



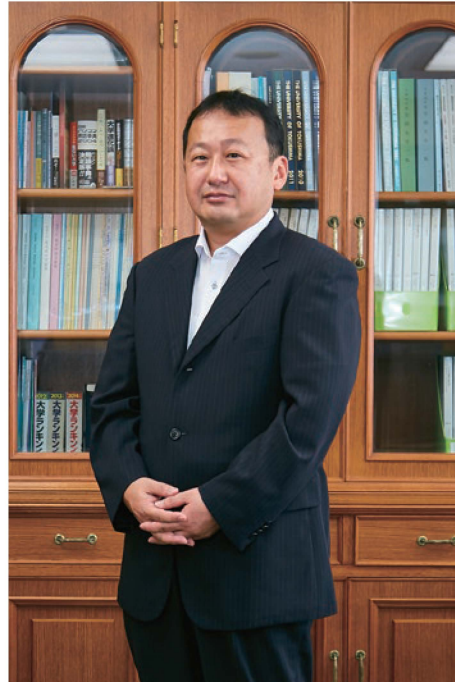
Pioneering the Future with the Potential of Light

The 21st century is often referred to as the century of light. LED, laser, and semiconductor laser technologies have been developed since 1960s, being now indispensable for our everyday life. One well-known example is blue and white LEDs, which causes “disruptive innovations”. They are widely used for lighting and display.

Light covers a very wide range of optical spectrum from deep ultraviolet to terahertz. Nevertheless, we use a very limited wavelength, i.e. visible light. By fully utilizing the full optical spectrum, including deep ultraviolet, infrared, and terahertz, we will have a lot of unique applications, which are impossible for visible light. However, due to the lack of practical light sources, the wavelengths are still “unexplored”.

The development of new practical light sources in the wavelengths will give us a new paradigm in our everyday life.

Under the motto, “Development and application of invisible next-generation light (deep ultraviolet, infrared, and terahertz),” we are pushing the researches for aging societies and boosting local industrial economies, so called “post-LED photonics research”.



Prof. YASUI Takeshi
Director of the Institute of Post-LED Photonics

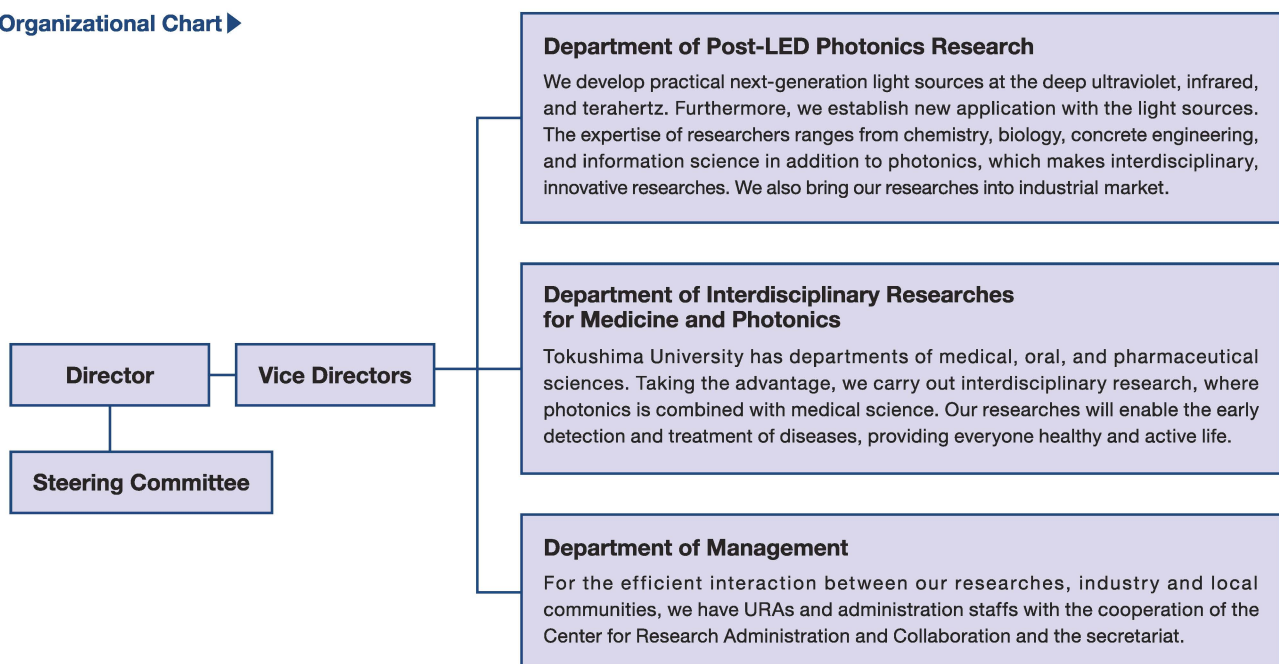
He received the first Ph.D. degree in engineering from the University of Tokushima, Japan, in 1997, and the second Ph.D. degree in medical science from the Nara Medical University, Japan, in 2013. From 1997 to 1999, he worked as a post-doctoral researcher in the National Research Laboratory of Metrology, Japan. He was an Assistant Professor with the Graduate School of Engineering Science, Osaka University, Japan, from 1999 to 2010, and then was a Professor in the Graduate School of Technology, Industrial and Social Sciences, Tokushima University, from 2010 to 2019. He is currently the director of the Institute of Post-LED Photonics, Tokushima University, Japan, established in March 2019. His research interests include THz technology, optical frequency comb, and second-harmonic-generation microscopy.

Outline of the Institute

This institute was established in Tokushima University in March 2019 to push optical science, aiming to open unprecedented optical markets. We are interested in the invisible next-generation light, i.e., deep ultraviolet, infrared, and terahertz. Our research includes development and application of the practical light source in that wavelengths. We also develop innovative medical techniques by combining optical science with medical science.

Under the leadership of Director Prof. YASUI Takeshi, all researchers with different expertise carry out cutting-edge optical science, while sharing the same vision and direction. We will develop interdisciplinary researches beyond one specialized field through close communication and interaction between researchers with various backgrounds.

Organizational Chart ▶



Vice Directors of the Institute



Graduated from the School of Medicine, Faculty of Medicine, Tokushima University, in 1990. Completed a doctoral course in Medical Science at the Graduate School of Medical Science of the same university in 1997. Earned a Ph.D. in medicine and is a pediatrician. Appointed as a professor of the Institute of Health Biosciences (now the Graduate School of Biomedical Science) of Tokushima University in 2001. Appointed as a vice director (for research) of Tokushima University in 2017. Specializes in Pediatrics and Immunology.



Graduated from the Department of Electronics, School of Engineering, Osaka University in 1985. Completed a master's course at the Graduate School of Engineering of the same university in 1987. Earned a Ph.D. in engineering. Appointed as a professor of the Institute of Technology and Science (now the Graduate School of Technology, Industrial and Social Sciences) of Tokushima University in 2009. Specializes in plasmonics.



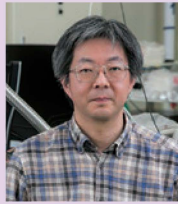
Graduated from the Department of Precision Engineering, Faculty of Engineering, the University of Tokyo, in 1982. After working for Canon Inc. and Cymer Japan, Inc., joined Nichia Corporation in 2000. Appointed as Group Leader of the Research Planning Group, Research Division, in July 2018, after serving as the deputy director of the Tokyo Technology Center, Research Division, director of the LD Business Planning Department, Research Division, and director general of the LD Business Headquarters.

World-leading researchers conducting research in new areas

Leading scientists invited from the Institute of Physical and Chemical Research and the University of Electro-Communications help us to develop the next-generation light at the unexplored wavelengths and bring the developed laser technologies into industrial markets.

Deep Ultraviolet Deep Ultraviolet LED Research Unit

Deep ultraviolet LEDs has an effective light source for sterilization such as viruses, etc. The LEDs are attracted much attention to realize deep ultraviolet light source as the environment-friendly, to replace mercury lamps. This group focuses on improving crystalline quality to achieve the long lifetime for LED and developing their new applications.



HIRAYAMA Hideki
Chief Scientist of RIKEN
(The Institute of Physical and Chemical Research)

Completed a doctoral course in the Department of Physical Electronics, Graduate School of Engineering, Tokyo Institute of Technology, in 1994. Earned a Ph.D. in engineering. Joined the Institute of Physical and Chemical Research in the same year. Appointed as chief scientist of the Quantum Optodevice Laboratory in 2012. Has pursued research into quantum electronics and optical devices, especially research into the crystal growth of AlGaN nitride semiconductors and the development of deep ultraviolet devices. Succeeded in developing the world's most efficient deep ultraviolet LEDs, close to that of mercury lamps. Won the Commendation for Science and Technology from Japan's Minister of Education, Culture, Sports, Science and Technology in 2015, and other awards.

Infrared Next-Generation Optical Frequency Comb Unit

With their recognized superiority such as extremely high precision and sensitivity in component analysis of volcanic gases and breath gases, infrared optical frequency combs are expected to significantly widen the range of applications of laser technology. This unit is conducting the development of new light sources, especially in terms of down-sizing such as micro-optical combs, and wavelength region such as middle-infrared optical combs, with the objective of applying them in numerous fields.



MINOSHIMA Kaoru
Professor of the University of Electro-Communications / Professor of Tokushima University

Completed a doctoral course in the Department of Physics, Graduate School of Science, the University of Tokyo in 1993. Earned a Ph.D. in science. Served as Senior Researcher at National Metrology Laboratory, the Ministry of International Trade and Industry, and Group Leader at the National Institute of Advanced Industrial Science and Technology, etc. Appointed as a professor of the Graduate School of Informatics and Engineering, The University of Electro-Communications, in 2013. Served as Research Director in JST ERATO MINOSHIMA Intelligent Optical Synthesizer Project. She has demonstrated many pioneering works in developing practical optical frequency comb light source and application technologies in various fields. Gaining attention from academia and industry as a leading expert in optical frequency combs. For example, her achievements have been published in the Nikkei newspaper and others.

Terahertz Metamaterials Research Unit

A metamaterial is a man-made material with an artificial structure finer than the wavelengths of light. By carefully designing the structure, it enables us to create a substance possessing properties that do not exist in nature. Working with metamaterials technology, this unit is pursuing the research and development of the next-generation optical and photonic technology that is indispensable to a safe and secure society. It seeks to extend the range of operational wavelengths from the deep ultraviolet region to the terahertz region, and to enable the detection of detrimental substances in foods and disease markers through the development of novel ultrasensitive spectroscopic devices.

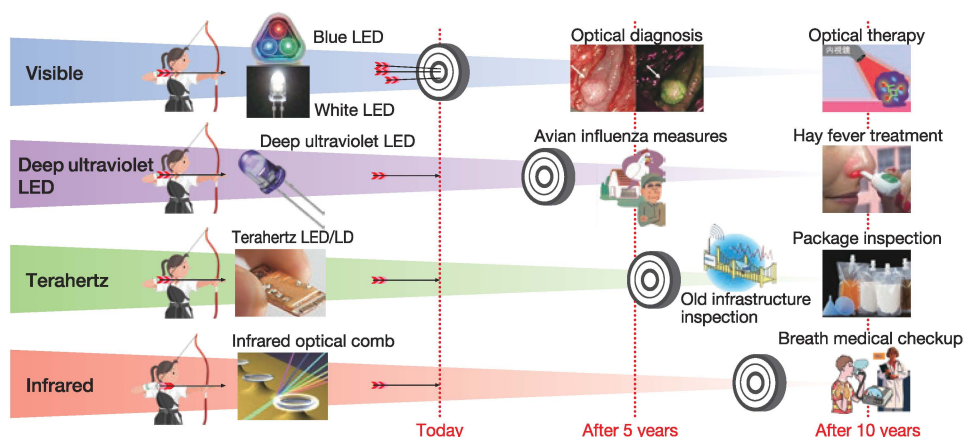


TANAKA Takuo
Chief Scientist, RIKEN
(The Institute of Physical and Chemical Research)

He obtained Ph.D. degree in Applied Physics from Osaka university in 1996, and he joined department of Electrical Engineering, faculty of Engineering Science, Osaka University as an assistant professor. In 2003, he moved to RIKEN as a research scientist in Nanophotonics Laboratory. He was promoted to associate chief scientist and established Metamaterials Laboratory in 2008. In 2014, he started another research team "Innovative Photon Manipulation Research Team". In 2017, he was promoted to chief scientist. In addition, he was appointed as a visiting professor in Saitama university from 2010, as a lecturer in Gakushuin university from 2012, as a visiting professor in national Tsing Hua university from 2017, and as a visiting professor in Tokushima university from 2019. His research background is three-dimensional microscopy. He developed two-photon reduction technique that enables to fabricate arbitrary 3D metal nano structures and this technique is known as ingenious technology of his group in this research community. He released the world's best research results regarding three-dimensional optical metamaterials.

Creating optical innovations (post-LED photonics)

- : Development of practical next-generation light sources
- ⊙ : Industrialization of new light sources and their application



Institute of Post-LED Photonics – Staff Members

Director	YASUI Takeshi
Vice Directors	YASUTOMO Koji HARAGUCHI Masanobu OKAUCHI Shigeki
Deputy Director	MATSUOKA Kaoru

Department of Post-LED Photonics Research

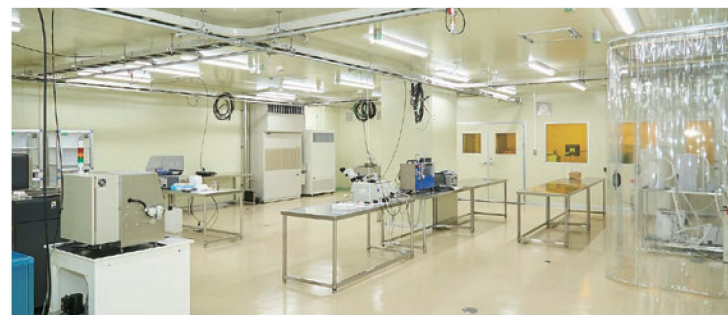
Distinguished Visiting Professor	HIRAYAMA Hideki	Associate Professor	SHIRAI Akihiro
Distinguished Visiting Professor / Professor of Tokushima University	MINOSHIMA Kaoru	Associate Professor	YAGISHITA Fumitoshi
Distinguished Visiting Professor	TANAKA Takuo	Associate Professor	YANAGIYA Shin-ichiro
Professor	FURUBE Akihiro	Designated Professor	KITADA Takahiro
Professor	NAOI Yoshiki	Designated Associate Professor	EMOTO Akira
Professor	NAGASE Masao	Designated Associate Professor	MINAMI Yasuo
Professor	SHISHIBORI Masami	Designated Associate Professor	YAMAGUCHI Kenzo
Professor	UEDA Takao	Designated Associate Professor	YOSHII Kazumichi
Associate Professor	KUSE Naoya	Designated Assistant Professor	HASE Eiji
Associate Professor	MINAMIKAWA Takeo	Designated Assistant Professor	MIZUNO Takahiro
Associate Professor	NAGAMATSU Kentaro	Designated Assistant Professor	TOKIZANE Yu
Associate Professor	OHNO Yasuhide	Designated Researcher	SUZUKI Akihiro
Associate Professor	OKAMOTO Toshihiro	Designated Researcher	YOSHIDA Hiroko
Associate Professor	YANO Takaaki	Designated Technical Staff	YAMANO Koji

Department of Interdisciplinary Researches for Medicine and Photonics

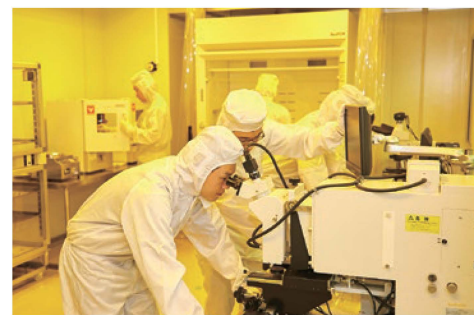
Professor	NAMBA Kosuke
Professor	TAKAYAMA Tetsuji
Professor	TSUNEYAMA Koichi
Associate Professor	SAKANE Ayuko
Associate Professor	TSUKUMO Shin-ichi
Designated Associate Professor	KAJISA Taira
Designated Associate Professor	TAKANARI Hiroki
Designated Assistant Professor	OTSUKA Kunihiro



Facilities and Equipment



Clean Room



Yellow Room



Grinder



Polisher



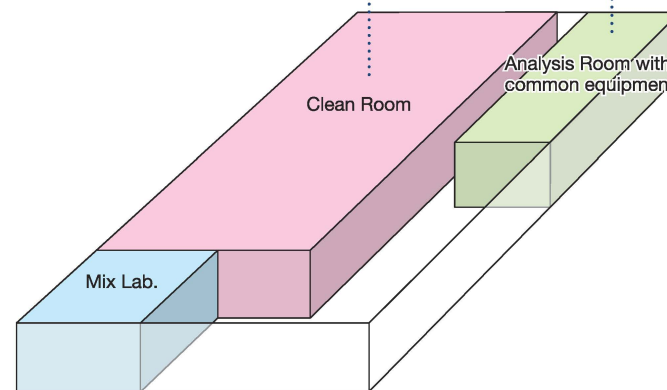
Spectrometer



Wire Bonder



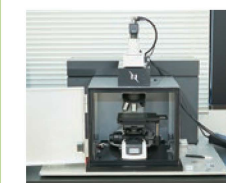
Contact Exposure Device



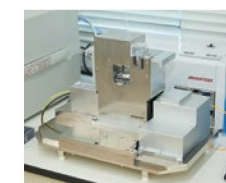
3F



Analysis Room with common equipment



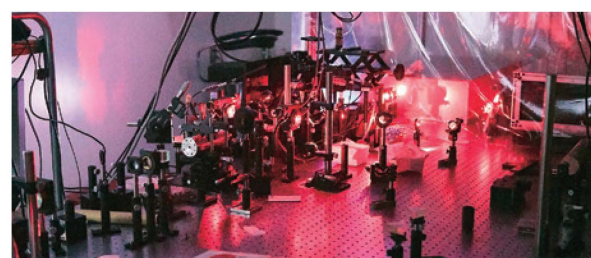
Raman microscope



Terahertz spectrometer



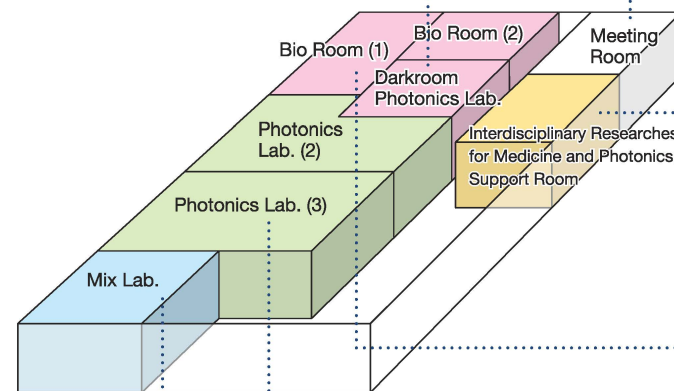
3D printer



Darkroom Photonics Lab.



Darkroom Photonics Lab., Bio Room (2)



2F



Interdisciplinary Researches for Medicine and Photonics; Support Room



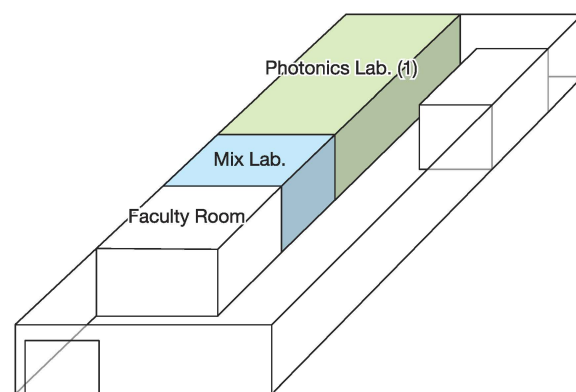
Meeting Room



Bio Room (1)



Photonics Lab. (2), Bio Room (1)



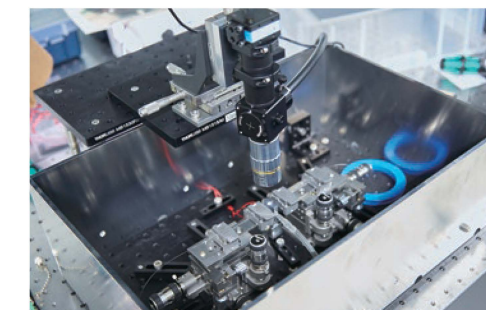
1F



Mix Lab.

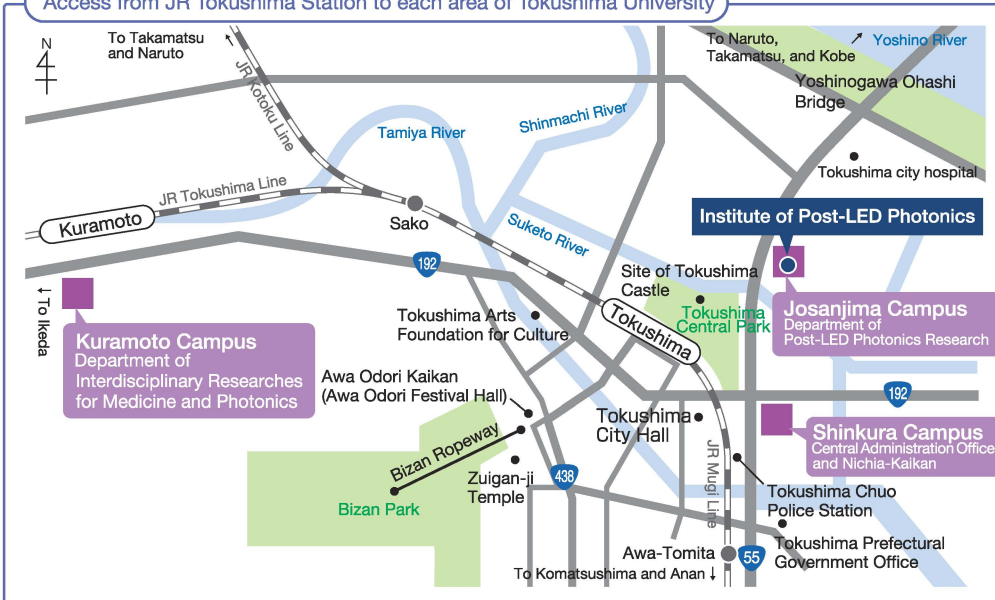


Photonics Lab. (3)



Micro-comb

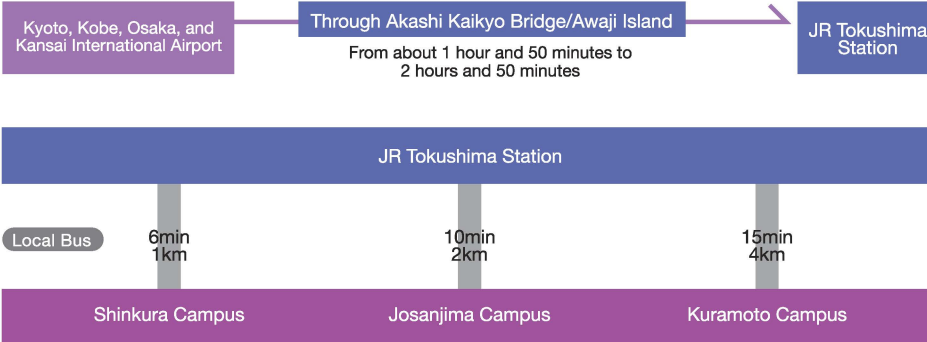
Access from JR Tokushima Station to each area of Tokushima University



Access to Tokushima by air



Access to Tokushima by bus



Institute of Post-LED Photonics, Tokushima University

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