 2025. The NTT Basic Research Laboratories, conducting basic research in the fields of Materials Science, Physical Science and Optical Science, will host invited and contributed presentations at FNS2025.



Organizing Committee

Hiroshi Yamaguchi, NTT Basic Research Laboratories (Chair)

Hajime Okamoto, NTT Basic Research Laboratories (Vice Chair)

Daiki Hatanaka, NTT Basic Research Laboratories

Motoki Asano, NTT Basic Research Laboratories

FNS International Committee

Farbod Alijani, Associate Professor, TU Delft

Adrian Bachtold, Professor, ICFO Barcelona

Ho Bun Chan, Professor of Physics, HKUST China

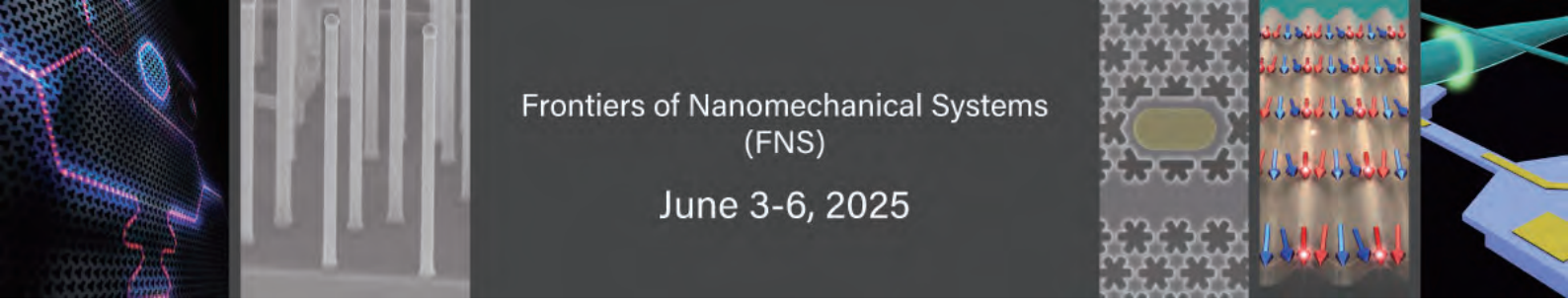
Mark Dykman, Professor of Theoretical Physics, Michigan State University

Fabio Pistolesi, Professor of Physics / CNRS Research Director, Université de Bordeaux

Michael Roukes, Frank J. Roshek Professor of Physics, Applied Physics, & Bioengineering, California Institute of Technology

Eva Weig, Professor of nano and quantum sensors, Technical University of Munich

Hiroshi Yamaguchi, Fellow, Physical Sciences Laboratory, NTT Basic Research Laboratories



Keynote Speakers

Michael Roukes (California Institute of Technology)

Andrew N. Cleland (The University of Chicago)

Invited Speakers

Farbod Alijani (Delft University of Technology)

Adrian Bachtold (ICFO)

Warwick Bowen (The University of Queensland)

Matteo Fadel (ETH Zurich)

Masamitsu Hayashi (The University of Tokyo)

Joel Moser (Soochow University)

Yoshichika Otani (The University of Tokyo/RIKEN)

Yogesh Patil (Yale University)

Fabio Pistolesi (CNRS)

John Sader (California Institute of Technology)

Amir Safavi-Naeini (Stanford University)

Albert Schliesser (Niels Bohr Institute)

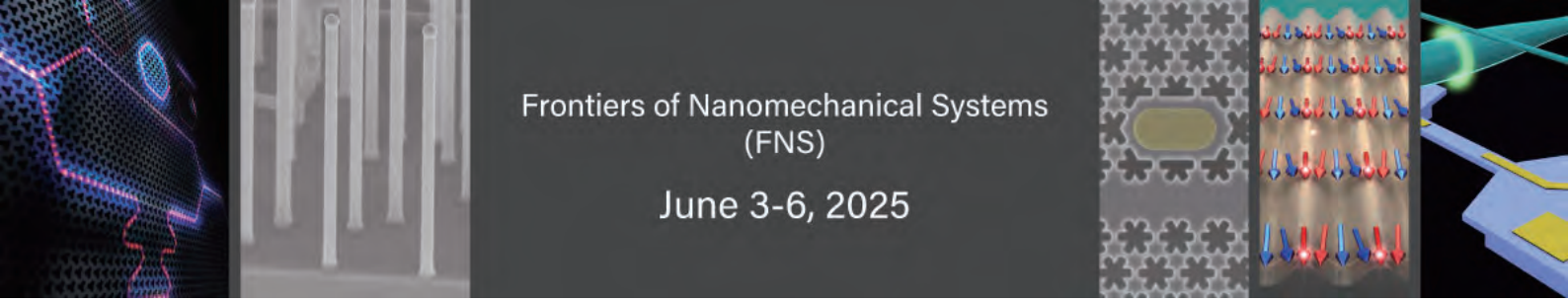
Oriel Shoshani (Ben-Gurion University)

Junho Suh (POSTECH)

Dana Weinstein (Purdue University)

Xin Zhou (CNRS)

Oded Zilberberg (University of Konstanz)

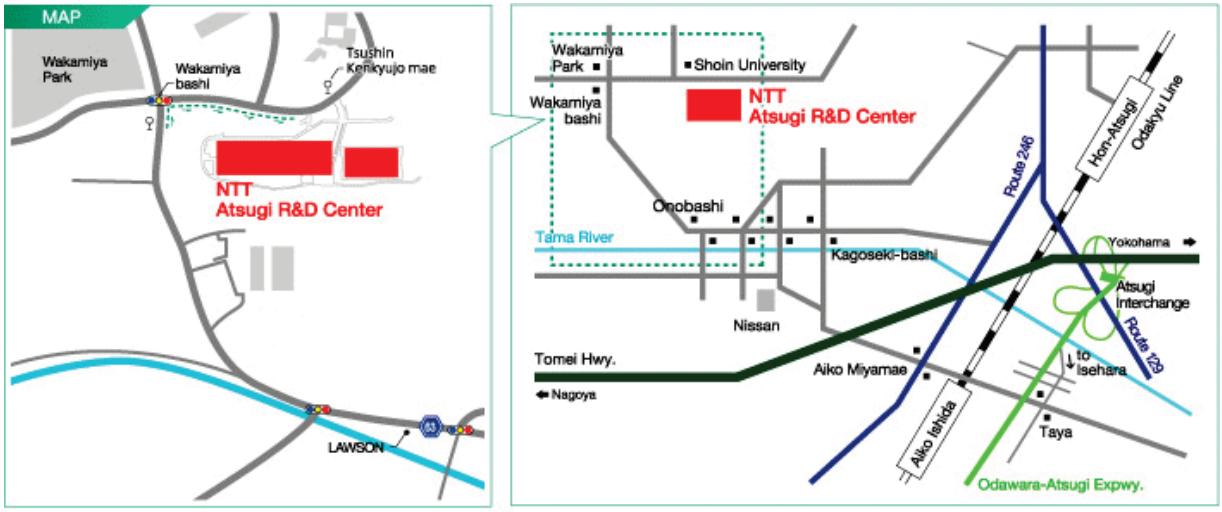


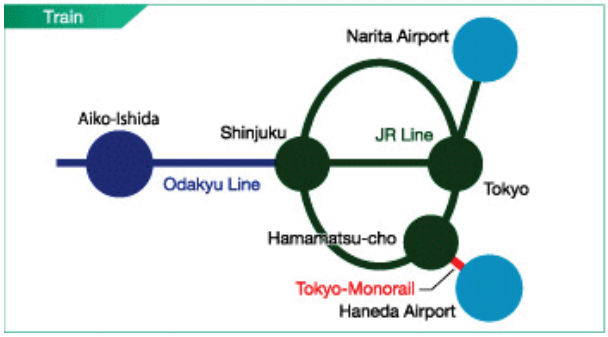
Workshop Venue

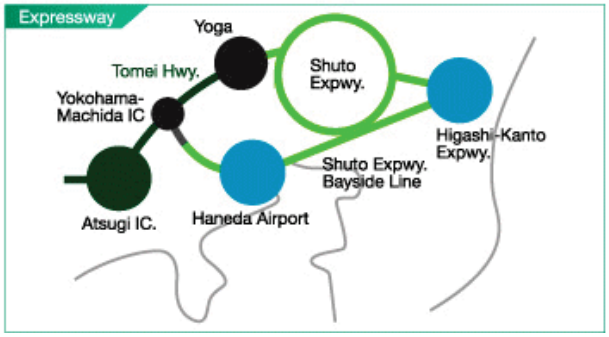
FNS2025 will be held at the NTT Atsugi R&D Center, located in the city of Atsugi, about an hour from central Tokyo.

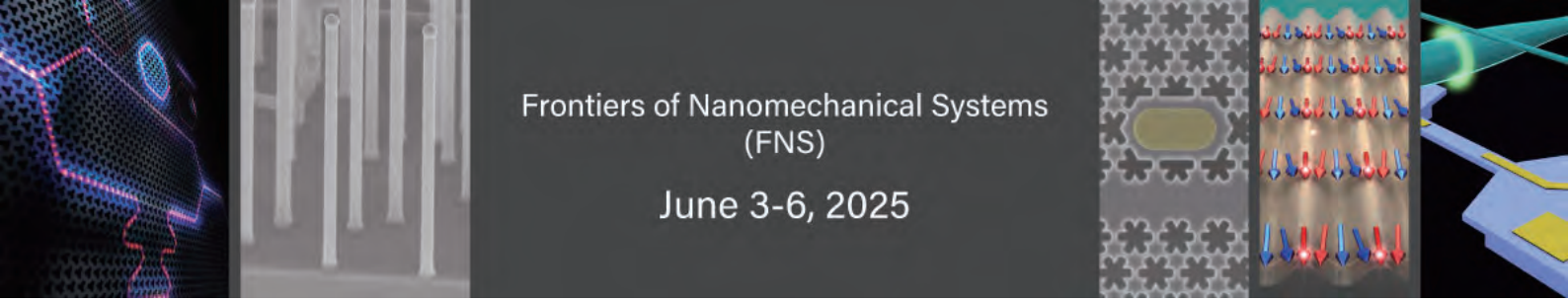
Nestled in a serene natural setting, the NTT Atsugi R&D Center is one of Japan's leading research facilities in the field of photonics and nanotechnology. The campus features modern architecture harmonized with spacious green surroundings, offering a quiet and inspiring environment for scientific exchange.
As part of NTT's Basic Research Laboratories, the center fosters cutting-edge research and innovation. During FNS2025, participants will have the unique opportunity to engage in scientific discussions at the very heart of Japan's research and development in frontier nanophotonics.

The nearest major train station from the workshop site is Hon-Atsugi station on the Odakyu Line. Airport access by Limousine bus is available between Haneda International Airports and Hon-Atsugi station.









Bus Transport

Here you find the schedule of the free shuttle bus from Atsugi Urban Hotel (5 minutes' walk from Hon-Atsugi Station) to bring participants in the morning to workshop venue and in the evening to the center of Atsugi.

Outbound Trip

All day: Atsugi Urban Hotel - NTT (workshop venue)

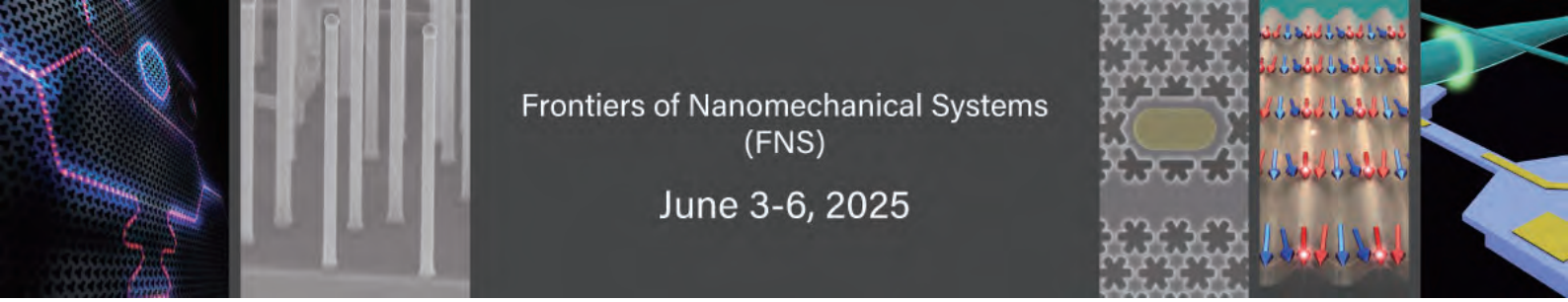
Return Trip

June 3rd, 4th and 6th: NTT (workshop venue) - Atsugi Urban Hotel

June 5th: NTT (workshop venue) - Rembrandt Hotel Atsugi (banquet venue)

Bus Schedule

	June 3rd (Tue.)	June 4th (Wed.)	June 5th (Thu.)	June 6th (Fri.)
Morning transport	8:10	8:10	8:10	8:10
	8:30	8:30	8:30	8:30
Evening Transport	18:30	18:30	17:40	16:10
	19:30	19:30	17:55	16:20
	19:40	19:40	18:05	16:30
	19:50	19:50	18:15	17:40
	20:00	20:00		

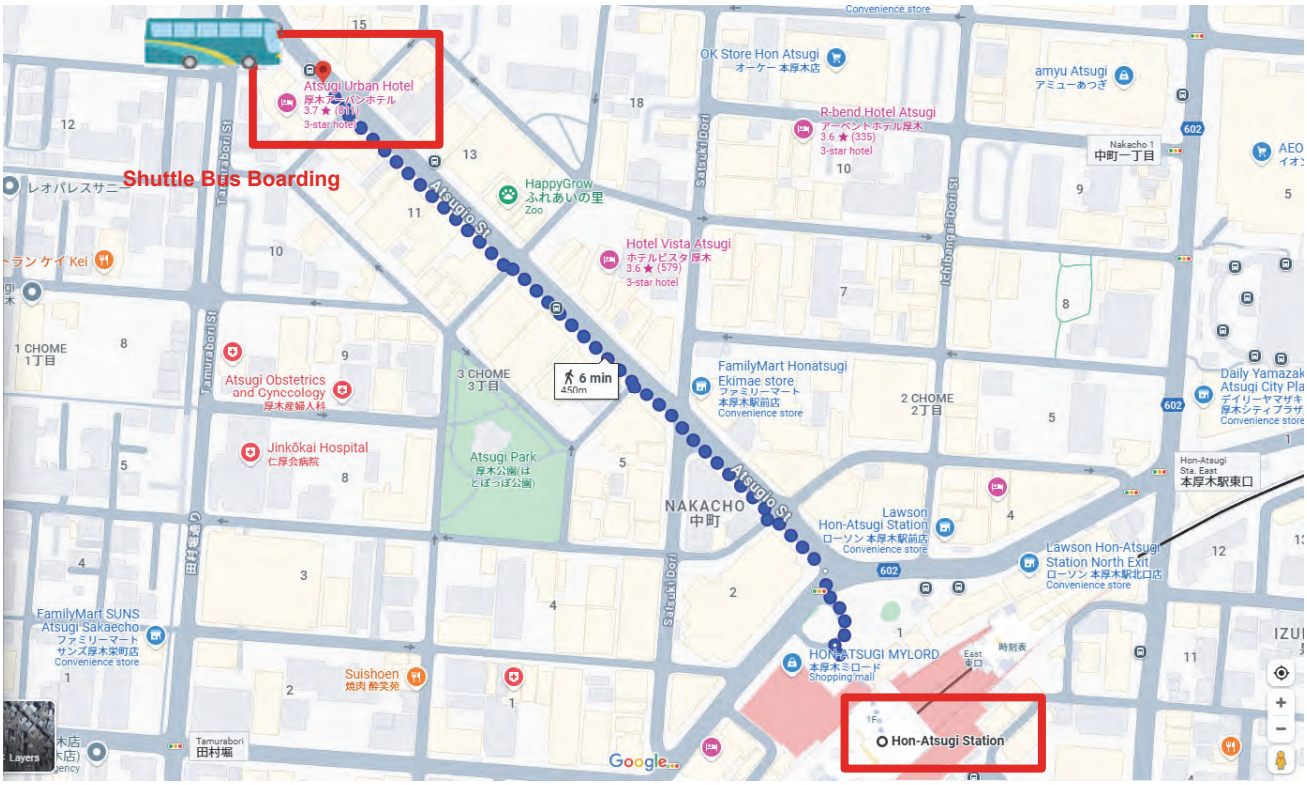


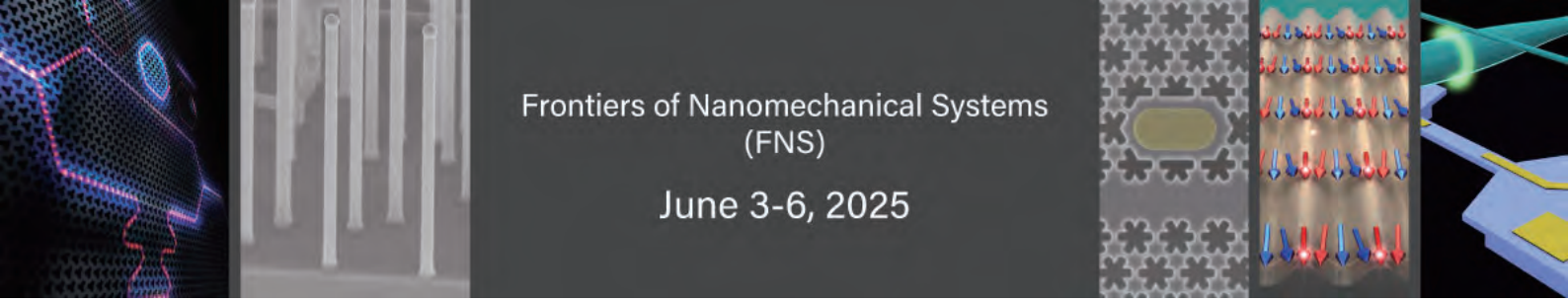
Shuttle Bus to NTT Atsugi R&D Center

The shuttle bus to the NTT Atsugi R&D Center will stop in the parking lot of the Atsugi Urban Hotel, at the location marked with a red square on the map.

Please refer to the separate timetable page for the bus schedule.

Staff will be on-site to guide you to the boarding area.



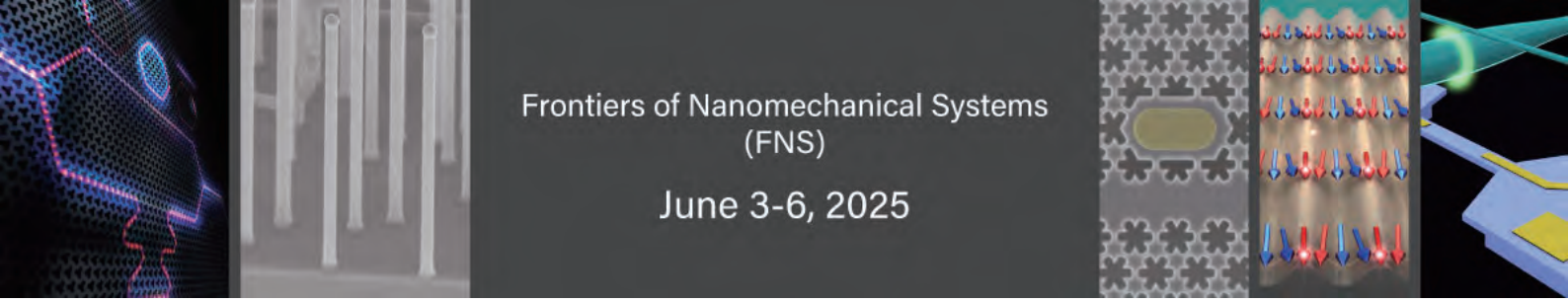


Welcome Reception

June 2nd (Mon.) 18:00 - 20:00

Welcome Party will be held at the Atsugi Urban Hotel

Atsugi Urban Hotel offers a refined and calming atmosphere, featuring a marble-accented lobby and interiors that blend simplicity with the warmth of natural wood.
The hotel's party venue provides a quiet and relaxed setting, fully equipped with a range of audiovisual systems to support a variety of events.

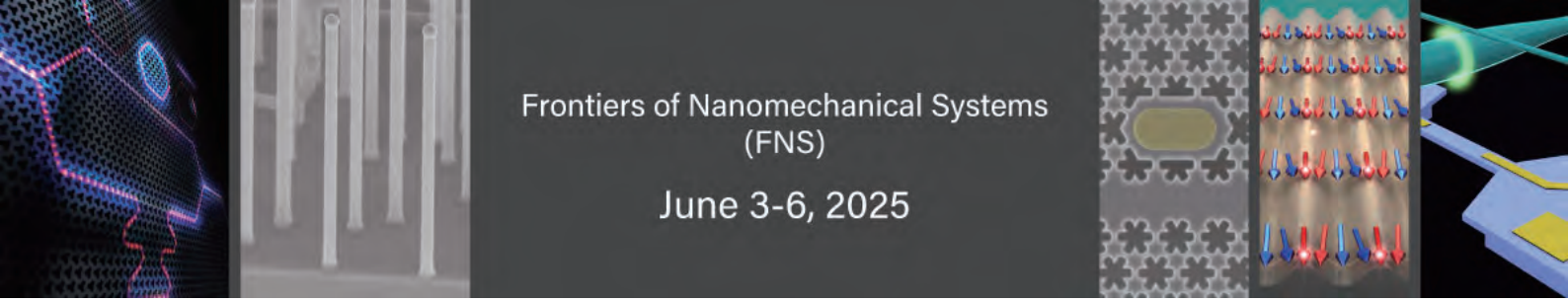


Workshop Dinner

June 5th (Thu.) 19:15 - 21:15

Workshop Dinner will be held at the Rembrandt Hotel Atsugi

Rembrandt Hotel Atsugi offers warm and comfortable guest rooms, a relaxation and massage salon, four restaurants, and a bar—all designed to ensure a pleasant and restful stay. Complimentary Wi-Fi is available throughout the entire property.
Our banquet venue is a refined and versatile space, ideal for everything from elegant parties to more intimate gatherings. With professional service and fully equipped facilities, we invite you to enjoy a truly special experience.



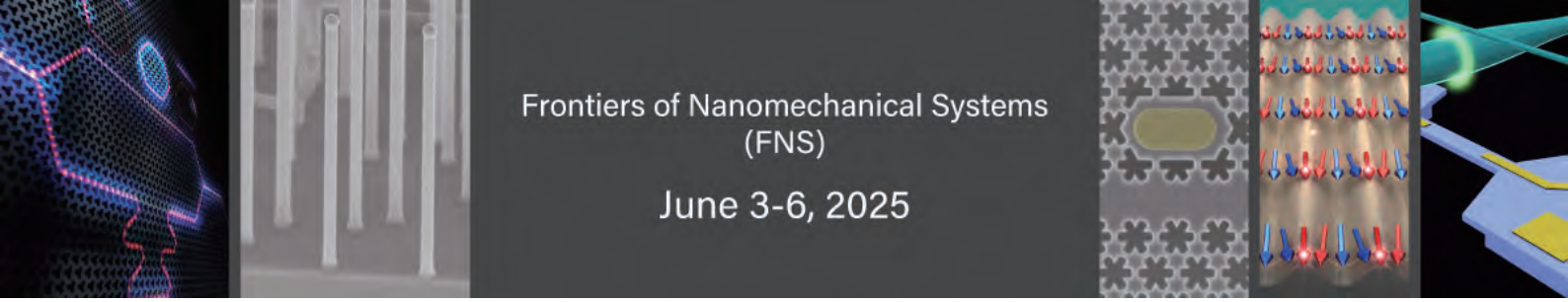
FNS2025 Program

3rd June (Tue.)

		9:40 - 9:50	Opening Remarks	
Tu-01	Keynote	9:50 - 10:35	> 30 Y of NEMS ...and yet, frontiers await	Michael Roukes
Tu-02	Invite	10:35 - 11:10	TBA	Amir Safavi-Naeini
		11:10 - 11:40	Cofee Break	
Tu-03	Oral	11:40 - 12:05	Superconducting Casimir forces on a chip: achieving ultimate parallelism with STM readout	Richard Norte
Tu-04	Oral	12:05 - 12:30	Measurement of the Casimir force between superconductors	Matthijs Hendrik Jan de Jong
		12:30 - 14:00	Lunch	
Tu-05	Keynote	14:00 - 14:45	Quantum physics with individual acoustic phonons	Andrew N. Cleland
Tu-06	Invite	14:45 - 15:20	Preparation and characterization of non-Gaussian quantum states of motion in a mechanical resonator	Matteo Fadel
Tu-07	Oral	15:20 - 15:45	Superconducting circuit optomechanics: from high-coherence to quantum collective dynamics	Mahdi Chegnizadeh
		15:45 - 16:15	Cofee Break	
Tu-08	Oral	16:15 - 16:40	Quantum squeezing of an optically levitated nanoparticle	Massimiliano Rossi
Tu-09	Oral	16:40 - 17:05	A levitated photoacoustic sensor	Letizia Catalini
Tu-10	Oral	17:05 - 17:30	Feedback cooling of high-Q magnetically-levitated resonator for ultraprecise accelerometry	Shilu Tian
		17:30 - 19:30	Poster	

4th June (Wed.)

We-01	Invite	9:20 - 9:55	Bacterial nanomotion and synchronization probed by micromechanical devices	Farbod Alijani
We-02	Oral	9:55 - 10:20	Detecting gravity at the milligram scale using optomechanics	Matthew Herbst
		10:20 - 10:50	Cofee Break	
We-03	Invite	10:50 - 11:25	Superfluid-coated nanophotonics: nonlinear waves and solitons	Warwick Bowen
We-04	Invite	11:25 - 12:00	Nonlinear fluid flows and mass spectrometry using nanomechanical devices	John Sader
We-05	Oral	12:00 - 12:25	Spin-driven nanomotor	Wataru Izumida
		12:30 - 14:00	Lunch	
We-06	Invite	14:00 - 14:35	Hybrid magnon-phonon crystals	Yoshichika Otani
We-07	Invite	14:35 - 15:10	The coupling constants of magnons and acoustic phonons in magnetic nanostructures	Masamitsu Hayashi
We-08	Oral	15:10 - 15:35	Ferromagnetic 2D membrane resonators: from thermodynamics to topological spin textures	Timofei Savilov
		15:35 - 16:05	Cofee Break	
We-09	Invite	16:05 - 16:40	Multimode coupling and nonlinear dynamics in coupled double-drum resonators	Xin Zhou
We-10	Oral	16:40 - 17:05	Towards large networks of mechanical parametric oscillators	Vincent Dumont
We-11	Oral	17:05 - 17:30	Programmable optomechanical circuits	Xiaofei Guo
		17:30 - 19:30	Poster	



FNS2025 Program

5th June (Thu.)

Th-01	Invite	9:20 - 9:55	Cavity and two-level system optomechanics in strong coupling	Fabio Pistolesi
Th-02	Invite	9:55 - 10:30	Knots, non-abelian braids, and geometric phases in non-hermitian systems	Yogesh Patil
		10:30 - 11:00	Cofee Break	
Th-03	Invite	11:00 - 11:35	Optomechanical nonlinearity and nanomechanical self-oscillation in cavity electromechanical system	Junho Suh
Th-04	Oral	11:35 - 12:00	Synthetic Kuramoto potential in an optomechanical resonator	Motoki Asano
Th-05	Oral	12:00 - 12:25	Slow buildup of self-sustained oscillations in a sideband-driven electromechanical resonator	Pak Yin Chan
		12:30 - 14:00	Lunch	
Th-06	Invite	14:00 - 14:35	A method for improving oscillator frequency stability using feedback-controlled amplitude and phase	Oriel Shoshani
Th-07	Oral	14:35 - 15:00	Suppressing mechanical noise in an optomechanical cavity with a tunable Kerr nonlinearity	Sarah Meilof
Th-08	Oral	15:00 - 15:25	Low temperature fluctuations of a mesoscopic mechanical mode	Alexandre Delattre
		15:25 - 15:55	Cofee Break	
Th-09	Invite	15:55 - 16:30	TBA	Dana Weinstein
Th-10	Oral	16:30 - 16:55	Laser micromachining of silicon nitride trampolines operating at the fundamental temperature fluctuation-noise limit	Raphael St-Gelais
Th-11	Oral	16:55 - 17:20	Ultrathin rippled materials with non-Hookean mechanical properties.	Daniel Lopez
		19:15 - 21:15	Workshop Dinner	

6th June (Fri.)

Fr-01	Invite	9:20 - 9:55	Nonlinearities in mechanical resonators at the zero-point motion level	Adrian Bachtold
Fr-02	Oral	9:55 - 10:20	Investigation of phase diffusion in a single driven nonlinear nanomechanical mode	Maria Kallergi
Fr-03	Oral	10:20 - 10:45	Characterization of nonlinear damping and noise squeezing by sideband measurements	Mengqi Fu
		10:45 - 11:15	Cofee Break	
Fr-04	Invite	11:15 - 11:50	The response of graphene resonators to a multifrequency coherent drive and to modulated boundary conditions	Joel Moser
Fr-05	Oral	11:50 - 12:15	hBN optomechanically induced transparency, gain and frequency combs	Francesco Fogliano
Fr-06	Oral	12:15 - 12:40	High-quality-factor viscoelastic nanomechanical resonators from moiré superlattice	Xin Zhang
		12:40 - 14:00	Lunch	
Fr-07	Invite	14:00 - 14:35	The topology of driven-dissipative nonlinear resonators	Oded Zilberberg
Fr-08	Oral	14:35 - 15:00	Hypersonic phonon propagation at 2GHz in a non-trivial topological phononic waveguide	Clivia Sotomayor Torres
Fr-09	Invite	15:00 - 15:35	Quantum and topological phononics with ultrasound waves on a chip	Albert Schliesser
		15:35 -	Closing Remarks	