Toshihiko **FUKUSHIMA** Robotics Researcher & Automotive Engineer

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HARD SKILLS

RODOTICS	Soπ robot, Bio-inspired robot, Legged robot, Musculoskeletal robot, Biomechanics, Biomimetics, Control		
	system, Statics, Machine learning, Embodied intelligence, Locomotion, Aerial righting, Soft actuator, Pneu-		
	matic actuator, Electrostatic actuator, Artificial muscle, HASEL, Data processing, Lidar, Sensor fusion		
Mechatronics	Mechanical modeling, CAE, Circuit design, PCB, Electrical modeling, BLDC motor, Field Oriented (vector)		
	Control, T-Motor, DYNAMIXEL, Embedded system, Arduino, ESP32, STM32, SPI, I2C, SSI		
Sim. & CAD	Matlab, Simulink, Simscape, OpenHRP3, MuJoCo, Genesis, DeepLabCut, Solidworks, CATIA, ADAMS		
Automobile	Chassis system, Steering system, Suspension system, Vehicle dynamics, By-wire system, Engine, EV-motor,		
	Transmission system, NVH, HiL, SiL, System bench, Vehicle test, MBD, Rapid-ECU, System stability, Battery		
	management, Heat management, Lifetime management, Functional safety, ISO26262		
Auto. soft.	dSPACE, MicroAutobox, ControlDesk, ModelDesk, RTI, ASM, CarSim, ATLAS, Romax, SharcNT		
IT	Illustrator, Premiere Pro, UNIX, Ubuntu, CentOS, DNS, Apache, Samba, OpenSSH, HTML5, CSS, Bootstrap		

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😛 Soft Skills

Communication	worked in international teams (6yrs) and coordinated global companies and institutions (6yrs)		
Management	experienced global coordination (6yrs), project management (10yrs), team management (3yrs)		
Innovation	have interdisciplinary background and created the first legged robot with HASEL technology. was select		
	in MPG research highlights 2024 (12 selected papers among 15,000+ publications)		
Productivity	published 12x papers (Nat. Commun., ICRA, Humanoids), received Young Investigation Excellence Award		
Presentation	received a presentation award. conducted 6x robotic demonstrations and automotive demos individually		
	to 2x Exec. Vice Presidents of Toyota. presented in 5x TV shows, 3x radios, 4x magazines, 200+ news articles		

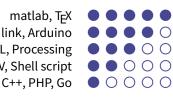
S LANGUAGES

Native:	Japanese 💻	$\bullet \bullet \bullet \bullet \bullet$
Professional:	English ا	$\bullet \bullet \bullet \bullet \bigcirc$
Beginner:	German 💳	$\bullet \circ \circ \circ \circ$
	Chinese 📒	$\bullet \circ \circ \circ \circ$

WORKING EXPERIENCE

🚯 Software Languages

matlab, T_EX Python, Simulink, Arduino HTML5, CSS, CAPL, Processing C, OpenCV, Shell script C++, PHP, Go



CIS Mar. 2023 -Present

Associated fellow Max Planck ETH Center for Learning Systems (CLS), Stuttgart, Germany

Research embodied intelligence in soft robotics

- > collaborate with international institutions and universities
- > supervise master and bachelor students and guide junior PhD students
- > reach out to the media and public domains to share the research outcomes with society

 Robotics
 Soft robotics
 Embodied intelligence
 Networking
 Team management
 Public relations
 Press release

 Media reaching
 Media interview
 Public speech
 Outreach
 Export control
 Event management
 Web development



Sep. 2020 -

Present

Doctoral Researcher

Max Planck Institute for Intelligent Systems, Stuttgart, Germany

Research soft robotics with soft electrohydraulic actuators (HASELs)

- > develop musculoskeletal **robotic legs** and proved their agile, adaptive, yet energy-efficient locomotion
- > develop compact sensing & control devices for high voltage robots (10kV) to optimize the system efficiencies
- > develop optimized controllers for electrostatic-based systems using electro-mechanical coupling

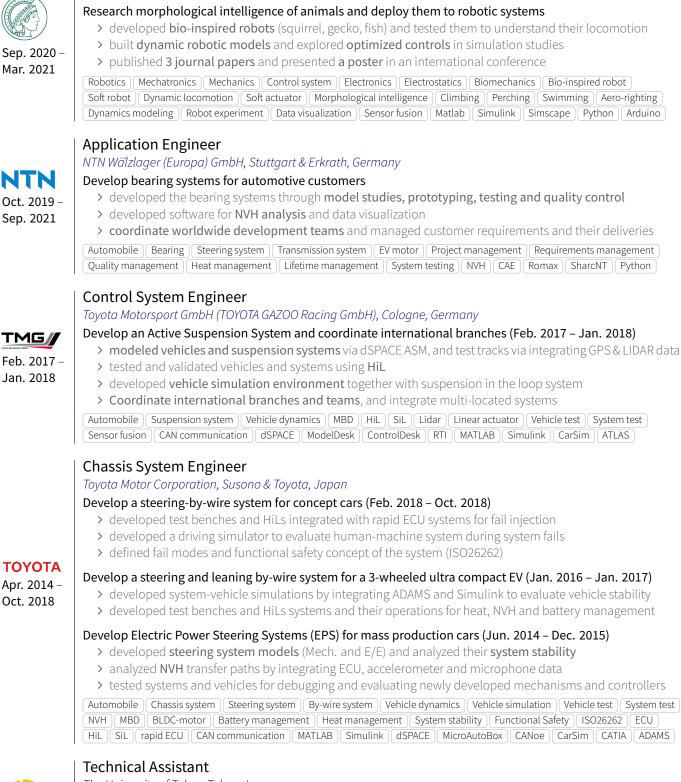
 Robotics
 Bio-inspired robot
 Soft robot
 Musculoskeletal robot
 Embodied intelligence
 Dynamic locomotion
 Legged robot

 Soft actuator
 Electrostatic actuator
 Electrohydraulic actuator
 HASEL
 BLDC motor
 Field Oriented (vector) Control
 T-Motor

 DYNAMIXEL
 Mechanical modeling
 Electrical modeling
 Solidworks
 Robot experiment
 Sensor fusion
 Data processing

 Circuit design
 PCB
 Matlab
 Simulink
 Simscape
 MuJoCo
 Genesis
 DeepLabCut
 Python
 Arduino
 STM32
 ESP32

 SPI
 I2C
 SSI
 HTML5
 Modern CSS
 Hugo Blox Bootstrap
 Experiment
 Sensor fusion
 <t





The University of Tokyo, Tokyo, Japan

Manage UNIX servers and renewed a website in the laboratory

- > installed physical servers and maintained DNS, mail, HTTP and Samba servers
- > designed and developed the website via Twitter Bootstrap and PHP

IT DNS Apache Samba OpenSSH Shell script UNIX Ubuntu CentOS HTML CSS PHP Twitter Bootstrap



Internship Toyota Boshoku Corporation, Kariya, Japan

develop a charging and discharging system for a small electric vehicle > built a simulation system and developed a prototype for the system

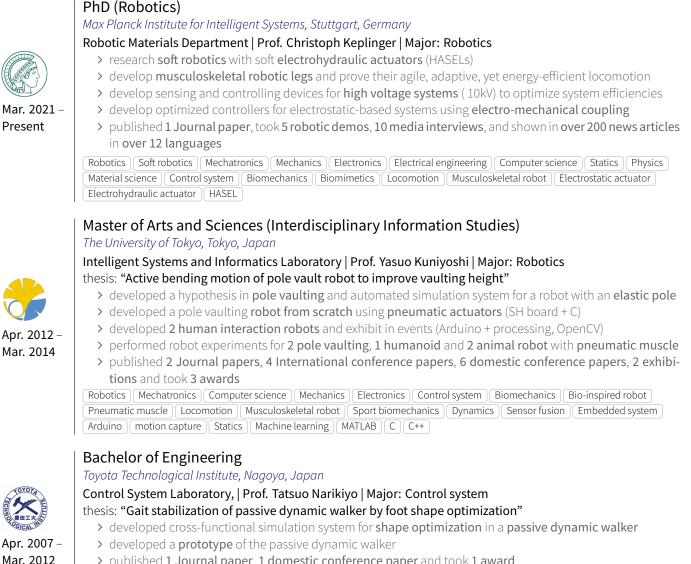
Simulink Electrical engineering Ladder Control Logic gate

TMG

Research Engineer

Max Planck Institute for Intelligent Systems, Stuttgart, Germany

Jan. 2018



> published 1 Journal paper, 1 domestic conference paper and took 1 award

Mechatronics Mechanics Control system Robotics Computer science Electronics Production system Passive dynamic walking Optimization Genetic algorithm MATLAB C BASIC OpenHRP3

MEDIA EXPOSURE

- > 7x TV shows: BBC News ₩, 3sat = 2 4, SWR =, YTN ∞, WKYT =, TNN =, KBS ∞
- > 3x Radio programs: NDR 💻 , rbb24 💻 , Radio Eins 💻
- > 4x Magazines: National Geographic Deutschland, Wirtschafts Woche, Stuttgarter Maschinenbau, Max Planck Society Year book
- > 200+ News articles in 12+ languages: REUTERS, AFP, heise, EL Economista, The National Tribune, THE HINDU, 人民日报, etc.

🏆 Honors

- > Research highlights 2024, Max Planck Society, selected 12 research articles out of 15,000+ publications in the year.
- > Editors' Highlights, nature communications, 2024.
- > Video Friday, IEEE Spectrum, 2024.
- > Young Investigation Excellence Award, The Robotics Society of Japan, 2014.
- > Scholarship for Students with Outstanding Achievements, Japan Student Services Organization (JASSO), 2014.
- > Student travel grant, 6th International Symposium on Adaptive Motion of Animals and Machines (AMAM), 2013.
- > Presentation award, The 13th SICE System Integration Division Annual Conference (SICE SI), 2012.

PUBLICATIONS

- > 7 journal papers
- > 5 international conference papers (ICRA, Humanoids)
- > 7 domestic conference papers

Details are shown in another document.