Academic Year 2021 Waseda University
Graduate School of Sport Sciences
Contents of Research Themes and List of Subject Codes

The following is information **as of March 30, 2020**.

<Points to note>

1 **Contact your prospective supervisor, discuss your research interest and have your research proposal approved. Make an initial contact with the prospective supervisor by sending an e-mail to supoken-eng@list.waseda.jp. On the message, you should indicate the following information:**

1) The name of the area of specialization,
2) The type of program (Master's Program or Doctoral Program),
3) Your full name,
4) Your contact information (Address, phone number, e-mail address, etc.) and
5) Prospective supervisor's name

*Please attach your CV, and a document file (e.g. PPT, word) describing your research interest.

In some cases such as overseas business trip, we may not be able to contact the supervisor right away or the reply may be delayed. Please start consulting and confirming with the supervisor early on.

2 Enter the research guidance code in the application form without mistake by referring to the following pages.

<Reference: Waseda University Web Syllabus System (search page)>
https://www.wsl.waseda.jp/syllabus/JAA101.php?pLng=en

Research Area	Subject code [Master]	Subject code [Doctor]	Name of tutorial	Qualification	Name of supervisor
Sport Culture	—	M25	Culture of Sport	Professor	Kohei Kawashima
Sport Business	—	N30	Sport Organization	Professor	Seiichi Sakuno
	—	N35	Business Administration of Sport Organizations	Professor	Yasuaki Muto
	EN8	N26	Sport Management (Master) Sport Business Marketing (Doctoral)	Professor	Hirotaka Matsuoka
	EB0	—	Sport Management	Associate Professor	Shintaro Sato
Sports Medicine	—	P00	Exercise Immunology	Professor	Takao Akama
	—	P32	Health and Behavioral Sciences	Professor	Koichiro Oka
	—	P34	Sports and Exercise Medicine	Professor	Koji Kaneoka
	—	P36	Preventive Medicine	Professor	Katsuhiko Suzuki
	—	P38	Athletic Training	Professor	Norikazu Hirose
	EN0	P42	Muscle Biology (Master, Doctoral)	Professor	Takayuki Akimoto
	EN2	P44	Exercise Physiology (Master) Exercise Metabolism (Doctoral)	Associate Professor	Masashi Miyashita
	—	P46	Functional Anatomy for Orthopaedic Sports Medicine	Professor	Tsukasa Kumai
	—	P50	Health Education	Associate Professor	Kaori Ishii
	EN1	P54	Sleep Science	Associate Professor	Masaki Nishida
	ENS	P48	Sports epidemiology (Master, Doctoral)	Professor	Susumu Sawada
Exercise Science	EN5	Q05	Biomechanics (Master) Biodynamics (Doctoral)	Professor	Yasuo Kawakami
	EN7	Q30	Sports Psychology (Master, Doctoral)	Professor	Hiroaki Masaki
	EN6	Q38	Sport physiology & neuropsychology (Master, Doctoral)	Professor	Yudai Takarada
	EN3	Q42	Biomechanics (Master, Doctoral)	Professor	Toshimasa Yanai
	EB1	—	Active Aging	Associate Professor	Michael Annear
	EB2	—	Applied Health Science	Associate Professor	Daisuke Sugimoto
Coaching	—	R30	Coaching of Budo: Japanese Martial Arts	Professor	Misaki Iteya

Academic Year 2021 Waseda University
Graduate School of Sport Sciences Contents of Research Themes

Master's program

- Health and Exercise Science

The master's program with a specialization of health and exercise science is designed to help students develop a thorough understanding of the basic principles and comprehensive knowledge related to health and exercise science. Students will learn fundamental research skills in the topic of their choice within the field of specialization. Conducting their own research projects and submitting a master's thesis are required for completing the master's degree program.

Health and Exercise Science 1

By Akimoto, Sawada, Miyashita, Nishida, Annear

Health and exercise science is an interdisciplinary field of research/studies and the discipline of health and exercise science focuses on the integration of exercise/physical activity into health care, sports performance, disease prevention and rehabilitation. The primary focus of this course is promoting health and preventing and treating disease through healthy behaviors, emphasizing physical activity and nutrition.

Graduate students in this course will explore physiology, psychology, nutrition, metabolism, public health and physiological principles of exercise. We specifically focus on the following themes and instruct related research.

<Master's Thesis Advisor>

Subject code	Specialization	Qualification	Name
EN0	Muscle Biology	Professor	Takayuki Akimoto
ENS	Sports Epidemiology	Professor	Susumu Sawada
EN2	Exercise Physiology	Associate Professor	Masashi Miyashita
EN1	Sleep Science	Associate Professor	Masaki Nishida
EB1	Actrive Aging	Associate Professor	Michael Annear

Health and Exercise Science 2

By Kawakami, Masaki, Takarada, Yanai

The master's program with a specialization of health and exercise science focuses on the integration of exercise/physical activity into health care, sports performance, disease prevention and rehabilitation. In this directed research, graduate students will learn fundamental research skills directly from the experts who specialize in the field of exercise science, such as cognitive neuroscience, biodynamics, biomechanics, motor control, motor nerve physiology and sport psychology. The goal for all students enrolled in this

directed researches are to complete their own research proposal, conduct experiments and write a master's thesis to fulfill the requirement for the master's degree.

<Master's Thesis Advisor>

Subject code	Specialization	Qualification	Name
EN5	Biomechanics	Professor	Yasuo Kawakami
EN7	Sports psychology	Professor	Hiroaki Masaki
EN6	Sport physiology & neuropsychology	Professor	Yudai Takarada
EN3	Biomechanics	Professor	Toshimasa Yanai
EB2	Applied Health Science	Associate Professor	Daisuke Sugimoto

- Sport Management

Sport Management (Directed Research M) A/B

By Matsuoka, Sato

The master's program with a specialization of sport management focus on the effective management of sport organizations such as national and international sport governing bodies, professional sports leagues, teams and clubs. Students will acquire knowledge on various management elements related to sport such as Sport management, Sport marketing, Sport governance, Sport policy, Sport event and facility management, and Sport finance and economics. From these academic viewpoints, students will analyze sport phenomena, conduct their own academic as well as practical research projects and prepare a master's thesis which is required for completing the master's degree program.

<Master's Thesis Advisor>

Subject code	Specialization	Qualification	Name
EN8	Sports Marketing	Professor	Hirotaka Matsuoka
EB0	Sport Marketing	Associate Professor	Shintaro Sato

Each Professor's Research Topics

1. Sport Humanities and Pedagogy Research Area

Culture of Sport (Doctoral Program) - **Prof. Kohei Kawashima**
Degree: Doctor of Philosophy, Brown University
Research guidance contents: Based on methodologies of history of sport and anthropology of sport, my field of study covers the histories and contemporary societies of the United States and Japan. More specifically, I welcome projects that seek to investigate the meanings and roles of any or all of class, race/ethnicity, and/or gender identities for and through the foundation and development of modern sports in the United States and/or Japan during the early-modern and/or modern eras. I also welcome projects that target at the process of the spread of American ideologies and philosophies of sport, and/or specific games of sports, such as baseball, American football, basketball, and volleyball to Meiji, Taisho, Showa, Heisei, and Reiwa Japan, and their impacts over the thoughts and activities of athleticism in Japan.
Keywords: United States, class, race, ethnicity, gender, Japan, history, anthropology

2. Sport Business Research Area

Sport Organization (Doctoral Program) –**Prof. Seiichi Sakuno**

Field of specialization; major: management for physical education and sport, sport organization

Degree: Ph.D., Kanazawa University

Website: http://www.f.waseda.jp/sakuno/

Research guidance contents: The relationship between people and sports is not limited to “to play” and “to watch” but is wide-ranging including “to support” and “to read.” In addition, these relationships often involve some sort of organizations. In this research guidance course, we deepen the understanding of organizations as a framework for grasping and explaining diverse physical education and sport and carry out research on organizational management methods based on this. Furthermore, we aim to acquire basic knowledge as well as research and analysis methods (quantitative and qualitative) for driving forward research based on each student’s interest. Research themes include leadership, motivation, organization, and human resource management in management of various sports organizations and we grasp them primarily from the perspective of micro- to meso-level organizational theory. In addition, the course also offers guidance on a wide range of themes including volunteer management and collaboration between school sports and community sports (see the above website for details).

Keywords: sport organization, community sports, sport club, human resource management, management for physical education

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Business Administration of Sport Organizations (Doctoral Program) – **Prof. Yasuaki Muto**

Field of specialization; major: sports management; sports finance

Degree: Doctor (sport sciences), Waseda University

Website: http://muto-web.jp/

Research guidance contents: The world of sports business is a “treasure trove” of new research themes that are not (cannot be) handled in general business or management. The course covers business, management and sports business and sports management from the aspect of comparative analysis, and the students acquire expert knowledge. In addition, in this process the students who wish to go into business aim to develop ability to handle management in sports-related business. The students who wish to become researchers aim to develop new research fields and themes.

Keywords: management strategy for professional sports, management of non-profit organization, sports governance, sponsor marketing, corporate sports

Sport Business Marketing (Master's Program, Doctoral Program) – **Prof. Hirotaka Matsuoka**
Field of specialization; major: sport management, sport marketing, sport consumer behavior
Degree: Ph.D. (sport management), Ohio State University
Research guidance contents: Marketing is indispensable in business of sport organizations for both professional sports clubs and teams that sell "spectator sports" and clubs and associations that sell "participation sports." Sport marketing can be divided into "marketing of sport" that offers sports by efficiently producing them, and "marketing through sport" in which businesses implementing promotional activities by leveraging sports, and in both these cases utmost priority is placed on understanding the sport consumers (those who play or watch sports). The course focuses on understanding sport consumers' psychology and behavior, which is necessary for effective marketing in sport business sites and the students acquire research methods required for their interpretation. Research themes may include motivation of sport spectators, fans' commitment to a particular sport team, perception of service quality and satisfaction among sport participants and spectators, impact of sports club promotion and that of sports sponsorship.
Keywords: sport business, sport marketing, sport consumer, sport sponsorship

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Sport Business Marketing (Master's Program) – **Associate Prof. Shintaro Sato**
Field of specialization; major: consumer behavior in sport, tourism, & entertainment; sport management
Degree: Ph.D. (sport management), University of Florida
Research guidance contents: Do we really know what kinds of experiences can make consumers happy? Why do some businesses succeed while others do not? How can sport and entertainment products contribute to city and community development? To answer these questions, our lab takes a multi-disciplinary approach (e.g., psychology, strategic management, economics) to conduct various research in sport, tourism, and entertainment contexts. The mission of our lab is to provide scientific evidence that can help various stakeholders' decision-making processes, including cities and government, companies, and consumers. Members of our lab are highly expected to (1) deliver academic presentations at recognized conferences and (2) publish scientific papers in peer-reviewed journals during the program.
Keywords: sport management, consumer behavior in sport, tourism and entertainment

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3. Sport Medicine Research Area

Exercise Immunology (Doctoral Program) – **Prof. Takao Akama**

Field of specialization; major: sports immunology, sports medicine, anti-doping

Degree: M.D., Ph.D. in medical science, Tsukuba University

Website: http://www.f.waseda.jp/takao-akama/top.html

Research guidance contents: We study changes in immune functions caused by exercises and their applications. We consider the mechanism of the changes in immune functions caused by exercises and verify that moderate exercises boost immune functions. Specific research themes include (1) exercise prescription for boosting immune functions of senior citizens whose functions have deteriorated due to ageing, (2) measurement of changes in athletes' immune functions due to training and its application in their conditioning, and (3) investigation of mechanism of immune function deterioration following exercises and study measures to prevent the deterioration. Moreover, anti-doping, an important issue in athletes' conditioning is covered as a research theme.

Keywords: immunity, fitness for protection, ageing, conditioning, cell, protein, anti-doping

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Health and Behavioral Science Research Guidance (Doctoral Program) – **Prof. Koichiro Oka**

Field of specialization; major: health and behavioral science; behavioral epidemiology

Degree: doctor (human sciences), Waseda University

Website: http://www.f.waseda.jp/koka/index.html

Research guidance contents: the course offers guidance for research on lifestyle improvement, especially, making a habit of physical activities and exercises and improvement of sedentary behaviours. Specifically, (1) development of lifestyle modificationprogram based on behavioral theory (physical activities and sedentary behaviours), (2) research on promotion of health information utilizing health communication, (3) development of a program for long-term care preventionfor the elderly (strengthtraining, aqua exercise, prevention of dementia, etc.), (4) application of cognitive behavioral therapy for senior citizens' self-management of knee and back pains, (5) exercise programaimed at improving health-related QOL amongcardiac rehabilitation patients, (6) research onenvironment improvement for supporting physical activities inchildren and youth, and (7) research regarding mental support for athletes based on cognitive behavioral therapy. The course supports the students so that they will learn the perspective and specific methods of behavioral science-based approach that is useful in practice of health promotion through health care, welfare, medical/nursing/rehabilitation, school education and sports instructions.

Keywords: behavior modification, sedentary behaviour, cancerprevention, dog walking, long-term care prevention, musculoskeletal disorders , exercise therapy, cognitive behavioral therapy, mental health, children and youth, physical activity support environment

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Sports and Exercise Medicine (Doctoral Program) – **Prof. Koji Kaneoka**
Field of specialization; major: sports medicine; orthopedics, biomechanics
Degree: Ph.D. in medical science, Tsukuba University
Research guidance contents: The course clarifies pathogenesis of spine disorder among athletes such as back pain and intervertebral disc disorder as well as spine injuries using methods such as epidemiological research, biomechanical analysis, and electromyographic analysis. Using the outcome, we will come up with methods to prevent disorders and injuries that are based more on scientific facts, implement them in practice, and assess their effects in search of more effective preventative measures. Moreover, we will develop exercise therapy for a wider range of patients, not limited to athletes, with spine disorders represented by back pain using the knowledge gained in this process and practice them.
Keywords: back pain, cervical spine injury, traumatism mechanism, disability prevention, impact biomechanics, exercise therapy

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Preventive Medicine (Doctoral Program) – **Prof. Katsuhiko Suzuki**
Field of specialization; major: Applied physiology, Internal medicine,Immunology
Degree: M.D., Ph.D (Medical sciences), Hirosaki University
Website: http://www.f.waseda.jp/katsu.suzu/english
Research guidance contents: We study methodology on analyses and assessments of physical stress and tissue damage due to exhaustive exercise and training together with their preventive countermeasures such as nutrition, supplementation, rehydration and alternative medicine. Specifically, host defense mechanisms such as leukocyte functions, stress hormone and cytokine dynamics, oxidative stress responses, and skeletal muscle and other organ damage/recovery are analyzed in relation with exercise and training. Also, pathological process and prevention of lifestyle-related disease and aging are studied by human and animal studies. Students are required for some experiences of biological and chemical experiments, statistical analyses and presentation skills so that they can acquire advanced methods and techniques of medical and life sciences-based approach for research activities.
Keywords: exercise, leukocyte, cytokine, inflammation, oxidative stress, aging, lifestyle-related disease

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Athletic Training (Doctoral Program) – **Prof. Norikazu Hirose**

Field of specialization; major: athletic training, conditioning, athletic injury prevention, talent identification and development

Degree: Ph.D., University of Tokyo

The Evidence Based Research in Athletic Training course introduces the research process in athletic training with an emphasis on evidence-based practice. This course will focus on research associated with prevention and reconditioning of common athletic injuries. Additionally, the course will explore strength and conditioning research. Ongoing projects include treatment of skeletal muscle and myofascial injuries, role of neuromuscular control in lower extremity injuries, conditioning strategy in hot environment and development of effective fitness training for soccer players. The course will involve a multidisciplinary approach, incorporating scientific (research) and practical application based on clinical studies.

Keywords: athletic training, prevention of sports injuries, conditioning, football (soccer)

Muscle Biology (Master's Program, Doctoral Program) – **Prof. Takayuki Akimoto**

Degree: Ph.D. in medical science, University of Tsukuba

Study on the mechanism of muscle plasticity by mechanical stress.

The main research topics of the current laboratory are (1) plastic mechanism of skeletal muscle tissue by mechanical stress, (2) The molecular mechanism by which skeletal muscle receives mechanical stress, and (3) the development of in vitro construction of skeletal muscle tissue.

For graduate students, I would like to train you to be a scientist to be able to set autonomous subject that you are willing to explore, conduct experiments, analyze data, write and publish papers, and obtain research funding.

Keywords: Molecular & Cellular Biology, Reverse Genetics, Biotechnology, Transcriptional Regulation, Post-transcriptional Regulation, Vision, Hard-work, Team-work

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Exercise Metabolism (Master's Program, Doctoral Program)－**Associate Prof. Masashi Miyashita**
Field of specialization; major: Exercise Physiology, Human Metabolism, Exercise Nutrition, Applied Health Science
Degree: Ph.D., Loughborough University, United Kingdom
http://www.f.waseda.jp/m.miyashita/en/index.html
Research guidance contents:
My research interests are in the physiology and nutrition of physical activity (exercise/sports and daily activities) and public health with an interest in both the basic science of physical activity and the applied aspects that relate to health in physical activity. Much of my work has examined the effects of physical activity on risk factors for cardiovascular disease. A major focus of my research has concerned the effects of physical activity on fat (triacylglycerol) metabolism after meals in humans. More recently my activities have expanded to include work on physical activity and appetite regulation, physical activity and atherogenic lipids/inflammatory markers, nutrition and exercise performance, and recovery science in humans. I also have an established network with my domestic and international collaborators for conducting cutting-edge research on physical activity and health.
Keywords: postprandial metabolism, appetite regulation, exercise performance, public health

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Functional Anatomy for Orthopaedic Sports Medicine (Doctoral Program) – **Prof. Tsukasa Kumai**
Field of specialization; major: Sports Medicine; Functional Anatomy; Orthopedic Foot & Ankle Surgery; Dance Medicine; Cycling Medicine
Degree: Ph.D. in medical science, Nara Medical University
Research guidance contents: Musculoskeletal overuse injury may be a great trouble to cause athletes not only performance loss but also carrier ending. Understanding pathomechanics from a point of view of functional anatomy is essential to provide proper treatments and prevention strategies to the injuries. Aim of this course is to establish an idea for athletes to help prevent injuries and return earlier to play. Our laboratory will give opportunities of biomechanical analysis, electromyography, ultrasound technique, cadaver dissection.
The main research interests of our lab are (1) anatomical evidences for sports specific motions and disorders, (2) the morphology and repair process of tendon-bone junction (enthesis biology), (3) the morphology and function of heel fat pad, (4) soft-tissue elasticity by shear wave elastography, (5) echo-guided intervention and surgery, (6) extracorporeal shock wave therapy.
Keywords: functional anatomy, tendinopathy, overuse injury, minimally invasive treatment

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Health Education(Doctoral Program) – **Associate Prof. Kaori Ishii**
Field of specialization; major: growth and development, health education
Degree: doctor (medicine), Tokyo Medical University
Website:
Research guidance contents: one of Japan's most important issues is the maintenance and improvement of lifelong physical and psychological health. Therefore, it is crucial to develop effective measures for acquiring a healthy lifestyle. In order to increase healthy lifestyles, it is necessary to understand the health behaviors of the population and how these behaviors can affect physical and psychological health, identify the factors related to these health behaviors, and establish and promote an approach method. The course is concerned with health promotion in the field of health education (particularly physical activities and sedentary behaviors). The main theme of this course is applying various theories of health education, elucidating factors which are related to the promotion of physical activities and the decrease of sitting activities in each stage of life, from childhood to old age, and discussing methods to promote these activities. The course aimed to assess the health promotion needs of the population, scientifically identify solutions, and determine specific methods that can be utilized in the health education setting.
Keywords: health behavior, growth and development, behavioral science

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Sleep Science (Master's Program, Doctoral Program) – **Associate Prof. Masaki Nishida**
Field of specialization; major: sleep science, sports psychiatry, sleep medicine
Degree: M.D., Ph.D. in medical science, Tokyo Medical and Dental University
Website: http://www. waseda.jp/prj-nishida/

Research guidance contents:
"Sleep" is one third of our lifetime, which means sleep is essential for human health. Physical activity such as sports or exercise plays a key role for regulating human sleep. The course demonstrates basic scientific knowledge on human sleep and circadian rhythm, closely associating with mental health *vice versa*. Based on the fundamental knowledge, the course aims to develop sleep science to performance enhancement and mental health for athletes. Specific research themes include (1) effect of physical exercise on sleep and circadian rhythm (2) optimization of duration and timing of sleep for elite athletes to enhance performance (3) investigation of human sleep by electrophysiological apparatus (electroencephalography) as well as recently developing wearable devise (actigraphy) .Moreover, sleep disorders and mental health issues commonly observed among athletes are covered as a research theme.
Keywords: sleep, circadian rhythm, actigraphy, electroencephalography, sleep disorder

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Sports epidemiology (Master's Program, Doctoral Program) – **Prof. Susumu Sawada**

Field of specialization: sports epidemiology, physical activity epidemiology, public health

Degree: Ph.D. in medicine, Juntendo University

Research guidance contents:

Sports epidemiology provides scientific evidence to society to solve the issues of preventive medicine, public health, and several sports fields.

· For master program, doctoral program [first half]

Our team will support you as follows, 1) setting appropriate research theme 2) finding relevant papers related to the theme 3) critical appraisal of related papers 4) making an appropriate study design to solve the research question 5) implementation of the study 6) appropriate analysis of the data 7) appropriate interpretation of the results 8) writing of master thesis.

Through these processes, we will support the master program students to become experts who contribute to society by utilizing scientific evidence. Also, we will support the building of the basic ability to proceed to the second half of the program for doctoral students.

· For doctoral program [second half]

Our team will support you as follows, 1) setting research theme, that's necessary to solve in society 2) making high quality study design to solve the research theme 3) implementation of the study using appropriate methods, also appropriate analysis and interpretation of the results 4) providing a research environment for cooperating with internationally renowned researchers to create high quality papers.

Through these processes, we will support the building of the ability to solve the problem in preventive medicine, public health, and several sports fields.

Active and Healthy Aging (Master's Program) – **Associate Prof. Michael Annear**

Field of specialization; major: Active and healthy aging, physical activity epidemiology, environmental/urban health.

Degree: PhD in Medicine, University of Otago, New Zealand.

Websites: https://www.michaelannear.com/
https://www.waseda.jp/healthpromotion/members/197/

Research guidance contents: Dr Annear is available to support and supervise graduate students with an interest in human life course issues (e.g. population aging, transitions to retirement, and longevity promotion). Dr Annear's particular expertise is in the areas of physical activity research and urban health as related to middle-aged and older adults. Students who are interested in these areas may be concerned with the following questions:

- How do urban environmental conditions support or constrain physical activity behaviors among different age groups?
- How do health interventions or major sports events affect population physical activity over short or long time periods?
- How do environmental, social, or cultural elements of Japan contribute to experiences of active and healthy aging relative to other countries or cohorts?

Dr Annear can support thesis students who plan to research and publish in English in the following ways: 1) Expertise across both quantitative and qualitative research methods and designs (including mixed method approaches), 2) Familiarity and teaching experience with advanced statistics and scale design and validation, 3) Significant experience of international publication in high-impact English-language journals, 4) International networks and research collaborations, which can provide students with a global context for their work. Please contact me via email if you have any questions (annear@aoni.waseda.jp).

Keywords: Population aging, environmental health, physical activity interventions, mixed methods, Social Ecological Model of health, preventive medicine, pragmatic research.

Applied Health Science (Master's program) – **Associate Prof. Daisuke Sugimoto**
Field of specialization; athletic training, rehabilitation, sports medicine
Degree: PhD in rehabilitation science, University of Kentucky, USA, Post-doctoral, Boston Children's Hospital, USA
Research guidance contents: My job is to help you identify an appropriate line of research in applied health science field, especially among children and adolescent populations in area of sports medicine. I will help you to learn what has been done based on documented literature and develop a logical research question. Then, I can help you to find a feasible research method to answer the research question. Precisely, I can be your help if you are interested in following areas: 1) assessment of exercise and performance data, 2) comparison of athletic injuries (example, children vs. adolescents, and/or female vs. male), 3) investigation of injury mechanism (how certain injury happens), 4) identification of risk factor(s) (factors that lead to particular injury), 5) development of a preventive intervention (a method to reduce specific injury), and 6) implementation and adherence of preventive initiative. I hope you will learn valuable lessons in this process.
Key words: injury prevention, risk factors, pediatrics, children, adolescents, females

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4. Exercise Science Research Area

Biodynamics (Master's Program, Doctoral Program) – **Prof. Yasuo Kawakami**
Field of specialization; major: exercise physiology; biomechanics
Degree: Ph.D., (pedagogy), University of Tokyo
Website: http://www.f.waseda.jp/ykawa/index.htm
Research guidance contents: 1) The course carries out in vivo measurement of the morphological and functional features of human skeletal muscles as the source of various movements. In addition, we will carry out research on non-invasive visualization of contracting skeletal muscles and their quantification by using image analysis such as ultrasound and MRI, as well as biomedical analysis using dynamometer, electromyogram under voluntary and evoked contractions. Dynamic contractions of skeletal muscles are quantified to search for the factors limiting the performance of physical activities and sports. We will further discuss the changes in the muscle that occur due to training, physical inactivity, growth, ageing and fatigue. 2) Morphological characteristics and composition of the human body are evaluated using MRI and 3-dimentional photonic scanning methods, to investigate the limiting factors to fitness and exercise performance, and the impacts of growth and ageing, and effectiveness of training. Presently, research under the following three themes is in progress: 1) skeletal muscle mechanics, 2) individual variability and adaptability of musculotendinous characteristics, and 3) exercise performance enhancement. See the lab website for specific projects.
Keywords: muscle fibers, tendinous tissue, fascial structure, ultrasound, MRI, biological signal & image analysis, biometrics, sports performance

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Sport Psychology (Master's Program, Doctoral Program) – **Prof. Hiroaki Masaki**
Field of specialization; major: sport psychology, exercise psychology, cognitive neuroscience, psychophysiology
Degree: Doctor (human sciences), Waseda University
Website: http://www.waseda.jp/sem-masaki/
Research supervision contents: The aim of this research supervision is to clarify the cognitive and affective functions associated with sport behaviors by applying psychophysiological methodology (e.g., electroencephalogram, event-related potentials, functional MRI, and eye tracking measurements). The underlying mechanisms of motor learning, choking under pressure during a big game, the beneficial effect of exercise on cognitive functions, and performance monitoring are investigated. For example, when an on-going movement deviates from the aimed (desired) movement, our brain detects the error and corrects it. We refer to this as performance monitoring. We can investigate these processes by recording event-related potentials.
Keywords: electroencephalogram, event-related potentials (ERPs), fMRI, eye tracker, motor learning, performance monitoring

Biomechanics (Master's Program, Doctoral Program) – **Prof. Toshimasa Yanai**
Field of specialization; major: biomechanics; sports injuries, performance analytics
Degree: Ph.D., University of Iowa
Website: http://researchers.waseda.jp/profile/en.ca21c8ec285c59a4a979d480589253e7.html
Research guidance contents: This course offers research guidance on biomechanics analysis of sports techniques and performance analytics of selected sports, aiming to help performers improve their techniques and minimize the risk of injuries. In biomechanics analysis, we measure various forces, such as ground reaction force, impact force, fluid force etc., to understand the physical load applied to athlete's body and capture the linear and angular motions of the body to describe the skills of sports performances. In performance analytics, we use various information technologies for gathering and analyzing big-data on baseball and golf to provide objective, valid and reliable observations of the performances. Using the outcome of these analyses and the laws of physics, we evaluate adequacy of the technique for each athlete, identify factors limiting their performance, find biomechanical risk of athletic injuries, and provide the athlete with specific guidelines to overcome the shortcomings.
Keywords: kinematics, kinetics, musculoskeletal injury, Newton mechanics, videography

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Sport physiology & neuropsychology (Master's Program, Doctoral Program) – **Prof. Yudai Takarada**
Field of specialization; major: Human Physiology (exercise), Cognitive Neuroscience (motivation)
Degree: Doctor (Multidisciplinary Sciences), University of Tokyo
Website: http://researchers.waseda.jp/profile/en.2a4c95e8182a613cb97bfd1b7340fabc.html
Research guidance contents: 1) Motor actions are typically consciously controlled and managed. However, some situations require unconscious decision-making processes. Indeed, healthy individuals sometimes pursue motor goals unconsciously, and when accompanied by a positive reward signal, this can enhance motivation to produce faster and stronger actions, independently of any reported increase in motivation to attain goals. We investigate the mechanism by which the unconscious goal-priming with reward produces more forceful voluntary motor action with the enhancement of the motor system state by using the affective-motivational priming paradigm and the following techniques. 2) Low-intensity resistance exercise combined with vascular occlusion ("KAATU") enhances endocrine response and motor system state, the training of which induces a marked hypertrophy and concomitant increase in strength, even if the exercise load is much lower than that expected to induce muscular hypertrophy. We investigate the acute and long-term effects of the occlusive exercise on physiological and neuroscience-related variables, muscular function, and sport performance. 3) We try to develop a new training method on the basis of scientific findings obtained by the above 1) and 2). [Techniques: electrical measurements, pupillometry, TMS, (f)MRI]
Keywords: motor system, implicit learning, unconscious goal pursuit, effort-related motivation, resistance training, vascular occlusion, muscular hypertrophy, maximal volitional force

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5. Sport Coaching Research Area

Coaching of Budo: Japanese Martial Arts – **Prof. Misaki Iteya**
Field of specialization; major: Sports science and Coaching
Degree: Ph.D., Tsukuba University
Research guidance contents: In the martial arts including Judo, the traditional practice is inherited, however recently is executed the physical, skill, and tactics training to improve competition ability. Interestingly, a person can use the power of the opponent in martial arts. There are special body movements or manipulations, which do not use in other sports and daily activities. We study to measure the special physical strength and analyze the movement of skill, thereby clarifying the efficiency of skills in top athletes. Research topics are 1) measurement the special strength during technique, 2) clarification of the mechanism of skills in experts, 3) development of the coaching method.
Keywords: Martial arts, Budo, Judo, Coaching
